IADR ANZ

INTERNATIONAL ASSOCIATION FOR DENTAL, ORAL, AND CRANIOFACIAL RESEARCH
AUSTRALIAN/NEW ZEALAND DIVISION

IADRANZ 64th Annual Conference PERTH 2026

# BOOK OF ABSTRACTS







**30 SEP – 2 OCT**

**The Pan Pacific Hotel • Perth • Western Australia**

**2026**

**Bridging Science, Society & Smiles: Advancing Oral Health Together**

## Host Institution

Proudly supported by the **UWA Dental School** and the **Oral Health Centre of Western Australia (OHCWA)**.

80 YEARS OF DENTAL EDUCATION IN WA

# Bridging Eight Decades of Scientific Progress

2026 marks a historic milestone for Western Australia. Join us as we celebrate 80 years of excellence, innovation, and community at the 64th IADR ANZ Division Meeting.

| 64th | 80yrs |
|---|---|
| ANNUAL MEETING | OF WA EDUCATION |

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# ORAL PRESENTATION SCHEDULE

## DAY 1 — Thursday, 1 October 2026

### Session 1 | 11:00–12:00 | Golden Ballroom Middle

**Session Topic** — **Digital Dentistry, Imaging, and Emerging Technologies**

| Presenter | Presentation Title |
|---|---|
| A. H. Brook | Dental Development is a Complex Adaptive System and Tooth Agenesis is a variation of its Phenotypic Outcome |
| Dilan Patel | A systematic review of the effect of tooth agenesis on tooth, arch and facial profile dimensions |
| A. Gurr | Does Tooth Agenesis affect dental arch dimensions? |
| G.V. Jose | Automating the measurement of tooth morphology: A deep learning methodology |
| Diya Harrypersadh | A Review of the Genetic Aspects of Syndromes exhibiting both Tooth Agenesis and Anomalies of Brain Development |
| L. Ding | Bridging the App Gap: Evaluating Preventive Oral Health Apps for Children |

### Session 2 | 13:00–14:00 | Golden Ballroom Middle

**Session Topic** — **Paediatric & Special Needs Dentistry**

| Presenter | Presentation Title |
|---|---|
| Dao Hang Nga | Efficient Class II Correction with the Carriere Motion Appliance: A Case Report |
| M.A.B. Paschoal | Evaluation of the Effect of Silicon-Enriched Toothpaste on Teeth with Molar-Hypomineralization: A Randomized Controlled Clinical Trial |
| M.A.B. Paschoal | From Simulation to Clinical Diagnosis: Can 3D Models Improve Enamel Defect Diagnosis? |
| Leah Hobbs | Preventable Paediatric Dental Presentations to Emergency Departments: A Metropolitan Queensland Analysis |
| Israa Awadh | Resources and experience, not care: CALD children's dental service use |

### Session 3 | 14:45–18:00 | Golden Ballroom Middle

**Session Topic** — **Biomaterials / Cariology & Restorative Dentistry / Endodontics / Prosthodontics**

| Presenter | Presentation Title |
|---|---|
| Huilin Zhu | An Anatomical Geometric Framework for Single-Tooth Implant Planning by Decoupling Perception from Reasoning |
| Kah Seng Low | An in vivo Investigation of a Novel Collagen Membrane Incorporating Triketone in Class II Furcation Defects in a Sheep Model |
| Ashagrachew Tewabe Yayehrad | Development and evaluation of smart nanocomposite systems with sustained antifungal properties for oral-targeted delivery |
| Fei Chen | Effect of Powder/Liquid Ratio on Properties of Experimental RMGIC |
| Asana Pour Ronagh | Effects of resin cements on the optical properties of indirect restorations |
| Fouzhan Chitsaz | Quantum Dot–Mesoporous Silica Fillers for Antibacterial Dental Composites |
| Hongyu Xie | Injectable ACMZP-loaded HAMA hydrogel for dentin remineralization and drug-free antimicrobial effect |
| Ya Zhang | Reinforcement of glass ionomer cement using ultralong hydroxyapatite nanowires |
| Anahita Manafi Khajeh Pasha | Synthetic Carbonate Apatite for Bone Regeneration: Large Animal Pilot Study |
| Wanlu Ouyang | Tideglusib-loaded hyaluronic acid hydrogels enhance odontogenic differentiation with adjunct low-intensity focused ultrasound |
| Ziqi Yan | Ultrasound-Responsive Remineralization Gel for White Spot Lesions |
| An Nguyen Hoai | Clinical effectiveness of Er:YAG laser preparation for non-carious cervical lesion restorations: A split-mouth clinical study |
| Khaled E Ahmed | Patient Age and Aesthetic Concerns Drive Tooth Wear Management Decisions in Australia |
| Yipeng Fu | Smart peptide-based materials and their clinical application for caries management |
| Karolinne Martins | Strength Development with Time of Modern Glass Ionomer Cements |
| Unni Krishnan | Long-term Outcome of Composite Resin Restoration on Cracked Teeth |
| Nagisa Kanazawa | Comparative Study on the Cleaning Effectiveness of Electric Toothbrushes in Periodontal Pockets |

## Session 4 | 17:00–18:30 | Golden Ballroom South

**Session Topic** **Dental Public Health**

| Presenter | Presentation Title |
|---|---|
| Anthony Craig | Oral Health Inequalities in the ADF: A Retrospective Observational Study. |
| Aoi Yamada | Possible relationship Between Perioperative Oral Care Interventions and Surgical Site Infection in Patients Undergoing Colorectal Cancer Surgery |
| V. Dickson-Swift | Advocacy in action: Improving oral health outcomes for rural communities in Victoria |
| Marwa Mostafa | Hospital Oral Health Encounters Among Justice-Involved Youth: National Linked Data |
| A. Yokoi | Association among oral hypofunction, malnutrition, postoperative complications and QoL in head-and-neck cancer survivors: a prospective cohort study. |
| Xuanyu Chen | Associations between sugar intake, oral microbiome ecology, and psychological distress in an Indigenous Australian cohort |
| Sharon Jose | Barriers and facilitators influencing oral health practices among preschool children of Indian migrants living in Victoria, Australia |
| Akash Sivam | Impact of head and neck cancer in First Nations Communities - A qualitative study |

## Session 5 | 17:00–18:30 | Golden Ballroom North

**Session Topic** **Digital Dentistry, Imaging, and Emerging Technologies / Oral Implantology**

| Presenter | Presentation Title |
|---|---|
| M. Pundir | Oral Melatonergic Axis: Real-Time Aptamer-Based Salivary Melatonin Sensing and Characterization of Receptor Signaling Networks |
| A Barazanchi | Properties of interim crown materials fabricated using digital and conventional methods |
| R. Chen | SmilesUp SMS Intervention to Prevent Early Childhood Caries: an RCT |
| S. Bracksley-O'Grady | Task-shared Oral Cancer Screening at Rural Agricultural Touchpoints an Implementation Pilot |
| Cam L.N.H | Morphological and Morphometric Characteristics of the Nasopalatine Canal in Dentate and Edentulous Patients: A Cone-Beam Computed Tomography Cross-Sectional Study |
| Thi Mai Anh Nguyen | Morphological Characterisation of Osteocytes in Peri-Implant Bone Using Acid-Etched Scanning Electron Microscopy |
| Ashi Mashoof | Comparison of tutor feedback, self-assessment and intraoral scanner feedback in improving fixed prosthodontic crown preparation by undergraduate dental students |

# DAY 2 — Friday, 2 October 2026

## Session 1 | 11:00–12:00 | Golden Ballroom South

**Session Topic** — **Dental Public Health / Dental Education**

| Presenter | Presentation Title |
|---|---|
| Nesa Aurlene Jayadhas | Understanding Barriers and Facilitators to Oral Health in Residential Aged Care Using the Theoretical Domains Framework |
| Thilini Jayasinghe | Understanding Research Capacity and Culture Among Oral Health Clinicians in a large Public Dental Service in NSW, Australia |
| K. M. McCormick | When Lost Teeth Change the Measure: Distortion in Periodontal Burden Estimates |
| Rachel Wong | Impact of Self-Directed Online Training and Educational Resources on Dental Students' Shade-Matching Accuracy |
| Chrishan Fernando | Weaving Educational Institutions to Support Mental Health in Dental and Oral Health Students: A Scoping Review |
| Kristy S. Choi | Trauma-Informed Care Practice for Dental Practitioners: A Scoping Review |

## Session 2 | 11:00–12:00 | Golden Ballroom Middle

**Session Topic** — **Periodontology & Peri-implant Diseases**

| Presenter | Presentation Title |
|---|---|
| S. Talapaneni | Associations between the Oral Microbiome and Periodontal Parameters in diabetic and non-diabetic Aboriginal and Torres Strait Islander Adults. |
| Yinghong Zhou | High-Purity Plasma-Derived Extracellular Vesicles Restore Macrophage Homeostasis and Enhance Periodontal Ligament Cell Differentiation |
| Xinyue Wang | Periodontitis-Induced Gut Microbiota Dysbiosis Drives Neuroinflammation and Glial Homeostasis Disruption |
| Negar Yazdani | SNAPP-star antimicrobial peptide-polymers are effective against bacterial biofilms and Porphyromonas gingivalis |

## Session 3 | 13:00–14:00 | Golden Ballroom Middle

**Session Topic** — **Periodontology & Peri-implant Diseases / Microbiology**

| Presenter | Presentation Title |
|---|---|
| Minh Tran | Validity of S. mutans as a Model for Dental Implant-Associated Biofilm Research: Biological Rationale, Experimental Models, and Characterisation Methods |
| Tao Wang | The influence of implant supra-structure on the efficacy of mechanical implant surface decontamination methods: an in vitro study |
| Raymond Shi | The link between the oral microbiome and cardiovascular disease in Indigenous Australian populations |
| H. Sato | Molecular Microbiological Profiling in the Remaining Bottled Black Tea and Coffee Beverages |
| Y. Kato | Profiling of Microbiota Isolated From Smartphone Touchscreens: Detection of Oral Bacteria and Effectiveness of UV Irradiation |

## Session 4 | 14:30–15:30 | Golden Ballroom Middle

**Session Topic** — **Oral & Maxillofacial Surgery / Oral Medicine & Oral Pathology / Oral Biology**

| Presenter | Presentation Title |
|---|---|
| Munira Xaymadran | Investigating the Impact of Maternal Periodontitis on Fetal Development |
| N. Varghese | Prevalence of postoperative complications following oral cancer surgery in a South Australian population: A cohort study |
| A. Efthymiou | The Effect of an Intermediate Splint on the Accuracy of Patient-Specific Implants in Orthognathic Surgery: A Cohort Study |
| Y. N. Tran | Integrated Multi Omics Indicates a miR-1321 and miR-320 Family Related Network as Diagnostic Biomarkers in Oral Squamous Cell Carcinoma |
| Phan Thi Thu Hang | Crown and Pulp Morphology of Primary Second Molars on Cone-Beam CT Images |

## Session 5 | 15:45–16:45 | Golden Ballroom Middle

**Session Topic** — **Orthodontics / Paediatric & Special Needs Dentistry / Others**

| Presenter | Presentation Title |
|---|---|
| Peiwei WU | A Clinic-Informed Biomechanical Strategy for Arch-Specific TAD Mechanics in High-Angle Bimaxillary Protrusion Retreatment |
| Lydia See | Developing the Modified Oral Health Assessment Tool (M-OHAT©) Training Materials for Non-Oral Health Professionals |
| E. Maretic | Acceptability of Cloud Shading of a New Conventional GIC |
| Mo Halane | Light-cured silver fluorides in hypomineralised molars |

## Session 6 | 16:45–17:30 | Golden Ballroom South

**Session Topic** — **Oral Implantology**

| Presenter | Presentation Title |
|---|---|
| Qiqian YAN | Osteoblast Adhesion on Nano-Engineered Dental Implants: A Single-Cell Force Study |
| A. Hendawi | Implant Distribution in the Edentulous Mandible: A CBCT Analysis |
| A. Hamilton | In Vivo Assessment of Mandibular Flexure in Full-Arch Implant Prostheses Using Photogrammetry: A Pilot Study |

## Session 7 | 14:30–17:30 | Golden Ballroom North

**Session Topic** — **Dental Public Health**

| Presenter | Presentation Title |
|---|---|
| Krishna Subedi | Challenges in Conducting Oral Health Epidemiological Surveys: A Scoping Review |
| K. Kajal | Changes in dental anxiety in a cohort followed from 15 to 52 years |
| Arash Rudman | Evaluation of the Senior Dental Benefits Scheme Demonstration Project for Older Adults |
| Nadia Kaunein | Area Deprivation, Remoteness and Oral Health Behaviours Among Australian Adolescents: A Multilevel Study |
| Shalinie King | Keeping your teeth, protecting your heart: Tooth Retention Reduces Cardiovascular Risk in Australian Women |
| Wajeeha Zahid | Measuring food insecurity: Psychometric validation and critical analysis of the Household Food Insecurity Access Scale among Aboriginal and Torres Strait Islander People |
| A. Ngo | Oral health and mental health: lived experiences of stigma and discrimination for Australians with mental health conditions |
| S Bracksley-O'Grady | Oral Health in Out-of-Home Care: Lived Experiences and Co-Designed Solutions |
| Manisha Tamrakar | Periodontitis and multimorbidity: A conceptual framework |
| Niluja Karmacharya | Prevalence and predictors of non-nutritive sucking habits in infants and children: A systematic review and meta-analysis |
| Leanne Smith | Strengthening the Aboriginal Oral Health Workforce: Barriers and Enablers Across the Education Continuum |
| Sarah Ng | Sustainable smiles - an overview of dental solid waste management and associated environmental impacts in Australia |
| Sudheer Babu Balla | The IMPROV project: Co-designing a culturally appropriate oral health promotion resource with Karen refugee families in Victoria |
| A. Singh | The Network Psychometric Properties of the Temporomandibular Joint Disorder Questionnaire among Australian Adults |

# Content Outline

# Oral Presentation Abstracts

2 Days • 12 Sessions • 84 Oral Presentations

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## DAY 2 — FRIDAY, 2 OCTOBER 2026

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# DAY 1

## Thursday, 1 October 2026

| Session 1 | Digital Dentistry, Imaging, and Emerging Technologies |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Dental Development is a Complex Adaptive System and Tooth Agenesis is a Variation of its Phenotypic Outcome |
| 2 | A Systematic Review of the Effect of Tooth Agenesis on Teeth, Arch and Facial Profile Dimensions |
| 3 | Does Tooth Agenesis Affect Dental Arch Dimensions? |
| 4 | Automating the Measurement of Tooth Morphology: A Deep Learning Methodology |
| 5 | A Review of the Genetic Aspects of Syndromes Exhibiting Both Tooth Agenesis and Anomalies of Brain Development |
| 6 | Bridging the App Gap: Evaluating Preventive Oral Health Apps for Children |

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 1

01

# Dental Development is a Complex Adaptive System and Tooth Agenesis is a Variation of its Phenotypic Outcome

**A. H. Brook, and M. Brook O'Donnell**

*Adelaide University and University of Pennsylvania*

**PRESENTER: A. H. Brook**

**Objectives:** To review evidence for dental development as a Complex Adaptive System (CAS) and to explore the interactions in networks of genetic, epigenetic and environmental factors that lead to the emergence of a tooth Agenesis phenotype.

**Materials and Methods:** Investigate published evidence from a narrative review of dental development and from a systematic review of Tooth Agenesis.

**Results:** Dental development demonstrates the general characteristics of a CAS i.e. self-organisation, self-adaptation, emergence, multitasking, robustness, critical phases and variation. These reflect dynamic interactions at different stages of this multifactorial, multilevel, multidimensional process from molecular to cellular to tissue to tooth germ to mineralisation and emergence levels. Heterogeneity drives molecular and cellular events during tooth agenesis. Tooth agenesis arises in the Initiation phase but is associated with changes in the subsequent Morphogenesis phase when tooth size and shape are determined; the same mutated genes, e.g. Msx 1, Pax 9, Axin 2, Wnt 10a, continue to be active. Evidence for interactions of multiple factors in the aetiology came from investigating members of a family with an identified mutation, T 62, of Pax 9 over several generations. The phenotype varied from 2 congenitally absent teeth to 18 in others with the same mutation. Larger numbers of congenitally missing teeth are associated with more marked changes in the size and shape of the formed teeth. Environmental factors identified in the literature review included maternal smoking during pregnancy, poor nutrition, systemic infections and toxins. Agents such as male hormones affecting dizygotic twin females in utero and toxic levels of lead may have their actions through inducing epigenetic changes.

**Conclusion:** This evidence that dental development is a CAS and that networks of multiple interacting factors during Initiation and Morphogenesis lead to the emergence of TA. provides a foundation for a series of studies.

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 2

02

# A Systematic Review of the Effect of Tooth Agenesis on Tooth, Arch and Facial Profile Dimensions

**Dilan Patel, Jamal Giri, Matthew Brook O'Donnell, Angela Gurr, George V Jose, Toby Hughes, Lewis Mitchell, Lyle J Palmer, Alan Henry Brook**

*Adelaide University, University of Pennsylvania*

**PRESENTER: Dilan Patel**

This systematic review will synthesise evidence on whether non-syndromic tooth agenesis is associated with altered tooth dimensions, dental arch and facial profile morphology. Dental development is a multilevel, multidimensional and progressive process influenced by genetic, epigenetic and environmental factors, interacting as a complex adaptive system. This systematic review aims to determine whether non-syndromic tooth agenesis is associated with measurable morphological differences in tooth dimensions and dental arch measurements compared with matched controls.

**Materials and Methods:** This is a systematic review conducted in accordance with PRISMA 2020. Electronic databases, including Medline/PubMed, Scopus, Embase and Web of Science, were searched from inception to 30 April 2026. Eligible studies will include children and adolescents with non-syndromic hypodontia and a comparison group without tooth agenesis. Outcomes include mesiodistal and buccolingual tooth dimensions, crown height, intercanine and intermolar widths, arch circumference and maxillary or mandibular arch morphology. Two reviewers will independently screen studies, extract data and assess risk of bias using Joanna Briggs Institute (JBI) critical appraisal tools appropriate to study design. Findings are synthesised by jaw, sex, tooth-agenesis severity, missing-tooth pattern and measurement method; meta-analysis is undertaken where clinical and methodological homogeneity permit.

**Results**: 15 studies met the inclusion criteria. Initial synthesis indicates that tooth agenesis is generally associated with reduced tooth dimensions and altered dental arch dimensions compared with controls. The magnitude and distribution of these differences appear to vary by jaw, sex, number and location of missing teeth, and measurement modality.

**Conclusion:** Morphological and dimensional differences in tooth agenesis extends beyond isolated tooth absence, reflecting coordinated variation in tooth number, size, shape and arch form within a complex developmental system. Clarifying these patterns can improve phenotypic classification, orthodontic-restorative planning, and future genotype–phenotype research.

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 3

03

# Does Tooth Agenesis Affect Dental Arch Dimensions?

**A. Gurr, M. Brook O'Donnell, T. Hughes, J. Giri, M. Farella, D. Patel, & A.H. Brook**

*Adelaide University, University of Pennsylvania, B.P. Koirala Institute of Health Sciences, and the University of Otago*

**PRESENTER: A. Gurr**

**Objectives:** To measure dental arch dimensions on pre-orthodontic dental casts from tooth agenesis (TA) patients and matched controls, to identify between-group differences.

**Material and Methods:** N=136 dental casts (68 TA, 68 controls) matched for age (10-21 years), sex and ethnicity. Customised MeshLab-based software manually placed landmarks on 3D STL images (maxillary and mandibular) dentitions, and gingival margins. Linear measurements were derived by projecting 3D landmarks onto an occlusal plane defined by singular value decomposition of antimere landmarks, accounting for asymmetry. Intercanine width (IC), intermolar width (IM), arch length (AL) and arch circumference (AC) were recorded. Intra and interoperator reliability were assessed using Intra Class Correlation (ICC), Krippendorff's alpha and Dahlberg statistics.

**Results:** Reliability was higher for IC and IM widths than for Al and AC. The ICC intraoperator values were IC (0.99), IM (0.93), AL (0.71) and AC (0.34); Interoperator: ICC: IC (0.99), IM (0.92), AL (0.68) and AC (0.61). All statistical approaches yielded consistent findings. Descriptive statistics showed: 1. In controls, males had larger arches than females across all eight measurements, 2. male controls had larger arches that TA males. 3. In contrast, TA females had larger arches than control females in 5 out of 8 arch measurements (maxillary IM, AL, AC, Mandibular IM, AL). To examine the inverted patterns of TA female > control females, univariate models (independent t-tests) were applied. For mandibular arch IM, TA subjects (M=47.24, SD=3.37) had significantly larger arches than control (M=45.41, SD=3.36) (t=-2.34, p=0.02 [CI -3.39, -0.27]) and in the maxillary arch, significantly larger AC (M=80.13, SD=5.70) in TA compared to control (M=76.72, SD=6.84) (t=-2.35, p=0.02 [CI –6.32, -0.51]).

**Conclusion:** Tooth Agenesis does affect the development of the dental arches, with implications for treatment planning. Analysis using multilevel models can explore further sex specific differences found.

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 4

04

# Automating the Measurement of Tooth Morphology: A Deep Learning Methodology

**G.V. Jose, N.C. Kurian, L. Palmer, T. Hughes, A.H. Brook**

*Adelaide University*

**PRESENTER: G.V. Jose**

**Objectives:** To develop and test a fully automated landmark detection method for measuring crown dimensions from 3D digital scans. This initial study evaluated automated landmark detection as the foundation for downstream crown measurement.

**Material and Methods:** 31 3D digital dental scans were manually annotated for the landmark classes of Mesial and Distal contact points, Cusp tips and Gingival margin points. A fully automated pipeline integrating 3DTeethSAM tooth segmentation with ToothInstanceNet landmark model was applied to each scan without retraining or finetuning. Predicted landmarks were compared to expert reference per tooth and per class at distance thresholds of 0.5, 1.0, 2.0 and 3.0mm. Mesiodistal width and Buccolingual width were derived from validated landmarks and compared against expert manual measurement on the scans.

**Results:** Across 31 scans, the pipeline detected landmarks on teeth with F1 scores at 2mm threshold of 1.0 (Mesial), 0.96 (Distal), 0.93 (Innerpoint) and 0.86 (Cusp), including canines detected via geometric inference. Median Euclidean errors of correctly identified landmarks: Mesial 0.49mm, Distal 1.01mm, Innerpoint 0.69mm and Cusp 0.48mm. Derived measurements when compared against expert manual measurements for mesiodistal width showed a mean absolute difference of 1.15 ± 0.54 mm across 340 teeth and for buccolingual width showed a mean absolute difference of 0.32 ± 0.27 mm across 392 teeth. Largest errors were observed with second molars across both landmarks and measurement metrics.

**Conclusion:** A fully automated landmark detection pipeline achieved near median sub-millimeter accuracy on relevant landmark classes. This provides a framework for performing end-to-end automated measurements of dental crowns using 3D scans. These findings warrant further development and evaluation of the methodology. This would enable larger scale morphometric studies with multiple clinical applications.

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 5

05

# A Review of the Genetic Aspects of Syndromes Exhibiting both Tooth Agenesis and Anomalies of Brain Development

**Diya Harrypersadh, Dilan Patel and Alan Henry Brook**

*Adelaide University*

**PRESENTER: Diya Harrypersadh**

**Objectives:** To identify genetic variants associated with concomitant tooth agenesis (TA) and abnormalities of central nervous system (CNS) development, and to determine how these findings expand the current understanding of genes implicated in tooth developmental disorders.

