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Books

Book Chapters

RESEARCH DAY

RESEARCH FUNDING

COMPLETING HIGHER DEGREES STUDENTS IN 2014

CONTINUING HIGHER DEGREES STUDENTS IN 2014
INTRODUCTION

It is with pleasure I present the 2014 School of Dentistry Research Report. This Report serves as a record of the School’s outstanding research achievements. It is a testimony to our staff who, under very trying times, continue to actively pursue their research interests. Despite reduced funding, increasing demands for teaching and a degree of uncertainty about the future location of our research facilities, it is very impressive that our staff and students still have the time, energy and enthusiasm to continue to be outstandingly productive in their research endeavours. There is no doubt in my mind that the international reputation of our School of Dentistry comes from this high quality research output.

In this report we document 122 journal articles, 2 books and 3 book chapters. Graduation of higher degree students included 3 PhD, 8 Doctor of Clinical Dentistry, 1 Doctor of Dental Science and 1 Graduate Diploma in Forensic Odontology. Research funding was obtained from 20 different sources and included 14 new ADRF grants. Unfortunately no new NH&MRC project grants or Fellowships were awarded for commencement in 2015.

Through its very strong research output, the School of Dentistry is recognised as one of the leading research intensive dental schools in the country. Its current ERA rating of 5 (well above world standing), positions it amongst the University’s best performing research groups. On the balance of what is presented in this current report, we are very hopeful that we will maintain this high ranking, which is due to be assessed in 2015.

The School of Dentistry very gratefully acknowledges all of the funding sources which have allowed our staff and students to achieve their research goals.

As always I acknowledge the outstanding efforts of all of the members of our 12 research groups, without whom none of the success would have been possible.

P. Mark Bartold
Assistant Dean, Research
September 2015
Population oral health is concerned with the community’s oral health, access to dental care and the provision of dental care. It focuses on the population as the patient. The Australian Research Centre for Population Oral Health (ARCPOH) is a University recognised research centre. ARCPOH includes research units in oral epidemiology and health services research, including the Australian Institute of Health and Welfare Dental Statistics and Research Unit (AIHW DSRU), the Colgate Oral Care funded Dental Practice Education Research Unit, the state and territory supported National Oral Health Promotion Clearinghouse, the Indigenous Oral Health Unit and the Health Services Research Unit. Additional support for ARCPOH is received through DSRU from the Australian Government Department of Health, and the South Australian Dental Service. A range of competitive grants (e.g. NHMRC, ADRF) and contract research/consultancies are also held by ARCPOH staff. ARCPOH has local, national and international collaborations and receives advice from an Expert Advisory Committee.

ARCPOH is pursuing a broad strategy of coordinating the relevant research activities of the contributing organisations and units so as to enhance progress in the following main areas:

- Burden and impact of oral disease
- Distribution and determinants of oral health
- Effectiveness of population oral health interventions
- Health services research
- Oral epidemiology
- Labour force research
- Oral health policy analysis
- Behavioural sciences and population oral health
- Oral health promotion data warehouse and information clearinghouse
- Indigenous oral health
- Geriatric oral health

ARCPOH staff are involved in national and international expert groups such as Nutrient Reference Values – Fluoride Expert Working Group and the Australian Burden of Diseases 2011- Oral Health expert group. ARCPOH is also responsible for conducting National Oral Health Surveys among children and adults in Australia and overseas, in developing randomized clinical trials to test different measures.
of preventing dental caries and periodontal diseases, and participating in large multidisciplinary health studies.

2. **CRANIOFACIAL BIOLOGY**

- Professor P Anderson
- Professor A Brook
- Professor F Greenwood
- **Professor G Townsend**
- Associate Professor T Hughes
- Associate Professor J Kaidonis
- Associate Professor T Winning
- Emeritus Professor T Brown
- Dr P Anastasiadis
- Dr J Berketa
- Dr H James
- Dr D Lekkas
- Dr S Mihailidis
- Dr R Phillips
- Dr S Ranjitkar
- Dr C Redwood
- Dr V Skinner
- Dr I Tomo
- Dr S Tomo
- Dr R Ueno
- Dr T Wilkinson
- Dr R Yong
- Ms C Bennett
- Ms M Bockmann
- Ms S Karanicolas
- Mrs S Pinkerton
- Mr J Rogers
- Mrs R Rogers (Honorary)
- Mr G Scriven
- Ms C Snelling
- Ms K Squires
- Mrs A White

The Craniofacial Biology Research Group is involved in several areas of research activity, including craniofacial genetics and development, tooth emergence and oral health, tooth wear, and masticatory anatomy. Analyses based on a large collection of records of Australian twins and their families obtained over the past 30 years is enabling us to elucidate the contributions of genetic, epigenetic and environmental influences to variation in facial and dental features, and childhood oral health. Clinical and experimental studies of tooth wear are clarifying how processes such as corrosion, abrasion, attrition and abfraction can lead to loss of tooth structure. Apart from collaborations with colleagues in Australia, our group is actively working with other research groups in the USA (Pittsburgh; Albuquerque), UK (Queen Mary University of London), Finland and Japan and is actively involved as part of the International Collaborating Network in Oro-facial Genetics and Development with Professor Alan Brook. New collaborations have been established with the J Craig Venter Institute (USA) and the Murdoch Children’s Research Institute, Early Life Epigenetics group.

