International Association for Dental Research
Southeast Asian Division

SingHealth DukeNUS
ACADEMIC MEDICAL CENTRE
ORAL HEALTH

Joint 37th IADR-SEA Annual Scientific Meeting and 2nd International Oral Health Symposium

22-25 November 2023, Singapore

PROGRAMME & ABSTRACTS

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Prof May Chun Mei Wong
President of IADR SEA Division (2021-23)

Dear friends and colleagues,

On behalf of the International Association of Dental Research Southeast Asian Division (IADR-SEA), we warmly welcome all attendees to the Joint 37th Annual Scientific Meeting of the IADR-SEA Division and the 2nd International Oral Health Symposium. This highly anticipated event will take place in the beautiful city of Singapore from November 22nd to November 25th, 2023.

This year's gathering holds particular significance as it marks the first face-to-face meeting since the onset of the COVID-19 pandemic. We extend our heartfelt appreciation to our local organizers, the Oral Health Academic Clinical Programme at Duke-NUS Medical School and the National Dental Centre Singapore, for their dedicated efforts in creating an engaging and diverse program, which includes enlightening plenary lectures and discussions, thought-provoking symposia and workshops, as well as Lunch and Learn with Experts sessions.

Under the theme of 'Applying Oral Research Excellence to Advocate Oral Health for All', we are excited to provide a platform for multidisciplinary collaboration and innovation. A unique opportunity for oral health researchers from the IADR-SEA Division to reconnect with colleagues, establish new collaborative networks, and foster partnerships with esteemed scientists and researchers in Southeast Asian countries, Australia, Japan, and Sweden in improving oral health care for all.

We would like to thank you for your unwavering support which has contributed to the success of this meeting. In addition to the invited presentations, we are proud to showcase over 200 scientific oral and poster presentations, where academics, researchers, practitioners, and research students will present their exciting research. We will also be recognizing outstanding research through the presentation of prestigious research awards.

We eagerly anticipate your presence in Singapore and are committed to providing you with an enriching and memorable experience at the Joint 37th IADR-SEA Division Annual Scientific Meeting and the 2nd International Oral Health Symposium.

Thank you, and we look forward to meeting you in person in Singapore!

CEO WELCOME MESSAGE

CI A/Prof Goh Bee Tin
Chief Executive Officer
National Dental Centre Singapore
Member Representative, International Oral Health Consortium

Dear delegates, partners, and friends

It is my great pleasure and privilege to welcome you to the Joint 37th Annual Scientific Meeting of the International Association for Dental Research SEA Division (IADR-SEA) and the 2nd International Oral Health Symposium (IOHS).

This is Southeast Asia's largest Scientific Dental Meeting and National Dental Research Institute Singapore (NDRIS), the research arm of National Dental Centre Singapore (NDCS), is honoured to host this event in Singapore for the first time. The institute is part of the International Oral Health Consortium which organises the annual IOHS and comprises member universities – University of Hong Kong, Karolinska Institute, Sweden, University of Melbourne, Australia, National Technological University, Singapore and Tohoku University, Japan.

The theme this year is, "Applying Oral Research Excellence to Advocate Oral Health for All". With this convening of the brightest scientific minds from around the world, we seek to advocate a future where oral health is essential to health and quality of life. Through impactful oral research, we aim to improve health outcomes amongst our population in ASEAN.

Thank you once again for your support and for being part of this Meeting. I look forward to four days of vibrant knowledge sharing, dynamic discussions, and ground-breaking ideas with opportunities for in-depth connections and collaborations together.

I wish you a fruitful and enjoyable time here in our SingHealth Campus and in our beautiful Garden City.

National Dental Centre Singapore (NDCS) is a member of SingHealth, the largest public healthcare group in Singapore with a network of acute hospitals, national specialty centres and community hospitals

WELCOME MESSAGE
Clinical Associate Professor Christina Sim
Chairperson, Organising Committee

Dear colleagues and friends

Greetings and welcome to Singapore!

On behalf of the Local Organising Committee, we warmly welcome all delegates and guests to the Joint 37th International Association for Dental Research South East Asian Division (IADR-SEA) Annual Scientific Meeting and the 2nd International Oral Health Symposium (IOHS).

With the theme 'Applying Oral Research Excellence to Advocate Oral Health for All', this highly anticipated conference brings together dedicated and passionate researchers from the IADR-SEA Division and the International Oral Health Consortium. The Organising Committee has curated an engaging and enriching programme delivered by a faculty of more than 60 esteemed speakers who are experts in their respective fields to deliver three plenary lectures, eight workshops, nine symposia and nine Lunch & Learn with the Experts sessions. There will be three sponsored symposia and more than 200 oral and poster presentations showcasing the latest research work of academics, researchers and students. A preview of the Community Dentistry and Oral Epidemiology Special Issue on 'Singapore Oral Health' adds to the diversity of the programme offerings. The response to the nine research competition awards has been tremendous and we thank the award sponsors for their support.

A conference with global participation is not complete without the social activities which create opportunities for networking, reconnecting with friends and fostering new friendships. The Welcome Reception and Conference Banquet completes each conference day with evenings of fun and relaxation. The highlight is undoubtedly the cultural exchange programme, a tradition where each country presents their unique culture, fostering cross-cultural understanding and meaningful connections, which is crucial in today's interconnected world.

To put together a conference of such magnitude is not an easy task. I want to personally thank the Local Organising Committee for their invaluable time and effort. We are grateful for the generous support and contribution from our invited speakers and sponsors. We also thank the conference delegates who have come from many parts of the world. Your presence makes all our efforts in organising this Conference worthwhile. Do join us in this conference where we will reflect upon and celebrate our past accomplishments, seek new insights, renew friendships and forge new collaborative networks.

See you at the conference!

LOCAL ORGANISING COMMITTEE MEMBERS
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SWEDEN

INVITED SPEAKERS

INVITED SPEAKERS

Alastair J Sloan

Head of School

Melbourne Dental School,
The University of Melbourne

AUSTRALIA

Alastair Sloan is Professor of Tissue Engineering and Dental Biology and the current Head of School (Dean) of Melbourne Dental School. An applied bioscientist, he obtained his BSc in Biomedical Sciences from the University of Wales in 1993 and his PhD in Oral Biology and Pathology from Faculty of Medicine and Dentistry at The University of Birmingham, UK in 1997. He was Head of the Department of Oral and Biomedical Sciences at the School of Dentistry between 2010-2015, Director of International (2012-2015) and Director of Research (2015-2017). Between 2015-2017 he was Director of the Cardiff Institute for Tissue Engineering and Repair (CITER), a cross-University research centre. He was appointed Dean of the School of Dentistry at Cardiff University in 2017, a post which he held until January 2020 when he relocated to The University of Melbourne. He is a Fellow of the Higher Education Academy and a Fellow of the Royal Society of Biology (FRSB). In 2020 he was elected Honorary Fellow of the International College of Dentists (FICD) and in 2022 was awarded an Ad Eundem Fellowship of the Faculty of Dentistry, Royal College of Surgeons Ireland (FFDRCSI). As an active educator, Alastair has developed curricula and programmes for BDS and BSc degree programmes alongside MSc programmes in tissue engineering. He developed and took through validation the MSc in Oral Biology at Cardiff University and has acted as external examiner for numerous Faculties and Schools globally. As a researcher he has been awarded in excess of AUD$10M of external grant funding and published over 90 peer reviewed papers. He currently sits as a research funding panel member for the EU (Eureka Eurostars panel) and Research Foundation Flanders Med-8 Panel having previously been a member of the UK NC3Rs grant assessment panel. He chairs the Nominations Committee of the International Association for Dental Research (IADR) and is a Past President of the Pulp Biology and Regeneration Group of the IADR. In 2022 he was awarded the IADR Distinguished Scientist Award, The Isaac Schour Memorial Award, for his research in anatomical sciences and tissue engineering.

Laureate Prof Eric C. Reynolds

Laureate Professor

Oral Health CRC,
Melbourne Dental School,
The University of Melbourne

AUSTRALIA

Laureate Professor Eric Reynolds AO is Chief Executive Officer and Research Director of the Oral Health Research Centre at the Melbourne Dental School, the University of Melbourne. For 16 years until 2015 Eric was Head of the Melbourne Dental School. He has lectured and published extensively and has chaired and participated in a wide range of professional committees and panels. He has over 400 scientific papers, 15 book chapters and 34 patents. High impact journals include Nature, Nature Microbiology, Science Advances and others. His current H-index is 98 with 33,908 citations. Eric has supervised over 70 BSc(Hons), BDentStud, MDSc, DClinDent and PhD students to completion. He established the Australian Centre for Oral Health Research in 2003 which is now an internationally recognized research centre focusing on the major oral diseases. He has attracted over $120 million in research funding with $21.2 million from 2020 to 2023 as Chief Investigator. Eric was appointed an Officer of the Order of Australia for his service to community dental health in 2005. He received the Clunies Ross National Science and Technology award in 2002 and the Victoria Prize for Science in 2005. In 2011 he received the Distinguished Scientist Award from the International Association for Dental Research, and in 2015 the Leach Medal for research excellence and the Global Health Impact Award from the University of Melbourne. In 2016, he received the Award of Merit from the Australian Dental Association and in 2017 the Prime Minister's Prize for Science Innovation. In 2019 he was elected Vice-President of the International Association for Dental Research and became President in July 2021. In 2020 he received the European Organisation for Caries Research Prize for outstanding scientific contribution and the American Academy of Periodontology Clinical Research Award.

Leanne Teoh

Lecturer of
Dental Therapeutics

Melbourne Dental School,
The University of Melbourne

AUSTRALIA

Dr Leanne Teoh is a dentist and registered pharmacist, Lecturer of Dental Therapeutics and an early career postdoctoral researcher at the Melbourne Dental School, University of Melbourne. Her research interest is on various aspects of medicine use in dentistry and dental prescribing practices, with a focus on dental antibiotic and opioid stewardship. She is a lecturer and coordinator for the Dental Therapeutics program for the Doctor of Dental Surgery and Bachelor of Oral Hygiene courses at the University of Melbourne.

She co-authored the Australian national dental prescribing guidelines, Therapeutic Guidelines Oral and Dental Version 2, is on the editorial board for the journal BMC Oral Health, and is Vice President of the Australian Dental Association Therapeutics Committee.

As an invited speaker, Leanne has presented both locally and internationally in various forums, including the Australian Government Therapeutic Goods Administration, FDI World Dental Federation and International Association for Dental Research. She has also been a guest on the "Dental Central" and "Purple Pen" podcasts, highlighting the use of therapeutics in dental practice.

Leanne has received several awards and scholarships, including the Rowden White Scholarship, International College of Dentists Community Oral Health Award for 2018, and the Ernest Joske Award in 2020 at Melbourne Dental School for research impact and publications. She is a founding member of the Global Antimicrobial Resistance Dental Network for the FDI World Dental Federation.

Rita Hardiman

Melbourne Dental School,
The University of Melbourne

AUSTRALIA

Dr Rita Hardiman is a learning and teaching specialist at the Melbourne Dental School. She leads the education programs in anatomy (head/neck and oral) for undergraduate and graduate students. Dr Hardiman's educational interest is the use of 3D imaging and modelling technologies to enhance object-based learning in anatomy. Dr Hardiman uses virtual models and 3D printed models created from authentic anatomical specimens to create flexible and student-focussed learning and teaching activities. Virtual models created as part of Dr Hardiman's work have been adopted in a diverse range of educational programs internationally (including outside dentistry and oral health).

Dr Hardiman's research in mineralised tissues interconnects with her teaching and learning initiatives to support innovations in dental education.

Roy Judge

Director of International Head of Prosthodontics

Melbourne Dental School, The University of Melbourne

AUSTRALIA

Roy is an Associate Professor at the Melbourne Dental School. His current roles at the school include:

- Head of Prosthodontics
- Director of International

Roy has spoken throughout Australia and overseas in regards to provision of implant dentistry, implant complications and the mechanical properties of bone around implants and teeth. His PhD was related to this research topic and has flowed on to several research projects carried out by graduate diploma, DCD, MPhil, MSc and PhD students.

Roy is the chief investigator for the eviDent practice based research project entitled "Implant Complications in Practice". This research project has gained support from external societies namely the Australian Prosthodontic Society, The Australian Osseointegration Society and the Australian Periodontal Society. Several papers have been published from this research project in national and international peer reviewed papers Roy is the research lead for the new dental implant being developed at the University of Melbourne, he maintains a part time specialist referral practice in Northwest Melbourne.

Stuart Dashper

Professor of Oral Microbiology

Melbourne Dental School, The University of Melbourne

AUSTRALIA

Stuart Dashper is the Professor of Oral Microbiology and Director of Research in the Melbourne Dental School at the University of Melbourne. He was awarded his PhD in 1991 and is an author on over 120 research publications. The majority of his current research fits under the umbrella of determining the causes of microbiome-mediated oral diseases, particularly periodontal diseases and dental caries. He is particularly interested in the polymicrobial nature of disease and has added to our knowledge of how bacteria interact and cooperate to cause disease. This research has involved the development of novel methodologies for the culture of oral anaerobic bacteria as polymicrobial biofilms. In recent time he has led an Oral Microbiomics Group to apply DNA-based technologies to investigate oral dysbiotic disease. He has contributed to knowledge about the role of oral bacteria in extra-oral disease, notably Alzheimer's disease and rheumatoid arthritis. The long-term aim of his studies is to develop novel strategies for the prevention and treatment of oral and systemic diseases, including the development of novel antimicrobials and vaccine technology. His research has been continuously funded by the Australian National Health and Medical Research Council or Medical Research Futures Fund since 1999 and he has received a number of NIH (USA) research grants in addition to the International Association for Dental Research (IADR)-GSK Innovation in Oral Care Award. He is a recipient of The Alan Docking IADR Science Award for outstanding scientific achievement in the field of dental research and was elected as a Fellow of the Australian Society for Microbiology in 2020. He has supervised 17 PhD, 8 Doctor of Clinical Dentistry and 19 BSc(Hons) students to completion.

Jaya Seneviratne

Director of
Higher Degree Research
School of Dentistry,
The University of Queensland
AUSTRALIA

Dr Jaya Seneviratne is a clinician scientist and academic in the field of Dentistry. Currently, he serves as the Director of Higher Degree Research at the School of Dentistry, The University of Queensland, Australia. Prior to this position, he was the founding leader of the Singapore Oral Microbiomics Initiative at the National Dental Research Institute, Singapore. Dr Seneviratne is internationally recognized for his research work in dental research, molecular microbiology, and infection control. His research track record includes over 100 publications in reputed international journals (h-index=43, i10-index=83, 5131 citations, Google Scholar), 12 book chapters, and an edited book titled "Microbial Biofilms: OMICS Biology, Antimicrobials, and Clinical Implications," published by Taylor & Francis CRC Press in 2017.

DrSeneviratne has successfully secured over US$ 7.11 million from competitive grants for his research and development work. Dr Seneviratne has also held prestigious international positions, such as the Secretary of the International Association for Dental Research (IADR), Asia Pacific Region, and the Chairman of the Session Committee for the 2023 IADR General meeting. Additionally, he is an editorial board member of the Journal of Dental Research and Critical Reviews in Microbiology. Dr Seneviratne is also an exceptional educator and course leader, earning accolades for his innovative teaching methods. He has supervised both undergraduate and postgraduate students, guiding them towards excellence in their research work. His research mentees have received numerous prestigious awards from IADR.

Ankur Singh

Melbourne Dental School,
The University of Melbourne
AUSTRALIA

Ankur Singh is an Australian Research Council DECRA Senior Research Fellow with joint appointments between Melbourne School of Population and Global Health and Melbourne Dental School. Ankur has research training in social epidemiology and he applies a range of quantitative skills to quantify the impact of policy interventions on health inequalities.

His research contributions are in the area of population oral health, tobacco control and social determinants of health. Ankur is also an Adjunct Fellow at Public Health Foundation of India and collaborates extensively with colleagues locally and internationally. Ankur is an Associate Editor of the Community Dentistry and Oral Epidemiology journal and holds leadership positions both within the International Association for Dental Research Global Oral Health Inequalities Research Network and IUHPE.

Anand Marya

Vice-Dean of Dentistry (Research) and Program Director of the Department of Orthodontics

Faculty of Dentistry, University of Puthisastra, Phnom Penh

CAMBODIA

Dr Marya is currently working as the Vice-Dean of Dentistry (Research) and the Program Director of Orthodontics at the Faculty of Dentistry, University of Puthisastra, Phnom Penh. He is also a post-graduate guide and Clinical Professor at International University, Phnom Penh. He graduated from Seema dental college and Hospital, India, and received his specialty orthodontic training in Manila, Philippines. He also took up his Ph.D. at Thammasat University Thailand. He is a member of both the Royal College of Physicians and Surgeons of Glasgow (MFDS RCPSG) as well as the Royal College of Surgeons, Edinburgh (MFDS RCS Ed) He was also awarded the Fellowship of the faculty of the Royal College of Surgeons, England (FDS RCS England). He has also been awarded multiple fellowships by the Pierre Fauchard Academy (PFA), the International College of dentists (FICD), and the International College of Continuing dental education (FICCDE).

He holds many important positions, such as the Chair of the Pierre Fauchard Academy-Cambodia section and the deputy regent of the International College of Dentists, Cambodia section. He is also serving as a council member of the IADR-SEA division. In November 2022, he was elected as a council member of SEAADE (South-east Asia association for dental education). In May 2023 he was appointed as the International Dental Ambassador of the Royal College of Surgeons-Edinburgh for the South-east Asian region. He has active research interests and has published more than 150 papers in high-impact, peer-reviewed journals. In recognition of his academic achievements, he was appointed as a distinguished adjunct faculty at Saveetha dental college, Chennai which was the top ranked dental school in India in 2021. In the year 2022 he was honoured as an Adjunct Professor and Research Fellow by the University of Airlangga the top ranked dental institution in Indonesia. He is also associated with Kasetsart University, Thailand as an overseas visiting researcher for the year 2023-24. He is also on the Editorial Board of many well- known journals such as PLOS One, BMC Oral Health by Springer Nature and Clinical Case Reports by Wileys.

Callum Durward

Dean

Faculty of Dentistry, University of Puthisastra

CAMBODIA

Professor Callum Durward has been Dean at the Faculty of Dentistry, University of Puthisastra, Cambodia for the past 10 years. He has degrees from New Zealand, Australia and the US. His career has included working in refugee camps, hospitals, school dental services and universities. He is also a part-time specialist in Pediatric Dentistry at the Roomchang Dental Hospital, country representative for the Association of Dental Education for Asia and Pacific (ADEAP), a former Council Member of the Southeast Asian Association of Dental Education (SEAADE), and former country representative for the IADR (SEA). His research interests include dental public health and pediatric dentistry. He is currently an advisor in the Oral Health Bureau of the Ministry of Health, and has been part of the working group developing the Cambodian National Oral Health Action Plan.

Rubens Spin-Neto

Associate Professor

Department of Dentistry and Oral Health, Aarhus University

DENMARK

Rubens Spin-Neto has received a PhD in Periodontology, Sào Paulo State University - UNESP, in 2011, and a second PhD degree in Oral Radiology, Aarhus University - Denmark, in 2015. In 2022, he was awarded a dr. odont. title in Dentomaxillofacial Radiology. Currently, he is an Associate professor at Aarhus University. He has published more than approximately a hundred and fifty peer-reviewed papers and is a key-opinion maker regarding artefacts in cone-beam computed tomography and dental-dedicated magnetic resonance imaging. He is the immediate past president of the European Academy of Dentomaxillofacial Radiology and is the coordinator of the "Diagnosis and Imaging" strategic research theme for Health, Aarhus University. He has been awarded the research awards of both the European Academy of Dentomaxillofacial Radiology (2014 and 2016) and of the International Association of Dentomaxillofacial Radiology (2017).

Chengfei Zhang

Clinical Professor, Associate Dean for Research & Innovation

Faculty of Dentistry, The University of Hong Kong

HONG KONG SAR

Dr Chengfei Zhang is a clinical professor in Endodontics, Associate Dean for Research and Innovation, Faculty of Dentistry, The University of Hong Kong (HKU). He serves as an editorial board member for International Endodontic Journal, International Dental Journal, and Bioengineering. He obtained his DDS and his Ph.D. degree from Peking University. He joined the Faculty of Dentistry HKU in 2009. His innovative research activities are internationally recognized, and he was awarded the IADR William J Gies Award for Biomaterials and Bioengineering Research, the Journal of Endodontics award for best paper, and the IADR distinguished scientist. His research in endodontic etiopathogenesis and pulp regeneration has been funded by Hong Kong RGC and Chinese mainland funding. He has lectured on many occasions nationally and internationally, particularly in IADR/AADR and IADR-SEA meetings, and published over 200 journal papers/book chapters.

Ollie Yu

Clinical Assistant Professor in Cariology

Assistant Dean in Knowledge Exchange

Faculty of Dentistry, The University of Hong Kong

HONG KONG SAR

Dr Ollie Yu is a clinical assistant professor in Cariology and assistant dean in Knowledge Exchange at the Faculty of Dentistry, the University of Hong Kong. Her research interests focus on dental caries and dental erosion, including their detection, prevention, control and management. She has published over 40 articles in peer-reviewed journals and received several international awards for her work in cariology research and dental education. Dr Yu is an editorial board member and a journal reviewer for several indexed journals. She is also the treasurer of society of preventive dentistry of Hong Kong.

Edward C.M. Lo

Chair Professor of Dental Public Health

Faculty of Dentistry, The University of Hong Kong

HONG KONG SAR

Edward C.M. Lo is currently Chair Professor of Dental Public Health in the Faculty of Dentistry in the University of Hong Kong. He is a past President of the International Association of Dental Research (IADR) Southeast Asian Division and the IADR Asia-Pacific Region, and a past IADR Treasurer. Prof. Lo is the Chairman of the Specialty Board of Community Dentistry of the College of Dental Surgeons of Hong Kong (CDSHK). His research interest is in oral epidemiology, oral healthcare services and preventive dentistry. He has published over 350 papers in international scientific journals. Prof. Lo has conducted many oral epidemiological surveys on various population groups. Prof. Lo has published extensively on clinical trials using various topical fluoride agents in the prevention of dental caries, and the use of various agents to arrest active decay in the primary teeth of young children and root surface of permanent teeth in older adults. With his outstanding contributions to the field, Prof. Lo was awarded the IADR Distinguished Scientist Award in Geriatric Oral Research in 2016 and also the IADR E.W. Borrow Memorial Award (for research in oral health promotion for children) in 2021.

Lijian Jin

Laboratory Professor in Clinical Dental Science and Professor of Periodontology

Division of Periodontology & Implant Dentistry, Faculty of Dentistry, The University of Hong Kong (HKU)

HONG KONG SAR

Prof. L.J. Jin, DDS, MMedSc, PhD, Odont Dr (Karolinska Inst.), FICD, FDS RCS ad hominem (Edinburgh)

Lijian Jin is the Modern Dental Laboratory Professor in Clinical Dental Science and Professor of Periodontology at the HKU Faculty of Dentistry. He joined HKU in 1994. His leadership services and academic engagement include FDI Councillor (2015-2021), Chair of FDI Global Periodontal Health Project Task Team (2016-2021) and FDI Science Committee Chairman (2012-2015); Member of IADR Board of Directors (2018-2021), President of IADR-Asia Pacific Region (2019.12-2020) and Chair of IADR-Task Group in Periodontal Disease-GOHIRA (2009-2012); Board Member of International Academy of Periodontology (2012-); President of Asian Pacific Society of Periodontology (2011-2013); and editorial/advisory board members of J Clin Periodontol (2011-), J Periodont Res (2007), J Periodontol (2006-2023) and JDR (2010-2015). He has received 10 GRF grants (PI) from the Hong Kong Research Grants Council, and his team has obtained multiple international prizes. Prof. Jin has primarily supervised the research projects for over 40 postgraduates, delivered 232 invited lectures nationally/internationally, and published 276 journal papers/book chapters.

May CM Wong

Chair Professor of Dental Public Health

Faculty of Dentistry, The University of Hong Kong

HONG KONG SAR

Professor May CM Wong is Professor in Dental Public Health at the Faculty of Dentistry, The University of Hong Kong (FoD, HKU). She teaches courses on biostatistics and clinical research methods to graduate and undergraduate students. Additionally, Professor Wong holds various leadership positions, including President of the Southeast Asian Division of the International Association for Dental Research (IADR), Chairman of the Faculty Board and Director of the Clinical Research Centre at FOD, HKU. She is also a Senate member of HKU and serves as the Consulting Services Secretary of the Hong Kong Statistical Society.

Her research focuses on biostatistics, clinical trials, oral epidemiology, oral health promotion, and quality of life. She has been involved in nearly 30 funded research projects as the principal investigator or co-investigator. Professor Wong has contributed to the research community as an editor of the Cochrane Oral Health Group, Associate Editor of Community Dentistry and Oral Epidemiology, and Statistical Consultant for Clinical Oral Implants Research. Her research work has been published in over 130 international peer-reviewed papers in reputable dental journals, such as the Journal of Dental Research.

Professor Wong has received numerous awards and honors, including the 2021 IADR Distinguished Scientist H. Trendley Dean Memorial Award which commends investigators with meritorious research in epidemiology and public health and is one of the highest honors bestowed by the IADR. She has also been recognized with the Faculty Outstanding Teacher Award and Research Output Prizes at HKU. Her research contributions have been acknowledged through awards received at international conferences and from journals. Professor Wong is frequently invited to speak at dental research meetings and forums, where she shares her expertise with fellow researchers.

Waruna Lakmal Dissanayaka

Assistant Professor

Applied Oral Sciences & Community Dental Care

Faculty of Dentistry, The University of Hong Kong (HKU)

HONG KONG SAR

Dr Waruna Dissanayaka is an Assistant Professor at the Faculty of Dentistry, The University of Hong Kong. His research is focused on enhancing post-implantation stem cell survival and vascularization during tissue regeneration, understanding the molecular mechanisms behind the dental stem cells; intercellular cross-talk, and lineage-specific differentiation of dental stem cells into odonto/osteoblasts and endothelial cells. His doctoral research work on scaffold-free microtissue spheroids in dental pulp regeneration was awarded IADR William J Gies Award for Biomaterials and Bioengineering Research (2016) and the Journal of Endodontics award for the Best Paper in Basic Science: Biology (2016). In 2020, he received the IADR Centennial Emerging Leaders Award for his achievements and potential in the advancement of dental, oral, and craniofacial research. He has published over 45 scientific papers and is an editorial board member for Clinical Oral Investigations and BMC Oral Health.

Armelia Sari Widyarman

Associate Professor

Department of Oral Biology, Faculty of Dentistry, Trisakti University, Jakarta

INDONESIA

Dr Armelia Sari Widyarman began her studies at Trisakti University, from which she holds a DDS in Dentistry and a MDSc in Oral Biomedical Science. She completed a PhD in Dentistry from the University of Indonesia. She has been the Head of Microbiology Department in Trisakti University since 2015 and a lecturer major in Molecular oral microbiology, and Research methodology. She is also the Editor-in-Chief and Editor for international journals (SCOPUS indexed journals). She has over 60 publications and 300 citations. Dr Widyarman has special interests in digital dentistry which focus on teledentistry. She is the Founder and CEO of GIGI.ID, the first teledentistry application in Indonesia that can improve access to oral healthcare and improve the delivery of oral healthcare. Additionally, Dr Widyarman has authored a Teledentistry book in Indonesia in 2020 that highlighted the foundations for the globalization of Teledentistry procedures and clinical applications of teledentistry.

Carolina Marpaung

TMD Oral Pain Specialist

INDONESIA

Dr Carolina Marpaung is a full-time lecturer at Universitas Trisakti, Jakarta, where she supervises both clinical and research students. After finishing her residency in prosthodontics from Universitas Indonesia in 2003, she pursued a 3-year-clinical post-grad program on Oral Kinesiology at Academic Centre for Dentistry Amsterdam (ACTA). Her training included Oral function, Orofacial pain, and Obstructive Sleep Apnea. She got her PhD degree from the University of Amsterdam under the supervision of Prof Frank Lobbezoo with a thesis on TMD and Bruxism in Children. Dr Marpaung is an active council member of the Asian Academy of Orofacial Pain and TMD (AAOT).

Finbarr Allen

Professor of
Oral Rehabilitation

Director,
Oral Health Research Centre

University College Cork

IRELAND

Finbarr Allen graduated from National University of Ireland in 1988 and is currently Professor of Prosthodontics and Oral Rehabilitation and Consultant in Restorative Dentistry at Cork Dental School and Hospital, Ireland.

He worked in general dental practice in Oxfordshire, UK prior to completing a Masters degree in Restorative Dentistry [Prosthodontics] at the University of Manchester, UK. He was awarded FDS by the Royal College of Physicians and Surgeons of Glasgow in 1995. He completed higher specialist training in Restorative Dentistry and a PhD whilst a Lecturer/Senior Registrar in Restorative Dentistry at Newcastle University and the Northern Region Hospitals Trust in the UK. He was awarded the intercollegiate specialty fellowship by the Royal College of Physicians and Surgeons of Glasgow in 2000. From 2001-2008, he was Senior Lecturer/Consultant in Restorative Dentistry at Cork Dental School and Hospital, Ireland and was appointed Professor of Prosthodontics and Oral Rehabilitation at University College Cork in 2008. He was Dean of Dentistry from 2006 until 2013. From 2016-2022 he was Dean of the Faculty of Dentistry National University of Singapore and Director of the National University Centre for Oral Health, Singapore and a Senior Consultant at the National University Hospital, Singapore.

His research interests are in geriatric oral health research (clinical trials, functional assessment), quality of life methodology and, health service research and has received over $6 million in research grants. To date, he has published > 250 peer reviewed papers, research abstracts/reports and is the author of 3 textbooks and twelve book chapters. He has served on numerous editorial boards and expert review panels.

He received a Distinguished Scientist Award from the International Association for Dental Research in 2011 for achievement in geriatric oral health research and the IADR/Unilever Social Entrepreneur Approach to Change Oral Health Behaviour Research Award, 2014.

Guang Hong

Vice-Dean & Professor

Division for Globalization Initiative

Tohoku University Graduate School of Dentistry

JAPAN

Prof Guang Hong is an Vice Dean of Graduate School of Dentistry, Tohoku University, and the Professor and Chair of Division for Globalization Initiative. He is also the Director of Office of International Affairs at the Liaison Center for Innovative Dentistry. Prof Hong was conferred his PhD from the Hiroshima University Graduate School of Dentistry in 2003. Prof Hong is an executive board member of the Japanese Society for Dental Materials and Devices and an associate editor of the Dental Materials Journal. He serves as the Director of The Japan Denture Care Society. He is also a committee member of the International Standardization Accelerated Project Japanese Ministry of Economy, Trade and Industry and an expert of the International Organization for Standardization (ISO) and the German Institute for Standardization (DIN). Prof Hong's research interest includes elucidation of the rheology properties of dental materials, the development of functionality of new dental materials and dental education. His research is mainly concerned with international standard institution; improvement and development of oral care and denture care materials, metal-free dental implant materials and development of dental materials and dental education system according to the Industry-Academia-Government collaboration. He published more than 80 papers with high Impact Factor Scientific Journal. He received the Tohoku University Presidential Prize for Educational Excellence in 2019.

Hiroshi Egusa

Professor and Chair, Division of Molecular and Regenerative Prosthodontics

General Vice-Director

Head of Dental Division, Tohoku University Hospital

JAPAN

Professor Hiroshi Egusa is the Director of the Center for Advanced Stem Cell and Regenerative Research, Director of the Liaison Center for Innovative Dentistry at Tohoku University Graduate School of Dentistry, and the General Vice Director (Head of Dental Division) of Tohoku University Hospital. He received his DDS (1998) and PhD (2002) degrees from Hiroshima University, and worked as Research Assistant in the Department of Oral Microbiology at the University of Hong Kong in 1999. He was awarded a postdoctoral fellowship by the Japanese government for regenerative medicine research at University of California, Los Angeles (UCLA) in 2002-2004. In 2004, he became Assistant Professor in the Department of Fixed Prosthodontics at Osaka University. In 2014, he was appointed as Professor and Chair in the Division of Molecular and Regenerative Prosthodontics at Tohoku University. He is a board-certified prosthodontist and Fellow of the Royal College of Pathologists (FRCPath). He is currently serving as Editor-in-Chief of the Journal of Prosthodontic Research (2021 Impact Factor: 4.338). He has received several international awards, including 1st place for the IADR Edward Hatton Award (2002), Winner for the IADR Arthur Frechette Award (2004), and the IADR Distinguished Scientist Award (Young Investigator Award: 2012). Professor Egusa was identified as a Top 2% Scientist from 2020 in the world scientist ranking in a global survey by Stanford University, USA.

Kentaro Mizuta

Vice-Dean,
Tohoku University Graduate School of Dentistry

Professor,
Department of Dento-oral Anesthesiology, Tohoku University

JAPAN

1993. 4 - 1999. 3 Tohoku University School of Dentistry, Japan (D.D.S.)
1999. 4 - 2003. 3 Tohoku University Graduate School of Dentistry, Japan (Ph.D.)
2003. 4 - 2004. 3 Resident, Tohoku University Hospital, Japan
2004. 4 - 2007. 3 Postdoctoral Research Fellow, The Japan Society for the Promotion of Science
2005.10 - 2007. 9 Postdoctoral Research Fellow, Department of Anesthesiology, Columbia University College of Physicians & Surgeons, USA
2007. 4 - 2011. 9 Assistant Professor, Department of Dento-oral Anesthesiology, Tohoku University Graduate School of Dentistry
2011.10 - 2014. 4 Lecturer, Department of Dento-oral Anesthesiology, Tohoku University Graduate School of Dentistry
2014. 5 - 2018. 9 Associate Professor, Department of Dento-oral Anesthesiology, Tohoku University Graduate School of Dentistry
2018.10 - present Professor, Department of Dento-oral Anesthesiology, Tohoku University Graduate School of Dentistry
2023. 4 - present Vice-Dean, Tohoku University Graduate School of Dentistry

Ken Osaka

Dean and Professor,
School of Dentistry

Department of Community and International Health,
Tohoku University

JAPAN

Professor Osaka has been conducting epidemiological research and engaging in policy-making activities on well-being with regard to oral health, the association between oral health and other systemic diseases, and health and care systems. His research utilizes “Real World Data” and “Large-scale Cohort study.” He has also served as an expert in national measures for COVID-19, including the development of guidelines. Additionally, he holds positions as a professor at the International Research Institute of Disaster Sciences (IRIDeS), the Smart Aging Research Organization (S.A.R.O.), and the Tohoku Medical Megabank Organization (ToMMo), all of which are part of Tohoku University. Furthermore, he has been a member of the Social Security Council and has worked as an expert drafting member on foodborne diseases in the joint program of microbiological risk assessment of WHO/FAO from 1998 to 2002.

Nobuhiro Takahashi

Professor and Chair

Division of
Oral Ecology and Biochemistry

Tohoku University
Graduate School of Dentistry

JAPAN

Dr Nobuhiro Takahashi received his D.D.S degree from Tohoku University School of Dentistry in 1984.3, and Ph.D. degree from Tohoku University Graduate School of Dentistry in 1988.3. After two years of research at University of Minnesota School of Dentistry, USA, he joined Tohoku University Graduate School of Dentistry in 1990.5. He has served as professor of the Division of Oral Ecology and Biochemistry, Tohoku University Graduate School of Dentistry since 2001.3. He served as Vice-Dean of the graduate school in 2004.1-2020.3 and Dean in 2020.4-2023.3. His professional service includes membership in various dental sciences, and he served as President of JADR in 2013.1-2014,12 and IADR Regional Board Member (Asia Pacific Region) in 2021.6-2024.3.

His research focuses on oral biofilm associated with caries, periodontitis, oral malodor, aspiration pneumonia etc, from biochemical, molecular biological, microbiological and ecological points of view. He has determined the metabolic pathways and their biochemical regulation of oral bacteria such as Streptococcus, Actinomyces, Lactobacillus, Bifidobacterium, Scardovia, Veillonella, Prevotella and Porphyromonas, and elucidated the interaction between bacterial metabolism-based pathogenicity and their environments. He is also a pioneer of the metabolomic analysis of oral microbiome. He applied his technology of monitoring pH at the interface between bacteria (oral biofilm) and the tooth surface to a new method of evaluating cariogenicity of foods, antimicrobial effect of biomaterials, and bacteria-induced deterioration of biomaterials. He is currently working to elucidate the relationship between the metabolites of oral microbiome and oral/systemic health, and to apply these findings to the development of new functional health foods.

He has been honored by Yngve Ericsson Prize (2019.7) as the first winner in the Asia and several academic awards. He has also been selected as one of the "Top 2% Researchers in the World". (Scopus-registered publications: 176, h-index: 36, Total citations: 5269 on May 25, 2023).

Kathreena Kadir

Head, Department of Oral and
Maxillofacial Clinic Sciences

Universiti Malaya,
Kuala Lumpur

MALAYSIA

Dr Kathreena Kadir is a Consultant Oral and Maxillofacial Surgeon at the Faculty of Dentistry, Universiti Malaya (UM). She is also the head of the Department of Oral and Maxillofacial Clinical Sciences at UM and the Department of Oral Maxillofacial, Universiti Malaya Medical Centre. She obtained her Master's in OMFS and BDS degree from the same university and completed her Fellowship in Oral and Maxillofacial Oncology and Reconstructive Surgery from 9th People's Hospital affiliated to Shanghai Jiao Tong University, School of Medicine. She is a member of Malaysia Academy of Medicine and has also held the post of Honorary Secretary for the Malaysian Association of Oral and Maxillofacial Surgeons (MAOMS) twice in the year 2015 and 2018. Her main surgical interest has been managing patients with head and neck oncology. While pursuing her subspecialty training, Dr Kathreena developed a new passion in the management of patients with Temporomandibular Disorders. She was the team leader for the Malay language version of the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) and since then pioneered the development of the first TMD multi-disciplinary team combined clinic in Malaysia. Dr Kathreena is currently the lead researcher in TMD for Universiti Malaya.

Umer Daood

Associate Professor,
Head of Restorative Division

School of Dentistry,
International Medical
University,
Kuala Lumpur

MALAYSIA

Graduated from Baqai Dental College (BDS) Pakistan in 1999 subsequently embarking on a lineup of advanced post graduate qualifications. Dr Umer Daood holds a Master of Science (MSc) in Oral Sciences and Biomaterials from the National University of Singapore as well as an MSc in Dental Materials from Queen Mary University of London. He obtained his PhD from Prince Philip Dental Hospital at the University of Hong Kong. He is currently enrolled in MSc Molecular Medicine at International Medical University. He is a Member of the Faculty of Dental Surgery of the Royal College Surgeons (MFDS, RCS Glasgow) and has a Certificate in Periodontology from Queen Elizabeth Hospital, Woolich, London.

Special interests: Dental Biomaterials, disinfection in Endodontics, Tissue Engineering of dentine structure and developing new adhesive and esthetic restoration.

- Currently working as Associate Professor, Head of Restorative Division, School of Dentistry, International Medical University, Kuala Lumpur.
- Adjunct Faculty Asst. Professor Prince Philip Dent Hospital, HKU at The University of Hong Kong.
- Member of the Faculty of Dental Surgery of the Royal College Surgeons (MFDS, RCS Glasgow)
- Member of the Ethical Institutional Board at IMU and university of Malaya

He has many international high impact publications, book chapters and patents to his name.

"I have always loved Science, Biology, History and have a deep interest in Cosmology. Dr Daood is open for Collaborations and Ideas and can be reached on his personal email at: udaood@gmail.com

Dr Jonathan Fandialan

PHILLIPINES

Dr Jonathan Fandialan is an Assistant Clinical Professor at the University of the Philippines Manila where he is part of the team that established the first and only university-based Temporomandibular disorders (TMD) and Orofacial Pain (OfP) Program in the country. The same team also maintains the first and free TMD and orofacial pain clinic in the same college of dentistry which caters to Filipinos from all walks of life. He is the founding member and secretary of the Orofacial Pain Association, Inc. which was organized specifically to uplift the level of education in TMD and OfP in the country and improve the delivery of service to patients. Dr Fandialan is part of the council of the Asian Academy of Orofacial Pain and TMD (previously the Asian Academy of Craniomandibular Disorders). He obtained his DMD degree from the University of the Philippines in 1998 and since then has attended TMD and OfP programs at the New York University, the University of Kentucky, and the Gruppo di Studio Italiano Dolore Orofacciale e Disordini Temporomandibulari in Italy. In 2019 he was the scientific chairman and the acting overall chairman of the 19th AAOT International Scientific Meeting held in the Philippines. Dr Fandialan has lectured all over the country promoting the biopsychosocial approach to treatment and management of the TMD and the use of the DC/TMD.

Adrian Yap

Head and Senior Consultant

Department of Dentistry
Ng Teng Fong
General Hospital

National University
Health System (NUHS)

SINGAPORE

Dr Adrian Yap is a Senior Consultant at Ng Teng Fong General Hospital, National University Health System. He is an Adjunct/Honorary/Guest Professor at the Dental Schools of Peking and Trisakti University as well as the University of Hong Kong and Malaya. Additionally, he is a Clinical/Adjunct Assoc. Professor at the National University of Singapore (NUS) and Duke-NUS Medical School. Dr Yap obtained his PhD, BDS degree, and Graduate Diploma in Psychotherapy from NUS and MSc from the University of London. He has also received numerous clinical/service excellence, teaching, and research awards including the NUHS-Mochtar Riady Pinnacle Master Clinician Award. Dr Yap is known for his expertise in Temporomandibular Disorders/ Biomaterials and has authored more than 275 international refereed journal articles (Scopus H-index of 47), 750 conference/seminar papers, several book chapters, and patents in these areas. Dr Yap serves on the editorial boards of many journals including the Journal of Oral Rehabilitation, Journal of Craniomandibular and Sleep Practice (CRANIO), Operative Dentistry, as well as Current Nanoscience.

Charles Lau

Research Fellow,
ORH ACP

SINGAPORE

Dr Charles Lau received his Bachelors in Applied Chemistry from the National University of Singapore in 2007. After graduation, he worked in the biopharmaceutical industry for 5 years as a protein purification scientist in Lonza Biologics PLC, United Kingdom, and as a manufacturing biotechnologist in Roche Singapore Technical Operations. In 2012 he returned to academia, and 2 years later he received a Master in Industrial Chemistry from the Technical University of Munich, Germany. In 2019, Charles graduated from NTU with a PhD in Bioengineering, under the supervision of Professor Teoh Swee Hin. He is now part of the research team in the SingHealth Duke-NUS Oral Health Academic Clinical Programme, working on biomaterials and animal models for periodontal and oral-maxillofacial regeneration. His PhD work in NTU, which was a collaboration in NDCS, won the best poster award in the Singapore General Hospital 23rd Annual Scientific Meeting in 2019.

Chris Peck

Professor and Dean

Faculty of Dentistry, National University of Singapore

SINGAPORE

Chris Peck is a senior clinical academic who has led national and international clinical, education and research activities in interdisciplinary pain management. His applied research has been both nationally and internationally collaborative, funded by competitive grants and has resulted in changes to clinical practice that directly benefits patients and the broader community. This includes development of consensus-based diagnostic criteria for orofacial pain and temporomandibular disorders, discovering underlying mechanisms for orofacial pain, and understanding the structure-function relationships of the human jaw system. He is currently Dean, Faculty of Dentistry, National University of Singapore, and previous roles included leading the academic strategy for one of Australia's largest health precincts; Dean of Dentistry at the University of Sydney and Chair of Board of Directors, Australian Dental Council.

Christina Sim

Clinical Associate Professor

Department of Restorative Dentistry, National Dental Centre

SINGAPORE

Clinical Associate Professor Christina Sim is the Director, Research and a Senior Consultant at the Prosthodontic Unit, Department of Restorative Dentistry, National Dental Centre Singapore. She graduated with a BDS degree from the National University of Singapore and obtained an MSc degree from the University of London. She received further training in dental implantology and aesthetic dentistry at Loma Linda University under a Ministry of Health Health Manpower Development Plan award. She obtained her PhD degree from the University of Melbourne under a National Medical Research Council Research Training Fellowship.

Currently, she is a Senior Consultant at the Department of Restorative Dentistry, National Dental Centre Singapore and a Clinical Associate Professor at the SingHealth DUKE-NUS Oral Health Academic Clinical Program and at the Faculty of Dentistry, National University of Singapore, involved in the graduate prosthodontics residency program. She is also a Fellow of the Academy of Medicine, Singapore, the Chair of NDCS Clinical Privileging and Competency Committee and a member of the Dental Specialist Accreditation Committee for Prosthodontics. She has been awarded more than $2 million in grant funding for her research. Her research interests include oral health research, particularly in vulnerable groups and artificial intelligence-enabled preventive oral health strategies.

Domenico Campolo

Associate Professor

School of Mechanical & Aerospace Engineering, Nanyang Technological University

SINGAPORE

Domenico Campolo is currently Associate Professor at the School of Mechanical and Aerospace Engineering and Director of the Robotics Research Centre, Nanyang Technological University (NTU), Singapore. He received his Laurea Degree (1998) in Electronics Engineering from the University of Pisa, Italy, his Diploma Degree (1999) in Engineering and his PhD (2002) in Micro-Engineering from Scuola Superiore Sant'Anna, Pisa. In 2000-2003, he was at UC Berkeley (USA). In 2003-2009, he worked at Campus Bio-Medico University in Rome (Italy). In 2009, he joined NTU as Assistant Professor.

His research interests hinge around the understanding of the mechanisms behind human and animal skills, also for possible transfer to robotic platforms. To this end, his work has been focusing on the development of Robotic platforms for Neuroscience, especially in relation to the sensorimotor domain and human-robot physical interaction; Mechatronic technologies with application to Neuro-Developmental Engineering; Biomimetic Robotics including development of biologically inspired actuators and sensors. His theoretical investigations to both Robotics and Computational Neuroscience are characterized by a geometric approach.

His scholarly work appeared in peer-reviewed international Journals and Conferences. He is co-inventor in several Technology Disclosures and Patents. He is co-founder of ArtiCares Pte Ltd, an NTU spinoff company focusing on Robotic Technologies for decentralized healthcare, including homes.

Prof Fábio Leite

Principal Investigator

National Dental Centre

SINGAPORE

Fábio explores mechanisms linking oral and systemic diseases using approaches, from cell culture to clinical trials and population-based registries. Collectively, his studies moved the oral inflammation field into the acknowledgement of the synergy and accumulation of multiple causes (from local and systemic molecular factors to structural determinants).

His interest lies in exploring why people develop different phenotypes of oral inflammation. His master's focused on tissue healing, plus clinical training in treating people with diabetes. His Ph.D. investigated common pathways of Crohn's disease and periodontitis, including a stay at Prof. Richard Darveau's microbiology laboratory (University of Washington).

He collaborated in studies involving birth cohorts and spent a year at the Australian Research Centre for Population Oral Health, University of Adelaide, to study common causes of systemic and oral inflammation.

Fábio held positions of trust, such as Head of Department, vice-president of an ethics committee, and executive and research steering committee member in Brazil, Denmark and Singapore. He has published over 90 articles and 4 book chapters, deposited patents, supervised over 30 masters and Ph.D. students, and secured multiple research grants. According to ResearchGate, Fabio is among the top 4% in dentistry and periodontology. Fábio's soft skills training encompasses leadership and communication.

Goh Bee Tin

Deputy CEO
(Research & Education),
Head & Senior Consultant

Oral & Maxillofacial Surgery,
National Dental Centre

SINGAPORE

Clinical Associate Professor Goh Bee Tin is the CEO of National Dental Centre Singapore. A/Prof Goh is also Vice- Chair, Research in the SingHealth Duke-NUS Oral Health Academic Clinical Programme and Lead, Singapore Oro-Facial Initiative (SOFI), National Dental Research Institute Singapore. A/Prof Goh is appointed Clinical Associate Professor at the National University of Singapore (NUS) Faculty of Dentistry and Adjunct Associate Professor at the Nanyang Technological University (NTU), School of Chemical and Biomedical Engineering. A/Prof Goh obtained her Bachelor of Dental Surgery from the National University of Singapore (NUS) in 1993. She then went on to specialize in the field of OMS, obtaining her Dental Fellowship with the Edinburgh Royal College of Surgeons in 1996 and Master of Dental Surgery from NUS in 1997. She obtained a PhD in 2009 from Radboud University Nijmegen, the Netherlands for her novel research work on modular endoprosthesis for mandibular reconstruction. Her research interests are in bone tissue engineering and development of novel devices for mandibular reconstruction. Her translational work includes pre-clinical animal models and clinical trials. She received the Osteopore Innovation Award for her work in clinical tissue engineering and the SingHealth GCEO Outstanding Clinician Researcher Award and Duke NUS Master Academic Clinician award for her academic achievements.

Gopu Sriram

Assistant Professor

Faculty of Dentistry,
National University
of Singapore

SINGAPORE

Dr Gopu Sriram is a tenure-track Assistant Professor at the Faculty of Dentistry, and Department of Biomedical Engineering, National University of Singapore. He also is the Co-Thrust Lead at the NUS Centre for Additive Manufacturing, where he oversees the applications of 3D printing, biofabrication, and other additive manufacturing technologies for oral and craniofacial applications.

Dr Sriram leads the microfluidics and biofabrication laboratory, where his team's research focuses on the application and convergence of microfluidics, 3D culture, and 3D printing-based biofabrication technologies. His team develops animal alternative models to understand host-microbiome interactions in periodontal disease, biocompatibility of oral/dental-care products, and regeneration of dental/ oral/ craniofacial (DOC) tissues.

Dr Sriram has garnered numerous accolades for his work on using microfluidic technologies as animal alternatives, including the Global 3Rs Award and IADR-Southeast Asia Research Award. Additionally, his works have led to the co-founding of a Singapore-based start-up that focuses on creating 4D human tissue models for cruelty-free testing of consumer-care products.

Gustavo Nascimento

Principal Investigator

National Dental Centre

SINGAPORE

Gustavo is a dentist with a PhD in Oral Epidemiology. He has a solid basis in epidemiology, with a focus on causal inference from observational data. He has experience with birth cohort studies as well as large studies using nationally representative registries.

Since 2013, Gustavo has published 130 peer-reviewed articles, served as a reviewer for 65 international journals, collaborated with several universities across the world, and obtained more than SGD 1.5 million in grants in Brazil and Denmark.

He currently serves as an editorial board member for the Journal of Dental Research, BMC Medical Research Methodology, and Heliyon and as an associate editor for PLOS One, Scientific Reports, and Frontiers in Oral Health. Gustavo's research focuses on different facets of periodontal epidemiology, which include methodological aspects of periodontal research and the relationship between periodontitis and systemic diseases. He is also interested in the role played by oral inflammation in the development of halitosis (bad breath) and the senses of smell and taste.

Hemant Vijaykumar Unadkat

Assistant Professor, Principal Investigator and Clinician Scientist

National Dental Centre Singapore, Duke-NUS Medical School

SINGAPORE

Dr Hemant Unadkat is an Assistant Professor at Duke-NUS Medical School, Clinician Scientist, Principal Investigator at the National Dental Centre. His innovative lab focuses on using biomaterials engineering and micro- and nanotechnologies to improve oral health through craniofacial tissue regeneration and disease modeling.

His research program merges discovery and application, incorporating high-throughput technologies, cell biology, and artificial intelligence for practical clinical use. Dr Unadkat's long-term goal is to make a lasting impact on craniofacial tissue engineering.

His work has been published in reputable journals, such as PNAS, and highlighted in Nature, Nature Materials, and Nature Methods. With over SGD 6M in research funding and numerous patent applications, Dr Unadkat demonstrates dedication to advancing his field. He is only the second dentist in Singapore to receive the prestigious Ministry of Health and National Medical Research Council Transition Award. Recently, he has also received the NMRC Clinician Scientist Individual Research Grant.

Hortense Le Ferrand

Nanyang Assistant Professor

Nanyang Technological University,
School of Mechanical and Aerospace Engineering

SINGAPORE

Dr Le Ferrand Hortense graduated in 2012 from ESPCI Paris (France) with a Diplôme d'Ingénieur and a major in Physical Chemistry, and in 2013 and 2017 from ETH Zürich (Switzerland) with a MSc and a PhD in materials science, respectively. Following an outstanding PhD thesis award, a postdoctoral prize in 2018 and a research stay at Purdue University (USA), she joined Nanyang Technological University (Singapore) to research on biomimicry and biological materials as a postdoctoral fellow under a Swiss National Foundation Early Postdoc Mobility Fellowship. In January 2019, she became Assistant Professor in the schools of Mechanical and Aerospace Engineering and Materials Science and Engineering at Nanyang Technological University (Singapore). Hortense has an h-index of 19 with more than 1400 citations. She published in Nature Materials, Advanced Materials, Nature communications, PNAS, ACS Nano and more. She is recognized internationally and had given more than 10 invited talks worldwide. In 2020, she was awarded the prestigious National Research Foundation (NRF) Fellowship from Singapore to pursue research on the additive manufacturing of bioinspired composites. In 2023, Dr Hortense was among the MIT innovators under 35, Europe list, for her 3D printed technologies to fabricate easily customisable and high-performance multifunctional materials. In 2023, she was also awarded a staff award from her school at NTU for her efforts in encouraging more Women to pursue studies and career in STEM disciplines.

Jonas Erik Sebastian Karlstroem

Associate Professor

Duke-NUS Medical School

SINGAPORE

Dr Jonas Karlström is a Swedish MD and a global health professional with more than 15 years of experience in health innovation, health, international development, policy and global health.

Before joining SDGHI, Dr Karlström worked from 2015 in various positions of UNICEF Health and Innovation programming. In his latest post, Dr Karlström served as a Health Innovation Specialist with the UNICEF Product Innovation Centre. In this capacity, he led a number of large health innovation efforts for the centre including a UNICEF Scaling Initiative to scale up access to oxygen therapy which was implemented in multiple countries in West and Central Africa during the COVID-19 pandemic. In health programmatic work Dr Karlström formed part of the Interagency Technical Support Team on SDG3 during the Agenda2030 process and later investigated Health System Resilience with a focus on the role of the community in the wake of the large West African Ebola outbreak.

Dr Karlström has published a range of articles on implementation and investigations of various types of novel health technologies in LMICs across a variety of geographies and led the Karolinska Institute course on Global Health in Laos PDR in coordination with the University of Health Sciences in Vientiane.

Karen Glazer Peres

Principal Investigator, National Dental Centre Singapore

Associate Professor. Duke-NUS Medical School

SINGAPORE

Karen Peres is a dentist with two master's degrees, one in Paediatric Dentistry and another in Public Health. She completed her PhD in Epidemiology at the University of Sao Paulo in 2002 after spending one year at University College London, UK. Karen joined the National Dental Research Institute Singapore, National Dental Centre Singapore, as a Principal Investigator and Associate Professor at Duke-NUS Medical School, Health Service and Systems Research Programme, Singapore, in October 2020.

She is an internationally recognized researcher in the field of Child Oral Health and Oral Epidemiology and spent seven years as a member of the Research Advisory Committee of the Australian Dental Research Foundation and the South Pacific Child Oral Health taskforce. Karen is the Vice-president of the International Association for Dental Research (IADR) Nutrition group. Her research areas of interest include child oral health epidemiology, inequalities in general and oral health, life course epidemiology, oral health surveillance, the relationship between oral health and general health, and the assessment of the effectiveness of oral health programs for children. Karen has been involved in international collaborative work on breastfeeding effects on several children's health outcomes. She has supervised more than 30 Master and PhD students and authored sixteen book chapters and 165 peer-reviewed papers. Her work has received over 12,000 citations, an H index of 65. Karen was cited in 2020 and 2021 among the top 2% of scientists globally. She is currently coordinating the International Consortium of Oral Health Birth Cohort Studies project, sponsored by the Borrow Foundation, UK, SingHealth Duke-NUS Global Health Institute, and the National Medical Research Council (NMRC), Singapore. She was the recipient of the 2022 International Association for Dental Research (IADR) EW Borrow Memorial Award for Global Oral Health Research.

Lee Phin Peng

*Deputy Programme Director, Singapore Biodesign A*STAR*

Adj Assistant Professor, Duke-NUS Medical School

SINGAPORE

Dr Lee Phin Peng is the Deputy Programme Director for Singapore Biodesign, Deputy Director for the Medtech Control Tower, I&E, A*STAR and adjunct Assistant Professor at the Duke-NUS Medical School. Dr Lee has been developing and driving innovation programmes at the national level with a focus on health and medtech.

Prior to his current role, Dr Lee was the Principal Investigator for a pre-spinoff medtech project around cerebrovascular stroke monitoring and detection. He served in a joint appointment at the Institute of Materials Research and Engineering and the Institute of High Performance Computing at A*STAR.

Dr Lee has been invited to speak at numerous events, speaker panels and conferences. He is also an accomplished and certified adult educator - Dr Lee has trained more than 600 researchers, healthcare professionals, and corporates in Design Thinking and the Biodesign methodology.

Dr Lee holds a PhD in Bioengineering from the University of California, San Francisco - Berkeley and a BSc in Biomedical Engineering from Brown University. He completed his post-doctoral training at the Stanford School of Medicine under the Singapore-Stanford Biodesign Innovation Fellowship.

Marco Peres

Professor

Deputy Chief Executive Officer, Academic Vice Chair, Research, National Dental Centre Singapore

Professor, Health Service and Systems Research Programme, Duke-NUS Medical School

SINGAPORE

Marco A Peres is a Brazilian dentist with a PhD in Epidemiology. After almost 30 years working in Universities in Brazil and Australia Marco moved to Singapore in 2020. Currently, he is the Deputy Chief Executive Officer, Academic Vice Chair, Research, National Dental Centre Singapore, Senior Principal Investigator, National Dental Research Institute Singapore, National Dental Centre Singapore, and Professor, Health Service and Systems Research Programme, Duke-NUS Medical School. Marcos leads the Singapore Oral Population Health Initiative. His research areas of interest include the effectiveness of oral health-related policies, health services research, big data linkage, oral health surveillance, fluorides, inequalities in oral health, global oral health, life course epidemiology and the relationship between oral health and general health. Marco was the President of the International Association for Dental Research Global Oral Health Inequalities Research Network (2021-2022) and he is a member of the Lancet Commission on Oral Health. Marco has been cited in a paper published in 2016 in Community Dentistry and Oral Epidemiology (doi: 10.1111/cdoe.12249) as the seventh most productive researcher in Public Health Dentistry in the world in the last half-century. Marco has been cited among the top 2% of scientists in the world in 2020 and 2021. He was the recipient of the 2017 International Association for Dental Research (IADR) Distinguished Scientist Award for Global Oral Health Research. Since 2002 Marco has had continuous funding grants from Brazilian, Australian and Singaporean agencies with 23 project grants over this period totalling over SG$ 25 million. Marco has supervised 40 postgraduate students, authored three books, 15 book chapters and almost 300 peer-reviewed papers. His work has received more than 23,000 citations and an H index of 83. Marco is the 2023 recipient of the prestigious NMRC Singapore Translational Research Investigator Award (STaR).

Nileshkumar Dubey

Assistant Professor

Faculty of Dentistry, National University of Singapore

SINGAPORE

Dr Nileshkumar Dubey is an Assistant Professor in the Faculty of Dentistry, National University of Singapore (NUS). He earned his Bachelor of Dentistry from Maharashtra University of Health Sciences and PhD in Tissue Engineering and Regenerative Medicine from NUS. In 2021, he received Interstellar Initiative Award by the New York Academy of Sciences and the Japan Agency for Medical Research and Development that recognizes and connects the world's most promising Early Career Investigators. His research group use biofabrication technologies (3D printing and Electrospinning) to fabricate personalized mineralized scaffolds and tissue, with the long-term goal of translating biomaterials and tissue into clinical use.

Paul Pronyk

Director of
Duke-NUS Center for Outbreak Preparedness (COP),
Deputy Director of SingHealth Duke-NUS Global Health Institute

Duke-NUS Medical School and SingHealth

SINGAPORE

Prof Pronyk is an infectious disease and public health specialist, with over two decades of experience in supporting health systems strengthening efforts in low and middle-income countries. Through his work at Duke-NUS and SingHealth, he currently supports research and training efforts across 14 countries in Asia. Prior to being in Singapore, Prof Pronyk held senior positions at UNICEF including supporting child health programs in Indonesia, the Ebola response in Sierra Leone, and led for the UN Commission on Life Saving Commodities facilitated health system support in 23 countries in Africa and Asia. He has also directed cross-sectoral research programs for Columbia University and the London School of Hygiene and Tropical Medicine.

Song Juha

Associate Professor

School of Chemistry, Chemical Engineering and Biotechnology,

Nanyang Technological University

SINGAPORE

Dr Juha Song, is an Associate Professor, in the School of Chemical and Biomedical Engineering at Nanyang Technological University (NTU), an active member of the Singapore Centre for 3D Printing (SC3DP). She has obtained her PhD in Materials Science and Engineering at Massachusetts Institute of Technology, in 2011 with research focus on bioimimetics and biomechanics for an understanding of material design principles of natural exoskeleton systems. She did her post-doctoral training at Advanced Institute of Convergence Technology, Seoul National University, where she conducted research on development of hybrid biomaterials for dental, orthopedic, cardiovascular, and soft tissue implants, actively working with local biomedical companies. During 2014-2015, she was also a contract professor at Korea University, School of Biomedical Engineering. Her lab's research interests focus on experimental and theoretical investigations of natural and synthetic composite materials across all length scales, particularly in the field of biomimetic and bioinspired engineering, as well as biomedical engineering, covering various topics on nanomechanics, biomechanics, biomimetic design, 3D fabrication and prototyping, biomedical material design, synthesis, and evaluation.

Vinicius Rosa

Vice Dean Research,
Vice Dean Graduate Studies

Faculty of
Dentistry National University
of Singapore

SINGAPORE

Vinicius is an Associate Professor at the NUS Faculty of Dentistry and Faculty at the NUS Centre for Advanced 2D Materials, studying the potential of graphene family materials for biomedical and dental applications. His first work in the field has shown that graphene coatings and scaffolds induce osteogenic differentiation and mineralization and elucidate the mechanosensitive pathways involved in such a phenomenon. Finally, Vinicius uses graphene to physically delay the development of biofilms on titanium, giving this material a potential candidate to prevent infections of implants without using antibiotics. He has championed the development of clean engineering solutions to deposit graphene onto objects with complex shapes and sizes, like dental and orthopedic implants. The work performed by Vinicius has a broad audience that includes primary, medical, and dental scientists and has been consistently published in premier periodicals like Nanotoxicology, 2D Materials, Carbon, Dental Materials, Journal of Dental Research, and others. He received the Academy of Dental Materials Student Award (2005), George C. Paffenbarger Student Research Award (2007), IADR Distinguished Scientist Award Young Investigator Award, and the IADR/DMG Stephen Bayne Mid-career Award (2021). In July 2023, Vinicius became the Vice-President of the International Association for Dental Research Dental Materials Group (DMG). He is an associate editor for the Journal of Prosthodontics and an editorial board member for Dental Materials, Journal of Dental Research, Journal of Endodontics, JADA Foundational Science, and others.

Yu Na

Associate Professor

National Dental Centre
Singapore

Duke-NUS Medical School

SINGAPORE

Dr Yu Na is a Senior Dental Surgeon at the National Dental Centre Singapore (NDCS) and Assistant Professor at the DUKE-NUS Medical School. Trained as a dentist and prosthodontist, she subsequently obtained her PhD in Medical Science at Faculty of Dentistry from Radboud University Nijmegen in the Netherlands. She is the first dentist in Singapore to have obtained the Clinician-Scientist Award from the National Medical Research Council (NMRC). As director and theme lead of Medtech research for oral-health Academic Clinical Programme, much of her research work is focused on innovative workflows for digital dentistry of removable prosthesis, including digital processing, 3D printing of dental appliances, novel biomaterials and regenerative dentistry.

Zayim Razina

National Dental Centre Singapore

SINGAPORE

Dr Zayim Razina obtained her doctorate in Bioengineering at the Nanyang Technological University. After graduation, she joined National Dental Centre Singapore as a postdoctoral fellow to continue the development of a minimally invasive microneedle technology for the purpose of achieving dental anaesthesia. Her key research interest lies in developing innovations that can be translated towards improving patient experience and care. Dr Zayim Razina has published high impact papers in internationally recognised journals and had received accolades for her work.

Tae-Sik Jang

Assistant Professor

Department of Materials Science & Engineering, Chosun University

SOUTH KOREA

Tae-Sik Jang is an Assistant Professor in Department of Materials Science and Engineering at Chosun University. Prior to being appointed as a full time faculty member in 2020, he worked as a research professor at Seoul National University Boramae Medical Center. From 2017 to 2018, he also worked as a research fellow in School of Chemical and Biomedical Engineering at Nanyang Technological University.

Prof. Jang maintains research activities focused on surface nanoarchitectures of dental implants; advanced additive manufacturing technology for developing customized biomedical implants; inorganic-organic hybrid materials for tissue regeneration; biodegradable tissue scaffolds. He has published articles in the *Advanced Functional Materials, Bioactive Materials, Biomaterials, Advanced Sciences, Additive Manufacturing, Biofabrication, and International Journal of Bioprinting.*

Anders Gustafsson

Professor of Periodontology

Dep. Of Dental Medicine, Karolinska Institutet

SWEDEN

Anders Gustafsson is a professor of Periodontology at the department of Dental Medicine, Karolinska Institutet. Gustafsson earned his dental and doctoral degrees at Karolinska Institutet. In 2005, he was appointed Professor of Periodontology and became head of the unit for Periodontology and Dental Hygiene. He has authored >115 articles within the fields of periodontology and inflammation. Gustafsson's main research focus is on the pathogenesis of periodontitis and the association between periodontitis and systemic diseases, primarily cardiovascular disease and diabetes. Gustafsson has been teaching undergraduate students on the dentist and dental hygiene programs for more than 30 years. He has supervised a large number of undergraduate, master and PhD students.

Ida Brännemo

Senior Consultant in Pediatric Dentistry

Karolinska Institutet, Stockholm

SWEDEN

Dr Ida Brännemo graduated as a dentist at Karolinska Institutet in 2009. In 2018 she completed her pediatric dentistry specialization at Karolinska Instutitet and is scheduled to finish her PhD in 2024. Her research focus is on oral health in preschool children and prevention strategies in collaboration with the Child Health Services in Sweden to benefit oral and general health in young children. Her work includes coordination and implementation of clinical research projects as well as oral health education of parents and non-dental professional. She is an appreciated lecturer and is often engaged to give lectures on her research topic, dental caries in preschool children.

Malin Ernberg

Professor, Senior Dentist

Department of Dental Medicine

Division of Oral Diagnostics and Rehabilitation

Faculty of Odontology, Karolinska Institutet (KI)

SWEDEN

Professor in Clinical Oral Physiology and Senior Consultant. Head of the Division of Oral Diagnostics and Rehabilitation. Clinical work at the Specialist Clinic at the University Dental Clinic.

Malin Ernberg received her dental degree (DDS) at Karolinska Institutet 1979 and received her Specialist Diploma in Orofacial Pain/TMD in 1995. In 1999 she defended her PhD thesis and in 2004 she was appointed Associate Professor at KI. Between 2004 and 2006 she was guest researcher at the Department of Orofacial Pain at Aarhus University, Denmark during a total of 1 year. From 2009 to 2014 she had a 50% clinical research position financed by the Swedish Research Council and was 2012 appointed Professor in Clinical Oral Physiology at KI. During 2011 and 2012 she was the President of the Neuroscience Group of the International Association for Dental Research (IADR) and between 2013 to 2016 the President of the Swedish Pain Society, the national chapter of the International Association for the Study of Pain (IASP). At the same time she was also a member of the European Pain Federation's (EFIC) Council. Presently she is the President of the European Academy of Orofacial Pain and Dysfunction (EAOPD).

She has co-authored more than 120 original papers, review papers and book chapters.

Margaret Sällberg Chen

Professor

H5 Department of Laboratory Medicine, Patologi

SWEDEN

Professor in Clinical Oral Immunology. Research Group Leader. Faculty Representative Research Education Committee at Karolinska Institutet. Margaret Sällberg Chen received her D.D.S. and Ph.D. degrees from Karolinska Institutet. Following postdoctoral trainings at The Scripps Research Institute, La Jolla, USA, where she developed T cell receptor transgene models for immunological studies of infection and cancer, she was recruited to the former Swedish Institute for Infectious Disease Control to study experimental vaccines and infection immunology. She became full professor 2020 at KI. She has published 90 scientific articles which have been cited by around 4000 other studies. She has active commitments on numerous scientific and editorial board.

Tulay Lindberg

Researcher

Division of Orthodontics and Paediatric Dentistry

Paediatric Dental Unit

SWEDEN

M.Sci - Stockholm University 1988
M.Med.Sc - Karolinska Institutet 1989
Ph.D - Karolinska Institutet 1999
Associate Professor - Karolinska Institutet 2007

Nareudee Limpuangthip

Assistant Professor

Department of Prosthodontics

Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand

THAILAND

Nareudee Limpuangthip completed her PhD program in 2018 and has been serving as an academic staff member at the Department of Prosthodontics, Faculty of Dentistry, Chulalongkorn University since then. From December 2019 to November 2021, she held the position of secretary for the IADR-SEA (International Association for Dental Research - Southeast Asia division) and currently serves as a council member of the organization. In 2022, she was honoured with the IADR-SEA Young Investigator Research Award as well as the Young Investigator Research Award (Health Science category) from Chulalongkorn University.

Her research interests primarily revolve around prosthodontic treatment strategies and options, dental materials, and exploring the connection between oral health and general health. Through her work, she aims to enhance the accessibility of oral care, improve oral health outcomes, and enhance overall quality of life.

Phanomportm Vanichanon

MSc, DDS

THAILAND

Dr Phanomporn Vanichanon, an Assist. Professor, was the former head of Occlusion Department at Faculty of Dentistry, Chulalongkorn University, Thailand. Dr Vanichanon obtained her MSc degree from the University of Michigan. She is a member of the executive Thai board of Occlusion and Orofacial pain. She has been a special lecturer for many universities and conferences in Thailand. Dr Vanichanon is also received teaching award from the faculty and an outstanding dentist award in the field of Occlusion and Orofacial pain from the Royal College of Dental Surgeons of Thailand. Dr Vanichanon is the team leader in DC-TMD Thai translation. Her research focuses on temporomandibular disorders, chronic orofacial pain, bruxism and dental occlusion.