**Materials and Methods:** A scoping review was conducted in accordance with the Arksey and O'Malley framework, refined by Levac et al., and reported using PRISMA-ScR guidelines. A protocol was developed a priori and registered with PROSPERO. Electronic databases including PubMed/MEDLINE, Embase, Scopus, and OMIM were searched from inception to final search date, with supplementary citation tracking via Google Scholar. Eligible studies included original human cohort, diagnostic genetic, population, and gene-association studies reporting both TA and CNS developmental abnormalities with identified pathogenic or likely pathogenic genetic variants. Data extracted included syndrome phenotype, implicated genes, inheritance patterns, and genotype–phenotype associations. Due to heterogeneity in study design and phenotypic reporting, findings were synthesised descriptively without meta-analysis.

**Results:** The review identified substantial developmental overlap between odontogenesis and neurodevelopment through shared embryological origins, neural crest cell interactions, and conserved signalling pathways including WNT, BMP, FGF, and SHH. Multiple genes traditionally associated with neurodevelopmental syndromes were also implicated in TA phenotypes, suggesting pleiotropic effects across craniofacial and CNS development. The literature demonstrated significant heterogeneity in phenotypic reporting and limited interdisciplinary investigation, with many studies focusing predominantly on either neurological or dental manifestations.

**Conclusion:** This review highlights a significant genetic and developmental intersection between TA and CNS abnormalities and identifies CNS-associated genes as potential contributors to tooth developmental disorders. Increased interdisciplinary awareness may facilitate earlier diagnosis, targeted genetic testing, and improved management of syndromic patients presenting with either dental or neurodevelopmental abnormalities.

DAY 1 | SESSION 1: Digital Dentistry, Imaging, and Emerging Technologies

ORAL 6

06

# Bridging the App Gap: Evaluating Preventive Oral Health Apps for Children

**L. Ding, R. Aiyar, J. Groundwater, S. Nath**

*Adelaide University*

**PRESENTER: L. Ding**

**Objectives:** The aim of this study is to develop an assessment tool for evaluating the quality of oral health education in mobile applications for children aged 4-15 years and their parents or caregivers and to assess the quality of existing oral health education mobile applications in the Apple App Store and Google Play Store.

**Materials and Methods:** This mixed-method study was conducted in two stages. Stage one recruited 59 participants: n = 15 dental professionals; n = 20 public health professionals; n = 13 parents or caregivers; and n = 11 software and design professionals with application experience. Participants completed an online questionnaire evaluating a preliminary assessment tool and optional semi-structured interview. Questionnaire data were summarised descriptively and interviews were analysed using template analysis to inform assessment tool refinement. Stage two applied the assessment tool to 20 eligible oral health applications for children available through the Australian Apple App Store and Google Play.

**Results:** From interviews with 59 participants, five themes were developed 1) Validity and applicability of the assessment framework 2) Clarity and structure of assessment items 3) Evidence-based oral health education content 4) User engagement and application design 5) Inclusion, ethics and safety in mobile applications.

**Conclusion:** The study presents a pilot tool addressing the lack of framework tailored to evaluating preventive oral health education for children and parents or caregivers. Applied to apps in the Australian marketplace, it identifies variability in quality and the need for clearer guidance on evidence-based, user-designed app development. As digital health expands, the tool may support dental professionals, public health bodies and application developers in designing, and evaluating applications, particularly for families facing socioeconomic or geographic barriers to care. Further refinement, validation, and outcome-based research are required. Additional Notes: App assessment is ongoing. Ethics approval HREC/HL/2025/0397, informed consent obtained electronically and verbally.

# DAY 1

## Thursday, 1 October 2026

**Session 2** | **Paediatric & Special Needs Dentistry**

| No. | Oral Presentation Title |
|---|---|
| 1 | Efficient Class II Correction with the Carriere Motion Appliance: A Case Report |
| 2 | Evaluation of the Effect of Silicon-Enriched Toothpaste on Teeth with Molar-Hypomineralization: A Randomized Controlled Clinical Trial |
| 3 | From Simulation to Clinical Diagnosis: Can 3D Models Improve Enamel Defect Diagnosis? |
| 4 | Preventable Paediatric Dental Presentations to Emergency Departments: A Metropolitan Queensland Analysis |
| 5 | Resources and Experience, Not Care: CALD Children's Dental Service Use |

DAY 1 | SESSION 2: Paediatric & Special Needs Dentistry

ORAL 1

07

# Efficient Class II Correction with the Carriere Motion Appliance: A Case Report

**Dao Hang Nga, Tran Thi My Hanh, Vo Truong Nhu Ngoc, Cao Thi Phuong Thao**

*School of Dentistry, Hanoi Medical University*

**PRESENTER: Dao Hang Nga**

**Introduction:** Class II correctors in adolescents often present challenges due to bulky designs and discomfort. The Carriere Motion Appliance (CMA) offers a less invasive, low-profile alternative that enables early Class II correction by establishing Class I molar and canine relationships prior to comprehensive fixed appliance therapy, during a period of high patient compliance.

**Case description:** 10 – year - old Vietnamese boy, Normodivergent Retrognathic Class II pattern, Bilateral class II molar and canine relationship, Increased overjet (6.4mm), Normal overbite (2.5mm), Proclined upper and lower incisors. Mesially rotated U6. Treatment plan: Phase 1: CMA to achieve Class I dental relationship. Phase 2: Fixed appliances to achieve a stable and functional occlusion. Outcomes: The patient showed excellent compliance, and after 2.5 months of CMA therapy, a Class I molar and canine relationship was attained, enabling transition to the second phase.

**Conclusion:** The CMA proved to be an effective and time-efficient modality for the correction of Class II malocclusion, facilitating favorable molar and canine relationships through upper molar distalization and lower molar mesialization.

DAY 1 | SESSION 2: Paediatric & Special Needs Dentistry

ORAL 2

08

# Evaluation of the Effect of Silicon-Enriched Toothpaste on Teeth with Molar-Hypomineralization: A Randomized Controlled Clinical Trial

**L. Póvoa-Santos, L. Gismonti-Gaudêncio, D. Carneiro, F. C. Sampaio, F. Vilhena, C. Martins-Pfeifer, P.A. Martins-Júnior, M.A.B. Paschoal***

*Charles Sturt University*

**PRESENTER: M.A.B. Paschoal**

**Objectives:** This randomized, triple-blind clinical trial, approved by the Institutional Review Board (IRB Opinion No.7,775,140), aimed to evaluate the effect of a silicon-enriched toothpaste on remineralization and tooth sensitivity in teeth with Molar-Incisor Hypomineralization (MIH).

**Materials and Methods:** Thirty children participated, randomized into: Experimental Group (G1: REFIX® Booster) and Control Group (G2: conventional toothpaste with 1450 ppm F), totaling 95 affected teeth evaluated in the study. The intervention included professional prophylaxis and daily home use. The outcomes were: mineral gain, assessed using Light-Induced Quantitative Fluorescence, and tooth sensitivity, assessed using the Visual Analog Scale (VAS), at T0 (baseline), T1 (5 min after prophylaxis), T2 (1 h after prophylaxis), and T3 (45 days of home use). For statistical analysis, Python software (SciPy 1.x; stats models 0.14) and Linear Mixed-Effects Models (LMM) with a random intercept per patient were used to account for tooth clustering and baseline imbalances in age and VAS, considering a 95% confidence interval.

**Results**: The groups showed baseline equivalence in QLF (p>0.05). Regarding remineralization, in both protocols, there was no significant mineral gain or difference between groups. Regarding sensitivity, the group × time interaction revealed a significant difference (p=0.011); G1 demonstrated superiority in maintaining the analgesic effect between T0 and T3, with a mean reduction of 1.62 points on the VAS scale, compared to 0.42 in G2.

**Conclusion:** Although the protocols had a comparable effect on remineralization at 45 days, G1 demonstrated better maintenance of reduced dental sensitivity compared to G2.

DAY 1 | SESSION 2: Paediatric & Special Needs Dentistry

ORAL 3

09

# From Simulation to Clinical Diagnosis: Can 3D Models Improve Enamel Defect Diagnosis?

**M.A.B. Paschoal, A. Nogueira, J. Delgado, L. Povoa-Santos, T.G. Vieira, L. Ottoni, G. Alves, F. Mateus, P.A. Martins-Junior**

*Charles Sturt University*

**PRESENTER: M.A.B. Paschoal**

**Introduction:** The diagnosis of enamel development defects (ED) is a common challenge in dental practice. Exclusively lecture-based methods tend to result in long-term memory loss, which allows for the integration of alternative methodologies. This study aimed to evaluate the impact of teaching stations using 3D-printed dental models on diagnostic accuracy and student confidence regarding the different types of EDs.

**Materials and Methods:** A randomized clinical trial was conducted with 36 dental students divided into: G1-Control (theoretical class; n=25) and G2-Experimental (theoretical class + practical stations; n=11). Group 2 participated in four thematic stations (Dysplastic Amelogenesis, Molar-Incisor Hypomineralization, Dental Fluorosis, and Enamel Hypoplasia), each lasting 5 minutes, for a total of 20 minutes of practice. Measures of diagnostic accuracy (0–10) and self-reported confidence (1–5 Likert scale) were assessed at five time points: baseline (Q1), post-theory (Q2), post-practical station (Q3), 60 days (Q4), and 180 days (Q5). Mann-Whitney and Wilcoxon tests were performed ($p<0.05$).

**Results:** At baseline (Q1), the groups were equivalent in accuracy ($p=0.63$) and confidence ($p=0.21$). After the theoretical class (Q2), there was no difference between groups ($p=0.48$). After the practical stations (Q3), G2 showed greater confidence than G1 ($p=0.0125$). At 60 days (Q4), G2 outperformed G1 in correct responses ($p=0.0058$) and confidence ($p=0.0024$). At 180 days (Q5), G2 maintained superiority in correct responses ($p=0.0013$) and confidence ($p=0.0002$). The experimental group (G2) maintained the gain in confidence throughout the follow-up period ($p=0.006$), while the control group (G1) returned to levels close to baseline.

**Conclusion:** It is concluded that 3D models, as a complementary strategy to theoretical instruction, improved long-term retention and diagnostic confidence in the teaching of enamel defects.

DAY 1 | SESSION 2: Paediatric & Special Needs Dentistry

ORAL 4

10

# Preventable Paediatric Dental Presentations to Emergency Departments: A Metropolitan Queensland Analysis

**Leah Hobbs, Sanketha Udugal Motege Gouree, Greg Kyle, Julian Wong, Anura Ariyawardana, Ruvini Manjula Hettiarachchi, Mehwish Nisar, Sobia Zafar**

*School of Dentistry, The University of Queensland, Brisbane, QLD 4006, Australia. Metro South Health, Qld, Australia*

**PRESENTER: Leah Hobbs**

**Background:** To describe and analyse the epidemiological characteristics of preventable dental-related emergency department (ED) presentations among children and adolescents aged 0–17 years in the Metro South Health (MSH) service in Queensland.

**Materials and Methods:** A retrospective review of 1,108 dental ED visits from 2018 to mid-2024 was conducted. Data were analysed through Stata 19.5 for demographic characteristics, hospital utilisation, referral sources, triage categories, time-based trends, and outcomes.

**Results:** The mean age at presentation was 6.83 years, with the highest proportion of visits occurring in children aged 4–9 years (37.67%), followed by those aged 0–3 years (33.60%). Overall, males accounted for 51.81% of presentations. The majority of cases were seen at the LG Hospital (59.75%). Most patients arrived via walk-in or private/public transport (96.03%) and were self-referred (90.88%). Australasian Triage Categories 3 and 4 comprised 89.26% of visits. Most patients resided within the MSH catchment area, with a small proportion (4.60%) coming from elsewhere in Queensland. Discharge was the most common outcome (80.51%) for those who attended ED for a preventable dental presentation. Notably, over 70% of presentations occurred outside standard Metro South Oral Health clinic operating hours. There was an increase in the number of presentations during 2020-21 which aligned with closures of public dental clinics due to COVID.

**Conclusion:** Paediatric dental ED presentations are frequent and often occur outside regular dental opening hours, with a high proportion of self-referrals and moderate urgency cases. These findings highlight the need for improved access to preventive dental care within community settings and after-hours oral health services.

DAY 1 | SESSION 2: Paediatric & Special Needs Dentistry

ORAL 5

11

# Resources and Experience, Not Care: CALD Children's Dental Service Use

**Awadh I, Ball L, Nickbakht M, Nisar M, Khan A, Zafar S**

*The University of Queensland*

**PRESENTER: Awadh I**

**Objectives:** Culturally and linguistically diverse (CALD) families in Australia face persistent barriers accessing dental care for their children, yet child-specific evidence on service-use patterns is limited. This study examined barriers, enablers, and sociodemographic factors associated with children's dental service use among CALD caregivers in Queensland.

**Materials and Methods:** A cross-sectional survey of CALD caregivers of children aged under 18 years was conducted across Queensland between November 2024 and August 2025, recruited through community organisations, language schools, and online platforms. A 37-item questionnaire developed using the Capability, Opportunity, Motivation-Behaviour (COM-B) framework measured caregiver experiences. Data were analysed using exploratory factor analysis (EFA) to identify latent constructs, followed by staged multinomial logistic regression examining associations between factor scores, sociodemographic factors, and service-use type (private only, public only, or mixed-sector; public only as reference).

**Results:** Among 385 participants, EFA identified a seven-factor solution (four barrier, three enabler), accounting for 48.37% of variance (KMO = .85). Private-only use was significantly associated with higher English proficiency ("very well": OR = 5.65, 95% CI [2.01, 15.88]), private dental insurance (OR = 4.91, 95% CI [2.66, 9.09]), and employer-based dental insurance (OR = 4.84, 95% CI [1.25, 18.73]). Mixed-sector use was associated with fewer structural and provider-related barriers (OR = 0.82, 95% CI [0.69, 0.96]), lower dissatisfaction/non-attendance (OR = 0.62, 95% CI [0.42, 0.91]), and stronger valuing of cultural and linguistic responsiveness (OR = 1.41, 95% CI [1.01, 1.97]).

**Conclusions:** Dental service use among CALD families is shaped by resources that precede service encounters, such as insurance and language proficiency, and by cumulative experiences across sectors. Improving equitable access requires a dual strategy: reducing structural and financial barriers (e.g., public sector waiting times) and embedding cultural and linguistic responsiveness as a core quality standard in both public and private dental care.

# DAY 1

## Thursday, 1 October 2026

| Session 3 | Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | An Anatomical Geometric Framework for Single-Tooth Implant Planning by Decoupling Perception from Reasoning |
| 2 | An in vivo Investigation of a Novel Collagen Membrane Incorporating Triketone in Class II Furcation Defects in a Sheep Model |
| 3 | Development and Evaluation of Smart Nanocomposite Systems with Sustained Antifungal Properties for Oral-Targeted Delivery |
| 4 | Effect of Powder/Liquid Ratio on Properties of Experimental RMGIC |
| 5 | Effects of Resin Cements on the Optical Properties Of Indirect Restorations |
| 6 | Quantum Dot–Mesoporous Silica Fillers for Antibacterial Dental Composites |
| 7 | Injectable ACMZP-Loaded HAMA Hydrogel for Dentin Remineralization and Drug-Free Antimicrobial Effect |
| 8 | Reinforcement of Glass Ionomer Cement Using Ultralong Hydroxyapatite Nanowires |
| 9 | Synthetic Carbonate Apatite for Bone Regeneration: Large Animal Pilot Study |
| 10 | Tideglusib-Loaded Hyaluronic Acid Hydrogels Enhance Odontogenic Differentiation with Adjunct Low-Intensity Focused Ultrasound |
| 11 | Ultrasound-Responsive Remineralization Gel for White Spot Lesions |
| 12 | Clinical Effectiveness of Er:YAG Laser Preparation for Non-Carious Cervical Lesion Restorations: A Split-Mouth Clinical Study |
| 13 | Patient Age and Aesthetic Concerns Drive Tooth Wear Management Decisions in Australia |
| 14 | Smart Peptide-Based Materials and Their Clinical Application for Caries Management |
| 15 | Strength Development with Time of Modern Glass Ionomer Cements |
| 16 | Long-term Outcome of Composite Resin Restoration on Cracked Teeth |
| 17 | Comparative Study on the Cleaning Effectiveness of Electric Toothbrushes in Periodontal Pockets |

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 1

12

# An Anatomical Geometric Framework for Single-Tooth Implant Planning by Decoupling Perception from Reasoning

**Huilin Zhu, Zilong Zeng, Shengyu Lu, Jie Li, Yinghong Zhou, Zhihui Tang, Hongyang Ma**

*University of Queensland*

**PRESENTER: Huilin Zhu**

**Objectives:** To evaluate an explainable artificial intelligence (XAI) framework for automated single-tooth implant planning that separates deep learning-based anatomical perception from transparent rule-based clinical reasoning.

**Materials and Methods:** In this retrospective study, CBCT scans from 20 patients were analysed. Deep learning was used exclusively for three-dimensional (3D) anatomical segmentation, while implant positioning was determined by a geometric reasoning engine incorporating arch reconstruction, region-of-interest (ROI) extraction, and multi-constraint optimisation with embedded clinical safety margins. Performance was assessed by positional and angular deviations from human expert (HI) plans, safety distances to critical anatomical structures, Expert Clinical Rating (ECR), and a double-blind Turing-style evaluation involving five implant surgeons. Statistical significance was assessed using Wilcoxon signed-rank tests.

**Results:** AI-generated plans demonstrated strong agreement with HI plans, with a mean centroid deviation of 1.598 mm and angular deviation of 7.158°. All AI plans complied with safety margins, with no significant differences in distances to critical anatomical structure compared with HI plans ($p > 0.05$). ECR assessment showed excellent inter-rater reliability (ICC = 0.859), and no plans were rated as clinically unacceptable. In the Turing-style evaluation, surgeons were unable to reliably distinguish AI-generated from HI plans (overall accuracy: 0.44; ROC-AUC: 0.417).

**Conclusion:** This XAI framework enables safe, reproducible, and clinically acceptable single-tooth implant planning. By replacing black-box models with transparent decision pathways, it provides a trustworthy foundation for human-AI collaboration in implant dentistry.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 2

13

# An in vivo Investigation of a Novel Collagen Membrane Incorporating Triketone in Class II Furcation Defects in a Sheep Model

**Dr. Kah Seng Low[1], Prof. Dawn Coates[1], Dr. Dina Abdelmoneim[1] Prof. Warwick Duncan[1]**

*Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand*

**PRESENTER: Dr. Kah Seng Low**

To compare the regenerative performance of the triketone-incorporated PVA-collagen membrane (TKCM) with a PVA-collagen membrane (CM), BioMend® Extend™ in surgically created Class II furcation defects This study was approved by the University of Otago Animal Ethics Committee (AUP 23-126). Standardised buccal Class II furcation defects were created in the mandibular second and third premolars of ten ewes, grafted with RegenerOss®, and randomised to receive TKCM, CM, BioMend® Extend™, or untreated control. The TKCM was fabricated by encapsulating β-triketones derived from mānuka oil (Leptospermum scoparium) within chitosan nanospheres and embedding these within an electrospun PVA-collagen membrane. Following 12 weeks of healing, specimens were analysed by μCT and histomorphometry using ImageJ, quantifying newly formed bone, connective tissue, epithelium, and white space. Statistical significance was set at $p < 0.05$. Results: Summarise key findings with relevant data and statistical significance 29 out of 40 sites were available for histomorphometric analysis. The TKCM demonstrated the highest mean bone fill (21.84% ± 14.28%) and lowest epithelial presence (1.09% ± 1.71%) compared with CM (15.26% ± 13.94%; 18.99% ± 17.07%), BioMend® Extend™ (6.51% ± 5.91%; 8.89% ± 6.43%), and control (16.16% ± 10.52%; 4.97% ± 6.82%). No statistically significant differences were observed between groups ($p > 0.05$). μCT confirmed complete graft displacement across all groups, precluding quantitative volumetric analysis. To the authors' knowledge, this is the first in vivo evaluation of a triketone-incorporated PVA-collagen membrane in a large-animal furcation model. Although no statistically significant differences were observed, the TKCM demonstrated numerically more bone fill and reduced epithelial downgrowth, suggesting a potential biological advantage. With methodological refinements, the TKCM represents a promising antimicrobial membrane for guided tissue regeneration. More preclinical and clinical studies are needed to confirm the regenerative capacity of this novel membrane.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 3

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# Development and Evaluation of Smart Nanocomposite Systems with Sustained Antifungal Properties for Oral-Targeted Delivery

**Ashagrachew Tewabe Yayehrad1,2, Sheetal Maria Rajan1, Barsha Shrestha1, Amr Fawzy1**

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*2 School of Pharmacy, Bahir Dar University, Bahir Dar, 79, Ethiopia*

**PRESENTER: Ashagrachew Tewabe Yayehrad**

**Introduction:** The integration of nanotechnology-based drug delivery systems into dental biomaterials offers a promising strategy for the localized and sustained treatment of oral infections. Objectives: The main objective of this project is to synthesize and characterize smart nanocarriers loaded with antifungal drugs and intrinsically anti-fungal nanoparticles, aiming for stimuli-responsive, sustained antifungal activity and oral biofilm-targeting capabilities tailored to the oral infection microenvironment.

**Materials and Methods:** Mesoporous silica nanoparticles (MSNs) were synthesized via a surfactant-assisted sol-gel method and subsequently functionalized with amine groups to enhance drug–carrier interactions. A model antifungal drug, Fluconazole, was loaded into MSNs using a solvent-assisted adsorption technique. The physicochemical properties of the synthesized and loaded nanoparticles were characterized using FTIR, TEM, EDS, DLS, XRD, UV–Vis and Raman spectroscopy to confirm successful synthesis, functionalization, and loading.

**Results:** TEM analysis demonstrated the formation of spherical MSNs. DLS measurements showed a hydrodynamic diameter of 247.7 ± 13.3 nm, a PDI of 0.43 ± 0.02, and a zeta potential of -22.2 ± 0.6 mV. The main FTIR peaks at around 1070, 805 and 459, and the highly amorphous XRD diffractogram confirmed successful synthesis of MSN. UV–Vis analysis revealed a drug loading capacity of 9-22.63% and an encapsulation efficiency of 11.93-55.8% at different drug-to-MSN ratios. FTIR, EDS, XRD, and Raman analyses confirmed successful functionalization and fluconazole encapsulation, supporting the suitability of the developed nanocarriers for potential controlled intra-oral antifungal drug delivery.

**Conclusion:** Fluconazole-loaded MSNs were successfully developed and characterized. The nanocarriers demonstrated promising properties aimed for sustained intra-oral antifungal delivery, with upcoming experiments focusing on imparting pH-responsive behaviour and integration into 3D-printed dental biomaterials.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 4

15

# Effect of Powder/Liquid Ratio on Properties of Experimental RMGIC

**Fei Chen, Pual Farrar, Karolinne Martins de Sousa, Wilson Ta**

*Research & Development, SDI Ltd, Melbourne, Australia*

**PRESENTER: Fei Chen**

**Objectives:** To compare the change in compressive strength, flexural strength, working time, and paste viscosity of an experimental Resin Modified Glass Ionomer Cement (RMGIC) formulation dosed over a range of powder/liquid ratios.

**Materials and Methods:** RMGIC powder/liquid weights were pre-dosed in capsules (SDI Limited) ranging from 3.46 to 2.53. Each capsule was triturated for 10 seconds using an Ultramat 2 (SDI Limited) and the mixed RMGIC paste extruded using Riva Applicator 2 (SDI Limited). Compressive strength (CS) evaluated according to method described in ISO9917-1:2025. Flexural strength (FS) and Working time (WT) based on methods described in ISO9917-2:2017. Paste Viscosity (PV) determined using a texture analyser (Brookfield CT3). Force values were recorded every 0.1 mm over a travel distance of 4.0 mm with a probe (LA39) speed of 2.00 mm/s.

**Results:** Within the limitations of this study, the experimental prototype showed a decrease in PV with decreasing powder/liquid ratios. The WT appears to have an optimal ratio range between 3.31–2.69 before increasing in time. The CS and FS appear to have an optimal ratio range between 3.46–3.15 before decreasing in strength. Statistical analysis shows broader CS standard deviations are found at the extremes of the ratios tested. A possible explanation is that the samples are difficult to prepare at very high or low ratios, leading to the introduction of defects/voids. For example, the highly viscous pastes of the 3.46 ratio could contribute to poorly prepared samples, increasing the likelihood of CS variability.