3. **DENTAL EDUCATION RESEARCH**

- Professor G Townsend
- Associate Professor J Kaidonis
- **Associate Professor T Winning**
- Dr D Lekkas
- Dr C Redwood
- Dr V Skinner
- Ms S Karanicolas
- Ms C Snelling

The research being undertaken by the Dental Education Research Group is focused on the investigation of students’ experiences and outcomes during their undergraduate education, in relation to: collaborative learning, communication and motor skills, interactive learning technologies to enhance face-to-face teaching, admission processes and sessional teacher development. This research involves post-graduate students, and institutional, national and international collaborations with colleagues in the Australian Catholic University and Universities of Melbourne, Tasmania, Otago, Hong Kong and Manitoba.
4. **ENDODONTICS AND PULP BIOLOGY**

- Associate Professor N Gully
- **Associate Professor G Rossi-Fedele**
- Clinical Professor G Heithersay

The Endodontics and Pulp Biology Group is active in a number of research projects including splinting of teeth, resorption and bleaching studies, and formulation of dental trauma guidelines. In collaboration with the Restorative Dentistry and Oral Microbiology and Immunology Groups, research interests include pulp neurophysiology, endodontic biofilms and the effect of irrigation and medication on endodontic pathogens.

5. **FORENSIC ODONTOLOGY**

- Dr J Berketa
- Dr G Cirillo
- Dr D Higgins
- **Dr H James**

Forensic Odontology focuses on legal aspects of human identification and oro-facial trauma. Current research is related to practical applications, including maximizing data from incinerated remains, obtaining DNA from teeth at varying post mortem intervals and expression of dental features to aid identification; education, including real and perceived value of dental records, and online education for the dental profession; and anthropology, including pathology and wear in ancient Aboriginal remains.

6. **ORAL AND MAXILLOFACIAL SURGERY**

- Professor A Goss
- Professor R Logan
- Dr M Doddridge
- **Dr P Duke**
- **Dr P Sambrook**
- Ms S Hughes

The Oral and Maxillofacial Surgery (OMS) Research Group primarily investigates problems related to the practice of OMS and related medical issues. These follow a number of themes, with the longest duration studies being conducted by the Japan Australia Temporomandibular Disorder Research Group. Other areas relate to orthognathic surgery, benign jaw pathology, pharmacotherapy and multidisciplinary management of head and neck cancer. In the last few years the group has been an international leader on bisphosphonate associated osteonecrosis of the jaws.

7. **ORAL MICROBIOLOGY AND IMMUNOLOGY**

- **Associate Professor N Gully**
- Associate Professor A Rogers
- Dr E Farmer
- Dr P Zilm

The Oral Microbiology and Immunology group is involved in research into the physiology, interactions between, and ecology of bacteria found in dental plaque. We have a particular interest in the biofilms of bacteria implicated in the aetiology of caries and periodontal diseases. Many of the investigations undertaken involve the growth and subsequent proteomic analysis of one or more bacterial species under continuous cultural conditions.
8. **ORAL PATHOLOGY**

- Professor A Goss
- Professor D Keefe
- **Professor R Logan**
- Professor K Roberts-Thomson
- Associate Professor R Gibson
- Associate Professor L Jamieson
- Dr J Bowen
- Dr S Liberali
- Dr J McIntyre
- Dr P Sambrook

A major focus of the Oral Pathology Group is toxicity of cancer treatment, particularly with respect to the pathogenesis of mucositis. This is an often severe side effect of chemotherapy and radiotherapy that has important implications for patients who are undergoing cancer treatment. We are interested in looking at the changes that occur, not only in the oral mucosa, but also throughout the entire alimentary tract, along its length and in different compartments of the mucosa. Other areas of interest include the oral health of homeless populations (particularly with respect to oral pathology), the epidemiology of oral cancer in Asia and also of oral cancer in Papua New Guinea including education and awareness about oral cancer.

9. **ORTHODONTICS**

- **Professor C Dreyer**
- Emeritus Professor W Sampson
- Associate Professor S Gue
- Dr M Broberg
- Dr W Cheung
- Ms S Hughes

The research activities of the orthodontic group have included investigations into the tissue responses of the periodontal ligament to osteo-inductive stimulus (ankylosis) and orthodontic tooth movement, evaluation of candidate cranio-metric planes in orthodontic diagnosis and treatment planning, and analysis of tooth wear as it interacts with dental arch development. Collaborations with the Institute of Medical and Veterinary Science, dental anthropology, periodontics, Neurophysiology at Flinders University, and the Physiology and Orthodontics departments of the National University of Singapore and the University of Hong Kong have been productive and valuable.