Thanaphum Osathanon

Professor,
Associate Dean
in Research Affairs

Dental Stem Cell
Biology Research Unit,
Faculty of Dentistry,
Chulalongkorn University

THAILAND

Professor Osathanon earned his bachelor's degree Doctor of Dental Surgery from Chulalongkorn University, Thailand, and further his graduated study Doctor of Philosophy in Oral Biology from the University of Washington, USA. He formerly served as Director of the Oral Biology Research Center, Faculty of Dentistry, Chulalongkorn University. Currently, Professor Osathanon is an Associate Dean in Research Affairs and Deputy Director of CU Dental Innovation Center at the Faculty of Dentistry, Chulalongkorn University, Thailand. He is also a chair of the Dental Stem Cell Biology Research Unit. He served as the Senior Expert at the Center for Dental Competency Assessment and Accreditation, the Dental Council of Thailand, and the Chair of the Biomedical and Dental Science Examination Development Committee, the Dental Council of Thailand. He published more than 100 publications with numerous international collaborations. His research interests are 1) intracellular pathways modulated stem cell function; 2) mechanical force and osteogenic differentiation; and 3) biomaterials and dentin/dental pulp regeneration.

Waranuch Pitiphat

Associate Professor

Division of Dental Public Health, Department of Preventive Dentistry, Faculty of Dentistry, Khon Kaen University

THAILAND

Dr Waranuch Pitiphat is Associate Professor and former Dean of Khon Kaen University Faculty of Dentistry in Thailand. She received DDS from Chulalongkorn University and MPHM from Mahidol University in Thailand, and later obtained MS and SD in Epidemiology from Harvard University, where she also completed Dental Public Health Residency in 2004. Dr Pitiphat is a Diplomate of the Thai Board of Dental Public Health and has held leadership positions in several international and national organizations. She is Past President of the Asian Academy of Preventive Dentistry (AAPD) and the Thai Society of Public Health Dentistry, as well as former Honorary Secretary of the South East Asia Association for Dental Education (SEAADE). She is a member of the Board of Directors of DeRouen Center for Global Oral Health at the University of Washington, USA, and Distinguished Adjunct Faculty of Saveetha Institute of Medical and Technical Sciences, India.

Dr Pitiphat is active in research particularly relating to the oral health-systemic disease link and epidemiology of oral diseases. Dr Pitiphat has over 90 publications in peer-reviewed journals and has served in numerous editorial boards, including Journal of Dental Research (JDR), JDR-Clinical & Translational Research, and Oral Diseases. She has won several grants from both local and international agencies including the US National Institutes of Health (NIH). She currently serves as the Director of the NIH-funded program, "Clinical and Public Health Research Training in Oral Health for Southeast Asia", to provide clinical research training to faculty from dental schools across the region.

Sarah R Baker

Editor-in-Chief, Community Dentistry and Oral Epidemiology

School of Clinical Dentistry

University of Sheffield, UK

UNITED KINGDOM

Professor Sarah R Baker, PhD, holds a Chair in Psychology as applied to Dentistry at the School of Clinical Dentistry, University of Sheffield, UK. She is Past President of the Behavioural, Epidemiologic, and Health Services Research group of the International Association of Dental Research. Professor Baker has an Honorary Professorship at University College London, is a Fellow of the College of General Dentistry, and a Chartered Psychologist of the British Psychological Society.

Professor Baker has been the Editor-in-Chief of the international flagship journal Community Dentistry and Oral Epidemiology since June 2021, and was Associate Editor from 2011-2021. She also sits on the Editorial Boards of the journals, Evidence-Based Dentistry and Community Dental Health. She has published over 250 peer-reviewed publications, and received over £8 million in funding from research councils, charities and industry. She collaborates with dental and social science researchers across the world in a wide range of areas in the oral health field including dental public health, periodontal disease, children's oral health, dental anxiety, dry mouth, dentine hypersensitivity, gerodontology, dental caries, systems science, behaviour change, and implementation science.

Professor Baker has received many awards for her contributions to social and behavioural sciences in dentistry. Most recently, she was the 2018 recipient of the International Association of Dental Research Distinguished Scientist Award for Behavioural, Epidemiologic and Health Services Research, and has received the IADR Giddon Award for best paper in Behavioural, Epidemiological and Health Services Research in 2013, 2016 and 2022.

Hoang Trong Hung

Vice-Dean In Charge

Vice-President,
Vietnam Odonto-Stomatology Association

Dental Public Health

Faculty of
Odonto-Stomatology,
University of Medicine and Pharmacy at Ho Chi MInh

VIETNAM

Dr Hoang is the Vice Dean in charge and the Head at the Department of Dental Public Health at the Faculty of Odonto-Stomatology, University of Medicine and Pharmacy in Ho Chi Minh City, Vietnam. He is the President Elect of the International Association for Dental Research Southeast Asian Division. He received D.D.S. from the University of Medicine and Pharmacy at HCMC in 1995, finished M.Sc and Ph.D of Odonto-Stomatology in 2003 and 2017 respectively. His major research areas include dental public health, preventive dentistry, dental education and digital dentistry in recent. Dr Hoang has become an invited speaker and received awards at many international dental conferences since 2005, including: the Second Prize of Travel Award from IADR-SEA Division in 2003; "Exellence Poster Award" at Bio-Dental Education & Research in Hiroshima, University of Hiroshima, Japan, 2011; The "Third Prize" for Oral Presentation at the 30th Annual Scientific Meeting of the South East Asia Association For Dental Education" at SEAADE in 2019; and the "Best paper for Innovations in Dental Education during the COVID-19" at the SEAADE meeting 2021.

CONFERENCE INFORMATION

CONFERENCE INFORMATION

Venue

The Academia (Singapore General Hospital Campus)
20 College Road
Singapore 169856

Conference Secretariat

MY Consultant Services
Blk 438 Choa Chu Kang Avenue 4 #12-479 Singapore 680438
Attention : Ms Marianne Yee
Email : admin@projectconsultants.com
secretariat@iadr-sea2023.com
Mobile : (65) 98334651

Secretariat – ACP Office

Email : Ms Chen Yitong
Mobile : (65) 9751 4095

Housing Bureau – Conference Hotels

Burnaby Solutions Pte Ltd
1 Yishun Industrial Street 1
A'Posh Bizhub Unit 07-12
Singapore 768160
Mobile : (65) 9677 0917
Office : (65) 6911 0855

Trade Booth and Related Build Up Contractor

Pico Art International Pte Ltd
Pico Creative Centre
20 Kallang Avenue Singapore 339411
Contact Person : Ms Freyja Tai
Mobile : (65) 90694881
E-mail : freyja.tai@pico.com

Welcome Reception – 22 November 2023: 7.00pm to 9.30pm

(part of conference registration fee)
EMPRESS
1 Empress Place, #01-03
Asian Civilisations Museum, Singapore, 179555

Congress Banquet

(on subscription basis, please check with the secretariat)
Sheraton Towers Hotel, Singapore
39 Scotts Road, Singapore 228230

Registration Fee

Registration fee is paid in Singapore Dollars and will include one Welcome Reception held on 22 November 2023 and all related coffee and lunch breaks during the conference proper days. E-certificates will be sent out after 10 days of the conference.

Official Language

English language will be used throughout all sessions unless otherwise stated.

Registration Counter Opening Hours

Registration counter opening hours:

22 November 2023	12noon to 6.00pm
23 & 24 November 2023	8.00am to 6.00pm

Cancellation and Refund Policy

Registration Fees will be refunded upon receipt of a written notice of cancellation as follows:

Before & on 31 October 2023	70% refund
From 1 November onwards	NO refund

Immigration and Travel Matters

All visitors entering Singapore must complete the SG Arrival Card:
https://eservices.ica.gov.sg/sgarrivalcard/
This is mandatory.

Liability

The Organising Committee is not liable for personal accidents, loss or damage or private properties of registered participants during the Congress. Participants should make their own arrangements with respect to personal insurance.

Disclaimer

Whilst every attempt will be made to ensure that all aspects of the Congess published in this announcement will take place as scheduled.

The Organising Committee shall not be held responsible should it fail to materialise for any reason.

CONFERENCE WORKSHOPS

Day 1
22 November 2023

DAY 1: WEDNESDAY, 22 NOVEMBER 2023

1.30pm - 5.30pm Room: L1-S3

Workshop 1: SUCCESSFUL SCIENTIFIC PUBLISHING & PEER-REVIEWING

Prof Stuart Dashper and Dr Ankur Singh (Australia)

Synopsis

This workshop will be held by Dr Ankur Singh, an Associate Editor for Community Dentistry and Oral Epidemiology and peer reviewer for more than 10 highly reputed dental, public health and epidemiological journals and Professor Stuart Dashper who is a microbiologist and on the Advisory Board of Journal of Dental Research. During the workshop we will explain the peer review process and will share practical tips for students and early career academics to prepare journal articles for peer reviewed journals. Key attention will be given to preparation of cover letters, titles, abstracts and key methodological aspects that drive decisions for rejection or acceptance of peer reviewed articles.

1.30pm - 3.30pm Room: L2-T1

Workshop 2: ARTEFACTS IN CBCT: HOW DOES IT INFLUENCE MY TREATMENT PLANNING?

Prof Rubens Spin-Neto (Denmark)

Synopsis

CBCT images provide accurate 3D visualisation of relevant dentomaxillofacial structures, and have been proven a good fit for a set of clinical diagnostic tasks. However, the presence of artefacts in the images poses as one of the major challenges in getting to optimal diagnostic image quality. In this workshop we will discuss the most common artefacts that take place in CBCT volumes, disclosing their causes, risk factors, and possibilities for correcting and/or avoiding them.

1.30pm - 3.30pm Room: L2-T1

Workshop 3: DENTAL-DEDICATED MRI, A NEW FRONTIER IN DENTOMAXILLOFACIAL DIAGNOSIS

Prof Rubens Spin-Neto (Denmark)

Synopsis

The further development of MRI tailored for dentistry has been expected as one of the key technological advancements for diagnostic imaging. Up until now, conventional MRI systems have been difficult to fit into dentistry. As compared to conventional MRI systems, a new breed of dental-dedicated MRI (ddMRI) systems is reaching the scientific and clinical world. These key characteristics create a promising outlook for the widespread availability of ddMRI systems in similar fashion as CBCT. In this workshop, we will discuss ddMRI technology in a nutshell, the current state-of-the-art and the clinical validation of this new modality, provided by most recent scientific evidence. The workshop will highlight the applicability and how some of the unique engineering features of a new breed of ddMRI systems can break down the barriers of dentists' access to MRI and facilitate the integration of this imaging modality into dentistry.

DAY 1: WEDNESDAY, 22 NOVEMBER 2023

1.30pm - 5.30pm A.L.I.C.E @ SGH Campus

Workshop 4:
INNOVATION CONNECT: ENABLING THE NEXT GENERATION OF ORAL HEALTH INNOVATORS

Synopsis

In the first part of this session, through interactive activities, participants will learn the concept of needs-based approach in the identification, filtration and validation of unmet oral needs. Trainers from the Singapore Biodesign (SB), first Asian Global Affiliated of the renowned Stanford Byers Centre for Biodesign, will further guide innovators to perform stakeholders analysis, formulate solution development plans, define market access, and navigate regulatory compliance and intellectual properties protection. Next, experts from the SingHealth Duke-NUS Global Health Institute (SDGHI) will share with the participants the necessary skills, knowledge and experiences needed to elevate regional oral health standards through SDGHI's initiatives and networks. Through the blended learning approach, SDGHI hopes to share their expertise with likeminded oral professionals to explore ways to address the need of future oral health challenges in this region. Lastly, participants will able to hear from their peers from National Dental Centre Singapore (NDCS) on their innovation journey from early phase solution conceptualization, development of proof-of-concept, all the way to clinical validation of the developed solutions. Partners of NDCS will also be sharing their experiences in commercializing solutions developed by dental innovators in NDCS.

Programme

1.30pm - 1.35pm	**Session Introduction and Moderator Address** *Asst Prof Yu Na (Singapore)*
1.35pm - 2.20pm	**Introduction to Biodesign – an Internationally Validated Methodology for Health and Medtech Innovation** *Dr Lee Phin Peng (Singapore)*
2.20pm - 2.35pm	**Q&A for Biodesign**
2.35pm - 3.20pm	**SingHealth Duke-NUS Global Health Institute Sharing** *A/Prof Jonas Karlstroem (Singapore)*
3.20pm - 3.35pm	**Q&A for SingHealth Duke-NUS Global Health Institute**
3.35pm - 3.50pm	Tea Break
3.50pm - 4.50pm	**NDCS Spinoffs/Innovators Sharing on Commercialization**
3.50pm - 4.05pm	**Innovate, Translate, Regenerate: The Path from Ideation to Clinical Impact** *Asst Prof Hemant Vijaykumar Unadkat (Singapore)*
4.05pm - 4.20pm	**Bioresorbable Scaffolds for Bone Regeneration** *Dr Charles Lau (Singapore)*
4.20pm - 4.35pm	**Innovation Connect in Digital Dentistry: A Journey of Software Development for Efficient Chairside Design and Dental Prosthesis Workflow** *Asst Prof Yu Na (Singapore)*
4.35pm - 4.50pm	**Improving Patient Experience – In a Journey from Innovation to Reality** *Dr Zayim Razina D/O Seeni Syed (Singapore)*
4.50pm - 5.30pm	Networking Session

DAY 1: WEDNESDAY, 22 NOVEMBER 2023

PREVIEW OF COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY JOURNAL'S SPECIAL ISSUE ON SINGAPORE ORAL HEALTH

Room: L1-S2

Synopsis

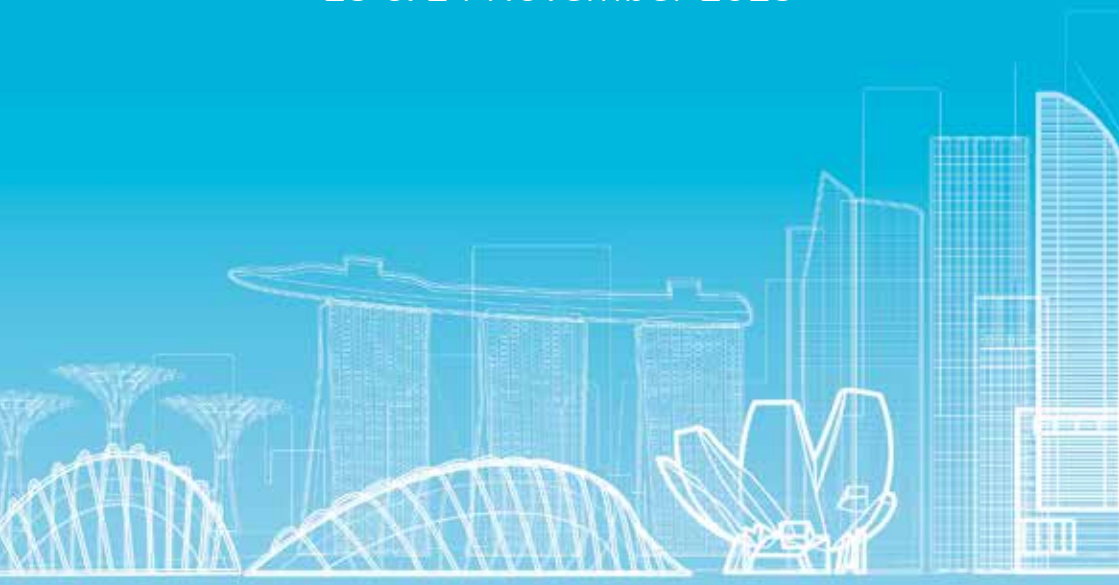
Community Dentistry and Oral Epidemiology is the leading international journal within the field of oral epidemiology, community dentistry, social and behavioural sciences in dentistry, and dental services research. The journal publishes novel and high-quality research including original research papers, critical review articles and commentaries. The journal is celebrating its 50th Anniversary in 2023. This presentation by the Editor-in-Chief will outline the mission, scope, values and approach of the journal. It will provide an overview of its research themes, trending topics and leading contributions over its 50 year history. The presentation will conclude with the launch of the Special Issue on Singapore Oral Health entitled 'From 3rd to 1st world in 50 years - Population oral health in an emerging nation'.

Programme

2.25pm	**Arrival of Guest-of-Honour** *Associate Professor Chng Chai Kiat, Chief Dental Officer*
2.30pm	**Opening Address** *Associate Professor Chng Chai Kiat, Chief Dental Officer*
2.35pm	**Celebrating Community Dentistry and Oral Epidemiology 50th Anniversary Year** *Prof Sarah R Baker, University of Sheffield, UK*
2.55pm	**Trends in Adult Oral Health Needs and Demands in Singapore** *Prof Finbarr Allen, University College Cork, UK*
3.15pm	**Monitoring Singapore Oral Health – A Journey Over the Past 50 years** *Prof Marco Peres, National Dental Centre Singapore*
3.35pm	**Q&A**
4.00pm	**End / Tea Reception at Lobby Area**

MAIN CONFERENCE PROGRAMME

23 & 24 November 2023



9.10am **Plenary Lecture 1**
Achieving Universal Oral Health Coverage for All
Prof Marco Peres, Deputy CEO Research & Education, National Dental Centre, Singapore

9.40am **Panel discussion: Oral Health Coverage for All – A Southeast Asian Perspective**
Moderator: Prof May Wong (Hong Kong SAR)

Achieving universal health coverage for oral health in Thailand: Current Situation and Challenges
A/Prof Waranuch Pitiphat (Thailand)

Challenges in Achieving Universal Health Coverage for Oral Health in Hong Kong
Prof Edward Lo (Hong Kong SAR)

Oral Health Promotion in Vietnam: Opportunities and Challenges
Prof Hoang Trong Hung (Vietnam)

Current progress and challenges in achieving Universal Health Coverage for Oral Health in Cambodia
Prof Callum Durward (Cambodia)

11.00am - 12.30pm *For Oral Sessions 1, 2, 3, please refer to pages 64 - 66*

12.30pm **Unilever Sponsored Lunch Session**
Understanding and Managing the Dental Caries Challenges in South East Asia
Moderator: A/Prof Armelia Sari Widyarman (Indonesia)

- Cl A/Prof Christina Sim, National Dental Centre Singapore
- Dr Iwan Dewanto, University Muhammadiyah Yogyakarta (Indonesia)
- Prof Hoang Trong Hung, University of Medicine and Pharmacy (Cambodia)
- Prof May Chun Mei Wong The University of Hong Kong (Hong Kong SAR)
- Madhurjya Banerjee, Global Brand Director Pepsodent, Unilever Oral Care

DAY 2: THURSDAY, 23 NOVEMBER 2023

12.30PM - 1.30PM **CONCURRENT SESSIONS**
LUNCH AND LEARN SESSIONS

Lunch and Learn 1: Challenges and Opportunities in Publishing Contemporary Research **ROOM: L1-S1**
A/Prof Vinicius Rosa (Singapore)

Building an independent scientific career hinges significantly on publishing original and impactful research papers. However, manuscript publication involves several equally essential phases, from acquiring compelling data to effectively communicating the entire research journey. Unfortunately, postgraduate training primarily focuses on subject specialization and research activities, leaving students with only a vague understanding of the multifaceted publication process, typically guided by supervisors and principal investigators.

Consequently, fresh graduates and early career researchers may feel ill-prepared or unaware of the challenges associated with publishing. Challenges include selecting the appropriate journal, collaborating with co-authors, preparing drafts and cover letters, and managing expectations throughout the peer-review process, involving editors, editorial boards, administrators, and reviewers. This session will provide students and early career researchers with a platform to explore two key areas. Firstly, we will explore the essentials, challenges, and opportunities for effective science communication. Understanding how to articulate their research effectively is vital for increasing the impact of their work. Secondly, participants will gain valuable insights from editorial and reviewer perspectives, offering invaluable guidance for achieving successful submissions and publications. This session aims to equip emerging researchers with the knowledge and skills necessary to excel in their scientific careers by bridging the gap between postgraduate training and the actualities of publishing. Students and early career researchers can overcome challenges and significantly contribute to their respective fields with a comprehensive understanding of the publication process.

Lunch and Learn 2: Leveraging Bioengineering Technologies for Impactful Research **ROOM: L1-S1**
Asst Prof Gopu Sriram (Singapore)

This session will highlight the integration of various bioengineering advancements in oral, dental and craniofacial research to drive innovation and improve patient outcomes. The potential application of cutting-edge techniques such as 3D printing, microfluidics, tissue engineering, and biomaterials, and their applications in oral health will be discussed. Explore the exciting possibilities of leveraging cutting-edge bioengineering technologies to understand interactions between host-microbiome and host-materials and the development of novel therapeutics, regenerative dentistry, and personalized treatment approaches. Participants will have the opportunity to visualize and gain valuable insights on various microfluidic devices used for oro-dental research, and network with fellow researchers in the field.

Lunch and Learn 3: Immunity in the Oral Cavity **ROOM L1-S3**
Prof Margaret Sällberg Chen (Sweden)

DAY 2: THURSDAY, 23 NOVEMBER 2023

12.30PM - 1.30PM **CONCURRENT SESSIONS**
LUNCH AND LEARN SESSIONS

Lunch and Learn 4: Oral Microbiome in Health and Disease **ROOM: L1-S3**
A/Prof Tulay Yucel-Lindberg (Sweden)

Periodontal disease (periodontitis) plays a major role in tooth loss and remains one of the most prevalent chronic infectious inflammatory diseases, affecting approximately 25–40% of the adult population. The most severe form of the disease affects around 5–15% of the global population. The disease develops due to intricate interactions between periodontal microorganisms and their products, initiating a host inflammatory response. Moreover, periodontitis is associated with an increased risk of developing various chronic systemic conditions, including cardiovascular disease, rheumatoid arthritis, diabetes, Alzheimer's disease, and certain types of cancers. This Lunch and Learn session will briefly summarize and discuss the studies conducted by our group on the oral microbiome, focusing on both periodontal health and disease.

Lunch and Learn 5: MRI in Dentistry: A New Era? **ROOM: L1-S4**
A/Prof Rubens Spin-Neto (Denmark)

In this informal session, the goal is to open space for discussion and planning of research partnerships in dental-dedicated MRI. As a follow-up from the workshop that takes place the day before, the lunch & learn session will allow the participants to put an answer to possible questions that appeared after reflection on the topic.

1.30pm - 3.00pm *For Oral Sessions 4, 5, 6, please refer to pages 67 - 69*
For Hatton Competition, please refer to pages 76 - 78

3.00PM - 4.15PM
SYMPOSIUM 1: THE LATEST INSIGHTS INTO ORAL SYSTEMIC HEALTH CONNECTION **ROOM: L1-S1**
Moderator: Prof Fábio Leite (Singapore)

3.05pm **Oral Dysbiosis in Human Systemic Diseases**
Prof Stuart Daspher (Australia)

3.20pm **The Importance of Bacterial Conversion of Nitrate to Nitrite for Oral and Systemic Health**
Prof Nobuhiro Takahashi (Japan)

3.35pm **Periodontitis increases the risk for subsequent cardiovascular events**
Prof Anders Gustafsson (Sweden)

3.50pm **The Role of Dyslipidaemia and Microcirculatory Dysfunction in the Association Between Diabetes and Periodontitis**
Prof Fábio Leite (Singapore)

4.05pm End of Session

DAY 2: 23 NOVEMBER 2023

3.00PM - 4.15PM

SYMPOSIUM 2: DIGITAL DENTISTRY, ARTIFICIAL INTELLIGENCE, AND ROBOTICS **AUDITORIUM**

Moderator: Asst Prof Yu Na (Singapore)

3.05pm	**Current Perspectives of AI in Dental Anesthesiology: Hype, Hope, and Hurdles** *Prof Kentaro Mizuta (Japan)*
3.17pm	**SmartRPD: Automating Removable Partial Denture Fabrication through 3D Generative Computer-Aided Design** *Asst Prof Yu Na (Singapore)*
3.29pm	**Towards a Robotic Approach to Personal Care: Addressing Oral Hygiene Negligence in Elderly Populations** *Prof Domenico Campolo (Singapore)*
3.41pm	**Virtual 3D Models to Enhance Education in Dentistry** *Prof Rita Hardiman (Australia)*
3.53pm	**The Use of Extended Reality (XR technology) in Helping Improve Orthodontic Education and Treatment Outcomes** *Prof Anand Marya (Cambodia)*

4.45PM - 5.45PM

SYMPOSIUM 3: POPULATION ORAL HEALTH **AUDITORIUM**

Moderator: Asst Prof Yu Na (Singapore)

4.50pm	**How Does our Social Environment Affect our Oral Health and Well-being?** *Prof Ken Osaka (Japan)*
5.02pm	**Sugar Consumption and Child Oral Health** *Dr Ida Brännemo (Sweden)*
5.14pm	**Measurement of Sugar Intake in Oral Health Research: A Global Perspective** *A/Prof Karen G Peres (Singapore)*
5.26pm	**Silver Diamine Fluoride Therapy for Dental Care** *Dr Ollie Yu (Hong Kong SAR)*
5.38pm	End of Session

DAY 2: 23 NOVEMBER 2023

4.45PM - 5.45PM
SYMPOSIUM 4: STEM CELL & TISSUE ENGINEERING **ROOM: L1-S2**
Moderator: Asst Prof Waruna Dissanayaka (Hong Kong SAR)

4.50pm	**Mechanical Stimulation Modulates Dental Stem Cell Responses** *Prof Thanaphum Osathanon (Thailand)*
5.02pm	**Stem Cell/Nanotechnology-Based Strategies in Regenerative Prosthodontics** *Prof Hiroshi Egusa (Japan)*
5.14pm	**Towards 'smart' materials: Regeneration of the Dentine-Pulp Complex** *Prof Alastair Sloan (Australia)*
5.26pm	**Divergent Roles of Activin A and TGF-b in the Crosstalks between DPSCs and Endothelial Cells** *Prof Chengfei Zhang (Hong Kong SAR)*

4.45PM - 5.45PM
SYMPOSIUM 5: BIOMATERIAL SCIENCE AND BIOMECHANICS IN DENTISTRY **ROOM: L1-S3**
Moderator: Prof Guang Hong (Japan)

4.50pm	**The Possibility of Zirconia Dental Implant** *Prof Guang Hong (Japan)*
5.05pm	**Titanium-based Dental Implants with Nanoarchitectured Surface Morphology** *Asst Prof Jang Taesik (South Korea)*
5.35pm	End of Session

DAY 3: FRIDAY, 24 NOVEMBER 2023

9.00am - 10.40am *For Oral Sessions 7, 8, 9, please refer to pages 70 - 72*

11.00AM - 11.30AM **AUDITORIUM**

11.00am **Plenary Lecture 2**
Microbiome Modulation and Fluoride Activation by a Saliva Biomimetic Promotes Oral Health
Laureate Professor Eric C. Reynolds
Oral Health CRC, Melbourne Dental School, The University of Melbourne

11.30AM - 12.30AM **CONCURRENT SESSIONS**

SYMPOSIUM 6: IMPROVING ACCESS TO ORAL CARE USING TELE-DENTISTRY **ROOM: L1-S1**
Moderator: Cl A/Prof Christina Sim (Singapore)

11.32am **Medical-Dental tele-Collaboration to Improve Oral Care for Vulnerable Seniors**
Cl A/Prof Christina Sim (Singapore)

11.50am **Teledentistry: Digital Dentistry that Improves Oral Health**
A/Prof Armelia Sari Widyarman (Indonesia)

12.08pm **Breaking Barriers to Oral Healthcare: The Introduction of Teledentistry for Thai Prisoners**
Asst Prof Nareudee Limpuangthip (Thailand)

12.26pm End of Session

SYMPOSIUM 7: **AUDITORIUM**
INNOVATIVE STRATEGIES FOR OROFACIAL REGENERATION AND DISEASE MODELLING
Moderator: Asst Prof Hemant Vijaykumar Unadkat (Singapore)

11.35am **3B's of 3D Printed Bone Substitutes**
Asst Prof Nileshkumar Dubey (Singapore)

11.50am **From Lab to Life: AI & Materiomics Fast-Track Orofacial Regeneration**
Asst Prof Hemant Vijaykumar Unadkat (Singapore)

12.05pm **Novel Implants**
A/Prof Roy Judge (Australia)

DAY 3: FRIDAY, 24 NOVEMBER 2023

11.30AM - 12.30AM **CONCURRENT SESSIONS**

IADR-SEA DIVISION MENTOR-MENTEE SHARING SESSION **ROOM: L1-S3**

11.30am - 11.40am **Introduction of Mentor-Mentee Programme**
Dr Jaya Seneviratne (Australia)

11.40am - 12.20pm **Mentee Sharing (10 minutes presentation + 2 minutes Q & A)**

- *Dr Caesary Cloudya Panjaitan (Indonesia)*
  Title: Topical Fluoride-Varnish Shifts Dysbiotic Plaque Microbiome towards Eubiosis in Children
  Mentors: Dr Armelia Sari Widyarman (Indonesia),
  Dr Jaya Seneviratne (Australia)

- *Dr Citra Fragrantia Theodorea (Indonesia)*
  Title: Children Salivary Ghrelin and Leptin with Stunted Growth in Nangapanda Indonesia
  Mentor: Dr Armelia Sari Widyarman (Indonesia)

- *Dr Vy Tran Ngoc Thuy (Vietnam)*
  Title: Medication-related Osteonecrosis of the Jaw: Histology and Osteoclast Profile in Comparison with Osteoradionecrosis of the Jaw and Osteomyelitis of the Jaw
  Mentor: Dr Risa Chaisuparat (Thailand)

12.20pm -12.30pm **Sharing by the Mentor**
Dr Risa Chaisuparat (Thailand)

NDRIS SPONSORED LUNCH SYMPOSIUM **AUDITORIUM**
"NDRIS PRESENTS: YOUNG INVESTIGATORS SYMPOSIUM
Moderator: Asst Prof Hemant Vijaykumar Unadkat (Singapore)

Programme

Decoding Maternal Health: Omics Approaches in Unravelling the Nexus between Oral and General Health During Pregnancy
Dr Preethi Prajod (Singapore)

Multi-omics Tools for Studying Oral Biofilms: A Translational Approach Towards Targeted Therapeutics Development
Dr Suriyanarayanan Tanujaa (Singapore)

Integrating AI into Digital Dentistry: Paving the way towards Precision, Efficiency, and Personalized Oral Care
Dr Jeffry Hartanto (Singapore)

An Immuno modulation therapy for MRONJ
Dr Ethiraj Lalith Prabha (Singapore)

DAY 3: FRIDAY, 24 NOVEMBER 2023

11.30AM - 12.30PM **CONCURRENT SESSIONS**

Lunch and Learn 6: Diagnosing TMD in General Practice – New Guidelines **ROOM: L1-S1**
Prof Malin Ernberg (Sweden)

In 2014 the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) was launched. The DC/TMD is now widely used by researchers and orofacial pain specialists and has been translated into more than 20 languages. However, due to a stressful schedule it has been difficult to get general dentists to use the DC/TMD, why a new and simplified shorter version of the examination protocol and axis II questionnaire has been developed to be used in general practice. This has good sensitivity and specificity for the TMD pain diagnoses and will be discussed during the lunch and learn session.

Lunch and Learn 7: Oral and Systemic Health: Data Linkage Capabilities **ROOM: L1-S2**
A/Prof Gustavo Nascimento (Singapore)

Several studies have identified an association between oral and systemic health. Cohort studies exploring the nature of this relationship — whether it's causal or predictive — require time and financial resources and are, hence, scarce. The use of electronic health records can be a valuable tool for exploring the oral-systemic relationship. Accordingly, the practical applications, benefits, and constraints related to the use of electronic health records in this context will be discussed in this L&L session.

Lunch and Learn 8: **ROOM: L1-S3**
The Lancet Commission on Oral Health:Recommendations from the Final Report
Prof Marco Peres (Singapore)

The Lancet Series On Oral Health published in July 2019 highlights the global public health importance of oral diseases and the urgent need for radical policy and system reform. The series explores the social and commercial determinants of oral diseases and identifies future action opportunities within the Non-Communicable Diseases (NCD) and Universal Health Care (UHC) agendas. After that, The Lancet created a Commission on Global Oral Health. created a Commission on Global Oral Health. This talk provides the updated developments of the Lancet Commission focusing on the global health inequalities, its origins in social and commercial determinants, and its costs in terms of human suffering and societal impact. As with most NCDs, oral conditions are chronic and strongly socially patterned. The personal consequences of chronic untreated oral diseases are often severe and include unremitting pain, sepsis, reduced quality of life, lost school days, family disruption, and decreased work productivity. The societal costs of treating oral diseases are a very high economic burden on families and the health care system. The WHO set up the Commission on Social Determinants of Health in 2005, with the objective to draw attention to social, political and economic factors associated with health inequalities and to support change in countries by promoting models and practices that effectively address the social determinants of health. This initiative received enthusiastic support from partner countries, which sponsored a research agenda. In 2009, under the direction of the International Association for Dental Research, a research network called Global Oral Health Inequalities was established; its research agenda was to examine global inequalities in oral health. Proposals highlighted the necessity to stimulate, promote, and foster research on global oral health inequalities, preferentially interdisciplinary collaboration among researchers with interest in global health inequalities. Although the definition of the agenda has been finalised, the development of multidisciplinary research is still very incipient and needs further implementation. The launch of the Lancet Global Health Commission is an excellent opportunity to update and expand this already proposed research agenda. This talk will provide an overview of the progress made by the Lancet Oral Health Commission.

DAY 3: FRIDAY, 24 NOVEMBER 2023

11.30AM - 12.30PM **CONCURRENT SESSIONS**

Lunch and Learn 9: 3D Printing Technology **ROOM: L1-S4**

A/Prof Song Juha (Singapore)

3D printing technology has revolutionized various sectors, and dentistry is no exception. This technology, also known as additive manufacturing, has proven to be a powerful tool that has brought a paradigm shift in dental practice, creating new opportunities for improved patient care. The application of 3D printing in dentistry ranges from the fabrication of dental models, orthodontic appliances, crowns, bridges, and implants to the creation of surgical guides, enabling precise and efficient treatments. It holds the potential to enhance personalized oral healthcare by enabling the production of patient-specific appliances, thereby improving comfort, fit, and treatment outcomes. This session will commence with a comprehensive overview of 3D printing technologies and their applications in dentistry, spanning the creation of precise dental models, custom orthodontic appliances, implants, crowns, bridges, and surgical guides. The ability of 3D printing to produce patient-specific appliances introduces a new dimension of personalization, enhancing patient comfort and treatment outcomes.

3.00PM - 3.45PM **AUDITORIUM**

CORLISON SPONSORED SESSION

Development of Defenze Mouth Rinse Targeting SARS-CoV-2 in Saliva: The Journey

Speakers
- *Mr Andy Ong, Marketing Director, PearlieWhite (Singapore)*
- *Dr Jaya Seneviratne (Australia)*

The emergence of the highly infectious novel coronavirus SARS-CoV-2, first reported on December 31, 2019, subsequently led to the global COVID-19 pandemic. To date, nearly 700 million people have contracted SARS-CoV-2, and over seven million have tragically lost their lives. The pandemic reached its peak in 2020 and 2021, challenging healthcare systems worldwide with a rapid surge in morbidity and mortality. In Singapore, one of the hotspots during this period was the dormitories housing foreign workers. To control the spread of COVID-19, temporary medical care facilities were established within these dormitories. This extensive operation received support from multiple government agencies, including the National Dental Centre Singapore (NDCS). Within this large-scale effort, NDCS staff collaborated across various professional backgrounds, including clinicians, nurses, pharmacists, radiographers, and medical social workers. Dr Jaya Seneviratne volunteered for this medical engagement, providing him with real-time experience in infection control.SARS-CoV-2 transmission routes include indirect contact with contaminated surfaces and direct exposure to infectious respiratory and salivary droplets, as well as aerosols. COVID-19-positive patients can have high viral loads of SARS-CoV-2 in their saliva. The practice of dentistry was significantly affected during this period due to concerns about disease transmission. The CDC's Interim Infection Prevention and Control Guidance for Dental Settings suggested that pre-procedural mouth rinses may reduce SARS-CoV-2 viral loads or prevent transmission. In response, Dr Seneviratne led a team in conducting the world's first randomized clinical trial to assess the effectiveness of commercial mouth rinses in reducing salivary SARS-CoV-2 levels in COVID-19 patients. The results indicated that specific formulations could be useful as pre-procedural mouth rinses to help reduce the transmission of COVID-19. This discovery significantly increased commercial interest in this area. In collaboration with Corlison, a Singapore-based oral healthcare industrial partner, the NDCS research team developed a new mouth rinse "Defenze", targeting salivary SARS CoV-2. This presentation will highlight the twists and turns encountered during this journey, leading to a successful clinical-industrial partnership to produce a product of clinical relevance for the public.

SYMPOSIUM 8: OROFACIAL DEVICES AND THERAPEUTICS

AUDITORIUM

Moderator: Cl A/Prof Goh Bee Tin (Singapore)

4.20pm	**AeroShield – Development of a Novel Biosafety Air Curtain for Aerosol-Generating Dental Procedures** *Cl A/Prof Goh Bee Tin (Singapore)*
4.35pm	**Drugs4dent®: a Novel Decision Tool to Assist with Dental Prescribing** *Dr Leanne Teoh (Australia)*
4.50pm	**Orofacial Pain – Where to Next?** *Prof Chris Pek (Singapore)*
5.05pm	**Examining the Role of Oral Healthcare Products in Infection Control During the COVID-19 Pandemic: A Critical Appraisal** *Dr Jaya Seneviratne (Australia)*
5.20pm	End of Session

SYMPOSIUM 9: ADVANCED DENTAL BIOMATERIALS AND BIOENGINEERING

ROOM: L1-S2

Moderator: A/Prof Vinicius Rosa (Singapore)

4.20pm	**Harnessing the Antimicrobial Potential of Quaternary Ammonium for the Next Generation of Biomaterials** *Prof Umer Daood (Malaysia)*
4.35pm	**Graphene Nanocoating Provides Antimicrobial Properties to Titanium** *A/Prof Vinicius Rosa (Singapore)*
4.50pm	**Microfluidics Strategies to Study Periodontal Health and Disease** *Asst Prof Gopu Sriram (Singapore)*
5.05pm	**Utilizing a Microfluidic Platform in Unraveling Dental Stem Cells' Mural Cell Function** *Asst Prof Waruna Lakmal Dissanayaka (Hong Kong SAR)*

CLOSING CEREMONY & PRIZE AWARD PRESENTATION

AUDITORIUM

5.30PM - 6.00PM

Programme

- Welcome Remarks
- Prize Awards Presentation
- Video presentation: 38th IADR-SEA Conference 2025 - Host Country
- Distinguished Awards
- Closing Remarks

CONFERENCE WORKSHOPS

Day 4
Saturday, 25 November 2023

DAY 4: 25 NOVEMBER 2023

8.30am - 1.00pm **Room: L1-S1**

Workshop 5: TEMPOROMANDIBULAR DISORDERS RESEARCH IN SEA: STRENGTH IN SYNERGY

Speakers:

- *Dr Adrian Yap (Singapore),*
- *Dr Kathreena Kadir (Malaysia),*
- *Dr Jonathan Fandialan (Philippines),*
- *Dr Carolina Marpaung (Indonesia),*
- *Dr Phanomportm Vanichanon (Thailand)*

Synopsis

Temporomandibular Disorders (TMD) is an umbrella term embracing more than 30 health conditions affecting the temporomandibular joints, masticatory muscles, and/or supporting tissues. They are the second most common musculoskeletal problem and a common cause of chronic pain. Besides orofacial pain and headaches, the other features of TMD include jaw joint sounds, limited/abnormal movement, and/or catching/locking of the jaws, as well as otologic symptoms. Although patients are usually women of reproductive age, the prevalence of TMD in children/adolescents is high varying between 20 to 60%. Given the widespread occurrence of TMD and their chronicity, nearly all dental disciplines are involved in the care of patients with TMD.

This workshop serves to gather clinicians/scientists interested in TMD research and the key leads of INfORM (International Network for Orofacial Pain and Related Disorders Methodology) in Southeast Asia (SEA). The workshop aims to introduce participants to the current concepts of TMD, its signs/symptoms, classification, etiology, and identification. In addition to the biopsychosocial approach to TMD exploration, the diversity and priorities in TMD research are also deliberated. Past, present, and future TMD research in SEA will also be presented to encourage collaborative cross-cultural/national work in the region through interactive interest group discussions. The workshop also functions to establish the "SEA+" TMD Network and mentoring program to promote research and undertakings in the field of TMD across different dental disciplines.

Workshop objectives

- To appreciate the current concepts of TMD
- To apply the biopsychosocial approach to TMD research
- To learn the various types of research in the field of TMD (SR, tools)
- To know the completed, current, and considered TMD research in SEA
- To highlight the priorities in TMD research
- To establish collaborative and multidisciplinary TMD research in SEA

Programme

8.30am - 8.45am	Welcome and TMD prologue *(Dr Adrian Yap, Singapore)*
8.45am - 9.00am	The biopsychosocial approach to TMD research *(Dr. Adrian Yap, Singapore)*
9.00am - 9.15am	Types of TMD research *(Dr Adrian Yap, Singapore)*
9.15am - 9.45am	TMD research in East Asia and Singapore *(Dr. Adrian Yap, Singapore)*
9.45am - 10.15am	TMD research in Malaysia *(Dr Kathreena Kadir, Malaysia)*
10.15am - 10.30am	TMD research in Philippines *(Dr Jonathan Fandialan, Philippines)*
10.30am - 11.00am	Tea Break and Networking Session I
11.00am - 11.30am	TMD research in Indonesia *(Dr Carolina Marpaung, Indonesia)*
11.30am - 11.45am	TMD research in Thailand *(Dr Phanomportm Vanichanon, Thailand)*
11.45am - 12.00am	Priorities in TMD research *(Dr Adrian Yap, Singapore)*
12.00am - 12.15pm	Q&A and Panelist Discussion
12.15pm - 1.00pm	Interest Group Discussion and Networking Session II

DAY 4: 25 NOVEMBER 2023

9.00am - 5.00pm **Room: L1-S2**

Workshop 6: MICRO AND NANOFABRICATION TECHNOLOGY FOR CRANIOFACIAL TISSUE REGENERATION

Asst Prof Hemant Vijaykumar Unadkat (Singapore)

Synopsis

This interactive workshop, titled "Micro and Nanofabrication Technology for Craniofacial Tissue Regeneration," will delve into the theoretical and practical aspects of micro and nanofabrication techniques, with a special focus on their applications in craniofacial tissue regeneration. Participants will gain an in-depth understanding of the fundamental processes used in microfabrication, including photolithography, etching, electron beam lithography, and micromoulding. The workshop will also explore the development and potential uses of hybrid techniques to answer fundamental questions about the biological behavior of materials. A significant portion of the workshop will be dedicated to a hands-on session, where participants will have the opportunity to practice soft lithography, a key microfabrication technique. This workshop aims to bridge the gap between theory and practice, providing participants with the knowledge and skills to leverage micro and nanofabrication technologies in the field of tissue regeneration.

9.00am - 1.00pm **NDCS L8 Training Room**

Workshop 7: DIGITAL DENTISTRY UNVEILED: REVOLUTIONIZING REMOVABLE PROSTHESIS REMOVAL PROTHESIS WITH INTRA-ORAL SCANNING, CAD DESIGN & 3-D PRINTING

Coordinated by : *Asst Prof Yu Na (Singapore)*

Speakers :

- *Assistant Professor Dr Yu Na,*
  National Dental Centre Singapore, Duke–NUS Medical School, Singapore
- *Mr Bryan Chow Kye Sern,*
  Clinical Innovation Engineer, National Dental Centre Singapore
- *Dr Wang Fu Ke,*
  Senior Research Scientist/Group Leader,
  Institute of Materials Research and Engineering (IMRE),
  *Agency for Science, Technology and Research (A*STAR)*

1st Part of the Workshop -
Digital Workflow, Scan, and Design

Conducted by : *Prof Dr Yu Na and Mr Bryan Chow Kye Sern*

Introduction: Digital Workflow for Partial and Complete Edentulous patients

1. Unravelling Intraoral Scans of Partial and Complete Edentulous arches.
2. Advancements in Computer-Aided Design for Removable Dentures: Unlocking New Possibilities.
3. Innovations in Denture Production: A Journey into Computer-Aided Manufacture Techniques and Materials.

This workshop aims to share the advancements and research-based benefits of digital dentistry for removable denture fabrication, particularly in the context of an ageing society. With the rapid global ageing population, the demand for dental treatments, including dentures, is expected to surge. However, traditional denture fabrication methods face numerous challenges, including multiple visits and technical complexities associated with manual processes.

Digital dentistry offers a promising solution to address these challenges. Throughout the workshop, we will delve into key research topics surrounding digital dentures, including the typical digital workflow, 3D scanning technique, computer aided design and advanced manufacture. We will also thoroughly analyze the advantages of 3D printing and milling technologies, as well as the physical characteristics and long-term durability of the materials utilized.

2nd Part of the Workshop -
3D Printing and Resin Materials for Dentistry: New Generation of Resin Materials for Digital Dentistry
Presented by : *Dr Wang Fu Ke*

3D printing, or additive manufacturing (AM), has become a digital revolution that the dental industry has quickly adopted, in both chairside and in dental laboratories. Dental 3D printing creates dental parts ranging from models of teeth and dental aligners to full sets of dentures. With 3D printing, dental providers can both create more specialized implants and treat patients more rapidly. However, the available printable materials for dental products limit practical utilization of 3D printing in dentistry. This presentation explores advancements in 3D printing materials for vat photopolymerization, focusing on critical attributes such as tensile strength, color accuracy for improved shade matching, and high flexural strength to prevent breakage. Addressing the demand for enhanced printing accuracy, the talk focuses on material design strategies to tailor the mechanical performance to meet these specific requirements and shows how resin formulations and manufacturing processes contributes to pushing the boundaries of material performance in vat photopolymerization-based printing technology.

Learning Outcomes
- Understand the components of a typical digital denture workflow for removable partial and complete edentulous patients.
- Explore the advancements and improvements offered by the digital workflow compared to conventional methods.
- Understand the benefits of using 3D printed and milling techniques in denture manufacturing.
- Gain knowledge about recommended materials and systems, including 3D printing, and other options for denture fabrication.

9.00am - 5.00pm **NDCS L8 Training Room**
Workshop 8: PRACTICAL SKILLS IN DIGITAL DENTURE DESIGN & PRINTING: A HANDS-ON WORKSHOP
Asst Prof Yun Na (Singapore)

Synopsis
With extensive research and technological advancements, digital dentures have emerged as an effective approach to overcome the limitations of conventional methods. By integrating digital technologies, clinicians and dental technicians can benefit from streamlined workflows, reduced patient visits, enhanced quality control, and the convenience of remanufacturing based on existing digital data.

This hands-on workshop will be focusing on Digital Dentistry for the creation of 3D-printed Removable Partial Dentures (RPDs) and Complete Dentures. This workshop is tailored for dental professionals seeking practical expertise in Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) using advanced tools like the 3Shape software. It offers participants a unique opportunity for hands-on experience with CAD design using the industry-standard 3Shape software. Dive into the intricacies of digital impressions, tooth placement, and overall design for RPDs and Complete Dentures. Beyond CAD, we will also show case the CAM application in action, translating digital designs into physical prosthetics through 3D printing. The workshop also covers basic fabrication processes for Complete Dentures, utilizing chair-side resin printing for efficient and practical learning.

Learning Outcomes
- Mastery of 3Shape CAD Software: Gain proficiency in the 3Shape software, navigating its features for precise and personalized RPD and Complete Denture design.
- Practical CAM Implementation: Learn how to apply CAM techniques effectively, ensuring the accurate translation of digital designs into physical prosthetics using 3D printing.
- Full Hands-On CAD Design: Engage in a complete hands-on experience with CAD design
- Chair-Side Resin Printing: Understand the basics of chair-side resin printing for Complete Denture fabrication.

Learning Objectives
Upon completion of this workshop, participants will master 3Shape CAD software, apply CAM techniques for 3D printing, and gain full hands-on proficiency in chair-side resin printing for the fabrication .

ORAL & POSTER SESSIONS

THURSDAY, 23 NOVEMBER 2023
11.00AM - 12.30PM

CONCURRENT SESSIONS
ROOM: L1-S1

ORAL SESSION 1 **BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1**
Chairpersons: *Phoebe Lam and Erum Zain*

ID001 11.00am **Knowledge, Attitude, Behaviour and Oral Health Problems of Overseas Students**
Is Susaati, Chulalongkorn University (Thailand)

ID002 11.10am **Digital Health Literacy and Self-medication in Brazilian Adolescents**
Fernanda Ferreira, National Dental Centre Singapore, Singapore

ID003 11.20am **Sealant Versus Fluoride Varnish Regarding Patient-Centred Experience Among Preschool Children**
Phoebe Lam, The University of Hong Kong (Hong Kong SAR)

ID004 11:30am **Taxing Sugary Drinks: Impact on Thai Children's Oral Health**
Nipaporn Urwannachotima, Chulalongkorn University (Thailand)

ID005 11.40am **Risk Factors Associated with Tooth Wear Among Nepalese Adults**
Chaulagain Rajib, Chitwan Medical College

ID006 11.50am **Patients' and Clinicians Perspective in Using Teledentistry**
Erum Zain, SeGI University (Malaysia)

ID007 12noon **Body Dysmorphic Disorder and Oral Health-Related Quality of Life**
Bernadette Quah, National University of Singapore (Singapore)

ID008 12:10pm **Prioritizing Oral Health in Malaysian Transgender Women: Health Educational Intervention**
Lahari Telang, Penang International Dental College (Malaysia)

ID009 12:20pm **Triglyceride Glucose Index and Severe Periodontitis: Role of Blood Pressure**
Ashish Kalhan, National Dental Centre Singapore (Singapore)

THURSDAY, 23 NOVEMBER 2023
11AM - 12.30PM

CONCURRENT SESSIONS
ROOM: L1-S2

ORAL SESSION 2 **ORAL HEALTH RESEARCH - 1**
Chairpersons: *Kantapong Kitiyamas and Jonas Hue*

ID010 1100am **Variant in PLEC Is Associated with Congenital Insensitivity to Pain**
Kitiyamas, Kantapong Kitiyamas, Chiang Mai University (Thailand)

ID011 11.10am **Intra-articular MSC Exosome-hyaluronic Acid Therapy Alleviates TMJ-OA Pain and Degeneration**
Timothy Sng, National University of Singapore (Singapore)

ID012 11.20am **Comparing Implant Placement Accuracy: Surgical Guides Versus Dynamic Navigation**
Chunxu Liu, The National University of Malaysia (Malaysia)

ID013 11.30am **Pearls and Pitfalls in an Innovative Approach to Trismus Management**
Matthew Gilmore, Royal Brisbane & Women's Hospital (Australia)

ID014 11.40am **A Comparative Analysis of Virtual Augmented Simulation in Local Anaesthesia [LASK-VR]**
Naffisah Hassan, Universiti Teknologi MARA (UiTM) (Malaysia)

ID015 11:50am **Animated Modules Enhancing Tongue Strength and Endurance: Development and Evaluation**
Boosana Kaboosaya, Chulalongkorn University (Thailand)

ID016 12noon **Nitric Oxide Modulates Glycolysis in Head and Neck Cancer Cells**
Kusumawadee Utispan, Thammasat University (Thailand)

ID017 12.10pm I**n-house 3D-printed Hybrid Teeth-and-bone-borne Wafers for Le Fort I Osteotomy**
Celestine Teo, National Dental Centre Singapore (Singapore)

ID018 12.20pm **Automated Image Analysis For The Quantification of Oral Dysplasia Severity**
Jonas Hue, National Dental Centre Singapore

ORAL SESSION 3 **PERIODONTOLOGY**
Chairpersons: *Charlene Goh and Shan Zhiyi*

ID019 11.00am **Hippo/YAP-targeted TGF-β1 is Essential for Shear Stress-induced Immunomodulation in hPDLSCs**
Nuttha Klincumhom, Chulalongkorn University (Thailand)

ID020 11.10am **Lipopolysaccharide-Induced Adenosine Triphosphate Regulates Inflammatory Responses of Periodontal Ligament Cells**
Phoonsuk Limraksasin, Chulalongkorn University (Thailand)

ID021 11.30am **Validating Self-reported Periodontitis in a Singapore Community-based Sample**
Charlene Goh, National University of Singapore (Singapore)

ID022 11.40am **Circ_0003764 Regulates the Osteogenic Differentiation of Periodontal Ligament Stem Cells**
Wang Hong, The University of Hong Kong (Hong Kong)

ID023 11.50am **Diagnostic Accuracy of Self-reported Periodontitis Using a Predicted Nomogram**
Fernando Bitencourt, Aarhus University (Denmark)

ID024 12noon **Periostin-αVβ5 Integrin Enhances Inflammatory Cytokine Under Mechanical Stress in Human Periodontal Ligament Cells**
Pimchanok Temmart, Chulalongkorn University (Thailand)

ID025 12.10pm **Predicting Tooth Loss and Periodontitis Progression with Pre-identified Risk Factors**
Jeffry Hartanto, National Dental Centre Singapore (Singapore)

ID026 12.20pm **Effects of LLLT on Periodontally Compromised Patients Undergoing Orthodontic Retention**
Zhiyi Shan, The University of Hong Kong (Hong Kong SAR)

ID027 12.30pm **Integrated Metagenome-metabolome Profiling Identifies New Links between Diabetes-mellitus and Periodontitis**
Preethi Prajod, National Dental Centre Singapore (Singapore)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00pm

CONCURRENT SESSIONS
ROOM: L1-S1

ORAL SESSION 4 **BIOMATERIALS - 1**
Chairpersons: *Regine Stelle Rodriguez and Apurva Mishra*

ID028 1.30pm **Properties of 3D-printed zirconia for Dental Prosthesis**
Zhao Wuyuan, The University of Hong Kong (Hong Kong SAR)

ID029 1.40pm **Mechanical Properties of 3D-Printed Denture Base Materials Under Biomimetic Conditions**
Setthawut Choochaisaengra, Boston University (USA)

ID030 1.50pm **Characterization of Eggshell-derived Hydroxyapatite and its Biocompatibility in Oryctolagus Cuniculus**
Regine Stelle Rodriguez, University of the East (Philippines)

ID031 2.00pm **Ion Release from GIC and RMGIC restorations with SDF Conditioning**
Ge Xingyun, The University of Hong Kong (Hong Kong SAR)

ID032 2.10pm **3-D Printed Stents for Standardization for Composite-resin Sample Preparation**
Nur Fatima Azzahara Mohamad Habibullah, Universiti Teknologi MARA (Malaysia)

ID033 2.20pm **Developing a Calcium Silver Zeolite with Remineralising and Antimicrobial Properties**
Laura Jiaxuan Li, The University of Hong Kong (Hong Kong SAR)

ID034 2.30pm **Dual-cured GelMA-Fibrin hybrid Hydrogel for Organotypic Bone Culture Model**
Apurva Mishra, National University of Singapore (Singapore)

ID035 2.40pm **Development of Artificial Saliva Gel Balls**
Phimnada Piromchotsiri, Prince of Songkhla University (Thailand)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00pm

CONCURRENT SESSIONS
ROOM: L1-S2

ORAL SESSION 5 **ORAL HEALTH RESEARCH - 2**
Chairpersons: *Upendra Bhadauria and Paolo Cattaneo*

ID036 1.30pm **Access to Dental Care in Individuals with Disability: A systematic Review**
Upendra Bhadauria, All India Institute of Medical Sciences New Delhi (India)

ID037 1.40pm **Adjunctive Use Of Virgin Coconut Oil In Subgingival Instrumentations**
Nur Shahira Azmi, Universiti Teknologi MARA (UiTM) (Malaysia)

ID038 1.50pm **Oral Health Education For Independent Older Adults: A Systematic Review**
Worachate Romalee, Thammasat University (Thailand)

ID039 2.00pm **How Should We Measure the Upper Airway?**
Paolo Cattaneo, University of Melbourne (Australia)

ID040 2.10pm **Platelet-rich Plasma Therapy in Oral Lichen Planus: A Systematic Review**
Wuttapon Sadaeng, Naresuan University (Thailand)

ID041 2:20pm **The Effects of Face Masks Wearing in Digital Panoramic Radiographs**
Peerapong Wamasing, Naresuan University (Thailand)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00pm

CONCURRENT SESSIONS
ROOM: L1-S3

ORAL SESSION 6 **ORAL HEALTH RESEARCH - 3**
Chairpersons: *Rohaida Abdul Halim and Rachel Seet*

ID042 1.30pm **Is Hypnosis Helpful During Nitrous Oxide/Oxygen Inhalation Sedation?**
Rohaida Abdul Halim, Universiti Teknologi MARA (Malaysia)

ID043 1.40pm **A Study on the Development of a Plaque Detection Programme Using Artificial Intelligence**
Jae-Young Lee, Dankook University (South Korea)

ID044 1.50pm **Bi-directional Temporal Relationship Between Caries and Atopic Dermatitis Among Children**
Hsu Chin-Ying, National University of Singapore (Singapore)

ID045 2:00pm **Pulp Survival of Crowned Vital Cracked Teeth after Orthodontic Banding**
Rachel Seet, National Dental Centre Singapore (Singapore)

ID046 2.10pm **D-Galactose and Obesity Induce Aging and Pathologies in Dental Pulp**
Savitri Vaseenon, Chiang Mai University (Thailand)

ID047 2.20pm **Antibiotic Resistance Genes in Orofacial Abscesses Identified Using a Metagenomics-based Approach**
Yeeun Lee, Seoul National University (South Korea)

ID048 2.30pm **Children Salivary Ghrelin and Leptin with Stunted Growth in Nangapanda-Indonesia**
Citra Fragrantia Theodorea, Universitas Indonesia (Indonesia)

ORAL SESSION 7 IOHS AWARD

Chairpersons: *Walter Lam and Ki Chan*

ID049 9.00am **Oro-Dental and Facio-Cervical Trauma from Strangulation: A preliminary Assessment and Clinical Implications**
Scotia Mulin, University of Melbourne (Australia)

ID050 9.10am **Accuracy of Generative Artificial Intelligence in Providing Oral Health Information**
Walter Lam, The University of Hong Kong (Hong Kong SAR)

ID051 9.20am **Metagenomic Analysis of Removable Prosthesis Microbiome with Different Prosthesis Cleanliness**
Lim Tong Wah, The University of Hong Kong (Hong Kong SAR)

ID052 9.30am **Standard- Versus Low-Dose CBCT in Decision-making for Impacted Third Molars**
Hung Kuo Feng, The University of Hong Kong (Hong Kong SAR)

ID053 9:40am **Salivary sPD-1 as Potential Diagnostic Tool in PCN Patients**
Michal Sobkowiak, Karolinska Institutet (Sweden)

ID054 9.50am **Defining Successful Ageing in Oral Health Context – HK Elders' Perspectives**
Rita Suen, The University of Hong Kong (Sweden)

ID055 10.00am **Neuroprotective Potential of Steerable Stem cell-based Microrobots**
Ki Chan, The University of Hong Kong (Hong Kong SAR)

ID056 10.10am **Effectiveness of Topical Fluoride Application in Preventing Occlusal Cavitated Caries**
He Shuyang, The University of Hong Kong (Hong Kong SAR)

ID057 10.20am **Bioinspired flexible Microneedle Patches for Improved Adaptability and Functionality**
Tay Jie Hao, Nanyang Technological University (Singapore)

ID058 10.30am **Bioinspired 'Sporulated' Cytoprotective Strategy for Ambient Temperature Cell Logistics**
Lydia Chong, Nanyang Technological University (Singapore)

FRIDAY, 24 NOVEMBER 2023
9.00AM - 10.40AM

CONCURRENT SESSIONS
ROOM: L1-S2

ORAL SESSION 8 ORAL MICROBIOLOGY & CARIOLOGY

Chairpersons: Tan Guang-Rong and Pei Liu

ID059 9.00am **Effects of Graphene Quantum Dot on Antibiofilm and Remineralisation**
Lu Cheng, The University of Hong Kong (Hong Kong SAR)

ID060 9.10am **Synergistic Potential of LRAP and Er:YAG Laser for Dental Remineralization**
Tan Guang-Rong, National University of Singapore (Singapore)

ID061 9.20am **Anti-adhesion Potential of Pili Kernel Oil Against Initial Biofilm Colonizers**
Chloe Vernice Uy, Centro Escolar University (Philippines)

ID062 9.30am **Lactobacillus-reuteri Reduces Biofilm Dysbiosis and Periodontal Inflammation; Pilot Clinical Evidence**
Louise Halim, Trisakti University (Indonesia)

ID063 9.40am **Can Oral Microbiome Predict Low-birth Weight Infant Delivery?**
Pei Liu, The University of Hong Kong (Hong Kong SAR)

ID064 9.50am **Efficacy of Chitosan Intracanal Medication against Fungal-bacterial Dual-species Biofilm**
Oranart Matangkasombut , Chulalongkorn University (Thailand)

ID065 10.00am **Mycobiota Spectrum of Oral Fungal Infections in Head-Neck Cancer Patients**
Khaled Almanei, Karolinska Institutet (Sweden)

ID066 10.10am **ZNF582 Methylation and Oral Microbiota in Oral Cancer**
Lin Yu-Min, National Yang-Ming Chiao Tung University (Taiwan)

ID067 10.20am **Effect of Candida Auris-phenotypic Switching on Co-aggregation with Staphylococcus Aureus**
Zainal Mukarramah, International Islamic University Malaysia (Malaysia)

ID068 10.30am **Targeted Metabolomics to Identify Biofilm Pathways of Enterococcus Faecalis Isolates**
Tanujaa Suriyanarayanan, National Dental Centre Singapore (Singapore)

FRIDAY, 24 NOVEMBER 2023
9.00AM - 10.40AM

CONCURRENT SESSIONS
ROOM: L1-S3

ORAL SESSION 9 STEM CELLS & TISSUE ENGINEERING

Chairpersons: *Worachat Namangkalakul and Wen Xiao*

ID069 9.00am **Role of ECM-derived from ICF-treated PDL Cells on Osteogenic Differentiation**
Phothichailert Suphalak, Chulalongkorn University (Thailand)

ID070 9.10am **Compressive Force Affects Matrix-Regulatory Molecule Expression of Periodontal Ligament Cells**
Novena Pakpahan, Chulalongkorn University (Thailand)

ID071 9.20am **Amelogenesis Imperfecta: Tooth Characteristics and Gingival Transcriptome**
Kanokwan Sriwattanapong, Chulalongkorn University (Thailand)

ID072 9.30am **Magnesium Enhances Osteogenic Differentiation of Human Periodontal Ligament Stem Cells**
Worachat Namangkalakul, Chulalongkorn University (Thailand)

ID073 9.40am **The Influence of Shear Stress on Exosome Secretion in hPDLSCs**
Thanaporn Kittimongkol, Chulalongkorn University (Thailand)

ID074 9.50am **A Microvascularized Dental Pulp-on-Chip for Studying Vasculogenesis and Pulpitis Modelling**
Dai Yichen, National University of Singapore (Singapore)

ID075 10.00am **Pathways Modulated Mineralization of Decellularized ECM-derived hDPSCs**
Chatvadee Kornsuthisopon, Chulalongkorn University (Thailand)

ID076 10.10am **M1 macrophages enhance angiogenic properties of DPSCs via IL-8**
Dineshi Thalakiriyawa, The University of Hong Kong (Hong Kong SAR)

ID076 10.20am **Cannabidiol Promotes Osteogenic Differentiation and Modulates Immunomodulatory Properties of hDPSCs**
Ajjima Chansaenroj, Chulalongkorn University (Thailand)

ID078 10.30am **Modelling Vascularized Dental Pulp-like Constructs in Vitro**
Wen Xiao, National University of Singapore (Singapore)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

CONCURRENT SESSIONS
ROOM: L1-S1

ORAL SESSION 10 BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Chairpersons: *Linda Slack-Smith and Shokunmonyneat Ngeth*

ID079 2.00pm **Evaluation of Abbreviated DASS-21 Versions in Young adults with TMD**
May Wong, The University of Hong Kong (Hong Kong, SAR)

ID080 2.10pm **Kindergarten Outreach Dental Service on Caries Experience: A Preliminary Analysis**
Edward Lo Chin Man, The University of Hong Kong (Hong Kong SAR)

ID081 2.20pm **Kindergarten Outreach Dental Service on Children's OHRQoL: A Preliminary Analysis**
Wu Sicheng, The University of Hong Kong (Hong Kong)

ID082 2.30pm **Focused Ethnography to Explore Social Practices in Oral Health Research**
Linda Slack Smith, The University of Western Australia (Australia)

ID083 2.40pm **Priority Setting and Resource Allocation Methodologies in Oral Health Care**
Priya Harsh, All India Institute of Medical Sciences New Delhi (India)

ID084 2.50pm **Willingness-to-pay for Teledentistry**
Sharon Tan, National University of Singapore (Singapore)

ID085 3.00pm **Networking Approach to Building Engagement on Oral Health in Cambodia**
Sokunmonyneath Ngeth, University of Puthisastra (Cambodia)

ID086 3.10pm **Interventions' Components to Reduce Sugar Intake: A Systematic Review**
Syathirah Hanim Azhar Hilmy, Universiti Teknologi MARA (Malaysia)

ID087 3.20pm **Psychological Intervention to Improve Adolescents' Oral Health: A Systematic Review**
Isabella He, The University of Hong Kong (Hong Kong SAR)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

CONCURRENT SESSIONS
ROOM: L1-S2

ORAL SESSION 11 BIOMATERIALS - 2

Chairpersons: *Kiho Cho and Zolzaya Javkhlan*

ID088 2.00pm **Lightweight Microarchitecture for Bone Augmentation and Osteoconduction**
Franz Weber, University of Zurich (Switzerland)

ID089 2.10pm **In vitro Evaluation on Mucoadhesiveness of Valsartan Conjugated Chitosan**
Yu Baiqing, National University of Singapore (Singapore)

ID090 2.20pm **A Groundbreaking Bioactive Membrane for Guided Bone Regneration**
Lau Chau Sang, National Dental Centre, Singapore

ID091 2.30pm **Dental Resin Composites Reinforced with Short S-Glass Fibers and Nanodiamonds**
Kiho Cho, The University of Hong Kong (Hong Kong SAR)

ID092 2.40pm **Marginal Adaptation of Calcium Silicate-based Sealers with Different Obturation Techniques**
Thanomsuk Jearanaiphaisarn, Chulalongkorn University (Thailand)

ID093 2.50pm **Increasing Cyclic Fatigue Resistance of Rotary Files with Refrigerant Spray**
Sirawut Hiran-us, Chulalongkorn University (Thailand)

ID213 3.00pm **3D Printed Polycaprolactone Scaffolds for Both Bone and Nerve Tissue Engineering**
Zolzaya Javkhlan, Graduate Institute of Clinical Dentistry (Taiwan)

ID 217 3.10pm **Glucose-gated Polyetheretherketone Implants for Enzymatic Gas Therapy to Boost Infectious Diabetic Osseointegration**
Li Jiahe, Sichuan University, China (China)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

CONCURRENT SESSIONS
ROOM: L1-S3

ORAL SESSION 12 ORAL HEALTH RESEARCH - 4

Chairpersons: John Tay and Twee In Meei

ID094 2.00pm **Artificial Intelligence in Aiding in Oral Hygiene: A Scoping Review**
John Tay, National Dental Centre, Singapore (Singapore)

ID095 2.10pm **Review of Oral Health Birth Cohort Studies: a GLOBICS Update**
Shilpa Sarawagi, National Dental Centre Singapore (Singapore)

ID096 2.20pm **Half-century Incidence And Mortality Trend Of Oral Cancer In Singapore**
Li Huihua, National Dental Centre Singapore (Singapore)

ID097 2.30pm **Patient-reported utcomes: A Systematic Review of Digital Complete Dentures**
Tew In Meei, The National University of Malaysia (Malaysia)

ID098 2.40pm **Oral Health Status of Patients with Inborn Errors of Immunity**
Thantrira Porntaveetus, Chulalongkorn University (Thailand)

ID099 2.45pm **Comparison of Intraoral Sites Reached by Different Mouthwash Administration Methods**
Chalatip Chompunud Na Ayudhya, Naresuan University (Thailand)

ID100 3.00pm **Psychological Techniques to Improve Autistic Children's Oral Health: Systematic Review**
Elise Fok Hoi Wan, The University of Hong Kong (Hong Kong)

WEDNESDAY, 22 NOVEMBER 2023
3.30PM - 5.00PM **ROOMS: PSL2 A & B (Level 2)**

POSTER SESSION **IADR-SEA HATTON AWARD (JUNIOR CATEGORY)**

ID101 **Oral Survey and Care Program for Osteogenesis Imperfecta Patients**
Lee Huang-ting, Kaohsiung Medical University (Taiwan)

ID102 **Potential Antibacterial Composite Resin Infused with Hydrated CaO**
Canlas, BN. Lucky Centro Escolar University (Philippines)

ID103 **Methods for Testing Bioactivity of Hydraulic Cements for Root-end Filling**
Johyun Lee, The University of Hong Kong (HKU)

ID104 **Characterization of human mesenchymal stem cells in cobalt-incorporated hydroxyapatite media**
Krongrat Thummachot, Thammasat University (Thailand)

ID105 **Amino-acid Starvation and DNA-protein-crosslink Repair Affect Candida Oxidative Stress Susceptibility**
Tanyaphon Danpipat, Chulalongkorn University (Thailand)

ID106 **On-demand Netal Oxide Nanozymes Eradicate Bacterial Biofilm**
Nathan Teo, The University of Hong Kong (Hong Kong SAR)

1D107 **Reuterin Inhibits Virulence of Fusobacterium Nucleatum Ex Vivo Endodontic Biofilms**
Denisa Amanda, Trisakti University (Indonesia)

ID108 **Lactobacillus-reuteri Modulates Virulence Gene of Dental Plaque on Orthodontic Patients**
Anastasya Muna Riad, Trisakti University (Indonesia)

ID109 **Effect of Commercial Mouth-rinses on Oral Microbiome of COVID-19 Patients**
Thomas Tengkawan, Trisakti University (Indonesia)

ID110 **BMP-2 mRNA Increased Rat Bone Formation: Micro-CT and Histological Study**
Boonlada Sathavornmanee, Chulalongkorn University (Thailand)

ID111 **Dental Pulp Stem Cell Conditioned Medium Enhancing Gingival Fibroblast Properties**
Kittiphoom Rueanson, Mahidon University (Thailand)

WEDNESDAY, 22 NOVEMBER 2023
3.30PM - 5.00PM **ROOMS: PSL2 A & B (Level 2)**

POSTER SESSION **IADR-SEA HATTON AWARD (SENIOR CATEGORY)**

ID113 **Oral health related quality-of-life in elderly patients requiring endodontic treatment**
Sim, Karen, National Dental Centre