**Conclusion:** The experimental RMGIC has an optimal CS and FS between 3.46–3.15 powder/liquid ratios, and optimal WT between 3.31–2.69 powder/liquid ratios. The PV decreases with lower powder/liquid ratios.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 5

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# Effects of Resin Cements on the Optical Properties of Indirect Restorations

**Asana Pour Ronagh, Vojislav Komlenic, Shalinie King, Vesna Miletic**

*University of Sydney*

**PRESENTER: Asana Pour Ronagh**

**Objectives:** The optical properties of resin cements play a critical role in the aesthetic success of indirect restorations by influencing shade, translucency, and overall visual integration. This scoping review aimed to evaluate the influence of resin cement composition, polymerization mode, aging conditions, and restorative context on the optical properties of indirect restorative materials, while identifying current evidence gaps and future research directions.

**Materials and Methods:** The review followed PRISMA-ScR guidelines. A comprehensive search of PubMed, Medline, Scopus, Embase, Web of Science, and the Cochrane Library was conducted and managed in Covidence. Studies assessing the optical behaviour of resin cements in indirect restorations were included without restriction on publication year. Studies involving metal or alloy restorations, non-resin-based cements, animal studies, case reports, review articles, and studies not focused on resin cements or optical properties were excluded. Screening and study selection were independently performed by two reviewers, with disagreements resolved through discussion or third-reviewer adjudication. Extracted data included resin cement type, restorative material, substrate, aging and staining conditions, optical outcomes, and evaluation methods.

**Results:** Fifty-seven eligible studies were identified out of 376 screened, all being in vitro investigations evaluating colour stability using CIELAB and CIEDE2000 formulae. The findings demonstrated that colour stability and translucency are multifactorial phenomena primarily influenced by resin chemistry, photoinitiator systems, polymerization mode, ceramic thickness, and ceramic/cement translucency. Light-cured and amine-free resin cements generally exhibited superior colour stability compared with dual-cure systems. Increased ceramic thickness enhanced masking ability and reduced perceptible discoloration.

**Conclusion:** Resin cements significantly affect the optical properties and aesthetics of indirect restorations. Colour stability and translucency were influenced by cement type, curing mode, aging, staining agents, and ceramic thickness. Light-cure cements showed better optical stability, while coffee and other staining solutions commonly caused significant discoloration. Further long-term clinical studies are needed to improve aesthetic predictability and durability.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 6

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# Quantum Dot–Mesoporous Silica Fillers for Antibacterial Dental Composites

**Fouzhan Chitsaz, Paul Farrar, Leon Prentice, B. Gangadhara Prusty**
*UNSW*

**PRESENTER: Fouzhan Chitsaz**

**Objective:** Zinc oxide quantum dots (ZnO QDs), initially recognized for their photoluminescent properties, have attracted growing interest in biomedical applications because of strong antibacterial activity. However, their direct incorporation into dental composites is limited by particle agglomeration, deterioration of mechanical properties, and rapid depletion in the oral environment. This study presents a hybrid filler strategy using mesoporous silica as an inorganic framework to enable homogeneous dispersion of ZnO QDs within a UDMA/TEGDMA-based model flowable composite.

**Materials and Methods:** ZnO QDs were synthesized via a precipitation method, surface-functionalized, and immobilized onto Santa Barbara Amorphous-15 (SBA-15) through radical polymerization. The fillers were incorporated into model flowable composite formulations at different weight percentages, followed by systematic evaluation of their mechanical properties. A grid-search optimization approach was used to identify the optimal filler loading. The optimized composite formulation was further assessed for surface hardness, surface roughness, degree of conversion, hydrolytic stability, cytocompatibility, antibacterial performance against Streptococcus mutans, and cumulative $Zn^{2+}$ ion release over 21 days.

**Results:** Incorporation of 11 wt% hybrid fillers resulted in a 35% increase in compressive strength compared with the control group. Although flexural strength and modulus of elasticity decreased significantly, the composite maintained flexural properties within clinically acceptable limits. Grid-search optimization identified 11 wt% as the optimal filler loading, providing the best balance between enhanced compressive performance and acceptable flexural behavior. The optimized composite also demonstrated pronounced antibacterial activity against Streptococcus mutans. Cytocompatibility was preserved, while surface hardness increased without adversely affecting surface roughness, polymerization efficiency, or hydrolytic stability.

**Conclusion:** Mesoporous silica microparticles provide an effective inorganic framework for incorporating ZnO QDs into dental resin composites, enabling high filler loadings without compromission of mechanical performance. At the optimized loading, the developed composite significantly reduced S. mutans biofilm formation without relying on excessive $Zn^{2+}$ ion release, while maintaining biocompatibility and essential physicochemical properties.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 7

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# Injectable ACMZP-Loaded HAMA Hydrogel for Dentin Remineralization and Drug-Free Antimicrobial Effect

**Hongyu Xie1, Erwin Paz Munoz2, Wanlu Ouyang1, Ziqi Yan1, Robert Anthonappa1, Alread Tay2, Amr Fawzy1**

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*2 School of Biomedical Science, Marshall Centre, 19 Monash Avenue, Nedlands, WA 6009, Australia*

**PRESENTER: Hongyu Xie**

**Objectives:** To develop and characterise an injectable methacrylated hyaluronic acid (HAMA) hydrogel incorporating magnesium- and zinc-doped amorphous calcium phosphate (ACMZP) nanoparticles for dentin remineralization, and drug-free antimicrobial activity against cariogenic bacteria.

**Materials and Methods:** ACMZP nanoparticles were synthesised and characterised by transmission electron microscopy (TEM), energy-dispersive spectroscopy (EDS), X-ray diffraction (XRD), and Fourier-transform infrared spectroscopy (FTIR). ACMZP nanoparticles were incorporated into HAMA to fabricate injectable hydrogels through photo-crosslinking. Hydrogel structures were analysed using scanning electron microscopy (SEM) and Raman spectroscopy. Cytocompatibility was confirmed using human dental pulp stem cells(hDPSCs) through MTT and live/dead assays. Ion release (Ca, P, Mg, and Zn) was quantified by inductively coupled plasma optical emission spectrometry (ICP-OES) over 7 days. Artificially demineralized human dentin was used to assess remineralization and mechanical recovery using SEM, atomic force microscopy (AFM), and nanoindentation. Antibacterial activity against Streptococcus mutans was assessed using colony-forming unit (CFU) analysis. Statistical analysis was performed using one-way ANOVA with Tukey's post-hoc test ($p < 0.05$).

**Results:** ACMZP nanoparticles exhibited a nanoscale amorphous structure as confirmed by TEM, EDS, XRD, and FTIR. The ACMZP-loaded HAMA hydrogel showed injectability, interconnected porosity, and structural stability after photo-crosslinking. ICP-OES demonstrated sustained release of Ca, P, Mg, and Zn over 7 days. Dentin studies showed significant remineralization and mechanical recovery in ACMZP-containing groups compared with controls, as observed by SEM and AFM. Human dental pulp stem cells maintained high viability, confirming cytocompatibility. ACMZP-loaded hydrogels significantly reduced Streptococcus mutans viability compared with controls ($p < 0.05$).

**Conclusion:** The ACMZP-loaded HAMA hydrogel functions as a bioactive ion-releasing system that enables simultaneous dentin remineralization and antibacterial effects. This multifunctional biomaterial shows strong potential for minimally invasive treatment of carious dentin lesions.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 8

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# Reinforcement of Glass Ionomer Cement Using Ultralong Hydroxyapatite Nanowires

**Ya Zhang**

*University of Otago*

**PRESENTER: Ya Zhang**

**Introduction:** Glass ionomer cements (GICs) are widely used in dentistry but suffer from limited mechanical strength. This study investigated the incorporation of ultralong hydroxyapatite nanowires (UHANWs) into GICs as a biomimetic reinforcement strategy to enhance mechanical performance without compromising clinical handling.

**Materials and Methods:** UHANWs were synthesized via a solvothermal method and incorporated into a conventional GIC at 4 wt% (4HA), 6 wt% (6HA), and 8 wt% (8HA). Structural and dispersion were characterized using XRD, FTIR, SEM, and TEM. Thermal stability was evaluated by TGA-DSC. The setting time was monitored using FTIR spectroscopy. Flexural and compressive strengths were tested in accordance with ISO standards. A simulated toothbrushing abrasion test was performed to evaluate weight loss and surface roughness (Sa, Sq, Sz).

**Results:** UHANWs exhibited a high aspect ratio (~10,000) and were uniformly dispersed within the GIC matrix. UHANW incorporation improved thermal stability and significantly accelerated the acid-base setting reaction. Flexural strength was markedly enhanced due to effective crack-bridging and crack-deflection mechanisms. In contrast, the compressive strength decreased at higher UHANW contents, reflecting microstructural heterogeneity associated with the disruption of the continuous GIC matrix at excessive UHANW loadings. Toothbrushing abrasion testing showed that moderate UHANW incorporation (4-6 wt%) maintained weight loss and surface roughness comparable to control GICs, whereas excessive loading led to substantial material loss despite limited surface roughening.

**Conclusion:** UHANWs provide an effective biomimetic reinforcement strategy for GICs. An optimal UHANW content (6HA) achieves a favorable balance between flexural reinforcement, setting kinetics, and abrasion resistance, supporting its potential application in stress-bearing restorative dentistry.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 9

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# Synthetic Carbonate Apatite for Bone Regeneration: Large Animal Pilot Study

**Dr. Anahita Manafi Khajeh Pasha1, Prof. Dawn Coates1, Prof. Patrick Schmidlin2, Prof. Warwick Duncan1**

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*2 Clinic of Conservative and Preventive Dentistry, Center of Dental Medicine, University of Zurich, Zurich, Switzerland*

**PRESENTER: Dr. Anahita Manafi Khajeh Pasha**

**Objectives:** To compare Cytrans® with Bio-Oss® and Puros® for bone regeneration in the grafted extraction sockets.

**Materials and Methods:** The University of Otago Animal Ethics Committee (AUP-25-09) approved this study. Six adult sheep had 2nd and 3rd mandibular premolars extracted. Tooth sockets were grafted with Cytrans® (a novel synthetic carbonate apatite bone substitute), Bio-Oss® (bovine-derived anorganic bone xenograft), Puros® (mineralized cancellous bone allograft), or ungrafted controls. Following a 12-weeks healing period, specimens were analyzed by μ-computed tomography (μ-CT). μ-CT outcomes included new bone formation, residual graft particles, and connective tissue percentage within a standardized 4×4 mm region of interest positioned at the center of the socket. Statistical significance was set at $p < 0.05$.

**Results:** All grafted mandibular sockets showed successful healing and improved ridge preservation compared with ungrafted controls. In mandibular extraction sockets Cytrans® demonstrated significantly greater new bone formation than Bio-Oss® (50.0±9.5% vs 26.6±8.5%, $p<0.001$) and lower connective tissue percentages (48.5±9.2% vs 70.1±7.4%, $p=0.001$). Bio-Oss® showed significantly higher residual graft particles than Cytrans® (3.3±1.7% vs 1.8±0.6%, $p=0.036$). Puros® demonstrated intermediate regenerative outcomes with significantly greater bone formation than Bio-Oss® ($p=0.023$).

**Conclusion:** The novel synthetic carbonate apatite graft demonstrated equivalent regenerative performance with enhanced bone formation and reduced graft remnants compared with conventional xenograft and allograft materials in this pilot study and may represent a suitable alternative for alveolar regenerative procedures. These findings support the potential of carbonate apatite materials for alveolar bone regeneration and are consistent with the findings of the animal study conducted by Fukuda et al. in 2022, however, further studies are needed to confirm these findings.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 10

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# Tideglusib-Loaded Hyaluronic Acid Hydrogels Enhance Odontogenic Differentiation with Adjunct Low-Intensity Focused Ultrasound

**Wanlu Ouyang, Sheetal Maria Rajan, Hongyu Xie, Ziqi Yan, Amr Fawzy**

*UWA Dental School, The University of Western Australia*

**PRESENTER: Wanlu Ouyang**

**Introduction:** Endodontic research is increasingly focused on biologically driven dentin-pulp repair. This study investigated a chemico-physical strategy combining a light-curable Tideglusib-loaded methacrylated hyaluronic acid (HA-MA) hydrogel with low-intensity focused ultrasound (LIFU) to support odontogenic differentiation of human dental pulp stem cells (hDPSCs).

**Materials and Methods:** HA-MA hydrogels were synthesized and characterized by ^1H NMR and Raman spectroscopy. Hydrogel formulations (1%, 2%, and 4% w/v) were evaluated for Tideglusib release kinetics, nanomechanical properties, and swelling behavior. The optimal formulation was selected for biological studies. hDPSCs were allocated to six groups: Control, LIFU, Tideglusib, Tideglusib+LIFU, Tideglusib-hydrogel, and Tideglusib-hydrogel+LIFU. Cytocompatibility, proliferation, RT-qPCR analysis of Wnt-related and odontogenic markers, immunofluorescence staining, and Alizarin Red S mineralization assays were performed. Statistical analysis used t-tests or one-way ANOVA with Tukey's post hoc test ($\alpha$=0.05).

**Results:** HA-MA synthesis was confirmed with a degree of methacrylation of 28.5%. The 2% hydrogel demonstrated sustained Tideglusib release with the best zero-order kinetic fit ($R^2$=0.9477), greater elastic modulus, and lower swelling ratio than the 1% formulation. The hydrogel was non-cytotoxic and maintained cell viability at 94.6–113.8% of control. Hydrogel-mediated Tideglusib delivery sustained AXIN2 expression for 10 days and enhanced RUNX2, ALPL, BMP2, and DMP1 expression compared with direct Tideglusib administration. The Tideglusib-hydrogel+LIFU group showed the highest BMP2 expression (3.0–3.3-fold vs control) and significantly greater mineralized matrix formation than direct Tideglusib groups.

**Conclusion:** Sustained Tideglusib delivery from HA-MA hydrogels, particularly when combined with LIFU stimulation, promoted odontogenic differentiation and mineralized matrix formation in hDPSCs. This strategy shows potential as a biologically driven approach for dentin-pulp repair and regeneration.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 11

22

# Ultrasound-Responsive Remineralization Gel for White Spot Lesions

**Ziqi Yan, Wanlu Ouyang, Hongyu Xie, Amr Fawzy Moussa**

*Dental School, The University of Western Australia, 17 Monash Avenue, Nedlands, WA 6009, Australia*

**PRESENTER: Ziqi Yan**

**Introduction:** Modern conservative dentistry aims to achieve biomimetic enamel regeneration rather than simple lesion repair. Calcium phosphate ion clusters (CPICs) can form highly ordered hydroxyapatite (HAP) crystals that resemble native enamel. However, their clinical application is limited by slow crystal growth and restricted penetration into subsurface lesions. Based on our previous finding that focused ultrasound (FUS) enhances HAP crystallinity, this study aimed to develop an ultrasound-responsive remineralization gel to accelerate ion transport and HAP formation for enamel remineralization.

**Materials and Methods:** CPICs (2 mg/mL) were incorporated into gels containing 5%, 7.5%, or 10% (w/v) hydroxyethyl cellulose (HEC). Gel physicochemical properties, ion release, and biocompatibility were evaluated. CPIC transformation after FUS treatment (250 kHz, 30 W) was analysed by Raman spectroscopy and X-ray diffraction (XRD). Artificial white spot lesions (WSLs) were created and characterized using SEM, Raman mapping, and micro-CT (μCT).

**Results:** TEM, SAED, EDS, Raman spectroscopy, and XRD confirmed the successful transformation of CPICs into ACP and subsequently HAP. CPICs converted to ACP within approximately 5 h and to HAP within 24 h. Increasing HEC concentration increased viscosity while reducing spreadability and conductivity. FUS decreased gel viscosity and increased spreadability and conductivity. MTT and DAPI assays demonstrated no cytotoxicity toward human oral fibroblasts. Following FUS treatment, CPICs in the 5% and 7.5% HEC gels successfully transformed into HAP. Artificial WSLs were established with an average lesion depth of approximately 150 μm.

**Conclusion:** FUS modified the physicochemical properties of HEC-based gels and facilitated CPIC-to-HAP transformation. The gel exhibited favourable biocompatibility and ultrasound responsiveness, suggesting potential as a carrier for ultrasound-assisted enamel remineralization. Further studies will evaluate its remineralization efficacy on WSLs.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 12

23

# Clinical Effectiveness of Er:YAG Laser Preparation for Non-Carious Cervical Lesion Restorations: A Split-Mouth Clinical Study

**An Nguyen Hoai, Chau Nguyen Thi, Ngoc Vo Truong Nhu, Phuong Nguyen Thi Thu, Huong Trinh Hong, Son Dang Cong, Hieu Nguyen Trong**

*Vinmec International Hospital*

**PRESENTER: An Nguyen Hoai**

**Introduction:** This study aimed to clinically evaluate non-carious cervical lesion (NCCL) restorations prepared with Er:YAG laser compared with conventional bur preparation.

**Materials and Methods:** Ten patients with a total of 56 NCCLs were included in this prospective split-mouth clinical study. Lesions were allocated to two preparation protocols: a conventional group prepared using rotary burs followed by 37% phosphoric acid etching, and a laser group prepared using an Er:YAG laser (Light Walker ST-E, Fotona, Slovenija EU) at 150 mJ, 10 Hz, 1.5 W without acid etching (n = 28 lesions per group). All lesions were restored with an adhesive bond and nanohybrid resin composite. Dentin hypersensitivity was evaluated using VAS criteria before restoration, immediately after cavity preparation, and immediately after restoration. Clinical performance was assessed according to modified USPHS criteria immediately after restoration and at 1 week, 3 months, and 6 months of follow-up.

**Results:** Group comparisons were performed using Fisher's exact test ($p < 0.05$). Er:YAG laser preparation significantly reduced dentin hypersensitivity immediately after cavity preparation ($p < 0.05$). No significant differences were observed between groups at 1 week and 3 months ($p > 0.05$). At 6 months, two restoration failures were observed in each group, with a trend toward higher restoration success, improved marginal integrity, and reduced postoperative dentin hypersensitivity in the Er:YAG laser group, although no significant differences were recorded.

**Conclusion:** Er:YAG laser preparation represents a feasible alternative to conventional bur preparation in NCCL restorations, with comparable short-term clinical performance and reduced immediate dentin hypersensitivity.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 13

24

# Patient Age and Aesthetic Concerns Drive Tooth Wear Management Decisions in Australia

**Khaled E Ahmed, James R Fernando, Anu Polster**

*University of Melbourne; La Trobe University*

**PRESENTER: Khaled E Ahmed**

**Objectives:** To examine how patient clinical factors and clinician characteristics influence treatment likelihood decisions in tooth wear management in Australia.

**Materials and Methods:** A within-subjects 2×2 factorial vignette survey was distributed to Australia-based dentists. Case 1 manipulated patient age (33 vs 73 years) and chief complaint (aesthetic concern vs none) against a high-severity wear scenario. Case 2 manipulated bruxism and gastro-oesophageal reflux disorder (GORD) status in a moderate-severity scenario. Eight treatment likelihood outcomes (0–10) were assessed per case. Normality was assessed using the Shapiro-Wilk test; the Wilcoxon signed-rank tests were applied with Bonferroni correction ($\alpha = .00625$). Covariate regression examined the moderating effects of clinician characteristics, including confidence in managing tooth wear, specialist status, postgraduate tooth wear education, and years since graduation.

**Results:** Sixty-four participants completed the survey. In Case 1, patient age significantly affected the likelihood of referral ($p < .001$), splint therapy ($p < .001$), and counselling ($p < .001$), with younger patients receiving higher scores across all three non-invasive management options. Chief complaint significantly influenced the likelihood of direct resin-based composite (RBC) ($p < .001$), referral ($p = .023$), and monitoring ($p = .043$), with aesthetic concern increasing operative and referral scores. A significant Age × Complaint interaction was identified for RBC ($p = .007$). In Case 2, only splint therapy likelihood was significantly affected by bruxism status ($p = .019$); GORD produced no significant effects on any treatment decision. RBC was preferred over crowns across all Case 1 conditions, with both modalities declining proportionally when aesthetic concerns were absent. No clinician characteristic significantly moderated primary treatment decisions after correction.

**Conclusion:** Patient age and aesthetic concerns are the dominant drivers of tooth wear treatment decisions amongst Australian dentists. Clinician characteristics had limited independent influence, suggesting substantial homogeneity in decision-making across experience levels.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 14

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# Smart Peptide-Based Materials and Their Clinical Application for Caries Management

**Yipeng Fu, Richard D. Cannon, Lei Cheng, Kai Chun Li, Manikandan Ekambaram, Paul R. Cooper, May L. Mei**

*Sir John Walsh Research Institute, University of Otago*

**PRESENTER: Yipeng Fu**

**Objectives:** To review the design principles, mechanisms of action, and translational potential of smart peptide-based materials for precision caries management, with a focus on antimicrobial, remineralizing, and environmentally responsive peptide systems.

**Materials and Methods:** A narrative review of the current literature was conducted to evaluate smart peptide-based anticaries strategies. Studies investigating targeted antimicrobial peptides, biomimetic remineralizing peptides, multifunctional peptide constructs, and environmentally responsive systems were analysed. Evidence relating to their biological mechanisms, therapeutic performance, and potential clinical applications was synthesised.

**Results:** Smart peptides are engineered to respond to disease-associated cues, including acidic pH, cariogenic bacterial species, and tooth-surface binding sites. Targeted antimicrobial peptides selectively suppress cariogenic pathogens while preserving beneficial oral microbiota, thereby reducing microbial dysbiosis. Remineralizing peptides promote biomimetic mineral formation and facilitate the repair of early enamel and dentine lesions. Multifunctional peptide constructs combine antimicrobial and remineralizing functions, enabling simultaneous biofilm modulation and tissue regeneration. Environmentally responsive systems further enhance therapeutic precision by activating in response to specific pathological conditions. Although most technologies remain at the preclinical stage, emerging in vivo studies and early clinical evidence demonstrate promising efficacy, safety, and translational feasibility.

**Conclusion:** Smart peptide-based materials represent a promising precision-guided and minimally invasive approach to caries management. By integrating pathogen-targeted antimicrobial activity, biomimetic remineralization, and environmental responsiveness, these systems address both the microbial and mineral components of the disease process. Continued optimisation and clinical validation may facilitate the development of personalised, microbiome-sparing, and lesion-specific therapies, supporting the future implementation of precision dentistry in routine clinical practice.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 15

26

# Strength Development with Time of Modern Glass Ionomer Cements

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER** [Presenter name]

## BACKGROUND / INTRODUCTION

[Insert accepted abstract text here.]

## METHODS

[Insert accepted abstract text here.]

## RESULTS

[Insert accepted abstract text here.]

## CONCLUSION

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

ORAL 16

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# Long-term Outcome of Composite Resin Restoration on Cracked Teeth

**Unni Krishnan*, Paul Renner*, Alex Moule*, Michael Swain+**

*University of Queensland*

**PRESENTER: Unni Krishnan**

**Introduction:** To evaluate the long-term clinical outcomes of direct cuspal coverage composite resin restorations placed on cracked posterior teeth, assessing tooth, restoration, and pulp survival rates and identifying clinical factors associated with failure.

**Materials and Methods:** This retrospective cohort study analysed 136 cracked posterior teeth treated with direct cuspal coverage composite resin restorations between 2014 and 2025. Teeth were followed for a median of 5.7 years (mean 5.9 years, SD 3.6; range: 1 day to 11.2 years). Sixteen clinical variables were recorded including patient age, gender, jaw type, crack location and direction, biomechanical classification, symptoms, cold sensitivity, pain on biting, and opposing tooth status. Survival analysis was performed using Kaplan-Meier estimates and univariate Cox proportional hazards regression to identify predictors of tooth, restoration, and pulp survival.