10. **PAEDIATRIC DENTISTRY**

- Professor P Anderson
- Professor A Goss
- Professor D Keefe
- Professor R Logan
- Associate Professor S Gue
- Associate Professor T Revesz
- Dr W Cheung
- Dr M Malandris

The Paediatric Dentistry Research Group is involved in several areas of research activity. Much of the focus has been centred on clinical retrospective and prospective research on oral mucositis in paediatric oncology, which has resulted in several publications in this field. Other areas include paediatric oral pathology, odontogenic infections and craniofacial biology. Current projects include: assessment and validation of a diagnostic scale, oral care protocol, prevention and treatment of oral mucositis in a paediatric population receiving cancer therapy; a retrospective analysis of oral and maxillofacial pathology in a paediatric tertiary referral hospital over 15-years; a 9 year retrospective audit of severe odontogenic infections at the Women’s and Children’s Hospital; and oral features of Crouzon and Pfeiffer Syndromes.
11. PERIODONTICS

- Professor PM Bartold
- Associate Professor N Gully
- Dr T Fitzsimmons
- Dr K Hynes
- Dr S Kaur
- Dr P Zilm
- Mr R Bright
- Ms C Marchant
- Mr V Marino

The periodontal research group has research projects focussed on the role of periodontal ligament stem cells in periodontal regeneration, the molecular mechanisms of bone resorption, periodontal disease and systemic health (including low birth weight, diabetes and rheumatoid arthritis), and the interactions of dental implants with hard and soft tissues. Collaborators include staff from the School of Medical Sciences, Department of Pathology, Royal Adelaide Hospital, Repatriation Hospital and several overseas institutions.

12. RESTORATIVE DENTISTRY

- Professor L Richards
- Professor G Townsend
- Associate Professor J Kaidonis
- Associate Professor J Dudley
- Dr J McIntyre
- Dr S Ranjikut
- Dr L Rupinskas
- Mr V Marino

The broad interests of the Restorative Dentistry Research Group include clinical and laboratory-based studies in fixed and removable prosthodontics, operative dentistry, implantology, dental materials, and tooth wear cariology. Current projects include: investigations of the influence of restorative materials and commonly used preventative agents on enamel and dentine re-mineralisation; wear studies involving enamel, dentine and restorative materials including strategies for wear prevention; Minimum Intervention dentistry and the Atraumatic Restorative Technique; glass-ionomer cements; cement retained crowns in implantology; a longitudinal study of implant treatment outcomes (15 year follow-up); microleakage of restorative materials and adhesive studies on bonding agents.
PERCEPTIONS OF THE FIRST DENTAL GRADUATES FROM USIM ON THEIR COMPETENCE

Ab Malik N, Mohamad AH, Townsend GC, Yatim SM, Md Ramli SNR.

The Bachelor of Dental Surgery (BDS) program has run for over 40 years and the approaches to learning and teaching vary. However, recently it was decided that all BDS programs in Malaysia had to fulfill a set of minimum competency requirements based on three main domains; knowledge, skills and attitudes. The Faculty of Dentistry, USIM has taken an innovative approach to evaluate the perception of its new dental graduates on all of these domains. This study was conducted on the first cohort of graduating students from USIM. The objectives of this study were to evaluate self-rated competencies upon graduation and to determine the baseline competencies of these graduates. It is self-rated and based on the 8 domains listed by the Ministry of Higher Education. The objectives relating to the minimum competencies were sent to all 29 graduates before they had commenced to work in the field. Twenty five out of 29 responded to the questionnaire. The survey used a Likert scale (1=very poor, 2=poor, 3=average, 4=good, 5=very good and 9=cannot judge). It was found that the percentage of rankings for good to very good categories combined in each domain were; D1-96%, D2-79%, D3-76%, D4-82%, D5-85%, D6-50%, D7-68% and D8-32%. In conclusion, the domains of knowledge (D1), values, ethics, morality and professionalism (D4) and communication skills and interpersonal relationship (D5) showed higher percentages compared with the other domains. In contrast, the D8 domain which focuses on managerial and entrepreneurial skills showed the lowest percentage. This reflects the reduced emphasis on this domain in the USIM program. The findings provide valuable insights for reviewing and further improvement of the existing curriculum.

HUMAN CADAVERIC HISTOMORPHOLOGICAL AND METALLURGICAL ANALYSIS OF DENTAL IMPLANTS FOLLOWING 12.5 YEARS OF SERVICE

Abbott JR, Marino V, Bartold PM.

Objectives: To provide a metallurgical and histomorphological analysis of hybrid bridgework and associated dental implants which have been in a clinical load bearing situation for a period of 12.5 years.

Materials and Methods: The physical integrity of the hybrid framework was examined with stereoimaging microscopy and scanning electron microscopy for signs of wear, fatigue cracks, corrosion. Elemental spectra and maps of the surface were analysed with an EDAX Detecting Unit (AMETEK, Inc, Mahwah, NJ, USA). Similarly, the supporting titanium abutments screwed into the implants were examined for fatigue and corrosion. Bone density scans and bone trabecular patterns were obtained from radiographs. Microcomputer tomography was used to assess the bone-implant interface and bone architecture around the implants. Histological sections were stained with 1% basic fuchsin to assess osseous microdamage.

Results: The study demonstrated that the gold alloy framework to be in satisfactory condition with little indication of corrosion or cracking. The interface between the gold alloy and the titanium abutments likewise demonstrated no obvious corrosion cells. No radiographic evidence of any adverse loss of bone around the implants was noted. Bone mineral density was related to implant position, being higher between the implants. Scanning electron micrograph images confirmed the good bone integration with
the implant threads with a high level of organisation, maturation and adaptation for the entire length of the implant. There was no evidence of any microdamage.

Conclusions: The implants, abutments and hybrid framework were in remarkably good condition considering their length of service.