ID114 **Early-life Oral Nitrate-reducing bacteria and cardiovascular risk in young children**
Tosha Kalhan, National University of Singapore

ID116 **Mechanical Properties of Lemongrass Essential Oil-Incorporated Dental Tissue Conditioner**
Ganokwalai, Naphisa Ganokwalai, Mahidol University (Thailand)

ID117 **Detecting Subsurface Defect in Bulkfill Composite Resins Restorations After Curing**
Ab Ghani, Siti Marian, Universiti Teknologi MARA (Malaysia)

ID118 **Enhanced Cellular Absorption of Acyclovir with Solid Lipid Nanoparticles**
Rath, Priti Rath, National University of Singapore (Singapore)

ID119 **Injectable Polyxylitol Succinate-based Adhesive Hydrogel for Periodontal Regeneration**
Shuting Gao, The University of Hong Kong (Hong Kong SAR)

ID120 **Dental Pulp Blood Vessel-Like Structures Response to Silver Diamine Fluoride**
Zaeneldin, Ahmed Zaeneldin, The University of Hong Kong (Hong Kong SAR)

ID121 **Preventive Effect of Silver Diamine Fluoride on Dentine Erosion**
Dhananthat Chawhuaveang, The University of Hong Kong (Hong Kong SAR)

ID122 **Root Canal Treatment In Irradiated Jaws - A Retrospective Study**
Sandra Chen, National Dental Centre Singapore (Singapore)

ID123 **The First Molar Axis In Relation To Maximum Bite Force**
Nguyen Le, Duy Le Nguyen, University of Medicine and Pharmacy (Vietnam)

ID124 **Effect of Cement Application Techniques on Implant-Supported Single Crowns**
Yanning Chen, The University of Hong Kong (Hong Kong SAR)

ID125 **An Evaluation of Maximum Occlusal Force in Endodontically Treated Teeth**
Mohd Khairul Firdaus Mazlan, Universiti Teknologi MARA (Malaysia)

ID126 **Temporal Stability of Tongue Microbiota in Elderly Patients**
Fa-Tzu Tsai, National Yang Ming Chiao Tung University (Taiwan)

WEDNESDAY, 22 NOVEMBER 2023
3.30PM - 5.00PM **ROOMS: PSL2 A & B (Level 2)**

POSTER SESSION **IADR-SEA HATTON AWARD (SENIOR CATEGORY)**

ID127 **Antimicrobial Susceptibility Studies on a Potentially Haemostatic Camellia Sinensis Extract**
Tengku Intan Baizura Tengku Jamaluddin, Universiti Teknologi MARA (Malaysia)

ID128 **In Vitro adhesion of Candida albicans on 3D-Printed Denture Bases**
Jerrold Dyeo, National Dental Centre Singapore (Singapore)

ID129 **Factors Associated with Alveolar Bone Graft Success for Implant Rehabilitation**
Kaung Win, Chulalongkorn University (Thailand)

ID130 **Oral Biofluid Biomarkers Associated with Peri-Implantitis: A Systematic Review**
Supanat Lumbikananda, Chulalongkorn University (Thailand)

ID132 **Salivary Biomarkers for Bone Healing associated with Megagen Anyridge® Implants**
Muhammad Amal Abd Wahab, Universiti Teknologi MARA (Malaysia)

ID133 **Classification of External Root Resorption Using Deep Learning-based Algorithm**
Nor Hidayah Reduwan, University of Malaya (Malaysia)

ID134 **Assessment of Intra-Oral Scanner Bite Registration At Maximal Intercuspal Position**
Tin Ho Si, University of Medicine and Pharmacy (Vietnam)

ID135 **Relationship Between The 3D Dental Arch Characteristics And Bite Force**
Nguyen Ngoc Hoang, Oanh, University of Medicine and Pharmacy (Vietnam)

ID136 **The Adverse Effects of Doxorubicin On Alveolar Bone In Rats**
Srivichit Bhumrapee, Chiang Mai University (Thailand)

ID137 **Shear Stress Pre-Condition Enhanced Periodontal Ligament Cell Survival**
Ravipha Suwittayarak, Chulalongkorn University (Thailand)

ID138 **Association Between Preterm Birth And Time Of First Tooth Eruption**
Nguyen Trung, Kien Nguyen, Van Lang University (Vietnam)

ID139 **Effectiveness Of Music-Based Tooth Brushing Instruction In Primary School Children**
Quyen Nguyen, University of Medicine and Pharmacy, Ho Chi Minh City (Vietnam)

ID214 **Medication-Related Osteonecrosis Of Jaw (Mronj): An Osteoclastic Or Inflammatory Condition**
Lalith Prabha Ethiraj, National Dental Centre Singapore (Singapore)

THURSAY, 23 NOVEMBER 2023
11.00AM - 12.30PM **Auditorium Foyer**

POSTER SESSION 1 **BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1**
Chairpersons *Monica Dev D S and Nadhirah Ghazali*

ID140 **Improving transition of Oral Care for patients with Special Needs**
Shenna Ho, National Dental Centre Singapore (Singapore)

ID141 **The Factors Affecting Oral Healthcare Access Among 4Ps Beneficiaries**
Chelsea Silao, University of Baguio (Phillippines)

ID142 **Association of oral health impact with psychosocial and dentist-patient factors**
Song Youngha, Seoul National University (South Korea)

ID143 **Sense of Coherence and Oral Health-Related Quality of Life**
Rajda Chaichit,Faculty of Dentistry, Khon Kaen University University (Thailand)

ID144 **Indian Tamil Parents' Navigating Cleft Lip/Palate Challenges: Phenomenological Qualitative study**
Monica D S Dev, The Tamil Nadu Dr. MGR Medical University (India)

ID145 **Double-Blind Studay Evaluating Denture Calculus Removal Properties of Vinegar Solution**
Binit Shrestha, Faculty of Dentistry, Mahidol University (Thailand)

ID146 **Effectiveness of Brush DJ app to improve oral hygiene compliance in fixed orthodontic appliances**
Gunjal, Shilpa Gunjal, International Medical University (Malaysia)

ID115 **Childhood Stress and Oral Health in Early Singapore Chinese Migrants**
Angela Goh, University of Melbourne (Australia)

ID147 **Family-Related Factors Contributing to Children's Dental Fear and Anxiety**
Jesse Jericho Go, University of Baguio (Phillppines)

ID148 **Barriers in Utilization and Access of Dental Services for SHCN in Pampanga**
Edbert Solan, Manila Central University; Jose B. Lingad Memorial General Hospital (Phillippines)

ID149 **Healthcare Professionals' Facilitators and Barriers to Oral Health Program for Antenatal Mothers : A Qualitative Systematic Review**
Nursharhani Binti Shariff, Universiti Teknologi MARA (Malaysia)

ID150 **Perceptions on the Delivery of Oral Healthcare in Baguio City**
Caila Lopez, University of Baguio (Philippines)

ID151 **Food Intake and Oral Hygiene Practices among Children in Philippines**
Maria Elissa Zam Amador, National University Philippines (Philppines)

ID152 **Dental Health Status of Patients Attending the University in Vietnam**
Pham Thanh, University of Medicine and Pharmacy, HoChiMinh City (Vietnam)

THURSDAY, 23 NOVEMBER 2023
11.00AM - 12.30PM

POSTER SESSION 1 **DENTAL MATERIALS - 1**
Chairpersons *Monica Dev D S and Nadhirah Ghazali*

ID153 **Influence of Shape and Restorations on NCCL under Cyclic Stress**
Chalida Limjeerajarus, Chulalongkorn (Thailand)

ID154 **Effect of repeated-firing on color-stability of CAD/CAM lithium disilicate ceramics**
Chawal Padunglappisit, Thammasat University (Thailand)

ID155 **Analyzing RTV Silicone Tear Strength with Varying Titanium Dioxide Fillers**
Ghazali, Nadhirah, Universiti Teknologi MARA (Malaysia)

ID156 **Mechanical Properties Of Resin Composite Containing Calcium Phosphate And Polylysine**
Munchuporn Pariwatanasak, Thammasat University (Thailand)

ID157 **Microhardness and Surface Characteristics of Restorative Resin-composite Containing Organic Fillers**
Morakot Piemjai, Faculty of Dentistry, Chulalongkorn University (Thailand)

ID158 **Mechanical properties of DX Universal Nano Hybrid Composite**
Andres, Maricar Joy Andres, Centro Escolar University (Thailand)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00PM

POSTER SESSION 2 **DENTAL MATERIALS - 2**
Chairpersons *Jasmina Qamaruzzaman, Caesary Cloudya Panjaitan and Anand Marya*

ID159 **Size of enamel-craze-line affects ultimate strength of human first premolars**
Nuttapol Limjeerajarus, Chulalongkorn University (Thailand)

ID160 **Acellular 3D-bioprinted Alginate-Based Bioink Scaffolds for Bone Tissue Engineering Applications**
Wu Yi Fan, Taipei Medical University (Taiwan)

ID161 **Cellular responses of biogenic source-derived scaffolds prepared from fish bones**
Theerapat Chanamuangkon, Faculty of Dentistry, Chulalongkorn University (Thailand)

ID162 **Plant-Derived Irrigation Solutions: Effect on Dentin Microhardness and Smear Layer**
Jasmina Qamaruzzaman, Universiti Kebangsaan Malaysia (Malaysia)

ID163 **Cationic Chitosan-based Complexes of Chelating Nanohydroxyapatite for Periodontal Bone Regeneration**
Wu Jingwen, Sichuan University (China)

ID164 **Fluoride Concentration and Biological Effects of Cannabis-Contained Beverage**
Lawan Boonprkong, Faculty of Dentistry, Chulalongkorn University (Thailand)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00PM

POSTER SESSION 2 **ORAL HEALTH RESEARCH - 2**
Chairpersons *Jasmina Qamaruzzaman, Caesary Cloudya Panjaitan and Anand Marya*

ID165 **Antibacterial Properties Of AgNCls/PMAA For Arresting Dental Caries**
Gustavo Molina, The Faculty of Dentistry, University of Hong Kong; Facultad de Ciencias de la Salud, Universidad Católica de Córdoba

ID166 **Topical Fluoride-Varnish Shifts Dysbiotic Plaque Microbiome towards Eubiosis in Children**
Caesary Cloudya Panjaitan, Universitas Trisakti (Indonesia)

ID167 **Assessment of the Dental Photography Imaging as Diagnostic Tool for Incipient Pits and Fissures Caries Lesions in Permanent Teeth**
Husein Al-Omer, Prince Abdulrahman Advanced Dental Institute (Saudi Arabia)

ID168 **Physical/mechanical properties of glass ionomer cement containing elastomeric micelles**
Nitchakarn Leenutaphong, Thammasat University (Thailand)

ID169 **Outcome of endodontic treated teeth vs implant restoration: Systematic-review**
Chanakarn Sinsareekul, Chulalongkorn University (Thailand)

ID170 **Avenanthramide-C shows alleviate inflammation and alveolar bone loss in periodontitis**
Kim Su-Jin, Chonnam National University (South Korea)

THURSDAY, 23 NOVEMBER 2023
1.30PM - 3.00PM

POSTER SESSION 2 ORTHODONTICS RESEARCH
Chairpersons *Jasmina Qamaruzzaman, Caesary Cloudya Panjaitan and Anand Marya*

ID171 **iDNAM: Advancements in Craniofacial Cleft Care through CAD/CAM**
Hathaichanok Parakarn, Khon Kaen University (Thailand)

ID172 **Varied Orthodontic Tipping and Torque Expressions at Different Interbracket Distances**
Mahmoud Elati University of the East (Phillippines)

ID173 **Success Rate of Orthodontic Traction of Impacted Teeth Involving GCB**
Qian Li, National Dental Centre Singapore (Singapore)

ID174 **Overjet and Vertical Skeletal Pattern in Modifying Perioral Soft Tissue**
Kulnipa Punyanirun, Prince of Songkla University (Thailand)

ID175 **Incisor-lip Changes After Retraction in Skeletal Type I/II Bimaxillary Protrusion**
Thitirat Siangloy, Prince of Songkla University (Thailand)

ID176 **Quantitative analysis of the pain perception of patients undergoing fixed orthodontic therapy**
Marya, Anand Marya, University of Puthisastra (Cambodia)

FRIDAY, 24 NOVEMBER 2023
9.00AM - 10.30AM

POSTER SESSION 3 **ORAL HEALTH RESEARCH - 3**
Chairpersons *Agustina Putri Arini and Li Jingwen*

ID177 **Edentulism And Denture Needs Of Home-Bound And Institutionalized Elderly**
Alethea Li Yen Foong, National Dental Centre Singapore (Singapore)

ID178 **Assessment of Oral Frailty among Patients with Stroke**
Hye-Sun Shin, Dongnam Health University (South Korea)

ID179 **Growth Media Effect of Candida Species and Staphylococcus Aureus Co-aggregation**
Wan Nurhazirah Wan Ahmad Kamil, Kulliyyah of Dentistry, International Islamic University Malaya; Universiti Teknologi MARA (UiTM) (Malaysia)

ID180 **Oral Microbiota Alterations: Age-Based Implications for Disease Detection**
Hsu Ming-Lun, National Yang-Ming University; Kaohsiung Medical University (Taiwan)

ID181 **Lactobacillus-reuteri Attenuates Enterococcus-faecalis Virulence Genes in Fixed Orthodontic Patients**
Thalianabilla Khalish, Faculty of Dentistry Trisakti University (Indonesia)

ID182 **Presence of Candida, Mutans streptococci, and Lactobacilli in Thai participants**
Siribang-on Khovidhunkit, Mahidol University (Thailand)

FRIDAY, 24 NOVEMBER 2023
9.00AM - 10.30AM

POSTER SESSION 3 PERIODONTOLOGY - 1
Chairpersons *Agustina Putri Arini and Li Jingwen*

ID183 **Initial Validation of the Adult Periodontal Health Knowledge Scale (ALPHA-K)**
Pimchanok Sutthiboonyapan, Faculty of Dentistry, Chulalongkorn University; Chulalongkorn University (Thailand)

ID184 **Association between PISA and Elevated hs-CRP Levels in Thai Adults**
Attawood Lertpimonchai, Chulalongkorn University (Thailand)

ID185 **Periodontal health and APRIL/BAFF salivary levels in rheumatoid arthitis patients**
Carina Fei, Karolinska Institutet (Sweden)

ID186 **Incidence and pattern of tooth loss in Thais: Cohort study**
Tavedhikul, Kanoknadda Tavedhikul, Faculty of Dentitry, Chulalongkorn University (Thailand)

ID187 **Systemic Inflammation Mediates the Association Between Periodontitis and Incident Hypertension**
Kitti Torrungruang, Chulalongkorn University Faculty of Dentistry (Thailand)

ID215 **Satisfaction with Government Recommended Pre-Procedural Mouthwashes: A Randomized Clinical Trial**
Huang Shan, University of Hong Kong (Hong Kong SAR)

FRIDAY, 24 NOVEMBER 2023
9.00AM - 10.30AM

POSTER SESSION 3 **ORAL SURGERY, MEDICINE & PATHOLOGY**
Chairpersons *Agustina Putri Arini and Li Jingwen*

ID188 **Prevalence and factors associated with SSI after minor oral surgery**
Keita Kano, Osaka Dental University; Uji Takeda Hospital (Japan)

ID189 **Impact of Tocopherol and Pentoxifylline before Tooth Extraction on Osteoradionecrosis**
Jiaranuchart, Sirimanas, Faculty of dentistry, Chulalongkorn University

ID190 **Effects of Alpha-Lactalbumin Hydrolysate on Human Squamous Cell Carcinoma Cells**
Arini, Agustina Putri, Faculty of Dentistry, Chulalongkorn University

ID191 **Odontogenic Cysts turned Squamous Cell Carcinoma**
Ashleigh Toh, National Dental Centre, Singapore (Singapore)

ID192 **Stabilized OLP is Not a Significant Risk for Peri-implant Diseases**
LI Jingwen, University of Hong Kong (Hong Kong SAR)

ID193 **Pg-LPS increases proliferation, MMP-1 and IL-8 in cisplatin-resistance HSC-3 carcinoma**
Titiporn Monthakarntivong, Faculty of Dentistry, Thammasat University (Thailand)

ID112 **Distinctive Tooth Phenotype Associated with Osteogenesis Imperfecta**
Sasiprapa Prommanee, Chulalongkorn University (Thailand)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

POSTER SESSION 4 **ORAL HEALTH RESEARCH - 4**
Chairpersons *Dewi Ni Luh and Abigail Koh*

ID194 **Survival of SMART on MIH after mean follow-up 38 months**
Nicholas Thong, Universiti Malaya (Malaysia)

ID195 **Novel PITX2 variant associated with oligodontia in the Thai family**
Narin Intarak, Faculty of Dentistry, Chulalongkorn University (Thailand)

ID196 **Dental Anomaly Detection Using RadImageNet Transfer Learning Models**
Shota Okazaki, Hiroshima University (Japan)

ID197 **Saliva Secretion and Masticatory Performance, and their Impact Towards OHRQoL**
Wilson Sarmiento, Manila Central University (Philippines)

ID198 **A role of HIF-1α in the regulation of bone homeostasis**
Lee Sun Young, Chonnam National University (South Korea)

ID199 **Temporomandibular disorder and somatic symptoms: Relations to negative emotional states**
Dewi Ni Luh, Trisakti University (Indonesia)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

POSTER SESSION 4 **ORAL HEALTH RESEARCH - 5**
Chairpersons *Dewi Ni Luh and Abigail Koh*

ID200 **Bone Formation around Implant with mRNA Encoding Bone Morphogenetic Protein-2**
Jaijam Suwanwela,Faculty of Dentistry, Chulalongkorn University (Thailand)

ID201 **Applying mobile extended reality (MXR) technologies in the dental area**
Wang Ding-Han, National Yang Ming Chiao Tung University (Taiwan)

ID202 **Management of closed lock during orthodontic treatment: Two case reports**
Phanomporn Vanichanon, Chulalongkorn Univeristy (Thailand)

ID203 **Efficacy of smart toothbrush in adults: 6-month randomized controlled trials**
Yiseul Choi, Yonsei University College of Dentistry (South Korea)

ID204 **The Virtual, Immersive Classroom**
Julie Owen, University of Melbourne (Australia)

ID205 **A Cloud-based Patient Management System in a Philippine Dental University**
Cez Margaret Acero, National University Philippines (Philippines)

ID216 **AI-assisted Oral Health Monitoring with Dental Selfies: A Systematic Review**
Reinhard Chau Chun Wang, University of Hong Kong (Hong Kong SAR)

FRIDAY, 24 NOVEMBER 2023
2.00PM - 3.30PM

POSTER SESSION 4 **PERIODONTOLOGY - 2**
Chairpersons *Dewi Ni Luh and Abigail Koh*

ID206 **Whole proteome analysis of gingival crevicular fluid**
Mariati Abdul Rahman, Universiti Kebangsaan Malaysia (Malaysia)

ID207 **Potential role of DEC1 in mediating circadian-rhythm disruption and periodontitis**
Park Ka Hyon, Chonnam National University (South Korea)

ID208 **Efficacy Of Soft Tissue Substitutes For Mucogingival Defects: A Meta-Analysis**
Abigail Koh, National Dental Centre Singapore (Singapore)

ID209 **Diabetes, Periodontitis, and PPAR-GAMMA in Human Gingival Biopsies: Inflammatory Profile**
Ingra Gagno Nicchio, School of Dentistry at Araraquara, São Paulo State University UNESP (Brazil)

ID210 **Regenerative Potential of Non-Surgical Periodontal Therapy in A Young Adult**
Mastura Norman, Universiti Teknologi MARA (UiTM) (Malaysia)

ID211 **Non-surgical periodontal treatment outcomes in Thai subjects with dyslipidemia**
Suteera Techatanawat, Srinakharinwirot University (Thailand)

ID212 **Prevalence and clinicopathologic profiles of biopsied gingival lesions from 2 dental schools in Thailand**
Kittipong Dhanuthai, Chulalongkorn University (Thailand)

ABSTRACTS

001

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

KNOWLEDGE, ATTITUDE, BEHAVIOR AND ORAL HEALTH PROBLEMS OF OVERSEAS STUDENTS

I. Susanti, Master Student of Oral Biology of Chulalongkorn University, Bangkok, THAILAND
N. Sanchavanakit, Anatomy, Faculty of Dentistry Chulalongkorn University, Bangkok, THAILAND
P. Pisarnturakit, Community Dentistry, Faculty of Dentistry Chulalongkorn University, Bangkok, THAILAND

Objectives: To determine the association of knowledge and attitude toward oral healthcare behavior of overseas university students staying in Thailand between January 2020 to July 2022 and explore the experiences of their oral health problems.

Methods: A cross-sectional study conducted using an online survey in English operated through the Google platform by convenience sampling among overseas Chulalongkorn University students. The sample size was calculated using Yamane formula with minimum sample size of 297 after additional 10% compensate. Descriptive statistics, Chi-square test, t-test, ANOVA, and Pearson correlations were employed using IBM SPSS version 29.

Results: Of 311 overseas students, 55.6% were male. The average age of students was 27.5±4.5 years. 68.81% of students were from ASEAN countries, and 73.31% studied in non-health science programs. The study fields, health, and non-health sciences were associated with knowledge ($p<0.001$) and attitude ($p=0.004$). Type of health insurance had an association with behavior ($p=0.014$) and the student's perspective about dental visits ($p=0.014$). There is positive correlation between knowledge-behavior ($p<0.001$, $r=0.198$) and attitude-behavior ($p<0.001$, $r=0.212$). Three hundred fifty-nine cases of oral health problems were experienced by 47.3% of overseas students consisted of tooth hypersensitivity (21.2%), gingivitis (15.3%), caries (14%), cracked or broken tooth (10%), severe toothache (9%) and others. There was an association between oral healthcare behavior and oral health problems ($p<0.001$), and a negative correlation was found between behavior score and the number of oral health problems ($p<0.001$, $r=-0.204$).

Conclusions: The oral healthcare behaviors of overseas students correlated positively with knowledge and attitude. A negative correlation was observed between behavior and the number of oral health problems. Furthermore, studying in health science programs impacts students' knowledge and attitude toward oral health, while dental treatment coverage of insurance affects decisions for dental visits.

002

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

DIGITAL HEALTH LITERACY AND SELF-MEDICATION IN BRAZILIAN ADOLESCENTS

F.M. Ferreira, M.C. Barbosa, A.P. Baldiotti, J.L. Resende, M.L. Dias, N.S. Braga, S.M. Paiva, Department of Child and Adolescent Oral Health, Federal University of Minas Gerais (UFMG), Belo Horizonte, BRAZIL
F.M. Ferreira, National Dental Centre Singapore, Singapore, SINGAPORE
A. Granville-Garcia, Campina Grande State University - UEPB, Campina Grande, BRAZIL

Objectives: Self-medication in adolescence is a challenge to health education. We evaluated the association between Oral Health Literacy (OHL), Digital Health Literacy (DHL), and self-medication in Brazilian adolescents.

Methods: This is a cross-sectional study, in which questionnaires were applied to 260 adolescents enrolled in public schools in the city of Belo Horizonte, Brazil, addressing issues such as socioeconomic and demographic characteristics, medication usage in the previous 30 days, and self-medication influenced by online information. To evaluate OHL and DHL the validated Brazilian versions for young adults/adolescents of the Rapid Estimate Adult Literacy in Medicine and Dentistry (REALMD-20) questionnaire and the Digital Health Literacy Instrument (DHLI-BrA: self-report + practical performance) were applied. Binary logistic regression was performed to assess the factors associated with self-medication.

Results: The participants' mean age was 15.6 years, and 55% were female. The average household income was approximately US$578.10 and 79% of parents/caregivers had 9 or more years of formal schooling. Among participants that used medication in the last 30 days, antiallergic and analgesic were the most cited (27% and 26%), followed by anxiolytic/antidepressants (19%), bronchodilators (14%) and antibiotics (12%). Twenty-two percent of the participants reported self-medicating. There was no association between OHL levels (REALMD-20 scores) or DHL levels (DHLI-BrA scores) and the report of self-medication by adolescents. However, those who had higher scores in the self-report domain of the ability to search for online health information in the DHLI-BrA instrument showed increased chances of performing self-medication influenced by online information (OR:1.79; IC95%1.09-2.93) when adjusted for socioeconomic and demographic variables.

Conclusions: Adolescents that self-assess as having better abilities to search for health information online were more likely to perform self-medication based on online information. This finding highlights the importance of rational use of medication awareness actions for this population, since, for them, a better self-perception of LDH could encourage this harmful practice.

003

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

SEALANT VERSUS FLUORIDE VARNISH REGARDING PATIENT-CENTRED EXPERIENCE AMONG PRESCHOOL CHILDREN

P. Lam, H.H. Chiu, C. Yiu, Paediatric Dentistry, The University of Hong Kong, Hong Kong, HONG KONG
E. Lo, Applied Oral Sciences & Community Dental Care, Faculty of Dentistry, The University of Hong Kong, Hong Kong, HONG KONG

Objectives: This randomised controlled trial aimed to compare the effectiveness of glass ionomer sealant (GIS) placement and sodium fluoride varnish (NaFV) application regarding patient-reported experience in terms of cooperativeness, dental anxiety and pain levels among preschool children in 18 months.

Methods: Healthy preschool children attending kindergarten grades 1 and 2 with at least one sound second primary molar were recruited. Eligible children were randomly allocated to receive either 5% NaFV application quarterly, or a single GIS placement with finger-press technique. Clinical parameters were assessed by one calibrated examiner, whereas sociodemographic and oral-health related factors were collected with a validated parental questionnaire. Oral hygiene, caries status, pre- and postoperative child behaviours and self-rated pain levels were recorded at baseline and at biannual follow-ups.

Results: A total of 228 and 185 children were allocated into NaFV and GIS group at baseline respectively, with 109 and 86 children being followed at 18 months. Significant reduction in preoperative dental anxiety over the 18 months was only found in GIS group ($p=0.039$); whereas significant improvement in postoperative behaviour was found in both NaFV ($p=0.015$) and GIS groups ($p<0.001$). Children in GIS group were significantly more anxious immediately after GIS placement ($p=0.016$), but markedly less anxious at 12 months ($p=0.006$). Intergroup comparisons of anxiety and cooperation levels did not show any significant difference at 6 and 18 months. Preoperative and postoperative cooperativeness at 6 and 12 months were significantly associated with the dental anxiety level at 18 months ($p\leq0.003$), but not for other sociodemographic factors.

Conclusions: Cooperativeness and dental anxiety levels of the study children gradually improved with time. GIS placement induced more dental anxiety to preschool children postoperatively than NAFV application, but no difference in the cooperativeness of the two groups was found at 18 months. Past dental anxiety level predicted the behaviour of children at 18 months.

004

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

TAXING SUGARY DRINKS: IMPACT ON THAI CHILDREN'S ORAL HEALTH

N. Urwannachotima, Faculty of Dentistry, Chulalongkorn University, Bangkok, Bangkok, THAILAND
J.P. Ansah, Center for Community Health Integration, School of Medicine, Case Western Reserve University, Cleveland, Ohio, UNITED STATES

Objectives: To estimate the prevalence of dental caries among Thai children after sugar-sweetened beverage tax policy by using the system dynamics modeling.

Methods: A mixed-method system dynamics model was developed to represent the complex relationship between sugar-sweetened beverage tax, sugar consumption and dental caries. The qualitative causal loop diagram was elicited through group modeling building by stakeholders. Then, the quantitative system dynamics model was developed to simulate the impact of actual sugar-sweetened beverage tax and 2 alternative scenarios on dental caries prevalence among Thai children aged 2 to 15 years from 2017 to 2040.

Results: As the actual sugar-sweetened beverage tax, dental caries prevalence in primary teeth and permanent teeth were projected to decrease respectively by 0.5% and 0.8% in urban area; 1.7% and 3.1% in rural area compared with the no tax scenario by 2040. The implementation of tax with 20% sugar content reduction in the beverage combining with health promotion policy throughout the country was projected to decrease the caries prevalence in primary teeth and permanent teeth respectively by 4% and 4.8% in urban area; 7.7% and 8.8% in rural area compared with the no tax scenario by 2040.

Conclusions: The sugar-sweetened beverage tax policy alone is unlikely to have meaningful reduction of dental caries among Thai children population. The implementation of tax policy with non-tariff measures such as health promotion and providing accessibility of low-sugar drinks will show the most improvement of oral health among population.

005

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

RISK FACTORS ASSOCIATED WITH TOOTH WEAR AMONG NEPALESE ADULTS

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E. Lo, Faculty of Dentistry, University of Hong Kong, Hong Kong, HONG KONG
S. Chaudhary, Department of Conservative Dentistry and Endodontics, Chitwan Medical College, Chitwan, Bagmati, NEPAL
L. Lin, School of Dentistry, National Taiwan University, Taipei, TAIWAN

Objectives: Tooth wear is the non-carious loss of tooth structure due to attrition, abrasion or erosion. The objective of the study was to determine the risk factors of tooth wear among the young adults in Bharatpur Metropolitan City of Nepal.

Methods: An age and sex matched case-control study was conducted among 332 young adults (cases-166, controls-166) in Bharatpur Metropolitan City of Nepal. Adults aged 20-30 years of both genders, willing to give consent, were included in this study while those with heavy restorations in cementoenamel junctions, undergoing orthodontic and periodontal treatment were excluded. The study participants first filled a self-administered questionnaire and then received an intraoral examination. Tooth wear was graded corresponding to the Smith and Knight classification of tooth wear. All the data were analyzed using SPSS version 16. A chi-square test was carried out to evaluate the association. Multivariate analysis was carried out with logistic regression analysis.

Results: Of the 332 participants, 40.4% were men and 59.6% were women. Among the studied factors, indigestion issues, frequency of changing toothbrush, types of toothpaste, consumption of sports drink, teeth grinding and chewing churpi showed statistically significant association with tooth wear ($p<0.05$). Further multivariate analysis showed a statistically significant association between indigestion, frequency of changing toothbrush, types of toothpaste used and rinsing of mouth after meal ($p<0.05$).

Conclusions: Among the factors analyzed, tooth wear was associated with frequency of changing toothbrush, types of toothpaste used and rinsing of mouth after a meal.

006

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

PATIENTS' AND CLINICIANS PERSPECTIVE IN USING TELEDENTISTRY

E. Zain, A. Kaur, A. Sivakumar, C. Lim, A. Wai, C. Bing Hong, Department of Restorative Dentistry, Faculty of Dentistry, SEGi University, Kuala lumpur, Kuala lumpur, MALAYSIA

Objectives: To evaluate patients and clinician experience in using teledentistry at an undergraduate teaching university.

Methods: 55 pre-registered patients from October to December 2022 visiting Faculty of Dentistry, SEGi university were invited for virtual consultation. Patients who had undergone RCT or deep caries management were invited for follow up appointment. Using the SEGi dental consultation Anytime, anywhere system, patients were offered scheduled appointments with clinicians which could be accessed through their phone or personal device. After virtual consultation, patients and clinicians were asked to complete a feedback form.

Results: Fifty-five patients participated in this study. Overall, 90 % of the patients were satisfied with virtual consultation. 89% patients were able to express themselves effectively and 77% patients felt as they were meeting the dentist in person. Majority (84 %) of the patients had trouble in using the platform and 51% patients also found it difficult to take a clear picture of their mouth. 95% of the patients agreed that the confidentiality was maintained, and they were able to express themselves. 100% patients agreed that teledentistry system can save time and they will consider using teledentistry for virtual consultation in future.

All 5 operators were satisfied (90%) with the overall consultation experience and were able to gain complete understanding of patient's condition. Majority of the patients (91%) attended the clinic on time and can effectively replace an in person visit to the clinic (100%). All operators (100%) expressed that the platform was complicated and difficult to use, however, it was time saving (100%) and all operators (100%) would like to use virtual clinics in future.

Conclusions: Our study shows positive patients and operators experience using teledentistry and both patients and clinicians were satisfied using virtual clinics for follow up visit. The result also prompted a need to improve the teledentistry platform and to make it more efficient and user friendly.

007

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

BODY DYSMORPHIC DISORDER AND ORAL HEALTH-RELATED QUALITY OF LIFE

B. Quah, C. Yong, R. Wong, I. Islam, A. Lim, Oral & Maxillofacial Surgery, National University of Singapore, Singapore, SINGAPORE
B. Quah, C. Yong, R. Wong, I. Islam, A. Lim, National University Centre for Oral Health Singapore, Singapore, SINGAPORE

Objectives: The objectives of this study were to identify associations between body dysmorphic disorders (BDD) and demographic factors or the severity of the maxillomandibular discrepancy (MMD) in patients undergoing orthognathic surgery, and correlations between BDD and oral health-related quality of life (OHRQoL).

Methods: A prospective study was conducted with ethics approval and written patient consent. Patients aged 16 to 60 years planned for orthognathic surgery from August 2022 to June 2023 were included. Patients with a history of maxillofacial trauma, pathology or surgery or craniofacial syndromes were excluded. Demographic data of their age, gender and history of psychiatric disorders was collected. Their skeletal relationship and MMD severity (using overjet and overbite) was recorded. The patients completed two screening questionnaires for BDD, the Body Dysmorphic Disorder Questionnaire (BDDQ) and Appearance Anxiety Inventory (AAI), and one questionnaire for assessment of their OHRQoL, the Oral Health Impact Profile-14 (OHIP-14). Their BDDQ and AAI scores were analysed for associations with their demographic data, skeletal relationship and MMD severity. Their scores were also analysed for correlations with their overall OHIP-14 score, and their scores in each of the OHIP-14's seven domains.

Results: 41 patients were included. AAI scores significantly correlated with BDDQ scores ($p=0.005$). Age, gender, skeletal relationship and degree of MMD were not associated with BDDQ or AAI scores. Higher AAI scores correlated with higher OHIP-14 scores, both overall and in all domains ($p=<0.001$). Higher BDDQ scores correlated with higher overall OHIP-14 scores ($p=0.005$), and in the domains of function ($p=0.023$), physical pain ($p=0.022$), psychological discomfort ($p=0.002$) and physical disability ($p=0.034$).

Conclusions: BDD is not associated with age, gender, skeletal relationship or severity of MMD. BDD, however, does correlate with poorer overall OHRQoL and physical and psychological function. As orthognathic surgery may not treat BDD, clinicians should implement routine screenings to identify at-risk patients.

008

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

PRIORITIZING ORAL HEALTH IN MALAYSIAN TRANSGENDER WOMEN: MHEALTH EDUCATIONAL INTERVENTION

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L.A. Telang, A. Cotter, Centre for Experimental Host Pathogen Research (CEPHR), School of Medicine, University College Dublin, Dublin, IRELAND
A. Rashid, Dept. of Public health, RCSI-UCD Campus Malaysia (RUMC), Penang, MALAYSIA

Objectives: Transgender women in Malaysia are vulnerable and marginalized. They experience unique social and interpersonal challenges that contribute to relatively unmet health care needs thereby increasing their risk of acquiring HIV and sexually transmitted infections (STIs). A qualitative study using in-depth interviews (n=20) and focus group discussion was undertaken to explore the barriers and enablers of oral health care utilization as well as safer sexual practices relating to oral transmission of STIs among Transgender women with the aim of developing an mHealth educational intervention.

Methods: The constructs of the Information, Motivation and Behavioural skills (IMB) theory was used as a framework to guide the thematic analysis which highlighted key areas of concern: 'Access to care', 'Role of support network', 'HIV/STI awareness', 'Perception of low risk', 'Attitudes and beliefs' and 'Socio-economic status'. Involvement and cooperation of local TGW community workers, activists and artists played a crucial role in the design and development of an educational intervention module aimed at raising awareness. The widely used ADDIE (analyse, devise, develop, implement, evaluate) model of instructional design was used for the development of the module.

Results: Gaps were identified in awareness of oral transmission of STIs along with a general lack of condom use during oral sex. As a result; a unique, customized, culturally sensitive and peer reviewed mhealth educational intervention module was developed for delivery through a widely popular social media platform. The collaborative efforts helped to create content in the form of posts, stories and reels centred on the health and needs of transgender women.

Conclusions: The study emphasizes the importance of collaboration with key partners within the local community to create a unique tool for the community by the community. Role of social support in positively influencing health promotion and health care utilization is also highlighted.

009

ORAL SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

TRIGLYCERIDE GLUCOSE INDEX AND SEVERE PERIODONTITIS: ROLE OF BLOOD PRESSURE

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T. Kalhan, Saw Swee Hock School of Public Health, National University of Singapore, Singapore, SINGAPORE
F.V. Bitencourt, Aarhus University, Aarhus, DENMARK

Objectives: Globally, 1.1 billion people are affected by severe periodontitis, an ageing-associated inflammatory condition that destroys supporting tissues of teeth resulting in tooth loss and negatively impacting quality of life. Evidence suggests that triglyceride-glucose index, a surrogate marker for insulin resistance, may be associated with periodontitis. However, mechanistic pathways underlying this association are still unclear, especially in severe cases. Therefore, this study assessed the association between triglyceride glucose index (Tyg index) and severe periodontitis and investigated the role of blood pressure as a potential mediator in the association.

Methods: Data was obtained from 7,679 US adults with complete periodontal examinations, participating in the 2011- 2014 National Health and Nutrition Examination Survey cycles. Participants were classified based on attachment loss and probing pocket depth into mild, moderate, severe, and no periodontitis, with the main outcome further dichotomized into moderate/severe periodontitis and mild/no periodontitis. The main exposure was the TyG index and systolic blood pressure (SBP) was the mediator tested in the pathway analysis using g-computation. Age, gender, race, poverty-income ratio, smoking status, presence of obesity, dyslipidaemia, and diabetes were included as potential confounders.

Results: Findings showed that 44.05% of the US adults, aged 30 years and above, were affected by moderate/severe periodontitis. Univariate analysis demonstrated a significant association between moderate/severe periodontitis and TyG index [odds ratio (OR), 95% confidence interval (CI) =1.54, 1.17 - 2.04)]. Stratified analysis showed the association to be statistically significant in obese and dyslipidaemia individuals (both $p<0.05$). After adjusting for potential confounders, SBP was shown to mediate the association of TyG index and moderate/severe periodontitis, with 44% of the proportion of total effect mediated. A direct effect of the TyG index on moderate/severe periodontitis was also noted.

Conclusions: Triglyceride-glucose index is linearly associated with increased odds of moderate/severe periodontitis, with the association partially mediated by underlying SBP levels.

010

ORAL SESSION 2

ORAL HEALTH RESEARCH - 1

Thursday, 23 November 2023

VARIANT IN PLEC IS ASSOCIATED WITH CONGENITAL INSENSITIVITY TO PAIN

P. Kantaputra, M. Kaewgahya, W. Intachai, Center of Excellence in Medical Genetics Research, Faculty of Dentistry, Chiang Mai University, Chiang Mai, THAILAND
P. Kantaputra, Division of Pediatric Dentistry, Department of Orthodontics and Pediatric Dentistry, Faculty of Dentistry, Chiang Mai University, Chiang Mai, THAILAND
K. Kitiyamas, Faculty of Dentistry, Chiang Mai University, Chiang Mai, THAILAND
T. Daroontum, Department of Pathology, Faculty of Medicine, Chiang Mai University, Chiang Mai, THAILAND

Objectives: To investigate the molecular etiology of congenital insensitivity to pain (CIP) with underdeveloped alveolar bone.

Methods: Clinical, radiographic examinations were performed on two sons of a consanguineous Thai family. Histological study and transmission electron micrography were performed on the skin. Whole exome and Sanger sequencing were done to identify genetic variations. Detailed histories were recorded through interviewing.

Results: Both patients had no pain sensation since birth. Progressive corneal dystrophy led to blindness. When teeth started to erupt, they both bit their tongues and lips resulting in scar lesions and oral constriction. At times, they pulled their teeth out. Acro-osteolysis was observed. Radiographic examination showed underdeveloped alveolar bone and absence of distal phalanges of hands and feet. At the ages of 28 and 19, both patients claimed had regained pain sensation.

Genetic findings showed a novel homozygous variant c.4039C>T; p.Arg1347Cys (rs372256096) in PLEC in both patients. This mutation is predicted to be disease-causing, deleterious, and probably damaging by Mutation Tasting, SIFT, and PolyPhen-2, respectively.

Conclusions: We have identified PLEC as a novel gene for congenital insensitivity to pain.

011

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

INTRA-ARTICULAR MSC EXOSOME-HYALURONIC ACID THERAPY ALLEVIATES TMJ-OA PAIN AND DEGENERATION

T.J. Sng, Y. Jiang, S. Zhang, R. Wong, A. Lim, W. Toh, Faculty of Dentistry, National University of Singapore, National University for Oral Health, Singapore, Singapore, Singapore, SINGAPORE
W. Toh, Department of Orthopaedic Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, SINGAPORE

Objectives: To evaluate the efficacy of mesenchymal stem cell (MSC) exosomes with hyaluronic acid (HA) against HA alone in the treatment of temporomandibular joint osteoarthritis (TMJ-OA) in a rabbit model.

Methods: MSC exosomes were prepared from an immortalized human MSC line. Nine rabbits (18 TMJs) were randomly assigned into three groups: (1) OA-HA, (2) OA-HA+Exo and (3) Sham. TMJ-OA was induced by intra- articular injection of mono-iodoacetate (MIA) in bilateral TMJs of 6 rabbits in OA-HA and OA-HA+Exo groups. Two weeks after OA induction, the rabbits received three weekly intra-articular injections of 50µl HA with 200µl phosphate- buffered saline (PBS) for the OA-HA group, or 50µl HA with 200µg exosomes in 200µl PBS for the OA-HA+Exo group.

Rabbits in the sham group received only needle pricks. The effect of treatments on TMJ-OA pain was assessed weekly by measurements of the head withdrawal threshold (HWT) using an algometer. By the end of 8 weeks post- treatment, the rabbits were euthanized and the dissected TMJs were evaluated by micro-computed tomography (micro-CT) and histological assessment.

Results: OA-HA+Exo group showed gradual improvements in HWT, and the pain was reduced to baseline level of the sham animals as early as 4 weeks post-treatment. In contrast, OA-HA group showed minimal HWT improvement throughout the course of study. Notably, OA-HA+Exo group showed significantly better outcomes in the macroscopic score ($P<0.05$), OARSI histologic score ($P<0.01$) and synovial membrane inflammatory score ($P<0.01$) than that of OA-HA group, and were comparable to that of the sham group ($P>0.05$). As evidenced by micro-CT analysis, OA- HA+Exo group had a higher ratio of bone volume over total volume (BV/TV) than that of OA-HA group ($P<0.01$) and was comparable in BV/TV and trabecular thickness (Tb.Th) as the sham group ($P>0.05$).

Conclusions: This study shows that the combination of MSC exosomes and HA administered at a clinically acceptable frequency of 3 weekly intra-articular injections can suppress TMJ-OA inflammation and pain, while enhancing cartilage and subchondral bone repair, with significantly improved morphological and histological outcomes.

012

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

COMPARING IMPLANT PLACEMENT ACCURACY: SURGICAL GUIDES VERSUS DYNAMIC NAVIGATION

C. Liu, I. Tew, X. Leong, S. Mohd Said, Dentistry, The National University of Malaysia, Shanghai, CHINA

Objectives: This in-vitro study aims to compare implantation accuracy among three techniques in metal artifacts conditions including guided implant by conventional method, guided implant by radiopaque impression method, and dynamic navigation aided technique.

Methods: An ideal placement of an implant in the edentulous area of the left central incisor was virtually designed by EXOCAD and 3D printed. The implant Active 4.3mm*13mm (Nobel Biocare) placement was guided by three techniques: Group A-surgical templates by conventional method; Group B-surgical templates by radiopaque impression method and Group C-dynamic navigation X-Guide (Nobel Biocare). Scanbodies were positioned onto each implant for digital scanning to get post-surgical implant positions. Evaluated by measuring 3D spatial deviation from the ideal virtual implant positions, including parameters (i) deviation at neck, (ii) deviation at apex, (iii) 3D angular deviation and (iv) vertical deviation in depth. Differences among groups were tested using One-way ANOVA, following by a post-hoc test with a significant level $p<0.05$.

Results: Thirty implants in total with ten used for each technique. The accuracy of implant position was significantly different among three groups ($p < 0.05$). For multiple comparison, Group C showed a significantly lower angular deviation than Group A and B ($p = 0.003$ and 0.002). Group B exhibited a significantly lower depth deviation compared to other two groups ($p = 0.027$ and 0.001). A significantly lower alignment error at the implant apex was found in Group B and C as compared to Group A ($p = 0.027$ and 0.001). Group B showed a significantly lower deviation at implant neck compared to Group C ($p = 0.005$).

Conclusions: Dynamic navigation and the radiopaque impression method demonstrated enhanced accuracy in certain implant placement parameters compared to the conventional-based surgical guide technique in artifacts conditions.

013

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

PEARLS AND PITFALLS IN AN INNOVATIVE APPROACH TO TRISMUS MANAGEMENT

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Objectives: Restricted jaw opening (trismus) affects roughly 47% of patients who undergo radiotherapy for head and neck cancer, and can greatly impact on their quality of life. Moderate to severe trismus impairs mastication, decreases nutrition, and makes access to the oral cavity difficult hampering oral hygiene. A range of commercial devices have demonstrated significant functional benefit in the treatment of trismus. Major barriers to the use of these devices include significant cost and poor patient fit. Through identification of this clinical problem and collaborating with an in-house biomedical engineering team, we aimed to produce a cost effective medical device that provided better patient fit and could be distributed open-source, allowing treatment of patients around the world at minimal cost.

Methods: A literature review and evaluation of current commercially available products were conducted by the study team, in collaboration with the investigating biomedical engineer. Key design elements were noted. Post-graduate students were then invited to design a novel device that would encompass these key design elements, could be distributed by open-source, 3-D printed locally and address issues of cost and patient fit.

Results: The team was successful in developing a prototype trismus device, capable of addressing the key clinical issues of cost and fit. The device has been developed such that it is able to be distributed open-source.

Conclusions: This presentation aims to discuss the pearls and pitfalls involved in the process of bringing a concept to a tangible outcome, the benefits of having an in-house biomedical engineering facility, and the challenges that open- source engineering may create in the current legal framework.

014

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

A COMPARATIVE ANALYSIS OF VIRTUAL AUGMENTED SIMULATION IN LOCAL ANAESTHESIA [LASK-VR]

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Objectives: Clinical education is imperative to produce safe outcomes for both the population and the clinician. In Malaysia, dental education is a five-year course where they experience two pre-clinical years and three clinical years (experiential learning) prior to graduation. These five years are significantly a continuum of learning, where fundamental theoretical knowledge and clinical reasoning should be further carried forward in their clinical years. The versatility and sustainability of virtual reality (VR) may further improve the quality and competency of current and future dental clinicians who will serve the Malaysian public, or those who may venture into international platforms. A cross-sectional study was conducted on second-year dental students at the Faculty of Dentistry, Universiti Teknologi MARA (UiTM) aimed to assess the preparedness and confidence levels of dental students in performing an inferior alveolar nerve block (IANB) prior and after using the Local Anaesthesia Simulation Kit (LASK-VR).

Methods: Data was collected using a 21-item questionnaire divided into 4 domains categorized as follows: (1)participant's perceived confidence and good training ambience (environment), (2)participant's theoretical knowledge, (3)participant's cognitive domains, and (4)participant's perceived confidence in performing an IANB.

Results: A total of 59 valid responses were collected and analysed for this study. The findings revealed significant increases in participants' confidence where the percentage of participants who strongly agreed or agreed with these skills improved substantially: from 17% to 88.1% for identifying correct anatomical landmarks, from 8.5% to 79.66% for accurate insertion of the dental needle, and from 11% to 86.6% for overall confidence in performing an IANB.

Conclusions: In conclusion, more than a 60% increment of confidence level in the cognitive domain was noted for dental students performing IANB. This domain is significant as local anaesthesia is imperative as it is required for most dental treatments such as dental extractions, endodontic treatment, and suturing soft tissue injuries in the maxillofacial regions.

015

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

ANIMATED MODULES ENHANCING TONGUE STRENGTH AND ENDURANCE: DEVELOPMENT AND EVALUATION

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Objectives: This article aims to provide information on the development process of animated tongue strengthening exercise (TSE) modules and to compare their effectiveness in improving tongue strength and endurance.

Methods: The animated TSE modules were created step by step, starting with the creation of digital pictures using Procreate® and editing them into moving frames using Adobe Premiere Pro 2021®. A total of 200 participants, including 105 dentists and 95 non-dentists, were prospectively enrolled to evaluate the contents of the animated TSE modules through questionnaires. Subsequently, 65 subjects without a history of TSE or tongue-related surgery were randomly recruited and divided into 5 groups: control (no exercise), tongue click, tongue wrap, tongue painting, and tongue corner exercise groups. All subjects performed the exercises 3 times per day, every day for 4 weeks. Tongue strength (measured in kilopascals) and endurance (measured in seconds) were assessed in all subjects before and after the TSE using the Iowa Oral Performance Instrument (IOPI).

Results: According to the questionnaires, most participants evaluated the content of the animated TSE modules easy to understand. When comparing the correctness of TSE, participants who watched the animated TSE demonstrated greater accuracy in performing the exercises compared to those who relied on images in all modules (accuracy scores were 3.06±0.47 and 2.78±0.48, respectively). Among 5 groups who underwent TSE, there were no significant differences in initial tongue strength and endurance. However, after 4 weeks of TSE, there was a significant increase in both tongue strength and endurance across all TSE groups ($p<0.05$), except for tongue endurance in the tongue corner group ($p>0.05$). Notably, the tongue wrap exercise demonstrated the greatest improvement in both tongue strength and endurance.

Conclusions: This study provided evidence that animated TSE modules are effective in facilitating self-practicing TSE and improving tongue strength and endurance. Notably, among the different exercises evaluated, the tongue wrap exercise emerged as the most effective in enhancing both tongue strength and endurance.

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ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

NITRIC OXIDE MODULATES GLYCOLYSIS IN HEAD AND NECK CANCER CELLS

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Objectives: Glycolysis is a crucial energy-providing process that represents one of the hallmarks of cancer. Nitric oxide (NO), a free radical molecule, has been reported to regulate glycolysis in various cancers. It has been observed that NO can alter the cell cycle and apoptosis in head and neck squamous cell carcinoma (HNSCC) cells. However, the precise effect of NO on glycolysis in HNSCC cells remains elusive. This study aimed to investigate the effects of NO on cell proliferation, gene expression of glucose transporters (GLUTs), and glycolytic indicators in HNSCC cell lines.

Methods: Two pairs of isogenic HNSCC cell lines, HN18/HN17 and HN30/HN31, were treated with a NO donor, DEA- NONOate, for 24, 48, and 72 hours. Cell proliferation was assessed using the MTT assay, and NO concentration was measured using the Griess Reagent System. Gene expressions of GLUT1, GLUT2, GLUT3, and GLUT4 were analyzed using real-time PCR. Additionally, hexokinase activity and lactate production were measured in NO-treated cells using colorimetric assays.

Results: The results revealed that DEA-NONOate concentrations of 0.5, 0.5, 10, and 100 µM significantly increased cell proliferation in HN18, HN17, HN30, and HN31 cells, respectively, at different time points. DEA-NONOate induced NO generation in a time-dependent manner in HN18, HN30, and HN31 cells, while no such effect was observed in HN17 cells. Interestingly, GLUT1 expression was differentially up-regulated in NO-treated HN18 cells compared to the control group. Furthermore, NO enhanced hexokinase activity and increased lactate production in HN18 cells.

Conclusions: In conclusion, this study demonstrated distinct proliferative effects of NO on HNSCC cells. Notably, NO treatment resulted in increased expression of glycolytic indicators, including GLUT1, hexokinase activity, and lactate production, in HN18 cells. These findings suggest that NO may promote cell proliferation by stimulating glucose consumption and glycolytic rate in HN18 cells.

017

ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

IN-HOUSE 3D-PRINTED HYBRID TEETH-AND-BONE-BORNE WAFERS FOR LE FORT I OSTEOTOMY

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Objectives: Virtual surgical planning (VSP) has gained significant traction and is used in orthognathic surgeries as an alternative to traditional surgical planning (TSP). Virtual surgical plans are transferred to operations with occlusal- based splints to guide movements of jaws. Although 3-dimensional (3D) printing has improved splint fabrication process, inaccuracies persist. This case series presents a novel design of patient-specific guides for osteotomies and repositioning of the maxilla in Le Fort I osteotomy. This design circumvents issues associated with occlusal-based splints and aims to improve accuracy in post-surgical outcomes.

Virtual surgical planning (VSP) has gained significant traction and is used in orthognathic surgeries as an alternative to traditional surgical planning (TSP). Virtual surgical plans are transferred to operations with occlusal-based splints to guide movements of jaws. Although 3-dimensional (3D) printing has improved splint fabrication process, inaccuracies persist. This case series presents a novel design of patient-specific guides for osteotomies and repositioning of the maxilla in Le Fort I osteotomy. This design circumvents issues associated with occlusal-based splints and aims to improve accuracy in post-surgical outcomes.

Methods: We present a hybrid design of patient-specific cutting and repositioning templates that are both teeth-borne and bone-borne for accurate osteotomies and repositioning of the maxilla in the Le Fort I osteotomy, and share our experience in the use of these fully in-house designed and printed guides. Each surgery was performed with hybrid surgical templates and the outcome was verified intraoperatively with 3D-printed occlusal wafers. Preliminary analysis was done with 3D color-coded heatmaps to validate the predictability and accuracy of orthognathic surgery, through a comparison of the 3D models of the virtual planning and postoperative CBCT by superimposing them based on the unchanged skull base.

Results: The generated 3D colour maps show accurate results with a mean geometric deviation of less than 2mm.

Conclusions: In conclusion, in-house virtual surgical planning in orthognathic surgery is able to offer predictable results, and we aim to improve further with calibration between the operating table and the computer over time.

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ORAL SESSION 2
ORAL HEALTH RESEARCH - 1
Thursday, 23 November 2023

AUTOMATED IMAGE ANALYSIS FOR THE QUANTIFICATION OF ORAL DYSPLASIA SEVERITY

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Objectives: The current methods for grading oral epithelial dysplasias (OED) are subjective with significant intra- and inter-operator variability. However, the grading guides treatment protocols and influences patient outcomes. Hence, we aimed to develop an automated image analysis tool to objectively quantify differences between the different grades of OED (mild, moderate, severe).

Methods: All H&E-stained photomicrographs of OEDs acquired with a 10x objective were obtained from the publicly available NDB-UFES dataset (n=43). Images of poor quality were excluded (n=6). An image analysis tool was developed using open-source software, QuPath, ImageJ and CellProfiler. A neural network pixel classifier was trained to enable object segmentation of the dysplastic epithelium. Morphometric, textural and granularity measurements are then obtained of the OEDs. Statistical analysis was performed to identify differences between the grades of OEDs.

Results: Quantified features of the OEDs were tested for differences between groups of dysplasia grade by the Wilcoxon rank sum test and clinical features such as age, alcohol and tobacco use were tested with the Fisher's exact test. Fifteen quantified features were found to be statistically significant ($P<0.05$). These features related to morphological characteristics of the epithelia such as convex area ($P=0.029$) and various Zernike features, potentially measuring changes in the architecture of the OEDs. Internal texture ($P=0.043$) and granularity ($P=0.048$) features were also significantly different between OED grades and may correspond to measurable cellular changes. None of the clinical features were significantly different between the OED grades.

Conclusions: We have developed an automated image analysis tool for the segmentation and quantification of architectural features of OEDs. We aim to develop the tool further to analyse single-cell features for a more comprehensive, multi-scale analysis. Our preliminary data suggests image features at this scale contain information which may be considered alongside cellular features to aid oral pathologists in the diagnosis and grading of OEDs. This tool has the potential to improve accuracy and reduce intra- and inter-operator variability.

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ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

HIPPO/YAP-TARGETED TGF-B1 IS ESSENTIAL FOR SHEAR STRESS-INDUCED IMMUNOMODULATION IN HPDLSCS

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Objectives: Human periodontal ligament stem cells (hPDLSCs) exhibit significant immunomodulatory properties in response to shear stress, inhibiting T cell proliferation and promoting Treg cell differentiation. Our previous study indicated that Yes-associated protein (YAP), a downstream effector of the Hippo signaling pathway, functions as a mechanosensitive transcriptional activator that regulates osteo-adipogenic fate decision in hPDLSCs. In this study, we aimed to investigate whether YAP is involved in the immunosuppressive properties of hPDLSCs in response to shear
stress loading.

Methods: The hPDLSCs were subjected to shear stress at different magnitudes (0.5, 5, and 10 dyn/cm^2) and were investigated for immunomodulatory characteristics using qRT-PCR, western blot, and ELISA. The hPDLSCs were transfected with YAP-specific shRNA for YAP silencing. The effects of the shear stress on the immunosuppressive properties of hPDLSCs were determined by treating T cells with a conditioned medium derived from shear stress- induced hPDLSCs (SS-CM). T cell proliferation and Treg differentiation were examined using a resazurin assay and flow cytometry analysis, respectively. The role of TGF-β1 was confirmed by using SB431542, the specific TGF-β1 inhibitor.

Results: Our data showed that shear stress at 5 dyn/cm^2 upregulated the mRNA expression of TGF-β1 and IDO. The amount of kynurenine product and active TGF-β1 increased in SS-CM compared to the control CM. SS-CM remarkedly decreased T cell proliferation, which was abolished by SB431542. The suppression of YAP reduced the TGF-β1 mRNA expression in hPDLSCs, and the TGF-β1 secretion in SS-CM. Subsequently, these SS-CM derived from YAP knockdown cells increased T cell proliferation and decreased $CD4^+CD25^{hi}CD127^{lo/-}$ Treg cell population, compared to the control SS-CM.

Conclusions: Our finding indicated that YAP plays a critical role in promoting the immunosuppressive capacity of hPDLSCs via TGF-β1 signaling in response to shear stress loading.

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ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

LIPOPOLYSACCHARIDE-INDUCED ADENOSINE TRIPHOSPHATE REGULATES INFLAMMATORY RESPONSES OF PERIODONTAL LIGAMENT CELLS

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Objectives: Many stimuli, i.e., mechanical stresses or inflammation, induce the release of adenosine triphosphate (ATP) by human periodontal ligament cells (HPDLCs). Extracellular ATP (eATP) affects HPDLCs' functions like immunosuppressive action and inflammatory responses. Lipopolysaccharide (LPS) is the key factor involved in periodontal inflammation. However, the possible correlation and detailed mechanism of inflammatory mediated eATP by LPS and inflammatory cascade formation in HPDLCs is unclarified. The objective of this study was to examine the role of eATP on the responses of HPDLCs concerning inflammatory actions after LPS treatment.

Methods: HPDLCs were stimulated with P. gingivalis LPS prior to ATP release measurement using a bioluminescence assay. HPDLCs were treated with eATP. The expression of pro-inflammatory (COX2, IL1B, IL6, IL8, IL12, TNFA) and anti-inflammatory (IL4, IL10) was determined. Specific P_2X_7 receptor inhibitors (BBG and KN62), specific P_2Y_1 receptor inhibitors (MRS2179), calcium chelator (EGTA), PKC inhibitors, NF-κB activation inhibitors, cAMP-dependent PKA inhibitors (H89 dihydrochloride) and activator (forskolin) were used to dissect the mechanism of eATP-induced inflammatory responses by HPDLCs.

Results: LPS induced ATP release by HPDLCs. 50 μM eATP increased pro-inflammatory genes expression (COX2, IL1B, IL6, IL8, IL12, TNFA). 500 μM eATP enhanced anti-inflammatory gene expression (IL4, IL10). BBG, KN62, and NF-κB activation inhibitors impeded eATP-induced pro-inflammatory gene expression. MRS2179 and H89 markedly suppressed eATP-induced anti-inflammatory (IL4 and IL10) gene expression, while forskolin further enhanced the expression of those genes.

Conclusions: HPDLCs respond to LPS by releasing ATP. eATP has dose-dependent dual functions on inflammatory responses of HPDLCs via different pathways. As regulation of inflammation is important in regeneration, eATP may help to limit inflammation and trigger the regeneration of periodontium.

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ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

VALIDATING SELF-REPORTED PERIODONTITIS IN A SINGAPORE COMMUNITY-BASED SAMPLE

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Objectives: Self-reported measures of oral health are useful tools for large scale epidemiological studies and population disease surveillance. However, few studies have examined the validity of self-reported measures of periodontal disease in Southeast Asia, and most have used a clinic-based recruitment of the validation sample. Therefore, we aimed to assess the validity of self-reported measures of periodontal disease in a community-based Singapore population sample.

Methods: Cross-sectional oral health data from an existing observational cohort provided an opportunity to validate self-reported periodontitis among a sample of 256 participants. The Centers for Disease Control and Prevention/American Academy of Periodontology (CDC/AAP) self-reported questionnaire (8 items) for periodontal disease was used and validated against full mouth periodontal examinations done by a single examiner. Periodontitis status was defined using the CDC/AAP classification of periodontal disease. Univariate analyses for the predictive ability of individual questions for severe periodontitis were conducted. Multivariable logistic regressions and AUROC were used to assess the performance of self-reported items with the addition of socio-demographic and risk factor variables.

Results: The participants had a mean age of 49±10 years, 55% were female, and prevalence of moderate and severe periodontitis as per CDC/APP classification were 45% and 21% respectively. Having a tooth become loose on its own was the best performing individual self-reported measure (OR: 4.8; 95%CI: 2.2 – 10.5). The combination of two self- reported questions (having gum disease; mobile tooth) together with socio-demographic information on age, gender, and ethnicity had good discrimination for severe periodontitis (AUC = 0.82 95% CI 0.76-0.88) and demonstrated a sensitivity and specificity of 78% and 78% respectively in this population.

Conclusions: Specific questions from the self-reported CDC/AAP questionnaire were useful for identifying individuals with severe periodontitis in this Singapore sample. Future studies examining the validity of these measures as well as other newly developed self-reported items in larger community-based populations are needed.

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ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

CIRC_0003764 REGULATES THE OSTEOGENIC DIFFERENTIATION OF PERIODONTAL LIGAMENT STEM CELLS

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Objectives: This study aimed to identify circular RNA (circRNA) involved in the osteogenic differentiation of periodontal ligament stem cells (PDLSCs) and investigate its role in regulating differentiation.

Methods: Five candidate circRNAs that may be involved in osteogenesis were predicted by the circBank database and previous studies. The circRNA with the most significant changes was screened by qRT-PCR after PDLSCs were cultured in the osteogenic induction medium or medium supplemented with TNF-α (10ng/ml). Identified circRNA was knocked down or overexpressed, and the effect on the osteogenic differentiation of PDLSCs was explored by western blot, qRT-PCR, alkaline phosphatase (ALP) staining, and Alizarin red staining. CCK-8 assay was done to examine the effect of the circRNA on the proliferation of PDLSCs.

Results: Circ_0003764 was the most significantly changed circRNA among the five candidate circRNAs (circ_0026344, circ_ACAP2, circ_0003764, circ_0008259, circ_0060731). When PDLSCs were cultured in the osteogenic induction medium for 3 or 7 days, the expression of circ_0003764 was significantly decreased ($p<0.05$), whereas it was dramatically increased ($p<0.05$) in TNF-α-induced PDLSCs. Knockdown of circ_0003764 promoted the expression of the osteogenesis-related genes and proteins (RUNX2, ALP, OCN), enhanced the ALP activity, and elevated the mineralization by PDLSCs, as shown by Alizarin red staining. However, with the overexpression of circ_0003764, the osteogenic differentiation capacity of PDLSCs was significantly reduced ($p<0.05$). The CCK-8 results indicated that circ_0003764 could inhibit the proliferation of PDLSCs.

Conclusions: Circ_0003764 inhibits the osteogenic differentiation and proliferation of PDLSCs, which indicates its use as a diagnostic and therapeutic target in bone regeneration-related diseases.

023

ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

DIAGNOSTIC ACCURACY OF SELF-REPORTED PERIODONTITIS USING A PREDICTED NOMOGRAM

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Objectives: This study aimed to develop a nomogram using self-reported data to predict periodontitis among Danish adults.

Methods: Individuals aged >18 years were clinically evaluated for periodontitis and classified according to the case definition proposed by the Centers for Disease Control and Prevention in collaboration with the American Academy of Periodontology—CDC/AAP. The sensitivity, specificity, and area under the receiver operating characteristic curve (AUC) were used to compare the accuracy of self-reported data (sociodemographic information and eight questions proposed by the CDC/AAP to identify periodontitis) to predict cases of moderate/severe periodontitis and any form of periodontitis. A multivariable model was developed, including variables with p-value<0.2 identified by univariable regressions. Nomograms were generated based on the multivariable regression coefficients of the Akaike Information Criterion of the selected model. Decision curve analyses (DCA) were performed to evaluate the potential clinical utility of the nomogram by assessing the clinical net benefit at different thresholds.

Results: Of the 197 participants, 50 were classified as having moderate/severe periodontitis and 68 as having any periodontitis. In the multivariable model, the best-fit model to predict moderate/severe periodontitis included information on smoking, dental status, previous periodontal treatment, and tooth loss. For predicting any periodontitis, the model included age, education level, dental status, and previous periodontal treatment. The nomogram demonstrated strong discriminatory performance [moderate/severe cases: AUC 0.82 (95% CI 0.74, 0.90); any periodontitis: AUC 0.81 (95% CI 0.74, 0.88)], adequate calibration (moderate/severe cases: intercept=-0.062; any periodontitis: intercept=-0.129), and an insignificant overestimation of high risk and an underestimating of low risk (moderate/severe cases: slope=0.932; any periodontitis: slope=0.891). Across a wide range of thresholds, DCA demonstrated consistent clinical net improvement in both periodontitis case definitions.

Conclusions: Our nomogram demonstrated an excellent predictive capability to identify individuals having periodontitis using self-reported information, providing a feasible instrument for self-report-based surveillance of periodontitis.

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ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

PERIOSTIN-AVB5 INTEGRIN ENHANCES INFLAMMATORY CYTOKINE UNDER MECHANICAL STRESS IN HUMAN PERIODONTAL LIGAMENT CELLS

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Objectives: Periostin signaling pathway are known to involve in mechanotransduction of Human Periodontal Ligament Cells (hPDLC). It has been observed that mechanical stress influences the expression of various inflammatory cytokines, including IFN-γ. However, the detailed mechanism remains unclear. This study aims to investigate the force-induced periostin-integrin signaling pathway in hPDLC, leading to the expression of inflammatory cytokine.

Methods: hPDLC were cultured, and applied with 0 (control), 0.5 and 5 dyn/cm^2 of shear force for 3 hours (n=3). Cell membrane permeabilized and a non-permeabilized group of hPDLC were used to localize periostin through an immunofluorescence assay. To determine the periostin-related pathway, siRNA of periostin was used. Additionally, two substances were used to inhibit integrin activity: Cilengitide, which is $\alpha_v\beta_5$ and $\alpha_v\beta_3$ integrin inhibitor, and siRNA of αVβ5 integrin. The amounts of IFN-γ gene and protein expressions were assessed using qRT-PCR and ELISA at 24 hours. The results were analyzed with one-way ANOVA.

Results: Shear force stimulation led to localized periostin accumulation in the intracellular matrix, as observed by immunofluorescent assay. IFN-γ gene expression in hPDLC significantly increased in a magnitude-dependent manner after shear force stimulation. This inductive effect was decreased after knocking down periostin. Additionally, inhibition of periostin receptors with Cilengitide attenuated the enhancement of periostin on shear force-induced IFN-γ expression by qRT-PCR and ELISA. Accordingly, knockdown of αVβ5 integrin abolished the enhancement of shear force-induced IFN-γ expression.

Conclusions: The results of this study reveal the requirement of intracellular periostin-αVβ5 integrin signaling in force- induced IFN-γ expression in hPDLC. This information largely supports that periostin-integrin is crucial in maintaining periodontium homeostasis, thus increasing the understanding of the reciprocal role of the intracellular matrix and shear force on periodontium homeostasis. This new finding could be used clinically to target periostin-αVβ5 integrin to promote periodontal tissue remodeling and reduce inflammation especially in periodontitic patient.

025

ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

PREDICTING TOOTH LOSS AND PERIODONTITIS PROGRESSION WITH PRE-IDENTIFIED RISK FACTORS

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Objectives: Several works have studied risk factors for tooth loss (TL) and periodontitis progression (PP) in patients undergoing periodontal maintenance therapy. However, the effectiveness of risk factors for predicting TL and PP after the end of therapy (T2) remains unknown. TL is periodontitis-related tooth loss for both patient and tooth levels. PP is a ≥ 3 mm CAL loss at ≥ 2 interproximal sites for the patient level and a ≥ 2 mm increase in PPD for tooth level from the end of therapy (T1) to T2. This study analyses the effectiveness of risk factors identified by Siow et al., 2023 in various predictive machine learning models.

Methods: This study uses 108 patients' periodontal records collected at T1 and T2. For TL, patient-level risk factors are smoking, diabetes, stage, maintenance freq., and the num. of sites with PPD ≥ 5 mm, whereas tooth-level risk factors are residual PPD ≥ 7 mm, Grade 1–2 furcation involvement, Grade 1–3 mobility and max. CAL ≥ 6 mm. For PP, patient-level risk factors are gender, FMBS, compliance, maintenance freq., and the num. of sites with PPD ≥ 5 mm, whereas tooth-level risk factors are residual PPD 5–6 mm, Grade 1–3 furcation involvement, and max. CAL = 6 mm. This study considers five predictive models, namely logistic regression, support vector machine, decision tree, random forest, and neural network, that take the risk factors at T1 as input features and generate binary predictions for TL and PP at T2.

Results: Table 1 shows the macro F1-score of predictive models with risk factors at T1 for predicting TL and PP at T2. Macro F1-score is a suitable evaluation metric for this study due to its sensitivity to a class imbalance problem which exists at the tooth level dataset. The best macro F1-score are 0.76 and 0.60 for patient-level and tooth-level TL, 0.55 and 0.5 for patient-level PP, which are generally low compared to the desired macro F1-score of ≥ 0.90.

Conclusions: This study found that the efficacy of predictive models with pre-identified risk factors is substandard. Despite this undesired performance, the results hold promise for predicting tooth loss and periodontitis progression using predictive models. By considering the contextual nuances and model refinements, the performance and clinical utility of these predictive models could be further improved.

026

ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

EFFECTS OF LLLT ON PERIODONTALLY COMPROMISED PATIENTS UNDERGOING ORTHODONTIC RETENTION

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Objectives: This study aims to investigate the effects of low-level laser therapy (LLLT) on periodontal and orthodontic outcomes in periodontally compromised patients undergoing one-year orthodontic retention.