**Results:** Kaplan-Meier survival analysis demonstrated 10-year tooth survival of 90.5% (95% CI: 85.4-95.8%), restoration survival of 78.5% (95% CI: 68.5-90.0%), and pulp survival of 64.7% (95% CI: 55.2-75.9%). Annual failure rates were 2.1% (SD 3.1%) for tooth loss, 4.8% (SD 5.1%) for restoration failure, and 9.1% (SD 15.1%) for pulp failure. Univariate Cox regression identified preoperative symptoms as a significant predictor of pulp failure (HR 2.29, 95% CI: 1.12-4.31, p=0.01), while age, crack direction, and other variables did not significantly influence survival outcomes.

**Conclusion:** Direct cuspal coverage composite resin restorations provide favourable long-term tooth and restoration survival in cracked posterior teeth, with 10-year tooth and restoration survival rates of 90.5% and 78.5% respectively. Pulp survival was lower (64.7% at 10 years) and declined over time. Symptomatic teeth at baseline carried a significantly greater risk of pulp failure. These findings support direct cuspal coverage composite resin as a viable conservative management strategy for cracked posterior teeth, while highlighting the importance of preoperative symptom status in prognosis and patient counselling.

DAY 1 | SESSION 3: Biomaterials/ Cariology & Restorative Dentistry/Endodontics/ Prosthodontics

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# Comparative Study on the Cleaning Effectiveness of Electric Toothbrushes in Periodontal Pockets

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER** [Presenter name]

## BACKGROUND / INTRODUCTION

[Insert accepted abstract text here.]

## METHODS

[Insert accepted abstract text here.]

## RESULTS

[Insert accepted abstract text here.]

## CONCLUSION

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

# DAY 1

## Thursday, 1 October 2026

| Session 4 | Dental Public Health |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Oral Health Inequalities in the ADF: A Retrospective Observational Study. |
| 2 | Possible relationship Between Perioperative Oral Care Interventions and Surgical Site Infection in Patients Undergoing Colorectal Cancer Surgery |
| 3 | Advocacy in Action: Improving Oral Health Outcomes for Rural Communities in Victoria |
| 4 | Hospital Oral Health Encounters Among Justice-Involved Youth: National Linked Data |
| 5 | Association Among Oral Hypofunction, Malnutrition, Postoperative Complications and QoL in Head-And-Neck Cancer Survivors: A Prospective Cohort Study. |
| 6 | Associations Between Sugar Intake, Oral Microbiome Ecology, and Psychological Distress in an Indigenous Australian Cohort |
| 7 | Barriers and Facilitators Influencing Oral Health Practices Among Preschool Children of Indian Migrants Living in Victoria, Australia |
| 8 | Impact of Head and Neck Cancer in First Nations Communities - A Qualitative Study |

DAY 1 | SESSION 4: Dental Public Health

ORAL 1

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# Oral Health Inequalities in the ADF: A Retrospective Observational Study.

**Anthony Craig, Arash Rudman, Bradley Christian, Woosung Sohn**

*University of Sydney / Australian Defence Force*

**PRESENTER: Anthony Craig**

**Objectives:** To describe oral health characteristics, including dental deployability, among Australian Defence Force (ADF) personnel whilst examining associations with Service and demographics.

**Materials and Methods:** This retrospective observational study used routinely collected Defence eHealth System records for serving ADF personnel aged ≥18 years who underwent an initial/periodic dental examination between 1 July 2023 and 30 June 2025. Outcomes included Dental Fitness Class (DFC), periodontal screening, decayed, missing, and filled teeth (DMFT), and Basic Erosive Wear Examination (BEWE). DFC was dichotomised as deployable (DFC 1–2) or non-deployable (DFC 3). Multivariable logistic and multinomial regression estimated adjusted odds ratios (ORs), relative risk ratios (RRRs), 95% confidence intervals (CIs) and p-values, adjusted for Service, rank, Service/rank, Indigenous status, age and sex.

**Results:** Among 61,418 personnel, 59,553 (97.0%) were dentally deployable and 1,865 (3.0%) were non-deployable. Army personnel had lower odds of deployability than Navy (OR 0.78, 95% CI 0.66–0.91, p=0.002) and Air Force personnel (OR 0.84, 95% CI 0.72–0.98, p=0.030). Officers had higher deployability than enlisted personnel across Navy, Air Force and Army (ORs 1.87–2.48, all p<0.001). Indigenous personnel had lower deployability (OR 0.60, 95% CI 0.50–0.73, p<0.001). Periodontal screening showed officers were less likely to have periodontal pocketing across all Services (ORs 1.21–1.30, all p<0.001), while Indigenous personnel had greater odds (OR 0.67, 95% CI 0.60–0.76, p<0.001). Moderate-to-severe tooth wear (BEWE ≥9) was strongly age-associated, with personnel aged 55+ having markedly higher odds than those <25 years (OR 9.98, 95% CI 9.05–11.00, p<0.001). DMFT burden also increased with age and was higher among Indigenous personnel for DMFT >20 versus <5 (RRR 2.15, 95% CI 1.45–3.20, p<0.001).

**Conclusion:** ADF dental non-deployability is uncommon but patterned by Service, rank and Indigenous status. Broader oral health measures demonstrate similar inequalities, confirming findings from overseas military cohorts and supporting targeted, equity-focused prevention to protect operational readiness.

DAY 1 | SESSION 4: Dental Public Health

ORAL 2

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# Possible relationship Between Perioperative Oral Care Interventions and Surgical Site Infection in Patients Undergoing Colorectal Cancer Surgery

**Aoi Yamada1, Masaharu Tatetsu1, Kenji Seo2, Gosei Ueda2, Suzuka Katsumata1, Keiichi Arakaki3**

*1 Department of Dentistry and Oral Surgery, Okinawa Prefectural Miyako Hospital, Okinawa, Japan*

*2 Department of Dentistry and Oral Surgery, Okinawa Prefectural Nanbu Medical center & Children's Medical center, Okinawa, Japan*

*3 Department of Dentistry and Oral Surgery, Okinawa Prefectural Chubu Hospital, Okinawa, Japan*

**PRESENTER: Aoi Yamada**

**Objective:** Perioperative oral management has been reported to reduce the risk of surgical site infection (SSI) after colorectal cancer surgery. However, the relationship between the number of oral care interventions and SSI remains unclear in routine clinical practice. Therefore, this study investigated the possibility of any relationship between the frequency of perioperative oral care interventions and postoperative occurrence between SSI in patients undergoing colorectal cancer surgery.

**Materials and Methods:** A retrospective study was conducted in 232 patients who underwent colorectal cancer resection at Okinawa Prefectural Miyako Hospital, Okinawa, Japan, from 2020 to 2025. Patients were classified into three groups according to the number of preoperative oral care interventions: 0, 1, and ≥2 visits. Patient characteristics were compared among groups, and univariate analyses were performed to evaluate factors associated with SSI. Multivariable logistic regression analysis was subsequently conducted.

**Results:** SSI occurred in 30 of 232 patients. The incidence of SSI tended to increase with a greater number of oral care interventions. In the multivariable logistic regression analysis, laparoscopic surgery was significantly associated with SSI occurrence. Although the number of oral care interventions showed a tendency to have some effect on the association with SSI ($p>0.05$).

**Conclusion:** Although we could not detect any significant association between the number of perioperative oral care interventions and postoperative SSI in the patients undergoing colorectal cancer surgery, further detailed analysis will be required in following analysis.

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ORAL 3

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# Advocacy in Action: Improving Oral Health Outcomes for Rural Communities in Victoria

**T.McBride, L.Purcell, K.Theodore, V.Dickson-Swift, S.Bracksley-O'Grady**

*Violet Vines Marshman Centre for Rural Health Research, La Trobe University, Victorian Oral Health Alliance and Australian Dental Association-Vic Branch*

**PRESENTER: V. Dickson-Swift**

**Introduction:** Community water fluoridation (CWF) is internationally recognised as one of the most successful public health measures with around 80% of the Australian population having access to fluoridated tap water. In Victoria, around 13% of the population in rural areas do not have fluoridated water despite government recommendations. Non-fluoridated areas have a disproportionate burden of disease with higher rates of dental caries (particularly in children), high rates preventable hospital admissions for dental conditions and report difficulty accessing public, or often any form of timely and affordable dental services, making them more vulnerable to both an increased likelihood and severity of dental disease. Objective A sub-committee of the Victorian Oral Health Alliance was established to develop a targeted advocacy campaign to raise awareness of the water fluoridation status of rural Victoria and to increase awareness of decision makers at local government level of the importance of community access to fluoride as key to the prevention of oral disease.

**Materials and Methods:** A range of information was collated and provided to local governments to enable them to understand a range of mitigation strategies that could reduce the risk of dental decay in their communities.

**Results:** A list of the top 20 local government areas (LGAs) in terms of population size, water fluoridation status, disadvantage and rurality was established and all local councils contacted and invited to meet with VOHA representatives. Seven local governments requested meetings to discuss strategies for reducing their community's risk of dental caries (e.g. advocating for water fluoridation, accreditation programs, health and wellbeing programs).

**Conclusion:** Local governments have a key role to play in advocating for improved oral health outcomes for their communities and with appropriate resources and support for prevention are well placed to do so.

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ORAL 4

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# Hospital Oral Health Encounters Among Justice-Involved Youth: National Linked Data

**Marwa Mostafa, Lindsay Pearce, Stuart Kinner, Anne-Marie Laslett, Mark Stoové, Matthew Legge, Felicity Crombie**

*University Of Melbourne*

**PRESENTER: Marwa Mostafa**

**Introduction:** Justice-involved young people (JIYP) bear a high burden of untreated oral disease, yet existing evidence on hospital-based health service utilisation among JIYP has focused largely on mental health and substance use disorders, with oral health-specific presentations under-researched. This study aims to describe rates and patterns of JIYP emergency department presentations (EDP) and hospital admissions (HA) in Australia.

**Materials and Methods:** This population-based retrospective cohort study linked the Youth Justice National Minimum Dataset to hospital records for JIYP in Australia (2000–2019 inclusive). Oral and dental International Classification of Diseases, Tenth Revision (ICD-10-AM) diagnosis codes in any diagnosis field position were collapsed into disease categories and rates expressed per 100,000 person-years, stratified by age group and sex.

**Results:** Among JIYP (n=88,406; 80.1% male) oral diagnoses were identified in 13,185 EDP and 9,481 HA. The 20–24-years group had the highest rates of EDP and HA for both sexes, with female rates significantly higher than males ($p<0.05$) peaking at 16,358 95%CI 15,616-17,127 per 100,000 person-years for EDP. Orofacial injury was the dominant diagnosis category overall, peaking among the 18–19-years male group (per 100,000 person-years: ED 5,578 95%CI 5224-5949; HA 4,297 95%CI 3966-4648) with rates significantly higher ($p<0.05$) for males in ED from the 14-17-years group and HA from the 18-19-years group. Females had significantly ($p<0.05$) higher rates of endodontic and dental caries diagnoses rates from the 18-19-years group for ED and for the 20-24-years group for HA. Neoplasia and non-caries dental hard tissue disorders were rarely recorded.

**Conclusion:** All categories of oral health-related diagnoses were represented in EDP and HA among JIYP, with orofacial injury most dominant. Major sex differences included higher rates of orofacial injury in males and higher rates of endodontic and dental caries diagnoses in females, typically reaching significant levels at older ages for HA compared to EDP data.

DAY 1 | SESSION 4: Dental Public Health

ORAL 5

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# Association Among Oral Hypofunction, Malnutrition, Postoperative Complications and QoL in Head-And-Neck Cancer Survivors: A Prospective Cohort Study.

**A. Yokoi, T. Maruyama, R. Yamanaka, N. Takeuchi, D. Ekuni.**

*Okayama University*

**PRESENTER: A. Yokoi**

**Objectives:** The number of patients living with head-and-neck cancer (HNC) is expected to increase over the next 10-20 years. The HNC survivors suffer from oral-hypofunction and malnutrition. The postoperative complications, including pneumonia and renal dysfunction affect quality of life (QoL). However, there is little information whether oral-hypofunction and malnutrition affect the complications and QoL. The purpose of this study was to investigate the association among oral hypofunction, malnutrition, complications and QoL in HNC survivors.

**Materials and Methods:** A total of 75 HNC survivors were enrolled in this longitudinal study. At baseline, the oral diadochokinesis (ODK), tongue pressure and mouth aperture size were measured as oral function. The data of blood albumin value (Alb) and body mass index were collected from medical records as nutritional status. At follow-up after one year, the data of complications were collected from medical records. QoL was evaluated using The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-Core30 (EORTC QLQ-C30) summary score. Structural equation modeling (SEM) was conducted to analyze the indirect/direct associations among oral function, nutritional status, complications and QoL. The significance level was set at $p<0.05$.

**Results:** Seventy-five HNC survivors (43 males and 32 females; 69 [median] years old) were analyzed in the study. Overall, 10 patients (13.3%) had complications such as pneumonia, renal dysfunction and osteonecrosis. The SEM results supported the hypothesized structural model (the comparative fit index [CFI] = 1.000, the Tucker-Lewis index [TLI] = 1.004, the root mean square error of approximation [RMSEA] < 0.001). Decreasing of ODK and tongue pressure had directly associated with low Alb. Low Alb was directly associated with incidence of complications. Furthermore, the incidence of complications was directly associated with low EORTC QLQ-C30 summary score.

**Conclusion:** Oral-hypofunction was directly associated with malnutrition and indirectly associated with low QoL after one year.

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# Associations Between Sugar Intake, Oral Microbiome Ecology, and Psychological Distress in an Indigenous Australian Cohort

**Xuanyu Chen, Sonia Nath, Xiangqun Ju, Lisa Jamieson**

*Adelaide University*

**PRESENTER: Xuanyu Chen**

**Objectives:** Frequent consumption of sugar-rich foods and beverages has been linked to both adverse oral health outcomes and psychological distress. However, the role of the oral microbiome in this relationship is not well understood. This study aimed to investigate associations between sugar intake frequency, oral microbiome ecology, and psychological distress, and to explore whether ecological features of the oral microbiome may contribute to the relationship between sugar consumption and distress.

**Materials and Methods:** Baseline data were analyzed from 290 Indigenous Australian adults who completed questionnaires on demographic, socioeconomic, behavioral, and health-related factors and provided saliva, plaque and calculus samples for 16S rRNA gene sequencing. Sugar intake frequency and psychological distress (K6) were derived from questionnaire data. Associations between sugar intake, oral microbiome ecology, and psychological distress were examined using multivariable regression and ecological analyses.

**Results:** Higher sugar intake frequency was associated with higher psychological distress scores, even after adjustment for demographic, socioeconomic, behavioral, and health-related factors. Participants with more frequent sugar intake and those with higher psychological distress showed consistent ecological shifts in the oral microbiome, including altered alpha diversity and compositional differences in both saliva and plaque communities. These patterns were characterized by enrichment of acidogenic and aciduric taxa and depletion of health-associated commensals. Exploratory mediation analyses suggested that selected microbiome ecological features partially attenuated the association between sugar intake frequency and psychological distress.

**Conclusion:** These findings suggest that frequent sugar consumption may be associated with psychological distress and changes in oral microbiome ecology. Oral microbiome ecology warrants further investigation as a potential biological pathway linking dietary behaviors and mental wellbeing. Longitudinal and mechanistic studies are needed to clarify the directionality and causal nature of these relationships.

DAY 1 | SESSION 4: Dental Public Health

ORAL 7

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# Barriers and Facilitators Influencing Oral Health Practices Among Preschool Children of Indian Migrants Living in Victoria, Australia

**Dr. Sharon Jose, Prof. Hanny Calache, Prof. Santosh Kumar Tadakamadla**

*La Trobe Rural Health School, La Trobe University, Bendigo*

**PRESENTER: Dr. Sharon Jose**

**Aim:** To explore the barriers and facilitators influencing oral health practices and access to dental care among preschool children of Indian migrants living in Victoria, Australia.

**Materials and Methods:** A qualitative study was conducted using semi-structured interviews with Indian-born parents of preschool children (n = 12) residing in Victoria, Australia. Participants were purposively recruited from the previous cross-sectional survey of the study by registering their interest to participate in this follow-up phase. Interviews were audio-recorded, transcribed verbatim, and analysed using thematic analysis supported by thematic network analysis.

**Results:** Four global themes were identified: (1) parental oral health beliefs and practices; (2) Parenting and systematic barriers; (3) Access and navigation of dental services; and (4) culturally appropriate support systems. Participants described how oral health practices were influenced by intergenerational beliefs, including low prioritisation of primary teeth and symptom-driven care. Although migration increased awareness of preventive oral health practices, competing priorities, limited oral health literacy, financial barriers, uncertainty regarding eligibility for services, and long waiting times limited preventive behaviours and healthcare utilisation. Difficulties navigating the dental healthcare system and unclear communication further affected engagement with services. Participants emphasised culturally tailored, community-based, and co-designed approaches as important strategies to improve oral health awareness and access to care for this population group.

**Conclusion:** Indian migrant families experience complex, multi-level barriers to oral healthcare, highlighting a gap between service availability and effective utilisation. The findings emphasise the importance of culturally responsive, community-driven, and system-level strategies to improve access to oral healthcare and promote oral health equity among Indian migrant populations.

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ORAL 8

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# Impact of Head and Neck Cancer in First Nations Communities - A Qualitative Study

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER** [Presenter name]

## BACKGROUND / INTRODUCTION

[Insert accepted abstract text here.]

## METHODS

[Insert accepted abstract text here.]

## RESULTS

[Insert accepted abstract text here.]

## CONCLUSION

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

# DAY 1

## Thursday, 1 October 2026

| Session 5 | Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Oral Melatonergic Axis: Real-Time Aptamer-Based Salivary Melatonin Sensing and Characterization of Receptor Signaling Networks |
| 2 | Properties of Interim Crown Materials Fabricated Using Digital and Conventional Methods |
| 3 | SmilesUp SMS Intervention to Prevent Early Childhood Caries: an RCT |
| 4 | Task-shared Oral Cancer Screening at Rural Agricultural Touchpoints an Implementation Pilot |
| 5 | Morphological and Morphometric Characteristics of the Nasopalatine Canal in Dentate and Edentulous Patients: A Cone-Beam Computed Tomography Cross-Sectional Study |
| 6 | Morphological Characterisation of Osteocytes in Peri-Implant Bone Using Acid-Etched Scanning Electron Microscopy |
| 7 | Comparison of Tutor Feedback, Self-Assessment and Intraoral Scanner Feedback in Improving Fixed Prosthodontic Crown Preparation by Undergraduate Dental Students |

DAY 1 | SESSION 5: Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology

ORAL 1

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# Oral Melatonergic Axis: Real-Time Aptamer-Based Salivary Melatonin Sensing and Characterization of Receptor Signaling Networks

**M. Pundir, K. Bouzid, R. Said, S. Papagerakis, B. Gosselin, P. Papagerakis**

*Melbourne Dental School, University of Melbourne, Victoria, Australia; Department of Electrical and Computer Engineering, Université Laval, Québec, Canada; Faculty of Medicine, Université Laval, Québec, Canada*

**PRESENTER: M. Pundir**

**Introduction:** Oral health is closely linked to systemic health, with saliva offering a wide array of biomarkers; however, current saliva-based biomarker measurements rely on a single time point, which fails to capture their dynamic circadian variation - particularly for markers such as melatonin, an important biomarker in sleep- and stress-related oral conditions. This limitation reduces diagnostic accuracy and obscures clinically relevant patterns. Additionally, the characterization of melatonin receptors (MTR1A and MTR1B) in oral tissues highlights melatonin's role beyond circadian regulation, positioning it as an active local signaling molecule involved in tissue homeostasis, inflammation, and repair, and emphasizing the need for temporally resolved measurement approaches.

**Materials and Methods:** Aptamer-based electrochemical biosensing platform for real-time detection of salivary melatonin was developed. A 5′-thiol-modified melatonin aptamer was immobilized on a gold screen-printed electrode and integrated with a portable potentiostat and microcontroller interface for continuous signal acquisition, with data recorded via a custom Python pipeline. In parallel, melatonin receptor expression (MTR1A and MTR1B) was assessed in experimental models of dental injury and autoimmune salivary gland dysfunction using immunohistochemistry and optical density quantification.

**Results:** The biosensor demonstrated clear electrochemical responsiveness, with cyclic voltammetry showing methylene blue redox peaks at approximately −250 mV (forward scan) and −150 mV (reverse scan). Increasing melatonin concentrations produced a proportional increase in peak current, consistent with target-induced aptamer conformational changes enhancing electron transfer. Receptor analysis showed upregulation of MTR1A and MTR1B in odontoblasts at injury sites and in acinar and ductal cells of submandibular gland in Sjögren syndrome pre-clinical models ($P<0.05$, $P<0.01$), supporting a functional role for melatonin signaling in tissue response to injury, inflammation, and autoimmune reactions.

**Conclusion:** This study demonstrates the feasibility of aptamer-based real-time electrochemical salivary melatonin detection, alongside evidence of melatonin receptor involvement in tissue adaptation, providing foundation to understand oral-systemic interactions and advance circadian-informed, personalized health strategies.

DAY 1 | SESSION 5: Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology

ORAL 2

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# Properties of Interim Crown Materials Fabricated Using Digital and Conventional Methods

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*1 Adelaide University School of Dentistry, Adelaide, Australia*

*2 SJWRI, University of Otago School of Dentistry, Dunedin, New Zealand*

**PRESENTER: Abdullah Barazanchi**

**Objective:** Interim crowns are necessary to maintain health of tooth, function, aesthetics and occlusal contacts during the time required for fabrication of an indirect restoration. This study aimed to test physical properties of different methods of fabrication of interim crown material and aid in decision making for clinicians when selecting provisional crown material.

**Material and Methods:** Specimens were fabricated using three manufacturing methods- one conventional (self-cure DMG Luxatemp bis-acrylate-(CV), and two digital-based methods, 3D-printing using Asiga Max printer with GC-Temp PRINT and milling with Ceramil TEMP light Polymethylmethacrylate (PMMA) resin blocks. Sixty-four block specimens measuring 25mmx2mmx2mm were created for each group. The specimens were then evenly divided into two subgroups – one group to undergo 6-months of simulated aging prior to testing, the other is tested without any aging process. Specimens were then tested for flexural strength (n=16) and hardness (n=16). Additionally, five block specimens measuring 25mmx5mmx2mm were created for each group to test for colour stability.

**Results:** Milled specimens had the highest flexural strength and microhardness compared to conventional and 3D-printed specimens. 3D-printed and conventional specimens had significant decrease in flexural strength after aging, while milled specimens showed no significant decrease in flexural strength after aging ($P<0.05$). Milled specimens also showed no significant change in microhardness post-aging whilst both conventional and 3D-printed group showed a statistically significant decrease in their hardness after aging. Milled specimens were the only group to be still considered aesthetically acceptable after the staining process.

**Conclusion:** Based on the findings of this study, milled PMMA is the interim restoration with highest flexural strength, microhardness, and best stain resistance property so can be recommended for medium to long-term use, where stable aesthetics and function are necessary.

DAY 1 | SESSION 5: Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology

ORAL 3

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# SmilesUp SMS Intervention to Prevent Early Childhood Caries: An RCT

**R. Chen, M. Irving, H. Kumar, N. Prabhu, B. Christian, W. Sohn, H. Spallek, S. Marschner, C. K. Chow**

*University of Sydney*

**PRESENTER: R. Chen**

**Introduction:** Digital support for oral health behaviour change is needed for parents of children with early childhood caries (ECC). SmilesUp is a 12-week co-designed short message service (SMS) intervention, focused on enhancing knowledge and motivation for behaviour change. The primary aim of this randomised controlled trial (RCT) was to evaluate the effectiveness of the SmilesUp mHealth intervention in improving parental oral health behaviours for their children, compared with standard clinical care.