PERCEPTIONS AND EXPERIENCES OF COLLABORATIVE LEARNING BY DENTAL AND MEDICAL STUDENTS: A COMPREHENSIVE SYSTEMATIC REVIEW


Background: Collaborative learning is suggested to have a number of advantages over other learning methods; however it can be demanding in terms of self-directed learning and group cooperation. We know students’ learning outcomes are influenced by their perceptions of their learning context. Current research findings have shown various aspects that may influence students’ perceptions about collaborative learning. Therefore, to design effective collaborative learning activities, we need to understand students’ perceptions about collaborative learning.

Objectives: The objective of this systematic review was to synthesise the best available evidence on dental and medical students’ experiences of collaborative learning.

Inclusion criteria: The participants of interest were dental and medical students regardless of age, gender or ethnicity.

Phenomena of interest: Students’ perceptions, beliefs, understandings, opinions and experiences of collaborative learning.

Types of studies: The qualitative component of this review considered studies that focused on various qualitative designs e.g. phenomenology, ethnography and action research. However, the search revealed only three types of studies: action research, multiple cases and qualitative descriptive studies. The quantitative component considered all quantitative studies that investigated students’ perceptions of collaborative learning. However only descriptive cross-sectional studies were found.

Search strategy: The search strategy included searching databases, e.g., PubMed, CINAHL, Embase, Scopus, Informit, ERIC and Web of Knowledge, reference lists of all identified reports, and a hand search of relevant dental and medical journals. The search was restricted to English language studies, from 1990 to May 2012.

Methodological quality: Two reviewers independently assessed studies for methodological quality using the standardised critical appraisal instruments from the Joanna Briggs Institute (JBI).

Data collection: Data were extracted using the standardised JBI data extraction tools.

Data synthesis: The data synthesis of the qualitative component used the standard JBI approach where findings were synthesised into categories, then aggregated into synthesised findings. Due to the descriptive nature of the study designs for the quantitative component of the review, statistical pooling was not possible. Therefore, the findings of this component of the systematic review are presented in a narrative summary.

Results: The review found evidence for students’ perceptions of how their learning is supported in collaborative learning contexts. There was also evidence about students’ perceptions of how their learning was negatively influenced in collaborative learning. In summary, it was clear that students valued collaborative learning; however, issues such as managing multiple ideas, and group and individual workloads need to be addressed. Evidence regarding students’ understandings of the core elements necessary for learning collaboratively was not identified. The quality of the studies’ design, conduct, and reporting was generally limited and some studies did not meet accepted standards e.g. no ethical approval and poor control of confounding factors.

Conclusions: From the students’ perspectives, several positive and negative factors that influenced students’ learning were identified. The review identified gaps in the current evidence, which need exploration. More focused qualitative and quantitative studies are essential to develop an evidence base of students’ perceptions about collaborative learning to inform the design of effective collaborative learning.
ORAL HEALTH BEHAVIOURS AND PERCEPTIONS REPORTED BY INDIGENOUS AUSTRALIANS LIVING IN DARWIN, NORTHERN TERRITORY


Objective: To describe the reported oral health behaviours and perceptions of Indigenous Australians living in Darwin, Northern Territory and to compare those with estimates for Darwin and Australia derived from the National Survey of Adult Oral Health (NSAOH).

Participants: A total of 181 Indigenous Australians aged 22 years and over living in Darwin, participating in screening for a wider randomised clinical trial, were included.

Method: Information on socio-demographic characteristics, oral health status including oral health behaviours and perceptions was collected using a questionnaire. Differences between the Darwin study (DS) participants and Australians in NSAOH were made based on non-overlapping 95% confidence intervals.

Results: Almost 72% of DS participants had last seen a dentist over a year earlier, compared to 47% and 39% of NSAOH Darwin and Australian participants, respectively. A higher proportion of DS participants usually visited a dentist because of a problem than NSAOH Darwin and NSAOH Australian participants. A higher proportion of DS participants had avoided or delayed a dental visit because of cost than NSAOH participants. Over three times as many DS participants rated their oral health as fair/poor compared to NSAOH participants. A higher proportion of DS participants had perceived gum disease and one or more symptoms of gum disease than NSAOH participants. A higher proportion of DS participants experienced toothache, felt uncomfortable about appearance of their mouth and avoided eating because of oral problems than NSAOH participants.

Conclusions: A higher proportion of Indigenous Australians living in Darwin presented with non-optimal oral health behaviours and perceptions compared with both the Darwin and Australian general populations.

APPLICATION OF THREE-DIMENSIONAL COMPUTED TOMOGRAPHY IN CRANIOFACIAL CLINICAL PRACTICE AND RESEARCH

Anderson PJ, Yong R, Surman TL, Rajion ZA, Ranjitkar S.

Following the invention of the first computed tomography (CT) scanner in the early 1970s, many innovations in three-dimensional (3D) diagnostic imaging technology have occurred, leading to a wide range of applications in craniofacial clinical practice and research. Three-dimensional image analysis provides superior and more detailed information compared with conventional plain two-dimensional (2D) radiography, with the added benefit of 3D printing for preoperative treatment planning and regenerative therapy. Current state-of-the-art multidetector CT (MDCT), also known as medical CT, has an important role in the diagnosis and management of craniofacial injuries and pathology. Three-dimensional cone beam CT (CBCT), pioneered in the 1990s, is gaining increasing popularity in dental and craniofacial clinical practice because of its faster image acquisition at a lower radiation dose, but sound guidelines are needed to ensure its optimal clinical use. Recent innovations in micro-computed tomography (micro-CT) have revolutionized craniofacial biology research by enabling higher resolution scanning of teeth beyond the capabilities of MDCT and CBCT, presenting new prospects for translational clinical research. Even after four decades of refinement, CT technology continues to advance and broaden the horizons of craniofacial clinical practice and phenomics research.
IMMUNOGLOBULIN G4-RELATED DISEASE OF THE HARD PALATE

Andrew N, Kearney D, Sladden N, Goss A, Selva D.