Methods: A randomized, triple-blinded, two-arm controlled trial was conducted. Twenty-nine periodontally compromised patients who were about to start orthodontic retention with a standard regimen were included following the eligibility criteria. Teeth on one side of the dental arch were randomly allocated into the LLLT group and received repeated diode laser (940nm and 800mW) by a quadrant-size probe, while teeth on the contralateral side were allocated to the non-LLLT group and subject to pseudo-laser irradiation with identical settings. Periodontal and orthodontic outcomes were comprehensively assessed using clinical examination and CBCT. Clinical periodontal parameters and orthodontic results were assessed before (T0) and 3 months (T1), 6 months (T2), and 12 months (T3) after fixed-appliance removal. CBCT was taken before (T0) and after 12-month retention (T3) to examine the tooth and alveolar bone dimensions. The difference in clinical and radiographic variables between the two groups and various time points was conducted using independent sample t-tests and ANOVA, respectively.

Results: The results showed that there was no significant difference in pocket depth (PD), gingival recession (GR), clinical attachment loss (CAL), bleeding on probing (BOP), and alveolar bone dimensions between the LLLT and non- LLLT groups ($p>0.05$) in periodontally compromised patients during orthodontic retention. Also, no statistically significant difference was detected in anterior teeth crowding, semi-arch length, and root resorption between the two groups ($p>0.05$). However, the increase in CAL (0.12±0.62mm) and BOP (5.88±13.26%) from the baseline was significantly higher at T3 compared to T1 in the LLLT group ($p<0.05$).

Conclusions: LLLT may not provide additional benefits in periodontal and orthodontic outcomes for periodontally-compromised patients during orthodontic retention. These patients tend to experience a recurrence of periodontal inflammation after one year.

027

ORAL SESSION 3
PERIODONTOLOGY
Thursday, 23 November 2023

INTEGRATED METAGENOME-METABOLOME PROFILING IDENTIFIES NEW LINKS BETWEEN DIABETES-MELLITUS AND PERIODONTITIS

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Objectives: Existing evidence supports the bi-directional association between type-2 diabetes mellitus (T2DM) and periodontitis. However, the mechanisms that link these two conditions are not completely understood. Hence, we aimed to characterize the interactions between the microbiome and metabolites in the oral environment to determine the association between T2DM and periodontitis using saliva as a medium.

Methods: In this case-control study, we performed nontargeted metabolic and metagenomic analyses of saliva in 39 women with T2DM (DM) and 40 women without T2DM (non-DM). Demographic and clinical data were recorded, and data were subjected to integrated bioinformatic analysis.

Results: Orthogonal Projections to Latent Structures Discriminant Analysis (OPLS-DA) model showed distinct salivary metabolomes for DM and non-DM groups. At an FDR of <0.05 and VIP>1, 126 metabolites significantly differed between the two groups. Most of these differentiating metabolites belonged to the class of amino acids and their derivatives, with dipeptides accounting for about 65% of the identified amino acid derivatives. Like metabolomics, salivary metagenomic profiles were significantly diverse between the DM and non-DM groups at the genus level. Through integrated metagenome-metabolome analysis using weighted gene co-express network analysis (WGCNA), we identified that the module constituting majorly of amino acids and dipeptides was significantly associated with genera Porphyromonas and Bacteroides, which are more prevalent in periodontitis ($r>0.4$, $p<0.0001$).

Conclusions: The elevated level of salivary amino acids, particularly dipeptides, in T2DM may serve as a critical nutritional source for the survival and growth of periodontitis-associated pathogens. This, in turn, increases the risk of developing periodontitis among patients with diabetes. Therefore, it is imperative to break this nutrient cycle to restore a healthy oral ecosystem. Given that T2DM increases the risk for periodontitis and vice-versa, regulating salivary dipeptide could be a potential target to mitigate the progression of both conditions, leading to improved oral and systemic health.

028

ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

PROPERTIES OF 3D-PRINTED ZIRCONIA FOR DENTAL PROSTHESIS

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Objectives: This study aims to investigate the accuracy, aging resistance, and ceramic-ceramic compatibility and surface roughness after chairside polishing procedure of 3D-printed zirconia.

Methods: A photosensitive slurry containing 42vol% of 3mol% yttria-stablized zirconia solid phase content was prepared. Samples were then fabricated using a homemade DLP 3D-printer equipped with a 405 nm UV light source and a resolution of 70 μm pixels in the X/Y plane with 50 μm layer thickness. After printing, the green bodies underwent de-binding and sintering processes at a maximum temperature of 1480 °C. In terms of accuracy, 3 groups of crowns (n=3 for each group) were manufactured with different printing directions and supporting positions (buccal lingual, adjacent , occlusal surface). The external surfaces were scanned using a desktop scanner, and 3D deviation analysis was performed. For ageing resistance, 3D-printed zirconia ceramic samples ($4.0x3.0x45mm^3$) underwent an accelerated ageing test according to ISO standard 13356:2015. Then, the 4-point bending strength was tested (n=7 for each group). In terms of ceramic-ceramic compatibility, test following ISO 9693-2:2016 standard was conducted (n=8). For surface roughness (Ra), both 3D-printed zirconia and conventional milling zirconia samples were used (n=3 for each group) and underwent a two-step grinding process using coarse and fine diamond grinders.

Results: For accuracy, the buccal lingual (0.053 ± 0.004 mm), adjacent (0.051 ± 0.007 mm) and occlusal surface (0.047 ± 0.104 mm) groups show no three no statistical significant difference ($p < 0.05$) in the RMS values. The 4- point bending strength of the 3D printed zirconia before (832 ± 65 MPa) and after (812 ± 64 MPa) the ageing process showed no significant difference ($p < 0.05$). The debonding/crack-initiation strength of the 3D-printed zirconia ceramic samples was measured to be 34.2 ± 3.1 MPa, exceeded 20 MPa in ceramic-ceramic compatibility test. The mean Ra for 3D-printed zirconia (0.669±0.140mm) and conventional zirconia (0.575±0.144mm) exhibited no significant difference ($p < 0.05$)

Conclusions: According to ISO standard requirements and comparison results, the 3D-printed zirconia has the potential for dental application.

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ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

MECHANICAL PROPERTIES OF 3D-PRINTED DENTURE BASE MATERIALS UNDER BIOMIMETIC CONDITIONS

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Objectives: To compare flexural strength, fracture toughness, and creep properties of four 3D-printed denture base materials under biomimetic conditions.

Methods: Four commercially available 3D-printed denture base materials, Formlabs-Denture-Base-OP, Pacdent- Denture-Base, Lucitone-Digital-Print, and DENTCA-Denture-Base-II, were used in the study.

Rectangular bar-shaped specimens were designed and printed with DLP-3D-printing machine and post-processed according to the manufacturer's instructions. Twenty-sixth specimens for each material were printed. Single-edge notched bars of 3x4x25mm3 were used for fracture toughness test(n=9); 4x8x40mm3 for three-point-bend flexural strength test(n=10), and 3x9x50mm3 for creep compliance test(n=6).

Specimens were tested at a controlled temperature 37±2°C using an environmental control chamber under an Instron- Universal-Testing-Machine. Three-point-bend was tested 1mm/min crosshead-speed and 20-mm-span until fracture. Specimens for fracture toughness were inspected under an optical-microscope for crack length and tested failure load using three-point-bend fixture with support 20-mm, crosshead-speed 0.5mm/min. Six specimens were used for creep test by loading specimens with displacement 1mm/min crosshead speed and holding 70%(20% for Lucitone) of mean failure stress 10minutes.

All values were calculated using one-way-ANOVA. The levels were compared by Tukey-KramerHSD using JMP- Pro16.2.

Results: DENTCA-Denture-Base-II and Formlabs-Denture-Base-OP showed significantly higher flexural strength than Lucitone-Digital-Print and Pacdent-Denture-Base,$P<0.0001$. However, Lucitone-Digital-Print had fracture toughness significantly higher than DENTCA-Denture-Base-II, Formlabs-Denture-Base-OP,and Pacdent-Denture-Base, respectively,$P<0.0001$. Lucitone-Digital-Print showed a significantly higher creep compliance percentage than Pacdent-Denture-Base, DENTCA-Denture-Base-II, and Formlabs-Denture-Base-OP,$P<0.0001$.

Conclusions: DENTCA-Denture-Base-II and Formlabs-Denture-Base-OP exhibit higher flexural strength than Lucitone-Digital-Print and Pacdent-Denture-Base.However, Lucitone-Digital-Print demonstrates superior fracture toughness compared to other materials.Regarding creep compliance, Lucitone-Digital-Print shows the highest percentage, indicating greater susceptibility to time-dependent deformation.

030

ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

CHARACTERIZATION OF EGGSHELL-DERIVED HYDROXYAPATITE AND ITS BIOCOMPATIBILITY IN ORYCTOLAGUS CUNICULUS

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Objectives: Hydroxyapatite ($Ca_{10}(PO_4)6(OH)_2$) is exceptionally associated with the bony apatite structure. Two-wall infrabony defects caused by periodontitis can be treated by placement of bone graft material to induce regeneration. This study evaluated and analyzed the biocompatibility, cytotoxicity, and regenerative capacity of an economical bone replacement graft utilized from eggshell-derived hydroxyapatite (EDHA).

Methods: The hen eggshells were locally sourced and then processed as a biomaterial before experimentation. Oryctolagus cuniculus (n=16) with a mean weight of 2.3±0.42kg were assigned to two groups: untreated group without EDHA and treated group which received EDHA. Using a low speed carbide bur, a 4mm two-wall bone defect was surgically-induced in the mesio-buccal alveolar bone of the maxillary central incisors of the rabbits in both groups. Physico-chemical characterization of EDHA was examined using pH analysis, Fourier transform infrared spectroscopy (FT-IR), field emission scanning electron microscopy (FE-SEM), and quantitative cell culture and viability assay. Assessment of bone regeneration was done by analyzing changes in clinical attachment level (CAL) and radiographic bone level (RBL) at 4^{th} and 8^{th} weeks post-operative.

Results: The results of CAL ($P<0.05$) and RBL ($P<0.05$) showed significant changes (Mann-Whitney U-test and Wilcoxon matched-pairs test) in bone regeneration of the EDHA-treated defect site at 4-weeks post-operative relative to baseline. EDHA had an alkaline pH (12.573+0.082) which is associated with rapid bone mineralization. EDHA also exhibited inorganic components comparable to human bone. FT-IR analysis showed presence of chemical groups in the hydroxyapatite structure: phosphate at 1050.50cm^{-1} and 1094.13cm^{-1}, hydrogen phosphate at 871.32cm^{-1}, carbonate at 1418.18cm^{-1} and 1470.08cm^{-1}, and hydroxide at 3407.76cm^{-1} and 3641.41cm^{-1}. Cytotoxicity result (77%) authenticated EDHA as non-cytotoxic (ISO 10993-5:2009). EDHA at 80,000x magnification is sized at 100nm, verifying it as a nanoparticle.

Conclusions: Confirmed by the results of this study, EDHA was a biocompatible, non-cytotoxic, nanosized bone replacement graft that facilitated bone regeneration in the surgically-induced two-wall defect.

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ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

ION RELEASE FROM GIC AND RMGIC RESTORATIONS WITH SDF CONDITIONING

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Objectives: To assess the fluoride and silver ion release of glass ionomer cement (GIC) and resin-modified glass ionomer cement (RMGIC) restorations after conditioning with 38% silver diamine fluoride (SDF).

Methods: 40 dentine blocks with a cavity of 2*2*2 mm were prepared. The dentine blocks were restored with either GIC or RMGIC and half of each type were applied with 38% SDF forming 4 groups: Group 1 - GIC + SDF, Group 2- GIC; Group 3-RMGIC+ SDF; Group 4- RMGIC. The blocks were immersed in 5 mL of deionized water individually and stored at 37 °C for 2 years. Fluoride and silver ion concentration in storage solutions were measured regularly using an ion analyzer and ion chromatography, respectively. The restored dentine blocks were then sectioned and the cross-sectional surfaces were assessed by scanning electron microscope (SEM) with energy-dispersive X-ray spectroscopy (EDS) after 1 week and 2 years, respectively.

Results: The mean and standard deviation of accumulative fluoride releasing in Groups 1-4 for 2 years were 25.53±0.98 mg/L, 18.99±1.31 mg/L, 20.50±1.41 mg/L and 9.41±0.39 mg/L respectively (Groups 1> 3&2> 4, $p<0.05$). The mean and standard deviation of accumulative silver releasing in Groups 1-4 for 2 years were 6.54±1.81 mg/L, 0.00±0.00 mg/L, 2.86±0.64 mg/L and 0.00±0.00 mg/L respectively (Groups 1> 3> 2&4, $p<0.05$). The GIC and RMGIC restorations with SDF conditioning showed significantly higher fluoride and silver releasing compared to restorations without SDF conditioning ($p<0.05$). SEM images of the cross-sectional view of the dentine blocks showed silver crystals within dentinal tubules 1 weeks and 2-years after restoration. EDS analysis found silver penetration depth in dentine in Groups 1 and 3 were around 255um in 1 weeks and 300um after 2 years.

Conclusions: The 38% silver diamine fluoride conditioning increased the fluoride and silver release of GIC and RMGIC restorations.

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ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

3D-PRINTED STENTS FOR STANDARDIZATION OF COMPOSITE-RESIN SAMPLE PREPARATION

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Objectives: Inconsistent dimensions and topographical features of composite-resin lead to huge standard deviations due to small thickness of the sample. Therefore, the present study aimed to overcome the limitations in standardizing composite-resin sample preparation by evaluating the effectiveness of custom 3D-printed stents.

Methods: A sample size of n=16, with a diameter of 10mm and a thickness of 1mm, was prepared using a stainless-steel mould. The composite resin-based material, Filtek Z350XT Shade Body A2, was used. The cured discs were divided into two groups: the test group (T) with a stent and the control group (C) without a stent. 3D printed stents were fabricated for (T) and eight discs were finished and polished under running water using grits ranging from 320-1200 on a grinder and polisher machine. The control discs (C) underwent the same procedure without a stent. Digital callipers were used to measure the thickness of both group discs. The mean roughness (Ra) was measured using a profilometer for all discs.

Results:
Intrarater Reliability: The ICC result of both the test and control groups shows high correlation with the result at 0.99.
Dimensions: (T) shows a mean of 1.0mm which is near to ideal thickness with a lower SD 0.08mm when compared to (C) with mean of 1.09mm and a high SD of 0.26mm. Mann-Whitney Test shows that the result is statistically significant ($p<0.05$).
Surface Roughness: (T) shows a mean of 1.02µm which is near to acceptable range of (0.4 to 1.7µm) with a lower SD 0.33µm when compared to (C) with a mean of 3.37µm and a high SD of 1.89µm. Mann-Whitney Test shows that the result is statistically significant ($p<0.05$).

Conclusions: By standardizing the sample preparation protocol, variability can be minimized, ensuring consistent composite resin samples. This enhances study validity, enabling meaningful comparisons and conclusions.

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ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

DEVELOPING A CALCIUM SILVER ZEOLITE WITH REMINERALISING AND ANTIMICROBIAL PROPERTIES

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Objectives: To 1) develop a novel calcium silver zeolite, 2) assess its calcium and silver ion release kinetics and, 3) assess its antimicrobial effect on common oral pathogens.

Methods: Calcium silver zeolite (Ca-Ag-Zeo) was synthesized using calcium chloride, silver nitrate and Zeolite X and characterized by X-ray diffraction spectrum, scanning electron microscopy, transmission electron microscopy and energy dispersive spectroscopy, respectively. The calcium and silver ion release of Ca-Ag-Zeo were assessed by Inductive Coupled Plasma Emission Spectrometry for 12 weeks. The antimicrobial effects of the Ca-Ag-Zeo on common oral pathogens, including Streptococcus mutans, Lactobacillus acidophilus, Lactobacillus casei, Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis and Candida albicans were assessed by minimum bactericidal concentration (MBC) assay. Silver zeolite X (Ag-Zeo) and zeolite X (Zeo) were used as control.

Results: Ca-Ag-Zeo was synthesized and presented a hexagonal cage structure containing calcium and silver. The accumulated calcium ion release concentration (±SD in mg/L) at 12 weeks of Ca-Ag-Zeo, Ag-Zeo and Zeo were 2.2 ± 0.54, 0 and 0, respectively (Ca-Ag-Zeo > Ag-Zeo = Zeo; $p<0.001$). The accumulated silver ion release concentration (±SD in mg/L) at 12 weeks of Ca-Ag-Zeo, Ag-Zeo and Zeo were 42.5 ± 5.58, 41.8 ± 3.96 and 0, respectively (Ca-Ag- Zeo = Ag-Zeo > Zeo; $p<0.001$). The MBC (mg/ml) of Ca-Ag-Zeo, Ag-Zeo and Zeo were 32, 16 and > 256 against S. mutans; 32, 16, >256 against L. acidophilus; 16, 16, and 256 against L. casei; 1, 2, >256 against A. actinomycetemcomitans; 0.25, 0.125, >256 against P. gingivalis; and 2, 1, > 256 against C. albicans respectively.

Conclusions: A novel calcium silver zeolite was developed. It can release calcium ions and silver ions sustainably and inhibit the growth of common oral pathogens.

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ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

DUAL-CURED GELMA-FIBRIN HYBRID HYDROGEL FOR ORGANOTYPIC BONE CULTURE MODEL

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Objectives: Gelatin methacryloyl (GelMA) a hydrogel made by crosslinking gelatin with methacrylic anhydride, is widely used as a scaffold for tissue engineering and bone regenerative strategies. However, the reduced temporal stability of the GelMA scaffold makes it non-conducive to support osteogenic differentiation. Fibrin is a proangiogenic bioactive polymer, frequently used as a matrix to support physiologically relevant organotypic cultures. Fibrin is the product of crosslinking between fibrinogen and thrombin in the presence of calcium ions. In the present study, we propose the development of dual-cure GelMA-Fibrin hydrogel and investigate its potential to support osteodifferentiation.

Methods: GelMA in different concentrations (G:6%,8%,10%) were mixed with 6% fibrinogen (F) in 1:1 (v/v) ratio to develop a hybrid hydrogel (3H, 4H & 5H). These prepolymer gels were tested for their viscoelastic properties. The gels were later photocured (1625mW/cm2) followed by crosslinking with thrombin and characterized for enzymatic degradation. Cellular viability was evaluated by encapsulating human periodontal ligament-derived stem cells (PDLSC) within the gels followed by live/dead staining and confocal laser microscopy. For osteodifferentiation, the PDLSC encapsulated in hydrogels were cultured in osteogenic media for 14 days and the levels of osteogenic markers were evaluated.

Results: GelMA-Fibrin hydrogels demonstrated shear thinning behavior and reduced viscoelastic properties compared to GelMA hydrogel controls. The incorporation of fibrinogen into GelMA significantly reduced the mass loss percentage and increased its elastic modulus. A significant reduction in the number of dead cells was observed in hybrid hydrogels compared to respective GelMA controls ($p<0.05$). Dual-cured hybrid hydrogels demonstrated enhanced osteodifferentiation potential as evidenced by the presence of phosphate, carboxyl ions peaks in spectroscopy, and increased levels of alkaline phosphatase levels under osteogenic conditions.

Conclusions: The dual-cured GelMA-fibrin hydrogel demonstrated increased mechanical properties, lower degradation rates, and superior bio-functionality. This offers promising applications in the field of tissue engineering and bone regenerative strategies.

035

ORAL SESSION 4
BIOMATERIALS - 1
Thursday, 23 November 2023

DEVELOPMENT OF ARTIFICIAL SALIVA GEL BALLS

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Objectives: To develop and characterize artificial saliva gel balls and to evaluate the satisfaction of artificial saliva gel balls in healthy volunteers.

Methods: The artificial saliva formula of PSU dental school was modified. Two gelation techniques, direct and reverse gelation, with 2 concentrations of xanthan gum, and 1 or 2 times of encapsulation produced 8 formulas of gel balls. Then, they were tested for their physical and texture properties. Physical stability of gel balls after one month was observed. Two formulas were selected and were flavored with 3 flavoring agents resulting in 6 formulas. The crossover design study on satisfaction with the 6 formulas was conducted in 3 age groups: 18-25, 26-59, and 60 years old or above. Twenty subjects were purposive sampling for each group with a totally of 60 samples. Questionnaires on satisfaction of taste, size, and ease of use were collected. Data were analyzed using ANOVA and repeated measures ANOVA with a 95% confidence level.

Results: Artificial saliva which added xanthan gum increased the pH and had pseudoplastic flow conforming to the natural saliva. Textures of the gel balls were jelly, and liquid with shell for direct and reverse gelation, respectively. Two formulas were selected according to their properties such as pseudoplastic flow and physical stability after one- month storage at refrigerate temperature. The gel balls passed the microbial limit test under monograph <1111> before testing in the human. Overall satisfaction was moderate to high with no significant difference between formulas ($p>0.05$). Whereas, the satisfaction with moisturizing and oral tissue coating sensation was relatively high.

Conclusions: The artificial saliva gel balls using direct and reverse gelation techniques were successfully developed.They were physical stable after one month in refrigerator. The overall satisfactions of the products were relatively high. The results imply that the artificial saliva gel balls have a potential for further development and use in patients with dry mouth.

036

ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

ACCESS TO DENTAL CARE IN INDIVIDUALS WITH DISABILITY: A SYSTEMATIC REVIEW

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Objectives: To explore the factors influencing access to oral health services in disabled individuals. To identify and examine the strategies to improve the access

Methods: PubMed, Scopus and Embase databases were searched. Studies except editorials reported in English regardless of the study design were included. Search was carried out on 23rd May 2023. Risk of Bias assessment was carried out using Agency for Healthcare Research and Quality, New Castle Ottawa Scale and JBI tool for cross sectional, case control and cohort and qualitative studies respectively.

Results: 11,372 records were initially identified, eventually leading to 12 relevant publications to be included in the review. Seven studies were cross sectional, one was case control, two were cohort and the remaining two were qualitative in nature. Individuals' valued oral health but found it difficult to access oral health services. Dental care was mainly accessed during emergencies and most participants (64.6%) felt apprehensive about visiting a local dentist because of their health condition and 38.4% already required dental treatment. Older individuals and women were reported to have lesser annual dental visits. Family size and education level impacted the struggles finding a treating dentist. Caregiver's and dentist's perspective was also reported in this study.

Conclusions: There is a need for provision of education, training and increasing awareness on dental hygiene and annual dental checkups to improve the access. It leverages the facilitators such as specialized dental professionals, collaborative partnerships, and reasonable accommodations.

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ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

ADJUNCTIVE USE OF VIRGIN COCONUT OIL IN SUBGINGIVAL INSTRUMENTATIONS.

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Objectives: Virgin coconut oil (VCO) has been proven to present anti-inflammatory, anti-bacterial and anti-plaque properties. This study investigates VCO's effectiveness as an adjunct to non-surgical periodontal therapy for periodontitis patients.

Methods: Eight patients with probing pocket depth (PPD) ≥ 5mm and clinical attachment (CA) level ≥ 3mm were randomly divided into two groups. All patients were given oral hygiene education, motivation and instructions, followed by scaling and root debridement (SRD). Placebo was locally delivered in the control group and VCO for the test group 24 hours after SRD, and weekly for three consecutive weeks. Clinical parameters of probing pocket depth (PPD), clinical attachment level (CAL), bleeding on probing (BOP), gingival Index (GI) and Plaque Index (PI) were done at baseline and then at the interval of 3 and 6 months.

Results: A total of 1272 periodontal pockets were examined and 249 pockets with PPD of ≥ 5mm were included in the analysis. At baseline, there are no significant differences in all parameters between groups. There are substantial differences in mean PPD (p=< 0.001, 95% CI of mean difference: 0.28,0.91), CAL (p=< 0.001, 95% CI of mean difference: 0.94,1.77) and BOP (p=< 0.001, 95% CI of mean difference: 0.20,0.63) at 3 months and PPD (p=< 0.001,
95% CI of mean difference: 0.75,1.35), CAL (p=< 0.001, 95% CI of mean difference: 1.03,1.85) and BOP (p=< 0.001, 95% CI of mean difference: 0.14,0.51) at 6 months between groups, indicating more significant reductions in the test group compared to the control group.

Conclusions: Adjunctive use of VCO in comparison with placebo for periodontitis patient resulted in significant reductions in PPD, BOP and more gain in CA level at 3 and 6 months follow up.

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ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

ORAL HEALTH EDUCATION FOR INDEPENDENT OLDER ADULTS: A SYSTEMATIC REVIEW

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Objectives: This study aims to systematically review and analyze the existing literature to evaluate the effectiveness of oral health education (OHE) interventions for independent older adults.

Methods: Randomized controlled trials involving independent older adults were included in this review. The databases searched were PubMed and the Cochrane Library, and articles published in English between 1976 and 2023 were considered. The outcomes assessed included plaque index, gingivitis, denture hygiene, unstimulated saliva flow rate (USFR), subjective oral dryness, oral health-related knowledge (OHK), and oral health-related quality of life (OHQoL). The risk of bias was evaluated following the Cochrane Handbook, and a meta-analysis was conducted using fixed- and random-effects models.

Results: A total of 1,113 articles were identified, and after evaluating 32 full texts, eight studies were included in qualitative synthesis, and seven studies were included in the meta-analysis. The studies employed various delivery approaches for oral health education including lectures, demonstrations, motivational interviews, re-motivation, and mobile applications. Overall, oral health education significantly improved the oral health status of independent older adults, as evidenced by reductions in plaque and gingivitis, improved denture cleanliness, increased OHK, and enhanced OHQoL. However, no significant effects were observed for subjective oral dryness and USFR.

Conclusions: Oral health education effectively enhances the oral health status, OHK, and OHQoL of independent older adults, although its impact on subjective oral dryness and USFR remains inconclusive. The effectiveness of OHE may vary depending on the specific educational methods employed. Further research comparing the effectiveness of different delivery approaches is recommended.

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ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

HOW SHOULD WE MEASURE THE UPPER AIRWAY?

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Objectives: The diagnosis of sleep-disordered breathing should be done only by a sleep physician. At the same time, CBCT taken for orthodontic diagnosis often encompass the upper airway (UA), thus offering a valuable tool to assess UA morphology. The aims of this study is to define how to measure UA: in details, which measurements should be considered, how reproducible they are also in respect to head posture, and which are the differences between the various measurements, and their implications to airflow in the UA.

Methods: CBCT-scans from 10 subjects and MRI-scans from 10 volunteers were analysed, and the UA was segmented using a manual threshold approach. Total volume and partial volumes of the nasal cavity and pharyngeal airway (PA) were assessed, and the cross-sectional areas and hydraulic diameters were calculated based on the PA centerline. The influence of head posture during image acquisition on UA volumes was also assessed.

Results: Measurements of the UA are reliable both at intra- and inter-examiner levels (minimal ICC, 0.960). Measuring the UA volume(s) alone do not depict the true morphology of UA. Similarly, cross sections cannot illustrate the areas characterized by a higher resistance to airway flow, whilst the hydraulic diameter seems to be a better predictor. Compared to normal head posture, head extension and flexion were associated with significant UA volume increment (p=0.02) and reduction (p=0.005), respectively.

Conclusions: Measuring the UA is not trivial. By following a standardized procedure and applying a manual threshold, the UA can be reliably segmented and measured. Using the centreline as a reference, the cross section together with the hydraulic diameter can accurately characterize the UA morphology. Yet, head posture should be standardized during image acquisition as an altered position greatly influences the measurements of UA.

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ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

PLATELET-RICH PLASMA THERAPY IN ORAL LICHEN PLANUS: A SYSTEMATIC REVIEW

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Objectives: Oral lichen planus (OLP) is regarded as an oral potentially malignant disorder. Platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) have been suggested as alternative treatment modalities for managing OLP. The aim of this systematic review is to evaluate the efficacy of intralesional PRP/PRF injections compared to intralesional corticosteroid injections in the treatment of OLP.

Methods: This study was registered on PROSPERO (CRD42023389196). Electronic databases including MEDLINE via PubMed, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), Scopus, ClinicalTrials.gov, World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP) Search portal, EBSCO Opendissertion and grey literature (Opengrey.eu) up to March 16, 2023. Randomized controlled trials which compared the clinical efficacy of intralesional PRP/PRF injection and intralesional corticosteroids injections in the management of OLP were included in this review. Two reviewers independently selected eligible articles, collected data, and qualitatively evaluated each included study.

Results: Nine studies were eligible for assessment. Four out of nine were excluded due to no control groups. Five remaining articles were included and extracted for data. A total number of 85 participants diagnosed with OLP were included. Three studies used PRF and two studies used PRP as intervention, while the control were triamcinolone acetonide in four studies and methylprednisolone in one study. Clinical parameters were reported as REU score, lesion size, and Thongprasom's score. After treatment, PRP/PRF significantly reduced clinical parameters from baseline, similarly to the control group. Additionally, pain/burning sensation significantly reduced from baseline in both groups.

Conclusions: The evidence suggested that intralesional PRP/PRF injections can reduce pain and clinical lesion scores comparable to the conventional intralesional corticosteroid injection. Therefore, PRP/PRF could be used as an effective alternative therapy in patients with OLP, especially for those with refractory lesions.

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ORAL SESSION 5
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

THE EFFECTS OF FACE MASKS WEARING IN DIGITAL PANORAMIC RADIOGRAPHS

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Objectives: Although the wearing of masks has been relaxed for public areas, Thai Ministry of Public Health still recommend the use of face mask to prevent infection by respiratory diseases including COVID-19 especially in the closed-environment. As for radiation protection, X-ray rooms usually build in sealed unit. Panoramic radiographs were accepted as gold-standard for oral screening examination. The purpose of this study was to compare the effects of masks wearing and without in digital panoramic radiographs.

Methods: The cross-sectional study was approved by the Institutional Review Board of Naresuan University, Phitsanulok, Thailand (NU-IRB-COA No. 389/2021). 600 patients were enrolled in the study. 300 patients were asked to wear masks during panoramic examination, another 300 went through the examination normally without masks. Each digital panoramic radiograph was observed by two radiologists independently in three times interval. 6 areas of panoramic radiographs; maxillary anterior teeth, maxillary posterior teeth, nasal and paranasal sinus, mandibular anterior teeth, mandibular posterior teeth and mandibular retromolar areas were graded as; 0 undiagnosable, 1 unclear, 2 diagnosable. Mean and SD of graded scores were calculated and compared.

Results: The intraclass correlation coefficient were 0.91, 0.96 and 0.95 in the first observer and 0.86, 0.91 and 0.89 in the second observer. The interclass correlation coefficient were 0.87, 0.96 and 0.92. The overall scores of masks wearing were 9.81±2.87, 10.24±2.74 and 10.03±3.02. The overall scores of un-masked were 10.45±3.02, 10.85±2.89 and 10.67±2.76. Both masked and un-masked wearing radiographs resulted in non significantly different for diagnostic ($p < 0.05$).

Conclusions: Masks wearing in digital panoramic radiographs do not affect the image quality in making diagnosis.

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ORAL SESSION 6
ORAL HEALTH RESEARCH - 3
Thursday, 23 November 2023

IS HYPNOSIS HELPFUL DURING NITROUS OXIDE/OXYGEN INHALATION SEDATION?

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Introduction: Dental anxiety and fear are the known obstacles to the completion of dental treatment both in adults and children. One of the ways to deal with these is treatment under inhalation sedation and hypnosis.

Hypnosis is one of the non-pharmacological behaviour management techniques that has been around for years, yet it is still underutilised. It can be used alone or as an adjunct to nitrous oxide (NO2/O2) sedation to reduce dental anxiety and improve pain tolerance, thus helping to complete dental treatment.

Objectives: This study aimed to evaluate the use of NO2/O2 inhalation sedation alone and in combination with hypnosis in terms of duration and percentage use of NO2/O2 gas.

Methods: Records of paediatric dental patients receiving treatments under NO2/O2 sedation and combined with hypnosis in Universiti Teknologi MARA Sungai Buloh 2017 until 2022 were reviewed. Treatment includes extraction, pulp therapy or minor oral surgery under local anaesthesia.

Results: Out of 136 procedures carried out under NO2/O2 sedation where 14 of them were combined with hypnosis. The main reason for treatment under sedation is anxiety. The titration duration for NO2/O2 sedation was 14 minutes, and for NO2/O2 sedation and hypnosis was 15 minutes. The therapeutic nitrous oxide level for both techniques is 30%. The duration and therapeutic level of the two behaviour management techniques showed no significant difference ($p < 0.05$).

Conclusions: Both are equally effective in reducing dental anxiety, as demonstrated in the percentage of nitrous oxide required to achieve therapeutic levels for the commencement of treatment. A comprehensive, well-controlled clinical research is recommended to evaluate the effectiveness of hypnosis as an adjunct to NO2/O2 sedation.

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ORAL SESSION 6
ORAL HEALTH RESEARCH - 3
Thursday, 23 November 2023

A STUDY ON THE DEVELOPMENT OF A PLAQUE DETECTION PROGRAM USING ARTIFICIAL INTELLIGENCE

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Objectives: To evaluate oral hygiene, disclosing evaluation of dental plaque is a very important diagnostic method. Various indices are applied to the staining and evaluation of these dental plaque, and they are determined by visual inspection by dental experts. In order to develop an image analysis program that can be more helpful in the quantitative evaluation, we tried to devise and evaluate an automatic scoring system by using artificial intelligence in the quantitative evaluation method of dental plaque using tooth staining agent.

Methods: The tooth surface coloring agent used for deep learning training was Monotone (Disclosing solution, THOMASTONE, CO, ltd, KOREA), and 1,000 images were used for learning. Labeling for quantitative evaluation of images was performed by two dental experts, and the dataset was divided into training data, verification data, and test data sets to form an artificial intelligence structure. In order to improve the accuracy of dental plaque, multi-model design and learning were conducted, and step-by-step dental plaque separation and detection results were confirmed.

Results: As a result of calculating and evaluating the degree of disclosing area compared to the teeth of the tooth-colored image using artificial intelligence, A data conversion success rate of over 99% was secured in the parsing process for individual tooth data in tooth photos and the post-parsing DB process, and a normalization process was established for AI analysis in tooth image photos. Also, this program accuracy of 95.5% was shown, and the separation of teeth from the image and the calculation of the tooth-colored range were numerically derived.

Conclusions: It was able to derive that the introduction of artificial intelligence in dental plaque color image analysis to evaluate oral hygiene is highly applicable.

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ORAL SESSION 6
ORAL HEALTH RESEARCH - 3
Thursday, 23 November 2023

BI-DIRECTIONAL TEMPORAL RELATIONSHIP BETWEEN CARIES AND ATOPIC DERMATITIS AMONG CHILDREN

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Objectives: Both atopic dermatitis (AD) and dental caries (DC) are common chronic childhood diseases, with 10~20% and 20~80% prevalence rates among global communities. Recently the AD-DC relationship between AD (as an exposure) and DC (as an outcome) has gradually surfaced. Following the subclinical ectodermal developmental structural defects (SEDSD) theory, the opposite (DC-AD) temporal relationship is postulated. Since the DC-AD link remains unknown, this study is purposed to assess the comorbidity with two retrospective cohorts to test the association from both directions.

Methods: Based on the TriNetX platform, two retrospective cohorts were set up using the existing data in the US Collaborative Network of 56 global healthcare organizations (HCOs). In the AD-DC cohort, 105,830 children younger than 2 years old, with AD diagnosed more than 2 times, were recruited and the non-AD control group (N=105,830) was established with 1:1 matching of age, sex, race, SES, and medical utilization. Likewise, in the DC-AD cohort, 34,823 children younger than 6 years old with more than 3 times of caries diagnosed were identified together with the matched non-DC group as aforementioned. The log-rank test and Cox-proportional hazard model were employed, respectively, to test the significance of association and estimate the hazard ratios (HRs) between the two diseases.

Results: Both AD-DC and DC-AD links were significant (both $p<0.001$) with an overall HR of 1.67 (95% CI, 1.56–1.79) and 1.24 (1.11–1.37), respectively. The presence of a bi-directional temporal association supports the comorbidity as predicted by the SEDSD theory.

Conclusions: Early childhood caries and atopic dermatitis may be closely related following similar ectodermal developmental pathways. Early referral and integrated oral/general healthcare for children may be critical for disease and cost control.

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ORAL SESSION 6
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Thursday, 23 November 2023

PULP SURVIVAL OF CROWNED VITAL CRACKED TEETH AFTER ORTHODONTIC BANDING

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Objectives: Orthodontic bands can be used in the interim to manage cracked teeth with reversible pulpitis before definitive restorations. The aim of this prospective study was to investigate the 1-year pulp survival of cracked teeth with reversible pulpitis managed with initial stabilization using orthodontic bands, followed by coronal coverage restorations.

Methods: One-hundred-and-twenty-five patients with a cracked tooth with reversible pulpitis each were recruited. Pre-operative patient and tooth data were collected. After definitive pulp diagnoses were determined following an interim period of 1 to 5 months of orthodontic banding, coronal coverage restorations were placed. Patients were reviewed 1 year after recruitment. Clinical and radiographic findings were recorded to determine pulp survival. Logistic regression was used to assess for possible prognostic factors and to correlate initial time to pulp stabilization while in orthodontic bands with eventual outcome.

Results: One-hundred-and-six cracked teeth were followed up at 1 year. Pulp survival was found in 82 teeth (77.4%.). There was no prognostic factor for pulp survival. Out of 24 failures, 11 (45.8%) required root canal treatment (RCT) at the molar band stage, 10 (41.7%) required RCT during the provision of coronal coverage restorations and 3 (12.5%) presented with asymptomatic apical periodontitis detected at the 1-year review. Teeth that eventually required RCT were found to have required a longer period in orthodontic bands prior to a definitive pulp diagnosis ($p<0.05$).

Conclusions: A step-by-step approach using orthodontic banding prior to coronal coverage may reduce the incidence of root canal treatment through definitive coronal coverage restorations for cracked teeth.

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Thursday, 23 November 2023

D-GALACTOSE AND OBESITY INDUCE AGING AND PATHOLOGIES IN DENTAL PULP

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Objectives: We previously demonstrated that both D-galactose (Dgal) induced aging and obesity caused pathological conditions as indicated by increased inflammation and impaired mitochondrial function in several vital organs. We also reported that Dgal-induced aging aggravated obesity-induced bone dyshomeostasis. However, the dental pulp pathologies including aging, inflammation, and mitochondrial dynamics imbalance in Dgal-induced aging, obesity and combined conditions still remain unclear. This study aimed to investigate the effects of Dgal-induced aging and high-fat diet (HFD)-induced obesity and combined conditions on aging, inflammation, mitochondrial dynamics, apoptosis, and mitophagy in dental pulp of male Wistar rats.

Methods: Twenty-four male Wistar rats were randomly fed with normal diet (ND) or HFD for 20 weeks. At week 13, each dietary group (ND or HFD) was subdivided into 2 subgroups (n=6/subgroup). Each subgroup was treated with either vehicle (0.9% normal saline, subcutaneous injection, once daily) or Dgal (150 mg/kg/day, subcutaneous injection, once daily) for 8 weeks. At the end of protocol, all rats were sacrificed. The pulp tissues from rats' incisors were collected for investigation of aging, inflammation, mitochondrial dynamics, apoptosis, and mitophagy.

Results: Pulpal tissues of Dgal-treated HFD-fed rats significantly 1) increased aging markers, including p16 and RAGE expressions; 2) increased inflammatory levels, such as TNF-α, IL-1β, and IL-6 expressions; 3) imbalanced mitochondrial dynamics, as indicated by decreased mitochondrial fusion proteins (MFN1, 2); 3) increased pulpal apoptosis: increased Bax/Bcl-2 ratio, and 4) impaired mitophagy as indicated by decreased the expressions of PINK1 and Parkin, when compared to vehicle-treated ND-fed rats ($p<0.05$), as shown in Table 1. Dgal administration and HFD-induced obesity alone did not induce aging in dental pulp, however obese condition led to increase pulpal inflammation and pulpal apoptosis, when compared to vehicle-treated ND-fed rats ($p<0.05$).

Conclusions: These findings suggest that Dgal-induced aging aggravates obesity-induced pulpal pathologies.

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ORAL HEALTH RESEARCH - 3
Thursday, 23 November 2023

ANTIBIOTIC RESISTANCE GENES IN OROFACIAL ABSCESSES IDENTIFIED USING A METAGENOMICS-BASED APPROACH

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Objectives: Current culture-based methods for microbiological diagnosis and antibiotic susceptibility tests have limitations in the management of oral and maxillofacial infections. In this pilot study, we aimed to profile pus microbiota and identify antibiotic resistance genes (ARGs) in oral and maxillofacial infections using a culture-independent approach.

Methods: Taxonomic profiling and prediction of ARGs were performed directly from the metagenomic raw reads generated by shotgun sequencing of genomic DNA samples extracted from the pus specimens of two patients with orofacial abscesses.

Results: Taxonomic profiling revealed obligate anaerobic polymicrobial communities associated with infections of odontogenic origins: the microbial community of Patient 1 consisted of one predominant species (Prevotella oris 74.6%) with 27 minor species, while the sample from Patient 2 contained 3 abundant species (Porphyromonas endodontalis 33.0%; P. oris 31.6%; and Prevotella koreensis 13.4%) with five minor species. A total of 150 and 136 putative ARGs were predicted in the metagenome of each pus sample. The coverage of most predicted ARGs was less than 10%, and only the CfxA2 gene identified in Patient 1 was 100%. ARG analysis of assembled genomes available in a public database suggested that P. oris may carry CfxA2 gene.

Conclusions: A metagenomics-based approach is useful to profile predominantly anaerobic polymicrobial communities, and this pilot study implies the possibility of ARG analysis using clinical metagenomic samples.

Acknowledgements: This study was supported by the National Research Foundation of Korea (Daejun, Korea) through the grants [2018R1A5A2024418 and 2020R1A2C2007038].

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ORAL SESSION 6
ORAL HEALTH RESEARCH - 3
Thursday, 23 November 2023

CHILDREN SALIVARY GHRELIN AND LEPTIN WITH STUNTED GROWTH IN NANGAPANDA-INDONESIA

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Objectives: Stunting has become a global problem for the growth and development of children and it is more likely to be at risk of being overweight and obese in the future. Growth is influenced by hormones, such as ghrelin and leptin that can be expressed in the salivary glands. However, the relationship between the level of the salivary ghrelin and leptin of stunted and healthy children has not been reported. This study aimed to compare the level of salivary ghrelin and leptin of stunted and healthy children.

Methods: Fourty-three stunted and 53 healthy children; age range 6-8 years old, at Nangapanda, East Nusa Tenggara, Indonesia were measured by using standing height to the nearest 0.1 cm using a microtoise. The equipment was calibrated at the start of each day and after every 10th child. Children were informed to refrain from eating, drinking or cleaning their teeth 2 h before the collection of unstimulated saliva. Ghrelin and leptin levels were analyze by using BioEnzy© ELISA kit with a wavelength of 450 nm. Data were analyzed using a Mann-Whitney test to identify the difference in salivary ghrelin and leptine hormone levels in children in the stunted and healthy groups

Results: Salivary ghrelin and leptin level in stunted children mean (SD) (2.97 ng/mL (2.05) and 16.61 ng/mL (2.09), respectively) was higher than in healthy children (0.78 ng/mL (1.19) and 14.56 ng/mL (1.05), respectively). Salivary ghrelin and leptin level in stunted was significantly higher than in healthy children ($p < 0.05$).

Conclusion: It can be stated that the higher the level of ghrelin and leptin in saliva, the worse the nutritional status of a person. The relationship between the ghrelin and leptin in saliva and nutritional status can be linked to the stunting phenomenon, which has the potential to cause obesity.

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ORAL SESSION 7
IOHS AWARD
Friday, 24 November 2023

ORO-DENTAL AND FACIO-CERVICAL TRAUMA FROM STRANGULATION: A PRELIMINARY ASSESSMENT AND CLINICAL IMPLICATIONS

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Objectives: Strangulation is a form of coercive control used by perpetrators of Intimate Partner Violence (IPV). It can have severe, long-lasting, and even lethal consequences. There is currently little research surrounding strangulation and its place in an Australian context. Research into Oro-dental and facio-cervical clinical presentations in non-lethal strangulation is also scarce We believe oral health practitioners are in a unique position to assess clinical signs of strangulation in their patients.

This study aims to

1. Find clinically significant oro-dental and facio-cervical traumatological patterns that could be used to provide premorbid intervention strategies through trauma identification in health care settings including dental clinics and hospitals.

2. Add to the understanding of strangulation in various forms within the realms of medical and dental clinical practice. We hypothesise that there will be differences in strangulation patterns between men and women, as well as variations in injury between accidental, suicidal, and homicidal strangulation.

Methods: Data from coronial reports, autopsy reports, police reports and post-mortem computer tomography scans from each Australian State and Territory as well as information from the New Mexico Decedent Image Database (NMDID) were analysed. Intrinsic and extrinsic variables were analysed. Relationships between strangulation trauma and epidemiological risk factors for individuals and community groups were also investigated.

Results: We found identifiable patterns of anterior neck trauma in the sample cohort. Trauma to laryngeal cartilage and bruising patterns have the potential to assist in IPV strangulation identification in health care settings including oral health care. Evidence of oro-dental trauma also shows the potential for clinically identifiable patterns. This study highlights that specific demographics such as women under the age of 40 and individuals in IPV contexts are at higher odds of being victims of strangulation.

Conclusions: This study provides foundational traumatological analysis which will aid in creating further in-depth mixed-method research to aid clinical strangulation identification and mitigation, assist in decreasing preventable deaths from strangulation, and improving public health.

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ORAL SESSION 7
IOHS AWARD
Friday, 24 November 2023

ACCURACY OF GENERATIVE ARTIFICIAL INTELLIGENCE IN PROVIDING ORAL HEALTH INFORMATION

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Objectives: Generative artificial intelligence (AI), including Natural Language Processing (NLP) and its specific application Large Language Models (LLM), has recently experienced remarkable development and popularity. Patients may seek advice by inputting their conditions into LLM. The accuracy of LLM in interpreting written input and providing accurate answers is crucial in providing personalized oral health information to individual patients.

Methods: A total of 1461 multiple-choice questions from the dental licensing examinations including all dental subjects were input into ChatGPT 4.0. The performance of AI in examinations and individual dental subjects was analyzed and compared to that of ChatGPT 3.5.

Results: ChatGPT 4.0 correctly answered 70.5% (n=1030/1461) of questions which was higher than the passing marks of the included dental examinations. ChatGPT performed the best in Periodontics (94.4% correct answers, n=102/108) while the worst was in Orthodontics and Pediatric Dentistry (51.9% correct, n=80/154) and Restorative Dentistry and Prosthodontics (58.6% correct, n=112/191). While ChatGPT 4.0 answered 327 more questions correctly, it answered 102 incorrectly compared to ChatGPT 3.5.

Conclusions: ChatGPT 4.0 passed the written dental licensing examinations and may be used for providing patient education, especially in periodontics. This may have implications for the role of dentists in patient management as well as in related dental education and training. While ChatGPT 4.0 performed better than ChatGPT 3.5, it may not perform universally better in all scenarios, and further improvement is needed.

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IOHS AWARD
Friday, 24 November 2023

METAGENOMIC ANALYSIS OF REMOVABLE PROSTHESIS MICROBIOME WITH DIFFERENT PROSTHESIS CLEANLINESS.

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Objectives: To characterize the microbiome of removable prostheses with different levels of cleanliness using Type IIB Restriction-site Associated DNA (2b-RAD) sequencing and compare the Microbial Index of Pathogenic Bacteria (MIP) between clean and unclean prostheses.

Methods: A cross-sectional study was conducted among participants wearing removable prostheses in Hong Kong.
The area of plaque coverage was quantified using a semi-automated planimetric assessment. Whole metagenomic sequencing of 97 prosthesis plaque samples was performed using the 2b-RAD method. Species-level abundance profiles were obtained to determine the MIP for each prosthesis microbiota. The MIP was calculated as the sum of the relative abundance of opportunistic pathogenic bacteria in a microbial community according to 300 published categories of opportunistic pathogenic bacteria by the Chinese Center for Disease Control and Prevention.

Results: The mean percentage of removable prostheses covered with plaque was 24.79%. Forty-two (43.3%) prostheses were deemed 'unclean' with a percentage plaque area coverage higher than 25%. The overall microbial evenness and richness in both groups (clean and unclean groups) showed no statistically significant difference. Beta diversity analyses based on Jaccard qualitative and Bray-Curtis quantitative distance matrices revealed significant differences between the two groups ($P<0.05$). The mean MIP for unclean prostheses (0.46 ± 0.25) was higher than for clean prostheses (0.37 ± 0.29). However, the difference was not statistically significant ($P=0.052$). The difference was statistically significant ($P=0.029$) after taking the prosthesis design into account.

Conclusions: Among a community-dwelling sample of participants attending a teaching hospital, approximately half had unclean prostheses as identified by the semi-automated planimetric method. The microbial community of plaque samples from unclean prostheses demonstrated a clear distinction compared with clean prostheses. In addition, a trend was also observed for the increased MIP in the unclean group in comparison with the clean counterpart.

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ORAL SESSION 7
IOHS AWARD
Friday, 24 November 2023

STANDARD- VERSUS LOW-DOSE CBCT IN DECISION-MAKING FOR IMPACTED THIRD MOLARS

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Objectives: To investigate whether there were significant differences in the diagnostic variables and treatment decisions for impacted mandibular third molars (M3M) between paired standard- and low-dose cone-beam computed tomography (CBCT) as evaluated by dental practitioners with different qualifications.

Methods: A randomised non-inferiority clinical study was conducted involving patients with an impacted M3M indicated for removal and panoramic radiograph showing ≤2mm between the mandibular canal (MC) and an M3M. The patients' M3Ms were randomly assigned to three groups for two small field-of-view CBCT scans performed using one standard-dose (333mGy×cm^2) and one of the three low-dose (78-131mGy×cm^2) protocols, with doses equivalent to panoramic radiography. Diagnostic variables (MC visibility on four-point scale and the risk of inferior alveolar nerve injury) and treatment decisions (surgical approach between full removal and coronectomy, referral to an oral- maxillofacial surgeon (OMFS), and the need for M3M crown/root sectioning) were assessed on both paired low- and standard-dose CBCT images by four blinded general practitioners and OMFSs. The differences in all variables between paired low- and standard-dose CBCTs were evaluated using Wilcoxon signed-ranks or McNemar test.

Results: A total of 154 paired CBCTs were obtained from 90 patients. Standard-dose CBCTs were deemed diagnostically acceptable in 85-99% of cases, with a visibility score of ≥3 across four observers. Inferior MC visibility was found in 2-31% of low-dose CBCTs compared to paired standard-dose images. No significant differences were found in all treatment decisions regarding surgical approach (p=0.453-1.000), referral (p=0.250-1.000), the need for crown (p=0.125-1.000)/root (p=0.07-1.000) sectioning between paired standard- and low-dose CBCTs for all three groups.

Conclusions: The three low-dose CBCT protocols were clinically acceptable for M3M management without significant changes in treatment decisions, regardless of the observer's qualification, when compared to paired standard-dose scans. The implementation of low-dose CBCT protocols, with doses equivalent to panoramic radiography, would not significantly affect clinical decision-making in M3M management.

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SALIVARY SPD-1 AS POTENTIAL DIAGNOSTIC TOOL IN PCN PATIENTS

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Objectives: Pancreatic cancer (PC) is associated with poor prognosis partially due to a severe lack of diagnostic tools for early detection. Recent studies suggest a link between oral health and PC, suggesting potential salivary biomarkers as diagnostic tools. We characterized soluble immune checkpoint (sIC) profile in salivary, plasma and pancreatic cyst fluid (CF) samples from patients diagnosed with pancreatic cystic neoplasm (PCN) who were undergoing pancreatic resection surgery. The objective was to determine the suitability of saliva as the diagnostic fluid to determine sIC levels, the correlation between salivary and CF levels of sICs, and the association between salivary sIC levels and pancreatic dysplastic progression.

Methods: Saliva, blood plasma and pancreatic CF were obtained from 47 PCN patients undergoing pancreatic resection surgery. A panel of ten select sICs was quantified in saliva, plasma and CF using Luminex technology. We then determined the correlation between salivary levels of the sICs and their levels in the CF compartment, as well as the association between salivary sIC levels and post-operative histopathological classification according to dysplastic progression.

Results: All sICs included were detectable by Luminex in all three compartments studied. sPD-1 level in saliva and CF showed a strong correlation (R^2=0.647, p<.001). However, a significant association between salivary sPD-1 level and pancreatic dysplastic progression could not be established. Some of the sICs measured showed possible trends associated with dysplastic progression in saliva (sCD40), plasma (sGITR) or CF (sBTLA, sCD40), however none of these reached significance.

Conclusions: Luminex technology can be used to detect the levels of sICs in patient saliva, underscoring saliva's importance as an easily and non-invasively collected diagnostic fluid. Furthermore, sPD-1 level in patient saliva correlates with sPD-1 level in the CF from patients diagnosed with pancreatic cystic neoplasms. While we were not able to establish a definite relationship between salivary sPD-1 and dysplastic progression in the pancreas, this finding demonstrates the potential of using salivary sPD-1 as an accessory biomarker in diagnosing types of cancer associated with PD-1 dysregulation.

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DEFINING SUCCESSFUL AGEING IN ORAL HEALTH CONTEXT – HK ELDERS' PERSPECTIVES

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Objectives: This study aimed to gain understanding of Hong Kong community elders about their perceptions of successful ageing in oral health context in exploring and supporting the definitions of oral health-related successful ageing.

Methods: A qualitative study was conducted among 19 community elders in Hong Kong recruited by a district elderly community centre. One-to-one semi-structured interviews were performed based on an interview guide. The interviews were audio recorded, followed by transcription into text for thematic coding and analysis.

Results: Regarding the definition of successful ageing, "Health and active daily living", e.g. self-care ability in terms of eating and cleaning, was considered most important by the interviewees. Similarly, "Physical function", e.g. walking freely, was considered important. Moreover, "Psychologically well adapted", e.g. optimism and religion, was considered a key to successful ageing. "Actively engaged in life" and "Cognitive function", e.g. participating in social activities and work, also helped them achieve successful ageing by giving them financial security and brain exercise. Additionally, interviewees commented that the current government services were good. However, the waiting time was too long to receive such services. They suggested that more funding should be provided to the existing non- governmental organisations to advance and expand their services to elders. In the long run, more dental services should also be provided to elders as well. For how oral health could be related to successful ageing, it was perceived that having teeth was considered important, as it could affect eating, digestion, nutrition intake and quality of life.

Conclusions: The definition of successful ageing from Hong Kong community elders' perspective was obtained, and it showed coherence to the five domains of Urtamo's framework of successful ageing (2019). Healthcare policies targeting elders, as well as oral health, were considered important attributes of successful ageing.

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NEUROPROTECTIVE POTENTIAL OF STEERABLE STEM CELL-BASED MICROROBOTS

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Objectives: This research aims to develop novel and advanced bio-functional microrobot which can transport therapeutic stem cells such as stem cells from apical papillae (SCAPs) to a precise location, direct stem cells toward a pre-destined cell lineage, and support cells' survivability, proliferation, and differentiation. By applying 3D bioprinting and microfluidic technology, the steerable and biodegradable SCAP-based microrobots are engineered and compared for targeted delivery of SCAPs within a controlled microenvironment for increasing survival and neurodifferentiation of
SCAPs.

Methods: The proposed study has applied the engineering techniques to encapsulate SCAPs within 3D gelatin methacrylate (GelMA) hydrogel loaded with calcium dioxide and brain-derived neurotrophic factor for fabricating SCAP-mediated microrobots called "SCAPBOT". Proliferative ability of SCAPs is examined by cell counting kit-8; Oxygen release capacity is detected by oxygen sensor meter; Migration capability of SCAPs is observed by time- lapse microscope; Neural differentiation is detected by immunohistochemistry.

Results: Two types of SCAPBOT were fabricated for comparison using (i) 3D bioprinting and (ii) droplet microfluidic platform. The SCAPBOT was actuated towards the target location by rotating magnetic fields generated by computer- controlled electromagnetic coils. SCAPs can be transported and actuated remotely by the 3D bio-printed and microfluidic droplet fabricated microrobots for directing SCAPs to undergo neural differentiation and demonstrate positive neuroprotective potential.

Conclusions: SCAPBOT fabricated by droplet microfluidics can be navigated efficiently by magnetic field and retain its differentiation capacities to the neurogenic lineage. Thus, this microfluidic engineering approach has the potential to develop the SCAP-based microrobot with embedded functionalities for targeted delivery of therapeutic stem cells.

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EFFECTIVENESS OF TOPICAL FLUORIDE APPLICATION IN PREVENTING OCCLUSAL CAVITATED CARIES

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Objectives: This study aimed to compare the effectiveness of the semi-annual application of 38% silver diamine fluoride (SDF), 5% NaF varnish and placebo control in preventing occlusal caries in primary molars in preschool children.

Methods: This parallel 3-arm, double-blind, randomized controlled trial started in September 2020. Children around three years old were randomly allocated to one of the three study groups - Group A: 38% SDF, Group B: 5% NaF varnish, and Group C: tonic water. The study agent, according to the child's group assignment, was applied with a mircobrush onto the non-cavitated occlusal surfaces of all primary molars. The interventions and dental examinations were carried out biannually in the kindergartens. Caries development was diagnosed at the cavitation level using the WHO criteria by standardized visual-tactile examination. An intention-to-treat (ITT) analysis was adopted for the analysis. Chi-square test and generalized estimating equation (GEE) were adopted to evaluate the differences in caries incidence rates at the child and the occlusal surface levels.

Results: 791 children with 5090 occlusal caries-free surfaces were included at the baseline. At the 24-month follow-up, the child-level caries incidence rates were 21.7% (57/263), 21.8% (57/262) and 26.7% (71/266) in Groups A, B and C, respectively (Chi-square test, p= 0.295). At the tooth surface level, the caries incidence rates were 5.8%, 5.8% and 7.1% for Groups A, B and C, respectively (p= 0.255). Oral hygiene, baseline caries experience, tooth type and location, snack-taking frequency, family income and place of birth influenced caries incidence.

Conclusions: Biannual application of SDF and NaF varnish did not show significant differences in preventing occlusal cavitated caries in primary molars in the 24-month observational period compared with the placebo. This trial is ongoing and a longer-term (30-month) result will be presented later.

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BIOINSPIRED FLEXIBLE MICRONEEDLE PATCHES FOR IMPROVED ADAPTABILITY AND FUNCTIONALITY

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Background: Emerging attention on healthcare issues have urged the development of point-of-care technologies especially when continual increase of chronic diseases and ageing population aggravated the burden of medical system. While flexible, continuous-based MN system has shown its potential in addressing skin contact issue in various wearable application like health monitoring and long-term drug delivery, miniaturized size of current MN system still hinders its clinical translation, especially with low drug loading capacity, limited skin coverage and conformity degree.

Objectives: To address skin conformity of flexible based MN system, meanwhile improving its intrinsic attributes such as drug loading capacity and penetration efficiency as compared to conventional rigid, continuous (RC) and flexible, continuous (FC) base substrate.

Methods: In this study, we propose a novel MN patch design – bioinspired by the multi-scale principle of naturally segmented fish armour systems – We translated stiff individual MN tips onto a macro-scale flexible assembly substrate, and with the introduction of kirigami-like fractal cut pattern, an adaptive and highly flexible MN patch with enhanced drug delivery capabilities was successfully fabricated. Functionality of the proposed MN system was predicted in numerical simulation and validated through a series of MN penetration efficiency tests.

Results: Through numerical modelling, the proposed MN system (FF) has demonstrated ~4-fold enhancement in contact stability and 2-fold improvement in skin penetration as compared to conventional flexible, continuous (FC) MN system, meanwhile minimising MN-substrate interfacial issue. Various MN performance tests have also validated the numerical prediction where FF system presented superior performance with >90% penetration rate and two-fold enhancement in drug delivery efficacy.

Conclusions: Validated by comprehensive approaches, the proposed ancient fish armour-inspired flexible MN system has proven its superiority in skin conformity and penetration efficiency. We envisage the proposed platform to be employed in various functional transdermal drug delivery platforms or long-term epidermal biosensors.

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BIOINSPIRED 'SPORULATED' CYTOPROTECTIVE STRATEGY FOR AMBIENT-TEMPERATURE CELL LOGISTICS

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Objectives: Considering the time- and temperature-sensitive nature of cell therapeutic products (CTPs), it is critical to sought for improved methods of handling them throughout the cell manufacturing supply chain. Herein, taking inspiration from nature, we proposed the use of chemically-induced cell 'sporulation' as a bioinspired cell protection strategy that eliminates the need for cell freezing and allows for on-demand cell recovery.

Methods: To induce cell dormancy/'sporulation', pyrogallol (PG), a plant-derived polyphenol, was coated onto mesenchymal stem cells (MSCs)-laden alginate microspheres (AlgMS) (Fig. 1). For proof-of-concept, the treated cells were subjected to simulated cell logistical conditions that could potentially be experienced during actual cell handling circumstances. These include, (i) RT: 7 days room-temperature exposure to simulate prolonged product storage due to unforeseen delays; (ii) CT: cyclic temperature simulation based on real-life temperature profile when CTPs were transported across countries of different seasons over 3 days – 30, 17 and 27°C for respective days. Thereafter, cells were recovered via degradation of the PG-coated AlgMS and re-incubated for 72 hrs to 'germinate'/restore cellular activities before cell viability was assessed.

Results: Regardless of the simulated conditions, viabilities of cells in PG-coated AlgMS were significantly higher than those non-coated (~82 vs 75%), suggesting that 'sporulation' has the potential to further augment cell protection in addition to what was provided by the AlgMS itself. After 72 hrs of 'germination', cells released from PG-AlgMS exhibited good adhesion and spreading, achieving viabilities of more than 80% for both simulated conditions. This further validated the capability of 'sporulation' in effectively preserving the quality of MSCs (i.e. viability and proliferation), despite exposure to less favourable environmental conditions.

Conclusions: With the competency of our bioinspired protection technique to maintain cell viability even under less favourable conditions, we envisage its potential use for ambient-temperature cell storage and transportation during supply chain logistics.

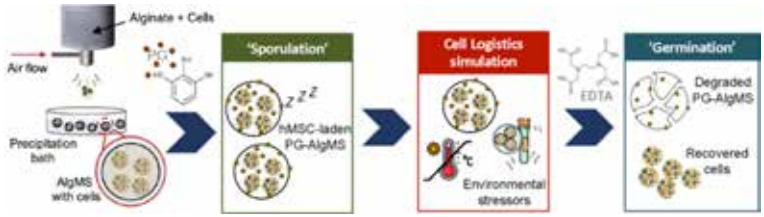

Fig. 1. Schematic diagram illustrating the fabrication process of 'sporulated' cell-laden microparticles followed by exposure to simulated cell logistical conditions, and subsequent 'germination' to recover cells for usage

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EFFECTS OF GRAPHENE QUANTUM DOT ON ANTIBIOFILM AND REMINERALISATION

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Objectives: Graphene quantum dot (GQD) has merged as an effective alternative to traditional antibacterial agents. This study aimed to investigate the antibacterial and remineralising effects of the GQD combined with casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) on enamel lesion in a biofilm-challenged environment.

Methods: The Minimum inhibitory concentration for Streptococcus mutans (S. mutans) of GQD was determined. S. mutans were grown on human enamel blocks. The antibacterial abilities such as growth kinetics were determined by Scanning Electron Microscopy (SEM), confocal laser scanning microscopy (CLSM), and culture colony-forming units (CFU). The remineralisation ability in a microbial environment was determined with the mineral loss, calcium-to- phosphorus ratio and surface morphology by SEM. To create a biofilm-challenged environment, enamel blocks were merged in S. mutans for 5 days to create the lesion, then went through pH cycling (4h in S. mutans and 20h in artificial saliva) for 7 days. The pH of brain heart infusion broth plus 2% sucrose (BHIS) solution was tested at 0,1, 3, 5,7 days, and the mineral changes were analysed by Micro-CT. Biocompatibility was tested using Cell Counting Kit-8 (CCK8) assay of Human gingival fibroblast (HGF-1).

Results: For remineralisation, CPP-ACP agent with GQD presented significantly more surface mineral regain compared to the control after 1 and 3 days by calcium-to-phosphorus molar ratios ($P<0.05$). Enamel covered by GQD showed better crystal structure formation than CPP-ACP alone. After coating on enamel surface, CPP-ACP agent with GQD inhibited S. mutans adhesion according to the lgCFUs of the control and GQD-treated groups ($P<0.05$). After 7-days pH cycling in a biofilm-challenged environment, CPP-ACP agent with GQD treated group showed higher pH value and less lesion depth than control group and CPP-ACP alone ($P<0.05$). The cytotoxicity of GQD showed no difference compared with control and CPP-ACP by CCK8 ($P>0.05$).

Conclusions: GQD could improve therapeutic and antibiofilm effects of CPP-ACP, and CPP-ACP agent with GQD could be a potential option for enamel lesion management.

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SYNERGISTIC POTENTIAL OF LRAP AND ER:YAG LASER FOR DENTAL REMINERALIZATION

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Objectives: Recent studies have explored the use of amelogenin-assisted dental remineralization, but the combined effect of leucine-rich amelogenin peptide (LRAP) and Er: YAG laser treatment remains relatively unexplored. This study aims to investigate the synergistic effect of LRAP and Er: YAG laser irradiation on dental remineralization.

Methods: Artificial lesions were chemically induced in dentin and enamel, followed by LRAP remineralization and laser treatment (absent in control groups), and subsequent demineralization. Surface texture, cracks, and mineral deposits were examined using stereomicroscopy. The remineralization effect was studied using polarized light microscopy (PLM) coupled with phase-contrast and fluorescence microscopy.

Results: In dentin, the presence of white depositions on tooth surfaces following LRAP remineralization treatment suggested the effectiveness of the remineralization processes. Low-energy laser irradiation did not induce noticeable changes, indicating its safety and lack of adverse effects on teeth. Stereomicroscopy identified cracks or defects before but more after demineralization. Mean lesion depth increments were 40.5 ± 4.0 µm for LRAP and 34.5 ± 5.0 µm for LRAP followed by laser treatments. In enamel, time-dependent PLM images of LRAP remineralization showed preferential remineralization of enamel diazone compared to the parazone. LRAP remineralization followed by laser treatment resulted in reduced enamel porosity after laser treatment. These results suggest that Er: YAG laser irradiation after LRAP remineralization may convert calcium apatite into hydroxyapatites, reducing dental solubility and preventing demineralization cascades.

Conclusions: Ongoing investigations are being conducted to validate these effects, elucidate underlying mechanisms, and evaluate the clinical translatability of combining LRAP with Er: YAG laser treatment for enhancing dental remineralization and preventing the progression of enamel/root caries.

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ANTI-ADHESION POTENTIAL OF PILI KERNEL OIL AGAINST INITIAL BIOFILM COLONIZERS

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Objectives: The pili nut (Canarium ovatum) is endemic to the Philippines, specifically in the Bicol region. The kernels of pili nuts are potential sources of anti-cariogenic polyphenols. Inhibiting the adhesion of the bacteria Streptococcus mutans, the primary causative agent for dental caries, will lower the incidence of dental caries which is the most common oral disease worldwide. This study aimed to determine the effect of pili kernel oil (PKO) on inhibiting the growth and attachment of S. mutans.

Methods: Preliminary tests performed were the organoleptic test, which relied on sensory evaluation, and the Folin-Ciocalteu method to evaluate the polyphenols in pili kernel oil using gallic acid. Kirby-Bauer Disk Diffusion method was performed to test the antimicrobial susceptibility of PKO against S. mutans, while SPV method was conducted to assess the total lipids that integrated into 9 enamel blocks (n=3/group) which had undergone pellicle formation and modification. A Shapiro-Wilk and Mann-Whitney U Test was used for data analysis.

Results: PKO was found to have a nutty and woody smell, with a sweet taste. Its consistency was comparable to saliva and virgin coconut oil (VCO). Results revealed that the gallic acid content of PKO is at least 1500 times higher than the minimum required to reduce S. mutans growth by 50%. Antimicrobial susceptibility test against S. mutans showed that VCO exhibited no zone of inhibition while PKO demonstrated a mean zone of 4.6mm. No significant difference was found between the lipid integration in PKO and the positive control (VCO).

Conclusions: Overall, pili kernel oil is suitable as an additive ingredient in commercial mouth rinses or as an alternative material for oil pulling due to its palatability, high gallic acid content, antibacterial effect, and lipid integration ability.

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LACTOBACILLUS-REUTERI REDUCES BIOFILM DYSBIOSIS AND PERIODONTAL INFLAMMATION; PILOT CLINICAL EVIDENCE

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Objectives: Patients with fixed orthodontics appliances are at risk of developing periodontal disease due to the plaque biofilm-trapping effect of orthodontic bands and brackets, leading to increased accumulation of periodontal pathogens such as Porphyromonas gingivalis. The aim of this pilot clinical study was to investigate the effect of Lactobacillus reuteri probiotic consumption on pathogenic gene expression of P. gingivalis in dental plaque biofilm and associated host inflammatory response.

Methods: Twenty subjects aged 18-24 years who had an orthodontic appliance for at least 12-months consumed probiotic lozenge containing 2x108 colony forming units of two L. reuteri strains, DSM17938 and ATCC PTA 5289, daily for 2 weeks. Dental plaque samples and gingival crevicular fluid (GCF) were collected from the subjects before and after the probiotic treatment. Reverse transcription-polymerase chain reaction and enzyme-linked immunosorbent assay were used to analyse the virulence gene uspA, hagB, fimA, and mfa1 expression of P. gingivalis and expression of host inflammatory cytokines IL-6, IL-8, MMP-9, and TNF-α, respectively.

Results: Daily consumption of probiotic L. reuteri for two weeks resulted in improved oral health in the subjects as evidenced by significant improvements in the OHI-s and PBI index. Moreover, the study demonstrated a significant reduction in the expression of all four virulence genes in P. gingivalis (uspA,hagB, fimA, mfaA) after probiotic treatment ($p < 0.05$). Additionally, there was a significant decrease in the concentration of all four inflammatory cytokines (IL-6, IL-8, TNF-alpha, MMP-9) in GCF samples ($p < 0.05$).

Conclusions: These findings suggest that L. reuteri probiotics may improve the healing process and prevent periodontal disease in patients with fixed orthodontic appliances the dysbiotic changes in dental plaque biofilm in terms of gene expression and host inflammatory response. Further studies are needed to explore the potential mechanisms underlying the beneficial effects of L. reuteri probiotics on periodontal health.