**Materials and Methods:** A multi-site, single-blinded, parallel-designed randomised controlled trial was conducted between 2023 and 2024 with 154 parents of children (0–6 years old) diagnosed with early childhood caries, accessing New South Wales public dental clinics. Outcomes were assessed via self-reported parental questionnaire measuring children's oral health behaviours pre and post 12 weeks. This included toothbrushing twice a day with fluoridated toothpaste, frequency of child's sugar-sweetened foods and beverage consumption. An intention-to-treat analysis was used with an adjusted logistic regression model.

**Results:** Of 154 randomised participants, 80.5% (124) completed the follow-up survey, with 96% completing the 12-week SmilesUp program, indicating a high degree of compliance and acceptability. At 12-weeks 73.8% participants in the SmilesUp program were more likely to brush twice a day compared to 66.7% in the control group (aOR, 2.45 [95% CI, 0.95-6.74]) and exhibited better oral health bedtime routines (88.5% versus 71.4% aOR, 3.25 [95% CI, 1.15-10.18], p=0.032). Parents demonstrated better knowledge brushing their child's teeth (92.0% versus 78.8% aOR, 5.47 [95% CI, 1.48-25.19]) and maintaining healthy bedtime routines (91.8% versus 80.8% aOR, 5.76 [95% CI, 1.38-32.16]). No significant differences in sugar-sweetened beverage consumption and sugar-sweetened food consumption.

**Conclusion:** The SmilesUp mHealth program showed overall positive effects on toothbrushing habits and bedtime routines, when compared to standard clinical care. Further research is needed to enhance the intervention for reducing sugar consumption before measuring long-term oral health outcomes.

DAY 1 | SESSION 5: Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology

ORAL 4

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# Task-shared Oral Cancer Screening at Rural Agricultural Touchpoints an Implementation Pilot

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**PRESENTER: Stacey Bracksley - O'Grady**

**Objective:** To evaluate the feasibility and acceptability of a task-shared, telehealth-enabled, photography-based oral cancer screening protocol at a rural agricultural touchpoint to improve early detection among populations with limited access to specialist care.

**Materials and Methods:** Convenience recruitment of adults was undertaken at the Wimmera Machinery Field Days in March 2025, following ethics approval (University of Melbourne 2025-31437-62756-3). West Wimmera Health Service health promotion workers were trained in a standardised 20-view intraoral photography protocol and in use of the MouthMap™ reporting software. Consenting participants completed pre- and post-imaging questionnaires including ad validated acceptability tool. High-resolution JPEG images were uploaded to MouthMap™ for asynchronous assessment by AHPRA-registered oral medicine specialists. Photo quality was scored across six criteria (focus, lighting, framing, magnification, tissue retraction, obstruction) using a REDCap form; findings were triaged (routine review, active monitoring, priority biopsy) and participants received a specialist report with follow-up recommendations. Summary statistics described feasibility, acceptability and diagnostic yield.

**Results:** All 49 participants completed imaging and questionnaires; mean age 75 years. The protocol was rated completely or partially acceptable by 100% of participants (82% completely acceptable; 18% acceptable); 50% rated the photography as “very comfortable” and 12% as “very uncomfortable.” Actionable abnormalities were identified in 11/49 participants (22%): 8/49 (16%) recommended priority biopsy and 3/49 (6%) recommended active monitoring.

**Conclusion:** Task-sharing intraoral photography to trained rural health workers, with remote specialist review via MouthMap™, was feasible and highly acceptable. The high actionable finding rate (~1 in 5) suggests potential for earlier detection in underserved rural populations. This decentralised model may reduce travel, improve specialist access, and strengthen rural health collaboration, though further evaluation of scalability, costs, and system-level barriers is needed.

DAY 1 | SESSION 5: Digital Dentistry, Imaging, and Emerging Technologies/Oral Implantology

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# Morphological and Morphometric Characteristics of the Nasopalatine Canal in Dentate and Edentulous Patients: A Cone-Beam Computed Tomography Cross-Sectional Study

**Cam L.N.H, Nhung H.N, Quynh T.N.N, Tram N.P.P, Ngoc T.T.N, Tu L.D.**

*Faculty of Odonto-Stomatology, University of Health Sciences, Vietnam National University, Ho Chi Minh City, Viet Nam.*

**PRESENTER: Cam L.N.H**

**Objectives:** To evaluate and compare the morphological and morphometric characteristics of the nasopalatine canal and the anterior bone region in dentate and completely edentulous patients via cone-beam computed tomography (CBCT).

**Materials and Methods:** CBCT analysis was performed on 108 patients (54 dentate maxillae and 54 completely edentulous maxillae). Morphometric parameters of the nasopalatine canal and the bone anterior to the canal were measured in the axial, sagittal, and coronal planes. Intergroup comparisons were conducted via regression models adjusted for age and sex. Ethical approval for this study was obtained from the Institutional Ethics Committee in Biomedical Research at the University of Health Sciences, Vietnam National University, Ho Chi Minh City, under approval number 02/QD-HDDD.

**Results:** Compared with the edentulous group, the dentate group presented a significantly greater nasopalatine canal length (mean difference: 1.66 mm; $p = 0.009$), whereas canal angulation was smaller (−6.47°; $p < 0.001$). On sagittal images, the middle and inferior canal widths were significantly smaller in the dentate group (ratios of means: 0.79 and 0.80; $p < 0.001$), whereas the superior width was not different. The bone region anterior to the nasopalatine canal in the dentate individuals presented greater buccal crestal length (4.66 mm; $p < 0.001$) and greater bone width at 1 mm and 6 mm apical to the crest (ratios: 1.65 and 1.24; $p < 0.001$). Morphologically, the Y-shaped canal configuration predominated in dentate patients (51.9%), whereas the single-canal configuration was more common in the edentulous group (64.8%). On the sagittal plane, cylindrical morphology was significantly more common in dentate individuals (odds ratio (OR) = 3.68; 95% CI: 1.56–9.00).

**Conclusion:** Edentulous patients exhibit wider and more angulated canals but reduced canal length and anterior bone volume. These findings highlight the importance of individualized CBCT evaluation to optimize implant planning and minimize surgical complications in the anterior maxilla

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# Morphological Characterization of Osteocytes in Peri-Implant Bone Using Acid-Etched Scanning Electron Microscopy

**Thi Mai Anh Nguyen, Minghao Zheng**

*University of Western Australia*

**PRESENTER: Thi Mai Anh Nguyen**

**Aim:** To characterise osteocyte morphology and dendritic connectivity in peri-implant bone using acid-etched scanning electron microscopy (SEM), and to compare osteocyte features in regions located near and far from the implant surface.

**Materials and Methods:** Methylmethacrylate (MMA)-embedded bone sections were polished, acid-etched, and treated with sodium hypochlorite to expose resin-casted osteocyte lacunae and canalicular networks. Samples were sputter-coated and imaged using secondary electron SEM. Osteocyte lacunae were analysed within predefined regions of interest located near and far from the implant surface. Quantitative morphometric analysis was performed using ImageJ. Parameters assessed included osteocyte lacunar density, length, width, ellipticity/eccentricity, and the number of primary dendritic processes arising from each osteocyte lacuna.

**Results:** Osteocytes located farther from the implant surface exhibited significantly altered morphology compared with osteocytes adjacent to the implant. Osteocytes in the far region demonstrated increased length, greater ellipticity/eccentricity, and a higher number of dendritic processes. In contrast, osteocytes near the implant appeared shorter and less elongated with reduced dendritic connectivity.

**Conclusion:** Acid-etched SEM enabled high-resolution visualisation of the OLCN and demonstrated regional differences in osteocyte morphology within peri-implant bone. Osteocytes located farther from the implant exhibited a more elongated and highly connected phenotype, suggesting spatial variation in osteocyte adaptation and network organisation during peri-implant bone remodelling.

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ORAL 7

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# Comparison of Tutor Feedback, Self-Assessment and Intraoral Scanner Feedback in Improving Fixed Prosthodontic Crown Preparation by Undergraduate Dental Students

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER** [Presenter name]

**BACKGROUND / INTRODUCTION**

[Insert accepted abstract text here.]

**METHODS**

[Insert accepted abstract text here.]

**RESULTS**

[Insert accepted abstract text here.]

**CONCLUSION**

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

# DAY 2

## Friday, 2 October 2026

| Session 1 | Dental Public Health/ Dental Education |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Understanding Barriers and Facilitators to Oral Health in Residential Aged Care Using the Theoretical Domains Framework |
| 2 | Understanding Research Capacity and Culture Among Oral Health Clinicians in a Large Public Dental Service in NSW, Australia |
| 3 | When Lost Teeth Change the Measure: Distortion in Periodontal Burden Estimates |
| 4 | Impact of Self-Directed Online Training and Educational Resources on Dental Students' Shade-Matching Accuracy |
| 5 | Weaving Educational Institutions to Support Mental Health in Dental and Oral Health Students: A Scoping Review |
| 6 | Trauma-Informed Care Practice for Dental Practitioners: A Scoping Review |

DAY 2 | SESSION 1: Dental Public Health/ Dental Education

ORAL 1

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# Understanding Barriers and Facilitators to Oral Health in Residential Aged Care Using the Theoretical Domains Framework

**Nesa Aurlene Jayadhas, Melanie Bish, Santosh Tadakamadla**

*La Trobe Rural Health School*

**PRESENTER: Nesa Aurlene Jayadhas**

**Background:** Older people living in residential aged care facilities (RACFs) in Australia experience a disproportionate burden of oral disease, with poor oral health contributing to adverse health outcomes, reduced quality of life, and increased risk of systemic conditions such as aspiration pneumonia. Understanding the behavioural determinants influencing oral hygiene practices is essential for developing effective, theory-informed interventions.

**Aim:** To explore the barriers and facilitators influencing oral health behaviours among older residents and caregivers in RACFs using the Theoretical Domains Framework (TDF). Methods: A qualitative study was conducted involving semi-structured interviews with 25 participants, comprising 12 residents and 13 caregivers recruited from three RACFs in rural Victoria, Australia. Interviews were guided by the TDF and analysed using a two-stage inductive-deductive approach. Themes were first identified inductively through thematic analysis and subsequently mapped to TDF domains.

**Results:** Twenty-eight themes were identified, including 10 barriers and 18 facilitators, which were mapped to 10 TDF domains. Key barriers included care-resistant behaviours among residents with dementia, inadequate education and training for caregivers, lack of skills in managing care-resistant behaviours, staff shortages, time constraints, limited access to dental services in rural areas, and the high cost of dental treatment. Facilitators included strong beliefs regarding the importance of oral health, high motivation to provide and perform oral hygiene behaviours, supportive workplace environments, and recognition of mouth care as a core caregiving responsibility.

**Conclusion:** Oral health behaviours in RACFs are influenced by multiple behavioural, environmental, and organisational factors. The findings provide a comprehensive understanding of the determinants of oral health behaviours among both residents and caregivers and will inform the development of a theory-based oral health promotion intervention using the Behaviour Change Wheel and COM-B frameworks to improve oral health outcomes for older people living in RACFs.

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# Understanding Research Capacity and Culture Among Oral Health Clinicians in a Large Public Dental Service in NSW, Australia

**Thilini Jayasinghe1, Jennifer Assaf2, Sharon A Lee3, David Schmidt4, Josephine Kenny2, Leanne Smith1, Helene Abouyanni6, Kathy Eljiz5, Mark Mclean6, Bradley Christian1,7, 8**

*University of Sydney*

**PRESENTER: Thilini Jayasinghe**

**Background:** Research-active health services deliver higher-quality care and better patient outcomes, making research capacity and culture (RCC) a core function of high-performing health systems. Despite being well placed to generate practice-relevant evidence, oral health clinicians remain among the least research-active health professional groups internationally. Most RCC assessments have focused on medical, nursing, and allied health workforces, rarely examining oral health clinicians as a distinct group. This study assessed research capacity and engagement among oral health clinicians in a large public dental service in Australia.

**Methods:** A cross-sectional online survey using a modified validated Research Capacity and Culture Tool (RCCT) was distributed to all oral health clinicians at Oral Health Services, Western Sydney Local Health District. Data were collected via REDCap in March 2026. Respondents self-rated 15 research skills on a 10-point Likert scale and completed sections on engagement, barriers, and support needs.

**Results:** Eighty oral health professionals responded: dental specialists (12.5%), dentists (36.2%), and other oral health professionals (51.2%). Females comprised 75.0%; 62.5% had over 11 years of experience. Only 22.5% had research formally included in their role. The overall median score was 4.3 (95% CI 3.76–4.94), with 51.2% at or above the midpoint. Literature searching and critical appraisal were rated highest; securing funding, ethics applications, and mentoring were rated lowest. Most reported no publications (87.7%), no grant applications (90.8%), and no research impact (73.8%) in the past 12 months. The majority were "not engaged" (30.8%) or "interested but not actively engaged" (46.1%). Barriers included time constraints, clinical workload, and limited research support.

**Conclusion:** Research activity was concentrated within a small subgroup of dental specialists. Most staff expressed latent interest but remained disengaged. Targeted, role-tailored interventions, supported by protected time, academic partnerships, and embedded research roles, are needed to translate this interest into sustained engagement.

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# When Lost Teeth Change the Measure: Distortion in Periodontal Burden Estimates

**K. M. McCormick, N. Amarasena, G. Guzzo, S. Nath, L. Jamieson**

*Adelaide University*

**PRESENTER: K. M. McCormick**

**Objectives:** Cross-sectional periodontal measures are calculated from retained teeth and observed sites. If severely affected teeth are more likely to be lost, these measures may condition on a survivor subset of the dentition and underestimate cumulative disease burden. We used simulation and nationally representative data to examine whether severity-dependent tooth loss can produce age-related attenuation in observed periodontal severity.

**Materials and Methods:** We developed a generative simulation in which latent cumulative periodontal burden increased monotonically with age across 28 anatomical subunits. Three observability mechanisms were compared: complete retention, age-dependent truncation, and severity-dependent truncation. Observed summaries were calculated among retained subunits only. We then analysed NHANES 2009–2014 data from dentate adults aged ≥30 years with periodontal examinations. Outcomes were percentage of sites with clinical attachment loss (CAL) ≥3, ≥5 and ≥6 mm, mean CAL, and percentage of eligible sites observed. Survey-weighted age-specific estimates and nonlinear age–severity associations were examined.

**Results:** In simulations, age-dependent truncation reduced observability but did not distort age–severity trajectories. In contrast, severity-dependent truncation produced attenuation at older ages despite continued monotonic increases in latent burden, with greatest distortion for higher severity thresholds. In NHANES, observable sites declined from 93.2% among adults aged 30–34 years to 67.9% among adults aged ≥80 years. Higher-threshold measures showed nonlinear attenuation with age: CAL ≥5 mm and CAL ≥6 mm both exhibited significant curvature, while CAL ≥3 mm increased more steadily. This pattern was consistent with depletion of the most severely affected teeth from the observable dentition.

**Conclusion:** Cross-sectional periodontal measures estimate severity among surviving teeth, not cumulative burden across the original dentition. Apparent age-related attenuation may reflect structural loss of severely affected teeth rather than biological slowing of disease. Periodontal surveillance should distinguish observed-dentition severity from cumulative lifetime burden.

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ORAL 4

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# Impact of Self-Directed Online Training and Educational Resources on Dental Students' Shade-Matching Accuracy

**Rachel Wong, Tony Chiu, Abdullah Barazanchi**

*Adelaide University*

**PRESENTER: Rachel Wong**

**Objectives:** To evaluate the impact of self-directed online training on shade-matching accuracy among undergraduate dental students.

**Materials and Methods:** BDS4 and BDS5 students at the University of Adelaide (n=43) were randomly allocated to experimental (n=25) or control (n=18) groups, following exclusion of one participant due to colour vision deficiency confirmed by Ishihara test (ethics H-2025-126). All completed eight standardised shade-matching tasks using the VITA Linearguide 3D-Master under controlled lighting at Session 1 (baseline) and Session 2 (six weeks later). The experimental group independently completed self-directed learning resources between sessions. Two scoring systems were applied: binary exact-match (/8) and a novel per-dimension proximity scoring system (/48) assessing Value, Chroma and Hue. Wilcoxon signed-rank, Mann-Whitney U and ANCOVA analyses were performed (alpha=0.05).

**Results:** Groups were statistically equivalent at baseline (all $p>0.18$). Following the six-week intervention, the experimental group improved significantly in exact match from 26.5% to 57.0% ($p<0.001$, $d=1.54$) and proximity score from 69.5% to 80.3% ($p<0.001$, $d=0.97$); 88% of participants improved and none declined. All three perceptual dimensions improved significantly: Value (71.5% to 83.0%, $p<0.001$), Chroma (71.8% to 79.8%, $p=0.019$) and Hue (65.2% to 78.2%, $p<0.001$, $d=0.92$). Only Hue remained significant after ANCOVA adjustment ($p=0.031$, eta-squared=0.11), with the experimental group significantly outperforming controls at Session 2 (78.2% vs 64.2%). The control group showed no significant Hue improvement ($p=0.345$), consistent with Hue requiring structured training beyond task repetition alone. The experimental group advanced from Poor to Average competency; 48% individually reached Superior level.

**Conclusion:** Self-directed online training produced significant, large-effect improvements in dental shade-matching accuracy without any instructor involvement, with the greatest gains observed in Hue - the perceptual dimension least responsive to practice alone. Outcomes were consistent with published instructor-led programmes, supporting integration of self-directed digital colour training into undergraduate dental curricula as a scalable and accessible educational resource.

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# Weaving Educational Institutions to Support Mental Health in Dental and Oral Health Students: A Scoping Review

**Dr Chrishan Fernando, Dr Kiah Evans, A/Prof Estie Kruger, Prof Khaled Ahmed**

*University of Western Australia (student)/University of Otago (Clinical Educator)*

**PRESENTER: Dr Chrishan Fernando**

The Australian Dental Council is responsible for the accreditation of tertiary dental education programs, leading to the professional registration of dental practitioners in Australia. Negative mental health and well-being states are a persistent issue in dental practitioners' training and graduate environments. Some interventions and frameworks exist within tertiary dental education providers, although there is no standardised approach to their delivery. The scoping review aimed to identify existing curriculum-based interventions to address the mental health concerns of undergraduate dental and oral health therapy students. The questionnaire aimed to determine the current mental health and wellbeing needs of undergraduate dental and oral health therapy students, to provide a foundation for future interventions.

**Materials and Methods:** This scoping review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). A comprehensive search strategy yielded 5,852 studies for double screening, which underwent double screening; of these, 12 studies were deemed eligible for inclusion in this review.

**Results:** Eight frameworks were identified to improve dental and oral health students' mental health and well-being. This included yoga, gratitude, arts-based epistemology, self-development coaching, mindfulness, rewilding, logistics-based adjustments, and gamification. The data presented showed that yoga, gratitude practices, and logistics-based modifications were effective, whilst the remaining frameworks lacked empirical data to support their use. Psychological stress was the main mental health variable identified, commonly measured using State-Trait Anxiety Inventory (STAI) and Perceived Stress Scale (PSS).

**Discussion:** Overall, the findings highlight a variability in the type, quality and supporting evidence for curriculum-based interventions within dentistry and oral health education. The limited theoretical support for identified frameworks suggests a need for more rigorous evaluation and alignment with current accreditation standards. Collectively, the scoping review provides some evidence for developing curriculum-based wellbeing interventions and may inform future accreditation standards and needs assessments conducted in the future.

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# Trauma-Informed Care Practice for Dental Practitioners: A Scoping Review

**Kristy S. Choi | Woosung Sohn | Delyse Leadbeatter**

*University of Sydney*

**PRESENTER: Kristy S. Choi**

**Background:** Trauma-informed care (TIC) is a patient care framework that recognises the widespread impact of trauma. While the likelihood of dental practitioners encountering patients with trauma is significant, there is limited guidance on TIC in dental care, highlighting the need for a clearer understanding. This scoping review was conducted to synthesise the literature to date concerning TIC practice for dental practitioners.

**Materials and Methods:** A search across six electronic databases and a manual search were conducted to find literatures from January 1992 to September 2025 that met inclusion criteria following the Systematic reviews and Meta-Analyses extension for Scoping Reviews guidelines. Of 176 identified papers, 27 papers informed this review.

**Results:** Identified TIC practices were categorised and synthesised according to 'the four R's' of TIC, such as safety and trust and other additional recurring TIC themes. This scoping review synthesised key concepts of TIC with the aim of informing clinical practice for dental practitioners.

**Conclusion:** The review highlights core TIC themes in the literature and identifies priorities for future research. As trauma is pervasive and often undisclosed, TIC practice by dental practitioners is recommended as a universal precaution approach in all patient care.

# DAY 2

## Friday, 2 October 2026

| Session 2 | Periodontology & Peri-implant Diseases |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Associations Between the Oral Microbiome and Periodontal Parameters in Diabetic and Non-diabetic Aboriginal and Torres Strait Islander Adults. |
| 2 | High-Purity Plasma-Derived Extracellular Vesicles Restore Macrophage Homeostasis and Enhance Periodontal Ligament Cell Differentiation |
| 3 | Periodontitis-Induced Gut Microbiota Dysbiosis Drives Neuroinflammation and Glial Homeostasis Disruption |
| 4 | SNAPP-Star Antimicrobial Peptide-Polymers Are Effective Against Bacterial Biofilms and Porphyromonas Gingivalis. |

DAY 2 | SESSION 2: Periodontology & Peri-implant Diseases

ORAL 1

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# Associations Between the Oral Microbiome and Periodontal Parameters in Diabetic and Non-diabetic Aboriginal and Torres Strait Islander Adults.

**S. Talapaneni, S. Nath**

*Adelaide University*

**PRESENTER: S. Talapaneni**

**Background:** Aboriginal and Torres Strait Islander peoples experience disproportionately high rates of both periodontitis and Type 2 Diabetes Mellitus (T2DM), however limited research has investigated the oral microbiome within Indigenous Australian populations. The aim of this study is to investigate cross-sectional differences in the oral microbiome and clinical periodontal parameters between diabetic and non-diabetic Aboriginal and Torres Strait Islander adults.

**Materials and Methods:** This study forms part of a larger mixed-methods study conducted in South Australia between 2022 and 2025. Participants underwent comprehensive periodontal examinations, plaque sample collection and HbA1c testing. Participants were categorised into diabetic and non-diabetic groups according to HbA1c levels, with diabetes defined as HbA1c ≥6.5%. Clinical periodontal parameters were also assessed. The V4 region of the 16S rRNA gene was sequenced using the Illumina MiSeq platform. Sequencing data were processed using QIIME2, with alpha diversity and beta diversity evaluated. Associations between microbial composition, diabetes status and periodontal clinical parameters were analysed using multivariable statistical models adjusted for relevant confounders.

**Results:** Data from 280 adult Indigenous participants were included in this cross-sectional analysis. More than 30% of participants were identified as having T2DM. Diabetic participants generally demonstrated reduced microbial diversity and greater periodontal disease severity, including increased clinical periodontal outcomes. Keystone periodontal pathogens including Porphyromonas gingivalis and Prevotella species were more frequently associated with diabetic participants and periodontal inflammation. Variations in both alpha and beta diversity suggested altered microbial community structure within the diabetic group compared with non-diabetic participants.

**Conclusion:** Diabetic Aboriginal and Torres Strait Islander participants demonstrated stark differences in oral microbiome composition and periodontal clinical parameters compared with non-diabetic participants. These findings suggest that diabetes may contribute to microbial dysbiosis and periodontal disease progression within Indigenous Australian populations and highlights the importance of targeted, culturally safe periodontal interventions to improve oral health outcomes.