A 71-year-old woman presented with erythematous, nontender, bilateral hard palate nodules of 6-month duration. Biopsy showed collagenous sclerosis and a follicular lymphoplasmacytic infiltrate among the minor salivary glands. Immunoglobulin G (IgG) and IgG4 staining showed 280 IgG4(+) cells per high-power field and a ratio of IgG4(+) to IgG(+) cells of 0.8. The patient subsequently developed bilateral lacrimal gland and parotid gland enlargement associated with an increased serum IgG4 level of 3,031 mg/dL (≤ 135 mg/dL). Left lacrimal gland biopsy confirmed IgG4-related dacryoadenitis. The patient declined corticosteroid treatment for IgG4-related disease (IgG4-RD) and remained stable at 15 months after the first presentation. Spontaneous, partial resolution of the palatal lesion was observed during follow-up. IgG4-RD should be considered in the differential diagnosis of lymphoplasmacytic lesions of the hard palate.

DENTAL FEAR AND SATISFACTION WITH DENTAL SERVICES IN SWITZERLAND

Armfield JM, Enkling N, Wolf CA, Ramseier CA.

Objectives: Dental satisfaction is associated with continuity of dental care, compliance with dentist advice, and positive health outcomes. It is expected that people with higher dental fear might have less dental satisfaction because of more negative dental experiences. The objective of this study was to examine satisfaction and reasons for satisfaction with dental practitioners in Switzerland and variations by dental fear.

Methods: A national sample of 1,129 Swiss residents aged 15-74 (mean = 43.2 years) completed a personal interview at their home with questions assessing dental fear, dental service use, general satisfaction with their dentist, and reasons for satisfaction or dissatisfaction.

Results: Overall, 47.9 percent of participants responded that they were satisfied with their dentist and 47.6 percent that they were very satisfied. Satisfaction differed significantly by gender, language spoken, region of residence, and educational attainment. Greater dental fear was significantly associated with greater dissatisfaction with the dentist. The percentage of people who were very satisfied with the dentist ranged from 56.0 percent among people with no fear to 30.5 percent for participants with "quite a lot" of fear but was higher (44.4 percent) for people who stated that they were "very much" afraid of the dentist. The most common reasons attributed for satisfaction with dentists were interpersonal characteristics of the dentist and staff. People with "quite a lot" of fear were found to endorse these sentiments least.

Conclusions: Although higher dental fear was associated with more dissatisfaction with the dentist, the level of satisfaction among fearful individuals in Switzerland is still high.

DENTAL ANXIETY SCREENING PRACTICES AND SELF-REPORTED TRAINING NEEDS AMONG AUSTRALIAN DENTISTS

Armfield JM, Mohan H, Luzzi L, Chrisopoulos S.

Background: It is recommended that dentists screen for dental anxiety (DA) so that fearful patients may be better managed. The main aim of this study was to determine what dentists are being taught in relation to DA as well as whether and how anxious patients are identified in the clinic.

Methods: Two hundred and forty-six practising dentists (adjusted response rate = 40.1%), from a random sample of registered Australian dentists, completed a mailed questionnaire.
Results: Dentists estimated that high DA affected 23.3% of children and 19.4% of adults seen. Only 3.7% of dentists reported using a published scale for screening DA, with the most common reason being lack of awareness (56.5%). Approximately one-half of responding dentists directly asked their patients about DA and this was more common among younger dentists ($\chi^2 = 7.75, p = 0.021$). There were few differences in DA screening by other practitioner or practice characteristics ($p > 0.05$). Only one-third of dentists had received undergraduate training related to DA and only 41.7% considered this to be 'good' or better. Almost 37% of respondents expressed an interest in future training opportunities. Conclusions: The use of formal, validated scales for screening DA is minimal. Training in anxiety management appears to be low and is an area that could be expanded upon.

"WHAT DO THESE WORDS MEAN?: A QUALITATIVE APPROACH TO EXPLORE ORAL HEALTH LITERACY IN VIETNAMESE IMMIGRANT MOTHERS IN AUSTRALIA"


Objective: This study, nested within a large cohort study, sought to explore how well Vietnamese mothers with pre-school children understood the dental health education material commonly available in New South Wales, Australia.

Design: Qualitative research.

Setting: Home-based interviews.

Method: Vietnamese-speaking mothers ($n = 24$) with young children were provided with two dental leaflets which gave advice on health behaviours in English and Vietnamese for comparison. Interviews were recorded, transcribed verbatim and analysed using a thematic coding.

Results: Mothers generally reported that the English leaflets were difficult to read due to their lower levels of English literacy skills. Although the mothers preferred leaflets in their native language, they noted that it did not completely reflect the Vietnamese culture. Mothers recommended pictorial presentations for immigrants to improve understanding.

Conclusions: The consistency of our findings suggest that health education leaflets should be provided to parents in their first language with use of illustrations to improve understanding, and that producers of health education leaflets should consider cultural differences in translation.