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CAN ORAL MICROBIOME PREDICT LOW-BIRTH WEIGHT INFANT DELIVERY?

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Objectives: Pathogenic oral microbiomes were recognized to be associated with adverse pregnancy outcomes including low birth weight (LBW, infant weighing < 2500g). The study aimed to identify underlying oral microbiota factors contributing to the LBW and develop a prediction model using machine learning.

Methods: In a prospective cohort of 580 Chinese pregnant women, a nested case-control study was conducted with selected 23 LBW delivery cases and 23 healthy delivery control. Age and smoking habit of the women were matched. Saliva samples were collected at early- and late-pregnancy. Their demographic profiles (age, BMI, education level, and smoking habit), systemic health status, and periodontal status were recorded. Microbiome profiles of the saliva were analyzed through 16S rRNA gene sequencing.

Results: In the LBW case group, the relative abundance of Streptococcus was over-represented (median 0.259 vs. 0.116) and Saccharibacteria_TM7 was under-represented (median 0.033 vs. 0.068) significantly than in the controls ($p<0.001$, $p=0.015$ respectively). Ten species were identified as microbiome biomarkers of LBW by LEfSe analysis, which included 6 species within the genus of Streptococcus, three species of Leptotrichia buccalis, Gemella sanguinis and Granulicatella adiacens (all LDA score>3.5) as risk biomarkers, and one species of Saccharibacteria TM7 as a beneficial biomarker (LDA=-4.5). The machine-learning model based on these 10 distinguished oral microbiota species could predict LBW, with an accuracy of 82%, sensitivity of 91% and specificity of 73% (AUC-ROC score 0.89, 95% CI: 0.75-1.0). Results of α-diversity showed that mothers who delivered LBW infants had less stable salivary microbiota construction throughout pregnancy than the control group (measured by Shannon, $p=0.048$; and Pielou's, $p=0.021$), however the microbiome diversity did not improve the prediction accuracy of LBW.

Conclusions: Several salivary microbiota biomarkers can assist in the prediction of adverse pregnancy outcome,
including one protective predictor. The developed machine-learning model demonstrates good prediction accuracy.

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EFFICACY OF CHITOSAN INTRACANAL MEDICATION AGAINST FUNGAL-BACTERIAL DUAL-SPECIES BIOFILM

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Objectives: Successful endodontic treatment depends on the ability to control intracanal infection. Multispecies biofilm composing of both fungal and bacterial species are particularly difficult to eradicate. Candida albicans and Enterococcus faecalis are examples of common microorganisms in persistent root canal infection and their dual- species biofilms showed increased resistance to treatment. Thus, we aimed to investigate the efficacy of an intracanal chitosan paste on the dual-species biofilm in an in vitro root canal infection model.

Methods: Twenty-four root samples were prepared from extracted human premolars and incisors and were infected with C. albicans and E. faecalis at 1:1 ratio and incubated at 37°C for 3 days for dual-species biofilm formation. The samples were randomly assigned to 4 groups of intracanal medication for 7 days: 1. negative control, 2. calcium hydroxide (Ca(OH)2), 3. propylene glycol (PG) and 4. chitosan (1700 kD) + PG. After removal of the medication, intracanal dentin was collected using Protaper next, and the number of colony forming units (CFUs) were counted from surviving colonies on Brain-Heart-Infusion agar (for E. faecalis) and Yeast Extract-Peptone-Dextrose agar (for C. albicans). The percentage of remaining CFUs relative to negative control was calculated and analyzed using One-way ANOVA and post-hoc Games-Howell test. The significance level was set at 0.05.

Results: Our results showed that although calcium hydroxide and PG could reduce the number of viable microorganisms compared with negative control ($P<0.001$), chitosan+PG paste showed highest antimicrobial activity ($P<0.001$, 0.008, and 0.095 comparing to negative control, calcium hydroxide, and PG, respectively).

Conclusions: In conclusion, chitosan paste showed the highest efficacy against C.albicans and E. faecalis dual-species biofilm after 7-day medication in an in vitro root canal infection model.

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MYCOBIOTA SPECTRUM OF ORAL FUNGAL INFECTIONS IN HEAD-NECK CANCER PATIENTS

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Objectives: This study aimed to characterize the mycobiota profile of oral fungal infections in HNC patients receiving radiation treatment (RT).

Methods: A 6-year retrospective study was conducted, analyzing oral mycobiota records from the Clinical Microbiology Laboratory at Karolinska University Hospital from 2014 to 2019. MALDI-TOF MS characterization was performed on oral mucosa samples from HNC patients who underwent RT and were diagnosed with oral fungal infections. Data from HNC patients were grouped according to their RT history (ongoing- or post-RT). Descriptive statistics, a linear regression model, and a Venn diagram were used to examine the diversity and trend of detected fungal species.

Results: A total of 190 oral fungi were isolated from all 162 HNC patients receiving RT. The genus Candida accounted for nearly 88% of all identified fungi, followed by the genus Pichia (5%). Two novel non-abicans Candida (NAC) species, including F. solani and C. jadinii, were detected in HNC patients under RT. Trend analysis based on annual records showed constant frequencies for C. albicans and P. kudriavevii. A mild to moderate increase was observed in C. tropicalis and C. parapsilosis, while a significant decrease was observed in C. glabrata ($P < 0.05$). The Venn analysis revealed that C. albicans, C. glabrata, P. kudriavzevii, C. parapsilosis, and C. tropicalis, were common species in both ongoing- and post-RT groups and represented the core mycobiota of the oral fungal infections in HNC patients.

Conclusions: MALDI-TOF MS technique identified a broad range of oral fungal species in HNC patients receiving RT. Despite the emergence of F. solani and C. jadinii, C. albicans remained the most frequently detected pathogen in oral fungal infections. Exploration of these causative pathogens could pave the way for developing therapeutics to control and treat oral fungal infections in HNC patients receiving RT.

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ZNF582 METHYLATION AND ORAL MICROBIOTA IN ORAL CANCER

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Objectives: DNA methylation plays a crucial role in oral cancer. Specifically, methylation status of the ZNF582 gene is a significant prognostic factor for disease progression. Dysbiosis of the oral microbiota has also been implicated in carcinogenesis. However, the relationship between ZNF582 methylation and oral microbiota in oral cancer remains unclear. This study aimed to explore the associations between oral microbiota composition, ZNF582 methylation levels, and oral squamous cell carcinoma (OSCC) progression.

Methods: Mucosal samples were collected and subjected to Bisulfite conversion to assess DNA methylation, while
next-generation sequencing (NGS) was employed to examine the composition of the oral microbiota.

Results: Participants were grouped based on methylation levels and pathological conditions. Analysis revealed that the OSCC group (n=14) exhibited higher bacteria species abundance compared to the healthy group (n=11), as determined by alpha diversity (Chao1, Shannon index), Beta diversity (PCA), and taxonomic composition analyses. Integrating ZNF582 DNA methylation with pathological characteristics showed significant differences in bacteria species diversity and abundance between OSCC patients and healthy individuals.

Conclusions: Results of this reveals a significant association between ZNF582 methylation, oral microbiota composition, and OSCC progression, emphasizing their potential as crucial pathophysiologic factors. These results contribute to the feasibility of early prediction of OSCC by identifying alterations in the oral microbiota during the carcinogenic process.

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ORAL SESSION 8
ORAL MICROBIOLOGY & CARIOLOGY
Friday, 24 November 2023

EFFECT OF CANDIDA AURIS-PHENOTYPIC SWITCHING ON CO-AGGREGATION WITH STAPHYLOCOCCUS AUREUS

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Objectives: This study aimed to determine the effect of phloxine B induced-phenotypic switching on the co- aggregation of C. auris with Staphylococcus aureus.

Methods: Phenotypic switching of C. auris (ATCC MYA-5002) was induced by inoculating the yeast on a yeast extract peptone dextrose (YEPD) agar containing 5 mg/mL of Phloxine B dye and incubated for five days to produce 1st switching generation. The protocol was repeated until the 4th generation. To determine the effect of phenotypic switching on co-aggregation, C. auris and its switched generations were grown in RPMI-1640, YEPD, Sabouraud dextrose (SD) and brain heart infusion yeast extract (BHIYE) broth. Meanwhile, S. aureus (ATCC 25923) was grown in brain heart infusion (BHI) broth. All microorganisms were standardised in a co-aggregation buffer to 10^6 cells/mL. Auto-aggregation was determined by measuring the absorbance difference at OD_{620nm} (ΔAbs) between 0 h and 1 h at room temperature of a similar kingdom. In contrast, co-aggregation was determined by combining two kingdoms in the same 2-mL Eppendorf tube.

Results: All BHIYE-grown C. auris had higher auto-aggregation than the other growth media (8.2±0.3% to 9.2±0.1%). Co-aggregation of C. auris with S. aureus exhibited the highest in the 1st generation in BHIYE (12.1±3.4%), followed by the ^{2nd} generation (3.0±0.0%) in the same medium. In addition, decreased ΔAbs% in co-aggregation were observed for the 3rd and 4th switched generations in all growth media compared to the auto-aggregation.

Conclusions: C. auris and switched generations interact antagonistically with S. aureus in planktonic, and the aggregation of the yeast is strain dependent.

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TARGETED METABOLOMICS TO IDENTIFY BIOFILM PATHWAYS OF ENTEROCOCCUS FAECALIS ISOLATES

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Objectives: Enterococcus faecalis biofilm formation is associated with endodontic treatment failure. Previous proteomics profiling of E. faecalis clinical isolates with strong and weak biofilm formation revealed that differences in metabolic activity levels of small molecule, nucleotide, nitrogen compound, and cellular amino acid processes were associated with differences in biofilm formation. We aimed to (i) further characterize E. faecalis biofilm formation pathways by semi-targeted and targeted nitrogen panel analysis of the strong (Ef 63) and weak (Ef 64) biofilm formers and (ii) validate the identified metabolic pathways using targeted pathway inhibitors.

Methods: Semi-targeted analysis of Ef 63, Ef 64 and control strain Ef 29212 was performed by selecting metabolites that were both part of the previously identified pathways and of a curated library with confirmed physical and chemical identity, followed by confirmatory targeted nitrogen panel analysis. Significantly regulated metabolites ($p<0.05$) were selected with fold change cut-offs of 1.2 and 0.8 for upregulation and downregulation, respectively, and subjected to pathway enrichment analysis (PEA). The identified pathways were validated by minimum biofilm inhibitory concentration (MBIC) and colony forming unit (CFU) assays with targeted pathway inhibitors.

Results: Metabolomics analysis showed upregulation of N-acetylglutamate, N-acetylaspartate, malonic semi- aldehyde, citrulline, and 3-phenyllactic acid and downregulation of choline, adenosine, glutamine, and octylamine in Ef 63 vs 64. PEA identified differential regulation of pyruvaldehyde degradation, methionine metabolism, glutathione metabolism, aspartate metabolism, and pyruvate metabolism. MBIC and CFU assays using pathway inhibitors, polydatin (glutathione metabolism), nitazoxanide (pyruvate metabolism), glutathione (pyruvaldehyde degradation), benzothiadiazole (methionine metabolism), and O-carboxymethyl hydroxylamine (aspartate metabolism) showed inhibitory effects of glutathione and O-carboxymethyl hydroxylamine against E. faecalis biofilm formation.

Conclusions: The study demonstrated the importance of pyruvaldehyde degradation and aspartate metabolism in E. faecalis biofilm formation. Targeted therapeutics development can thereby reduce the economic and healthcare burden of E. faecalis infections.

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ORAL SESSION 9
STEM CELLS & TISSUE ENGINEERING
Friday, 24 November 2023

ROLE OF ECM-DERIVED FROM ICF-TREATED PDL CELLS ON OSTEOGENIC DIFFERENTIATION

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Objectives: PDLs are considered as mechanosensory cells in responding to force. ICF is mechanical stimulation related to mastication in the regulation of homeostasis of hPDLs activity. This study aims to investigate the effect of extracellular matrix (ECM) expression (ECM)-derived from intermittent compressive force (ICF)-treated human periodontal ligament cells (PDLs) on osteogenic differentiation.

Methods: PDLs were seeded on 24 well-plate for 24h and loaded with ICF at 1.5g/cm^2 for 24 h in serum-free medium and maintained with normal medium (N) and osteogenic induction medium (OM) followed by a decellularization process. Decellularized ECM (dECM) was characterized using SEM and EDX analysis. PDLs were reseeded on dECM and cell viability was examined by resazurin assay and LIVE/DEAD assay. Mineralization was determined by Alizarin Red S staining.

Results: ECM derived from ICF-treated PDLs exhibited fibrillar structure. ECM derived from ICF-treated PDLs cultured in OM demonstrated the upregulation of fibronectin and type I of collagen expression. dECM from both N and OM conditions did not exhibit cytotoxicity. Cells were able to attach and proliferate on dECM. The dECM derived from ICF-treated PDLs cultured in OM significantly enhanced mineral deposition compared to that dECM derived from PDLs in normal condition.

Conclusions: dECM derived from ICF-treated PDLs supports cell growth and differentiation. This could be further utilized as an alternative biomaterial for regenerative treatment.

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COMPRESSIVE FORCE AFFECTS MATRIX-REGULATORY MOLECULE EXPRESSION OF PERIODONTAL LIGAMENT CELLS

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Objectives: Periodontal ligament is subjected to the transmitted occlusal force from teeth. However, the roles of intermittent compressive force (ICF) on extracellular matrix (ECM) homeostasis of human periodontal ligament cells (hPDLCs) have not been clarified. The degradation of ECM is controlled by proteolytic enzymes, matrix metalloproteinases (MMPs), on the other hand, the activity of MMP is inhibited by their inhibitor, Tissue Inhibitor of Metalloproteinases (TIMPs). Therefore, this study aims to evaluate the effect of ICF on the expression of MMPs and
TIMPs by hPDLCs.

Methods: The hPDLCs were seeded into a 6-well plate with a density of 300,000 cells/well using a growth medium for a day. Then, the medium was changed into a serum-free medium prior to the ICF application. The ICF was applied by adding the six cylinders to the plate and placing it inside the ICF machine, which was connected to a computerized program, with a magnitude of 1.5 g/cm^2 and loaded for 24 hours. The mRNA and protein expression of MMPs and TIMPs were assessed using RT-PCR and ELISA analyses, respectively. TGF-β inhibitor (SB431542) was used to assess role of TGF-β in this study. The control was cultured in the same conditions without ICF.

Results: The mRNA and protein levels showed that ICF significantly induces the expression of TIMP1, and TIMP3, but decreases the expression of MMP1 compared to the control group. Treatment with the TGF-β inhibitor and continue loading to ICF showed the downregulation of TIMP3 and TIMP1, however, TGF-β has no effect on the expression of MMP1.

Conclusions: ICF affects ECM homeostasis of hPDLCs by regulating MMPs and TIMPs, furthermore, the expression of TIMP1 and TIMP3 was regulated by TGF-β1. These findings provide an understanding of the molecular mechanism of hPDLCs under ICF and may be beneficial for periodontal regenerative therapy.

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AMELOGENESIS IMPERFECTA: TOOTH CHARACTERISTICS AND GINGIVAL TRANSCRIPTOME

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Objectives: To investigate detailed tooth phenotype and transcriptomic profile of gingival cells in a patient having autosomal-recessive amelogenesis imperfecta (AI).

Methods: An AI tooth obtained from a patient with biallelic FAM20A mutations was subjected to assessments of ultrastructure, mineral content, mineral density, roughness, and hardness, and compared with those of control teeth obtained from healthy individuals. RNA sequencing was performed on the gingival cells of the AI patient and 4 healthy controls.

Results: Ultrastructural analysis revealed severely collapsed enamel rods and disorganized dentin-enamel junction. Additionally, the tooth exhibited decreased phosphorus and increased carbon contents. Decreased enamel mineral density was observed in AI tooth compared with controls. The mRNA expression levels of FAM20A were significantly downregulated in the gingival cells of AI patient compared to control cells. Interestingly, the localization of FAM20A did not exhibit significant differences between AI and control cells. Transcriptional profiling of AI cells revealed the activation of genes associated with positive regulation of transcription, as identified through Gene Ontology (GO) analysis of biological processes. These genes were primarily involved in cell proliferation, biomineralization, and migration.

Conclusions: Our findings demonstrate that FAM20A mutation leads to defects in mineral composition and mechanical properties of AI tooth, along with dysregulated transcriptomic profiles of gingival cells. This study offers valuable insights into the field AI and highlights the importance of FAM20A in tooth development and gingival tissue homeostasis.

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MAGNESIUM ENHANCES OSTEOGENIC DIFFERENTIATION OF HUMAN PERIODONTAL LIGAMENT STEM CELLS

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Objectives: Magnesium-based capping materials have potential in regenerative dentistry for promoting osteo/odontogenic differentiation of dental pulp stem cells. However, the impact of magnesium on human periodontal ligament stem cells (hPDLSCs), which could play a role in alveolar bone regeneration, remains elusive. This study aims to investigate the effects of magnesium on the proliferation and osteogenic differentiation of hPDLSCs.

Methods: hPDLSCs were isolated, characterized and cultured with magnesium chloride ($MgCl_2$) at various concentrations (0.1-10 mM). Cell viability andproliferation were assessed using MTT assay. Colony-forming unit (CFU) and cell cycle analysis were examined by crystal violet and propidium iodide staining, respectively. Cell migration was measured by a scratch wound assay. Osteogenic differentiation and mineralization were assessed by alkaline phosphatase (ALP) activity, Alizarin Red S staining, and osteogenic-related gene expression using RT-qPCR. All statistical analyses were evaluated at $p < 0.05$.

Results: hPDLSCs showed the mesenchymal stem cell characteristics. $MgCl_2$ concentrations higher than 10 mM exhibited cytotoxicity. Significant increase in cell proliferation rate, higher CFU percentages, and active cell cycle activity were observed when hPDLSCs were treated with 0.1, 0.5, and 1 mM $MgCl_2$. However, $MgCl_2$ had no effect on cell migration. Mineralized nodules were significantly observed in hPDLSCs treated with 0.1 and 0.5 mM $MgCl_2$ in an osteogenic induction medium for 14 days. Conversely, hPDLSCs treated with 1, 5, and 10 mM $MgCl_2$ exhibited lower levels of mineralization. Furthermore, hPDLSCs treated with 0.1 mM $MgCl_2$ resulted in an increase in osteogenic marker gene expression, including RUNX2 and ALP.

Conclusions: $MgCl_2$ at a concentration of 0.1 mM is the most effective dose to promote cell proliferation and stimulate osteogenic differentiation of hPDLSCs, in vitro. This data suggests the potential role of magnesium as a supplemental chemical in regenerative dentistry, particularly in alveolar bone regeneration

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THE INFLUENCE OF SHEAR STRESS ON EXOSOME SECRETION IN HPDLSCS

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Objectives: In response to mechanical force, human periodontal ligament stem cells (hPDLSCs) exert regenerative properties through the secretion of paracrine factors, including exosomes. Exosomes are 30-100 nm membrane- bound vesicles that encapsulate bioactive molecules, including proteins, lipids, mRNA, and non-coding RNA, facilitating cell-to-cell communication during tissue homeostasis. The exosomes derived from cyclic stretch-induced PDL cells have demonstrated the ability to regulate macrophage-mediated inflammation. Our previous study revealed that shear stress promoted the secretion of TGF-β1 and kynurenine in the conditioned medium (CM), further decreasing T cell proliferation and increasing Treg cell differentiation. In this study, we aim to investigate the effect of shear stress on exosome secretion by hPDLSCs.

Methods: The cells were subjected to a cone-shaped rotating machine that generated a shear stress of 5 dyn/cm^2 for 3 h. The CM was collected for kynurenine measurement. The exosomes were isolated from CM using the ultra- centrifugal tube-based method and subsequently evaluated for nanoparticle size distribution and concentration using nanoparticle tracking analysis (NTA). Expression of exosome surface markers CD63 was detected using western blotting analysis.

Results: The particle size distribution analysis conducted using NTA revealed that the isolated vesicles exhibited dominant particle sizes of 126.85±20.15 nm and 103.5±12.8 nm in shear stress-derived exosome (SS-EXO) and non- shear stress-derived exosome (nSS-EXO), respectively. The average particle sizes were 140.4±15.27 nm and 190.15±50.5 nm in SS-EXO and nSS-EXO, respectively. The particle concentration of SS-EXO (5.28x10^7±1.68x10^7 particles/ml) was higher when compared to nSS-EXO (2.9710^7±7.35x10^6 particles/ml). Moreover, SS-EXO exhibited an increased CD63 protein expression compared to nSS-EXO.

Conclusions: Collectively, our results reveal that shear stress enhances the exosome secretion by hPDLSCs. However, further studies are needed to emphasize the role of shear stress on hPDLSCs response regarding exosome secretion, composition, and function.

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A MICROVASCULARIZED DENTAL PULP-ON-CHIP FOR STUDYING VASCULOGENESIS AND PULPITIS MODELLING

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Objectives: Traditional endodontic therapy involves replacing the entire pulp with inert fillings. However, studies have shown that keeping viable pulp increases the success rate of treatment and improves the performance of treated teeth. Vascularization is critical in regenerating dental pulp. Therefore, this study proposed a novel microvascularized dental pulp-on-chip (DPoC) for studying pulp vasculogenesis and modelling pulpitis.

Methods: PDMS-based microfluidic devices were prepared in 3D-printed molds with pulp canal morphology. DPoC constructs were fabricated by mixing dental pulp stem cells (DPSCs) and microvascular endothelial cells (ECs) into human fibrin-based matrix and cultured for 8 days on-chip. Unidirectional flow of media was initiated by a hydrostatic pressure difference between the apical inlet and coronal outlet. Towards modeling a diseased state (pulpitis), DPoC constructs were exposed to heat-killed Fusobacterium nucleatum (Fn) on the coronal end under unidirectional flow conditions. Secretion of cytokines, perfusion, and attachment of THP-1 monocytes to ECs were investigated.

Results: Under flow conditions for 8 days, constructs within the chip displayed excellent vasculogenesis resulting in a perfusable microvascular network. Compared to static conditions, both vessel area and branching index were found to be higher in constructs under flow conditions. DPoC constructs were further characterized by strong expression of vimentin and collagen IV, demonstrating high viability of DPSCs and functional vascular basement membrane. Time- lapse imaging under perfused conditions showed the active movement of THP-1 monocytes through the perfusable microvascular network. Exposure of DPoC constructs to Fn under unidirectional flow directed from the apical towards coronal end significantly reduced the secretion of IL6, IL8, and CCL2, in contrast to flow directed from coronal to apical end. Similarly, attachment of THP-1 monocytes to microvascular network was lower in the apical to coronal flow group.

Conclusions: In conclusion, this study demonstrates the potential to emulate vascularized dental pulp-on-chip and its application to study pulpitis and pulp regeneration.

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HIPPO AND WNT PATHWAYS MODULATED MINERALIZATION OF DECELLULARIZED ECM-DERIVED HDPSCS

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Objectives: Extracellular matrix (ECM) is an intricate structure providing the microenvironment niche that influences stem cell differentiation. This study aimed to compare the efficacy of decellularized ECM derived from human dental pulp stem cells (dECM_DPSCs) and gingival-derived mesenchymal stem cells (dECM_GSCs) as an osteogenic inductive scaffold for reseeded GSCs.

Methods: ECM was constructed from DPSCs and GSCs that were cultured in a growth medium supplemented with L-ascorbic acid (N-ECM) or osteogenic induction medium (OM-ECM). Matrisome profile was analyzed using proteomic analysis. GSCs were reseeded on dECM_DPSCs and dECM_GSCs to evaluate the osteogenic differentiation potential of each type of dECM. Global differential gene expression and potential regulatory pathways were examined using bioinformatic analysis. The Mann Whitney U test was used to verify significant differences for two independent group comparisons. For three or more group comparisons, statistical differences were assessed using the Kruskal Wallis test followed by a pairwise comparison. The significance level was set at 5% ($p < 0.05$).

Results: GSCs reseeded on N- and OM-dECM_DPSCs exhibited a significant increase in cell proliferation and mineral deposits compared to those derived from GSCs, even though. The proteomic analysis demonstrated that common and signature matrisome proteins from dECM_DPSCs and dECM_GSCs were related to osteogenic differentiation. In the GSC reseeding experiment, RNA sequencing data revealed that dECM_DPSCs upregulated genes related to the Hippo and Wnt signaling pathways. Hippo and Wnt inhibitors significantly decreased the osteogenic differentiation potential of reseeded GSCs that were cultured in growth medium. Further, GSCs reseeded on dECM_DPSC and cultured in growth medium exhibited significant upregulation of genes related to Hippo and Wnt signaling.

Conclusions: dECM_DPSCs contained mineralization-associated factors that superiorly promoted GSCs osteogenic differentiation through Hippo and Wnt signaling pathways. These results emphasized the promising translational application of dECM_DPSCs as a bio-scaffold rich in favorable regenerative microenvironment for tissue engineering.

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M1 MACROPHAGES ENHANCE ANGIOGENIC PROPERTIES OF DPSCS VIA IL-8

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Objectives: To investigate the effects of M1 macrophages on dental pulp stem cell (DPSC) supported vascular constructs.

Methods: THP-1 cells were differentiated into macrophages(M0) via 320nm Phorbol 12-myristate 13-acetate (PMA) induction for 24 hours. M0 macrophages were then cultured for 48 hours in media supplemented with IFN-γ (100 ng/ml) and LPS (100 ng/ml) for M1 activation or IL-4 (40 ng/ml) and IL-13 (20 ng/ml) for M2a activation. M0, M1, and M2a macrophages were seeded into microfluidic devices with cocultures of human umbilical vein endothelial cells (HUVECs) and DPSCs to determine their effects on vascular network formation. The angiogenic growth factors, IL-8 and vascular endothelial growth factor (VEGF), in conditioned medium (CM) of M0, M1, and M2a macrophages were assessed via the Angiogenesis array kit and ELISA. DPSCs were treated with macrophage CM for 48hrs with and without Reparaxin (IL-8 inhibitor), and ELISA for VEGF was performed on the supernates. In addition, DPSCs were treated with exogenous IL-8 for 48hrs, and ELISA for VEGF was performed on the supernates.

Results: When M1 macrophages were seeded onto the side channel of the microfluidic device where DPSCs and HUVECs were encapsulated in fibrin gel and seeded in the center channel, an enhanced vascular network was observed, as shown by the significantly higher ($p<0.05$) number of vascular segments, sprouts, and branching points compared to M0-seeded groups and negative controls. According to the Angiogenesis array and ELISA results, CM of M1 macrophages contained significantly high ($p<0.05$) amounts of IL-8. VEGF levels were increased in supernates of M1 CM-treated DPSCs, which was significantly reduced ($p<0.05$) when IL-8 inhibitor reperaxin was added. Additionally, significantly high levels ($p<0.05$) of VEGF were detected in supernates of exogenous IL-8-treated DPSCs compared to control groups.

Conclusions: Taken together, M1 macrophages enhance the angiogenic properties of DPSCs via IL-8-mediated induction of VEGF secretion.

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CANNABIDIOL PROMOTES OSTEOGENIC DIFFERENTIATION AND MODULATES IMMUNOMODULATORY PROPERTIES OF HDPSCS

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Objectives: Cannabidiol (CBD) has been introduced as an effective analgesia for various chronic conditions such as multiple sclerosis and rheumatoid arthritis. Furthermore, therapeutic potential of CBD has been extensively explored in dentistry. Hence, the present study aimed to investigate the effect of CBD towards the osteogenic differentiation potential and immunosuppressive properties of human dental pulp stem cells (hDPSCs).

Methods: hDPSCs were isolated from human dental pulp tissues. The effect of CBD was evaluated in LPS-induced hDPSCs inflammation. The expression of osteogenic-related and immunomodulatory markers was evaluated using quantitative polymerase chain reaction (qPCR). The effects of condition medium following CBD treatment on T cell proliferation were examined using a resazurin assay. Regulatory T cell (Treg) differentiation was investigated using qPCR and flow cytometry analysis. The migration of macrophages was evaluated using transwell migration assay.

Results: CBD (1.25 ug/ml) significantly rescued the effect of LPS-induced downregulation of hDPSCs mineralization and osteogenic mRNA expression including COL1A1, BMP2, RUNX2, OSX, DSPP, and DMP1. In addition, CBD significantly abolished the effects of LPS-induced inflammatory and immunomodulatory cytokines, TNFα, IL1β, IL6, TLR2, and TLR4 expression. p38 mitogen-activated protein kinase (p38) inhibitors diminished the effect of CBD- attenuated inflammation in LPS treatment. Further, CBD-derived conditioned media decreased T cell proliferation, promoted Treg differentiation as indicated by FOXP3 mRNA expression, and additionally attenuated migration of macrophages.

Conclusions: CBD restored osteogenic differentiation potential of hDPSCs in LPS-induced inflammatory condition. In addition, CBD modulates immunosuppressive properties of hDPSCs through p38 signaling pathway, leading to the inhibition of macrophage migration and T cell proliferation. Moreover, CBD exerts a stimulatory effect on Treg cell differentiation. These results suggest the role of CBD in osteogenic differentiation and immunomodulation in hDPSCs. Therefore, CBD would be a promising bioactive molecule for vital pulp therapy and regenerative endodontics.

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MODELLING VASCULARIZED DENTAL PULP-LIKE CONSTRUCTS IN VITRO

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Objectives: The management of necrotic dental pulp is undergoing a paradigm shift towards dental pulp-derived stem cells (DPSC)-based strategies to regenerate pulp vitality, providing a promising alternative to traditional root canal therapy. However, a mature tooth with a narrow apical foramen restricts the exchange of nutrients and oxygen leading to a hypoxic microenvironment that limits cell growth and proliferation. Endothelial cell (EC)-laden pre-vascularized engineered pulp tissue constructs provide opportunities to accelerate angiogenesis and pulp regeneration. In this study, we investigated the fabrication of vascularized dental pulp-like constructs using a GelMA-fibrin hydrogel laden with DPSCs and ECs.

Methods: Dual-cure hydrogels were fabricated using varying concentrations of GelMA (6 to 10%) mixed with fibrinogen (6 mg/ml), followed by photocuring and enzymatic cross-linking. The ability of the hydrogels to support vasculature was evaluated by encapsulating the DPSC and microvascular ECs within the hydrogels followed by live/dead staining. To evaluate the potential for the formation of microvasculature, DPSC and ECs were seeded in different ratios (1:10, 10:1 and 1:1), cultured for eight days, and the tissue constructs were evaluated using confocal microscopy for vascular network parameters.

Results: The GelMA-fibrin hydrogel supported cellular viability and proliferation of ECs and DPSCs. Upon culture over 4-8 days, the DPSC-EC co-culture within these hydrogels resulted in the formation of an extensive network of microvasculature. The microvasculature demonstrated the presence of lumen, expression of vascular markers CD31 and vWF, supported by vimentin-expressing DPSCs and collagen-IV rich basement membrane.

Conclusions: The proof-of-concept study shows the potential to fabricate vascularized pulp-like constructs in vitro. Future studies on understanding the mechanics of vascularization under microenvironments representative of pulpal inflammation could shed more light on developing novel pulp regeneration strategies.

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ORAL SESSION 10

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

EVALUATION OF ABBREVIATED DASS-21 VERSIONS IN YOUNG ADULTS WITH TMD

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Objectives: The Depression, Anxiety, Stress Scales-21 (DASS-21) contain three subscales measuring the negative emotions of depression, anxiety, and stress. Several short-form versions of the DASS-21 have been developed which demonstrated better clinical utility and measurement properties than the original instrument. This study explored the factor structure of various abbreviated DASS-21 versions and identified/validated the optimal one for assessing young adults with Temporomandibular disorders (TMDs).

Methods: A total of 974 university-attending young adults were recruited in two waves (wave 1: 519; wave 2: 455). Demographic information, the DASS-21, and quintessence five TMD symptoms (5Ts) of the Diagnostic Criteria for TMDs were collected. Principal component analysis (PCA) was employed to condense the DASS-21 based on wave 1 data while confirmatory factor analysis (CFA) was used in conjunction with wave 2 data to determine maximum likelihood estimates and compare different abbreviated DASS-21 versions. Known-groups and concurrent validity were subsequently performed for young adults with and without TMD symptoms.

Results: The mean age of the recruited young adults was 21.0 years (SD = 0.1) and 80.4% were women. Twelve DASS-21 items were identified from the PCA. However, from the seven abbreviated DASS-21 versions that were analyzed, the Korean DASS-12 (Lee et al., 2019) provided the best-fit model ($\chi 2/df = 2.07$, CFI = 0.975, TLI = 0.960, RMSEA = 0.049, SRMR = 0.033) when compared to all other abbreviated versions in the CFA. When performing the known-groups and concurrent validity, 110 young adults with headache alone were excluded. Among the remaining 864 young adults, 55.4% were 5Ts-positive and 44.6% were 5Ts-negative. The Korean DASS-12 showed good known-groups and concurrent (rs = 0.959) validity when contrasted to the DASS-21.

Conclusions: The Korean DASS-12 possessed a good fit, known-groups, as well as concurrent validity, and was the best abbreviated DASS-21 version for screening young adults with TMD symptoms for psychological distress.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

KINDERGARTEN OUTREACH DENTAL SERVICE ON CARIES EXPERIENCE: A PRELIMINARY ANALYSIS

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Objectives: A preliminary analysis to compare the caries experience and treatment needs of primary school students in Hong Kong who had attended a kindergarten outreach dental service program using silver diamine fluoride therapy with those who had not.

Methods: Primary school students (Grade 3 or 4) who joined the School Dental Care Service (SDCS) provided by the Department of Health, the Government of Hong Kong SAR were recruited, and their clinical examination records were retrieved from the SDCS. Dental caries experience in primary teeth at Grade 3 (3 years after the outreach service) was measured by the dmft score (number of decayed, missing, and filled teeth). Accumulated treatment received for each student from Grade 1 to Grade 3 was measured by counting the number of treatments by type. Chi-square test and Wilcoxon rank-sum test were used to compare those who had attended a kindergarten outreach dental service (exposure group) and those who had not (control group).

Results: Until July 2023, complete clinical data from 937 students were obtained. Among them, 174 (18.6%) had attended the kindergarten outreach service and 763 (81.4%) were classified as controls. 54.0% of the exposure group and 58.7% of the control group had caries experience (dmft score>0) at Grade 3 (P=0.258). 37.9% of the exposure group and 46.3% of the control group had decayed teeth at Grade 3 (P=0.046). The median (Q1, Q3) dmft score was 1.0 (0.0, 3.0) in the exposure group and 1.0 (0.0, 4.0) in the control group (P=0.576). Students from the exposure and control groups received a median (Q1, Q3) of 6.0 (4.0, 8.0) and 6.0 (4.0, 8.0) preventive treatment items (P=0.458), and 1.0 (0.0, 3.5) and 1.0 (0.0, 3.0) caries-related treatments (P=0.356), respectively.

Conclusions: This preliminary analysis showed a lower level of decayed teeth in primary school students who had attended a kindergarten outreach dental service program. Further investigation is needed to verify the results.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

KINDERGARTEN OUTREACH DENTAL SERVICE ON CHILDREN'S OHRQOL: A PRELIMINARY ANALYSIS

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Objectives: A preliminary analysis to compare oral health behavior and oral health-related quality of life of primary school students in Hong Kong who had attended a kindergarten outreach dental service program using silver diamine fluoride therapy with those who had not.

Methods: Primary school students (Grade 3 or 4) who joined the School Dental Care Service (SDCS) provided by the Department of Health, the Government of Hong Kong SAR, were recruited. Students were interviewed. Oral health- related quality of life was measured by Child Perception Questionnaire (CPQ). Students were classified as the exposure group if they had attended kindergartens that received an outreach dental service, otherwise as the control group. Chi-square test and Wilcoxon rank-sum test were used for comparisons between groups as appropriate.

Results: Until July 2023, complete data from 890 students were obtained. Among them, 174 (19.6%) were exposed to the kindergarten outreach service and 716 (80.4%) were the controls; 56.0% (498/890) were of Grade 3 and 44.0% (392/890) were of Grade 4. Majority of the students brushed their teeth at least twice a day (Exposure group: 75.3%; Control group: 79.2% P=0.262) and over half used additional tooth cleaning aids (Exposure group: 55.2%; Control group: 57.1%, P=0.641). Only 11.5% and 9.2% of the exposure group reported poor/ very poor oral health conditions and experienced a lot of/great impact of oral health status on daily life compared to 13.7% and 9.8% in the control group (P=0.444 and 0.816, respectively). The median (Q1, Q3) CPQ scores for exposure and control groups were
19.0 (17.0, 22.0) and 19.0 (16.0, 21.0), respectively (P=0.702).

Conclusions: No evidence of a difference in oral health-related quality of life was observed between the groups in this preliminary analysis. Further investigation is needed to verify the results.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

FOCUSED ETHNOGRAPHY TO EXPLORE SOCIAL PRACTICES IN ORAL HEALTH RESEARCH

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Objectives: Social Practice Theory (SPT) allows us to focus on oral health related social practices rather than individual behaviour. Focusing on individual behaviour risks health professionals blaming individuals for non- compliance with health messages without understanding their social context. A social practice account reflects the complexity of lived experience and how social context informs decision making. While Shove, a leading proponent of social practice theory, suggests there is no specific 'social practice methodology', our objective is to explore focused ethnography as an appropriate method to investigate social practices in oral health contexts.

Methods: Focused ethnography can help deepen understanding of the social context and inter-relationships involved in oral health. Our approach to explore relevant research informed by SPT and how it can be applied to oral health research in our own work. Guided by social practice theory the focus of analysis is the social practice, not individual behaviour. Our approach was to explore relevant research informed by SPT and consider how it can be applied to oral health research.

Results: While investigation of the relevant literature revealed no uniform or accepted method for exploring Social Practices generally, we identified focused ethnography as a good potential fit for oral health research. It allows researchers who were familiar with the local setting to engage with participants including community and stakeholders with a specific research question.

Conclusions: Hence, a focused ethnography approach to apply social practice theory in oral health research is a promising option. It moves the focus of poor health away from the individual to better understand how social context informs decisions around oral health practice and subsequent outcomes.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

PRIORITY SETTING AND RESOURCE ALLOCATION METHODOLOGIES IN ORAL HEALTH CARE

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Objectives: The dental diseases are one of the most expensive diseases to treat globally. Thus priority setting with needs adaptive fund allocation is the new norm for optimum financing of the oral care. This distribution of funds may vary from country to country as per their identification and clarification of the presence of resources mix. The present study aimed at identifying the various priority setting and resource allocation (PSRA) methodologies in oral health context.

Methods: A literature search was conducted on MEDLINE, EMBASE, SCOPUS, LILAC, and a limited online gray literature search after the PROSPERO registration. The initial search was performed in July 2023 and there was no limit to the year of publication, however it started from 2006.

Results: Only nine studies on oral health using various methodology of PSRA were available. While most of the studies included elements of oral health or disease, very few explicitly acknowledged the core clinical components as the guiding principle for the study. It was analysed that multiple level engagements of stakeholders varying from policy makers to field workers were involved. Most of the studies were from high income groups. The categorization of methodology overlapped (multi criteria decision analysis, program budgeting marginal analysis, accountability for reasonableness) hence best buys were compiled.

Conclusions: It was concluded that very few studies have utilized the PSRA methodologies in the context of oral health. Hence, addressing this lacunae is the first step towards improved financing and deliberative priority setting for oral health. These may lead to concrete actionable and context adaptive improvement in oral care financing.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

WILLINGNESS-TO-PAY FOR TELEDENTISTRY

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Objectives: The study aims to elicit patients' willingness-to-pay (WTP) for dental consultations and reviews through video calls and evaluate whether paying class influenced WTP.

Methods: Patients or parents of children attending a dental appointment at a public hospital were recruited between August 2021 and March 2023. Participants completed a questionnaire on their sociodemographic characteristics and perspectives towards teledentistry. A bidding contingent valuation method was adopted to elicit the maximum amount participants were willing to pay for teledentistry consults and reviews. Cards with monetary values were shuffled to provide random starting bids, and WTP were elicited in intervals of SGD$5. All statistical analyses were performed using R version 4.2.1. Median WTP values were calculated using the minimal legal WTP model estimator. Multiple linear regression was employed to evaluate the effects of sociodemographic factors and patients' paying status on WTP. The significance level was set at $p < 0.05$.

Results: 458 patients and 139 parents of children completed the survey. 42.4% of participants were visiting the hospital for new consults, 18.9% for restorative visits, 19.1% for restorative reviews, and 19.6% for post-operative reviews. The median WTP for a video consult and review were SGD$25 (IQR 15 – 35) and SGD$15 (IQR 10 – 20) respectively. 54.4% were willing to have an initial consult via a video call compared to 70.9% for a review. 31.2% agreed that a video call was adequate for a consult compared to 54.2% for a review. After adjusting for age, gender, ethnicity, nationality, education status, employment status, housing type, monthly expenditure, and other financial coverage, private patients had SGD$22.8 (95% CI, 20.3 – 25.4) and $7.9 (95% CI, 6.5 – 9.3) higher WTP for video consults and reviews respectively compared to subsidised patients.

Conclusions: The WTP for video consults are higher than that for reviews, and higher for private than subsidised patients.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

NETWORKING APPROACH TO BUILDING ENGAGEMENT ON ORAL HEALTH IN CAMBODIA

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Objectives: To evaluate the progress of an oral health advocacy network to engage stakeholders for supporting the Cambodia National Action Plan for Oral Health 2023-2030.

Methods: The 'Effective networks for improvement' framework was used to guide the process of establishing an oral health advocacy network with the aim of supporting the Cambodia National Action Plan for Oral Health 2023-2030. The Action Plan requires demonstration projects in three geographic areas and so the network is required to support the implementation processes. The network was led by three facilitators who were tasked with going through the process described in the framework of assessing the network, growing the network, building community, and developing engage and mediate. Network building happened across multiple communication platforms and in person.

Results: The network has reached the stage of 'building community'. The assessment of the network led to a four layer structure being defined as follows: Level 1 Implementers, those are primary health care providers who attended training and participating in a telegram group (N=120) or those targeted as being potential implementers in the future over Facebook (N=>5000); Level 2 local level decision makers who attended consultation meetings (N = 96 across there provinces); Level 3 key dental stakeholders (N = 91 across three communities); and Level 4 personnel who work for central government and development partners (N = 164). Demonstration projects have been initiated in three
working areas through this network.

Conclusions: The network has moved past the initial assessment and growth phases, although further growth is expected across the social media platforms into new geographical areas. In most levels, sufficient relationships are required in order to achieve the objective of setting up demonstration projects. The next step will be to test processes for further engagement and mobilization of stakeholders at each level.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

INTERVENTIONS' COMPONENTS TO REDUCE SUGAR INTAKE: A SYSTEMATIC REVIEW

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Objectives: Excessive sugar consumption is well documented as a common risk factor for many Non-Communicable Diseases (NCDs). Thus, an adequate intervention description is important to minimise research waste and improve research usability and reproducibility. A systematic review was conducted to identify components in published evidence interventions pertaining to the health promotions on reducing sugar intake among adults.

Methods: The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and used the Mixed Methods Appraisal Tool (MMAT) for quality appraisal. The period for the selected study was from 2000 to 2022, and articles were retrieved from WOS, Medline, Scopus, and PubMed. The target population was adults aged 18 years old and above who underwent intervention to assess the changes in their sugar intake. Data sources and all human epidemiologic studies were included.

Results: Out of the 9,333 papers identified, 25 were included. The overall quality of evidence of the studies was considered moderate. Apart from the characteristics of the reviewed studies, components of interventions are including the basis of theoretical or model for the intervention, which majority use Social Cognitive Theory, followed by PRECEDE-PROCEED model, socio-ecological and process-improvement theories and Transtheoretical Model; providers, who are commercial provider, qualified nutritionist, professor of nutrigenomics and nutrigenetics, doctor, dietitian nutritionist, lifestyle coaches, and junior public health nurses; duration of the intervention and follow-up time, varies from as short as one month to as long as 24 months; material provided either softcopy or hardcopy; tailoring approach, based on the individual goals, the process of change, genotype analysis, beliefs, barriers, and sociocultural norms; delivery mechanism either face-to-face or technology-mediated; and tools to measure the sugar consumption outcome mostly used Food Frequency Questionnaire (FFQ), besides 24-h dietary recalls, and food diaries.

Conclusions: There are various components in downstream health promotion to reduce sugar intake among adults that can be adapted according to the local health promotion context.

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BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 2

Friday, 24 November 2023

PSYCHOLOGICAL INTERVENTION TO IMPROVE ADOLESCENTS' ORAL HEALTH: A SYSTEMATIC REVIEW

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Objectives: This systematic review aimed to evaluate the effectiveness of psychological interventions in improving oral health among adolescents.

Methods: The PICO format (population, intervention, comparison, and outcome) was used to define eligible studies. The population was adolescents aged 12 to 18 years old. The intervention was psychological interventions based on psychological theories or models. The comparison was conventional oral health education or negative control. Study outcomes were oral health-related behaviors and oral health status. A comprehensive search was conducted in six electronic databases, including PubMed, Ovid Medline, Ovid Embase, Cochrane Library, APA PsyINFO (ProQuest) and Web of Science. The risk of bias tool used was RoB 2 for randomized control trial.

Results: Sixteen studies met the inclusion criteria, and twelve randomized control trials were included in the meta- analysis. The studies were conducted in school or clinic settings. All the studies had high risk of bias or with some concerns. There was a moderate level of evidence showing that psychological intervention could improve adolescent's oral hygiene and periodontal status in the short term (up to 6 months) compared to conventional oral health education or negative control, with the overall SMD=-1.04 (-1.55, -0.52) of dental plaque accumulation and SMD=-1.18 (-2.32, - 0.04) of Community Periodontal Index respectively. No significant difference was found in oral hygiene improvement between psychological intervention and control in the long term (12 to 24 months), with the overall SMD=-0.31 (-0.64, 0.01).

Conclusions: Psychological intervention was effective in improving adolescents' oral hygiene and periodontal status in short term, however low certainty of evidence shows that psychological intervention could improve adolescents' oral health outcomes in long-term. In addition, low level of evidence was found in reducing dental caries. Further research is needed to evaluate their long-term impact on oral health outcomes.

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ORAL SESSION 11
BIOMATERIALS - 2
Friday, 24 November 2023

LIGHTWEIGHT MICROARCHITECTURE FOR BONE AUGMENTATION AND OSTEOCONDUCTION

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Objectives: In the last decades, advances in bone tissue engineering mainly based on osteoinduction and stem cell research. Only recently, new efforts focused on the micro- and nanoarchitecture needed to improve and accelerate bone regeneration. By the use of additive manufacturing, libraries of bone substitutes were produced and tested to identify highly osteoconductive microarchitectures to treat bone defects. Optimal microarchitectures for bone augmentation purposes, however, are still elusive. To that end, we produced triply periodic minimal surface (TPMS) lightweight-based scaffolds based on three different algorithms and tested them in a cranial defect and a bone augmentation model in rabbits. The advantage of TPMS microarchitectures is high mechanical strength combined with low amount of material.

Methods: For the production of scaffolds, we applied the CeraFab 7500 from Lithoz, a lithography-based additive manufacturing machine and studied tri-calcium phosphate- based and hydroxyapatite-based scaffolds. As in vivo test model, we used a calvarial defect and a bone augmentation model in rabbits.

Results: Histomorphometry revealed that all generatively produced structures were well osseointegrated into the surrounding bone and induced bone augmentation. The histomorphometric analysis, based solely on the middle section combined with microCT analysis showed that for triply periodic minimal surface lightweight microarchitectures, gyroid- and diamond-microarchitecture performs well in bone augmentation and cranial defect models.

Conclusions: In essence, we have identified the optimal triply periodic lightweight, microarchitecture for bone augmentation purposes needed for the placement of dental implants and for cranial defects. We learned before that the optimal pore-based and filament-based microarchitecture for bone augmentations differs from the best for the treatment of defects. For TPMS-based microarchitectures, however, diamond and especially gyroid microarchitectures are optimal for bone augmentation and osteoconduction. Moreover, we saw that additive manufacturing appears as a promising tool for the production of personalized bone substitutes to be used in cranio-maxillofacial surgery, dentistry, and orthopedics.

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Friday, 24 November 2023

IN VITRO EVALUATION ON MUCOADHESIVENESS OF VALSARTAN CONJUGATED CHITOSAN

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Objectives: Chitosan is a mucoadhesive polycation with capability of covalent modification and is thus potential for delivery of poorly-soluble drugs. However, it remains a challenge to evaluate the mucoadhesion properties of chitosan with a convenient in vitro method. In this study, we evaluate the mucoadhesiveness of a valsartan conjugated chitosan using a mucin particle method, comparing with chitosan of different molecular weight or chitosan labelled with fluorescein-5-isothiocyanate (FITC).

Methods: The drug valsartan, low molecular weight chitosan (50-190 kDa, L-chitosan) and medium molecular weight chitosan (190-310 kDa, M-chitosan) were used in the study. Valsartan-L-chitosan was prepared by 1- hydroxybenzotriazole/1-ethyl-3-carbodiimide method and obtained as solution in PBS (pH=6.8). FITC-L-chitosan and FITC-M-chitosan was prepared by mixing FITC and chitosan in 1.2% acetic acid, purified and obtained as solution. Conjugation of FITC was characterized by infrared spectroscopy and ultraviolet-visible light spectroscopy. Mucoadhesion experiment was conducted by mixing chitosan solutions with mucin particle suspension in PBS at different chitosan to mucin mass ratio (0-1.0), followed by determination of zeta potential using electrophoretic light scattering. The mucoadhesiveness of Valsartan-L-chitosan was compared with the controls: L-chitosan, M-chitosan, FITC-L-chitosan and FITC-M-chitosan. Statistical analyses were conducted by two-sample t-test with global significant level at 5% (n=3).

Results: Zeta-potential of mucin particles in all groups increased with the mass ratio of chitosan added and reached maximum at ratio 1.0. M-chitosan was the most mucoadhesive among all groups as it increased the zeta-potential from around -28.1 mV to 20.0 mV, followed by L-chitosan that increased the zeta-potential to 15.5 mV. FITC conjugation did not changed the mucoadhesiveness of the respective L-chitosan or M-chitosan. Valsartan-L-chitosan had a reduced mucoadhesion that increased the zeta-potential of the mucin particles to 12.0 mV.

Conclusions: Mucoadhesiveness of valsartan-chitosan conjugate was effectively evaluated by the mucin particle method. Although valsartan conjugation reduced mucoadhesion, the chitosan conjugate still possessed decent mucoadhesiveness.

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Friday, 24 November 2023

A GROUNDBREAKING BIOACTIVE MEMBRANE FOR GUIDED BONE REGENERATION

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Objectives: Bone grafting is a prevalent procedure in dental medicine, crucial for restoring bone defects and preparing patients for dental implants. However, traditional grafting methods carry risks of complications and disease transmission. Guided Bone Regeneration (GBR), which uses a barrier membrane to guide the growth of new bone cells, is becoming an increasingly popular method. Yet, the unpredictable efficacy and animal origin of current GBR membranes highlights the need for improvement.

Our study introduces a novel GBR strategy: a bioactive, bioresorbable polycaprolactone (PCL) barrier membrane, designed with optimal surfaces to promote bone tissue formation.

Methods: We identified the optimal surfaces using a high-throughput Materiomics screening approach. Further, these surfaces were tested in vitro using our unique Cellompic chip, microfabricated with 160 distinct surfaces. AI based Machine learning algorithms helped identify the topographies that led to increased cell migration and osteogenic differentiation.

After rigorous in vitro evaluation, we tested the selected membranes in a rabbit cranial defect model, identifying two optimal surfaces. These were further evaluated in a clinically relevant monkey mandibular defect model.

Results: The results of the monkey study were promising: radiographic data showed a significant improvement in bone formation after 12 weeks for defects covered with the modified membrane, compared to conventional collagen membrane and uncovered defects.

Conclusions: Our findings suggest that this innovative membrane could enhance the success of dental implants, warranting further exploration in clinical trials. This work contributes to the ongoing efforts to improve bone regeneration, offering a potentially safer, more effective solution for our patients.

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DENTAL RESIN COMPOSITES REINFORCED WITH SHORT S-GLASS FIBERS AND NANODIAMONDS

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Objectives: This study aimed to develop a novel bisphenol A (BPA) free dental resin composite using fluorinated UDMA (FUDMA) and micro/nano fillers containing glass particles, short S-glass fibers, and nanodiamonds for dental restoration applications. The resin/filler ratio was optimized to enhance the mechanical and physical properties of the composites with improved aesthetics.

Methods: The resin system consisted of FUDMA/TEGDMA containing 5-10 wt% short S-glass fibers, 0.2 wt% nanodiamonds, and 45-55 wt% glass particles (Diameter: ~ 0.7 μm). Short S-glass fibers were treated with a selective metal etching method in 10-98% sulfuric acid for 1-3 hours under various acidic conditions, followed by grafting of silane coupling agent (8-MOTS) with different concentrations to maximize the fiber/polymer interfacial bond strength. All raw materials were mixed in a high-speed mixer under dark conditions to prevent pre-polymerization. After photocuring (λ: ~450 nm) for 1 minute, the mechanical and physical properties were investigated, namely: 3-point bend test and micro-indentation, and digital shade measurement (CIE76).

Results: Short S-glass fibers exhibited the best surface condition when treated in 10% sulfuric acid etch for 3 hours followed by 1% 8-MOTS silanization. This treatment provided a thin nano-coating for effective adhesion of the fibers and resin. The composites reinforced with 10 wt% glass fibers increased the flexural strength and modulus by up to 54.42% and 21.82%, respectively, compared to the composites with 5 wt%. The addition of 0.2 wt% nanodiamonds to the composites significantly increased the hardness ($p<0.01$) and resulted in a smaller color difference (CIE delta-E: 17.95) from the standard white point compared to the composites without nanodiamonds (delta-E: 28.90).

Conclusions: This research has successfully developed BPA-free dental resin composites using surface modified glass fibers and nanodiamonds resulting in improved mechanical properties and aesthetics. The improved surface hardness and aesthetic appeal can offer promising potential for esthetically demanding restorations.

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MARGINAL ADAPTATION OF CALCIUM SILICATE-BASED SEALERS WITH DIFFERENT OBTURATION TECHNIQUES

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Objectives: To compare marginal adaptation on root canal wall between IRoot SP sealer and EndoSequence BC Hiflow sealer (Hiflow) after obturated with Single cone techniques (SC) or Warm vertical compaction (WVC) at different root levels under scanning electron microscope (SEM).

Methods: Twenty-eight extracted mandibular premolars with one root canal were cut at CEJ, prepared root canals with Reciproc 40 and irrigated with 2.5% NaOCl and 17% EDTA. The samples were randomly divided into 4 groups (n = 7) depend on sealers and obturation techniques. After obturation, the samples were incubated at 37°C and 100% humidity for 28 days. Each root was cut into 3 pieces (coronal, middle, apical level). The slices were desiccated in a critical point dryer and then were coated with gold and investigated under SEM. Gaps between sealer and dentin were measured at 1000X microphotographs from 3 points/zone and 3-6 zones/slice and mean were calculated. The differences of gaps among groups at each level and among levels of each group were analyzed using 1-way ANOVA and Bonferroni post hoc test.

Results: There was no significant gap size difference among groups at coronal and apical levels ($p > 0.05$). At middle level, Hiflow with SC group had significantly higher gap size than HiFlow with WVC group ($p < 0.05$). Coronal level had higher gap size than apical level excepted the gaps in IRootSp with SC group.

Conclusions: Conclusions Within the limitations of this study, at middle third of root canal, EndoSequence BC HiFlow with Warm vertical compaction technique performed better marginal adaptation than EndoSequence BC HiFlow with Single cone technique. The obturation technique could affect sealer adaptation at middle root level.

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INCREASING CYCLIC FATIGUE RESISTANCE OF ROTARY FILES WITH REFRIGERANT SPRAY

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Objectives: This study aimed to investigate the effect of refrigerant spray on cyclic fatigue resistance of different rotary files.

Methods: New twenty rotary files of each system (ProTaper Universal [PU], ProTaper Gold [PG], Reciproc [RE], Reciproc Blue [RB], Protaper NEXT [PN], WaveOne Gold [WG]) were randomly divided into two groups (spray-applied [S], without spray-applied [WS]). For spray-applied group: files were sprayed with refrigerant spray (Endo-Frost) under specific protocol for ten seconds then immediately tested for cyclic fatigue resistance. Cyclic fatigue resistance was tested by rotating the files in steel artificial canal model with 60 degrees and 5-mm radius of curvature according to their recommendations (speed, torque, motion) until files were separated under simulated body temperature chamber. Time to fracture (TTF) was recorded by using magnified video camera. Mean and standard deviation were calculated. Fractography was investigated by scanning electron microscopy (SEM). Independent t-test was used for comparing means between spray-applied and without spray-applied groups.

Results: Mean and standard deviation of TTF of tested files were S-PU 58.9±10.09, WS-PU 40.4±5.64, S-PG 133.0±30.82, WS-PG 83.6±6.90, S-RE 133.2±7.33, WS-RE 111.5±11.81, S-RB 239.2±11.03, WS-RB 196.4±9.85, S-PN 59.6±13.29, WS-PN 40.5±7.37, S-WG 146.5±6.95, WS-WG 122.3±11.54. TTF of spray-applied groups were significantly different when compared to without spray-applied groups within the same rotary system. The significant differences were observed irrespectively of the rotary file system ($p<0.001$). SEM revealed cyclic fatigue failure in all tested sample.

Conclusions: Under condition of this study, using refrigerant spray can increase cyclic fatigue resistance of rotary files in all type of produced alloys (conventional nickel-titanium, M-Wire, Gold Wire, Blue Wire) and motion of rotation (continuous rotation, reciprocation). Applying refrigerant spray to investigated rotary files before using in the canal might reduce incidence of broken file.

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ORAL SESSION 11
BIOMATERIALS - 2
Friday, 24 November 2023

3D PRINTED POLYCAPROLACTONE SCAFFOLDS FOR BOTH BONE AND NERVE TISSUE ENGINEERING

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Objectives: Bone and peripheral nerve tissue regeneration is important issue and still face to challenging. The purpose of this study was to investigate that 3D printed and modified half tubular array or tubular polycaprolactone (PCL) scaffolds for nerve tissue, mesh structured PCL scaffolds coated with beta-tricalcium phosphate for bone tissue engineering both in vitro and in vivo.

Methods: In vitro assays of viability and differentiation were carried out on 3D printed PCL of PC12 and MG-63 cells. The MTT tetrazolium assay used for assessing cell viability. ALP, mineralization assay used for MG-63 cell differentiation. Expression of PC12 cell neuronal differentiation marker such as β3-tubulin was carried out by immunofluorescence. In addition, experiments were done continue in vivo. Bone marrow stem (BMSC) cells were isolated and seeded in the 3D printed PCL scaffold for transplantation into left jaw ramus of each rabbit and pig. The ramus side jaw of rabbit and a dog were transplanted with acellular scaffolds as the control group. Micro-CT was performed for observation of bone critical defect reconstruction. Dental cone beam computed tomography (CBCT) irradiation was used for dynamic assessment. Four and eight weeks post operation, animals were euthanized and the jaws of animals were sectioned for clinical finding, fixed for histological observation with Stenvenl's Blue, hematoxylin and eosin staining and clinical finding. Confocal microscope was evaluated bone mineralization. Immunofluorescence was used for neuronal detection in the cellular or acellular 3D printed PCL scaffolds transplantation area.

Results: The result shows that the reconstruction of the bone defect, stage of bone mineralization and neuronal differentiation in the experimental group with cellular scaffold was significantly higher than the control group with acellular scaffold.

Conclusions: We conclude that superior bone and neuronal regeneration efficiency of BMSC seeded 3D printed PCL and PCL coated with beta-tricalcium phosphate scaffolds for effective both bone and neural regeneration and repair.

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ORAL SESSION 11
BIOMATERIALS - 2
Friday, 24 November 2023

GLUCOSE-GATED POLYETHERETHERKETONE IMPLANTS FOR ENZYMATIC GAS THERAPY TO BOOST INFECTIOUS DIABETIC OSSEOINTEGRATION

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Objectives: The hyperglycemic micromilieu surrounding implants in patients with diabetes mellitus, a chronic metabolic disease, leads to several complications, such as the high failure rate of implantation and implant-associated infection. Carbon monoxide (CO) has been reported to combat implant-associated infections; however, its on-demand liberation in the diabetic micromilieu and the elucidation of the underlying antibacterial mechanism remain challenging.

Methods: To address this issue, we design and develop a multipurpose orthopedic implant comprising polyetheretherketone, glucose oxidase (GOx), and manganese carbonyl ($Mn_2(CO)_{10}$, MnCO), which can serve as a glucose-gated enzymatic gas therapy for infectious diabetic osseointegration. The GOx acts as a glucose-actuated gate responsive to the hyperglycemic environment, thereby achieving *in situ* delivery of CO triggered by the GOx-driven Fenton-like reaction of MnCO.

Results: The released CO gasotransmitter considerably prevents bacterial multiplication by penetrating the membrane, binding to cytochrome bo_3, and interfering with the respiratory chain *in vitro*. Furthermore, the engineered implant displays the desired antibacterial properties and enhances osseointegration in a diabetic infectious bone defect model *in vivo*.

Conclusions: Collectively, this work has resulted in the creation of a multipurpose orthopedic implant capable of delivering glucose-gated enzymatic gas therapy, with potential application in treating infectious diabetic bone defects.

KEYWORDS: Polyetheretherketone; antibacterial; osteogenicity; diabetic osseointegration; orthopedic implant.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

ARTIFICIAL INTELLIGENCE IN AIDING IN ORAL HYGIENE: A SCOPING REVIEW

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Objectives: To map out and summarise the evidence around the use of AI in the context of oral hygiene education.

Methods: This scoping review was developed according to the Joanna Briggs Institute scoping review protocol guidelines and the PRISMA-ScR guidelines. Publications that involved the use of AI for oral hygiene education in any population and setting were included. A systematic electronic database search (MEDLINE via PubMed, EMBASE, Web of Science, Scopus, Cochrane Library, and IEEE Xplore, arXiv, Proquest, Google Scholar, ClinicalTrials.gov, and PROSPERO) up to, and including 4 February 2023 was carried out. Citation searching from the full-text of included publications was also performed.

Results: Of the 3215 publications screened, 20 were selected for qualitative synthesis. These were broadly divided into two categories of AI-assisted feedback: (1) synchronous and (2) asynchronous monitoring. There is a lack of high- quality studies, scarce reflection on possible ethical concerns on AI, and of studies comparing qualitative feedback to quantitative clinical outcomes with a control. Barriers to adoption of AI technologies, patient privacy, and specific areas for improvement were identified.

Conclusions: This is the first review to map out the available literature on AI in providing oral hygiene education. Within the limitations of this study, the use of AI to modify oral hygiene behaviour is promising. Further work is required in generating higher quality intra-oral images for dental biofilm detection, and in developing more personalised feedback for users.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

REVIEW OF ORAL HEALTH BIRTH COHORT STUDIES: A GLOBICS UPDATE

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Objectives: To report a 3-year update of the scoping review, led by the Global Consortium of Oral Health Birth Cohort Studies (GLOBICS). GLOBICS is an initiative to bring together a network of researchers from various countries to address the global oral health challenges by pooling data from OHBCS.

Methods: We reviewed OHBCS data published from 01 January 2021 to 21 March 2023. Studies were searched using the databases PubMed, Embase, Web of Science, OVID, and grey literature (Google Scholar, OpenGrey and Proquest) with no language restrictions. Two independent reviewers screened studies and extracted data. We included studies with baseline data collection during pregnancy or within the first year of life. We linked future oral health data to exposures during either of these life stages. Studies focusing exclusively on mothers' oral health and specific populations (e.g., premature/low birth weight/high birth weight children or cohorts of adolescents) were excluded.

Results: Electronic search revealed 1,656 records, of which 168 articles were included after the initial screening of titles and abstracts. After full-text reading, 88 articles were included. We found 19 new OHBCS conducted in 12 countries worldwide. Australia has most new cohorts (n=5) followed by Brazil (n=2), Ireland (n=2), USA (n=2), Czech Republic (n=1), Denmark (n=1), Finland (n=1), Japan (n=1), New Zealand (n=1), Spain (n=1), Sweden (n=1) and United Kingdom (n=1). The majority of new cohorts were from high-income countries (n=17) and only 2 cohorts were from upper-middle-income countries. There was no new cohort from lower-middle or low-income countries.

Conclusions: Globally, OHBCS have significantly increased during the last three years. There are currently 139 OHBCS compared to 120 cohort studies identified in the first scoping review. The majority of OHBCS come from high- income countries. An international collaboration like GLOBICS may be a useful strategy to encourage and promote middle- and low-income countries to conduct new OHBCS.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

HALF-CENTURY INCIDENCE AND MORTALITY TREND OF ORAL CANCER IN SINGAPORE

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Objectives: To examine trends in the incidence and mortality of oral cancer in Singapore between 1968 and 2017.

Methods: All diagnosed oral cancers by anatomical sites and population size were extracted from the Singapore Cancer Registry and the Department of Statistics Singapore, respectively. The trend of age-standardized incidence rate (ASIR) and mortality rate (ASMR) (per 100,000 person-years) of the lip, oral cavity and salivary gland cancers were evaluated by Prais-Winsten regressions in each age group for each ethnicity and gender.

Results: In fifty years, 49 lip, 3494 oral cavity and 1066 salivary gland cancers were diagnosed in Singapore, resulting in 28 lip, 2310 oral cavity and 476 salivary gland cancer-associated deaths. The oral cavity cancer ASIR and ASMR reduced from 3.07 (1968-1972) to 2.01(2008-2012) and from 2.06 (1978-1982) to 1.21 (2013-2017), respectively, with both highest in Indians throughout the period. Male:Female ratio ranged from 3.43 (1973-1977) to 1.75 (2013-2017) and from 3.41 (1978-1982) to 2.40 (2013-2017) for ASIR and ASMR, respectively. However, both salivary gland cancer ASIR and ASMR increased from 0.50 (1968-1972) to 0.80 (2008-2012) and from 0.18 (1968-1982) to 0.42 (1988-1992), respectively, with both higher in males since 1993. Oral cavity cancer ASIR decreased for males aged ≥60 and Indian females aged ≥25 but increased among Chinese females aged ≥60. Oral cavity cancer ASMR decreased among Chinese aged 25-59 and among Malay males and Indian females. Salivary gland cancer ASIR increased among Chinese males aged ≥60 and Malay males aged 25-59, while ASMR increased among Chinese males aged ≥60.

Conclusions: Overall, a decrease in the incidence and mortality of oral cancer was observed in Singapore. However, oral cavity cancer ASIR increased among Chinese females aged ≥60 and salivary gland cancer ASIR and ASMR increased among Chinese males aged ≥60.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

PATIENT-REPORTED OUTCOMES: A SYSTEMATIC REVIEW OF DIGITAL COMPLETE DENTURES

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Objectives: This systematic review aims to compare the patient satisfaction levels and oral health-related quality of life (OHRQoL) between patients who had digital and conventional complete dentures treatments.

Methods: A systematic search was conducted in PubMed/Medline, EBSCOhost and Google Scholars databases to identify relevant English-language literature published between January 2011 to December 2022. The search was supplemented by hand searches to address the key population, intervention, comparison and outcome (PICO) question: How do digital complete dentures affect patient satisfaction and OHRQoL compared to conventional complete dentures? Retrospective, prospective, randomized-controlled and randomized-crossover clinical studies involving at least 10 subjects were included. Patient satisfaction parameters and oral health impact profile (OHIP) domains were examined.

Results: A total of 280 published articles were identified. After applying the inclusion criteria, 6 articles were selected for the final analysis. Two articles addressed both patient satisfaction level and OHRQoL, two articles focused on patient satisfaction level, and the remaining two articles focused on OHRQoL only. Among the selected articles, two studies reported superior outcomes for digital complete dentures in terms of chewing efficiency, comfort, retention, overall patient satisfaction, social disability, functional limitation, and psychological discomfort. In contrast, two studies favored conventional complete dentures on phonetics, ease of cleaning, stability, comfort, overall satisfaction and OHIP domains such as social disability and functional limitation. The remaining two studies did not reveal any significant differences in patient satisfaction or OHRQoL between digital and conventional complete dentures.

Conclusions: Overall, the findings of the systematic review suggest that there are both advantages and disadvantages associated with digital and conventional complete dentures in terms of patient satisfaction and OHRQoL. However, further research is required to establish a conclusive comparison between the two types of complete dentures.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

ORAL HEALTH STATUS OF PATIENTS WITH INBORN ERRORS OF IMMUNITY

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Objectives: Patients with inborn errors of immunity (IEI) experience a range of orodental problems; however, there is a scarcity of research focusing specifically on these issues. The aim of this study was to conduct comprehensive studies investigating the orodental status of patients with IEI and identify potential confounding factors.

Methods: Clinical assessments, laboratory tests, and exome sequencing were carried out on 45 patients with IEI. Data on patients' characteristics, dental hygiene habits, dental attendance, and household income were collected. Dental plaque samples of 15 IEI patients and 15 healthy individuals were obtained and subjected to metagenome sequencing. The collected data underwent statistical and bioinformatic analysis, including logistic regression.

Results: Mutations in genes such as BTK, STAT3, ELANE, TTC37, and NCF1 were identified in patients with IEI. Ninety-three percent of patients had gingivitis while 11% had periodontitis. Calculus and caries were found in more than 67% of patients. Significant associations were observed between age and oral health conditions, including caries, moderate-severe gingivitis, periodontitis, calculus, and ulcers. Patients who had taken antibiotics within the last two months exhibited a fivefold higher risk of experiencing caries. Patients with a lower household income had a ninefold higher risk of calculus deposit. Metagenomics revealed alterations in oral microbe composition, alpha-diversity, and beta-diversity among IEI patients. Bacterial species including T. denticola, S. gordonii, S. oralis, and V. parvula were significantly increased in the dental plaque of IEI patients.

Conclusions: Patients with IEI exhibit gingivitis, calculus formation, caries, mucosal ulcers, and dental plaque microbiome dysbiosis. The use of antibiotics was found to increase the risk of caries, while low-income children had a higher likelihood of developing calculus. These findings underscore the significance of addressing oral health issues in the IEI population, considering the impact of antibiotic usage, socioeconomic factors, and dysbiosis of the oral microbiome.