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# High-Purity Plasma-Derived Extracellular Vesicles Restore Macrophage Homeostasis and Enhance Periodontal Ligament Cell Differentiation

**Tian Xu, Dalila Iannotta, Zhengming Tang, Pingping Han, Sašo Ivanovski, Joy Wolfram, Yinghong Zhou**

*School of Dentistry, The University of Queensland*

**PRESENTER: Yinghong Zhou**

**Aim:** Periodontitis is chronic inflammatory disease driven by dysregulated immune responses, particularly excessive pro-inflammatory macrophage activity, which can lead to tooth loss if untreated. Plasma-derived extracellular vesicles (pEVs) have emerged as promising nanotherapeutics capable of reaching inflamed periodontal tissues through plasma exudation. This study aimed to evaluate the immunoregulatory effects of high-purity pEVs with reduced lipoprotein contamination and their capacity to enhance periodontal ligament cell (PDLC) differentiation.

**Materials and Methods:** Human pEVs were isolated from de-identified residual plasma using targeted chemical pre-treatment combined with tangential flow filtration to minimise lipoprotein contamination, generating high-purity pEVs. The immunomodulatory effects of standard and high-purity pEVs were assessed in lipopolysaccharide (LPS)-stimulated macrophages across multiple concentrations using RT-qPCR, immunofluorescence staining, and ELISA. To evaluate downstream regenerative effects, conditioned media from pEV-treated macrophages were applied to PDLC cultures. Osteogenic and cementogenic differentiation were assessed by Alizarin Red S staining and RT-qPCR analysis of bone- and cementum-related marker expression.

**Results:** High-purity pEVs were successfully generated with substantially reduced lipoprotein contamination while maintaining vesicle integrity. Both standard and high-purity pEVs suppressed pro-inflammatory gene expression and cytokine secretion in M1-like macrophages. However, high-purity pEVs promoted a more pronounced shift toward an anti-inflammatory M2-like phenotype. Furthermore, macrophages treated with high-purity pEVs significantly enhanced PDLC osteogenic and cementogenic differentiation compared with those treated with standard pEVs.

**Conclusion:** High-purity pEVs exhibit potent immunoregulatory properties, restoring macrophage homeostasis by reducing inflammatory responses and promoting a pro-regenerative phenotype. Through macrophage-mediated mechanisms, these vesicles further enhance PDLC differentiation toward bone- and cementum-forming lineages. These findings highlight lipoprotein-depleted pEVs as a promising cell-free therapeutic strategy for periodontal tissue regeneration.

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# Periodontitis-Induced Gut Microbiota Dysbiosis Drives Neuroinflammation and Glial Homeostasis Disruption

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*1 Nanjing Stomatological Hospital, Affiliated Hospital of Medical School, Institute of Stomatology, Nanjing University, Nanjing, China*
*2 Department of Oral Implantology, Hefei Stomatological Hospital, Hefei, China.*

*3 School of Medicine, Nankai University, Tianjin, China*

*4 Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand*

**PRESENTER: Xinyue Wang**

**Background:** Emerging evidence suggests an association between periodontitis and neurodegenerative disorders; however, the mechanisms linking periodontal inflammation to brain dysfunction remain poorly understood. This study investigated whether periodontitis induces neuroinflammatory alterations through gut microbiota dysbiosis along the oral–gut–brain axis.

**Materials and Methods:** Ligature-induced periodontitis was established in C57BL/6J mice. Neuroinflammatory responses were assessed using histology, quantitative PCR, immunofluorescence staining, and brain transcriptomic analysis. Gut microbiota composition was characterized by 16S rRNA sequencing. Correlation analyses were performed to evaluate associations between microbial alterations and brain inflammatory signatures. To determine the causal role of gut microbiota, fecal microbiota transplantation (FMT) from periodontitis and control donors was performed in germ-free mice, followed by neuroinflammatory and transcriptomic assessments.

**Results:** Periodontitis induced low-grade neuroinflammation characterized by increased expression of inflammatory mediators (TNF-α, IL-6, IL-1β, and IL-17), activation of astrocytes and microglia, and significant brain transcriptomic alterations. Periodontitis also reduced gut microbial diversity and depleted multiple short-chain fatty acid (SCFA)-producing taxa, including Roseburia, Butyricimonas, and Muribaculaceae, while enriching potentially pro-inflammatory bacteria. Gut microbial alterations were strongly associated with brain inflammatory and glial-related gene signatures. Importantly, transplantation of periodontitis-associated microbiota into germ-free mice reproduced inflammatory gene expression changes, astrocytic activation, and immune-related transcriptomic alterations in the brain.

**Conclusion:** Periodontitis promotes neuroinflammatory remodeling and glial homeostasis disruption, which are closely associated with gut microbiota dysbiosis. Depletion of SCFA-producing bacteria may represent a key mechanism linking periodontal inflammation to brain immune activation. These findings provide evidence for an oral–gut–brain axis connecting periodontitis with neuroinflammation and suggest that modulation of gut microbiota may represent a potential therapeutic strategy to mitigate neurological consequences of periodontitis.

DAY 2 | SESSION 2: Periodontology & Peri-implant Diseases

ORAL 4

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# SNAPP-Star Antimicrobial Peptide-Polymers Are Effective Against Bacterial Biofilms and Porphyromonas Gingivalis.

**Negar Yazdani1*, Alastair Sloan2, Rita Hardiman3, Anders Barlow4, Ray Dagastine5, Sara Hadjigol1# and Neil M. O'Brien-Simpson1#.**

*1 ACTV Research Group, Division of Basic and Clinical Oral Sciences, Centre for Oral Health Research, Melbourne Dental School, Royal Dental Hospital, The University of Melbourne, Carlton, Melbourne, Victoria, Australia. 2 Chancellery, Research and Enterprise, Raymond Priestly Building, The University of Melbourne, Melbourne, Victoria, Australia. 3 Melbourne Dental School, Faculty of Medicine, Dentistry and Health Sciences, Royal Melbourne Dental Hospital, The University of Melbourne, Melbourne, Victoria, Australia. 4 Materials Characterisation & Fabrication Platform | Faculty of Engineering and Information Technology, The University of Melbourne, Melbourne, Victoria, Australia. 5 Department of Chemical Engineering, Faculty of Engineering and Information Technology, The University of Melbourne, Melbourne, Victoria, Australia.*

**PRESENTER: Negar Yazdani**

**Objectives:** Porphyromonas.gingivalis is a key pathogen in periodontal and peri-implant infections, its major virulence factors, the gingipains are known to contribute to disease progression and inactivate antimicrobial-materials. Synthetic-nanoengineered-antimicrobial-peptide-polymers (SNAPPs) have broad-spectrum antimicrobial activity against Gram-positive, Gram-negative, and multidrug-resistant bacteria and are a potential therapeutic strategy against P.gingivalis. This study aimed to (1) investigate SNAPP efficacy under aerobic and anaerobic conditions, (2) determine the role of gingipains in bacterial protection against antimicrobial-materials, and (3) evaluate SNAPPs antibiofilm activity.

**Materials and Methods:** Antibacterial activity of SNAPPs was assessed under gingipain-inhibited, reduced, and non-reduced conditions using minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) assays. Antibiofilm activity was evaluated using biofilm prevention and eradication assays. Mechanistic studies included flowcytometry analysis of membrane-integrity, membrane-potential, and reactive-oxygen-species (ROS) production. Morphological and motility changes were assessed using helium-ion-microscopy (HIM) and Halo microscopy. All assays were conducted under aerobic and anaerobic conditions on antibiotic-resistant Escherichia coli. Biocompatibility was evaluated using LDH cytotoxicity and MTS proliferation assays.

**Results:** SNAPPs antimicrobial activity was altered from a bactericidal in aerobic conditions to bacteriostatic mode of killing in anaerobic conditions for antibiotic-resistant E.coli. SNAPP efficacy against P.gingivalis was linked to Lys-gingipain activity, as a Lys-gingipain-deficient mutant was susceptible to SNAPP whereas wild-type P.gingivalis was not. Inactivation of the Lys-gingipain using non-reducing media or enzyme inhibitors restored SNAPP-activity to wild-type P.gingivalis. SNAPPs where found to inhibit biofilm formation and eradicate established biofilms at 4×MIC($p<0.001$). Mechanistically, SNAPPs induced membrane disruption, membrane depolarisation, and ROS generation, leading to bacterial death. Imaging showed that SNAPPs induced structural cell-envelope damage and impaired bacterial motility in E.coli. SNAPPs demonstrated high biocompatibility in mammalian cell assays.

**Conclusion:** SNAPP-based therapies in optimised conditions show strong potential for managing peri-implant and antibiotic-resistant periodontal infections. Their antibacterial, antibiofilm, and synergistic properties support their development as next-generation therapeutics for oral-biofilm-associated diseases.

# DAY 2

## Friday, 2 October 2026

| Session 3 | Periodontology & Peri-implant Diseases/ Microbiology |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Validity of *S. mutans* as a Model for Dental Implant-Associated Biofilm Research: Biological Rationale, Experimental Models, and Characterization Methods |
| 2 | The influence of Implant Supra-Structure on the Efficacy of Mechanical Implant Surface Decontamination Methods: An In Vitro Study |
| 3 | The Link Between the Oral Microbiome and Cardiovascular Disease in Indigenous Australian Populations |
| 4 | Molecular Microbiological Profiling in the Remaining Bottled Black Tea and Coffee Beverages |
| 5 | Profiling of Microbiota Isolated from Smartphone Touchscreens: Detection of Oral Bacteria and Effectiveness of UV Irradiation |

DAY 2 | SESSION 3: Periodontology & Peri-implant Diseases/ Microbiology

ORAL 1

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# Validity of *S. mutans* as a Model for Dental Implant-Associated Biofilm Research: Biological Rationale, Experimental Models, and Characterization Methods

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER:**

**BACKGROUND / INTRODUCTION**

[Insert accepted abstract text here.]

**METHODS**

[Insert accepted abstract text here.]

**RESULTS**

[Insert accepted abstract text here.]

**CONCLUSION**

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

DAY 2 | SESSION 3: Periodontology & Peri-implant Diseases/ Microbiology

ORAL 2

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# The influence of Implant Supra-structure on the Efficacy of Mechanical Implant Surface Decontamination Methods: An In Vitro Study

**Tao Wang1, Kaichun Li1, Sunyoung Ma1, Tino Mercado1, Andrew Tawse-Smith1**

*1Sir John Walsh Research Institute, Faculty of Dentistry, University of Otago, Dunedin, New Zealand*

**PRESENTER: Tao Wang**

**Objectives:** To evaluate the influence of implant crown emergence angle on the decontamination efficacy of three different mechanical instrumentation methods in an in vitro peri-implantitis model.

**Materials and Methods:** A total of 120 implants (Astra Tech Implant EV, Dentsply Sirona) coated with red ink simulating a biofilm were divided into three groups based on the surface decontamination modality: a metal ultrasonic scaler, a polyether ether ketone (PEEK) ultrasonic scaler, and an air polishing device. Forty implants from each modality were further allocated to four restorative configurations of 10 implants each based on emergence angle: a no crown control, 30°, 45°, and 60°. Decontaminated implant surfaces were quantified objectively using digital image analysis to calculate the percentage of residual ink.

**Results:** Our results indicated that complete decontamination was not achieved in any group, and efficacy was further compromised by the prosthetic contour. In the no crown group, decontamination was comparable across all treatment modalities with overall limited efficacy. A substantial reduction in decontamination efficacy was observed as the emergence angle increased from 30° to 45° and 60°. For the groups with implant crowns with wider emergence angles, the metal and PEEK ultrasonic scalers demonstrated a similar decrease in efficacy. However, the air polishing exhibited a marked reduction in performance. At the maximum 60° emergence angle group, air polishing left substantially more residual ink compared to other decontamination modalities.

**Conclusion:** Achieving complete implant surface decontamination remains challenging, as all decontamination modalities demonstrated compromised efficacy even in the no crown group. The presence of implant crowns with wider emergence angles significantly affects decontamination efficacy. Although all methods demonstrated limitations, air polishing was significantly more compromised by wider emergence angles compared to other decontamination modalities.

DAY 2 | SESSION 3: Periodontology & Peri-implant Diseases/ Microbiology

ORAL 3

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# The Link Between the Oral Microbiome and Cardiovascular Disease in Indigenous Australian Populations

**Raymond Shi, Lisa Jamieson, Sonia Nath**

*Adelaide University*

**PRESENTER: Raymond Shi**

**Aim:** This study aims to characterise the oral microbiome of Indigenous Australians and investigate its association with cardiovascular disease (CVD) status, as well as related biomarkers, including C-reactive protein (CRP), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and total cholesterol (TC).

**Materials and Methods:** This cross-sectional study enrolled 280 Indigenous Australian adults. Sociodemographic data and CVD history were collected using questionnaires. Cardiovascular biomarker levels, including CRP, HDL, LDL, and TC, were measured from finger-prick blood samples. All participants underwent a comprehensive clinical dental examination for the diagnosis and staging of periodontitis, during which subgingival plaque and whole unstimulated saliva were collected. Microbial community profiling was performed via 16S rRNA amplicon sequencing targeting the V3–V4 hypervariable regions. Alpha- and beta-diversity were characterised across samples. Associations between individual oral taxa (at genus and family level) and continuous cardiovascular biomarker levels (CRP, HDL, LDL, TC) were evaluated using multivariable linear regression models, adjusted for age, sex, smoking status, and periodontitis severity. The association between oral microbial profiles and binary CVD status (present/absent) was assessed using multivariable logistic regression models.

**Results:** Alpha-diversity (Shannon index) was significantly higher in participants with CVD than in those without ($p = 0.05$), whereas beta-diversity analysis revealed distinct microbial community structures between CVD and non-CVD groups ($p < 0.05$, PERMANOVA). Porphyromonas and Treponema were positively associated with elevated CRP levels. Fusobacterium abundance was inversely associated with HDL levels, whereas Prevotella was positively associated with TC. Logistic regression revealed that a higher relative abundance of Porphyromonas was independently associated with CVD status, whereas a higher relative abundance of Streptococcus was inversely associated with CVD status, suggesting a potentially protective microbial signature.

**Conclusion:** This study provides evidence that the oral microbiome of Indigenous Australians with periodontitis harbours distinct microbial signatures that associate with CVD status and related inflammatory and lipid biomarkers.

DAY 2 | SESSION 3: Periodontology & Peri-implant Diseases/ Microbiology

ORAL 4

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# Molecular Microbiological Profiling in the Remaining Bottled Black Tea and Coffee Beverages

**H. Sato, M. Kawachi, A. Wakui, Y. Kato, N. Kubo, A. Misumi, M. Imai, R. Okabe, T. Akagawa, M. Morohashi, N. Asano, J. Washio, T. Sato**

*Division of Clinical Chemistry, Niigata University Graduate School of Medicine, Dentistry, and Health Sciences, Niigata, Japan*

**PRESENTER: H. Sato**

**Objectives:** Oral bacteria can possibly be transferred to drinks in plastic bottles after direct drinking. In this study, resting saliva was collected and inoculated into the plastic bottles of black tea or coffee with/without sugars/milk; and then the survival of oral bacteria and their characteristics were examined after storage at 37°C for 24-h.

**Materials and Methods:** After obtaining informed consent, resting saliva was collected from 14-healthy subjects (19-26 years), and then inoculated as 1.8×103 CFU/mL into the plastic bottles of black tea (Kirin Holdings Company, Ltd.) and coffee (Suntory Holdings, Ltd.). After 1-day, the samples in the bottles were inoculated onto CDC Anaerobe Blood Agar plates, and incubated anaerobically at 37°C for 7-days. The bacterial species were identified by 16S-rRNA gene-sequencing.

**Results:** From the black tea (without sugars/milk) in the 14-cases, the amounts of bacteria were only 101 levels, while in the 7-cases (with only sugars; 3.9%), those were from 101 to 103 levels; the adding of sugars to the black tea gives little or no impact. In contrast, from the black tea (with only milk) in the 4-cases, the mean amounts of bacteria were (3.3±0.7)×107; and Streptococcus parasanguinis/salivarius (66%) and S. mitis/oralis/sanguinis/infantis (34%) were predominantly detected among 125-isolates. Furthermore, from the black tea (with sugars/milk) in the 4-cases, the mean amounts of bacteria were (4.7±2.6)×107; and S. parasanguinis/salivarius (69%) and S. mitis/oralis/sanguinis/infantis (31%) were predominantly detected among 175-isolates. Similarly, from the black coffee (with sugars and milk) in the 4-cases, S. parasanguinis/salivarius (35% and 63%) and S. mitis/oralis/sanguinis/infantis (63% and 37%) were predominantly detected among 116-isolates and 65-isolates, respectively.

**Conclusion:** The bacterial levels of the black tea/coffee were quite distinct between with and without milk, suggesting that the black tea/coffee beverages without milk may possibly be preserved for a longer period from the view point of bacterial levels.

DAY 2 | SESSION 3: Periodontology & Peri-implant Diseases/ Microbiology

ORAL 5

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# Profiling of Microbiota Isolated from Smartphone Touchscreens: Detection of Oral Bacteria and Effectiveness of UV Irradiation

**Y. Kato, A. Wakui, H. Sato, A. Misumi, N. Kubo, T. Abe, M. Kawachi, M. Imai, T. Akagawa, M. Morohashi, N. Asano, J. Washio, T. Sato**

*Division of Clinical Chemistry, Niigata University Graduate School of Medicine, Dentistry, and Health Sciences, Niigata, Japan*

**PRESENTER: Y. Kato**

**Objectives:** This study aimed to characterize bacterial communities on smartphone touchscreens, and the effectiveness of UV irradiation.

**Materials and Methods:** After obtaining informed consent, smartphone touchscreens and the skin of all five fingers were swabbed using sterile cotton swabs from 15 healthy subjects. Samples were suspended, inoculated onto CDC Anaerobe Blood Agar plates, and incubated under anaerobic and aerobic conditions at 37°C. Bacterial species were identified by 16S rRNA gene sequencing. We performed the similar analysis on samples that had been disinfected with 70% ethanol or irradiated for the specified duration (5 to 8 minutes) using three types of UV irradiators designed for smartphones.

**Results:** Bacterial counts recovered from smartphone surfaces were $(6.2\pm9.2)\times10^2$ and $(2.5\pm5.1)\times10^2$ CFU/mL under anaerobic and aerobic conditions, respectively. Under anaerobic conditions, Cutibacterium (65.5%), Streptococcus (13.3%), Staphylococcus (8.9%), and Corynebacterium (7.4%) were predominant. Bacterial counts from finger skin were higher, at $(3.7\pm8.3)\times10^3$ and $(6.5\pm9.5)\times10^2$ CFU/mL under anaerobic and aerobic conditions, respectively. Cutibacterium (74.1%) and Staphylococcus (22.8%) were predominant under anaerobic conditions. When smartphone surfaces were disinfected with ethanol, the bacterial counts decreased to (6.7±19.2)×100 and (5.4±10.5)×101 CFU/mL under anaerobic and aerobic conditions, respectively. Even after UV irradiation (with all three models), the counts were $(0.3–1.7)\times10^2$ and $(0.5–4.6)\times10^2$ CFU/mL under anaerobic and aerobic conditions, respectively.

**Conclusion:** The bacterial counts on the surface of the smartphone touchscreens ranged from 16% to 38% of the total found on five fingers, even when the surfaces were not disinfected, suggesting that the surface was not suitable for microorganisms to inhabit. The UV irradiators were approximately 90% effective, while ethanol disinfection proved to be more effective.

# DAY 2

## Friday, 2 October 2026

| Session 4 | Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Investigating the Impact of Maternal Periodontitis on Fetal Development |
| 2 | Prevalence of Postoperative Complications Following Oral Cancer Surgery in a South Australian Population: A Cohort Study |
| 3 | The Effect of an Intermediate Splint on the Accuracy of Patient-Specific Implants in Orthognathic Surgery: A Cohort Study |
| 4 | Integrated Multi Omics Indicates a miR-1321 and miR-320 Family Related Network as Diagnostic Biomarkers in Oral Squamous Cell Carcinoma |
| 5 | Crown and Pulp Morphology of Primary Second Molars on Cone-Beam CT Images |

DAY 2 | SESSION 4: Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology

ORAL 1

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# Investigating the Impact of Maternal Periodontitis on Fetal Development

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER:**

**BACKGROUND / INTRODUCTION**

[Insert accepted abstract text here.]

**METHODS**

[Insert accepted abstract text here.]

**RESULTS**

[Insert accepted abstract text here.]

**CONCLUSION**

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

DAY 2 | SESSION 4: Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology

ORAL 2

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# Prevalence of Postoperative Complications Following Oral Cancer Surgery in a South Australian Population: A Cohort Study

**N. Varghese, E. D. Jensen, A. Cheng, P. Sambrook**

*Adelaide University*

**PRESENTER: N. Varghese**

**Introduction:** Early postoperative complications following oral cancer surgery, especially within the first 30 days, have significant individual impacts and adversely affect recovery and functional outcomes. Despite growing international evidence, there remains limited data characterising these postoperative outcomes within Australian populations. The objective of this retrospective cohort study was to explore the distribution and risk factors of early postoperative complications among adults who had undergone surgical management alone for treatment of oral cavity malignancies.

**Materials and Methods:** Medical records of adults aged 18 years and older were obtained from a tertiary hospital over a 6-year period. Adult individuals who underwent surgical management as the sole treatment modality with biopsy proven malignant neoplasm of the oral cavity were included. Age at diagnosis, sex, tobacco and alcohol use, tracheostomy status, cancer type and location, cancer staging, and postoperative complications within 30 days were obtained. Univariate and multivariate odds regression analyses were used to identify prognostic values. A p-value of $<0.05$ was considered statistically significant.

**Results:** A total of 91 individuals were identified from the single hospital cohort, with an overall complication rate of 37.4%. Nausea (14.3%) and vomiting (12.1%) were the most frequently diagnosed postoperative complications, followed by recipient site dehiscence (9.9%) and hospital-acquired pneumonia (8.8%). Tracheostomy was significantly associated with increased complication rate (OR 5.26, $p = 0.003$) in multivariate analysis, while advanced age and current smoking showed non-significant trends.

**Conclusion:** Early postoperative complications following oral cancer surgery represented a significant postoperative burden within this South Australian cohort. High-risk individual subgroups, such as those requiring tracheostomy, often present with greater disease severity and surgical complexity and may benefit from increased perioperative monitoring and targeted interventions to reduce postoperative adverse events.

DAY 2 | SESSION 4: Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology

ORAL 3

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# The Effect of an Intermediate Splint on the Accuracy of Patient-Specific Implants in Orthognathic Surgery: A Cohort Study

**A. Efthymiou, E.D. Jensen, A. Cheng, P. Sambrook**

*Adelaide University*

**PRESENTER: A. Efthymiou**

**Introduction:** Patient-specific implants (PSIs) are increasingly utilised in orthognathic surgery to improve the accuracy of maxillary repositioning. However, limited evidence directly compares splintless and splint-assisted PSI workflows. This retrospective cohort study aimed to compare the translational and rotational accuracy of splintless and splint-assisted PSI protocols following single-piece Le Fort I surgery.

**Materials and Methods:** Participants from a single surgeon's private practice who underwent Le Fort I procedures between 2018 and 2024 were recruited and allocated non-randomly according to the surgical protocol in use at the time of treatment. Planned and postoperative maxillary positions were compared using three-dimensional analysis to assess translational and rotational discrepancies at multiple anterior and posterior maxillary landmarks. Normality was assessed using the Shapiro-Wilk test, with between-group comparisons performed using the Mann-Whitney U test. Benjamini-Hochberg correction was applied to control for multiple comparisons, with statistical significance set at $p = 0.05$.

**Results:** A total of 38 participants were included, comprising nine splintless and 29 splint-assisted PSI cases. Both workflows demonstrated clinically acceptable translational and rotational accuracy overall, with similar outcomes observed at anterior maxillary landmarks. However, splint-assisted PSI protocols demonstrated improved control over posterior and pitch-related movements, particularly in the anteroposterior and superoinferior dimensions. The splint-assisted PSI group exhibited a mean discrepancy at the upper right molar of 0.83mm (standard deviation (SD) 0.81mm), significantly lower than the splintless PSI group's 1.49mm (SD 0.56mm) ($p = 0.009$). Several additional measurements in the posterior region, along with pitch, also approached significance. Conclusion:

**Conclusion:** Splint-assisted PSI workflows may provide improved control over posterior landmarks and pitch-related movements compared to splintless PSI protocols. Future prospective studies with larger cohorts are warranted to further evaluate the observed improvements in posterior landmark and pitch control associated with splint-assisted PSI workflows.