"OVERSEAS-QUALIFIED DENTISTS’ EXPERIENCES AND PERCEPTIONS OF THE AUSTRALIAN DENTAL COUNCIL ASSESSMENT AND EXAMINATION PROCESS: THE IMPORTANCE OF SUPPORT STRUCTURES"


Objective: The Australian Dental Council is responsible for the assessment of overseas-qualified dentists seeking to practice dentistry in Australia. The aim of this paper is to reflect on the Council's assessment and examination process through the experiences and perceptions of overseas-qualified dentists in Australia.

Methods: Qualitative methods were used. Life stories of 49 overseas-qualified dentists from 22 nationalities were analysed to discern significant themes and patterns. We focused on their overall as well as specific experiences of various stages of the examination. The analysis was consistent with a hermeneutic phenomenological approach to social scientific research.

Results: Most participants referred to 'cost' of the examination process in terms of lost income, expenses and time. The examination itself was perceived as a tough assessment process. Some participants seemed to recognise the need for a strenuous assessment due to differences in patient management systems in Australia compared with their own country. Significantly, most of the participants stressed the importance of support structures for overseas-qualified dentists involved in or
planning to undertake the examination. These considerations about the examination experience were brought together in two themes: (1) 'a tough stressful examination'; and (2) 'need for support.'

Conclusion: This paper highlights the importance of support structures for overseas-qualified dentists. Appropriate support (improved information on the examination process, direction for preparation and training, further counselling advice) by recognised bodies may prevent potential exploitation of overseas-qualified dentists. Avenues that have been successful in providing necessary support, such as public sector schemes, offer policy options for limited recruitment of overseas-qualified dentists in Areas of Need locations. Such policies should also be in line with the local concerns and do not reduce opportunities for Australian-qualified dentists.

VARIATION IN NATURAL HEAD POSITION AND ESTABLISHING CORRECTED HEAD POSITION


Corrected head position (CHP) has been simulated by using the Frankfurt horizontal (FH) for over 100 years but FH varies between individuals. Because CHP is biologically relevant for orthodontic diagnosis and treatment planning, orthognathic surgical planning, and art, this study examined relationships between head position and selected cephalometric planes. Natural head position cephalograms of Aboriginal Australians and two contemporary samples from private orthodontic practices were analysed. Each sample comprised 40 individuals (20 males and 20 females). The Aboriginal Australian sample comprised longitudinal data (T1 early adolescent, T2 late adolescent, and T3 adult), enabling examination of natural head position (NHP) reproducibility over a period of approximately 8 years. Results of reproducibility differences revealed an absolute mean=2.9°, range=-7.9° to 8.2°, and standard deviation=3.6°. Stable basicranial line (SBL), neutral horizontal axis (NHA), FH, palatal plane (P plane), and Krogman-Walker plane (KW plane) demonstrated near parallelism and their mean angulations from the true horizontal (HOR) ranged between -4.6° and 2.4°. While NHP is not consistently reproducible at the individual level, the combined use of multiple planes such as SBL, P plane, and KW plane enables a more consistent CHP to be achieved.

RADIOFREQUENCY-TRIGGERED RELEASE FOR ON-DEMAND DELIVERY OF THERAPEUTICS FROM TITANIA NANOTUBE DRUG-ELUTING IMPLANTS


Aim: This study aimed to demonstrate radiofrequency (RF)-triggered release of drugs and drug carriers from drug-eluting implants using gold nanoparticles as energy transducers.

Materials & Methods: Titanium wire with a titania nanotube layer was used as an implant loaded with indomethacin and micelles (tocopheryl PEG succinate) as a drug and drug carrier model. RF signals were generated from a customized RF generator to trigger in vitro release.

Results & Discussion: Within 2.5 h, 18 mg (92%) of loaded drug and 14 mg (68%) of loaded drug carriers were released using short RF exposure (5 min), compared with 5 mg (31%) of drug and 2 mg (11%) of drug carriers without a RF trigger. Gold nanoparticles can effectively function as RF energy transducers inside titania nanotubes for rapid release of therapeutics at arbitrary times.

Conclusion: The results of this study show that RF is a promising strategy for triggered release from implantable drug delivery systems where on-demand delivery of therapeutics is required.
UTILISATION OF ORAL HEALTH SERVICES PROVIDED BY NON-DENTAL HEALTH PRACTITIONERS IN DEVELOPED COUNTRIES: A REVIEW OF THE LITERATURE

Barnett T, Hoang H, Stuart J, Crocombe L, Bell E.

Objective: People who have limited access to dental care may present to non-dental health practitioners for dental treatment and advice. This review synthesised the available evidence regarding the use of non-dental health practitioners for oral health problems and the services provided by non-dental health practitioners to manage such presentations.

Methods: PubMed and CINAHL databases were searched using key search terms to identify all relevant quantitative and qualitative English-language studies published between 1990 and March 2014. Snowballing techniques were then applied whereby the reference lists of retrieved articles were searched for other relevant citations. Grey literature was searched via Google using the same search terms to identify unpublished work and government reports.

Results: Of the 43 papers which met the review criteria, 25 papers reported on the use of non-dental health practitioners for oral health problems and 18 on dental care education and training for non-dental health practitioners. Four reports were located from the grey literature on the involvement of non-dental health practitioners in the management of oral health care.