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ORAL SESSION 12
ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

COMPARISON OF INTRAORAL SITES REACHED BY DIFFERENT MOUTHWASH ADMINISTRATION METHODS

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Objectives: Antiseptic mouthwashes have been recommended as a standard measure before dental procedures to reduce the number of microorganisms in the aerosols, thereby decreasing the chance of infectious disease transmission. Different methods of mouthwash administration could affect how mouthwash reaches the anatomical areas of the oral cavity, which may limit its efficacy and lead to unsatisfactory outcome. The objective of this study was to compare the intraoral coverage achieved between three mouthwash administration methods: oral rinse, oral gargle, and oral spray.

Methods: The cross-sectional study was approved by the Institutional Review Board of Naresuan University, Phitsanulok, Thailand (NU-IRB-COA No. 145/2021). Thirty individuals were enrolled into the study. Participants were asked to use mouthwash mixed with blue food dye by three application methods on three separate days. Two investigators independently assessed nine intraoral areas (upper buccal vestibule, lower buccal vestibule, base of tongue, floor of mouth, hard palate, soft palate, uvula, anterior tonsillar pillar, and posterior tonsillar pillar) and scored the dye visibility from 0 to 2. Mean and SD of dye scores were calculated for overall and each of anatomical sites.

Results: The overall scores of dye coverage were 8.52 ± 2.71, 13.28 ± 2.88, and 11.77 ± 3.02 for oral rinse, oral gargle, and oral spray, respectively. Oral gargle provided the highest coverage in all nine anatomical areas tested. Both oral gargle and spray resulted in a significantly higher dye coverage at the upper buccal vestibule and posterior oral cavity when compared to oral rinse ($p < 0.05$). The efficacy of oral spray on its coverage achieved was generally comparable to oral gargle ($p = 0.176$).

Conclusions: Oral gargle and spray are significantly better than oral rinse in term of mouthwash distribution. These findings can be implied to the clinical settings to reduce COVID-19 and other infectious disease transmission.

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ORAL HEALTH RESEARCH - 4
Friday, 24 November 2023

PSYCHOLOGICAL TECHNIQUES TO IMPROVE AUTISTIC CHILDREN'S ORAL HEALTH: SYSTEMATIC REVIEW

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Objectives: This systematic review and meta-analysis summarised the evidence in the existing literature regarding the effectiveness of different psychological techniques and behavioural therapies to improve toothbrushing and oral health among autistic children.

Methods: Interventional studies that investigated psychological techniques and behavioural therapies to improve oral-health habits among autistic children were retrieved from five electronic databases. Initial screening by abstract and title, followed by secondary full-text screening were performed by two independent reviewers to identify eligible studies. Dual independent data extraction, risk of bias assessment, evidence evaluation with the Grading of Recommendations Assessment Development and Evaluation approach were also carried out.

Results: Preliminary systematic search yielded 987 articles; 51 full text papers retrieved for full-text reviews (κ=0.816). Ultimately eleven and five articles were found eligible for qualitative and quantitative syntheses respectively (κ=1).

Psychological techniques including visual pedagogy (VP), social stories, Picture Exchange Communication System, and video modelling (VM) with Mobile and iPad application were being investigated by the included studies. All behavioural interventions were found effective in improving oral health parameters among autistic kids.

Meta-analyses suggested that VP significantly improved the toothbrushing skills and oral health of autistic children, with a mean reduction of gingival index at 6 months (-0.36, 95% CI, -0.41, -0.31; p<0.001); and plaque index at 3 months (-0.35; 95% CI, -0.41, -0.30; p<0.001) and 6 months (-0.43, 95% CI, -0.49, -0.37; p<0.001). Plaque index reduction was more significant with VM than VP at 3 months (-0.05; 95% CI, -0.10, -0.00; p=0.035). Certainty of evidence however was found very low due to nonrandomised studies, considerable heterogeneity between studies and small sample sizes.

Conclusions: Psychological techniques including VP and VM are promising tools to improve toothbrushing and oral health among autistic kids. Randomized controlled trials with larger sample size are warranted to validate its effectiveness and transform into practice among the autistic community.

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POSTER SESSION

IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

ORAL SURVEY AND CARE PROGRAM FOR OSTEOGENESIS IMPERFECTA PATIENTS

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Objectives: Osteogenesis Imperfecta(OI) is a rare genetic disorder that weakens the skeletal system, causing frequent bone fractures. OI patients may also have dental abnormalities like dentinogenesis imperfecta, which leads to discoloration and fragility. To address the oral health of OI patients, we collaborated with dentists and the Taiwan Osteogenesis Imperfecta Association, aiming understand oral conditions, identify risk factors, and promote oral health.

Methods: A questionnaire is conducted. Sociodemographic information, oral habits, chewing ability, oral health- related quality of life, dental conditions, and periodontal conditions are collected. 48 individuals participated, with 21 males and 27 females of different age groups. 52.1% reported good or very good physical health, while 47.9% reported fair or poor health.

Results: In the dental examination, participants had an average of 25.18 remaining natural teeth. Self-perceived oral
health revealed that 22.9% felt very good or good, while 77.1% reported fair or poor oral health. Participants who perceived their oral health as good had better chewing ability and quality of life.

Conclusions: This study has some limitations: Firstly, there were relatively few subjects enrolled. Secondly, although the oral health-related quality of life doesn't appear to be very poor, the participants in this study were willing to come forward and undergo oral examinations. A significant portion of the population who are not willing to step forward needs additional support from relevant departments, such as the Ministry of Health and Welfare, in providing subsidies to rare disease associations.

In conclusion, there were no significant differences in chewing ability or quality of life across age groups. However, patients who perceived their health and oral health as good had better oral health-related quality of life and chewing ability. Encouraging social engagement and providing comprehensive healthcare services, including subsidies for dental prostheses, can improve chewing function and enhance the overall health and quality of life for OI patients.

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POSTER SESSION

IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

POTENTIAL ANTIBACTERIAL COMPOSITE RESIN INFUSED WITH HYDRATED CaO

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Objectives: Composite resin is one of the most promising restorative materials today. It is often associated with superior esthetic qualities, ease of use and a conservative approach towards cavity preparation. However, microorganisms accumulate more on the surface of this restoration than other restorative materials which causes secondary caries and eventually leads to failed restorations. The current study aimed to address this drawback by incorporating hydrated calcium oxide (CaO) from calcined Asian moon scallop (Amusium pleuronectes) shells to commercially-available composite resin to produce an antibacterial property.

Methods: One control group and three experimental groups (composite containing 1%, 5% and 10% hydrated CaO) were utilized. Kirby-Bauer disk diffusion susceptibility test was conducted to evaluate the antibacterial property of the groups against gram-positive cocci. Furthermore, the properties of the composite resin, specifically the flexural strength, depth of cure, water sorption and solubility were also assessed to determine if these were compromised upon the addition of hydrated CaO. Shapiro-Wilk Test, Independent Samples t-Test and Mann-Whitney U test were used for data interpretation.

Results: The experimental groups with hydrated CaO significantly inhibited the growth of gram-positive cocci having p values of 0.015, 0.020 and 0.027 respectively when compared to the control group. These results favor the experimental groups. Moreover, there was no significant difference on the flexural strength, depth of cure, water sorption and solubility of the experimental groups and control group except that of the 5% concentration which had better polymerization (p=0.034) and the 10% concentration which was more water soluble (p=0.046).

Conclusions: It can be concluded that composite resin with hydrated CaO can be a promising restorative material with antibacterial efficacy and largely uncompromised properties. This innovation, alongside further research, can prevent the occurrence of failed restorations due to secondary caries formation.

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POSTER SESSION

IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

METHODS FOR TESTING BIOACTIVITY OF HYDRAULIC CEMENTS FOR ROOT-END FILLING

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Objectives: To summarize in vitro testing methods for evaluating the cytotoxicity and bioactivity of hydraulic calcium silicate cements used as root-end filling materials.

Methods: A literature search strategy was carried out on PubMed. Studies published in English between January 1993 and May 2023, focused on commercial hydraulic cements used as root-end filling materials, were selected. Review papers, clinical trials, case report, case series and animal studies were excluded. This screening was conducted by three researchers independently.

Results: In total, 27 cellular studies were included in this scoping review. Established cell lines including mouse osteoblastic cell line, murine fibroblast cell lines, murine macrophage cell line, human osteosarcoma cell lines were used in 11 studies. Primary cells including human periodontal ligament cells, gingival fibroblasts, osteoblasts, stem cells derived from apical papilla, bone marrow-derived mesenchymal stem cells, and inflammatory cells isolated from human periapical lesions were selected in 16 studies. For cement preparation, 18 studies tested set hydraulic cements (varied between 2 hours to 2 weeks), 4 studies evaluated freshly mixed non-set cements, and 5 studies included both set and no-set cements. For the exposure of hydraulic cements to cells, 7 studies seeded the cells on top of cement disks (direct contact), 19 studies used cement extracts (indirect contact), and 1 study included both direct and indirect contacts. The ratio of cell counts to the cement amount or the concentration of cement extracts varied largely among studies. Apart from cytotoxicity, inflammatory and osteogenic/odontoblastic differentiation responses of cells were assessed.

Conclusions: There is a lack of standardized tests for evaluating the cytotoxicity and bioactivity of root-end filling materials. To facilitate the comparisons across different laboratories and studies, and to enhance the clinical value of in vitro laboratory testing, the development of a standardized, reproducible, and clinically relevant method is highly desirable and essential.

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POSTER SESSION

IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

CHARACTERIZATION OF HUMAN MESENCHYMAL STEM CELLS IN COBALT-INCORPORATED HYDROXYAPATITE MEDIA

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Objectives: Cobalt-incorporated hydroxyapatite (HACo) has been developed for bone substitute material. Co treatment initiates hypoxia mimic to cells such as osteoclasts and osteoblasts. Co ions could be released from HACo. Therefore, the objective of this study was to determine the effects of Co release from HACo discs on human mesenchymal stem cells (hMSCs).

Methods: HACo discs at concentrations 40, 400, 4,000, and 8,000 µM were fabricated by simple soaking method. HA was served as control. HA and HACo discs were incubated in DMEM media (conditioned media) for 3 days. The conditioned media were then collected and used for cell cultured. After conditioned medium treatment, cell adhesion, morphology, and time-lapse migration assay were performed.

Results: Conditioned media collected from moderate concentration tended to increase number of cell adhesion. HACo enhanced cell spreading area and density of actin filament cytoskeleton. Time-lapse imaging showed that wound closure progressed continuously in every sample. After 18 hours, the highest migration of cells was seen in cells exposed to HACo40-conditioned media. The wound area in HACo40 was 47% of the area at time 0.

Conclusions: Co altered cell behaviors such as cell adhesion, cell morphology, and cell migration.

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POSTER SESSION
IADR-SEA HATTON AWARD (JUNIOR CATEGORY)
Wednesday, 22 November 2023

AMINO-ACID STARVATION AND DNA-PROTEIN-CROSSLINK REPAIR AFFECT CANDIDA OXIDATIVE STRESS SUSCEPTIBILITY

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Objectives: Because oxidative stress is an important antimicrobial mechanism of phagocytes, this study aimed to investigate the effects of amino-acid starvation condition that mimics intraphagosomal environment and of DNA- protein-crosslink (DPC) repair on Candida albicans sensitivity to oxidative stress and neutrophil killing.

Methods: Growth rates of Candida albicans strains, including wild type (SC5314), DPC repair protease null mutant (Cawss1$^{-/-}$), homologous recombination gene null mutant (Carad52$^{-/-}$), and double deletion (Cawss1$^{-/-}$rad52$^{-/-}$) were determined. All were grown in Yeast-Peptone-Dextrose (YPD) media overnight and then switched to YNBA with and without amino acid supplements in the presence or absence of hydrogen peroxide (H_2O_2) for 24 hours at 30°C. OD600 was measured hourly using Multiskan SkyHigh Microplate Spectrophotometer. For neutrophil killing assay, neutrophils were freshly isolated from healthy volunteers using PolymorphPrep in RPMI1640. The study protocol was approved by the Faculty IRB (HREC-DCU 2011-124). Log phase C. albicans was incubated with heat-inactivated serum before being co-cultured with neutrophils for two hours. After cell lysis, surviving Candida were recovered on YPD plates for CFU counts. Percentage of neutrophil-killing was calculated by comparing CFU counts to no-neutrophil control.

Results: Based on growth rates, in normal laboratory condition with amino acid supplements, while all strains showed sensitivity to H_2O_2, the mutant strains showed higher sensitivity than wildtype. Interestingly, amino-acid starvation decreased fungal sensitivity to H O in wild type, but not in the mutants. Neutrophil killing assays indicated that, compared to the wildtype, all mutant strains were more susceptible to neutrophil killing with Cawss1$^{-/-}$, Carad52$^{-/-}$, and Cawss1$^{-/-}$rad52$^{-/-}$ being 1.22± 0.35, 1.10±0.19, and 1.22±0.41 times more susceptible than wild type, respectively.

Conclusions: Amino-acid starvation affects the growth rate of C. albicans and decreased the sensitivity of C.albicans to oxidative stress. Disruption of DPC repair genes render C. albicans more susceptible to oxidative stress and to killing by neutrophils.

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POSTER SESSION

IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

ON-DEMAND METAL OXIDE NANOZYMES ERADICATE BACTERIAL BIOFILM

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Objectives: Biofilms are complex entities that are remarkably difficult to eradicate. Nanozymes are promising materials that trigger the conversion of hydrogen peroxide (H_2O_2) to superoxide radicals, resulting in excellent antibacterial activity. Copper oxide (CuO) shows intrinsic peroxidase enzyme-mimic activity. However, an external supply of H_2O_2 is not a clinically feasible approach, requiring alternative peroxidase-mimic substrates. Furthermore, the effect of CuO nanozymes on biofilms remains unknown and no 'smart' antimicrobial systems based on CuO nanozymes have been developed to date. To address this unmet need, this study was designed to (1) synthesize and characterize CuO nanoparticles, and (2) investigate the antimicrobial and antibiofilm activity of CuO in combination with a biocompatible peroxidase-mimic substrate in the presence and absence of external stimuli.

Methods: The CuO was synthesized using a facile solution-based approach. A suite of materials characterization techniques was employed to understand the morphology, surface characteristics, size, and optical properties of CuO. The ability of the CuO alone and in combination with the peroxidase-mimic substrate to rapidly kill planktonic and biofilm forms of a key pathogen, Enterococcus faecalis, were evaluated in the presence and absence of external stimuli.

Results: CuO and the peroxidase-mimic substrate did not kill E. faecalis at concentrations of 10 ppm and 50 mM respectively. However, sub-lethal concentrations CuO and the mimic were synergistically able to eliminate both planktonic and preformed biofilms forms of E. faecalis within 5 mins of external stimulus application ($P<0.05$). On the other hand, no significant inhibition of E. faecalis was observed against both planktonic and biofilm forms of E. faecalis ($P>0.05$) in the absence of such external trigger.

Conclusions: This study shows new insights into the on-demand synergistic antibiofilm activity of CuO nanoparticles and a peroxidase-mimic substrate.

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IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

REUTERIN INHIBITS VIRULENCE OF FUSOBACTERIUM NUCLEATUM EX VIVO ENDODONTIC BIOFILMS

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Objectives: The compound reuterin isolated from the probiotic Lactobacillus reuteri is known to exhibit antimicrobial activity against a wide range of pathogens. The aim of this study was to investigate the effect of reuterin on the expression of fadA, fomA, radD, and aid1 virulence-associated genes in Fusobacterium nucleatum biofilm in an ex vivo root canal model.

Methods: Reuterin was isolated from Lactobacillus reuteri using standard methodology. The minimum inhibitory concentration (MIC) of reuterin against F. nucleatum ATCC-25586 was determined. F. nucleatum cultures were inoculated into sterilized and pre-prepared root canals of a total of 24 human premolar teeth and incubated anaerobically at 37 °C for 24-h. The teeth were divided into four groups based on the type of irrigant used; I. reuterin isolated from L. reuteri LC 382415 (Indonesian strain) 25 ug/mL; II. reuterin isolated from L. reuteri Prodentis (BioGaia); III. NaOCl 2.5 % (positive control); IV. saline (negative control). Root canal models were irrigated with 5 mL of respective irrigating agents for 5-min and 30-min. Thereafter, biofilm samples were collected, subjected to RNA extraction and qPCR using specific-primers for fadA, fomA, radD, and aid1 virulence genes of F. nucleatum. The data were statistically analysed using one-way ANOVA with a significance level of $p<0.05$.

Results: The MIC of reuterin derived from the Indonesian strain Lactobacillus reuteri against F. nucleatum was found to be 25 µg/mL. At MIC reuterin 25 µg/mL, reuterin significantly inhibited the expression of virulence genes of fadA, fomA, radD, and aid1 genes in the ex vivo F. nucleatum biofilm after 30 min contact time compared to the negative control ($p<0.05$).

Conclusions: Reuterin exhibits anti-biofilm activity by down-regulating virulence-associated gene expression of E. faecalis ex vivo. Therefore, reuterin may have potential to develop as a endodontic irrigant in future. Further clinical research is required to draw concrete conclusions.

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Wednesday, 22 November 2023

LACTOBACILLUS-REUTERI MODULATES VIRULENCE GENE OF DENTAL PLAQUE ON ORTHODONTIC PATIENTS

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Objectives: Patients on fixed orthodontic appliances often have higher accumulation of dental plaque biofilms leading to microbial dysbiosis and oral pathologies. Probiotic bacteria is known to modulate the microbial dysbiosis. The aim of this study was to determine the efficacy of probiotic bacteria Lactobacillus reuteri containing lozenges on pathogenic trait of major oral pathogens Candida albicans and Fusobacterium nucleatum from dental plaque samples of patients wearing fixed orthodontic appliances.

Methods: The subjects wearing fixed orthodontic appliances (n=20) enrolled to this prospective clinical trial consumed L. reuteriprobiotic lozenges (2 x 10^8 CFU/ml) each day for two weeks. Plaque samples were obtained using standard methodology were subjected to RNA extraction and cDNA synthesis. The expression of virulence-associated genes of C. albicans namely BCR1 and ACE2 and F. nucleatum namely fadA and aid1 were evaluated using qPCR. The data were statistically analyzed with the Shapiro-Wilk normality test and paired t-test2 where appropriate.

Results: The post-intervention with probiotic lozenges containing L. reuteri significantly downregulated the C. albicans BCR1 and ACE2 gene expression as well as fadA and aid1 gene expression in F. nucleatum in dental plaque biofilm samples of orthodontic patients ($p < 0.05$)

Conclusions: L. reuteri probiotic containing lozenges reduce the pathogenic-trait associated gene expression of key oral pathogens in dental plaque biofilms. This indicates that probiotic may bring beneficial effect to modulate dysbiotic dental biofilm commonly seen in patients wearing fixed orthodontic treatment.

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EFFECT OF COMMERCIAL MOUTH-RINSES ON ORAL MICROBIOME OF COVID-19 PATIENTS

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Objectives: Pre-procedural mouth rinsing has been recommended as an infection control strategy since the COVID- 19 pandemic. However, there are no studies in the literature examining the effect of commercial mouth-rinses on oral microbiome of COVID-19 patients. In this pioneering clinical trial, we examined the effect of mouth-rinses on the salivary microbiome profiles of COVID-19 patients.

Methods: A cohort of COVID-19 patients were randomly allocated to three test groups who used a mouthwash containing either Povidone-iodine (PVP-I), cetylpyridiunium chloride (CPC) or sodium chlorite (NaClO2), and a control group rinsed mouth with water. The saliva samples(n=10/group) were collected pre mouth-rinse and 6 h post-rinse.
The salivary microbiome was profiled by next-generation sequencing using the V3-V4 region of 16S-rRNA. The data were analysed for composition, diversity, and relative abundance using standard bioinformatics tools.

Results: At the genus level, communities were dominated by Streptococcus (20%), Prevotella(8%), Veillonella(8%), Rothia(5%). Certain periodontal-associated Leptotrichia species were significantly reduced after 6hr of CPC mouth rinsing. In the post PVP-I group , periodontal pathogens such as Gamella Haemolysans, Lautropia mirabilis, and Kingella oralis were significantly reduced compared to the water control group ($P<0.05$). Out of which, the reduction of Lautropia mirabilis was affected by both CPC and PVP-I ($P<0.01$). However, the NACIO2 mouth rinse did not show any effect on reducing known periodontal and caries pathogens ($P>0.05$). Furthermore, the overall salivary diversity and bacterial community structures remained unaffected by the mouth rinsing performed after six hours compared to water control groups.

Conclusions: PVP-I and CPC based mouth-rinses were found to reduce the pathogenic oral microbiota and hence beneficial as a pre-procedural mouth rinses in COVID-19 patients. More evidence with larger cohorts is warranted.

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Wednesday, 22 November 2023

BMP-2 MRNA INCREASED RAT BONE FORMATION: MICRO-CT AND HISTOLOGICAL STUDY

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Objectives: Bone morphogenetic proteins (BMPs) are signaling molecules that stimulate bone formation, and the most commonly used BMP is recombinant human bone morphogenetic protein-2 (rhBMP-2). However, rhBMP-2 has a short half-life, requiring high doses to be effective and can cause adverse effects, such as ectopic bone formation. A promising alternative, mRNA encoding BMP-2, is simple to manufacture, more cost effective, and can rapidly translate BMP-2 protein without integrating into the host genome. Therefore, this study was designed to investigate bone formation in rat femurs after delivering rhBMP-2 and mRNA encoding BMP-2 compared with natural bone formation using micro-computed tomography and histological analysis.

Methods: Defects (0.5 mm diameter) were created using a 25 gauge needle in the left and right femurs of 11-week-old male Sprague-Dawley rats (N=60). Each femur was allocated into one of four groups: phosphate-buffered saline (dPBS), rhBMP-2, 5 µg mRNA encoding BMP-2, and 15 µg mRNA encoding BMP-2. After 3 or 6 weeks, the rats were euthanized and the femurs were collected. Micro-CT analysis was performed to measure the percentage of bone volume over total volume (%BV/TV), connectivity density (Conn. D), and structure model index (SMI) to assess bone formation. Hematoxylin-Eosin staining was performed to evaluate the histology of the bone.

Results: The mean %BV/TV from lowest to highest in both the 3-week and 6-week groups were dPBS, rhBMP-2, 5 µg mRNA-BMP, and 15 µg mRNA-BMP. At both 3 and 6 weeks, the 15 µg mRNA-BMP group had a significantly higher bone volume than the dPBS group. The Conn. D of the 3-week 15 µg mRNA-BMP group was significantly higher than the dPBS group. The SMI was significantly lower in the 3-week 15 µg mRNA-BMP group compared with the dPBS group. The histological evaluation also revealed that the 6-week 15 µg mRNA-BMP group had the greatest size and quantity of lamellar bone.

The histological images revealed that the 3-week 15 µg mRNA-BMP group had slimmer plate-like pieces of bone compared with the spherical bone in the 3-week dPBS group. The microCT results corresponded to the histological images.

Conclusions: The results suggest that mRNA encoding BMP-2 can induce bone formation. Further gene expression studies will help elucidate the mechanism of this particular mRNA.

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IADR-SEA HATTON AWARD (JUNIOR CATEGORY)

Wednesday, 22 November 2023

DENTAL PULP STEM CELL CONDITIONED MEDIUM ENHANCING GINGIVAL FIBROBLAST PROPERTIES

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Objectives: To investigate the biological effects of dental pulp stem cell-derived conditioned medium (DPSC-CM) on human gingival fibroblasts (HGFs).

Methods: DPSC was isolated and characterized. DPSC-CM were obtained from cell culture supernatants after 2 days in serum-free medium. The total protein in DPSC-CM was determined using Bradford assay. For the cell viability assay using MTT, HGFs were treated with various concentrations of DPSC-CM (1.56, 3.12, 6.25, 12.5, 25, 50 and 100 µg/ml) in serum-free DMEM for 24 hours. For the proliferation assay using CCK-8 assay, HGFs were treated with 3.12 and 6.25 µg/ml of DPSC-CM in DMEM with serum. The proliferation of HGFs after treatment on days 1, 3, 5, and 7 was measured. For collagen production using picrosirius red staining, HGFs were treated with 3.12 and 6.25 µg/ml of DPSC-CM in DMEM with serum. The qualitative and quantitative analyses of collagen amount were conducted on days 7 and 14. The COL1A1 and COL3A1 gene expression was examined at days 7, 14 and 21 by real-time PCR.

Results: HGFs treated with DPSC-CM at 3.12 and 6.25 µg/ml showed significantly higher cell viability than that of the control group without DPSC-CM. DPSC-CM at concentrations of 3.12 and 6.25 µg/ml significantly increased proliferation on day 7. Collagen amount was significantly higher in HGFs treated with 3.12 and 6.25 µg/ml of DPSC- CM at days 7 and 14, compared to the control group. Relative gene expression of COL3A1 was upregulated at days 7 and 14, compared to the control. The 6.25 µg/ml showed the highest expression of COL3A1 at both days, and of COL1A1 at day 14. At day 21, both COL3A1 and COL1A1 were down-regulated.

Conclusions: DPSC-CM has the potential to promote the viability, proliferation, and collagen production in HGFs, indicating its promising properties to apply for enhancing oral wound healing.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

ORAL HEALTH RELATED QUALITY-OF-LIFE IN ELDERLY PATIENTS REQUIRING ENDODONTIC TREATMENT

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Objectives: Population ageing is a global trend, with more people retaining their teeth into old age. This study aimed to assess the impact of endodontic disease on oral health related quality-of-life (OHRQOL) in an elderly population requiring non-surgical root canal treatment (NSRCT). Appropriateness of the Oral Health Impact Profile (OHIP-17) and General Oral Health Assessment Index (GOHAI) as OHRQOL assessment tools for this population was also assessed.

Methods: Patients aged ≥65 years requiring NSRCT were recruited. OHRQOL assessments were conducted using OHIP-17, GOHAI and an oral health perception questionnaire. Potential influencing factors for OHRQOL scores were investigated. Internal consistency, concurrent validity, and discriminant validity of both tools were evaluated.

Results: One hundred and twenty-two patients were recruited. The mean total OHIP-17 and GOHAI scores were 16.35 ± 11.81 (max possible=68) and 16.85 ± 7.04 (max possible=48) respectively. The percentage of patients reporting no impact was lower with GOHAI (0.8%) than OHIP-17 (9.8%). Multivariate analyses showed that higher OHRQOL scores were significantly associated with higher levels of education, full/part-time employment and more teeth requiring NSRCT. Internal consistency was high for both tools. Concurrent validity assessment demonstrated significant association of satisfaction with oral health for GOHAI, and perceived importance of keeping one's own teeth and perceived oral health for both OHIP-17 and GOHAI. Neither tool significantly correlated patient-reported impact with clinicians' assessment of oral health.

Conclusions: OHRQOL is reduced amongst elderly patients requiring NSRCT and is negatively associated with higher education level, being employed, and more teeth requiring NSRCT. GOHAI appears more successful than OHIP-17 in detecting the impact of endodontic disease on OHRQOL.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

EARLY-LIFE ORAL NITRATE-REDUCING BACTERIA AND CARDIOVASCULAR RISK IN YOUNG CHILDREN

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Objectives: Cardiovascular disease (CVD) is the leading cause of mortality worldwide. Besides the conventional CVD risk factors, studies in adults have shown levels of oral nitrate-reducing bacteria (NRB) to be inversely associated with blood pressure. Evidence shows initiation of subclinical hypertension and atherosclerosis to occur as early as in childhood, emphasizing the need for early identification of CVD-susceptible individuals. Therefore, we aimed to test the potential link of early-life oral NRB with CVD risk markers in later childhood.

Methods: Data was obtained from Growing Up in Singapore Towards Healthy Outcomes (GUSTO) cohort. Oral microbiome samples from tooth and tongue dorsum of 323 children were collected at 2-, 3- and 5-years and characterized using 16S rRNA sequencing (Illumina HiSeq). NRB exposure was operationalised as ratio of NRB genera and Streptococcus (NRB/S ratio). Child's systolic/diastolic blood pressure (SBP/DBP) was recorded annually from 3- to 8-years with measurement of CVD risk factors including arterial thickness (defined by carotid intima-media thickness, cIMT), aortic augmentation index (AIx) and pulse wave velocity (PWV) at 6-years. Linear mixed effect modelling was used to test association of NRB/S ratio with repeated measures of SBP/DBP. Linear regression was used to test association with cIMT/AIx/PWv at 6-years.

Results: After adjusting for potential confounders, multivariable analysis demonstrated an inverse relationship between NRB/S ratio in tongue dorsum at 5-years with cIMT at 6-years and SBP/DBP at 7- and 8-years (all $p<0.05$). This association was absent with NRBs from tooth surfaces. Oral NRB/S ratio at 5-years significantly improved prediction performance of core model for the outcome "elevated SBP (>90th percentile)" at 8-years, with increase in area under the curve from 0.71 to 0.84 ($p<0.05$).

Conclusions: Higher NRB levels in early life was associated with reduced blood pressure in later childhood, potentially mediated by lower carotid intima-media thickness. Site-specific NRB colonization may be a promising cardiovascular health predictor.

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MECHANICAL PROPERTIES OF LEMONGRASS ESSENTIAL OIL-INCORPORATED DENTAL TISSUE CONDITIONER

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Objectives: Overcoming compromised oral hygiene and susceptibility to opportunistic oropharyngeal candidal infections in maxillectomy patients is a critical challenge. Tissue conditioners (TC) enhance the recovery of healing tissues and can serve as an effective vehicle for delivery of antimicrobial agents. The addition of lemongrass essential oil (EO) extract in TCs has shown promising antifungal properties, but their mechanical properties remain unexplored. Therefore, this study assessed the effects of lemongrass EO incorporation at various concentrations on the tensile bond strength (TBS) of TCs. The presence of the lemongrass EO in the TC was further evaluated using Raman spectroscopy.

Methods: Unmodified Coe-Comfort™ TC served as the baseline, whereas lemongrass EO-incorporated Coe-Comfort™ (final concentrations of 1.77%, 3.56%, and 7.17% [w/w]) served as the experiment groups. The TBS of Coe-Comfort™ to denture base acrylic was determined using Universal Testing Machine at 10 mm/minute crosshead speed (n = 10/group). Similarly, Raman spectrums for unmodified and modified TCs were obtained. Data analysis was performed using one-way ANOVA followed by post hoc Tukey HSD multiple comparison test, at $p \leq 0.05$.

Results: No significant difference of TBS was observed between unmodified Coe-Comfort™ and 1.77% (w/w) lemongrass EO Coe-Comfort™ groups ($p=0.184$). No significant difference was noted in TBS between 3.56% and 7.17% (w/w) lemongrass EO Coe-Comfort™ ($p=0.971$). Additionally, significantly higher TBS was observed in the unmodified and 1.77% (w/w) lemongrass EO Coe-Comfort™ groups compared to the 3.56% and 7.17% (w/w) groups. Besides these observations, the remaining test groups all had significant differences in TBS among them. Raman spectrum analysis confirmed the presence of lemongrass EO in the EO-incorporated TC samples.

Conclusions: Lemongrass EO-incorporated TC at concentration of 1.77% (v/v) showed adequate mechanical properties, which is also sufficient for long-lasting antifungal properties.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

DETECTING SUBSURFACE DEFECT IN BULKFILL COMPOSITE RESINS RESTORATIONS AFTER CURING

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Objectives: Placing bulk-fill composite resins (BFCR) greater than 2 mm has raised concerns regarding the adaptation of the material causing debond from internal walls. This study aimed to identify subsurface debond immediately after curing by the dynamic of BFCR polymerization shrinkage.

Methods: An in-vitro studies, Class-I cavities of 4 x 4 x 4 mm3 were prepared in 25 extracted molars and divided into 5 groups (n:5): G1 - bonded at all surfaces, G2 – debonded at floor, G3 – debonded at mesial wall, G4 - debonded at two adjacent walls and G5 – debonded at two opposing walls. Finite element analysis of the Class-I restoration was carried out using Abaqus 6.13 with dimensions of the model 10.5 mm x 12.4 mm x 7.8 mm for the tooth, 4 x 4 x 4 mm 3 for the composite resins and 10-mm thick for the adhesive layer. Linear displacement (LD) were measured from the experiment utilizing microCT and FEA simulation. Agreement between the microCT-measurement and FE-predicted methods were analysed.

Results: The micro-CT images and FEA showed that displacements did occur at all free and debond surfaces, with the largest displacement at the middle of occlusal surface restoration. MicroCT measured LD were G1:62.4±5.2µ, G2:32.8±4.0µ, G3:34.5±4.1µ, G4:30.8±4.8µ and G5:29.4±6.1µ. The FEA values were G1:46.8µ, G2:34.6µ, G3:37.7µ, G4:32.3µ and G5:30.5µ. G1 exhibited the highest value and G5 the lowest in both measurement methods. One-way ANOVA showed significant difference ($p<0.05$) between G1 to G2, G3, G4 and G5, but no significant difference ($p>0.05$) noted between G2, G3, G4 and G5.

Conclusions: Debond walls or floor in restorations gave a specific characteristic on the LD polymerization shrinkage. The in-vitro experiment and FEA confirmed that subsurface debond significantly reduces the linear surface displacement of composite resins restoration from a fully bonded restoration.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

ENHANCED CELLULAR ABSORPTION OF ACYCLOVIR WITH SOLID LIPID NANOPARTICLES

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Objectives: Acyclovir, a potential anti-viral drug for oral herpes infection, has lower permeability into the cells due to its hydrophobic nature, leading to its bioavailability is 15-30% and a half-life of 3h. Encapsulation of acyclovir into nanocarriers, such as solid lipid nanoparticles (SLN), has provided a sustained release of the drug for 24h. The following study works with the in vitro drug transport model to observe the acyclovir (ACY) permeation encapsulated in SLN (ACY-SLN).

Methods: Human oral keratinocytes seeded in 12 well-plate inserts were treated with 1mg/ml ACY in ACY-SLN. Treatment with only 1mg/ml of ACY and stearic acid nanoparticles (STA) was used as a control (n=3). Absorbance reading followed by transmission electron microscopy was done of the collected media at different time points after 24h of treatment. Gene expressions of the tight junction proteins, such as epithelial cadherin (ECAD), Tight Junction Protein -1 (TJP-1), occludin (OCLN), claudin (CLDN1), were obtained by real-time PCR analysis of the lysed cells after 48h of treatment. Statistical analyses were performed using paired T-test and one-way ANOVA with post-hoc Bonferroni test with global significant level pre-set at 5% for intra- and inter-group analysis, respectively.

Results: A higher permeation of acyclovir was recorded in the basolateral chamber when cells were exposed to ACY through absorbance reading. TEM images reveal the presence of STA and ACY-SLN in the basolateral chamber after 8h and 24h of exposure. A significant decrease in the concentration of ACY from 298±3µg/ml at 0h to 114±3µg/ml at 48h in the apical was observed for ACY-SLN, compared to other groups. A 10-fold increase in the gene expression of CLDN1 was noted when the cells were treated with STA and ACY-SLN.

Conclusions: Stearic acid acts as transcellular permeation enhancer, improving acyclovir's permeability into the cells with a sustained release of the drug into the basolateral chamber.

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INJECTABLE POLYXYLITOL SUCCINATE-BASED ADHESIVE HYDROGEL FOR PERIODONTAL REGENERATION

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Objectives: To develop an injectable adhesive hydrogel with antibacterial and osteogenic properties for periodontal regeneration.

Methods: A novel copolymer polyxylitol succinate (PXS) was prepared through the esterification of xylitol with succinyl chloride. Adhesive properties were subsequently incorporated into the prepolymer by combining biocompatible catechols, via caffeic acid (CFA). The PXS and CFA were subjected to citric acid in a one-pot synthesis. The final injectable caffeic acid/PXS/citric acid composite polymer (iCPC) hydrogel was fabricated by cross-linking the pre- polymer solution with MgO. PXS and iCPC polymers were characterized by proton nuclear magnetic resonance (^{1}H NMR) spectra. Adhesion strengths were examined by lap shear testing. Biocompatibility of iCPC on human periodontal ligament cells (hPDLCs) was examined by CCK8-assay and live/dead staining. Anti-bacterial effects of iCPC against Actinomycis actinomycetemcomitans and Porphyromonas gingivalis were examined by OD600 value recording. Alizarin red staining and alkaline phosphatase (ALP) activity of hPDLCs/iCPC were performed to assess the osteogenic properties. Statistical analysis was performed using one-way ANOVA and Tukey multiple comparison tests.

Results: The ^{1}H NMR spectrum of PXS featured specific peaks corresponding to the methine protons from xylitol and the methylene protons of succinic acid. In iCPC polymer, specific peaks in the chemical shifts, which can be ascribed to CFA, confirmed the successful conjugation of CFA to the polymer backbone. Lap shear adhesion test results showed superior adhesive properties of iCPC compared to fibrin glue ($P<0.05$). CCK8 assays and live/dead staining results indicated that iCPC hydrogels are biocompatible and could enhance the proliferation of hPDLCs. OD600 values showed that iCPC hydrogel inhibited the growth of A. actinomycetemcomitans, and P. gingivalis confirming its anti-bacterial properties ($P<0.05$). Alizarin red staining for mineralized nodule formation and ALP activity results confirmed the superior osteogenic properties of iCPC hydrogels on hPDLCs ($P<0.05$).

Conclusions: iCPC hydrogel possesses excellent tissue-adhesive, antibacterial, and osteogenic properties required for periodontal regeneration.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

DENTAL PULP BLOOD VESSEL-LIKE STRUCTURES RESPONSE TO SILVER DIAMINE FLUORIDE

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Objectives: This study aims to evaluate the response of the dental pulp blood vessel-like structures formed in a 3D cell culture to silver diamine fluoride treatment.

Methods: 3D spheres of dental pulp stem cells (DPSC) and human umbilical vein endothelial cells (HUVEC) with the ratio 3:1 were formed using a low attachment agarose mold. The spheres were left to grow for 14 days before treatment. The 3D spheres were treated with 0.0001% SDF (Group SDF 10X), 0.00001% SDF (Group SDF 1X), and no treatment (Group Control), respectively. The concentration was determined according to concentration of the SDF the in dental pulp when used as an indirect pulp capping agent in deep cavities. Live/Dead assay was performed. Viability was evaluated using CCK-8 assay.

Results: The average values of live/dead assay were 98.3% for Group SDF 10X, 98% for Group SDF 1X, and 96% for Group Control. There was no significant difference among the groups ($p=0.378$). The average values of the CCK-8 assay was 94% for Group SDF 10X, 87% for Group SDF 1X and 87% for Group Control. Group SDF 10X showed a significant higher cell viability than Group SDF 10X and Group Control ($p<0.001$)

Conclusions: SDF at a low concentration did not have an adverse effect on the dental pulp blood vessel-like structures. Moreover, 0.0001% SDF treatment increased the viability of the dental pulp cells.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

PREVENTIVE EFFECT OF SILVER DIAMINE FLUORIDE ON DENTINE EROSION

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Objectives: To investigate the preventive effect of 38% silver diamine fluoride (SDF) on dental erosion in dentine blocks with salivary pellicle.

Methods: 105 dentine blocks were allocated into three groups. Group 1 received a one-off 38% SDF, Group 2 received stannous chloride-containing fluoride (SnCl2/AmF/NaF) daily and Group 3 received deionized water daily. The blocks were immersed in fresh saliva before each erosive challenge and surface treatment to form salivary pellicle. The morphology of the salivary pellicles was assessed by atomic force microscopy (AFM). The treated blocks were subjected to a 5-time 120s/day citric acid at pH 3.2 for 14 days. Dentine microhardness loss, dentine surface loss, crystal characteristics and surface morphologies were assessed using microhardness test, non-contact profilometry, X-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. Data of dentine hardness loss and dentine surface loss were analysed by one-way ANOVA and Tukey's multiple comparison post hoc test.

Results: AFM revealed salivary protein clumped on dentine block surface in Groups 1 and 2. Dentine microhardness loss (±SD in %) in Groups 1 to 3 were 15.20 ± 2.18, 17.42 ± 2.10, and 28.17 ± 2.20, respectively (Groups 1=2<3; $p<0.001$). The dentine surface loss (±SD in µm) in Groups 1 to 3 were 4.75 ± 0.28, 4.62 ± 0.33, and 9.66 ± 0.32, respectively (Groups 1=2<3; $p<0.001$). XRD analysis showed silver chloride, silver phosphate and silver fluoride formed in Group 1, ammonium fluoride, sodium fluoride and calcium fluoride formed in Group 2, while only hydroxyapatite were detected in Group 3. SEM revealed dentinal tubular occlusion in Groups 1-2 and exposed dentinal tubules in Group 3.

Conclusions: A one-off application of 38% SDF with salivary pellicle had promising results initial outcome similar to stannous chloride-containing fluoride in preventing human dentine erosion.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

ROOT CANAL TREATMENT IN IRRADIATED JAWS - A RETROSPECTIVE STUDY

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Objectives: To investigate healing outcome, survival, and their associated prognostic factors, in teeth that received non-surgical root canal treatment (RCT) in irradiated head and neck cancer (HNC) patients.

Methods: Patients who received radiation therapy (RT) for HNC and RCT were identified via search of electronic clinical records from 2011-2022. Variables of interest, healing outcome and tooth survival were determined from clinical and radiographic records. Radiation dosages received by the tooth and its periapical region were calculated by mapping the corresponding regions on the RT dosimetric computed tomography (CT) scan. Healing outcome was categorised into "healed and healing" and "diseased" based on clinical and radiographic criteria. The association of prognostic factors with healing outcome or survival were analysed using a mixed-effects logistic regression or cox regression respectively.

Results: The study cohort consisted of 138 teeth in 71 patients. Healing outcome was analysed for patients with 1-year reviews and found to be 79.3% (92/115 teeth). No prognostic factors were significantly associated with healing. Overall survival probability was estimated to be 83.3% (95% CI = 72.3%-95.9%) at 8 years. Multivariate analysis identified two prognostic factors for tooth loss ($P<0.05$): tooth type (posterior teeth) and higher mean (>33.4Gy) radiation dosage received by the periapical region of teeth. None of the endodontically-treated teeth developed ORN during the study period.

Conclusions: Healing outcomes and survival of endodontically-treated teeth in irradiated HNC patients are favourable. Posterior teeth and higher mean radiation dosage received by tooth periapical regions may be predictive of tooth loss after RCT and should be considered during pre-RT dental clearance. However, amount of radiation received by tooth and periapical region may not affect healing outcome of RCT. Endodontic treatment of compromised teeth in irradiated jaws may help reduce the need for extractions and the associated risk of extraction-related ORN.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

THE FIRST MOLAR AXIS IN RELATION TO MAXIMUM BITE FORCE

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Objectives: To investigate the relationships between maximum bite force (MBF), and first molars' crown angulation (CA), inclination (CI) in adults with normal occlusion.

Methods: The sample consisted of 33 adults aged 18-25 (mean age: 22.03±1.68), with Angle's class I occlusions and healthy dentitions, no previous orthodontic treatment. MBF at the first molar was recorded by a digital occlusal force gauge (BFM 4th generation, Vietnam). Participants' dentitions were scanned using an intra-oral scanner (3Shape, Denmark), subsequently calibrated, and analyzed using Geomagic Design X software (Artec, Luxembourg). For each subject, 3D coordinates were set; and longitudinal axes of clinical crowns (LACC) were constructed for four first molars. CA and CI were measured by the angle between the LACC and a line perpendicular to the horizontal reference plane when viewing from the sagittal and frontal reference plane, respectively. Inter-molar angulation and inclination were determined from CA and CI. Paired t-test was used to compare the means between sides. Pearson's correlation coefficient was performed to evaluate the statistical relationships ($p<0.05$ shows statistical significance).

Results: Mean MBF was 619.66N±36.25N; mean CA of maxillary and mandibular first molars were 1.28°±1.21° and 2.15°±1.41° respectively (inter-molar angulation was 0.87°±1.06°); mean CI of maxillary and mandibular first molars were 14.21°±2.42° and 30.03°±6.16° respectively (inter-molar inclination was 15.82°±8.13°). No significant difference between sides was found in the mentioned variables. Correlation coefficients between MBF and upper CA, lower CA, inter-molar angulation, upper CI, lower CI, and inter-molar inclination were 0.29 (weak, $p<0.05$), -0.60 (strong, $p<0.01$), -0.24 (weak, $p<0.05$), 0.35 (moderate, $p>0.05$), -0.43 (moderate, $p<0.05$), -0.49 (moderate, $p<0.05$), respectively.

Conclusions: There was a linear relationship between the maximum bite force and the first molar axis. The MBF was higher when the inter-molar angulation and inclination of the first molars were closer to zero.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

EFFECT OF CEMENT APPLICATION TECHNIQUES ON IMPLANT-SUPPORTED SINGLE CROWNS

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Objectives: This study aimed to investigate the effect of different cement application techniques on the cement usage, film thickness, and retention force of implant-supported single crown restorations.

Methods: Thirty-two titanium abutments and lithium disilicate crowns (UP.CAD, Upcera Dental, China) were fabricated and randomly divided into four groups (n=8). After surface treatments, they were adhesively luted using a resin cement (3M™ RelyX™ Universal Resin Cement, 3M ESPE, Germany) in four different methods: by brushing a thin layer of cement on the inner surface of the crown (brush-on application, BA), by placing the resin cement on 3 mm width of the inner crown margin (margin application, MA), by filling the whole inner crown with the cement (gross application, GA), and by pre-seating the cement-filled crown on the copy abutment before cementation (chair-side copy abutment, CCA). The mass of cement used was weighed and calculated. Cement film thicknesses were measured on digital files acquired by microcomputed tomography (Micro-CT). The crown retention forces were tested via the tensile test using a universal testing machine, after which failure modes were examined. One-way ANOVA with the post hoc Tukey HSD test was performed at $\alpha = 0.05$.

Results: The CCA group (20.162 ± 2.385 mg) had a significantly lower cement usage than MA (26.149 ± 0.875 mg), BA (25.248 ± 0.644 mg), and GA (25.198 ± 1.226 mg) ($p < 0.05$). Specimens cemented via brush-on application (187.06 ± 23.77 µm) presented significantly higher cement film thicknesses than those using other application techniques (155.20 ± 13.44 µm for MA, 152.39 ± 25.32 µm for GA, and 135.73 ± 27.42 µm for CCA) ($p<0.05$). Under the tensile test, the four groups had comparable retention forces ($p = 0.897$).

Conclusions: Different cement application techniques presented diverse features in cementing implant-supported single crowns. Although all methods can achieve adequate retention, brush-on cement application results in higher film thickness, while pre-seating the cement on the chair-side copy abutment can reduce cement usage and potential cement residue.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

AN EVALUATION OF MAXIMUM OCCLUSAL FORCE IN ENDODONTICALLY TREATED TEETH

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Objectives: Understanding the relationship between endodontically treated teeth and sensitivity to masticatory load is important for managing the risk of tooth damage following pulp removal. The study aimed to compare the maximum occlusal force in endodontically treated teeth and their vital contralateral counterparts and to evaluate the factors affecting them.

Methods: Thirty adult participants presented with an endodontically treated tooth and its vital contralateral counterpart tooth were recruited, consisting of 15 males and females each. Maximum occlusal forces were measured using a wireless sensor network occlusal force recorder. Data were analyzed by comparing the mean maximum occlusal force of endodontically treated teeth and their vital contralateral counterpart. The intraoral clinical and endodontically-related factors were recorded and the association with maximum occlusal force was analysed using multiple factors ANOVA analysis.

Results: The mean maximum occlusal force for endodontically treated teeth was 215.44 ± 74.11N and 202.40 ± 70.67N for their vital contralateral counterpart. There was a statistically significant difference in the means of maximum occlusal force between the 2 groups ($P < 0.001$) using the paired sample t-test. The maximum occlusal forces of both groups were statistically significantly associated with the location of teeth and crown root ratio ($P < 0.01$). Results from a multiple factors ANOVA analysis for endodontically treated teeth revealed that the location of teeth was the key factor associated with the maximum occlusal force ($P = 0.007$). Endodontically treated anterior teeth had a significantly lower maximum occlusal force than premolars ($P = 0.039$) and molars ($P < 0.001$).

Conclusions: Endodontically treated teeth showed higher maximum occlusal force than the control group and the tooth location was the significant clinical factor affecting occlusal force. This highlights the importance of taking protective precautions and the importance of preserving the natural sensory and protective mechanisms of teeth.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

TEMPORAL STABILITY OF TONGUE MICROBIOTA IN ELDERLY PATIENTS

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Objectives: The oral microbiota influences both oral and systemic health. Maintaining a stable oral microbiota has broad implications for overall health, as well as diagnostics, prognosis, prevention, and treatment. Dysbiosis can occur due to factors such as lifestyle, feeding methods, and host genetics. The tongue, characterized by bacterial biofilm and abundant microorganisms, offers an ideal context for studying long-term microbiota stability. However, research on microbiota stability has primarily focused on healthy individuals, leaving a gap in understanding the effectiveness of stability measures for long-term care patients. This study investigates the long-term stability of tongue-based microbiota in geriatric patients under long-term care, contributing to improved oral disease diagnostics and prediction.

Methods: We employed next-generation sequencing (NGS) to analyze the oral bacterial composition and abundance in 8 participants receiving long-term care in Taiwan. Over a period of 10 months, tongue coating samples were collected from the participants at 0, 5, and 10 months by dentist using swabs. Subsequently, DNA extraction was performed, and we assessed the microbial compositions, taxonomic classifications, as well as the alpha and beta diversity of the samples.

Results: Bioinformatic analysis was conducted to investigate the disparities in microbiota composition among patients. In the context of beta-diversity analysis, irrespective of the metric employed, the samples from the three time points consistently clustered together in the principal coordinates analysis (PCoA) plots, indicating the temporal stability of the tongue microbiota. Conversely, substantial dissimilarities were observed between individuals, indicating that each patient hosted a unique microbial composition. Additionally, taxonomic analysis unveiled that the majority of patients exhibited consistent components in their tongue microbiota across the three time periods.

Conclusions: We conclude that the tongue microbiota is a stable oral microbiota niche and might be applied as a long-term screening tool for the general health state of the individual.

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IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

ANTIMICROBIAL SUSCEPTIBILITY STUDIES ON A POTENTIALLY HAEMOSTATIC CAMELLIA SINENSIS EXTRACT

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Objectives: Oral and maxillofacial infections have either an odontogenic or a non-odontogenic aetiology. The oral cavity is a reservoir of 774 bacterial species as documented in the expanded Human Oral Microbiome Database (eHOMD) v3.1. Staphylococcus is an opportunistic non-fastidious gram-positive bacterium, a commensal of the oral cavity, nasal cavity, and cutaneous tissues in healthy homo sapiens. This in vitro study aimed to confirm the antimicrobial susceptibility of six Camellia sinensis variety assamica tea leaves extracts (a potential dental haemostatic agent) on the Staphylococcus aureus subspecies aureus Rosenbach ATCCÒ 25923™ strain.

Methods: Disk-diffusion tests (DDT) were conducted where Staphylococcus aureus (S.aureus) 25923™ inocula, incubated in tryptone soy broth (TSB) for a minimum of 20 hours were suspended on Mueller-Hinton agar plates in triplicate (CLSI supplement M100.33Ed.). Commercialised antibiotic discs[OXOID™] of AML10:amoxycillin (10 mg), AMC30:amoxycillin + clavulanate (30 mg), and CXM30:cefuroxime (30 mg) were placed as the positive control in three different sets of DDT, while 6.0mm filter discs of deionised water (10 mL) were placed as the negative control to exclude experimental bias in this study. 10 mL of six types of tea leave samples were placed on 6.0mm filter discs. CSALE samples comprised independently extracted fresh green tea leaves and commercialised black tea leaves from a single, locally sourced highland plantation, fresh green tea leaves: GTE1, GTE2, and GTE3 whereas commercialised black tea leaves: BTE1, BTE2, and BTE3.

Results: Our study shows that all Camellia sinensis variety assamica extracts have antimicrobial susceptibility, with GTE1 showing the highest susceptibility against Staphylococcus aureus 25923™, mean zone of inhibition in diameter: 21.3mm (AML 10); 21.0mm (AMC30), and 13.0mm (CXM30) when compared to the other five extracts.

Conclusions: In conclusion, GTE1, an extraction of fresh green tea leaves has shown high susceptibility ratio and bears no harm in the treatment of odontogenic or non-odontogenic oral and maxillofacial haemorrhage.

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POSTER SESSION
IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

IN VITRO ADHESION OF CANDIDA ALBICANS ON 3D-PRINTED DENTURE BASES

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Objectives: To investigate, in vitro, the impact of resin types (3D printed VS conventional denture resin) and finishing protocols on surface roughness and adhesion of C. albicans.

Methods: 5 experimental groups were manufactured via 3D printing or conventional fabrication. They were then subjected to 3 post fabrication surface treatment protocols. The groups were: 3D printed unpolished resin (3DU); 3D printed polished resin (3DP); 3D printed coated resin (3DC) and conventional unpolished resin (CU); conventional polished resin (CP). 8 samples for each group were prepared and immersed in distilled water for 6 days of water aging. After which, they were sterilized under UV light. Biofilm quantification was performed using XTT assay and colony forming units (CFU) count to determine levels of C. albicans adhesion. 2 time points of 24 hours and 48 hours were done for each method i.e. 24h-XTT, 48h-XTT, 24h-CFU and 48h-CFU. Surface roughness (Ra) of the samples was measured immediately after fabrication. Results were collected and statistically analysed using One-way ANOVA, Kruskal-Wallis tests and Spearman's rank correlation coefficient.

Results: 3DU showed significantly greater surface roughness than CU ($P < 0.05$), while no statistical difference was found between 3DP and CP ($P > 0.05$). Polishing significantly reduced surface roughness for both conventional and 3D printed samples ($P < 0.05$). Coating significantly reduced surface roughness of 3D printed samples ($P < 0.05$)

3DU showed significantly greater C. albicans adhesion than CU ($P < 0.05$). 3DP showed significantly greater C. albicans adhesion than CP only at 48 hours ($P < 0.05$). CU showed greater C. albicans adhesion than CP, significance was found for 48h-CFU ($P < 0.05$), and not found in 24h-XTT, 48h-XTT and 24h-CFU ($P > 0.05$). C. albicans adhesion showed a consistent trend of 3DP < 3DC < 3DU, with statistical significance at 48 hours.

Additionally, a positive correlation was found between surface roughness and C. albicans adhesion ($P < 0.05$).

Conclusions: The unpolished 3D printed denture resin presents with significantly higher surface roughness and C. albicans adhesion compared to conventional denture resin. Use of a 3D printed denture may increase the risk for developing denture stomatitis. Coating the intaglio of a 3D printed denture may help to reduce this risk.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

FACTORS ASSOCIATED WITH ALVEOLAR BONE GRAFT SUCCESS FOR IMPLANT REHABILITATION

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Objectives: To compare bone graft success rate, implant survival rate, and peri-implant marginal bone loss (MBL) among different alveolar bone grafts, and to identify factors associated with bone graft success, implant survival, and MBL.

Methods: This retrospective study was conducted on the treatment outcomes of 115 patients with alveolar bone grafts for implant rehabilitation performed during 2007-2016 in Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Chulalongkorn University. Primary predictors were types of bone graft. As outcome variables, bone graft success rate (Barone Criteria) and implant survival rate (Pisa Implant Health Scale) were recorded. Moreover, MBL was measured by the difference between the height of implant body to the height of alveolar bone around implant in periapical radiographs (ImageJ) at 3-6 months(T1), 12-15 months(T2) and 21-24 months(T3) after implant installation. Influences of secondary predictors related to patient (age, gender, systemic health, history of head and neck radiation, anti-osteoresorptive drug therapy, smoking), bone graft (surgery technique, adjunctive membrane use, anatomic location), and implant (placement protocol related to bone graft, crestal morphology, dimension) were determined.

Results: In mean follow-up 40 months (range 1-10 years), overall bone graft success rate (n=177) revealed 97.7% (autograft 98%, allograft 95.8%, xenograft 100%, synthetic graft 90.9%, composite graft 96.3%; logistic regression analysis, p=0.68) and overall implant survival rate (n=226) showed 99.1% (autograft, allograft, and synthetic graft 100%, xenograft 98.7%, composite graft 97.1%; log-rank test, p=.01). Comparing MBL between T1-T2, T2-T3 and T1- T3, Wilcoxon-Sign-Rank test demonstrated significant increased MBL in autograft, allograft, and xenograft ($p<0.001$), and synthetic and composite grafts ($p<0.05$). Two-year MBL of autograft, allograft, xenograft, synthetic graft, and composite graft were 0.93±0.63mm, 0.65±0.59mm, 0.92±0.74mm, 1.31±0.08mm, and 0.62±0.39mm, respectively (Kruskal-Wallis test; p=0.12). However, none of the secondary predictors correlated with studied outcomes ($p>0.05$).

Conclusions: Based on the available data, it would be summarized that autograft can be preferred for implant rehabilitation.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

ORAL BIOFLUID BIOMARKERS ASSOCIATED WITH PERI-IMPLANTITIS: A SYSTEMATIC REVIEW

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Objectives: The objective of this systematic review is to explore current studies on salivary and peri-implant sulcular fluid (PISF) biomarkers for peri-implantitis. The aim is to identify reliable biomarkers that can be used for the early detection and monitoring of peri-implantitis, which is crucial for timely intervention and improved treatment outcomes.

Methods: A systematic search was conducted on two databases, PubMed and Scopus, to identify relevant studies published until January 2023. The search aimed to identify articles that investigated salivary and PISF biomarkers in relation to peri-implantitis. A total of 90 articles were included in this review, and data extraction and analysis were performed on the selected articles.

Results: The review reveals that several biomarkers in salivary and PISF samples have been investigated for their association with peri-implantitis. These biomarkers fall into various categories, including inflammatory markers, matrix metalloproteinases, bone loss markers, and microbial markers. Elevated levels of pro-inflammatory cytokines, such as interleukin-1β (IL-1β), interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), and matrix metalloproteinases, were consistently found in both saliva and PISF samples and were associated with peri-implantitis. Additionally, osteoprotegerin (OPG) and soluble receptor activator of nuclear factor-kappa B ligand (sRANKL) showed significant increases specifically in PISF samples.

Conclusions: This systematic review provides insights into the current research on salivary and PISF biomarkers for peri-implantitis. The identified biomarkers hold promise as noninvasive diagnostic tools for early detection, monitoring, and personalized management of peri-implantitis. Future studies should focus on establishing standardized protocols and conducting well-designed clinical trials to validate the diagnostic accuracy and clinical relevance of these biomarkers.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

SALIVARY BIOMARKERS FOR BONE HEALING ASSOCIATED WITH MEGAGEN ANYRIDGE® IMPLANTS

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Objectives: The aim of this study was to determine the various proteins involved in cell signaling, tissue remodeling, and integration of Megagen AnyRidge® Implants with the surrounding bone.

Methods: The study was conducted on 7 patients who received Megagen AnyRidge® implants to replace a missing mandibular molar. Saliva samples were collected from the patients before implant placement (T0), 1 week after implant placement (T1), and 16 weeks after implant placement (T2). The saliva was analysed for the presence of proteins that are involved in bone healing using LCMS (Model 6520-Accurate Mass Q-TOF LC/MS).

Results: 21 saliva samples were collected from 7 patients to examine dental implant healing at the proliferative and remodeling phases. A total of 397 different human proteins were identified across the samples. Among these proteins, 130 were unique to T0, 125 to T1, and 117 to T2. In T1, 45 proteins associated with the proliferative phase of dental implant healing were identified, involving processes such as cell proliferation, growth, extracellular matrix, cell adhesion, cell signaling, receptor activation, and transcriptional regulation. In T2, 30 proteins associated with the bone remodeling phase of dental implant healing were identified, involving processes such as extracellular matrix and signaling proteins, cell adhesion and cytoskeletal proteins, regulatory and signaling proteins, and enzymes and metabolic proteins.

Conclusions: These proteins are growth factors, extracellular matrix components, enzymes, receptors, and signaling molecules which work together to promote cell adhesion, migration, proliferation, and differentiation, ultimately leading to osseointegration. Further research is necessary to understand the precise mechanisms and interactions between these proteins and the Megagen implant surface during the healing process.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

CLASSIFICATION OF EXTERNAL ROOT RESORPTION USING DEEP LEARNING-BASED ALGORITHM

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Objectives: Early identification of external root resorption (ERR) is challenging due to the absence of clinical symptoms in most cases and is often detected incidentally during radiographic examination. Although Cone beam CT (CBCT) allows superior visualization of ERR, the clinician's skills resulted in subjective variability of the interpretation performance of CBCT images. A machine learning system combined with a pre-trained convolutional neural network (CNN) and a feature selection technique (FST) can potentially enhance the ability to identify ERR on CBCT images. This study aims to evaluate the performance of deep CNN models for the classification and segmentation of ERR on CBCT images.

Methods: Cone beam CT scans of 88 extracted premolars with simulated ERR were evaluated and labeled by an oral and maxillofacial radiologist and were defined as the reference dataset. Training and validation (80%) and test dataset (20%) were then established from the dataset. Random Forest algorithm combined with VGG16 deep CNN was employed to identify ERR according to different depths (0.5mm,1.0mm, 2.0mm). The Unet algorithm was applied to segment ERR lesions in all two-dimensional slices of the CBCT scans. The performance of the test dataset in the trained Random Forest+VGG16 and Unet models was evaluated in terms of accuracy, F1-score, and Intersection over Union.

Results: The classification accuracy using Random Forest+VGG16 improved from 78.6% to 81.1% following FST optimization. The segmentation accuracy measured by Intersection over Union was 63%. The volumetric measurement of the ERR was comparatively similar between the deep CNN system and manual segmentation.

Conclusions: Random Forest with VGG16 algorithm combined with FST has the potential to aid in the identification of ERR on CBCT images based on different depths. The Unet algorithm offers the potential for segmentation and volumetric ERR measurement.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

ASSESSEMENT OF INTRA-ORAL SCANNER BITE REGISTRATION AT MAXIMAL INTERCUSPAL POSITION

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Objectives: This study aimed to compare the occlusal contacts (OC) in adults with class I occlusion between the traditional articulating paper and the intraoral scanner (IOS).

Methods: A total of 22 participants with class I occlusion and stable maximal intercuspal position (MIP) were recruited. The occlusal contacts were recorded using 40µm articulating paper (Bausch, Germany). The upper OC color marks were collected by an intra-oral scanner (Trios3, 3Shape, Denmark). Next, the digital OC was collected from a bite-scan file from the buccal side for the same participant. Finally, Geomagic Design X 2020 (Artec 3D, Luxembourg) was used to compare the occlusal contacts between two groups of OC data.

Results: The number of OC recorded by 40µm articulating paper and by IOS were 41.89±6.34 points and by IOS were 33.17±9.04, simultaneously. The difference was statistically significant ($p<0.05$). The strength of agreement on the location of the OC points assessed by Cohen's Kappa K= 0.391 (K>0.4), at a moderate level.

Conclusions: Bite registration by intra-oral scanners may be acceptable in clinical practice. However, more studies
are needed.

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POSTER SESSION
IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

RELATIONSHIP BETWEEN THE 3D DENTAL ARCH CHARACTERISTICS AND BITE FORCE

O. Nguyen Ngoc Hoang, A. Nguyen Ho Quynh, K. Nguyen Dang, H. Hoang Trong, University of Medicine and Pharmacy at HCMC, Vietnam, Ho Chi Minh City, VIET NAM

Objectives: This study aimed to assess the relationships between dental arch width, occlusal curves, and the maximum bite force (MBF) in dental arch widths in Angle's class I healthy adults.

Methods: Subjects were 36 adults (18 males and 18 females) aged 18-25, with Angle's class I occlusions and healthy dentitions. 3D models of each participant were recorded using the same intra-oral scanner (TRIOS 3, 3Shape, Denmark). All 3D data was calibrated and analyzed using Geomagic Design X (3D Systems, United States). The processing procedure included two steps: reorientation and measuring. First, the horizontal reference plane was set from 3 landmarks (incisive papilla and the intersection of the palatal sulci of the first permanent molars with the gingival margin). Then the sagittal and frontal plans were defined accordingly. Second, arch width and occlusal curves (Spee curve and Wilson curve) were measured for each subject. 3 arch width parameters between canine cusps, bucco-mesial cusps of first molars, and bucco-distal cusps of second molars were calculated in the horizontal plane. The maximum bite force was recorded by a digital occlusal force gauge (BFM 4th generation, Vietnam). Paired t-tests were used to compare the means between sides (left and right) and genders (male and female). Pearson's correlation coefficient was performed to evaluate the statistical relationships ($p<0.05$).

Results: The correlation coefficient between the radius of Spee curve and MBF was 0.53 (moderate positive correlation, $p<0.05$). The correlation coefficient between the radius of Wilson curve at the first premolar, second premolar, first molar, and second molar and MBF were 0.37, 0.54 (moderate positive correlation, $p<0.05$), 0.64 and 0.60 (strong positive correlation, $p<0.05$), respectively. There was no significant relation between dental arches width and MBF ($p>0.05$).

Conclusions: MBF might be influenced by occlusal curvatures but not related to the dental arch width. The three-dimensional analysis of occlusal curvatures may be a valuable predictor of the masticatory function.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

THE ADVERSE EFFECTS OF DOXORUBICIN ON ALVEOLAR BONE IN RATS

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C. Thonusin, N. Chattipakorn, Center of Excellence in Cardiac Electrophysiology, Faculty of Medicine, Chiang Mai University, Chiang Mai, THAILAND
C. Thonusin, N. Chattipakorn, Department of Physiology, Faculty of Medicine, Chiang Mai University, Chiang Mai, THAILAND
R. Aeimlapa, N. Charoenphandhu, Department of Physiology, Faculty of Science, Mahidol University, Bangkok, THAILAND
R. Aeimlapa, N. Charoenphandhu, Center of Calcium and Bone Research (COCAB), Faculty of Science, Mahidol University, Bangkok, THAILAND
S.C. Chattipakorn, Oral Biology and Diagnostic Sciences, Faculty of Dentistry, Chiang Mai University, Chiang Mai, THAILAND

Objectives: Alveolar bone is a basic support structure that can be compromised by several factors. Doxorubicin (Dox) is an anti-cancer drug that has been known to cause osteotoxicity and the impairment of bone remodeling. However, the negative impacts of doxorubicin on alveolar bone remain unknown. This study aimed to investigate the adverse effects of Dox on bone mineral density, periodontal ligament (PDL) space, osteogenesis, osteolysis, and inflammation of alveolar bone in rats.

Methods: Twelve male Wistar rats were randomly divided into 2 groups (n=6/group) to receive either 1 mL of normal saline solution as a vehicle (Control group) or 3 mg/kg/day of Dox intraperitoneally on day 0, 4, 8, 15, 22, and 29 (Dox group). The rats were euthanized on day 30 to enable alveolar bone collection. The left maxillary alveolar bone at the first molar area was prepared for measuring the expression of gene-related bone homeostasis and inflammation using Quantitative Real-Time Polymerase Chain Reaction and statistical analysis (Kruskal-Wallis, $p<0.05$). The right maxillary alveolar bone at the first molar area was prepared for evaluating periodontal and bone mineral density using ultra-high-resolution VecTor^{6}CT system (voxel size=5μm) and statistical analysis (ANOVA, $p<0.05$).

Results: The Dox-treated rats demonstrated decreased alveolar bone mineral density and increased PDL space ($p<0.05$). Dox led to impaired alveolar osteogenesis, as indicated by the reduction of RUNX2, ALP, and Col1A1 gene expressions ($p<0.05$). On the other hand, alveolar osteolysis was found increased in Dox group, as indicated by elevated gene expressions of CTSK, RANKL, and RANKL/OPG ratio ($p<0.05$). Increased alveolar bone inflammation was also observed in Dox group, as shown by increased IL-1β and IL-6 gene expressions ($p<0.05$).

Conclusions: Dox reduced bone mineral density, increased PDL space, decreased osteogenesis, increased osteolysis, and induced inflammation in maxillary alveolar bone of rats, suggesting the development of osteoporosis in alveolar bone of subjects treated with chemotherapy.

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

SHEAR STRESS PRE-CONDITION ENHANCED PERIODONTAL LIGAMENT CELL SURVIVAL

N. Limjeerajarus, Engineering, Thai–Nichi Institute of Technology, Bangkok, THAILAND

R. Suwittayarak, N. Klincumhom, C. Limjeerajarus, P. Pavasant, T. Osathanon, dentistry, Chulalongkorn, Bangkok, Bangkok, THAILAND

Objectives: Periodontal ligament cells (PDLs) acts as mechanosensory cell, enabling response to mechanical stimuli. The present study aims to investigate the influence of shear stress on cell survival, challenging in a serum-free medium (SFM).

Methods: PDLs were loaded with shear stress at different magnitudes (0.5, 5, and 10 dyne/cm^2). Gene expression was evaluated using real-time polymerase chain reaction. Protein expression was determined using western blotting and immunofluorescent staining. For dissecting regulatory mechanisms, cells were pretreated with chemical inhibitors prior to shear stress exposure. Cell viability and apoptosis by Resazurin assay and flow cytometry, respectively.

Results: The expression of SOX2 was more increased in 0.5 dyne/cm^2 than that of another group. The localization of SOX2 in the nucleus was markedly observed. The percentage of cell viability was increased at 0.5 dyne/cm^2 under SFM. Shear-induced SOX2 expression was inhibited in the presence of an ERK inhibitor. Further, shear stress at 0.5 dyne/cm^2 under SFM attenuated the total apoptotic cell number. The effect of shear stress on cell apoptosis was abolished when cells were pretreated with an ERK inhibitor.

Conclusions: Shear stress upregulated SOX2 expression via the ERK signaling, potentially contributing to the enhancement of cell survival under serum starvation. These findings may provide insight mechanism regarding the homeostasis of periodontal ligament cells under mechanical stimuli from normal function.

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POSTER SESSION
IADR-SEA HATTON AWARD (SENIOR CATEGORY)
Wednesday, 22 November 2023

ASSOCIATION BETWEEN PRETERM BIRTH AND TIME OF FIRST TOOTH ERUPTION

K. Nguyen Trung, A. Dien Hoa, Faculty of Dentistry, Van Lang University, Ho Chi Minh City, VIET NAM

Objectives: The aim of this study was to evaluate the association between preterm birth and time of first tooth eruption in infants.

Methods: This study was a prospective study carried out at Tu Du hospital, Ho Chi Minh City, Vietnam. Children whose gestational age of less than 37 weeks were defined as being preterm birth. Dental records of children were followed by questionnaires at six months and twelve months of age.

Results: Among a total of 391 children, 19.44% of infants are preterm birth. The median age of first tooth eruption was 8 months. There was a statistical significant difference ($p<0.001$) in the time of first tooth eruption between preterm birth and fullterm birth groups (10.63 ± 2.05 months and 6.85 ± 1.76 months, respectively).