DAY 2 | SESSION 4: Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology

ORAL 4

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# Integrated Multi Omics Indicates a miR-1321 and miR-320 Family Related Network as Diagnostic Biomarkers in Oral Squamous Cell Carcinoma

**Y. N. Tran, H. T. Vu, H. T. Huynh, H. N. Luu, N. L. Le, L. T. N. Truong**

*Can Tho University of Medicine and Pharmacy, University of Medicine and Pharmacy Ho Chi Minh City*

**PRESENTER: Y. N. Tran**

**Objectives:** Oral squamous cell carcinoma represents over 90% of oral cavity malignancies. This study aimed to identify key pathways and potential biomarkers for diagnosis and therapeutic orientation.

**Materials and Methods:** Eight gene-expression datasets, including seven GEO datasets (GSE23558, GSE30784, GSE37991, GSE74530, GSE215403, GSE28100, and GSE113956) and TCGA data, were analyzed. Differentially expressed miRNAs and mRNAs between tumor and normal samples were identified (padj < 0.05 and |log2FC|>1 as significance thresholds), together with single-cell expression patterns. Consensus mRNAs were subjected to GO and KEGG enrichment analyses. In parallel, miRNAs differentially expressed in both serum and tumor biopsy datasets were selected for miRNA–mRNA interaction prediction using MiRSystem. The cellular origin and expression patterns of candidate mRNAs were further investigated using single-cell RNA-sequencing data.

**Results:** A total of 205 differentially expressed mRNAs were identified from four GEO datasets and TCGA. GO and KEGG revealed prominent enrichment in ECM-receptor interaction. For miRNAs, 60 differentially expressed miRNAs were detected with KEGG suggesting Hippo signaling pathway. The hsa-miR-320 family accounted for 41.95% of target mRNAs and suppresses OSCC progression. Notably, hsa-miR-1321 was consistently downregulated in both serum and tumor tissues, with discriminatory performance in tissue (AUC= 0.961) and serum (AUC= 0.976). It potentially targets 14 upregulated mRNAs including RTKN, AURKA, CDCA8, PDE7A, SPRY4, CD276, CDH3, ITGA5, MARCKSL1, NRG1, PCDH7, SOX11, TMEM132A and TPX2. These candidate mRNAs showed AUCs ranging from 0.85 to 0.97 and were expressed across malignant epithelial, proliferating, B-cell, endothelial, fibroblast/CAF, and myeloid/macrophage populations in single-cell RNA-seq analysis.

**Conclusion:** The consistent downregulation of the hsa-miR-320 family and hsa-miR-1321, together with upregulation of 14 mRNAs, highlights their collective potential as diagnostic biomarkers in OSCC and defines underlying miRNA–mRNA networks linked to Hippo signaling and ECM–receptor interaction. Whereas hsa-miR-320 is known in tumor biology, hsa-miR-1321 remains largely unexplored in OSCC, warranting future validation.

DAY 2 | SESSION 4: Oral & Maxillofacial Surgery/ Oral Medicine & Oral Pathology/Oral Biology

ORAL 5

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# Crown and Pulp Morphology of Primary Second Molars on Cone-Beam CT Images

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER:**

**BACKGROUND / INTRODUCTION**

[Insert accepted abstract text here.]

**METHODS**

[Insert accepted abstract text here.]

**RESULTS**

[Insert accepted abstract text here.]

**CONCLUSION**

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

# DAY 2

## Friday, 2 October 2026

| Session 5 | Orthodontics/ Pediatric & Special Needs Dentistry /Others |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | A Clinic-Informed Biomechanical Strategy for Arch-Specific TAD Mechanics in High-Angle Bimaxillary Protrusion Retreatment |
| 2 | Developing the Modified Oral Health Assessment Tool (M-OHAT©) Training Materials for Non-Oral Health Professionals |
| 3 | Acceptability of Cloud Shading of a New Conventional GIC |
| 4 | Light-Cured Silver Fluorides in Hypomineralised Molars |

DAY 2 | SESSION 5: Orthodontics/ Paediatric & Special Needs Dentistry /Others

ORAL 1

64

# A Clinic-Informed Neural-Operator Workflow for Generative Attachment and Traction Design in Clear Aligner Molar Distalization

**PEIWEI WU, QIAN PENG**

*The University of Melbourne*

**PRESENTER: PEIWEI WU**

**Objectives:** To develop a clinic-informed, neural-operator-assisted design workflow for optimising clear aligner attachment morphology and traction configuration for maxillary molar distalization, with the aim of improving distalization efficiency while limiting crown tipping, anchorage loss and periodontal ligament stress.

**Materials and Methods:** Clinically relevant design challenges and parameter ranges for clear aligner molar distalization were defined from orthodontic treatment-planning scenarios, including attachment shape, attachment position, traction point, force magnitude, force direction, aligner trimline, distalization step size and periodontal support level. Patient-specific crowns, roots, periodontal ligament and alveolar bone were reconstructed from cone-beam CT and intraoral scan data. A parametric finite-element simulation library was generated to evaluate tooth displacement, aligner deformation, periodontal ligament pressure and alveolar bone stress across a broad range of design combinations. A neural-operator surrogate model was trained to approximate full-field biomechanical responses from patient geometry and treatment parameters. The surrogate model was then coupled with differentiable shape variables based on signed-distance representations to generate candidate attachment and traction designs under predefined biomechanical constraints. Mesh refinement, held-out finite-element validation and material-parameter perturbation were planned to assess numerical robustness.

**Results:** The proposed workflow generated patient-specific biomechanical risk maps and candidate aligner-design configurations rather than only comparing manually selected designs. The neural-operator surrogate enabled rapid screening of high-dimensional design combinations and identified attachment/traction patterns expected to improve molar distalization control while reducing unfavourable tipping and localized periodontal stress concentration. Generated designs provided interpretable trade-offs between distalization efficiency, anchorage preservation and periodontal safety.

**Conclusion:** This study presents a reproducible preclinical computational framework that reframes clear aligner finite-element analysis from retrospective scenario comparison to prospective, patient-specific design generation. The workflow may support more rational and risk-aware aligner biomechanics before clinical testing.

DAY 2 | SESSION 5: Orthodontics/ Paediatric & Special Needs Dentistry /Others

ORAL 2

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# Developing the Modified Oral Health Assessment Tool (M-OHAT©) Training Materials for Non-Oral Health Professionals

**See, Lydia; Ha, Diep; Walsh, Laurence J; Fung, Cheuk Kee C.; Schuch, Helena; Lopez Silva, Claudia P.; Pritchard, Lyndal; Zamora, Angelique; Tran, Ngoc Kien; Khan, Sadaf; Le, Thu; Do, Loc**

*The University of Queensland*

**PRESENTER: See, Lydia**

**Objectives:** The Modified Oral Health Assessment Tool (M-OHAT©) supports non-oral health professionals in identifying oral health issues and determining referral needs. However, effective implementation requires staff to understanding basic normal oral conditions and changes. This study aimed to develop and critically design training materials tailored to residential aged care facility (RACF) staff, accounting for workload constraints, limited oral health training, and adult learning principles.

**Materials and Methods:** Training materials were developed using cognitivism, experiential learning, and self-directed learning frameworks to maximise usability. A dual-component structure was employed. The theoretical component addressed M-OHAT domains, including normal findings, indicators for monitoring, and referral thresholds. The practical component focused on real-world application in RACFs, incorporating infection control, ergonomics, oral hygiene, denture care, and intraoral assessment techniques. Content was delivered through short (1–6 minutes) video modules using real clinical images and demonstrations. Development involved specialist input from special needs dentistry and population oral health, including videography and photography sessions, followed by iterative review with the research team and RACF staff to ensure usability.

**Results:** A total of 22 modular videos delivered via the PADLET platform supported flexible, self-directed learning. The design demonstrated alignment with adult learning principles through concise, segmented content, multimodal delivery (visual, audio, subtitles), and clinically relevant demonstrations. Iterative feedback allowed improved clarity, usability, and relevance to daily care practices. The format allowed staff to learn at their own pace, revisit content, and develop an understanding of recognising normal and abnormal oral findings.

**Conclusion:** The development of M-OHAT training materials required a targeted, theory-informed approach that prioritised usability, accessibility, and clinical relevance within RACF settings. This training material demonstrated that embedding adult learning principles and iterative feedback can produce a practical and contextually appropriate training solution. Future research will formally evaluate its effectiveness in improving knowledge, clinical application, and uptake of the M-OHAT tool.

DAY 2 | SESSION 5: Orthodontics/ Paediatric & Special Needs Dentistry /Others

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# Acceptability of Cloud Shading of a New Conventional GIC

**E. Maretic, J. Mynott, C. Duff, L.H. Prentice**

*SDI Limited*

**PRESENTER: E. Maretic**

**Objectives:** To assess the acceptability of VITA® cloud shade grouping of Riva Self Cure Ultra (prototype) (RSCU). To show data of translucency changes of RSCU (prototype) compared with Equia Forte HT (EFHT).

**Materials and Methods:** Ten disks (φ16mm) of RSCU (shade A1, A2, A3, A3.5) and EFHT (shade A1, A2, A3, A3.5) were made. Disks were stored in DI water and analysed for translucency at 1 hour, 1 day, 1 week, and 1 month using a portable sphere spectrophotometer (X-rite™ SP64). Usability survey 1 had RSCU shade disk samples assessed in a standardised light booth (X-Rite™ SpectraLightQC) under D65 lighting, and usability survey 2 had photos of RSCU shade disk samples with applicable VITA® classical A1-D4 shade arms for comparison by clinicians as the user group. Both surveys had aged disks assessed with usability evaluations with participants (n=15) responding with a five-point system from ‘Strongly agree’ to ‘Strongly disagree’.

**Results:** More than 50% of participants answered ‘Strongly Agree’, ‘Agree’, or ‘Neutral’ for multiple VITA® shades (classical guide) for each RSCU shade, with only a single shade (VITA® C2) being excluded from the cloud grouping for RSCU A3.5. The second survey had 93% of clinicians responding with ‘Strongly Agree’, ‘Agree’, or ‘Neutral’ for Vita classical A1-D4 shade arm matching with Riva Self Cure Ultra. Spectrophotometric data showed RSCU had both a greater increase in translucency and higher translucency at maturity (1 month) when compared to EFHT. Translucency changes were only significant ($p<0.05$) in the first week for each material.

**Conclusion:** Usability surveys 1 & 2 show feasibility and acceptability of multiple VITA® shades for individual Riva Self Cure Ultra shades. Cloud shade grouping of Riva Self Cure Ultra restorative is acceptable. The higher translucency of RSCU may lead to improved aesthetics in clinical situations.

DAY 2 | SESSION 5: Orthodontics/ Paediatric & Special Needs Dentistry /Others

ORAL 4

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# Light-Cured Silver Fluorides in Hypomineralised Molars

**[Author 1], [Author 2], [Author 3], [Author 4]**

*[1] Institution / Department; [2] Institution / Department*

**PRESENTER:**

**BACKGROUND / INTRODUCTION**

[Insert accepted abstract text here.]

**METHODS**

[Insert accepted abstract text here.]

**RESULTS**

[Insert accepted abstract text here.]

**CONCLUSION**

[Insert accepted abstract text here.]

**KEYWORDS** [keyword 1] • [keyword 2] • [keyword 3] • [keyword 4]

# DAY 2

## Friday, 2 October 2026

| Session 6 | Oral Implantology |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Osteoblast Adhesion on Nano-Engineered Dental Implants: A Single-Cell Force Study |
| 2 | Implant Distribution in the Edentulous Mandible: A CBCT Analysis |
| 3 | In Vivo Assessment of Mandibular Flexure in Full-Arch Implant Prostheses Using Photogrammetry: A Pilot Study |

DAY 2 | SESSION 6: Oral Implantology

ORAL 1

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# Decoding Initial Cell Adhesion on Nano-Engineered Implant Surfaces

**QIQIAN YAN, KARAN GULATI**

*University of Queensland*

**PRESENTER: QIQIAN YAN**

The long-term clinical performance of implants is increasingly recognized to be shaped by early cell adhesion events occurring within the first seconds to minutes of cell–surface contact. While major advances in surface engineering have substantially improved tissue integration, current evaluation strategies remain largely focused on macroscopic integration outcomes. As a result, the mechanistic relationship between early interfacial cell dynamics and long-term biological integration remains incompletely understood. Our research aims to investigate how nano-engineered surfaces regulate initial cell adhesion events using single-cell force spectroscopy (SCFS), and to further explore how these early adhesion events may dictate subsequent cellular behaviors. Ultimately, this work seeks to provide mechanistic insights for the rational design of nano-engineered implant surfaces.

DAY 2 | SESSION 6: Oral Implantology

ORAL 2

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# Implant Distribution in the Edentulous Mandible: A CBCT Analysis

**A. Hendawi, R. Nedelcu, S. Akhondi, A. Hamilton**

*The University of Western Australia*

**PRESENTER: A. Hendawi**

**Background:** Mandibular full-arch implant-supported prostheses require optimisation of implant distribution within the limitations of the posterior mandible. Conventional inter-foraminal placement may increase distal cantilever length and limit anterior–posterior (A–P) spread. This CBCT/MDCT-based virtual planning study compared three implant configurations for A–P spread, cantilever length, augmentation requirements, and implant length.

**Materials and Methods:** CBCT/MDCT scans of edentulous mandibles were retrospectively analysed using a dual-scan virtual planning protocol in coDiagnostiX. Each mandible was planned with two anterior axial reference implants and bilateral posterior implants across three configurations: Group 1, axial inter-foraminal; Group 2, 30° distal-angulated inter-foraminal; and Group 3, axial distal-foraminal. Implant sites were planned under standardised prosthetic and anatomical constraints. A–P spread area, cantilever length, implant length, and augmentation score were recorded. Linear mixed-effects models assessed configuration effects on A–P spread and cantilever length; augmentation and implant-length distributions were analysed descriptively.

**Results:** Fifty-six edentulous mandibles were included, providing 336 planned posterior implant sites. Implant configuration significantly affected A–P spread area and cantilever length ($p < 0.001$). A–P spread increased progressively from axial inter-foraminal to distal-angulated inter-foraminal placement and was greatest with axial distal-foraminal placement. Cantilever length decreased correspondingly. Axial distal-foraminal implants provided the most favourable biomechanical distribution but showed higher augmentation requirements. Nevertheless, approximately 61% of distal-foraminal sites demonstrated no, minor, or moderate deficiency, indicating clinical feasibility overall. Inter-foraminal configurations had fewer severe deficiencies, although minor and moderate grafting requirements remained common. Implant length also differed by configuration: inter-foraminal sites predominantly allowed longer implants, whereas distal-foraminal sites frequently required short implants, with 6-mm implants representing over half of planned distal-foraminal implants.

**Conclusion:** Posterior implant configuration significantly influences A–P spread and distal cantilever length in edentulous mandibles. Axial distal-foraminal placement offers the greatest biomechanical advantage when anatomy permits, while distal-angulated inter-foraminal placement remains an effective alternative when distal placement is not feasible.

DAY 2 | SESSION 6: Oral Implantology

ORAL 3

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# In Vivo Assessment of Mandibular Flexure in Full-Arch Implant Prostheses Using Photogrammetry: A Pilot Study

**A. Hamilton, S. Akhondi, A. Hendawi, G. Gallucci**

*Harvard School of Dental Medicine*

**PRESENTER: A. Hamilton**

**Objectives:** Mandibular flexure may alter implant spatial relationships during function and potentially influence the passivity of full-arch implant-supported prostheses. This pilot study aimed to evaluate mandibular flexure by assessing changes in inter-implant distance and angulation between open- and closed-mouth positions using photogrammetry. A secondary aim was to assess the repeatability of the measurement protocol.

**Materials and Methods:** Patients with edentulous mandibles restored with fixed implant-supported prostheses on multi-unit abutments were recruited. Photogrammetry scans were acquired using an extraoral dental photogrammetry system under two mandibular conditions: closed-mouth position and maximum open-mouth position. Five repeated scans were obtained for each condition. Inter-implant distances and angular relationships were calculated in anterior and posterior regions using three-dimensional coordinate data. Measurement repeatability was assessed using residual-based analysis. Paired-samples t-tests were used to compare open and closed mandibular positions.

**Results:** Eleven patients were recruited, and nine patients were included in paired statistical analysis after exclusion of incomplete datasets. Distance measurements demonstrated high repeatability, with a residual standard deviation of 7.85 μm. Angular measurements were also highly repeatable, with a residual standard deviation of 0.0438°. Anterior inter-implant distance changes were small and not statistically significant, with a mean difference of −6.04 μm. In contrast, a statistically significant reduction in posterior inter-implant distance was observed during mouth opening, with a mean difference of −21.32 μm. Posterior deformation was significantly greater than anterior deformation. Angular changes were minimal and not statistically significant in either region.

**Conclusion:** Within the limitations of this pilot study, photogrammetry provided a precise and repeatable method for detecting mandibular flexure in vivo. Mandibular opening produced a small but statistically significant posterior contraction, while angular changes were negligible. These findings support the potential use of photogrammetry for patient-specific assessment of mandibular flexure in full-arch implant prosthodontic workflows.

# DAY 2

## Friday, 2 October 2026

| Session 7 | Dental Public Health |
|---|---|

| No. | Oral Presentation Title |
|---|---|
| 1 | Challenges in Conducting Oral Health Epidemiological Surveys: A Scoping Review |
| 2 | Changes in Dental Anxiety in a Cohort Followed from 15 To 52 Years |
| 3 | Evaluation of the Senior Dental Benefits Scheme Demonstration Project for Older Adults |
| 4 | Area Deprivation, Remoteness and Oral Health Behaviors Among Australian Adolescents: A Multilevel Study |
| 5 | Keeping Your Teeth, Protecting Your Heart: Tooth Retention Reduces Cardiovascular Risk in Australian Women |
| 6 | Measuring Food Insecurity: Psychometric Validation and Critical Analysis of the Household Food Insecurity Access Scale among Aboriginal and Torres Strait Islander People |
| 7 | Oral Health and Mental Health: Lived Experiences of Stigma and Discrimination for Australians with Mental Health Conditions |
| 8 | Oral Health in Out-of-Home Care: Lived Experiences and Co-Designed Solutions |
| 9 | Periodontitis and Multimorbidity: A Conceptual Framework |
| 10 | Prevalence and Predictors of Non-Nutritive Sucking Habits in Infants and Children: A Systematic Review and Meta-Analysis |
| 11 | Strengthening the Aboriginal Oral Health Workforce: Barriers and Enablers Across the Education Continuum |
| 12 | Sustainable Smiles - An Overview of Dental Solid Waste Management and Associated Environmental Impacts in Australia. |
| 13 | The IMPROV Project: Co-designing a Culturally Appropriate Oral Health Promotion Resource with Karen Refugee Families in Victoria |
| 14 | The Network Psychometric Properties of the Temporomandibular Joint Disorder Questionnaire among Australian Adults |

DAY 2 | SESSION 7: Dental Public Health

ORAL 1

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# Challenges in Conducting Oral Health Epidemiological Surveys: A Scoping Review

**Krishna Subedi, Abanish Singh, Liana Luzzi, Gustavo Hermes Soares, Xiangqun Ju, Lisa Jamieson**

*Adelaide University, Australian Research Centre for Population Oral Health (ARCPOH), Level 4, Rundle Mall Plaza, SA 5000 Australia, Adelaide*

**PRESENTER: Krishna Subedi**

**Objectives:** To identify the challenges encountered in conducting national oral health surveys, as well as potential solutions to inform the planning of future surveys.

**Materials and Methods:** Included articles comprised original reports of national oral health surveys, studies outlining methodological approaches that encountered challenges in conducting national oral health surveys, and articles written in English and published since 1998. To ensure methodological rigour, this review followed the Joanna Briggs Institute methodology for scoping reviews. A literature search was conducted in PubMed, MEDLINE, Embase, Web of Science, Scopus, Dentistry & Oral Sciences Source, and Policy Commons, along with manual searches of relevant Ministry of Health websites.

**Results:** A total of 6,905 records were identified and imported into Covidence. After removing duplicates, 2,484 articles underwent title and abstract screening by two reviewers, followed by full-text review of 94 articles. In total, 46 surveys (33 original reports and 13 journal publications) from 25 countries were included, with the highest number from the Western Pacific Region (n=16). Most surveys from the WHO African Region (5/6) and the WHO Southeast Asia Region (3/4) did not receive direct government funding. Response rates ranged from 24.8% for a questionnaire-based survey in Australia to 99.97% for the survey conducted in Iran. Nearly half of the surveys (n=22) did not report challenges. The most reported challenges were low response rates and difficulties recruiting dental examiners. Proposed strategies for conducting successful oral health surveys included advanced planning, careful coordination, and strong partnerships.

**Conclusion:** Key findings showed limited reporting of implementation challenges and solutions. The main challenges were low response rates and difficulty recruiting examiners. Surveys in low- and lower-middle-income countries appeared to rely mainly on external grant funding rather than direct government support. These findings highlight the need for standardised reporting to guide future surveys.

DAY 2 | SESSION 7: Dental Public Health

ORAL 2

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# Changes in Dental Anxiety in a Cohort Followed from 15 to 52 Years

**K. Kajal, K.C. Morgaine, S. Ramrakha, J.M. Broadbent**

*University of Otago*

**PRESENTER: K. Kajal**

Few studies have investigated long-term changes in dental anxiety, though some cross-sectional studies have suggested higher dental anxiety in the middle years of life.

**Objective:** To describe changes in dental anxiety from the teenage years to the early 50s, and key variables associated with long-term experience of dental anxiety.

**Materials and Methods:** The Dunedin Multidisciplinary Health and Development Study has followed a cohort of 1037 individuals since birth, with repeated assessment throughout life on a wide range of health, development, and aging issues (ethical approval H23/034, University of Otago Human Ethics Committee (Health)). Dental anxiety was assessed at ages 15, 18, 26, 32, 38, 45 and 52 years using the Corah dental anxiety scale (DAS). Associations between dental anxiety at age 52 and key early-life social, psychological, and clinical oral health factors were examined using logistic regression.

**Results:** In the Study's most recent assessments at age 52 years, 92% of the surviving cohort were assessed. Dental anxiety prevalence (Corah DAS score of at least 13) doubled from 10% age 15 to 21% at age 52 years. Females (OR 1.8; 95% CI 1.3, 2.5), those of lower childhood socioeconomic status (OR 3.0; 95% CI 1.6, 5.5), and the number of filled tooth surfaces at ages 15/18 years (OR 1.0; 95% CI 1.0, 1.1) had greater odds of having dental anxiety at age 52 than their respective counterparts.

**Conclusion:** The doubling of dental anxiety by age 52 challenges the common assumption that this condition lessens with age, highlighting the need for proactive anxiolytic strategies in dental practice.

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ORAL 3

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# Evaluation of the Senior Dental Benefits Scheme Demonstration Project for Older Adults

**Arash Rudman, Zoe Szewczyk, Woosung Sohn, Shilpi Ajwani, Leanne Smith, Bradley Christian**

*The University of Sydney*

**PRESENTER: Arash Rudman**

**Introduction:** Older adults face major barriers to dental care, including cost, long public waiting times, chronic disease, mobility limitations, and competing financial priorities. The Senior Dental Benefits Scheme Demonstration Project (SDBS-DP) was a first of its kind proof-of-concept initiative in Australia, designed to provide free dental care for eligible older adults within an integrated medical-dental setting. This evaluation examined service delivery, clinical outcomes, costs, and patient experiences.