Conclusions: The review of literature showed that both children and adults utilise non-dental health practitioners for oral health problems. Despite this, Emergency Department medical staff, medical practitioners and pharmacists generally lacked training and knowledge in the management of oral health. Services from non-dental health practitioners mainly focussed on children. The literature on education and training for non-dental health practitioners was limited.

UNDERSTANDING THE RESEARCH-POLICY DIVIDE FOR ORAL HEALTH INEQUALITY

Bell E, Crocombe L, Campbell S, Goldberg LR, Seidel BM.
Healthc Policy. 2014 Nov;10(2):64-78.

Background: No studies exist of the congruence of research in oral health to policy. This study aimed to examine the broad congruence of oral health research to policy, and implications for developing oral health research that is more policy relevant, particularly for the wider challenge of addressing unequal oral health outcomes, rather than specific policy translation issues.

Methods: Bayesian-based software was used in a multi-layered method to compare the conceptual content of 127,193 oral health researchs published between 2000-2012 with eight current oral health policy documents from Organisation for Economic Co-operation and Development countries.

Findings: Fifty-five concepts defined the researchs, of which only eight were policy-relevant, and six of which were minor research concepts.

Conclusions: The degree of disconnection between clinical concepts and healthcare system and workforce development concepts was striking. This study shows that, far from being "lost in translation," oral health research and policy are so different as to raise doubts about the extent to which research is policy-relevant and policy is research-based. The notion of policy relevance encompasses the lack of willingness of policy makers to embrace research, and the need for researchers to develop research that is, and is seen to be, policy-relevant.
EXPERIENCE OF RACISM AND TOOTH BRUSHING AMONG PREGNANT ABORIGINAL AUSTRALIANS: EXPLORING PSYCHOSOCIAL MEDIATORS

Ben J, Jamieson LM, Priest N, Parker EJ, Roberts-Thomson KF, Lawrence HP, Broughton J, Paradies Y.

Objectives: Despite burgeoning evidence regarding the pathways by which experiences of racism influence health outcomes, little attention has been paid to the relationship between racism and oral health-related behaviours in particular. We hypothesised that self-reported racism was associated with tooth brushing, and that this association was mediated by perceived stress and sense of control and moderated by social support.

Methods: Data from 365 pregnant Aboriginal Australian women were used to evaluate tooth brushing behaviour, sociodemographic factors, psychosocial factors, general health, risk behaviours and racism exposure. Bivariate associations were explored and hierarchical logistic regression models estimated odds ratios (OR) and 95% confidence intervals (CI) for tooth brushing. Perceived stress and sense of control were examined as mediators of the association between self-reported racism and tooth brushing using binary mediation with bootstrapping.

Results: High levels of self-reported racism persisted as a risk indicator for tooth brushing (OR 0.51, 95% CI 0.27-0.98) after controlling for significant covariates. Perceived stress mediated the relationship between self-reported racism and tooth brushing: the direct effect of racism on tooth brushing was attenuated, and the indirect effect on tooth brushing was significant (beta coefficient -0.09; bias-corrected 95% CI -0.166,-0.028; 48.1% of effect mediated). Sense of control was insignificant as a mediator of the relationship between racism and tooth brushing.

Conclusions: High levels of self-reported racism were associated with non-optimal tooth brushing behaviours, and perceived stress mediated this association among this sample of pregnant Aboriginal women. Limitations and implications are discussed.

SELF-REPORTED RACISM AND EXPERIENCE OF TOOTHACHE AMONG PREGNANT ABORIGINAL AUSTRALIANS: THE ROLE OF PERCEIVED STRESS, SENSE OF CONTROL, AND SOCIAL SUPPORT

Ben J, Paradies Y, Priest N, Parker EJ, Roberts-Thomson KF, Lawrence HP, Broughton J, Jamieson LM.

Objectives: We hypothesized that the psychosocial factors perceived stress and sense of personal control mediated the relationship between self-reported racism and experience of toothache. We hypothesized that social support moderated this relationship.

Methods: Data from 365 pregnant Aboriginal Australian women were used to evaluate experience of toothache, socio-demographic factors, psychosocial factors, general health, risk behaviours, and self-reported racism exposure. Hierarchical logistic regression models estimated odds ratios (ORs) and 95 percent confidence intervals (CIs) for experience of toothache. Perceived stress and sense of personal control were examined as mediators of the association between self-reported racism and experience of toothache. Social support was examined as a moderator.

Results: Self-reported racism persisted as a risk indicator for experience of toothache (OR 1.99, 95 percent CI 1.07-3.72) after controlling for age, level of education, and difficulty paying a $100 dental bill. The relationship between self-reported racism and experience of toothache was mediated by sense of control. The direct effect of self-reported racism on experience of toothache became only marginally significant, and the indirect effect was significant (β coefficient=0.04, bias-corrected 95 percent CI 0.004-0.105, 21.2 percent of effect mediated). Stress was insignificant as a mediator. Social support was insignificant as a moderator.
Conclusions: The findings indicate that high levels of self-reported racism were associated with experience of toothache and that sense of control, but not perceived stress, mediated the association between self-reported racism and experience of toothache among this sample of pregnant Aboriginal Australian women. Social support did not moderate the association between self-reported racism and experience of toothache.

**MAXIMIZING POSTMORTEM ORAL-FACIAL DATA TO ASSIST IDENTIFICATION FOLLOWING SEVERE INCINERATION**

Berketa JW.