Conclusions: Preterm birth prolonged the time of the first tooth eruption in infants

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POSTER SESSION

IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Wednesday, 22 November 2023

EFFECTIVENESS OF MUSIC-BASED TOOTH BRUSHING INSTRUCTION IN PRIMARY SCHOOL CHILDREN

Q. Nguyen, University of Medicine and Pharmacy at Ho Chi Minh City, Ho Chi Minh City, VIET NAM

Objectives: The aim of this study was to evaluate the effectiveness of music-based tooth brushing instruction among primary schoolchildren in Ho Chi Minh City, Vietnam.

Methods: The study was conducted through 3 stages: (1) Composing a new song named "Let's brush teeth" with appropriate rhythm and specific content for tooth brushing; (2) Collecting survey data about the opinions of teachers and primary students about the integration of the new song into the tooth brushing program at school; (3) Conducting a community intervention trial to evaluate the effectiveness of the music-based tooth brushing instruction. Final stage, 600 schoolchildren were randomly divided into two groups: music group and non-music group. During the period of reinforced tooth brushing, copies of the song were distributed to teachers and school authorities to be played every day while children brushed their teeth at class. In non-music group, tooth brushing instructions in the traditional form using tooth brush and dental model. QHI and DMF (both DMF-T and DMF-S in permanent teeth) indices were applied. Dental caries was recorded by using WHO's Criteria. These parameters were re-evaluated after 4 weeks, 24 weeks and 48 weeks by 2calibrated examiners who were blinded (kappa values: 0.78 and 0,89.)

Results: 100% of teachers claimed that this song should be integrated into the dental educational program at school. More than 70% of students and more than 93% of teachers gave this song a score higher than 7 in the scale of 10 in favor of the introduction of this brushing song in oral health education to schoolchildren. Mean values of QHI showed a statistically significant drop from the start to the end of study in music group. Moreover, The the results of the follow-up at 48 weeks showed significant differences in DMF Index (1.33 ± 0.11 in music group and 1.69 ± 0.10 in non-music group). The difference between two groups was statistically significant (<0.001)

Conclusions: The study showed that music and dance integrated in tooth brushing instruction for school children and combined with community empowerment approach increased the effectiveness of tooth brushing at school among school children in Ho Chi Minh city.

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POSTER SESSION:
IADR-SEA HATTON AWARD (SENIOR CATEGORY)

Date : Wednesday, 22 November 2023
Time : 3:30 PM

MEDICATION-RELATED OSTEONECROSIS OF JAW (MRONJ): AN OSTEOCLASTIC OR INFLAMMATORY CONDITION

E. Lalith Prabha, ACP-Research, National Dental Centre Singapore, Singapore, SINGAPORE
E. Lalith Prabha, T. James, Lee Kong Chian School of Medicine, Singapore, SINGAPORE
T. James, IMCB, A STAR, Singapore, SINGAPORE

Objectives: The use of bisphosphonates in preventing skeletal-related events has significantly expanded in recent years because of the rising prevalence of osteoporosis and bone metastases. The incidence of the uncommon but potentially serious adverse effect of using bisphosphonates, known as MRONJ, has concurrently grown. The rarity of MRONJ limits the scope of human study, and the underlying mechanism is still unknown. There is strong support in the literature for an immunological role in the development of MRONJ. This study postulates that an additional inflammatory mechanism is required to generate MRONJ since bisphosphonate-induced osteoclastic inhibition alone is insufficient to create it.

Methods: This study measures and analyses osteoclast activity on the adult zebrafish's tooth-bearing ceratobranchial bone. We also characterised the changes to osteoclasts, osteoblasts, neutrophils, macrophages, NF-kB signalling pathway due to alendronate treatment, using various trangenic zebrafish.

Results: We discovered that bisphosphonate could suppress the spontaneous osteoclastic activity around the pharyngeal teeth of zebrafish. We also found teeth-bone disjunction in every adult zebrafish treated with bisphosphonates, which is identical to the MRONJ seen in the clinic. Zebrafish are, therefore, a reliable and practical model of MRONJ. In this investigation, we also demonstrated an initial neutrophil invasion that subsided after three weeks, followed by an accumulation of activated macrophages at the teeth-bone junction. An early downregulation of NF-kB signalling was present along with this, and at later time periods, a strong upregulation of NF-kB signalling was observed.

Conclusions: In conclusion, We developed a zebrafish model of MRONJ and used it to get some initial understanding of the role played by the immune system in the condition. We also discovered a signaling route that can be targeted for the treatment or prevention of MRONJ.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

IMPROVING TRANSITION OF ORAL CARE FOR PATIENTS WITH SPECIAL NEEDS

S. Ho, J. Yang, Geriatric Special Care Dentistry, National Dental Centre Singapore, Singapore, SINGAPORE
B. Lai Wen Pui, Paediatric Dentistry, National Dental Centre Singapore, Singapore, SINGAPORE

Objectives: To evaluate the perceptions of caregivers of patients with special health care needs (SHCN) regarding the factors that may impede or facilitate the transition process from paediatric to adult-based dental care

Methods: Semi-structured interviews were conducted with nine caregivers to discuss the anticipated challenges and perceived enablers during the transition process. An inductive thematic analysis directed by the grounded theory approach was performed.

Results: Four themes emerged for anticipated challenges: (i) uncertainty over acclimatisation to a new environment, (ii) not knowing how to search for suitable dentist, (iii) lack of capable and willing dentists, and (iv) financial concerns. Four other themes emerged for suggested facilitators: (i) information on how to find a suitable dentist, (ii) communication between paediatric and adult dentists (e.g. handover memo, verbal discussion), (iii) onsite- introduction to the adult dentist, and (iv) having a capable and willing dental team.

Conclusions: Findings revealed various logistical, administrative, financial and professional barriers which need to be addressed in tandem. Addressing these barriers can be impactful in ensuring that individuals with SHCN benefit from a seamless and smooth transition from paediatric to adult-based dental care.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

THE FACTORS AFFECTING ORAL HEALTHCARE ACCESS AMONG 4PS BENEFICIARIES

C. Silao, M.E. Cantor, J.F. Sudcalen, L.M. Diwag, H.S. Menendez, L.A. Obaldo, D.B. Simon, S.R. Susa, H.A. Tomas, University of Baguio, Baguio, PHILIPPINES

Objectives: The objective of this study was to determine the different factors influencing access to dental healthcare and to determine the extent of unmet dental needs among families of 4Ps beneficiaries.

Methods: This study used a quantitative-descriptive research design to investigate factors affecting oral healthcare access among 4Ps beneficiaries in Barangay Irisan, Baguio City. With a population of 208 family representatives, the study used a survey questionnaire and Likert scale to gather data. The Statistical Package for the Social Sciences was used for analysis, and the weighted mean values, standard deviation, and frequency were interpreted using Likert Scale.

Results: Most 4Ps beneficiaries in Barangay Irisan, Baguio City received dental health education in the local health centers but often avoided visiting dentists due to cost and lack of dentists. Home remedies like over-the-counter medications and saltwater rinses were used to manage dental problems. On structural factors, 4Ps beneficiaries moderately agreed on the oral health care provider's ability to provide services and have an organized delivery system, promoting access to oral healthcare. They have a moderately positive attitude towards oral healthcare, have average oral health literacy, attend monthly gatherings, and are regularly assisted by local health centers to avoid unsustainable and costly treatments.Overall, these factors moderately promote access to oral healthcare for 4Ps beneficiaries in Barangay Irisan Baguio City.

Conclusions: 4Ps beneficiaries receive dental education and consultations at local healthcare centers, but face challenges in visiting dentists due to high costs and lack of dentists in their community.They opt for home remedies like over-the-counter medications and saltwater rinses. Financial constraints prevent timely dental care as stated by the American Dental Association. However,beneficiaries are more confident in providing dental care for their children and have a moderate awareness of oral health.They have moderate oral health literacy in oral hygiene and healthcare.Local health centers provide dental services to avoid out-of-pocket spending. To improve accessible oral healthcare amenities, various dental procedures can be included in local health centers' services, with an increasing number of dental healthcare providers.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

ASSOCIATION OF ORAL HEALTH IMPACT WITH PSYCHOSOCIAL AND DENTIST-PATIENT FACTORS

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Objectives: Oral health is an essential component of overall health and well-being. In the biopsychosocial model of oral health, psychosocial factors and dentist-patient relationships (DPR) play a significant role in shaping oral health outcomes. This study aimed to examine the relationships between psychosocial factors, DPR, and oral health-related quality of life (OHRQoL) using a distal-to-proximal framework.

Methods: A random sample of 12,245 adults aged 18 years and above living in South Australia participated in the study. Data were collected through self-administered questionnaires in 2015-2016. Explanatory variables were categorized into psychosocial and DPR domains. The psychosocial domain consisted of well-being, social support, and health self-efficacy. The DPR domain comprised trust in dentists, satisfaction with dental care, and dental fear. The outcome variable was oral health impact, which measured OHRQoL.

Results: Data were analysed from 3,767 participants after screening and preparing responses (adjusted valid response rate 37.4%). Confirmatory factor analyses produced acceptable model fits and validity/reliability of each domain and full measurement model (Goodness of fit index=0.95, Comparative fit index=0.98, Root mean square error of approximation=0.04). The structural model in path analysis indicated trust was mediated by satisfaction (β=–0.14) and fear (β=0.19) for oral health impact. Well-being and self-efficacy had direct effects to the outcome with β=–0.12 and –0.07, respectively along with intermediate effects on DPR variables. The invariance of the final model was confirmed through cross-validation and multi-group analyses on participants' diverse characteristics except for the time since the last dental visit.

Conclusions: This study found the direct and indirect effects of psychosocial factors and DPR variables on OHRQoL in the conceptual framework. Psychosocial determinants are warranted for the promotion of health beyond clinical behaviour changes in the biomedical model.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

SENSE OF COHERENCE AND ORAL HEALTH-RELATED QUALITY OF LIFE

R. Chaichit, Preventive Dentistry, Faculty of Dentistry, Khon Kaen University University, Muang, Khon Kaen, THAILAND

Objectives: This study aimed to explore the association between Sense of Coherence (SOC) and the impact of oral health problem on daily life (Oral health-related quality of Life: OHRQoL).

Methods: A cross-sectional study was conducted among older adults in Udon Thani Province, Northeast Thailand. The participants consisted of 450 people aged 60 years old and above. The oral examination was conducted for dental caries (DMFT), periodontal disease (CAL) according to WHO criteria and occlusal condition (Eichner index). The questionnaire included demographic factors, socioeconomic information, oral health behaviour, Sense of Coherence (SOC) and the Oral Impact on Daily Performance (OIDP).The SOC outcome, dichotomized by the median of the total score was analyzed by multiple logistic regression adjusted for confounding factors.

Results: A total of 58.6 % of the respondents had one or more impacts on OIDP, and 47.3% showed a high SOC. The results showed those with high SOC and low SOC were 47.3% and 52.7 %, respectively, with an average score of 66.8 points, the lowest score of 28 and the highest score of 83. The binary analysis showed the association between SOC and OIDP in a subdomain and the total prevalence of impacts. The multiple logistic regression revealed that people with low SOC were 2.88 times more likely to affect oral health-related quality of life than people with high SOC (OR = 2.88,95%CI 1.23-4.32) adjusted for oral status and oral health behaviour.

Conclusions: This impact on OIDP was associated with a low SOC, even after adjusted by behavioral and clinical factors. Future studies should consider the SOC in determining the oral health impact on quality of life.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

INDIAN TAMIL PARENTS' NAVIGATING CLEFT LIP/PALATE CHALLENGES: PHENOMENOLOGICAL QUALITATIVE STUDY

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K. O P, Ramaiah University of Applied Sciences (RUAS), Banglore, INDIA

Objectives: To explore the unique challenges experienced by Indian Tamil parents of children operated for cleft lip and/or palate.

Methods: Participants: Parents of children aged 8-16 years with operated cleft lip and/or palate. Recruitment of participants: The recruitment was done with the line list provided by the Rashtriya Bal Swasthya Karyakram (RBSK) a national program to envisage Child Health Screening and Early Intervention Services. The study method used in this current study is Focus Group Discussion (FGD)-Qualitative approach. FGD was conducted with an interview guide focusing on experiences from anomaly scan, birth of the child upto surgery and follow up procedures. The data was recorded and transcribed. The transcribed data were analyzed with Colaizzi's qualitative method.

Results: A collective of 16 parents engaged in separate Focus Group Discussions (FGDs), each held in three distinct districts within the state of Tamil Nadu, India. An FGD took place at the District Early Intervention Centre situated within the Government Medical College in Thiruvarur district, while the other two FGDs were held at the Primary Health Centers located in Thiruvallur and Cuddalore districts. The themes identified were about the experience of giving birth to a cleft child, access to health care, anomaly scan counseling, reasons for the delay in surgery, family support, superstitious beliefs, feeding problems, the child's school experience to bullying/teasing, speech function and distress of the child, dental complaints, post-surgery experience, post-surgery support care and recommendations to the service providers.

Conclusions: This qualitative study delved into the lived experiences of parents whose children underwent cleft surgery and essential follow-up interventions, such as oral care, speech therapy, and psychological counseling were most neglected. By giving voice to their experiences, the study emphasizes the significance of adopting a comprehensive care strategy that addresses the holistic well-being of both the children and their families, encompassing their physical, psychological, and emotional needs.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

DOUBLE-BLIND STUDY EVALUATING DENTURE CALCULUS REMOVAL PROPERTIES OF VINEGAR SOLUTION

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S. Dechkunakorn, N. Anuwongnukroh, Department of Orthodontics, Faculty of Dentistry, Mahidol University, Bangkok, THAILAND|P. Tantivitayakul, Department of Oral Microbiology, Faculty of Dentistry, Mahidol University, Bangkok, THAILAND

Objectives: Lack of hygiene maintenance can lead to plaque and calculus formation on oral appliances which may lead to aesthetically unpleasing oral appliances as well as halitosis and oral infections. Previous in-vitro studies have shown vinegar solution has anti-microbial as well as can denture calculus removal properties. In this double-blind multicenter study, denture calculus removal property of a novel vinegar solution was investigated using in-vivo model on removable prosthetic dentures and orthodontic retainers.

Methods: Twenty-four patients were randomly assigned in 2 groups and instructed to immerse their oral appliances in either novel vinegar solution or reverse osmosis purified water (control) for 2 hours/session twice a week for 1 month. Representative surfaces of 17 prosthetic dentures obtained from 11 patients and 13 orthodontic retainers from 10 patients were analyzed for changes in denture calculus coverage following immersion using digital image-based planimetric analysis. Two-way ANNOVA was carried out to compare the mean difference in calculus removal according to the type of dental appliance and immersion solution ($p \leq 0.05$).

Results: The study showed that the novel vinegar solution had highly statistically significant differences ($p<0.01$) in mean denture calculus removal from both groups of removable dental appliance as compared to the control. Furthermore, there were no statistical differences in calculus removal between the two types of oral appliances when immersed in vinegar solution.

Conclusions: The use of vinegar as a denture cleansing solution proved to be significantly effective in removing denture calculus from both types of removable dental appliance as compared to the control. Therefore, vinegar can serve as a viable alternative denture cleansing agent.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

EFFECTIVENESS OF BRUSH DJ APP TO IMPROVE ORAL HYGIENE COMPLIANCE IN FIXED ORTHODONTIC APPLIANCES

Shilpa Gunjal[1], Christina Wong Yik Tin[2], Ng Hui Chin[2], Kirti Saxena[1]
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[2]School of Dentistry, International Medical University

Background: In this technology-based era, smartphones have gained an enormous position over the course of our daily lives, and the use of mobile application is on the rise. Thus, the provision of behavioural health interventions via mobile apps have become increasingly common.

Objectives: This study aims to assess the effectiveness of Brush DJ mobile app on improving the oral hygiene status of patients with fixed orthodontic appliances using plaque and gingival indices.

Methods: A single blinded, randomised controlled clinical trial was conducted on 60 orthodontic patients with fixed appliances, aged 15 to 35 years who volunteered to participate in the study. They were randomly assigned to one of the two groups to (a) group I: received only standard oral hygiene instructions; (b) group II: received standard oral hygiene instructions in addition to reminders through Brush DJ mobile application. Oral hygiene compliance of orthodontic patients was measured using modified plaque index and gingival index at baseline (T0), 4th week (T1), 8th week (T2) and 12th week (T3). Data were analysed using SPSS software version 27.0. Repeated measure ANOVA was used to test statistically significant difference within the groups with different time intervals. Independent test was used to compare differences between the groups.

Results: Repeated measure ANOVA revealed statistically significant differences within group I and group II at different time intervals for both PI and GI scores ($p<0.05$). Independent t-test showed statistically significant higher PI scores and GI scores at the end of 12 weeks in group I compared to group II ($p<0.05$).

Conclusions: The present study showed potential utility of the Brush DJ app for improving the oral hygiene of fixed orthodontic subjects.

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POSTER SESSION 1

BEHAVIORAL, EPIDEMIOLOGIC AND HEALTH SERVICES RESEARCH - 1

Thursday, 23 November 2023

CHILDHOOD STRESS AND ORAL HEALTH IN EARLY SINGAPORE CHINESE MIGRANTS

A.L. Goh, R. Hardiman, Melbourne Dental School, University of Melbourne, Melbourne, Victoria, AUSTRALIA|D. Manton, Center for Dentistry and Oral Hygiene, University of Groningen, Groningen, NETHERLANDS
C. Sim, National Dental Centre Singapore, Singapore, SINGAPORE
T. Dupras, College of Arts and Sciences, Texas Tech University, Lubbock, Texas, UNITED STATES

Objectives: The Bukit Brown Municipal Cemetery in Singapore was in use from 1922 to 1973, representing an ethnic Chinese migrant population from the late-19th to the mid-20th centuries. The aim of the study is to investigate the prevalence of enamel hypoplasia, caries, and calculus in the teeth of individuals exhumed during a road construction project. Enamel hypoplasia can provide a snapshot of childhood stress within the cemetery population, as these enamel defects occur during periods of physiological stress in early childhood. Likewise, the presence of caries and calculus can be an indicator of the level of oral health in the cemetery population.

Methods: A total of 107 individuals' teeth have been assessed for enamel hypoplasia, caries, and calculus. Only permanent dentition was assessed. Each tooth was assessed macroscopically for each pathology and was then scored either as present or absent for the pathology. Teeth that were too deteriorated to present any pathology were excluded and individuals with no teeth that were able to be scored were excluded from the sample. For enamel hypoplasia, individuals without anterior teeth and premolars were also excluded. Prevalence was calculated based on the percentage of affected individuals out of the total number of individuals that could be assessed for each pathology.

Results: Of the 107 individuals assessed, 70.30% showed some enamel hypoplasia (affected/number assessed=71/101), 84.62% showed evidence of caries (a/n=44/52), and 85.96% demonstrated presence of calculus (a/n=49/57). Within our assessed sample, there was a high prevalence of all three pathologies. Notably, the prevalence for caries and calculus in our sample are very similar.

Conclusions: This preliminary investigation highlights elevated levels of childhood stress and poor oral health among our sample of the early Chinese migrants in Singapore. The study will continue to assess more samples and further research will be conducted to elicit more data regarding degree of pathology, differences by tooth types, age or gender differences and changes over time.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

FAMILY-RELATED FACTORS CONTRIBUTING TO CHILDREN'S DENTAL FEAR AND ANXIETY

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Objectives: This study aimed to investigate the family-related factors that contribute to children's dental fear and anxiety and the strategies parents employ to minimize or avoid these negative emotions.

Methods: The research was conducted through a case study approach, utilizing qualitative research methods. An in- depth interview was conducted to fifteen (15) parents of sixth-grade pupils who have dental fear and anxiety. Thematic analysis approach in qualitative research was applied in treating the data gathered during the interviews.

Results: The study highlights the different family-related factors and their impact on children's dental fear and anxiety, and the strategies parents employ to mitigate these negative emotions. On the family-related factors that contribute to children's dental fear and anxiety, four themes emerged: lack of regular dental check-ups due to financial reasons, parental anxiety towards dental visits, personal history of dental fear, and witnessing a family member's painful dental procedure. Four themes from the impact of family-related factors on children's dental fear and anxiety were identified: lack of access to dental care due to financial constraints, influence of parental dental fear and anxiety, personal history of dental fear from childhood due to previous negative experiences, and influence of peers and social environment. On the strategies parents employ to minimize children's dental fear and anxiety, regular dental check-ups, getting used to visiting the dentist, and debunking myths surrounding dental procedures were identified as themes.

Conclusions: This study emphasizes the importance of addressing family-related factors that contribute to dental fear and anxiety in children. Dental professionals, parents, and caregivers can play a crucial role in promoting lifelong oral health and preventing the development of dental fear and anxiety in children. The study provides several implications for further research, including understanding the role of culture in dental fear and anxiety and developing new strategies and interventions to address this issue.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

BARRIERS IN UTILIZATION AND ACCESS OF DENTAL SERVICES FOR SHCN IN PAMPANGA

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Objectives: To analyze the relationship between the demographic profiles of the respondents and their perceived barriers and factors affecting the proper utilization and access of Dental Services for patients with Special Health Care Needs.

Methods: A cross-sectional study was conducted in San Fernando Elementary School Special Education Department, San Fernando Pampanga and carried out between May 2023 to June 2023. The survey questions were to be distributed using the Google form, directlyanswering on the said databased collection.

Results: the respondents agreed that there were 8 factors to consider as patient factor in considering the access of dental service. While there were 4 factors and barriers to consider in the utilization of dental services. Imply that age, employment, monthly income, and number of children may influence the assessment of the perceived barriers and factors.

Conclusions: Parents , guardians and caregivers of special healthcare needs patients in San Fernando Elementary School, SPED Department, perceived some difficulties accessing dental care services for individuals with special healthcare needs.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

HEALTHCARE PROFESSIONALS' FACILITATORS AND BARRIERS TO ORAL HEALTH PROGRAM FOR ANTENATAL MOTHERS : A QUALITATIVE SYSTEMATIC REVIEW

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Objectives: This review aims to synthesize the findings of qualitative investigations to evaluate facilitators and barriers among healthcare professionals to deliver preventive dental programs available to antenatal mothers.

Methods: Qualitative studies or qulitative studies with a mixed-method design and punlished in English were systematically searched within six databases (PubMed, Web of Science, Embase, MEDLINE Complete via EBSCOhost, APA PsycINFO via EBSCOhost, and Scopus). Thematic anakysis was implemented, and an inductive method was used to classify the indicated barriers and facilitators/opportunities inside a multilevel structure.

Results: Of 239 reports screened for eligibility, 9 studies were included in the synthesis with a total of 188 participants, categorized into dental professionals/providers (n = 67) and non-dental professionals/providers (n = 121). Most relevant elements were at the provider level; however, several factors were also tied to the provider's perception of the patient as well as the organization level. Level of oral health care knowledge among health care professionals/providers was the most common element in both barriers and facilitators. Healthcare professionals/providers stated that a lack of knowledge or understanding of oral health care was linked to their own training and education in the field and was cited as a major impediment. Alternatively, Oral health care training empowers health care professionals in assessing oral health, advocating for oral health care, and referring patients to oral health care practices.

Conclusions: Healthcare providers can enhance the oral health of expectant mothers but there is inconsistency in the evidence about how effectively these professionals execute recommended practices.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

PERCEPTIONS ON THE DELIVERY OF ORAL HEALTHCARE IN BAGUIO CITY

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Objectives: The purpose of this study was to determine the oral healthcare services rendered by the Local Government Units, assess the extent of implementation of oral healthcare services, determine the frequency of oral healthcare services given by the LGUs, assess the level of satisfaction of the residents on the delivery of oral healthcare services, and to discuss the implications of oral health promotion and delivery of oral healthcare services of the LGUs to its community citizens.

Methods: This study evaluated the extent of implementation, frequency and the level satisfaction of the residents who have undergone or availed oral health services in the Fifteen District Health Centers of Baguio City. The population is composed of 360 involved participants in which 24 residents in each district health centers are randomly selected. Likert scale was utilized to determine the level of agreement and satisfaction among the residents in each district health centers.

Results: The result of this study showed that the perceptions on the delivery of oral healthcare services of local government units in fifteen district health centers of Baguio City varies in terms of the extent of implementation of oral healthcare services which perceived a moderate result (with an overall mean of 3.00), In reference to the moderate level of satisfaction of the residents (with an overall mean of 3.02) although the 15 district health centers offer a set of oral healthcare services, Unfortunately only a few are being acquired by the residents, and for the level of frequency of oral healthcare services given by the LGUs, respondents agreed that the 15 district health centers regularly render their services that address their oral health concerns which scored highly (with an overall mean of 4.14).

Conclusions: For the most part of this study, It can be concluded that the lack of manpower (number of attending dentists per district, dental technician, and dental assistants), insufficient number of dental units, equipments and other resources, scheduling and cutoff time, and lacking of emphasis on the advocacies and promotion of the oral healthcare services in the community has a great impact on the perception of the residents with regards to the delivery of oral healthcare services of the LGUs in fifteen district health centers of Baguio City.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

FOOD INTAKE AND ORAL HYGIENE PRACTICES AMONG CHILDREN IN PHILIPPINES

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Objectives: This study determined the food intake, frequency of dental visit, and oral hygiene practices of children in a Barangay in Pasay City, Philippines.

Methods: Purposive sampling technique was implemented to gather one hundred (100) guardians 6-9 years old to participate in this study. Survey questionnaire were distributed to gather data on children's age, height, and weight. The children's Body Mass Index (BMI) were subsequently computed. Questions regarding the children's food intake, frequency of dental visit, and oral hygiene practices were answered in frequency scales. Data were reported using percentage.

Results: The result showed majority (39%) of the children are 6 years old. The remaining 26%,21%, and 14% of the respondents are 9,8, and 7 years old, respectively. Based on their Body Mass Index, majority (43%) of the children are underweight. The remaining 18% are overweight, 15% are obese, and 24% are healthy. Regarding food intake, 80% answered the children preferred to eat sweet food, while 20% don't prefer to sweet food. Furthermore, 96% answered that their children eat a variety of go, grow, and glow foods, while the remaining 4% do not. In terms of frequency of dental visit, most of the children (66%) have not gone to dental clinic even if they experienced dental problems, while 31% have visited a dental clinic at least once. Regarding oral hygiene practices, 33% of the respondents answered that they help the children in brushing their teeth, while 67% answered that they don't help the children in brushing their teeth. Meanwhile, 19% of the children use dental floss, and 81% don't. Furthermore, 31% of the children use mouthwash, while 69% don't.

Conclusions: The findings in this study indicate that the children in a Barangay in Pasay City, Philippines have poor diet and poor oral hygiene practices.

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POSTER SESSION 1
ORAL HEALTH RESEARCH -1
Thursday, 23 November 2023

DENTAL HEALTH STATUS OF PATIENTS ATTENDING THE UNIVERSITY IN VIETNAM

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Objectives: This study aimed to evaluate status of dental health and need of dental treatments among patients attending the Faculty of Odonto-Stomatology, University of Medicine and Pharmacy at Ho Chi Minh City from 2017 to 2020.

Methods: This retrospective study was conducted on 595 adult patient's dental records (254 males and 341 females) attending the Faculty of Odonto-Stomatology, University of Medicine and Pharmacy at Ho Chi Minh City for comprehensive dental care. Dental health status and data collection were evaluated by using World Health Organization criteria 2003.

Results: The prevalence of dental caries was found to be 93.28%. The mean DMFT index was 8.13 (± 6.31). A significant difference of mean DMFT and its each component was observed between the ages ($P < 0.05$). Additionally, 95.13% patient had gingivitis, and 30.42% had tooth wear. Treatment needs of periodontal disease presented a highest percentage (99.83%), including scaling treatment (84.04%) and non-surgical treatment of periodontal disease (9.24%). The results indicated that 94.62% patients needed filling due to their dental caires (87.9%) and their tooth wear (28.91%). Regarding clinically defined treatment needs, about 34.45% of participants required tooth extraction, 56.3% needed prosthodontic treatment, and 32.77% required pulp care.

Conclusions: This study comes out with the significant prevalence of dental caries and periodontal disease, and high treatment needs of those among patients attending the Faculty of Odonto-Stomatology, University of Medicine and Pharmacy at Ho Chi Minh City.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

INFLUENCE OF SHAPE AND RESTORATIONS ON NCCL UNDER CYCLIC STRESS

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Objectives: Resin composites are strongly recommended due to their good bonding abilities and cavity adaptation to the cyclic stress in Non-carious cervical lesions (NCCLs).

This study aimed to 1. compare the effectiveness and efficiency of conventional, and bulkfill flowable composite resin. 2. evaluate the performance and longevity of non-carious cervical lesions restoration using incremental and bulk-fill technique.

Methods: Simulation model: True-scale 3D model of the maxillary first premolar from CBCT images was used to model and analyze the distribution affected by various restoration patterns using Finite Element Analysis (FEA). In- vitro study: Extracted human maxillary first premolars were prepared with diamond bur to simulate NCCL. The teeth were prepared into horizontal-round shaped. The selected teeth were separated into 2 groups; (1) filled with Filtek™ Z350 XT using incremental technique and (2) filled with Filtek™ Bulk Fill Flowable using bulk-fill technique. Each specimen was subjected to a 60 N load at a frequency of 15 Hz for 4.8 million cycles. Then, the samples were scanned by micro-CT. Paired images were aligned and analysed using 3D slicer and ImageJ. 2D and 3D microleakages were calculated from the images. Statistical analysis were performed by SPSS.

Results: Simulation results revealed after restoration, there were no significant difference ($p<0.05$) between the two types of composite resins regarding effectiveness and efficiency. Likewise, there were no statistically difference ($p<0.05$) between incremental and bulk fill filling technique regarding longevity and performance.

Conclusions: The longevity of NCCLs restorations were not affected by filling techniques. Moreover, different types of composites have similar to no difference regarding microleakage and stress distribution. However, technique sensitivity and moisture control in clinical situation should also be considered.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

EFFECT OF REPEATED-FIRING ON COLOR-STABILITY OF CAD/CAM LITHIUM DISILICATE CERAMICS

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Objectives: To compare the color stability of three CAD/CAM lithium disilicate ceramics after repeated firings.

Methods: Square-shaped lithium disilicate specimens (n=10) were prepared according to the ISO. 6872/2015. They were IPS E.max CAD (EM), LiSi CAD (LS), and CEREC TesseraTM (TSR). Specimens were submitted to two firing cycles. The color was measured with a digital spectrophotometer on the white background according to ISO. 7491. The color difference was analyzed by two-way ANOVA at significant level of 0.05.

Results: After repeated two firing cycles, EM and TSR exhibited significant color differences at p values of 0.0006 and 0.0034, respectively. No color alteration was observed in LS (p=0.0755). Of the lithium disilicate ceramics, TSR exhibited the highest color difference, which was statistically significant difference compared to EM (p<0.00101) and LS (p=0.0002). However, no significant difference in color between EM and LS (p=0.5953).

Conclusions: LS promoted the greatest color stability after repeated firings compared to TSR and EM.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

ANALYZING RTV SILICONE TEAR STRENGTH WITH VARYING TITANIUM DIOXIDE FILLERS

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Objectives: This study aims to determine the influence of titanium dioxide as filler on the tear strength of Room- Temperature Vulcanizing (RTV) silicone at different percentage.

Methods: This in vitro study consisted of a control group and five study groups at different percentage (1%, 2%, 3%, 4% and 5%) of titanium dioxide by weight (w/w) mixed into the RTV silicone. A total of 30 angle samples were prepared for the tear test according to ISO 34-1 and tear strength was evaluated using the Universal Testing Machine (Schimadzu, Japan). Prior to testing, the thickness of each sample was measured three times using calliper and averaged. The testing speed of the jig was set for 500mm/min. The results of tear strength were recorded and analysed.

Results: Statistically significant difference in tear strength were found between different percentages of modified RTV silicone with titanium dioxide ($p<0.05$). Mann-Whitney U test noted difference between the 2%, 4%, 5% with the 3% group. The highest tear strength was recorded in the 3% group at median of 10.9N/cm whilst the lowest value was observed in the 5% group.

Conclusions: Titanium dioxide as a filler affects the tear strength of RTV silicone. Vulcanization with 3% of titanium dioxide by weight has improved the tear strength.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

MECHANICAL PROPERTIES OF RESIN COMPOSITE CONTAINING CALCIUM PHOSPHATE AND POLYLYSINE

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Objectives: The aim of this study was to assess the degree of monomer conversion (DC) and biaxial flexural strength (BFS)/modulus (BFM) of novel dental composites containing calcium phosphate and polylysine (Renewal MI, MI). The results were compared with a commercial resin composite (Filtek Z350 XT, Z350), conventional glass ionomer cements (EQUIA Forte, EQ; Fuji VII, F7), and resin-modified glass ionomer cement (Fuji II LC, F2).

Methods: DC of MI, Z350, and F2 after light-curing for 20 s were determined using ATR-FTIR (n=8). BFS/BFM of all materials after immersion in artificial saliva for 24 h were assessed using a ball-on-ring testing jig under a universal testing machine (n=8). Data were analyzed using one-way ANOVA followed by Tukey's multiple comparison test. The significance level was set at p=0.05.

Results: Mean DC of MI (57%) was comparable to that of Z350 (61%)(p=0.168). DCs of these materials were significantly lower than that of F2 (98%)(p<0.05). The highest BFS was obtained from Z350 (268 MPa). The BFS of MI (135 MPa) was comparable to that of F2 (109 MPa) but higher than EQ (50 MPa) and F7 (35 MPa). Additionally, MI exhibited a comparable BFM (3.2 GPa) to EQ (3.8 GPa) and F2 (3.6 GPa)(p>0.05). However, the modulus of MI was lower than Z350 (4.5 GPa).

Conclusions: The novel resin composite containing calcium phosphate and polylysine showed a comparable DC but lower strength than the commercial resin composite. The strength values were still comparable to or higher than that of glass ionomer cements. These properties could potentially help reduce secondary caries occurred with resin composite restorations.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

MICROHARDNESS AND SURFACE CHARACTERISTICS OF RESTORATIVE RESIN-COMPOSITE CONTAINING ORGANIC FILLERS

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Objectives: This research compared the surface microhardness and characteristics of restorative resin-composite containing with and without organic fillers.

Methods: Ten resin-composite blocks (4 mm × 4mm ×2 mm) were prepared using a standardized mold and light- cured following the manufacturers' recommendation for each type: MetafilCX, Fantasista V, and Clearfil AP-X ES2 containing organic fillers; Clearfil AP-X and Filtek Z350XT with inorganic fillers. After being embedded in a PVC tube using epoxy resin, a resin-composite block surface was wet polished with silicon carbide abrasive papers grit #400, #600, #1000, #1200 and 0.05 µm alumina paste, respectively, using a polishing machine. All polished specimens in each group (n = 10) were ultrasonically cleaned in distilled water for 15 min and immersed in 37 °C water for 24 h. Microhardness measurement using the Vicker hardness test was performed for all specimens with thirteen indentations, each indentation using 100 g of loading for 15 s. The surface characteristics of tested specimens were examined using a light microscope at ×500 magnification.

Results: Means±standard deviations of microhardness values (VHN) had statistically significant differences between groups except for Fantasista V and Clearfil AP-X ES2 groups using one-way ANOVA and Bonferroni multiple comparisons ($p < 0.05$). The resin-composite containing organic fillers, Fantasista V (46.88±3.85), Clearfil AP-X ES2 (44.12±3.07), and MetafilCX (32.06±2.99), had lower microhardness values than the ones containing only inorganic fillers, Clearfil AP-X (115.26±1.25) and Filtek Z350XT (89.89±2.67). However, the polished surface of MetafilCX and Fantasista V appeared smoothest compared with the other groups.

Conclusions: The results suggest that organic fillers reduce the microhardness value, but their high adhesion to the resin matrix leads to fewer fillers dislodgement and higher surface smoothness of polished restorative resin-composite compared with those without organic fillers.

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POSTER SESSION 1
DENTAL MATERIALS - 1
Thursday, 23 November 2023

MECHANICAL PROPERTIES OF DX UNIVERSAL NANO HYBRID COMPOSITE

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Objectives: The aim of the study is to evaluate the mechanical properties of a new dental composite material (DX Universal Nano Hybrid Light Cure Composite by DENTEX) using the standard set by ISO4049:2009.

Methods: Thirty three (33) specimens were prepared to test for depth of cure, flexural strength, water sorption and solubility. Preparation of test specimens, test conditions and procedures, apparatus and treatment of results followed strictly ISO 4049:2009(E).Data were analyzed using mean and standard deviations.

Results: Results shows that the depth of cure has a mean maximum depth of 2.55mm and a mean minimum depth of 1.89mm, for flexural strength the mean is 130.46Mpa, for water sorption the mean result is 16.44µg/mm while solubility has a mean=0.348µg/mm.

Conclusions: The parameters used in evaluating mechanicalproperties of the new nanohybrid composite materials are within the minimum and maximum standard requirement of a poly-based restorative material based on ISO 4049:2009. Further studies on the techanical properties of the new materials should be conducted supplemented by a long-term clinical trial for a more conclusive assessment of the new material.

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POSTER SESSION 2
DENTAL MATERIALS - 2
Thursday, 23 November 2023

SIZE OF ENAMEL-CRAZE-LINE AFFECTS ULTIMATE STRENGTH OF HUMAN FIRST PREMOLARS

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Objectives: To date, there is no conclusive treatment guideline for craze lines whether to immediately remove the craze line and restore or observe for further signs. This study evaluates the effect of width and depth of craze lines on the ultimate strength of permanent maxillary first premolars using an experimental approach.

Methods: Fifty sound human first premolar teeth were extracted and machined to create artificial craze lines using a CNC machine. The samples were divided into 5 groups based on their craze line depth (D) and width (W); no craze line (group 1), D 2 mm W 1 mm (group 2), D 4 mm W 1 mm (group 3), D 2 mm W 0.5 mm (group 4) and D 4 mm W 0.5 mm (group 5). The compression test was done using a universal testing machine and the contact area was measured using a stereo microscope. The tooth ultimate strength was calculated by dividing the maximum force the tooth could withstand before crack by the contact area.

Results: The experimental results showed that teeth with craze lines had significantly lower average ultimate strength (c.a. 200- 600 MPa), as compared with that of sound teeth (784 MPa). The craze depth had more effect on more on the tooth ultimate strength than the craze width.

Conclusions: Reduction in tooth ultimate strength indicated that such craze lines needed to be addressed immediately in order to prevent tooth failure (fracture). However, in a clinical situation, a much smaller craze line is often encountered. Further investigation on the smaller craze sizes could be fruitful to identify a benchmark of a craze size that does not need urgent restoration.

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POSTER SESSION 2
DENTAL MATERIALS - 2
Thursday, 23 November 2023

ACELLULAR 3D-BIOPRINTED ALGINATE-BASED BIOINK SCAFFOLDS FOR BONE TISSUE ENGINEERING APPLICATIONS

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Objectives: The aim of this study was to develop a 3D-printable, tricalcium phosphate (TCP)-based acellular scaffold using alginate, gelatin, and other composite materials. By utilizing a multivalent cation (Ca^{2+}) as a crosslinking agent, we aimed to achieve a specific shape suitable for bone tissue regeneration. We evaluated the physical and biological properties of scaffolds with varying alginate concentrations (10%, 12%, and 15%) combined with 5% TCP.

Methods: Our bioink was prepared with gelatin, glycerol, sodium alginate, and β-TCP powder. It was then homogenized, and loaded into a Cellink® BioX printer. The 3D scaffolds were printed and crosslinked with $CaCl_2$. Physical properties were assessed through viscosity analysis, SEM, EDS, FTIR, swelling/degradation rates, and contact angle measurements. Each test condition was performed on five samples of each scaffold type. For the biological assessment, MG-63 human osteoblast cells were seeded onto the scaffolds and cultured in osteogenic differentiation media. Cell viability was evaluated using the AlamarBlue assay, and alkaline phosphatase (ALP) activity was quantified. Osteogenic gene expression was analyzed using quantitative polymerase chain reaction (qPCR) to evaluate the osteogenic differentiation potential of the cells on the scaffolds. The data was analyzed using a two-tailed Student's t-test for statistical significance.

Results: The scaffold was composed of 10% alginate with β-TCP exhibited optimal printability, swelling capability, and degradability, making it conducive for cell growth and nutrient diffusion. These scaffolds effectively supported the growth and proliferation of MG-63 human osteoblasts, underscoring their potential applicability in bone regeneration. Furthermore, the inclusion of β-TCP particles significantly enhanced osteogenic differentiation, as evidenced by the upregulated expression of osteogenic gene markers (OC, OPG).

Conclusions: To sum up, the 10% alginate hydrogel with bone-like β-TCP is an appropriate acellular-based bioink candidate for scaffold fabrication. Its potential to enhance the repair of bone defects makes it a promising prospect in bone regenerative medicine.

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DENTAL MATERIALS - 2
Thursday, 23 November 2023

CELLULAR RESPONSES OF BIOGENIC SOURCE-DERIVED SCAFFOLDS PREPARED FROM FISH BONES

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Objectives: This study aims to investigate the biogenic source-derived scaffolds (BS) fabricated from Nile Tilapia bone (FB) on morphology, cytotoxicity, and migration of human periodontal ligament cells (hPDLCs).

Methods: The BS-FB was fabricated from Nile tilapia (Oreochromis niloticus) bones using thermal decomposition methods, with three different calcination temperatures (500, 600, and 700 °C). The attachment and morphology of hPDLCs cultured on the BS-FB were observed using a scanning electron microscope. Cell viability and proliferation were determined using the MTT assay according to ISO 10993-5:2009 at 1, 3, and 7 days. Cell migration was examined using a wound healing assay at 1, 3, and 7 days. The cell cultured without BS-FB were served as the positive control. The data were analyzed using one-way ANOVA followed by Tukey's post-hoc analysis, with a significance level of 0.05.

Results: hPDLCs cultured for 1, 3, and 7 days exhibited a spindle-shaped appearance and demonstrated good adhesion on the scaffold surface in all groups. According to the MTT assay, cell viability was significantly higher in BS- FB500, BS-FB600, and BS-FB700 compared to the positive control after 3 and 7 days ($p<0.001$). The wound healing assay revealed a significantly higher percentage of cell migration in BS-FB500, BS-FB600, and BS-FB700 compared to the positive control after 1, 3, and 7 days ($p<0.001$). Furthermore, BS-FB600 exhibited the highest percentage of cell migration compared to the other groups after 1, 3, and 7 days ($p<0.05$).

Conclusions: This study demonstrated that the BS-FB exhibits cellular biocompatibility with hPDLCs. Further studies should be conducted to investigate its physical, chemical, and mechanical properties, as well as its effects on the induced osteogenic differentiation of hPDLCs. Biogenic source-derived scaffolds fabricated from Nile Tilapia bones present a promising alternative for orthopedic biomedical applications and bone regeneration in the future.

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POSTER SESSION 2
DENTAL MATERIALS - 2
Thursday, 23 November 2023

PLANT-DERIVED IRRIGATION SOLUTIONS: EFFECT ON DENTIN MICROHARDNESS AND SMEAR LAYER

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Objectives: Several plant extracts have shown promise when used as irrigants or medicaments during root canal treatment due to their antimicrobial, anti-inflammatory, and therapeutic effects. This study aims to compare the effects of three plant-derived root canal irrigants, namely cat whiskers, clove and ginger, on dentine microhardness and smear layer removal.

Methods: Eighty-four extracted permanent single-rooted premolars were selected. Microhardness analysis was conducted using Vickers indenter on sixty decoronated roots. Root canal preparation was carried out prior to longitudinal resection of the root specimens and immersion for 5 minutes in six experimental and control solutions (n=10), namely: Group 1: 0.5 % ginger, Group 2: 2.5 % cat whiskers, Group 3: 0.05 % clove, Group 4: 2.5 % sodium hypochlorite (NaOCl), Group 5: 17 % ethylenediaminetetraacetic acid (EDTA) and Group 6: 0.9 % normal saline. Microhardness values were determined before and after immersion. Smear layer removal (n=24) at the coronal middle and apical root third was analysed using field-emission scanning electron microscopy analysis (FESEM). Data were analyzed using paired t-test, and mixed ANOVA with post hoc Tukey's HSD test.

Results: Ginger solution showed the highest reduction in dentin microhardness ($p < 0.05$) followed by EDTA, cat whiskers, clove, NaOCl and saline. Post hoc Tukey's HSD test did not show any statistically significant difference in the reduction of the dentin microhardness between all irrigants ($p > 0.05$). Normal saline showed the most occluded dentinal tubules with the presence of superficial debris, whilst the remaining groups showed few occluded dentinal tubules with superficial debris.

Conclusions: Within the limitations of this study all the experimental plant-derived root canal irrigants did not significantly alter dentin microhardness and had similar effectiveness to remove the smear layer as conventional irrigants.

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POSTER SESSION 2
DENTAL MATERIALS - 2
Thursday, 23 November 2023

CATIONIC CHITOSAN-BASED COMPLEXES OF CHELATING NANOHYDROXYAPATITE FOR PERIODONTAL BONE REGENERATION

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Objectives: The aim of this study is to fabricate a chitosan-based complex with antioxidant and cationic antibacterial abilities for periodontal bone regeneration.

Methods: Firstly, a favorite chitosan-catechol (CS-H)/collagen type I (Col I) mass ratio was filtrated by comparing the cytocompatibility, antibacterial and antioxidant activities of three groups of CS-H/Col I complex (CS-g-Col, CS-H/Col I mass ratio: 3/7, 5/5, and 7/3 wt%, n=3). Then, two groups of CSC-g-nHAp (nHAp concentrations: 15 and 30 mg/mL) were fabricated by CS-H chelating nanohydroxyapatite (nHAp) and binding Col I based on the filtrated CS-H/Col I mass ratio. Thereafter, the physicochemical properties, microstructure, cytocompatibility, and osteoinductive abilities of obtained CS-g-Col and CSC-g-nHAp were studied in vitro (n=3). Finally, the nude mice subcutaneous implantation model (n=6) and SD rat critical-sized periodontal bone defect model (n=4, depth×length×width: 2×5×2 mm3) were utilized to investigate the in vivoosteoinductive ability of CSC-g-nHAp. One-way analysis of variance (ANOVA) followed by Tukey post-hoc test was used to compare differences between groups.

Results: CSC-g-nHAp (CS-H/Col I: 5/5 wt%, nHAp concentration: 30 mg/mL) showed excellent cationic antibacterial activity, satisfied antioxidant ability, and great osteoinductive ability. This cationic complex mimics the nanostructure and composition of natural bone matrix to provide desirable microenvironments for stem cell migration and proliferation. It also presented a microenvironment-regulating ability due to the inherent antioxidant and cationic antibacterial activities of CS-H. More importantly, nude mice dorsal subcutaneous implantation demonstrated that CSC-g-nHAp promoted rat bone marrow mesenchymal stem cells osteogenic differentiation and induced significant biomimetic mineralization (BV=23.66±4.20mm3, BV/TV=40.78%±9.41%). Furthermore, after 8 weeks of implantation in rat critical-sized periodontal bone defect, 5.5-fold greater bone regeneration was observed in the CSC-g-nHAp group than in the untreated group ($p<0.0001$).

Conclusions: CSC-g-nHAp could regulate the microenvironment of bone defect areas through its synergistic antibacterial, antioxidant, and osteoconductive activities, is a promising bone substitute for periodontal regeneration.

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POSTER SESSION 2
DENTAL MATERIALS - 2
Thursday, 23 November 2023

FLUORIDE CONCENTRATION AND BIOLOGICAL EFFECTS OF CANNABIS-CONTAINED BEVERAGE

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Objectives: This study aims to investigate the fluoride concentration, cytotoxicity, and antimicrobial activity of commercially available cannabis beverages.

Methods: Fluoride concentration and pH were examined using a fluoride ion selective electrode and pH meter, respectively. L929 and primary human gingival fibroblast cells (hGF) were rinsed with test products for 2 min and subsequently cultured for 24 h. Cell viability was determined using an MTT assay. Antimicrobial activity against S. mutans was examined using a disk diffusion test.

Results: Sixteen commercially available cannabis-related beverages were examined. Fluoride concentration ranged from 0.0268 to 1.8233 mg/mL. Fourteen samples exhibited a pH lower than 5.5. Fourteen and thirteen products at 100% concentration demonstrated cytotoxicity to L929 and hGF, respectively. Only one product was toxic to L929 while four products showed cytotoxicity to hGF.

Conclusions: Most commercially available cannabis-contained beverages had a pH lower than enamel critical pH. The cytotoxicity and antibacterial effect may not relate to the cannabis component as different products contain other different supplemented ingredients.

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POSTER SESSION 2
ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

ANTIBACTERIAL PROPERTIES OF AGNCLS/PMAA FOR ARRESTING DENTAL CARIES

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Objectives: To assess the antibacterial properties of 20% AgNCls/PMAA against two bacterial strains associated with dental caries.

Methods: Streptococcus mutans and Lactobacillus acidophilus obtained from frozen stock were seeded onto blood agar plates. A single bacterial colony was used to inoculate 10 mL of BHI broth, incubated at 37 °C for 24 hours. The bacterial cells were harvested by centrifugation at 5,000 rpm, washed twice with phosphate buffered saline and their optical density was measured at 660 nm using a microplate reader. The cells were then diluted in phosphate buffered saline in 10-fold steps to a final dilution of 10-6. To evaluate Minimum Inhibitory Concentration (MIC), AgNCls/PMAA, was diluted two-fold from 20% to 0.03%; 100 µL of each two-fold dilution, 100 µL of bacterial culture and 100 µL of BHI were added to each well of a 96-well plate. Positive and negative controls were included. Growth was determined by measuring the optical density (OD) of each sample at 660 nm using a spectrophotometer. Agar diffusion tests (ADTs) were used to calculate the minimum bactericidal concentration (MBC) of the solution; 10 µL was removed from the 96-well plate, observed after 24 h of incubation at 37°C and placed onto the BHI agar plates separately, with MBC being the lowest concentration of the substance at which no colonies formed. The bacterial colonies were counted, and the measurements were repeated three times. Colony forming unit (CFU/mL) count was performed using the agar plate count method after incubation at 37 °C for 24 hours under anaerobic conditions.

Results: For MIC, a plateau of the bacterial growth inhibition phase was observed from the 1.25 % dilution upwards, confirming the strong antibacterial capacity of AgNCls/PMAA. MBC results showed 2.5% was the lowest concentration for killing most bacteria for both strains. Log CFU counts for both S. mutans and L. acidophilus in 1.25% AgNCls/PMAA groups were significantly lower than in the control groups ($p<0.01$).

Conclusions: AgNCls/PMAA presented a powerful antibacterial effect for S. Mutans and Lactobacillus even at low concentrations.

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ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

TOPICAL FLUORIDE-VARNISH SHIFTS DYSBIOTIC PLAQUE MICROBIOME TOWARDS EUBIOSIS IN CHILDREN

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Objectives: Fluoride varnish (FV) has been widely used as a caries-inhibitory agent to reduce the risk of caries development. FV application was found to significantly inhibit early childhood caries and reverse demineralization due to disturbances in dental plaque microbiology. This study aimed to investigate the effect of sustained fluoride release on the microbial diversity of dental plaque biofilms between 8-9-year-old children with mixed dentition using 16S rRNA gene sequencing.

Methods: Dental plaque samples collected from a clinical trial on caries in children were examined. The study population comprised 20 children aged 8–9 years who were diagnosed of having dental caries. FV was applied 1 month (once a week) to all subjects. Clinical parameters and demographic information of the subjects such as caries index (DMFT and dmft) were recorded at the baseline, salivary pH level and PHP index (Patient Hygiene Performance) were recorded at both baseline and after one month of the topical application of the FV. The plaque samples were collected both prior to (baseline) and after (one month) the topical application of the FV. Microbial diversity was further analyzed using 16S rRNA gene Next Generation Sequencing.

Results: After one month of FV application, the plaque microbiome has significantly shifted along with rare taxonomic for 37% ($p < 0.01$). Approximately 73% of the species that were significantly increased belong to the phylum Proteobacteria. It was shown that the significant differences in the composition dental plaque were caused by the reduction dental caries bacteria.

Conclusions: FV application led to a shift dental plaque biofilm from dysbiosis to eubiosis. Furthermore, weekly FV application for one month noticeably depleted certain established caries-causing bacteria while promoting the growth of rare, abundant genera primarily belonging to the Proteobacteria phylum, which may play a protective role in the progression of dental caries.

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ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

ASSESSMENT OF THE DENTAL PHOTOGRAPHY IMAGING AS DIAGNOSTIC TOOL FOR INCIPIENT PITS AND FISSURES CARIES LESIONS IN PERMANENT TEETH

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Objectives: The aim of this study is to assess the digital dental photography imaging as a diagnostic tool for detecting occlusal pits and fissures caries lesions in permanent teeth and compare it to the direct visual examination., To validate the actual scoring of pit and fissure caries lesions t on extract premolars teeth

Methods: Direct clinical examinations , Tooth surfaces were examined After carefully cleaning and drying.

Magnification dental loupe (X3.5 magnification) rusing ICDAS II to categorize the lesions, hypoplasia, erosion or tooth wear, fissure sealants, and restorations were excluded. PHOTOGRAPHIC IMAGES, All the images were photograph with a professional DSLR camera (EOS Canon 800D, f/2.8L Macro 100-mm lens) and Macro ring Flash YN14EX (YONGNUO) after tooth cleaning and drying. Photographs were taken in 1:2 magnification using f/23 aperture and 1/200 shutter speed based on the best results obtained from pilot testing.. All assigned teeth were evaluated clinically by the two AEGD residents and the two restorative consultants then re-examine the photographs blindly in a presentation room using a large screen.. HISTOLOGICAL EXAMINATION

The diagnostic validation of actual scores was performed by Downer histological examination. Sections were scored according to Downer histological examination as score 0 no enamel demineralization, score 1 enamel demineralization limited to the outer 50% of the enamel layer

Results: the data were analyzed using 2 way annova test for diffeent variables, the calibration between examiners have shown adequate agreenet for the incepient caries, all studied photographs have shown high sensitivity with great accuracy for detection the pits and fissures non cavitated lesions. the histological scaning for sectioned teeth have validated the accuracy of the images.

Conclusions: with in limitation of this clinical observation, the Cross-over analysis of clinical examination, Digital photography and Histological sectioned scanning. All have shown that professional digital dental photography could be used as an adequate and precise tool for detecting pits and fissure incipient caries

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ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

PHYSICAL/MECHANICAL PROPERTIES OF GLASS IONOMER CEMENT CONTAINING ELASTOMERIC MICELLES

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Objectives: This study assessed setting kinetic, biaxial flexural strength, and surface microhardness of the self- healing glass-ionomer cement containing elastomeric micelles (Deltafil; DF) and compared with the other commercial conventional glass-ionomer cements (EQUIA Forte HT Fil; EQ, Fuji IX GP extra; F9, and Ketac molar; KT).

Methods: Setting kinetic after mixing for 10 min was examined using ATR-FTIR (n=5). The biaxial flexural strength/modulus after immersion in water for 24 h was determined by a universal testing machine (n=8). The surface microhardness of the material after immersion in water for 24 h was performed using a Vickers microhardness tester (n=8). Data were analyzed using the one-way ANOVA followed by Tukey post hoc comparison.

Results: The calculated degree of acid-base reaction observed with DF (73.6 ± 4.4 %) was comparable to that of KT (71.0 ± 1%), F9 (73.1 ± 2.4 %), and EQ (70.1 ± 1.0 %) (Figure 1A). Additionally, DF exhibited a significantly higher BFS (61.8 ± 8.8 MPa) and BFM (3.3 ± 0.5 GPa) compared with other materials ($p<0.05$) (Figure 1B). The lowest BFS and BFM values were observed from F9 (34.8 ± 7.1 MPa) and EQ (2.4 ± 0.4 GPa), respectively (Figure 1C). DF showed the lowest surface microhardness (58 ± 3 VHN) compared to F9 (64 ± 6 VHN), EQ (63 ± 2 VHN), and KT (71 ± 1 VHN), respectively (Figure 1D).

Conclusions: Deltafil demonstrated a rapid acid-base neutralization but showed a similar final degree of acid-base reaction. The flexural strength of Deltafil was higher than other tested materials, but the surface microhardness was lower than other materials.

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ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

OUTCOME OF ENDODONTIC TREATED TEETH VS IMPLANT RESTORATION: SYSTEMATIC-REVIEW

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Objectives: The purpose of this systematic review was to compare the treatment and/or patient-report outcomes between endodontically-treated teeth and dental implant restoration. The primary aim was to determine which treatment modality offers more favorable outcomes in terms of treatment and/or patient-reported outcome

Methods: A literature search from three databases (PubMed, SCOPUS, and Cochrane Database of Systematic Reviews), published up to July 2024, were conducted. The review protocol was based on PI(E)CO. P (population) was the teeth with pulp and periapical disease, E (exposure) was endodontically treated teeth, C (comparison) was dental implant restoration, and O (outcomes) were the treatment and/ patient-reported outcomes (oral health-related quality of life, satisfaction). Randomized clinical trials, comparative clinical trials (CCTs), prospective, and retrospective study which directly compared between two treatments were included. A manual search was also performed. The quality of the studies was appraised using the modified Newcastle-Ottawa scale. Two reviewers (C.S., N.L.) independently screened and selected the studies based on specified inclusion criteria. Any disagreements were resolved with third reviewer.

Results: A total of nine retrospective studies met the inclusion criteria for this systematic review. These studies demonstrated that there was no difference in survival outcome between two treatment modalities. However, implant placement has a higher risk with further intervention required. Additionally, the overall OHRQoL of both treatments was not different, except for psychological discomfort and psychological disability that more frequently occurred in endodontically-treated tooth.

Conclusions: Both endodontic treatment and implant placement are recognized as valid and complementary treatment options. The decision to choose either treatment should be based on multiple factors, such as tooth's restorability, cost-effectiveness, and patient factors.

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ORAL HEALTH RESEARCH - 2
Thursday, 23 November 2023

AVENANTHRAMIDE-C SHOWS ALLEVIATE INFLAMMATION AND ALVEOLAR BONE LOSS IN PERIODONTITIS

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Objectives: Periodontal disease is a chronic inflammatory disease that leads to the gradual destruction of the supporting structures of the teeth including gums, periodontal ligaments, and alveolar bone. Recently, interests in alleviating symptoms of PD using natural compounds is increasing. Avenanthramide-C (Avn-C) is a polyphenol found only in oats. To date, the effect of Avn-C on PD pathogenesis has not been confirmed. Therefore, this study aimed to verify the protective effects of Avn-C on periodontal inflammation and subsequent alveolar bone erosion in vitro and in vivo.

Methods: To elucidate the effect of Avn-C on periodontal inflammation, we treated human GF and periodontal ligament (PDL) cells with different doses of Avn-C and examined the expression levels of inflammatory factors under in vitro periodontal pathological conditions by qRT-PCR. The total protein expression and phosphorylation level of three MAP kinases, namely, the ERK, p38 MAPK, and JNK, were determined in IL-1β-treated human GF. To explore the role of Avn-C in PD in vivo, we administered Avn-C to the ligature-induced PD mouse model via intra-gingival injection. The alveolar bone loss was evaluated as the cementum-enamel junction (CEJ) to alveolar bone crest (ABC) distance measured via μ-CT or histological analysis.

Results: Upregulated expression of catabolic factors, such as MMP1, MMP3, IL-6, IL-8, and COX2 induced by LPS and proinflammatory cytokines, IL-1β, and TNF-α, was dramatically decreased by Avn-C treatment in human gingival fibroblasts and periodontal ligament cells. Moreover, alveolar bone erosion in the ligature-induced PD mouse model was ameliorated by intra-gingival injection of Avn-C. Molecular mechanism studies revealed that the inhibitory effects of Avn-C on the upregulation of catabolic factors were mediated via ERK kinase and NF-κB pathway that was activated by IL-1β or p38 MAPK and JNK signaling that was activated by TNF-α, respectively.

Conclusions: Based on this study, we recommend that Avn-C may be a new natural compound that can be applied to PD treatment.

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CLINICAL AND RADIOGRAPHIC ASSESSMENT AROUND DENTAL IMPLANT: A CROSS-SECTIONAL STUDY

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Objectives: The aim of this study was to assess the peri-implant tissue clinically and radiographically, a minimum of a year after loading time.

Methods: This cross-sectional study included fifty-eight patients (20 males, 38 females; mean age, 51.78±10.115 years) treated between 2015 and 2019. These patients received 91 tissue- and bone-level Straumann® dental implants (mean implant life 3.64±1.465 years, ranging from 1-6 years). The patient's demographic and implant details were extracted from the patient's records. All patients were examined by a calibrated examiner in relation to the following implant-associated parameters: plaque score, bleeding on probing (BOP), probing depth (PD), and recession. The marginal bone loss was measured at mesial and distal aspects of the implants on standardized intraoral periapical radiographs (IOPa) by comparing the radiograph at the study time with the baseline radiograph taken immediately after loading. Data were analyzed by using Multiple linear regression and Pearson coefficient ratio.

Results: The results showed only 29.7% of patients had good oral hygiene with a plaque score of less than 10%. However, only 3.3% of implants were noted with plaque accumulated at the implant surfaces. The mean BOP recorded was 18.34±24.21% with the probability sites with PD less than 4 having BOP was 43.21% and the odds ratio 0.286 ($p<0.001$). There was no significant difference in the probability of BOP observed in terms of gender (male or female), implant location (anterior and posterior), or implant type (tissue level or bone level) with $p>0.05$. The mean of distal and mesial vertical alveolar bone loss was 0.388±0.593 mm and 0.347±0.515 mm, respectively. The evidence of bone loss was 0.033 mm and 0.008mm bone with increments of 1 year, at distal and mesial sites, respectively.

Conclusions: Clinical and radiographic assessment of dental implants after 1-6 years in function showed promising results, especially in well-maintained implants.

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ORTHODONTICS RESEARCH
Thursday, 23 November 2023

IDNAM: ADVANCEMENTS IN CRANIOFACIAL CLEFT CARE THROUGH CAD/CAM

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Objectives: In recent years, the use of Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) to produce Nasoalveolar molding (NAM) appliances has emerged as a new paradigm for presurgical infant orthopedics. This technique can simplify the NAM procedure, save time, and allow for reproducibility which will eliminate the limitations of the conventional method. However, using new technology also entails expensive CAD software, and technological skill. Besides, a nasal stent is still manually incorporated into the NAM plate, depending on the treatment modality. The purpose of this study is to introduce an individualized Digital NAM (iDNAM), a complete digital workflow of NAM therapy, and to evaluate the changes in alveolar ridges and nasolabial morphology after treatment with iDNAM.

Methods: Seven infants with complete UCLP underwent PSIO therapy using iDNAMs. Intraoral and extraoral scans were performed to create a virtual maxillary model and a 3D facial scan. Maxillary segmentation, alveolar ridge approximation, and plates design were done virtually. A nasal extension was then digitally incorporated into the second plate, along with a novel method for nasal activation. Alveolar ridges and nasolabial soft tissue outcomes were measured in 3-dimension at initial (T1) and pre-surgical (T2) time points, enabling a comparative analysis to assess the efficacy of iDNAM.

Results: Two iDNAM plates were used as part of the treatment protocol. The changes in the alveolar ridge were as follows. The mean alveolar cleft gap reduction was 8.28 ± 1.22 mm. Length of the greater segment and lesser segment, and posterior arch width increased by a mean of 1.14 ± 1.49 mm, 3.48 ± 1.36 mm, and 2.72 ± 2.59 mm, respectively, while intercanine width decreased by 1.59 ± 1.92 mm. Nostril height on the cleft side, columellar length, and nose projection increased by a mean of 1.84 ± 0.59 mm, 2.60 ± 0.33 mm, and 2.42 ± 0.96 mm, respectively, while nostril width on the cleft side was reduced by 0.93 ± 3.67 mm. The mean improvement in nasal base-columellar angle was 19.86 ± 8.85 degrees.

Conclusions: iDNAM effectively reduced the alveolar cleft gap and improved nasal morphology in patients with complete UCLP. iDNAM offers a complete digital workflow in NAM therapy with minimal number of CAD/CAM NAM plates and digitally incorporated nasal stent.

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POSTER SESSION 2
ORTHODONTICS RESEARCH
Thursday, 23 November 2023

VARIED ORTHODONTIC TIPPING AND TORQUE EXPRESSIONS AT DIFFERENT INTERBRACKET DISTANCES

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Objectives: The tipping and torque bends are essential factors in finishing orthodontic cases. Tooth morphology and interbracket distance may influence the tipping and torque expressions but studies pertaining to this subject are limited. The purpose of this study was to investigate the effect of interbracket distance on tipping and torque expression in preadjusted orthodontic brackets.

Methods: One hundred thirty-five (135) pre-adjusted orthodontic brackets of McLaughlin, Bennett, and Trevisi (MBT) prescription with a slot of 0.022- inches for central incisor, lateral incisor and cuspid were used. The brackets were mounted on acrylic plexiglass sheet with different interbracket distances of eight (8), four (4), and six (6) mm per group. A 0.021x0.025-inches stainless steel arch wire was engaged to the brackets and uniformly tied with a of 0.009-inches stainless steel ligature wire. A Universal Testing Machine (INSTRON 3360, USA) was utilized to evaluate the resistance force to sliding (frictional force) of each group to produce friction values. Those values were computed and analyzed using the mathematical rule of proportions

Results: Interbracket distance affects the tipping and torque values of MBT prescription, such that, the tipping and the torque bends have a direct proportional relationship with frictional force (resistance to sliding) with α value = 0.05.

Conclusions: Conclusively, it may be said that interbracket distance affects the tipping and torque values of MBT prescription, such that, the tipping and the torque bends have a directly proportional relationship with frictional force (resistance to sliding), such that when IBD is increased/decreased by two (2) mm, the tipping values may increase/decrease by two (2) degrees and torque values may increase/decrease by three (3) degrees

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ORTHODONTICS RESEARCH
Thursday, 23 November 2023

Success Rate of Orthodontic Traction of Impacted Teeth Involving GCB

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Objectives: To investigate the success rate of orthodontic traction of impacted teeth involving gold chain bonding (GCB) procedure.

Methods: Orthodontic patients who had GCB procedure performed in National Dental Centre Singapore (NDCS) between 2014 and 2021 were included in this study. Historical records of these patients' Orthopantomograms and electronic medical records were evaluated to determine the diagnosis of impacted teeth, performance of GCB procedure, and documented success or failure of eruption of the impacted teeth.

Results: Overall success rate of GCB procedure was 93.3% in NDCS. There was no significant difference in success rate between male (92.9%) and female (93.8%) groups. There was also no significant difference in success rate found between Chinese (93.2%), Malay (94.4%) and Indian (91.7%) ethnic groups.

Conclusions: Orthodontic traction of impacted teeth involving GCB procedure is highly predictable across different genders, age groups and ethnic groups. Further research will be needed to investigate other variables affecting success rate of this procedure.

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ORTHODONTICS RESEARCH
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OVERJET AND VERTICAL SKELETAL PATTERN IN MODIFYING PERIORAL SOFT TISSUE

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Objectives: This pilot study aimed to investigate the effect of overjet and vertical pattern on perioral soft tissue area.

Methods: Sixty pre-treatment lateral cephalograms of skeletal Class II patients were equally allocated into six groups of ten according to overjet (OJ) (normal OJ (NOJ=1-3mm) and increased OJ (IOJ=4-6mm)) and skeletal divergence (hypodivergence (Hypo), normodivergence (Normo), and hyperdivergence (Hyper)): NOJHypo, IOJHypo, NOJNormo, IOJNormo, NOJHyper, and IOJHyper, then measured randomly using Dolphin Imaging program and ImageJ. One- way ANOVA and Tukey's HSD were used to compare parameters among groups ($p<0.05$).

Results: Upper incisors (UI-NA(deg)) in NOJHyper (mean±SD= 21.50±7.33°) were significantly more retroclined than IOJHypo (30.30±4.86°) and IOJHyper (32.00±4.67°)($p=0.033$ and $p=0.006$, respectively). NOJHypo (23.62±7.19°) was also significantly more retroclined than IOJHyper ($p=0.049$). Protrusion of UI (UI-NA(mm)) was significantly greater in IOJHypo (8.99±1.87mm) and IOJHyper (8.37±1.98mm) when compared with NOJHypo (5.27±2.90mm) and NOJHyper (5.00±3.04mm) ($p=0.016$ and $p=0.037$, respectively). Meanwhile, NOJNormo and IOJNormo were similar regarding UI inclination and position. Lower vermilion lip thickness (LVLT) was significantly greater in IOJ groups between NOJHypo/IOJHypo (12.40±1.71mm/15.90±3.28mm), NOJNormo/IOJNormo (11.60±2.50mm/15.40±2.80mm), and NOJNormo/IOJHyper ($p=0.021$, $p=0.009$, and $p=0.044$, respectively). A significantly more backward position of the soft tissue pogonion (Pg-SnTVP) increased with hyperdivergence and OJ (NOJHypo(-4.80±2.82mm)/ NOJHyper (-9.40±2.80mm), NOJHypo/IOJHyper(-11.00±4.06mm), IOJHypo (-6.40±3.57mm)/ IOJHyper, and NOJNormo(-6.00±2.21mm)/IOJHyper ($p=0.024$, $p=0.001$, $p=0.024$, and $p=0.011$, respectively). A deeper mentolabial sulcus depth (MSD) was found between NOJNormo (-4.30±0.95mm) and IOJNormo(-6.48±1.06mm)($p=0.005$).

Conclusions: OJ affected LVLT in Hypo and Normo group, however Hyper group was not affected which might have to do with mandibular and lower lip position. Having IOJ together with hypodivergence exhibited a more forward position of lower lip and chin. MSD could be influenced by UI. NOJ of varying divergence did not show any significant difference except for a more backward chin position caused by a smaller SNB angle and hyperdivergence.

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ORTHODONTICS RESEARCH
Thursday, 23 November 2023

INCISOR-LIP CHANGES AFTER RETRACTION IN SKELETAL TYPE I/II BIMAXILLARY PROTRUSION

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Objectives: To identify the changes of incisors and lips after the retraction in skeletal type I (BM1) and II (BM2) bimaxillary protrusion patients and compare between groups.

Methods: 30 adult bimaxillary protrusion patients (15 in BM1 and 15 in BM2) with four premolars extracted followed by anterior retraction were investigated. Pretreatment (T0) and posttreatment (T1) cephalograms were traced and digitized. Paired and independent t-tests were performed for statistical comparisons within and between groups at $p<0.05$.