**Materials and Methods:** A mixed-methods evaluation was conducted. Quantitative data were extracted from program records for 70 eligible participants and included demographic characteristics, dental status, service use, treatment outcomes, and costs. Descriptive analyses compared baseline and final visit oral health indicators, including decayed, missing, and filled teeth. The qualitative component included nine semi-structured interviews and eight anonymised patient narratives. Data were analysed using reflexive thematic analysis and interpreted using implementation science frameworks.

**Results:** Participants had a mean age of 77.8 years. Most were not in paid employment, held concession cards, and reported low household income. More than half spoke a language other than English at home. Untreated decay reduced from a mean of 1.14 teeth at baseline to 0 at the final visit. Filled teeth increased from 6.57 to 7.84, and missing teeth increased from 9.78 to 10.46, reflecting extractions of unrestorable teeth. The most common services were prosthodontic, periodontal, restorative, diagnostic, and preventive care. The average cost per patient was $1,099. Qualitative findings showed that participants valued free care, timely local access, respectful care, clear communication, and trust. Reported benefits included improved comfort, eating, denture function, confidence, self-esteem, oral health literacy, and wellbeing.

**Conclusion:** This first of its kind demonstration project showed that integrated free dental care for older adults was feasible, acceptable, and valued. Findings support further evaluation to inform future policy and possible scale-up of a national Senior Dental Benefits Scheme.

DAY 2 | SESSION 7: Dental Public Health

ORAL 4

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# Area Deprivation, Remoteness and Oral Health Behaviors Among Australian Adolescents: A Multilevel Study

**Haoyue Zhao, Matt Hopcraft, Ankur Singh, Nadia Kaunein**

*University of Melbourne; University of Sydney*

**PRESENTER: Nadia Kaunein**

**Introduction:** Oral health behaviours are important determinants of oral health outcomes and are influenced by both individual- and area-level factors. This study examined the associations of geographic remoteness and area-level socioeconomic deprivation with oral health behaviours among Australian adolescents aged 12–13 years.

**Materials and Methods:** This cross-sectional study analysed data from the Longitudinal Study of Australian Children (LSAC; Wave 7, 2015), including 3,381 adolescents aged 12–13 years. Multilevel logistic regression models were used to examine associations between area-level deprivation and remoteness with five oral health behaviours: dental attendance, toothbrushing frequency, fruit juice consumption, fast-food consumption, and sugar-sweetened beverage (SSB) consumption.

**Results:** Adolescents living in the most socioeconomically deprived areas had significantly higher odds of adverse oral health behaviours and reduced dental attendance compared with those in the least deprived areas. They were more likely to not visit a dentist within the previous year (OR=1.56, 95% CI: 1.24–1.96), brush their teeth less than twice daily (OR=1.43, 95% CI: 1.14–1.78), and consume fruit juice (OR=1.30, 95% CI: 1.06–1.61), fast food (OR=1.63, 95% CI: 1.31–2.04), and SSBs (OR=1.59, 95% CI: 1.28–1.98) on the previous day. Adolescents from outer regional and remote areas had higher odds of not attending a dental visit within the past year (OR=1.23, 95% CI: 0.96–1.57) and lower odds of fast-food consumption (OR=0.91, 95% CI: 0.71–1.18), with minimal differences observed for toothbrushing, fruit juice, and SSB consumption.

**Conclusion:** Area-level socioeconomic deprivation demonstrated stronger and more consistent associations with adolescent oral health behaviours than geographic remoteness. Findings highlight the need for targeted public health strategies addressing socioeconomic inequalities to improve oral health behaviours and access to dental care among Australian adolescents.

DAY 2 | SESSION 7: Dental Public Health

ORAL 5

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# Keeping Your Teeth, Protecting Your Heart: Tooth Retention Reduces Cardiovascular Risk in Australian Women

**Shalinie King, Simone Marschner, Desi Quintans, Alice Gibson, Clara K Chow**

*University of Sydney*

**PRESENTER: Shalinie King**

**Introduction:** To determine the association between retention of a functional dentition and the risk of incident CVD in a prospective cohort study of Australian women and investigate the role of diet in this relationship.

**Materials and Methods:** A prospective population-based study of Australian women (n=8306) from the 1946-51 cohort of the Australian Longitudinal Study on Women's Health. Data from survey 5 (2007) was used as baseline to assess tooth loss and diet quality. Incident CVD was determined from linked data over a 17-year follow-up period (2024). Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) adjusted for known risk factors (age, sociodemographic, lifestyle and medical history factors).

**Results:** Women with an average age of 58.5 ± 1.5 years, 69.2% with a functional dentition were included in the analysis. During the 17-year follow-up period 1432 (17.2%) women developed incident CVD. The presence of a functional dentition was associated with a lower risk of incident CVD compared to women with a non-functional dentition, 15.5% vs 21.1% respectively, [HR 0.83 (95% CI 0.74, 0.93)]. Participants with a functional dentition were more likely than those with a non-functional dentition to have a high-quality diet score, (42% vs 36%, p <0.001). However, controlling for diet quality did not attenuate this association [HR 0.82 (95% CI 0.73, 0.92)].

**Conclusion:** Among Australian women the presence of a functional dentition was associated with a lower risk of incident CVD independent of diet quality. These findings suggest that women with a non-functional dentition should be actively assessed and managed for cardiovascular risk.

DAY 2 | SESSION 7: Dental Public Health

ORAL 6

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# Measuring Food Insecurity: Psychometric Validation and Critical Analysis of the Household Food Insecurity Access Scale among Aboriginal and Torres Strait Islander People

**Wajeeha Zahid, Brianna Poirier, Pedro Henrique Ribeiro Santiago, Gustavo Hermes Soares, Lisa M Jamieson, Nicolas Reid, Dandara G Haag**

*Australian Research Centre for Population Oral Health (ARCPOH), School of Dentistry, Adelaide University, Adelaide, South Australia, Australia.*

**PRESENTER: Wajeeha Zahid**

**Objectives:** To assess psychometric properties of HFIAS among Aboriginal and Torres Strait Islander People and to evaluate its alignment with Aboriginal and Torres Strait Islander conceptualisations of food security.

**Materials and Methods:** Participants included 219 Aboriginal and Torres Strait Islander individuals from the South Australian Aboriginal Birth Cohort study. Cross-sectional analysis combining psychometric evaluation and directed content analysis. Psychometric analyses assessed item redundancy, dimensionality, model fit, criterion validity and reliability of the HFIAS. Known-groups validity was assessed by comparing HFIAS scores across sociodemographic and behavioural groups. Convergent validity was examined using Spearman correlations between HFIAS scores and general and dental health outcomes. Content analysis examined conceptual alignment between HFIAS items and seven pillars of the National Strategy for Food Security in Remote Aboriginal and Torres Strait Islander Communities (2025-2035), with items reviewed against each pillar's definitions and intended outcomes.

**Results:** HFIAS demonstrated a unidimensional structure with adequate item stability, model fit, and reliability. Higher HFIAS scores were moderately associated with poorer self-rated general health (ρ=0.31, 95% CI: 0.18–0.42) and dental health (ρ=0.23, 95% CI: 0.10–0.35). Food insecurity was also higher among participants receiving government payments (median=4, IQR=9) and current smokers (median=4, IQR=9) compared with those with employment income and never smokers. Content analysis demonstrated limited alignment between HFIAS items and seven pillars of the National Strategy for Food Security. Partial alignment was observed for Health and Nutrition, Families and Communities, and Healthy Economies, but was largely restricted to household-level access hardship.

**Conclusion:** Although the HFIAS demonstrated acceptable psychometric performance, it captures only a narrow component of food security as conceptualised in Indigenous frameworks. Reliance on this measure alone risks overlooking the broader structural, cultural, environmental, and governance dimensions that underpin food security for Aboriginal and Torres Strait Islander peoples. More comprehensive assessment requires complementary, culturally grounded measures aligned with Indigenous-led policy priorities.

DAY 2 | SESSION 7: Dental Public Health

ORAL 7

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# Oral Health and Mental Health: Lived Experiences of Stigma and Discrimination for Australians with Mental Health Conditions

**A. Ngo, S. Lawn, A. Carter, L. Earle-Bandaralage, R. Hill, P. Justice, J. Milford, C. Nanson, S. Reed, R. Turner, A. Tudehope & C. Kaine**

*Flinders University, Lived Experience Australia, Australian National University, Deakin Private Hospital*

**PRESENTER: A. Ngo**

Oral health disparities persist among people with mental health conditions, who experience high rates of dental disease due to medication side effects, socioeconomic disadvantage, and stigma. Despite high need, access to dental care is limited by structural inequities, cost barriers, and provider bias. Stigma reduces care-seeking behaviour, yet research rarely centres lived experience perspectives. In Australia's privatised dental system, inequities are amplified, and mental health guidelines seldom address oral health. This study used a co-designed qualitative approach with Australians with lived experience of mental health conditions to explore barriers, stigma, and systemic failures in oral healthcare. Grounded in interpretive phenomenology, a secondary analysis was conducted on data from a lived experience-led national survey. Responses from 198 mental health consumers to three open-ended questions on stigma and discrimination were analysed using latent content analysis. A lived experience co-design group contributed throughout the research process, including survey design, interpretive input, and review of findings. Findings reveal that intersectional stigma linking mental health status, oral health, socioeconomic disadvantage, and marginalised identities (including Indigenous background, refugee status, substance use, history of transmissible diseases) perpetuates inequities in dental care, with lifelong consequences. Stigma operated at multiple levels: experienced, internalised, and anticipated stigma, leading to avoidance of care; diagnostic overshadowing (oral health concerns were dismissed as behavioural); dehumanising clinical interactions including derogatory language and dismissal of pain; and ethical concerns, including inadequate consent processes. Participants also described exclusion from preventive care, with compounding effects for multiple marginalised groups. This Australian study highlights how intersectional stigma in dentistry deter care-seeking and worsen oral health outcomes among people with mental health conditions. Structural responses are required, including stigma-informed dental education, trauma-informed clinical practice, and policy reform to improve equitable access to care. Addressing these barriers is essential to reducing entrenched oral health inequities and improving health outcomes.

DAY 2 | SESSION 7: Dental Public Health

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# Oral Health in Out-of-Home Care: Lived Experiences and Co-Designed Solutions

**Virginia Dickson-Swift 1, Santosh Tadakamadla1,2, Corina Modderman1, Fiona Dangerfield1, Stacey Bracksley-O'Grady1**

*1 Violet Vines Marshman Centre for Rural Health Research, La Trobe Rural Health School, La Trobe University, Bendigo, Australia, 2 Dentistry and Oral Health, La Trobe Rural Health School, La Trobe University*

**PRESENTER: Stacey Bracksley-O'Grady**

**Objectives:** Children and young people (CYP) living in out-of-home care (OOHC) experience significantly poorer oral health outcomes despite being designated a priority population; this study aimed to identify barriers within dental systems and co-design implementable solutions with key stakeholders.

**Materials and Methods:** A two-year Australian project funded by the Borrow Foundation explored lived experiences of oral health care among children and young people in OOHC, carers, child protection staff, and dental professionals across rural Victoria (La Trobe University Human Research Ethics Committee approval HEC25139). Using qualitative semi-structured interviews, barriers and challenges to accessing and delivering oral health care were explored. Transcripts were analysed using reflexive thematic analysis with cross-stakeholder comparison to identify key themes. Findings were synthesised into composite, evidence-informed vignettes, which were used in structured co-design workshops to generate practical, context-specific strategies to improve oral health outcomes for CYP in rural OOHC settings.

**Results:** Across 29 interviews (carers (n=7), CYP (n=8), child protection staff (n=5), and dental professionals (n=9)) oral health was widely recognised as important by CYP and carers, yet frequently deprioritised due to trauma, instability and competing care demands. Consent complexity, unclear eligibility processes, dental fear, limited procedural explanation, and disrupted continuity of care contributed to delayed treatment and crisis-driven service use. In three co-design workshops, participants mapped key barriers (including consent delays, missed recalls and eligibility confusion) and collaboratively developed feasible, service-level and preventive strategies that could be tested and implemented.

**Conclusion:** Oral health inequities for CYP in OOHC are driven largely by structural and organisational barriers rather than clinical complexity alone. Improving outcomes requires greater understanding and support from dental professionals and clinic support teams, alongside trauma-informed communication, streamlined consent processes, reliable recall systems, and stronger interagency coordination.

DAY 2 | SESSION 7: Dental Public Health

ORAL 9

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# Periodontitis and Multimorbidity: A Conceptual Framework

**Manisha Tamrakar, Najith Amarasena, Liana Luzzi, Gloria Mejia**

*Adelaide University, University of North Carolina at Chapel Hill*

**PRESENTER: Manisha Tamrakar**

**Objectives:** The study proposes a unified conceptual model that integrates biological mechanisms and shared risk factor frameworks within a multimorbidity network context. The framework aims to address how periodontitis may be associated with multimorbidity within interconnected systemic disease processes.

**Materials and Methods:** A narrative literature search was conducted to identify existing conceptual frameworks related to periodontitis and multimorbidity. The review examined epidemiological, socio-ecological, and biological models relevant to oral-systemic health relationships to identify shared determinants and conceptual gaps. Two major explanations have been proposed to explain the link between periodontitis and chronic conditions: biological mechanisms and shared risk factor frameworks. Therefore, proposed framework incorporates shared biological pathways, including systemic inflammation, immune dysregulation, and microbial translocation, together with behavioural, social, and structural determinants informed by the Common Risk Factor Approach.

**Results:** The proposed framework conceptualises periodontitis not as an isolated oral condition but as a potential component within interconnected multimorbidity pathways. The model integrates biological mechanisms with shared behavioural and structural determinants to illustrate the potential pathways linking oral and systemic health.

**Conclusion:** This conceptual model provides a foundation for bridging oral and systemic health research within a unified framework. Clinical Relevance: By combining biological, behavioural, and structural determinants within a unified model, the framework may support future empirical research, interdisciplinary collaboration, and the integration of oral health within chronic disease prevention and management strategies.

DAY 2 | SESSION 7: Dental Public Health

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# Prevalence and Predictors of Non-Nutritive Sucking Habits in Infants and Children: A Systematic Review and Meta-Analysis

**Niluja Karmacharya, Kh Shafiur Rahaman, Shirin Mumu, Tiffany Patterson-Norrie, Amit Arora**

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**PRESENTER: Niluja Karmacharya**

**Background:** Non-nutritive sucking habits (NNSH), such as pacifier use and thumb or finger sucking, are common in infancy and early childhood. While these behaviours provide comfort and emotional regulation, they are linked with adverse oral health outcomes. This study aimed to synthesise the current global evidence to explore the prevalence and predictors of NNSH in children and to develop targeted preventive strategies.

**Materials and Methods:** This review was conducted following the Joanna Briggs Institute (JBI) framework and reported according to PRISMA guidelines. Studies that included healthy infants and children aged 0-12 years and published in English from January 2000 onwards have been included. Four electronic databases (MEDLINE, Embase, Scopus, and CINAHL) were systematically searched, complemented by citation tracking. Quantitative synthesis was performed using random-effects meta-analysis where appropriate, with narrative synthesis applied in the presence of substantial heterogeneity.

**Results:** From 4,454 retrieved records, 2,246 studies were screened, 71 articles underwent full-text review, and 38 studies were included. Most studies reported on specific NNSH types, particularly pacifier use and thumb or finger sucking. Meta-analysis of cross-sectional studies showed the weighted pooled prevalence of pacifier use, finger sucking, overall NNSH, and both pacifier and finger were 26% (CI: 16%-38%), 13% (CI: 8%-18%), 42% (CI: 29%-56%), and 1% (CI: 0%-3%), respectively. Cohort studies reported higher pooled prevalence for pacifier use (43%) and overall NNSH (51%). Consistent predictors included shorter duration or absence of exclusive breastfeeding, early bottle or pacifier introduction, younger maternal age, lower maternal education, lower socioeconomic status, birth order, and prematurity.

**Conclusion:** Non-nutritive sucking habits are highly prevalent among infants and children worldwide, with substantial variation by habit type and study design. Pacifier use and finger sucking remain common beyond infancy. Targeted, culturally appropriate prevention strategies and early parental guidance are essential to minimise persistence and reduce potential adverse oral and general health outcomes.

DAY 2 | SESSION 7: Dental Public Health

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# Strengthening the Aboriginal Oral Health Workforce: Barriers and Enablers Across the Education Continuum

**L.Smith, D. Leadbeatter, E. Taylor, B. Christian, J. Stanley, J. Gao, W. Sohn**

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**PRESENTER: L. Smith**

**Introduction:** Aboriginal and/or Torres Strait Islander people remain underrepresented in the Australian oral health workforce, limiting access to culturally appropriate care and contributing to oral health inequities. This study examined barriers and enablers across the oral health education continuum among Aboriginal dental assistants, university students, and dental practitioners.

**Materials and Methods:** A cross-sectional study using electronic questionnaires was conducted with Aboriginal participants across three cohorts: dental assistants; students enrolled in university dental programs (Bachelor of Oral Health and Doctor of Dental Medicine); and dental practitioners. Surveys were co-designed with an Aboriginal Advisory Group, hosted in REDCap, and disseminated via email and professional associations. Dental assistants and students were recruited in New South Wales, and practitioners nationally. Consent was obtained prior to commencing the survey. Questions examined demographics, as well as barriers and enablers related to undertaking a university dental degree in Australia, including factors influencing enrolment and completion. Quantitative data were analysed descriptively; free-text responses underwent summative content analysis. Ethical approval for the study was obtained from the Aboriginal Health and Medical Research Council (AH&MRC) [2077/23].

**Results:** Thirty-four participants completed the survey (dental assistants n=16; students n=5; practitioners n=13). Financial hardship was the most common barrier (76.9,100%), alongside separation from family and community. Accommodation challenges were notable among practitioners (76.9%). Enablers differed by cohort: flexible learning for assistants (81.3%), Indigenous Support Centres for students (60.0%), and family and community support for practitioners (76.9%). Qualitative data highlighted cultural safety, mentorship, and flexible delivery as important supports, while barriers included financial burden, feelings of isolation, and pressure to succeed.

**Conclusion:** Persistent financial, cultural, and structural barriers constrain Aboriginal participation in oral health education, perpetuating workforce inequities. System-level investment in culturally safe training environments, Indigenous support services, mentorship, and flexible pathways is essential to improve retention and strengthen a culturally responsive oral health workforce.

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# Sustainable Smiles - An Overview of Dental Solid Waste Management and Associated Environmental Impacts in Australia.

**Sarah Ng, Prabhakar Veginadu, Rebecca Chen, Natalia Uhurralt, Woosung Sohn, Bradley Christian**

*The University of Sydney*

**PRESENTER: Sarah Ng**

**Objectives:** To collate and synthesise current Australian and global evidence from academic and grey literature sources, and to understand the current scope and characteristics of Australian and global policies on dental solid waste management. To provide an overview of the associated environmental impacts of dental solid waste management.

**Materials and Methods:** A rapid literature review was conducted of academic and grey literature, in addition to reviewing of Australian policies on dental solid waste management. Key findings were tabulated and thematically coded into sections with headings adapted from the 2018 Australian National Waste Policy framework for solid waste management.

**Results:** The waste hierarchy promotes waste avoidance as the preferred method for managing solid waste, achievable through several waste-reduction actions, including promoting regular preventative dental care, integrating digital technologies, and streamlining clinical processes. Although creating a greener, more sustainable dental practice requires significant resource investment, re-designing systems is important for reducing solid waste. Knowledge sharing and staff education help to motivate behavioural change towards the management of solid waste. Highlighting the importance of environmental sustainability, alongside product stewardship and reduction in single-use plastics and packaging, also contributes to improving solid waste management. Hazardous and chemical wastes, such as Amalgam and Gypsum, require appropriate management to reduce their environmental impacts. Waste auditing is required to ensure appropriate solid waste management practices are successfully implemented.

**Conclusion:** Approaching solid waste management using the waste hierarchy is important for ensuring efficient and effective waste management, with reducing dental solid waste generation as the preferred method. Dental solid waste cannot be completely omitted, and dental health organisations need to engage alternative strategies to manage solid waste. Strong governance and leadership are required to support organisational solid waste management strategies, to ultimately reduce greenhouse gas emissions and the impacts of dental solid waste on the environment.

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# The IMPROV Project: Co-designing a Culturally Appropriate Oral Health Promotion Resource with Karen Refugee Families in Victoria

**Sudheer Babu Balla, Jyothi Tadakamadla, Santosh Kumar Tadakamadla**

*La Trobe University*

**PRESENTER: Sudheer Babu Balla**

**Objectives:** This study aimed to co-design a culturally appropriate oral health promotion resource with Karen refugee families to improve access to oral healthcare and support positive oral health practices for children.

**Materials and Methods:** This study formed part of the broader IMPROV (Intervention Mapped for Promoting Refugee Oral Healthcare in Victoria) project, a participatory PhD research project exploring access to oral healthcare among Karen refugee families in Victoria, Australia. Earlier qualitative interviews and Nominal Group Technique (NGT) workshops identified priority areas related to oral health information, navigation of public dental services, and culturally appropriate communication. These priorities informed a series of co-design workshops conducted with Karen refugee parents. Workshops were facilitated using participatory activities, visual prompts, and group discussions to collaboratively develop the content, format, and delivery preferences for an oral health promotion resource. Discussions were audio-recorded, transcribed, and analysed thematically to identify key design preferences and implementation considerations.

**Results:** Participants highlighted the importance of simple, visual oral health information that could be easily understood by families with varying levels of English literacy. A culturally tailored video-based resource emerged as the preferred intervention format. Key content areas identified included eligibility for public dental services, how to access dental care, preventive oral health practices for children, and guidance on navigating referral pathways. Participants emphasised the importance of using plain language, culturally familiar examples, Karen language narration, and trusted community-based delivery channels to improve engagement and accessibility.

**Conclusion:** The co-design approach enabled Karen refugee families to actively contribute to the development of a culturally relevant oral health promotion resource grounded in lived experiences and community priorities. The findings demonstrate the value of participatory approaches in designing equitable and culturally responsive oral health interventions for refugee communities.

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# The Network Psychometric Properties of the Temporomandibular Joint Disorder Questionnaire among Australian Adults

**A. Singh, S. Nath, L. Jamieson, PHR Santiago**

*Australian Research Centre for Population Oral Health, School of Dentistry, Adelaide University, Australia*

**PRESENTER: A. Singh**

**Introduction:** Australian adults have at least one symptom of Temporomandibular Joint Disorder (TMD), and those who experience TMD report lower oral health-related quality of life. While a self-administered TMD questionnaire can be a valuable screening instrument for the initial identification of disease/conditions, to the best of our knowledge, there are no comprehensively validated TMD questionnaires for the Australian population. This study uses modern network models to evaluate the psychometric properties of the TMD questionnaire, developed by Locker and Slade (1988) in Canada and widely used worldwide, in Australia.

**Materials and Methods:** This is a secondary analysis of data from the National Study of Adult Oral Health 2017-18. The sample included 2,423 participants who responded to the 12-item TMD questionnaire. Descriptive statistics included demographic characteristics and the mean TMD of adult Australians. The analytical steps include: (1) model estimation, (2) Unique Variable Analysis, (3) Exploratory Graph Analysis (EGA) and network loadings, (4) model fit, (5) criterion validity and (6) reliability.

**Results:** The mean (SD) age of the study participants was 50.69 (17.40), where most of the respondents were female (59.10%). After removing poorly performing items, EGA revealed a 9-item TMD questionnaire had excellent item stability, substantive network loadings and adequate model fit ($X^2$= 1924.29, df = 14; CFI= 0.950; RMSEA= 0.097, 90% CI: 0.093-0.100). The reliability was good ($\alpha$= 0.76), with acceptable group validity by sex (Risk Ratios ranging from 1.46 to 2.93) and criterion validity for the quality of life ($\rho$= -0.26) and age ($\rho$= 0.12).

**Conclusion:** Network psychometric analysis demonstrated that the 9-item TMD questionnaire is valid and reliable for adult Australians. The TMD questionnaire is readily available for future use in population oral health research in Australia and potentially internationally, providing valid and reliable estimates of TMD in the general population.