Results: For the incisor change, the changes of upper and lower incisor inclination were significantly different between BM1 and BM2 ($p<0.001$). The inclination reduction of upper and lower incisors in BM1 were -9.14±2.09 and - 9.87±3.85, and -4.80±1.97 and -12.67±1.99 in BM2, respectively. However, there were no statistically significant differences in amount of upper and lower incisor retraction between groups ($p=0.212$ and $p=0.087$ respectively). For the change of lips, the lower lip retraction and lip-chin-throat angle (LCTA) reduction in BM2 was greater than BM1 significantly ($p<0.001$). The changes of lower lip and LCTA were -2.89±0.82 mm and -11.96±6.06 in BM1, and -3.63±0.55 mm and -17.04±5.91 in BM2, respectively. Nevertheless, there were no significant differences in upper lip change and nasolabial angle (NLA) between BM1 and BM2 ($p=0.862$ and $p=0.174$ respectively).

Conclusions: The patterns of incisor retraction were different between BM1 and BM2. After treatment, upper incisors were more retroclined in BM1 than BM2, while lower incisors were more retroclined in BM2 than BM1. However, the change of upper lip in both groups were not significantly different, while the lower lip protrusion was reduced more in BM2 when compared to BM1.

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POSTER SESSION 2
ORTHODONTICS RESEARCH
Thursday, 23 November 2023

QUANTITATIVE ANALYSIS OF THE PAIN PERCEPTION OF PATIENTS UNDERGOING FIXED ORTHODONTIC THERAPY

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Objectives: In the current orthodontic treatment scenario, there is a significant focus on researching newer treatment options, techniques, and modalities to accelerate orthodontic treatment. There is also a need to decrease treatment times due to the usual side effects associated with prolonged treatment times, such as tooth decay, gingival recession, alveolar bone loss, root resorption, and pain. Pain significantly discourages potential patients from opting for fixed orthodontic treatment. This study explored pain and outcome-related perception associated with the various stages of fixed orthodontic treatment among patients at the University of Puthisastra Dental Hospital in Cambodia.

Methods: This was a quantitative study in which the convenience sampling method was employed and 104 patients receiving fixed orthodontic treatment at the University of Puthisastra Dental Hospital were interviewed for data collection purposes. The patients were interviewed over 15 minutes each and asked a series of 29 questions. The results were collected, organized, and analyzed using SPSS version 25.0 (IBM Incorporation, NY, USA).

Results: It was observed that approximately one-third (38.35%) of the participants were not aware before the treatment that the placement of separators and bands would be painful. It was also seen that 38.50% of the respondents did not know that the placement of bands would be painful. The study results also showed that 40.5% of the participants expected that there would be mobility of the teeth after treatment. A high percentage of patients (30%) thought that their faces would change a lot due to treatment, while they may lose weight during fixed orthodontic therapy, while 22.2% of the patients were expecting a profile change at the end of treatment.

Conclusions: According to the findings of this study, the existing orthodontic treatment-related knowledge and pain perception were found to have a significant effect on individual patient participation, which could directly impact the success of orthodontic treatment.

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POSTER SESSION 3
ORAL HEALTH RESEARCH - 3
Friday, 24 November 2023

EDENTULISM AND DENTURE NEEDS OF HOME-BOUND AND INSTITUTIONALIZED ELDERLY

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Objectives: To determine tooth loss, denture wear, and denture treatment needs in the home-bound and institutionalized elderly.

Methods: Participants ≥60 years old, either nursing home residents or home-bound (cared for by a home medical team), were recruited. Clinical oral examination and denture assessment for retention, stability, and occlusion were done. Prevalences of tooth loss and denture wear were reported. Univariable logistic regressions were performed to identify groups of elderly more likely to wear dentures.

Results: 170 participants were recruited (62 home-bound, 108 nursing home residents; 52.4% female; mean age 79.5). 7.6% were cognitively impaired and a majority (80.6%) required assistance with at least one activity of daily living (ADL). Mean number of teeth present was 6.4. 43.5% of participants were completely edentulous, 45.3% had 1- 19 remaining teeth, and 11.2% had ≥20 remaining teeth.

67.1% of participants did not wear dentures. 37 wore both upper and lower dentures, while 19 wore only upper dentures. Majority of the dentures (79.6%) were complete dentures. 48.2% of upper dentures and 54.1% of lower dentures were unsatisfactory, requiring repair (n=11), reline (n=13), and replacement (n=23). Denture stomatitis was reported for 21.4% of upper denture wearers and 8.1% of lower denture wearers.

Participants were more likely to wear an upper denture if they were ≥80 years old (OR=4.37, p=0.012), had 3-6 missing anterior teeth (OR=6.04, p=0.019), or had ≥9 missing teeth overall (OR=5.74, p=0.022). Participants with more teeth were less likely to wear a lower denture (1-19: OR=0.03, p<0.001; 20-28: OR<0.01, p<0.001). The odds of wearing a lower denture was 84% more with every increase in number of missing teeth (OR=1.84, p=0.008). No significant difference in denture wear was found when comparing cognitive status and need for assistance with ADL.

Conclusions: Despite the high prevalence of edentulism among the home-bound and institutionalized elderly, the majority did not wear dentures. Half of dentures examined required modification or replacement. Elderly with more missing teeth were more likely to wear a denture.

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POSTER SESSION 3
ORAL HEALTH RESEARCH - 3
Friday, 24 November 2023

ASSESSMENT OF ORAL FRAILTY AMONG PATIENTS WITH STROKE

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Objectives: Oral frailty among stroke patients refers to the vulnerability and weakness of oral health and function that can occur as a result of a stroke. Research on oral frailty, represented by oral functional decline, among stroke patients, has been rarely published. In Korea, an expert consensus has been reached on the diagnostic criteria for oral frailty. The study aims to assess oral frailty in stroke patients.

Methods: The study participants were obtained from departments of rehabilitation medicine, neurology clinics, nursing homes, and daycare centers. Based on the following diagnostic criteria, oral frailty was diagnosed when functional impairment was observed in two or more out of a total of six items: 1) masticatory function(MF)<level 3, 2) Maximum occlusal force(MOF)<500N, 3) maximum tongue pressure(MTP)<20kPa, 4) oral dryness (OD)≤27.9, 5), Modified Water Swallowing Test(MWST)≤2, and 6) oral health assessment tool(OHAT)=score 2. We assessed "risk" based on six criteria, analyzed the risk within the group, and conducted an analysis of oral frailty.

Results: A total of 50 individuals participated in this survey, of which 57.4% were male and 42.6% were female (Average age: 67). The risk for MF was 34.2%, for MOF was 56.8%, for MTP was 31.4%, for OD was 24.3%, for MWST was 0%, and for OHAT was 65%. The prevalence of overall oral frailty was 28.1%. In particular, there was a strong correlation between the sum of the six oral frailty items and MTP($r=-0.698$, $p<0.001$). Additionally, age($r=0.385$, $p<0.032$), MF($r=-0.562$, $p=0.001$), MOF($r=-0.579$, $p<0.001$), and OD($r=-0.484$, $p=0.005$) exhibited significant correlations.

Conclusions: Stroke patients were experiencing a lower oral frailty level than normal individuals. Collaboration that encompasses both systemic and oral frailty aspects from medical and dental standpoints is necessary. In the future, there is a need for specialized strategies and clinical trial research focusing on oral frailty in stroke patients.

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POSTER SESSION 3
ORAL HEALTH RESEARCH - 3
Friday, 24 November 2023

GROWTH MEDIA EFFECT OF CANDIDA SPECIES AND STAPHYLOCOCCUS AUREUS CO-AGGREGATION

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Objectives: This study aimed to elucidate the aggregation ability of six different species of Candida spp. with S. aureus in four different growth media.

Methods: Candida auris (ATCC MYA-5002), Candida albicans (ATCC MYA-4901), Candida lusitaniae (ATCC 64215), Candida dubliniensis (ATCC MYA-2975), Candida parapsilosis (ATCC 22019), and Candida glabrata (ATCC 90030) and S. aureus (ATCC 25923) were cultured in RPMI-1640, yeast extract peptone dextrose (YEPD), Sabouraud dextrose (SD) and Brain Heart Infusion-Yeast Extract (BHIYE) broth. Meanwhile, S. aureus was grown in Brain Heart Infusion (BHI) broth. Then, Candida spp. and S. aureus were standardised in co-aggregation buffer to 10^6 cells mL^{-1} and 10^7 cells mL^{-1}, respectively. Auto-aggregation was determined by measuring the absorbance difference at 620 nm (ΔAbs) between 0 h and 1 h at room temperature of a similar kingdom in a different vial. In contrast, co- aggregation was determined by combining two kingdoms in the same vial.

Results: C. glabrata had the highest auto-aggregation in RPMI-1640 (2.54±0.09%), SDB (4.47±0.13%), and BHIYE (10.81±0.45%), respectively, when compared to other Candida spp. In addition, all Candida spp. exhibited decreased co-aggregation in RPMI-1640 when co-cultured with S. aureus. Finally, only C. auris and C. parapsilosis exhibited increased co-aggregation scores in BHIYE (0.22±0.00%) and SDB (1.04±0.02%), respectively, compared to auto- aggregation.

Conclusions: In conclusion, Candida spp. interact antagonistically with S. aureus except for C. auris and C. parapsilosis grown in BHIYE and SDB, respectively.

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POSTER SESSION 3
ORAL HEALTH RESEARCH - 3
Friday, 24 November 2023

ORAL MICROBIOTA ALTERATIONS: AGE-BASED IMPLICATIONS FOR DISEASE DETECTION

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Objectives: Based on the 2020 National Development Commission's data, Taiwan transitioned into an aging society in 2018, and is projected to become super-aged by 2025. The aging process typically follows a trajectory from health to sub-health, weakness, disability or dementia, serious illness leading to bedridden state, and ultimately death. Thus, early intervention during the stage of physical weakening can prevent or delay the onset of disability. Oral health is intrinsically linked with general health, and dysbiosis of the oral microbiota can contribute to both dental and systemic diseases. Consequently, there is a necessity for appropriate health screening tools or highly applicable medical technologies in community settings to facilitate early detection of disease risks. In the context of these realities, the aim of this study is to investigate the alteration in oral microbiota that occur during the aging process.

Methods: We employed next-generation sequencing (NGS) to delineate the oral bacterial composition and relative abundance in three distinct groups: 20 young adults, 20 healthy older individuals, and 20 long-term care patients with nasogastric tubes. Tongue samples were collected using swabs, and following DNA extraction, we characterized the microbial compositions, taxonomic classifications, and both alpha and beta diversity of these samples.

Results: The microbiota from the three groups exhibited distinct diversity and homogeneity, as well as unique bacterial species. Both the heatmap and principal component analysis (PCA) highlighted significant differences among the groups. Notably, the young adults' group demonstrated a higher abundance of taxa within the order Saccharimonadales, whereas genera such as Prevotella and Veillonella were more abundant in the healthy elderly group. Conversely, the group of patients utilizing nasogastric tubes showed an elevated abundance of bacteria within the genera Corynebacterium and Pseudomonas.

Conclusions: Differences in oral microbiota composition from youth to frailty highlight potential avenues for developing community-based screening tools and technologies for early disease detection and prevention.

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POSTER SESSION 3
ORAL HEALTH RESEARCH - 3
Friday, 24 November 2023

LACTOBACILLUS-REUTERI ATTENUATES ENTEROCOCCUS-FAECALIS VIRULENCE GENES IN FIXED ORTHODONTIC PATIENTS

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Objectives: Enterococcus faecalis, a pathogen in dental plaque biofilm associated with antimicrobial-resistance may increase in patients wearing fixed orthodontic appliances. The aim of this study was to determine the effect of consuming lozenges containing the probiotic Lactobacillus reuteri on the expression levels of E. faecalis virulence genes (gelE, atlA) in dental plaque biofilms of patients wearing fixed orthodontic appliances.

Methods: Dental plaque samples were obtained from 20 subjects before and after consuming L.reuteri probiotic lozenges (Biogaia, Stockholm, Sweden) dose of $2x10^8$ CFU/ml, once a day for two weeks. Subsequently, RNA was extracted cDNA was synthesized and subjected to RTqPCR using specific primers for gelE and atlA genes of E. faecalis. Housekeeping gene rpoA was used as the reference. Statistical analysis was performed using Shapiro-Wilk normality test ($p>0.05$), and paired t-test with $p<0.05$ as level of significance.

Results: Expression of gelE and atlA genes were found to be decreased after the subjects consumed the probiotic L. reuteri for two weeks. However, there was no statistically significant difference ($p<0.05$)

Conclusions: Consumption of probiotic L. reuteri may help reduce the E. faecalis virulence genes in dental plaque biofilm of patients using fixed orthodontic appliances. However, further research is needed to optimize the probiotic intervention protocol to maximum the beneficial effect.

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POSTER SESSION 3

ORAL HEALTH RESEARCH - 3

Friday, 24 November 2023

PRESENCE OF CANDIDA, MUTANS STREPTOCOCCI, AND LACTOBACILLI IN THAI PARTICIPANTS

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Objectives: To investigate the presence of Candida, Mutans streptococci and Lactobacilli in a group of patients who attended the oral cancer (OC) and oral potentially malignant disorders (OPMDs) screening in local district hospital located in the northeastern region of Thailand.

Methods: Convenient participants residing in the lower northeastern districts of Thailand who attended the oral cancer screening were enrolled. A questionnaire retrieving demographic characteristics, risk factors of oral cancer, and risk of having xerostomia was completed. Oral examination was performed by oral medicine specialists or oral surgeons. Four groups of participants were categorized according to clinical diagnosis. These groups included the normal oral mucosa (NOM), the OPMDs/OC, the non-OPMDs/OC and the clinically suspected of oral candidiasis (CSOC) groups. Stimulated salivary flow rate was measured. Dip-slide test was performed using stimulated saliva in each participant to evaluate the presence of Candida, Mutans streptococci, and Lactobacilli. The levels of these 3 organisms were categorized into high and low levels according to the score received from the dip-slide test.

Results: A total of 599 participants were recruited. Approximately 50% of participants in the CSOC groups compared to 20%-30% of participants in the other groups had high Candida levels. For Mutans streptococci, 20-27% of participants in the 4 groups had high levels of Mutans streptococci. Twelve percent of participants in the CSOC group had high levels of Lactobacilli whereas 4%-6% of participants in the other groups had high Lactobacilli levels. The mean levels of Candida and Lactobacilli were also highest in the CSOC groups compared to the other groups.

Conclusions: Higher number of participants in the CSOC groups had high level of Candida and Lactobacilli. Close follow up may be needed in this group of participants.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

INITIAL VALIDATION OF THE ADULT PERIODONTAL HEALTH KNOWLEDGE SCALE (ALPHA-K)

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Objectives: This study aimed to develop and validate the Adult Periodontal Health Knowledge Scale (ALPHA-K) for the assessment of periodontal health knowledge in adults.

Methods: An item pool comprising 18 true-false statements related to periodontal health knowledge was generated through a literature search and translated into Thai. The initial ALPHA-K draft was then reviewed and assessed its content validity by an expert panel before pilot testing in 20 Thai adults. After final scale refinement, a 20-item ALPHA- K was established and administered to a validation sample of 140 participants, categorized as new patients (n=83) and old patients (n=57), based on their history of periodontal treatment at dental school. Descriptive analysis was performed to assess demographic, oral health behavior and periodontal health knowledge between two groups.

Results: The ALPHA-K scale was found to be relevant, comprehensive and comprehensible by an expert panel and target sample. The final 20-item scale demonstrated both item- and scale-content validity index of ≥0.86. Median ALPHA-K score of validation sample was 13 (maximum=20, minimum=7). The majority of participants (92%) understood that dental plaque is the primary cause of periodontal disease. However, over two-thirds of study population reported that flossing is primarily for removal of food impaction (91%) and salt water can treat periodontal disease (73%). The old patient group had significantly higher median ALPHA-K scores than the new patient group
(p=0.05), indicating good discriminative validity.

Conclusions: The ALPHA-K is the first validated scale designed for the assessment of periodontal health knowledge in adults. This user-friendly scale can serve as a valuable instrument in evaluating and improving periodontal health knowledge. There remains considerable misunderstandings about periodontal health among the general population. The present results also emphasize the importance of targeted education and intervention programs, particularly for new patients, to enhance their understanding and practices related to periodontal treatment.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

ASSOCIATION BETWEEN PISA AND ELEVATED HS-CRP LEVELS IN THAI ADULTS

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Objectives: Extensive research has explored systemic inflammation induced by periodontitis, but inconsistent results across studies due to varying periodontitis case definitions have limited conclusive findings. The novel Periodontal Inflamed Surface Area (PISA) parameter offers a promising measure of periodontal inflammation. However, its relationship with systemic markers remains understudied. This cross-sectional study aimed to investigate the association between PISA and high-sensitivity C-reactive protein (hs-CRP) levels in Thai adults.

Methods: Health questionnaires and physical examinations were conducted on employees of the Electricity Generating Authority of Thailand (EGAT). The hs-CRP was measured by immunoassays from blood samples. Participants with hs-CRP levels exceeding 3 mg/L were categorized into the high hs-CRP group. The PISA was computed using comprehensive periodontal parameters, including measurements of gingival recession, clinical attachment level, and bleeding on probing. The periodontal status was categorized into three distinct groups based on quartiles of PISA value: no/mild (Q1), moderate (Q2,3), and severe periodontitis (Q4). The Kruskal-Wallis test was employed to examine the variations in hs-CRP levels among the three PISA groups. Then, the association between periodontitis and high hs-CRP levels was estimated using the chi-square test.

Results: Of the 2,643 participants aged 34-74 years, the mean hs-CRP level was 1.69±1.74 mg/L, with 16.3% (n=430) having hs-CRP levels above 3 mg/L. Our findings revealed a dose-response relationship between the severity of periodontitis and hs-CRP levels, with participants diagnosed with severe periodontitis exhibiting significantly higher hs-CRP levels compared to those with no/mild periodontitis. Moreover, the presence of elevated hs-CRP levels was significantly associated with the severity of periodontitis ($p = 0.025$).

Conclusions: PISA, which serves as a representation of periodontal inflammation, showed a noteworthy correlation with increased hs-CRP levels among Thai adults.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

PERIODONTAL HEALTH AND APRIL/BAFF SALIVARY LEVELS IN RHEUMATOID ARTHITIS PATIENTS

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Objectives: Periodontitis (PD) and rheumatoid arthritis (RA) are chronic inflammatory diseases characterized by bone and tissue destruction. These two conditions share several clinical and pathological features as well as risk factors. This study aimed to investigate the periodontal health and the levels of TNF-superfamily members, APRIL and BAFF, in saliva samples of RA patients.

Methods: The patients with established RA (n=39), predominantly women (92.3%) with a mean age of 63.4±10.2 years, were recruited from Karolinska University Hospital (Stockholm). All participants underwent a full mouth dental examination and collection of stimulated saliva. Periodontal parameters include plaque index (PI), bleeding on probing (BoP), probing pocket depth (PPD) and number of missing teeth. Periodontal diagnosis followed the new classification of Caton, et al. 2018. The levels of APRIL and BAFF (pg/ml) were analyzed using immunoassay kits.

Results: Among the participants, 31% (n=12) were diagnosed with PD stage 2; 54% (n=21) were diagnosed with PD stage 3; and 15% (n=6) were diagnosed with PD stage 4.

The periodontal parameters for the groups with PD stage 2, 3 and 4 were as follows. For PI 57.1%, 48.0%, and 37.3%; for BoP 27.5%, 31.8%, and 50.6%, for PPD 4-5 mm 2,6%, 8.1% and 10.9; for missing teeth 1.3, 2.2 and 9.3, respectively.

Mean salivary levels of APRIL and BAFF were measured in three PD groups (stage 2, 3, and 4). PD group with stage 4 exhibited significantly ($p < 0.05$) higher levels of APRIL as compared to group 2 and 3 (42882, 53048, and 301645, respectively). Additionally, BAFF levels were significantly higher ($p < 0.05$) in group 4 as compared to group 3 (4612 and 2971, respectively).

Conclusions: In this cross-sectional study, high prevalence of PD was observed in patients with RA. The salivary levels of TNF-superfamily members, APRIL and BAFF, increased with stages of PD. Further research with larger sample size is needed to elucidate the role of APRIL and BAFF in the pathogenesis and progression of PD in patients with RA.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

INCIDENCE AND PATTERN OF TOOTH LOSS IN THAIS: COHORT STUDY

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Objectives: This cohort study aimed to investigate the incidence and pattern of tooth loss and compare the rates among diverse subgroups of Thai adults.

Methods: A 10-year observational cohort study was conducted among workers of the Electric Generation Authority of Thailand (EGAT) using data from participants who enrolled in the health survey in 2003 and 2013. The primary outcome was the incidence of tooth loss. An event was counted if participants had lost at least one tooth during the observation period. Tooth loss was described by assessing the mean annual tooth loss (teeth/person/year) and the frequency of tooth loss per tooth type. The Kruskal-Wallis and Mann-Whitney U tests were employed to compare the mean annual tooth loss across various subgroups, including sex, age, education, income, smoking, diabetes mellitus, and baseline periodontal status.

Results: Over 10 years, tooth loss affected 51.7% of the 1,855 participants, resulting in the loss of 2,744 teeth (6.0%). The overall tooth loss rate was 0.15±0.24 teeth/patient/year. The most commonly lost teeth were mandibular and maxillary second molars (11.0-13.1%). Mandibular canines were the least frequently lost (1.7-1.9%). Notably, males and individuals with lower education and income levels had a significantly higher rate of tooth loss. Current smokers and those with diabetes mellitus also showed an increased incidence of tooth loss. Furthermore, the severity of periodontitis at baseline correlated with a higher rate of tooth loss.

Conclusions: In conclusion, this study revealed a high prevalence of tooth loss among Thai adults, with over half of the participants experiencing tooth loss over a 10-year period. Molar teeth were more frequently affected. Males, older age, lower socioeconomic status, smoking, diabetes mellitus, and periodontitis severity were identified as significant contributors to tooth loss.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

SYSTEMIC INFLAMMATION MEDIATES THE ASSOCIATION BETWEEN PERIODONTITIS AND INCIDENT HYPERTENSION

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Objectives: The aim of this five-year longitudinal study was to explore the associations between periodontitis and hypertension and the extent to which these associations were mediated through systemic inflammation.

Methods: The severity and extent of periodontitis were determined using probing depth (PD). Oral hygiene was assessed using plaque scores. Hypertension was defined as systolic blood pressure (SBP) ≥140 mmHg, diastolic blood pressure ≥90 mmHg, or the use of antihypertensive medications. The associations between periodontal variables and five-year blood pressure changes or incident hypertension were analyzed using linear or Poisson regression, adjusting for age, sex, education level, body mass index, exercise frequency, smoking status, drinking status, and diabetes. Causal mediation analysis of two systemic inflammatory biomarkers, white blood cell count (WBC) and C-reactive protein (CRP) levels, was performed.

Results: The study population included 901 hypertension-free participants, aged 50-73 years. The incidence of hypertension was 289 cases (32.1%). Greater mean PD, higher % sites with PD ≥6 mm, and poor oral hygiene were associated with elevated SBP, with regression coefficients of 1.968 ± 0.783 (p = 0.012), 2.192 ± 0.757 (p = 0.004), and 0.414 ± 0.207 (p = 0.046), respectively. These periodontal variables were also associated with increased hypertension risk, with relative risks of 1.17 (95% CI: 1.02-1.34, p = 0.029), 1.13 (95% CI: 1.02-1.26, p = 0.023), and 1.08 (95% CI: 1.03-1.13, p <0.001), respectively. Periodontitis and poor oral hygiene were associated with higher WBC and CRP levels (p <0.05), which in turn were associated with increased hypertension risk (p <0.05). WBC and CRP jointly mediated 14.1-26.9% of the associations between periodontal variables and incident hypertension.

Conclusions: Our findings demonstrated that periodontitis and poor oral hygiene were associated with increased hypertension risk, and systemic inflammation was, in part, a mediator of these associations.

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POSTER SESSION 3
PERIODONTOLOGY - 1
Friday, 24 November 2023

SATISFACTION WITH GOVERNMENT RECOMMENDED PRE-PROCEDURAL MOUTHWASHES: A RANDOMIZED CLINICAL TRIAL

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Objectives: To evaluate satisfaction and acceptability with three pre-procedural mouthwashes recommended by the Government of Hong Kong Special Administrative Region (HKSAR) during the COVID-19 pandemic.

Methods: A triple blind parallel-arm randomized controlled clinical trial was conducted. Following eligibility assessment, participants were block-randomized to the three intervention pre-procedural mouthwash groups: Povidone-iodine 1% w/v, (2) Hydrogen peroxide 1.5%w/v and (3) Chlorhexidine 0.2% w/v. Participants rinsed with one of the mouthwashes assigned to, prior to any dental treatment. Participants, operators and assessors were blind to the assigned mouthwashes (triple blind). Satisfaction ratings were assessed on a 10cm visual analogue scale (VAS) and acceptability of the mouthwashes and adverse events were determined.

Results: Following clinical screening, 228 subjects participated in the trial (no drop-outs). The mean overall VAS satisfaction was 7.35 (SD 1.68). There was no significant difference in VAS satisfaction ratings among the three groups ($p>0.05$), nor in-between groups. Acceptability of the mouthwashes was high with the vast majority (89.5%, 204) willing to use the mouthwashes again if pre-procedural mouthwash rinsing is required. There was no significant difference in acceptability ratings ($p>0.05$). There were some aspects such as taste and smell that were commented on (on average, 24.6%, 56), although no significant difference in prevalence of reports among groups ($p>0.05$).

Conclusions: There were high rates of satisfaction and acceptability of the HKSAR Government recommended pre-procedural mouthwash for the mitigation of COVID-19 transmission in the dental setting. There was no significant difference in satisfaction and acceptability rates among the three recommended pre-procedural mouthwash. The high satisfaction and acceptability rates of the HKSAR Government recommended pre-procedural mouthwashes in the mitigation of COVID-19 lends support for the HKSAR's policy on pre-procedural mouthwash use in the dental setting, and this has implications for practice and policies during pandemics.

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POSTER SESSION 3
ORAL SURGERY, MEDICINE & PATHOLOGY
Friday, 24 November 2023

PREVALENCE AND FACTORS ASSOCIATED WITH SSI AFTER MINOR ORAL SURGERY

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Objectives: Antimicrobial resistance (AMR) has become a global problem, and many countries are working on AMR countermeasures. In Japan, this problem is also being actively addressed, but there is still much room for improvement in the appropriate use of antimicrobial agents in dental practice. The purpose of this study was to clarify the surgical site infection (SSI) rate after tooth extraction, and to identify factors associated with an increased risk of SSI after tooth extraction.

Methods: A retrospective study was conducted on the medical records of patients who underwent tooth extraction over a 10-year period (2013-2022) at the study hospital. Patient background and factors related to SSI were extracted from the medical records. Multivariate analysis using binomial logistic regression analysis were performed for each factor, with the presence of SSI as the dependent variable.

Results: A total of 4,889 cases were included, including both ordinary and wisdom tooth extraction. There were 118 cases (2.4%) of SSI occurrence. The variable that significantly influenced the occurrence of SSI were the expertise of the surgeon (odds ratio: 9.93; $p<0.05$) and the complexity of the extraction (odds ratio: 4.4; $p<0.05$). The type and duration of antibiotics did not significantly affect the occurrence of postoperative infection.

Conclusions: The risk of SSI in tooth extraction was low and excessive antibiotic prescription was considered unnecessary.

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IMPACT OF TOCOPHEROL AND PENTOXIFYLLINE BEFORE TOOTH EXTRACTION ON OSTEORADIONECROSIS

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Objectives: Osteoradionecrosis of the jaws (ORN) is a rare but severe condition that significantly impacts the quality of life in patients with a history of head and neck irradiation. Currently, there is no established treatment regimen that shows promising results. The use of Pentoxifylline in combination with Tocopherol has demonstrated effectiveness in reducing radiation fibrosis after breast irradiation. However, its potential for preventing ORN prior to tooth extraction requires further investigation.

Methods: Retrospective data was collected from computer-based medical records between 2017 and 2020 at a cancer center in Thailand. A total of 43 head and neck irradiated patients underwent tooth extraction, resulting in the extraction of 110 teeth. Prior to and following tooth extraction, all patients were prescribed pentoxifylline 400 mg twice a day and tocopherol 1000 IU per day. Data on primary tumor diagnosis, staging and location, diagnosis of the extracted tooth, and any drug complications were recorded.

Results: Among the tooth extractions, 6 sites in 3 patients were diagnosed with ORN, resulting in a prevalence rate of 5.4% at the tooth level and 6.9% at the patient level. Although the odds of ORN occurrence were 3.67 times higher in the mandible compared to the maxilla, this association was not statistically significant (95% CI: 0.4136 to 32.5024). No statistically significant associations were found among the factors studied, and no drugs complication was reported.

Conclusions: The administration of Pentoxifylline and Tocopherol did not demonstrate a reduction in the prevalence of ORN compared to rates reported in previous evidence-based studies. However, it should be noted that the number of patients in this study was limited. Further studies with larger sample sizes or experimental designs are necessary to fully elucidate the efficacy of these drugs in preventing ORN.

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EFFECTS OF ALPHA-LACTALBUMIN HYDROLYSATE ON HUMAN SQUAMOUS CELL CARCINOMA CELLS

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Objectives: Squamous cell carcinoma (SCC) is a common malignant tumor found in the oropharyngeal region. Alpha- lactalbumin hydrolysate (LAH), a main component found in whey protein, has shown cytotoxicity against several cancer cells and holds promise as an alternative anti-cancer agent. However, the effects of LAH on head and neck cancer cells remain elusive. This study aims to examine the effects of LAH on the behavior of SCC cell lines, in vitro.

Methods: The primary and metastatic human tongue SCC cell lines (HSC-4 and 7) and pharyngeal SCC cell lines (HN-22, 30 and 31) were treated with a 2-fold serial dilution of LAH (100-0.39 mg/ml). Cell viability and cell proliferation were investigated using the MTT assay. Cell migration was examined using the scratch wound healing assay. Gene expression of matrix metalloproteinases (MMP) and tissue inhibitor of metalloproteinases (TIMP) was assessed using RT-qPCR. All statistical analyses were evaluated at p value <0.05.

Results: LAH treatment at 25, 50, and 100 mg/ml exhibited cytotoxicity on all HSC and HN cells, as well as immortal human PDL cells. The proliferation of HSC and HN cells was also significantly attenuated after LAH treatment from day 3. Further, LAH treatment inhibited cancer cell migration in both primary and metastatic HSC and HN cells. The mRNA expression of MMP1 and MMP2 was significantly downregulated in the HN-22 cell. Similarly, the expression of MMP1 and MMP13 transcript was reduced in HSC-4 cell, while mRNA level of MMP2 and TIMP1 was downregulated in HSC-7 cell.

Conclusions: LAH treatment has inhibitory effects on cancer cell proliferation and migration in HSC and HN cell lines, in vitro. This suggests the promising activity of LAH as an alternative anti-cancer agent; however, further investigation is required.

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ODONTOGENIC CYSTS TURNED SQUAMOUS CELL CARCINOMA

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Objectives: This case series aims to highlight that clinicians should be cognizant of the potential for odontogenic cysts to undergo malignant transformation, albeit rare. Odontogenic cysts are common lesions in the oral cavity, defined as cavities with odontogenic epithelium lining. While mostly benign, studies have shown that they have the potential to transform into malignant lesions - or Primary Intraosseous Carcinoma (PIC). They are rare central tumours that arise from odontogenic epithelium and may be associated with odontogenic cysts or other benign precursors. Diagnosis requires histological evidence of squamous cell carcinoma (SCC), absence of communication with overlying mucosa, and exclusion of metastasis from distant primary tumour. They most commonly involve the mandible, and typically present with pain and swelling.

Methods: Careful clinical and radiographic examination should always be performed. Patients may present with profound pain involving large areas of the jaw and/or paraesthesia – clinical features which should ring alarm bells. Suspicious radiographic signs include a large radiolucent lesion with mixed contents, ill-defined borders, and/or the destruction of cortical borders and surrounding structures. However, PIC may lack these features.

Results: The authors present 3 cases of malignant transformation of odontogenic cysts seen at the National Dental Centre, Singapore. Two cases arose from odontogenic keratocysts (OKC), one of which was a recurrence, and the third case was believed to have developed from a radicular cyst. Histopathological analysis of the enucleated specimens of all 3 cysts revealed squamous cell carcinoma (SCC). All three patients were subsequently worked up and treated with radical resection and neck dissection for PIC.

Conclusions: PIC often masquerade as an odontogenic cyst, posing a challenge for early diagnosis. It is thus prudent to submit the enucleated odontogenic cyst or pericoronal tissue for histopathological examination. If indicated, the patient should also be followed-up closely for recurrence.

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STABILIZED OLP IS NOT A SIGNIFICANT RISK FOR PERI-IMPLANT DISEASES

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Objectives: This study aimed to evaluate the incidence of implant failure in patients with oral lichen planus (OLP), investigate the possible association between OLP and peri-implant diseases, and assess the risk of oral cancer in OLP patients who undergo dental implant therapy.

Methods: A systematic search was conducted in June 2023 across four databases (Embase, Web of Science, PubMed, and Scopus), resulting in 19 eligible publications, two of which were included in a meta-analysis.

Results: The global incidence of implant failure was 4.58% (7 out of 153 patients) at the patient level and 3.67% (12 out of 327 implants) at the implant level. Six patients (3.92%) from five out of nineteen studies were diagnosed with oral cancer after implant placement. The prevalence of peri-implantitis, peri-implant mucositis, and bleeding on probing at the implant level were 14.00%, 20.00%, and 40.00%, respectively. Two studies included in the meta- analysis, one of which was prospective, and the other was a cross-sectional study, consisting of 34 OLP patients and 34 healthy controls. A higher risk of PI in OLP patients in comparison to the healthy controls (OR=1.62, p=0.23), however, there was no significant difference. Similarly, there was also no significant difference in the number of implants suffering from PIM (OR=0.84, p=0.61) or BOP (OR=0.77, p=0.40) between the OLP patients and healthy controls. Besides, the included studies classified as having a low risk of bias.

Conclusions: Stabilized OLP is not a significant risk factor for peri-implant diseases, and implants or prostheses should not be placed during the acute period of the disease. Histopathological investigation to differentiate OLP and oral lichenoid dysplasia is crucial. Further large-scale prospective studies are needed to clarify the relationship between OLP and implant failure and to develop appropriate treatment strategies for OLP patients undergoing dental implant therapy.

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PG-LPS INCREASES PROLIFERATION, MMP-1 AND IL-8 IN CISPLATIN-RESISTANCE HSC-3 CARCINOMA

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Objectives: The aim of this research is to investigate the effect of Pg-LPS on proliferation, matrix metalloproteinase-1 (MMP-1) activity, and interleukin-8 (IL-8) production of cisplatin-resistant human tongue squamous carcinoma HSC-3 cell line.

Methods: Human tongue squamous carcinoma, HSC-3 cells, were induced to become cisplatin-resistant (HSC-3/R). HSC-3 and HSC-3/R cells were cultured separately. The proliferative activity, MMP-1 activity and IL-8 production of both cell lines with and without Pg-LPS activation (0.25 - 1 µg/ml) were evaluated using MTT assays, gelatin zymography and ELISA, respectively.

Results: At 24 hours, Pg-LPS activated HSC-3 cells showed lower cell proliferation when compared to the control ($P<0.05$), whereas Pg-LPS activated HSC-3/R cells showed greater proliferation when compared to the control ($P<0.05$). Gelatin zymography illustrated that Pg-LPS activated HSC-3/R cells portrayed more MMP-1 production than HSC-3 group at 48 and 72 hours. In concordance with ELISA assay, the production of IL-8 was higher significantly in Pg-LPS activated HSC-3/R cells than that of HSC-3 at the same concentration ($P<0.05$).

Conclusions: The ability of cell proliferation, MMP-1 activity and IL-8 production in HSC-3/R cells once activated with Pg-LPS were higher than the parental HSC-3 cells. Hence, cisplatin-resistant carcinoma cell has increased aggressiveness in inflammatory condition.

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DISTINCTIVE TOOTH PHENOTYPE ASSOCIATED WITH OSTEOGENESIS IMPERFECTA

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Objectives: This study aims to investigate and compare the properties of teeth in patients with osteogenesis imperfecta (OI) with and without dentinogenesis imperfecta (DI), in order to identify distinctive tooth phenotypic features associated with the conditions.

Methods: Primary teeth were collected from two individuals clinically diagnosed with OI type III, one with DI (OIDI) and the other without DI (OI). Tooth characterization was carried out, including the analysis of tooth color, surface roughness, hardness and elasticity, mineral density, and mineral content using a digital intraoral colorimeter, surface profilometer, micro-computerized tomography (Micro-CT), nano-base indentation system, and Energy-Dispersive X- ray (EDX), respectively. Furthermore, the ultrastructure of the teeth were observed using Scanning Electron Microscopy (SEM) and histology.

Results: OIDI teeth exhibited darker, yellower, and redder compared to OI teeth. Surface analysis demonstrated that OIDI teeth were smoother than both OI and control teeth. Micro-CT analysis revealed higher enamel density in OIDI teeth compared to OI and control teeth. Furthermore, nanohardness and elasticity of the enamel and dentin of OIDI teeth were significantly reduced compared to OI teeth. The calcium/phosphorus (Ca/P) ratio in the enamel and dentin of OIDI teeth was comparable to that of OI and control teeth. Ultrastructural examination of OIDI teeth revealed a marked reduction in dentinal tubule number, as well as the presence of spare, obstructed, and disorganized dentinal tubules. In contrast, the ultrastructure of OI teeth were similar to those of control teeth.

Conclusions: This study provides insight into the distinct tooth characteristics observed in OI patients with DI. The reduced hardness and elasticity, along with the malformation of dentin structure observed in OIDI teeth, could contribute to their increased brittleness and potential failure of adhesive restorations. These findings expand our understanding of the phenotypic spectrum in OI patients, both with and without DI, and emphasize the importance of raising awareness among dental practitioners regarding the unique management considerations for individuals with OI.

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SURVIVAL OF SMART ON MIH AFTER MEAN FOLLOW-UP 38 MONTHS

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Objectives: To assess the survival of ART, SMART without papain-based gel and SMART with papain based gel on MIH molars after mean follow-up of 38 months.

Methods: Between 2019 and 2020, 63 MIH molars in 38 patients were restored with 21 ART, 21 SMART without papain-based gel and 21 SMART with papain-based gel as part of an RCT. Restorations were reviewed according to ART criteria after mean follow-up of 38 months.

Results: 38 MIH molars in 23 children returned for follow up (60.3%). The Kaplan-Meier and log rank analysis stated the mean survival time for ART, SMART without papain-based gel, and SMART with papain-based gel were 40.6, 42.7, and 41.3 months respectively with no detected significant differences (p=0.690). The cumulative mean survival rate of all HVGIC restorations was 41.0 months.

Conclusions: HVGIC, SMART without papain-based gel, and SMART with papain-based gel have comparable clinical performance and survival in MIH molars.

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NOVEL PITX2 VARIANT ASSOCIATED WITH OLIGODONTIA IN THE THAI FAMILY

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Objectives: This study aimed to investigate the orodental characteristics and genetic basis of syndromic oligodontia in a Thai family.

Methods: The proband and their family members were subjected to physical and oral examinations. DNA samples were collected for whole exome sequencing. Sanger sequencing was used to validate the identified mutation. The pathogenicity of the variant was assessed using InterVar, Mendelian Clinically Applicable Pathogenicity (M-CAP), and Rare Exome Variant Ensemble Learner (REVEL). Conservation analysis across multiple species was conducted using Clustal Omega.

Results: The proband, a 12-year-old Thai boy, presented with multiple missing teeth. Intraoral and radiographic examinations revealed the absence of 10 permanent teeth (excluding third molars), retained deciduous teeth, taurodontism, a thick and wide maxillary labial frenum, and a high-arched palate. Physical examinations identified a protruding excess periumbilical stump. The ophthalmological evaluation revealed anomalies in the right eye, including correctopia, glaucoma, and amblyopia. The proband exhibited normal intellectual development and was clinically diagnosed with Axenfeld-Rieger syndrome (ARS). The variant analysis identified a novel heterozygous missense variant, c.274G>C (p.A92P), in the PITX2 gene of the proband, absent in the parents. Sanger sequencing confirmed the variant. Computational analysis predicted the variant to be disease-causing, with REVEL and M-CAP scores of 0.963 and 0.839, respectively. Additionally, the variant met several criteria outlined in the ACMG/AMP 2015 guideline (PS2, PS3, PM1, PM2, PP2, PP3). The A92 residue is located within the highly conserved DNA binding domain of PITX2, shared among PITX2A, PITX2B, and PITX2C isoforms and across species

Conclusions: This study identified a novel PITX2 gene mutation associated with syndromic oligodontia in a Thai family. This provides insights into the investigation of syndromic oligodontia within a dental hospital setting. The identification of the genetic variant facilitated accurate diagnosis and appropriate management for the patient, emphasizing the vital role of dentists in identifying and addressing such conditions.

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DENTAL ANOMALY DETECTION USING RADIMAGENET TRANSFER LEARNING MODELS

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Objectives: Dental anomalies that involve teeth number abnormality are common conditions, which affect the subsequent growth of healthy dentition. Recently, the application of Artificial Intelligence (AI) has witnessed remarkable advancements in various clinical disciplines and expected to help dentists diagnose accurately and rapidly. However, limited sample size makes it challenging to construct robust and generalizable AI in the dental field. Transfer Learning (TL) utilizes an AI pre-trained on a very large dataset and then it is fine-tuned for specific tasks using specific datasets. TL is expected to create highly accurate AI from the limited and small data sets. Herein, we examined the applicability of the TL using RadImageNet, which is a large-scale medical image dataset, to detect supernumerary teeth in the early mixed dentition stage.

Methods: We employed the TL with RadImageNet pretrained model in this study. The total of 200 panoramic radiograph images were revalidated and diagnosed by two expert pediatric dentists as supernumerary teeth (case group, n = 100) or no anomalies (control group, n = 100). The datasets were randomly split into training dataset (75%), validation dataset (10%), and test dataset (15%). The classification accuracy, precision, recall, F1 score, and area under the curve were calculated for detection and diagnostic performance of the algorithms. This study was approved by Ethical Committee for Epidemiology of Hiroshima University.

Results: The results of the classification accuracy, precision, recall, F1 score, and area under the curve were 90.0%, 92.9%, 86.7%, 89.7%, and 0.92 respectively. This model achieved high values in each performance metric.

Conclusions: These results suggested that the TL with RadImageNet pretrained model is potentially applicable to detect dental anomalies in panoramic radiograph images. The technology of TL with RadImageNet is expected to help dentists make the diagnosis of dental anomalies on panoramic radiographs.

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SALIVA SECRETION AND MASTICATORY PERFORMANCE, AND THEIR IMPACT TOWARDS OHRQOL

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Objectives: The aim of this study was to know whether there is a difference in the saliva secretion, masticatory performance, and Oral Health-Related Quality of Life of the older population based on what dental status category they belong to which includes the complete denture-wearing patients, denture-wearing partially edentulous patients, and non-denture-wearing partially edentulous patients.

Methods: A total of 45 subjects have participated in the study and were divided according to their dental status. Saliva secretion was collected through the use of the Saxon Test and was followed by the assessment of their masticatory performance through a visual scoring method using a special test food (gummy jelly). Oral Health-Related Quality of Life (OHRQoL) was evaluated using a 14-item questionnaire, Oral Health Impact Profile (OHIP-14). Analysis of Variance was employed to determine the differences between the different categories.

Results: Results showed no significant differences in the Masticatory Performance (MP), Saliva Secretion, and Oral Health-Related Quality of Life (OHRQoL) of the participants when grouped according to their sex. Age was noted to have a significant difference when tested with volume of saliva and masticatory performance, however, no significant difference was found in the Oral Health Related Quality of Life (OHRQoL). Lastly, significant differences were observed in the saliva secretion, Masticatory Performance (MP), and Oral Health Related Quality of Life (OHRQoL) when tested together with the dental status of the participants at 0.05 level of significance.

Conclusions: As people age, their saliva secretion declines and their masticatory performance is impeded which leads to a negative perception or oral health. However, not all patients see this as a problem as long as their dental status allows them to perform oral functions like speech and mastication in an acceptable degree.

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A ROLE OF HIF-1A IN THE REGULATION OF BONE HOMEOSTASIS

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Objectives: Hypoxia-inducible factor (HIF) was found to be a pivotal regulator in both bone development and remodeling. Here, we investigated the role of HIF-1α on osteoblast functions during bone remodeling along with its differences from HIF-2α.

Methods: In order to compare gene expression profiles about overexpression Hif1a and Epas1 during pre-osteoblast differentiation, RNA sequencing analysis was performed. To confirm the role of HIF-1α during osteoblast differentiation, we used gain-of-function and loss-of-function system of Hif1a using primary calvarial pre-osteoblast. For in vivo test, we examined the bone microarchitecture using a micro-CT and analyzed bone mass using a bone histomorphometry after H&E and TRAP staining.

Results: Using RNAseq analysis, we identified that specific genes involved in the regulation of osteoblast differentiation were similarly but slightly differently governed by HIF-1α and HIF-2α. We found that increased expression of HIF-1α inhibited osteoblast differentiation through inhibition of RUNX2 function by upregulation of Twist2, and it was confirmed in an in vivo animal model using Hif1a conditional KO mouse. Ectopic expression of HIF- 2α via Ad-Hif1a resulted in increased expression and activity of RANKL, while knockdown of Hif1a expression via siRNA or in KO mouse had no discernible effect on osteoblast-mediated osteoclast activation. The unexpected outcome was elucidated by the upregulation of HIF-2α upon Hif1a overexpression, providing evidence that HIF-2α is a downstream target of HIF-1α in the regulation of RANKL expression. It was verified through an experiment of HIF-2α knockdown after HIF-1α overexpression. The above results were validated in OVX- and aging-induced osteoporosis model using Hif1a conditional KO mouse.

Conclusions: Our findings conclude that HIF-1α plays crucial roles in regulating bone homeostasis, such as osteoblast differentiation independently on HIF-2α and osteoclast activation via crosstalk with osteoblasts depending of HIF-2α.

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TEMPOROMANDIBULAR DISORDER AND SOMATIC SYMPTOMS: RELATIONS TO NEGATIVE EMOTIONAL STATES

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Objectives: To investigate the relationship between FOMO and other negative emotions with Temporomandibular disorder (TMD) and somatic symptoms in young adults. The correlations between the various physical and emotional variables were also established.

Methods: TMD and somatic symptoms were appraised with the Short-form Fonseca Anamnestic Index, quintessential five TMD symptoms of the DC/TMD, and Patient Health Questionnaire-15. FOMO and other negative emotional states were assessed with the FOMO Scale and Depression, Anxiety, Stress Scales-21 (DASS-21). Data were evaluated using non-parametric tests/correlation and regression analysis ($\alpha = 0.05$).

Results: While only negative affectivity (total DASS), anxiety, and stress differed significantly between those without and with TMDs, significant variances in FOMO and all DASS-21 constructs were discerned between individuals without and with somatization.Multivariate analysis shows that being female increased the risk factor for somatization (OR = 2.97, 95% CI:1.60-5.60, p 0.001), TMD present (OR = 1.88, 95%CI: 1.21 – 2.92, $p < 0.001$), and negative affectivity (OR = 1.09, 95% CI: 1.06-1.12, $p < 0.001$)

Conclusions: Individuals with orofacial pain and more severe somatic symptoms have higher levels of negative emotions including FOMO. While somatization increased the prospect of TMDs, being female, presence of TMDs, and negative affectivity were risk factors for somatization in young adults.

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BONE FORMATION AROUND IMPLANT WITH MRNA ENCODING BONE MORPHOGENETIC PROTEIN-2

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Objectives: To evaluate the use of N1-methylpseudouridine-modified mRNA encoding bone morphogenetic protein-2 (m1-BMP-2 mRNA) to improve bone regeneration with implant placement in rat femur.

Methods: Twelve implant titanium wires were placed into 6 Sprague-Dawley (SD) rats. The femur defects were randomly filled with 15 µg m1-BMP-2 mRNA (n = 4), 4 µg recombinant human bone morphogenetic protein-2 (rhBMP- 2) (n = 4), or Dulbecco's phosphate-buffered saline (dPBS) (n = 4). The animals were sacrificed at 3 and 6 weeks after implantation. The bone volume fraction (BV/TV), trabecular number (Tb.N), trabecular thickness (Tb.Th) were evaluated using micro-computed tomography imaging (micro-CT). One-way ANOVA was used to analyze the data between the three groups. All statistical analysis was performed at a significant level of 5% (p-value < 0.05).

Results: The BV/TV, and Tb.Th levels were significantly higher in the m1-BMP-2 mRNA group than the dPBS group at 6 weeks after implantation. At 3 weeks, there were no significant differences between the groups in any parameters. At 6 weeks after implantation, Tb.Th level in the rhBMP-2 group and m1 -BMP-2 mRNA group were significantly higher than at 3 weeks. In contrast, there were not any significant differences in the dPBS group.

Conclusions: In conclusion, these results show a constructive effect of m1-BMP-2 mRNA that results in improved bone formation in the peri-implant area compared to rhBMP-2 and dPBS.

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APPLYING MOBILE EXTENDED REALITY (MXR) TECHNOLOGIES IN THE DENTAL AREA

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Objectives: Mobile extended reality (MXR) which is composed of augmented reality (AR), virtual reality (VR) and mixed reality (MR) is a promising tool that can be applied in dental education, clinical, and research. By using MXR system, visualizing patient-specific three-dimensional (3D) models may improve surgical planning and enhance patients shared decision-making. An MXR platform including patient-specific 3D models that have been built for both desktop and mobile interfaces. To ensure smooth operation and accurate data in the mobile XR system, the imported images need to be appropriately reduced in size. This study aimed to describe the workflow and investigate the acceptable size reduction ratio of patient-specific 3D models for display on the MXR platform.

Methods: Three models from different acquisition sources were included: a human mandible, a teeth model, and a rat's condyle model. The image analysis process included model preparation, size reduction, alignment, and comparison using software Mimics and Meshmixer. Deviation of downsized model compared to original was recorded and analyzed.

Results: In general, the more reduction of file size, the more distortion of 3D images. For model derived from CBCT, size reduction from 10 to 70% ensure the deformity is less than 30 mm. The deformity of resized models derived from IOS was less severe than others. A maximum deviation of 20μm occurred when data size was reduced up to 80%. The most severe distortion was observed in micro-CT-derived images. However, size reduction can be performed up to 90% without losing the visibility of the anatomical structures.

Conclusions: The solution of size reduction for 3D models using Meshmixer can be applied before input into MXR mobile app. This might be a necessary initial step for further applications in the future.

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MANAGEMENT OF CLOSED LOCK DURING ORTHODONTIC TREATMENT: TWO CASE REPORTS

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Objectives: To present two cases who developed acute closed lock during orthodontic treatment using a simple management technique.

Methods: Two female patients, one (36-year-old) with traditional braces (C1) and the other (43-year-old) wore clear aligners (C2). Both cases received the same intervention by applying muscle release techniques before jaw mobilization. The cross-arch and cross-side finger technique developed by the investigator was applied for guided lateral and open-close jaw movement followed by manual manipulation. After successful intervention, the maximum mouth opening increased from 10-mm (C1) and 26-mm (C2) to 50-mm (C1) and 49-mm (C2) with the click sounds reappearing. Then repositioned appliances were fabricated. C1 wore an immediate appliance fabricated with thick pink wax while C2 wore an immediate putty temporary appliance over the clear aligner.

Results: Both patients were successfully unlocked. On 1.5-month follow-up appointments, patients were satisfied with the results. They were able to wear the appliances and open their mouths wide with minimal click sounds, no pain reported and could continue their orthodontic treatment.

Conclusions: The presented finger technique eases manual manipulation as an early intervention for acute closed lock management. Also, an immediate repositioning appliance fabricated within a visit is effective, easy to fabricate and low cost without interfering with ongoing orthodontic treatment.

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POSTER SESSION 4
ORAL HEALTH RESEARCH - 5
Friday, 24 November 2023

EFFICACY OF SMART TOOTHBRUSH IN ADULTS: 6-MONTH RANDOMIZED CONTROLLED TRIALS

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Objectives: Smart toothbrushes are technologically advanced toothbrushes that provide personalized feedback on an individual's toothbrushing habits and oral hygiene. Research comparing the efficacy of smart toothbrushes and manual toothbrushes are lack currently, and more research on the impact of smart toothbrushes on oral health is needed. Therefore, this study aimed to conduct a 6-month prospective randomized controlled trial to verify the clinical effectiveness of using two smart toothbrushes compared to a manual toothbrush.

Methods: This randomized controlled clinical trial evaluated the relative plaque removal efficacy, reduced halitosis, and changes in the oral microbiota of toothbrushing with a smart toothbrush compared to a manual toothbrush. This study was conducted at the Department of Advanced General Dentistry between January and May 2022. One hundred and fifty participants were enrolled and randomly divided into three groups (Oral-B® Genius 8000; OBG, Mombrush; MB, and Manual toothbrush; MTB). The evaluation was conducted at four-time points: at baseline and 1, 3, and 6 months (IRB No. 2-2020-0032).

Results: The Simple Hygiene Score(SHS) decreased in the MB group compared to the MTB group ($p<0.05$), and the Quigley-Hein Plaque Index(QHPI) also decreased in the MB group compared to the OBG and MTB groups at different time points ($p=0.000$). Also, the ratio of caries-risk bacteria significantly increased, whereas the ratio of anti-caries bacteria decreased in the MTB group ($p<0.05$). However, there were no significant differences in halitosis (H_2S and CH_3SH) or high-risk periodontal bacteria between the groups at these different time points.

Conclusions: In this study, the smart toothbrush improved the SHS score and QHPI score. showing that using the smart toothbrushes with the application enable proper oral hygiene management for longer periods than manual toothbrushes. However, we found that the interest in smart tooth brushing declined at 3 and 6-month recalls, which we presumed to be long recall periods. In the future, we will investigate whether the participants of this study continued to use the application after the study was completed and which smart toothbrush was customized according to an individual's systemic diseases or oral conditions.

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Friday, 24 November 2023

THE VIRTUAL, IMMERSIVE CLASSROOM

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Objectives: The Radiology and Radiography preclinical laboratory is an integral preclinical teaching space at the Melbourne Dental School for Doctor of Dental Surgery and Bachelor Oral Health students. The small room size and large student cohort requires this lab to support a large number of small group teaching sessions throughout the academic year.

To enhance use of learning and teaching time, a 'virtual and immersive' teaching space was needed to allow the cohort 24/7 'guided' access to familiarise themselves with the room and it's equipment prior to preclinical practical exercises.

To create a safe and unlimited access for all students to a physically small and restricted lab space.

To allow revision for students between practical classes to ensure a productive use of practical sessions. The virtual classroom also provides an introduction to the lab to new staff members.

Methods: The interior of the preclinical lab was filmed using a 360 degree camera. The descriptive hotspots were 'attached' to equipment imaged on the recording.

This recording was uploaded to the Learning Management System (CANVAS). Quizzes and introductory activities relative to the introductory exercises and radiation safety practices required for safe lab use were provided via the Learning Management System (CANVAS). Students had a due date for completion of the 'virtual pracs' prior to attending the inperson preclinical practical sessions.

Results: The introduction of this immersive virtual classroom practical has provided a more valuable preclinicial learning experience for students as they are familiar with the preclinical lab and the equipment when they enter for their first practical session.

Students are also able to review these exercises as they need or wish, Staff are also able to create (and subsequently store these) quizzes/exercises to suit radiation safety classes as needed to suit individual cohorts.

Conclusions: This has proved to be a valuable asset to preclinical teaching in that the recording can suit staff and students in both the teaching and assessment of radiation safe practices and procedures. Potentially this methodology of a virtual classroom could be implemented as introductory practicals for many aspects of practical teaching exercises.

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ORAL HEALTH RESEARCH - 5
Friday, 24 November 2023

A CLOUD-BASED PATIENT MANAGEMENT SYSTEM IN A PHILIPPINE DENTAL UNIVERSITY

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Objectives: This study determined the usefulness and efficiency of a cloud-based patient management system among dental clinicians and dental hygienists in a dental university in the Philippines.

Methods: Random sampling was implemented to gather dental clinicians and dental hygienists to participate in the study. The participants were asked to use the platform prototype, during their clinical duty, prior to the distribution of a survey questionnaire. The survey questionnaires were subsequently distributed to gather data on the perception of dental clinicians and dental hygienists on the ease of use of scheduling system, convenience of shifting to website scheduling, efficiency of website health screening of patient compared to manual health screening of patients, smart
action and interface of the website, self-health declaration, and access to treatment records. Questions were answered using a 5-point Likert Scale. The overall mean of each indicator is reported.

Results: One hundred forty-one (141) dental clinicians and dental hygiene interns participated in this study. The participants strongly agree to the following indicators and features such as ease of use of scheduling system (4.40), convenience of website-based scheduling over manual scheduling (4.26), transparency and user-friendly interface (4.37), efficiency of website health screening of patient and smart action of the website (4.30), self-health declaration (4.40) and access to treatment records (4.33). Based on the results, the scheduling system and self- health declaration features of the platform are the two features best appreciated by the respondents. Overall, the findings of the study indicate that the users show positive attitude on the utilization of the cloud-based platform.

Conclusions: In conclusion, the cloud-based platform is potentially a helpful tool in the implementation of an efficient patient management and scheduling system in this Philippine dental university.

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ORAL HEALTH RESEARCH - 5
Friday, 24 November 2023

AI-ASSISTED ORAL HEALTH MONITORING WITH DENTAL SELFIES: A SYSTEMATIC REVIEW

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Objectives: This study aimed to systematically review the evidence relating to artificial intelligence-assisted oral health monitoring using smartphone selfie photography for better oral health.

Methods: A broad literature search was performed across four electronic databases using a standardised search strategy. Screening and reporting followed the PRISMA framework. A qualitative synthesis of the evidence was performed.

Results: The search identified 2442 articles, 1639 following removal of duplicates. Following ratings of title and abstracts. 64 full-texts were identified as potentially effective studies. Finally, four articles were identified as effective studies to inform the review. Three studies were conducted among orthodontic patients; one was on periodontal treatment maintenance. Mostly studies were of short-term duration: two 3-momth studies and 1 6-month study. Three of the four studies reported significant improvement in oral health following the use of artificial intelligence-assisted oral health monitoring. There were significant reductions in plaque index scores and gingival index scores in the short term.

Conclusions: AI-assisted oral health monitoring with dental selfies may have potential as a means of improving oral health/ maintaining oral health in the short-term, but the patient's compliance and adherence to long-term regular use are still questionable.

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POSTER SESSION 4
PERIODONTOLOGY - 2
Friday, 24 November 2023

WHOLE PROTEOME ANALYSIS OF GINGIVAL CREVICULAR FLUID

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Objectives: Oral fluids such as saliva are rich sources of biomarkers for the detection of diseases. One relatively unexplored oral fluid is gingival crevicular fluid (GCF). GCF is an inflammatory exudate derived from the periodontal tissues. It is composed of serum, cells and locally generated materials such as tissue breakdown products, inflammatory mediators, and antibodies directed against dental plaque bacteria. As indicators and markers for connective tissues and bone detection are known to be present in GCF, it has been employed in the determination of the severity of periodontitis. Objective: We are currently exploring GCF as a source of biomarkers for Bisphosphonate Related Osteonecrosis of the Jaw (BRONJ).

Methods: As an initial step, we have performed shotgun proteome analysis of GCF isolated from normal (control) individuals. Optimization of extraction and LCMS analysis procedures were performed.

Results: Using the optimized protocols, we were able to identify a total of 246 protein species. These proteins included serum proteins, structural proteins, enzymes, metabolic proteins, and salivary proteins.

Conclusions: They included proteins that have the potential to be developed into biomarkers for the detection of diseases.

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PERIODONTOLOGY - 2
Friday, 24 November 2023

POTENTIAL ROLE OF DEC1 IN MEDIATING CIRCADIAN-RHYTHM DISRUPTION AND PERIODONTITIS

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Objectives: Bacterial infection is known to be a major cause of periodontitis. But recently, there are increasing reports that aging alone can aggravate periodontitis. The weakening of circadian-rhythm, one of the symptoms of aging, is involved in various disease pathways, and the functions of circadian clock genes (CCGs) involved in these pathways are important. In this study, the relationship between periodontitis and circadian-rhythm was identified, and the role of DEC1 as a candidate factor mediating circadian-rhythm disruption and inflammatory response was explored.

Methods: Circadian clock genes were measured using periodontal tissues of PER2-KI mice, and circadian-rhythm disruption in gingival fibroblasts (hGFs) was induced by treatment with KL044, a circadian clock inhibitor. The regulation of the inflammatory response was confirmed using DEC1 adenovirus and siRNA.

Results: First, the circadian-rhythm of periodontal tissue was confirmed through bioluminescence analysis. At the same time, the expression patterns of CGGs were confirmed at the mRNA level, and it was confirmed that the CGGs expression patterns decreased when cytokines were treated. In addition, by increasing inflammatory response factors in hGFs treated with KL044, it was confirmed that circadian-rhythm disruption could induce inflammatory responses. This suggests a relationship between periodontitis and circadian-rhythm disruption. It was confirmed that the expression of DEC1, one of the CGGs, increased in the gingival tissues of patients with periodontitis. In addition, it was confirmed that the expression of DEC1 increased in hGFs treated with LPS and IL1β. Finally, it was confirmed that overexpression of DEC1 increased the expression of catabolic factors and promoted the inflammatory response.

Conclusions: Collectively, we confirmed that DEC1, which is upregulated during periodontitis, has the potential to induce circadian-rhythm disruption in periodontal tissues and simultaneously promote inflammatory responses. This can be suggested as a new therapeutic pathway for controlling periodontitis and suggests that DEC1 can be a target for periodontitis treatment

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PERIODONTOLOGY - 2
Friday, 24 November 2023

EFFICACY OF SOFT TISSUE SUBSTITUTES FOR MUCOGINGIVAL DEFECTS: A META-ANALYSIS

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Objectives: Although numerous clinical studies have analysed the efficacy of soft tissue substitutes (STS) in the treatment of mucogingival defects, there is no current consensus on the non-inferiority of STS in comparison with autogenous grafts. This review analyses the efficacy of STS, in comparison to autogenous grafts, in root coverage and non-root coverage procedures surrounding the natural dentition.

Methods: Electronic searches of PubMed and EMBASE databases were conducted to identify relevant clinical studies. The primary outcomes analysed for root coverage procedures were: percentage mean root coverage (%MRC), change in recession depth (RECd), gain in keratinised tissue width (KTWg), and clinical attachment levels (CALg). The primary outcomes analysed for non-root coverage procedures were: KTWg and gingival thickness (GT). Other relevant outcomes, such as patient-related outcome measures (PROMs), complication rates, and surgical time, were also reported.

Results: A total of 34 publications were included. For root coverage procedures, acellular dermal matrices (ADM) were comparable to autogenous grafts at 6 months. However, at 12 months, autogenous grafts appeared to confer significantly better clinical outcomes, with higher change in RECd (WMD = 0.4 [95%CI = 0.2; 0.6]) and %MRC (WMD = 11.3 [95%CI = 2.9; 19.7]). Collagen matrices (CMX) and tissue-engineered constructs (TEC) performed inferiorly as compared to autogenous grafts at all time points. For non-root coverage procedures, autogenous grafts, achieved significantly greater KTWg post-augmentation compared to ADM (WMD = 2.5mm [95% CI = 1.7; 3.3]), CMX (WMD = 2.7mm [95% CI = 0.5; 4.9]) and TEC (WMD of 1.5mm [95% CI = 1.1; 1.9]). However, STS reduced complications, surgical time, minimised post-operative discomfort, enhanced esthetics, and improved PROMs.

Conclusions: Based on the findings of this review, autogenous tissues remain the gold standard for treating mucogingival defects surrounding natural teeth. Nevertheless, the benefits of STS are noteworthy and may be considered as viable alternatives to autogenous grafts.

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Friday, 24 November 2023

DIABETES, PERIODONTITIS, AND PPAR-GAMMA IN HUMAN GINGIVAL BIOPSIES: INFLAMMATORY PROFILE

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Objectives: The aim of our study was to evaluate whether the presence of T2DM has impact on the gingival inflammatory infiltrate of patients with P.

Methods: The total of 150 individuals went through a complete anamnesis, physical, periodontal and biochemical examination, and were separated into groups: Control (C), Periodontitis (P), T2DM individuals with health periodontium (T2DM_no_P), and well-controlled T2DM patients with Periodontitis (T2DM+P). By the time of surgical procedure, under patient's consent, it was collected a 1 mm fragment of gingiva. The gingival fragments were processed, paraffin embedded, and stained in Hematoxylin and Eosin for morphological analysis. Immunohistochemical reactions for detection of Peroxisome Proliferator Activated Receptor gamma (PPARG) were also performed.

Results: The results showed lower inflammatory cells rate in C group, while individuals from P and T2DM_no_P groups showed higher inflammatory cells density. The occupied area by collagen was evidently reduced in T2DM_no_P patients compared to other groups. At morphological analysis, we noted a predominance of polymorphonuclear cells PPARG immunolabeled in the lamina propria, mainly in groups with T2DM or P. Additionally, PPARG labeling was directly proportional to the presence of endothelium; the greater the amount of vessels present, the greater the immunoexpression of this molecule, a fact that occurred in the T2DM+P and P groups. The C group exhibited less immunopositivity, while T2DM+P, P and T2DM_no_P showed high inflammatory cells with this staining.

Conclusions: It was concluded that the presence of T2DM, not just Periodontitis, contributed to increased tissue inflammation and degradation of the extracellular matrix; and that there were higher PPARG immunopositivity in polymorphonuclear and endothelial cells in inflamed gingival biopsies.

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PERIODONTOLOGY - 2
Friday, 24 November 2023

REGENERATIVE POTENTIAL OF NON-SURGICAL PERIODONTAL THERAPY IN A YOUNG ADULT

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Objectives: Periodontitis can affect susceptible people of all ages but patients with periodontitis at a young age are considered to have a poorer prognosis compared to older patients and often requires additional periodontal surgical therapy, especially in intrabony defects. This case report describes the regenerative potential of non-surgical periodontal therapy in a young patient with generalized periodontitis stage IV grade C.

Methods: A 22-year-old female patient with no medical history complained of increasing spacings in her upper and lower front teeth making her concerned with the aesthetic appearance. Clinical examination showed generalized sound dentition, however, there were deep periodontal probing depths (PPD) of 8-9mm detected at multiple sites and noticeable spacings between her upper and lower left central and lateral incisors. The patient's plaque control was moderate to good. Radiographic examination revealed alveolar bone loss around multiple teeth with several sites exhibiting vertical bone defect, especially at her first molars. Based on the findings, the patient was diagnosed with generalized periodontitis stage IV grade C. A full mouth scaling and root surface debridement was done within 24 hours with the use of adjunctive systemic antibiotics which was the combination of amoxicillin and metronidazole for a week.

Results: At 2- and 6 months follow-up, the clinical examination showed resolution of deep periodontal pockets while radiographic examination at 12 months reveals signs of bone fill ranging from 11.8% to 4.8% at some sites with vertical bone defects. Subsequently, patient was referred to orthodontic department for closure of the spacings in the anterior region and recalled under supportive periodontal therapy every 3 to 4 months.

Conclusions: It can be concluded that non-surgical periodontal therapy alone could not only stabilize the periodontitis, but it is proven to regenerate the intrabony defects which normally involve advance regenerative procedures.

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Friday, 24 November 2023

NON-SURGICAL PERIODONTAL TREATMENT OUTCOMES IN THAI SUBJECTS WITH DYSLIPIDEMIA

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Objectives: To evaluate changes in periodontal parameters and lipid profiles in Thai subjects with dyslipidemia after receiving non-surgical periodontal treatment.

Methods: This case-control study recruited 32 subjects with dyslipidemia (DLP) who were not using lipid-lowering medication, and 16 systemically healthy individuals as the DLP and the control groups, respectively. All subjects received non-surgical periodontal treatment by means of scaling and root planing. Lipid profiles including total cholesterol (TC), triglyceride (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) and periodontal parameters including probing depth (PD), clinical attachment level (CAL), plaque index (PI) and sites with bleeding on probing (BOP) were recorded at baseline and 3 months after periodontal treatment. Changes in periodontal parameters and lipid profiles were evaluated.

Results: At baseline, both groups showed similar characteristics in terms of age, BMI, gender, and number of teeth. Periodontal parameters including PD, PI, percentage sites with BOP of both groups were comparable, except for CAL in that subjects in the DLP group had significantly higher CAL than those of healthy controls. At 3-month follow-up, decreasing trend of TC levels were observed in both groups. Overall periodontal parameters of both group were improved. No significant diffierence in terms of gaining of clinical attachment levels, changes in percentage sites with BOP and PI were found between the DLP and the control groups.

Conclusions: Subjects with dyslipidemia respond to non-surgical periodontal treatment as well as healthy subjects.

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PREVALENCE AND CLINICOPATHOLOGIC PROFILES OF BIOPSIED GINGIVAL LESIONS FROM 2 DENTAL SCHOOLS IN THAILAND

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Objectives: To analyze the prevalence and clinicopathologic profiles of biopsied gingival lesions from Chulalongkorn University and Rangsit University, Thailand.

Methods: Biopsy records of the participating institutions from 1995 to 2020 were reviewed for gingival lesions. The demographic data, site of the lesions, and diagnosis were collected. Data were analyzed by descriptive statistics.

Results: From a total of 16,207 biopsied cases, 1,589 cases (10.2%) were from the gingiva. The mean age ± SD of the patients was 42.3 ± 18.6 years with the highest prevalence being in the fourth decade of life (17.4%). A male-to- female ratio was 0.48:1. The most common location was the posterior gingiva of the mandible (27.4%). Regarding the type of gingival lesions, non-neoplastic lesions (88.5%) outnumbered neoplastic lesions (11.5%). The most common lesion was pyogenic granuloma, followed by irritation fibroma and peripheral ossifying fibroma. Among the neoplastic lesions, squamous cell carcinoma was the most prevalent lesion followed by papilloma and lymphoma.

Conclusions: Gingival lesions mostly occur in the fourth decade of life and have a predilection for female patients. The majority of the lesions are located in the posterior gingiva of the mandible. Non-neoplastic lesion, especially the reactive subtype, is the most prevalent group and pyogenic granuloma is the most common lesion at the gingiva. Data from this study represent biopsied gingival lesions from Thailand which may be different from those of other countries

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