Purpose: This paper reviews the literature for methods of maximizing the postmortem oral-facial information available for a comparison to be made for identification following an incident resulting in incineration.

Method: A search was initially instigated utilizing PubMed, Scopus, and Google Scholar, with further library searches and correspondences among peers around the world leading to a comprehensive review of the literature.

Conclusion: Maximizing postmortem dental evidence in a severe incineration event requires correct recognition and recording of dental data. Odontologists should attend the scene to facilitate this recognition. The information should be documented, photographed, and stabilized before retrieval. Wrapping, padding, and further support of the remains during transportation to the examination mortuary will aid this process. Examination at the mortuary requires further photography, complete charting, and radiographic examination of any dental material available, as well as awareness of other possible medical evidence, to enable identification of the human remains.

**A STUDY OF OSSEOINTEGRATED DENTAL IMPLANTS FOLLOWING CREMATION**

Berketa JW, James H, Langlois NE, Richards LC.

Background: The comparison of dental morphology and restorative work for human identification has been well documented. This case study involved documentation of osseointegrated and clinically restored dental implants following cremation.

Methods: The mandible and the maxilla were excised from a head containing implants and cremated. The remains were retrieved, digital and radiographic images were taken and elemental analysis undertaken. The brand of implants was identified utilizing web based search engines. A prosthodontist, known to commonly use this implant system, was approached to ascertain possibilities that matched the data given.

Results: Following cremation the implants were identified and a prosthodontist was able to identify the deceased. Two implants in the maxilla had dehiscences on their buccal surfaces, which could not be detected by periapical radiographs.

Conclusions: Dental implants osseointegrated and restored with a prosthetic superstructure were recognizable following severe incineration. It was possible to trace back the identity of the unknown victim to a prosthodontist. Bone dehiscences discovered in this study highlighted how two-dimensional radiographs may not reveal lack of bone support.
PART II – HUMAN BODIES TO TEACH ANATOMY: IMPORTANCE AND PROCUREMENT – EXPERIENCE WITH CADAVER DONATION


Publication of the Debate on “Human Bodies to Teach Anatomy: Importance and Procurement – Experience with Cadaver Donation” in the immediate past issue called the attention of the international anatomic community because of the broad approach and the diversity of the mentioned situations. Instead it is possible to find many other articles on this topic they are usually focused on a particular experience, country or, eventually, a continent. This Debate gave a brief mapping on different continents and provided a quick point of view on agreements and diversity of problems afforded by the professors of Anatomy under a wide variety of cultures. As it was specified in the first part, comments, queries and answers from the initial participants and general readers should be considered as a second part of the Debate. All significant contributions have been organized and included in this instance. Readers may find important information related to Australia, Czech Republic, Russia, Turkey and Venezuela, and additional comments on the previous published concepts about India, Malaysia, South Africa and United States.

SOCIAL DETERMINANTS OF HEALTH AND DENTAL CARIES IN BRAZIL: A SYSTEMATIC REVIEW OF THE LITERATURE BETWEEN 1999 AND 2010

Boing AF, Bastos JL, Peres KG, Antunes JL, Peres MA.

Objective: To review epidemiological studies conducted in Brazil that investigated the distribution of dental caries according to socioeconomic status and demographic characteristics.

Methods: The systematic review included articles published between 1999 and 2010 available in six bibliographic sources, without any other restriction. We analysed the bibliometric and methodological characteristics of the studies, and the direction and statistical significance of associations tested.

Results: Of the 1,128 references identified, 67 were incorporated into this study. There was a higher percentage of publications in the last two years and most of the studies were conducted in the South and Southeast of the country with a young population. The cross-sectional design, using a complex sampling procedure, was the most commonly adopted. The DMFT and dmft indexes were the most commonly used to measure dental caries, while sex/gender, income, education, race/skin colour and type of school were the most common socioeconomic exposures.

Conclusions: Most studies identified a high rates of dental caries among the poorest, least educated, black and brown and female individuals. A more detailed methodological and theoretically sound study of the relationship between dental caries and socioeconomic conditions is needed.

SOCIOECONOMIC INEQUALITY IN CATASTROPHIC HEALTH EXPENDITURE IN BRAZIL

Boing AC, Bertoldi AD, Barros AJ, Posenato LG, Peres KG.

Objective: To analyse the evolution of catastrophic health expenditure and the inequalities in such expenses, according to the socioeconomic characteristics of Brazilian families.

Methods: Data from the National Household Budget 2002-2003 (48,470 households) and 2008-2009 (55,970 households) were analysed. Catastrophic health expenditure was defined as excess expenditure, considering different methods of calculation: 10.0% and 20.0% of total consumption and
40.0% of the family's capacity to pay. The National Economic Indicator and schooling were considered as socioeconomic characteristics. Inequality measures utilized were the relative difference between rates, the rates ratio, and concentration index.

Results: The catastrophic health expenditure varied between 0.7% and 21.0%, depending on the calculation method. The lowest prevalences were noted in relation to the capacity to pay, while the highest, in relation to total consumption. The prevalence of catastrophic health expenditure increased by 25.0% from 2002-2003 to 2008-2009 when the cutoff point of 20.0% relating to the total consumption was considered and by 100% when 40.0% or more of the capacity to pay was applied as the cut-off point. Socioeconomic inequalities in the catastrophic health expenditure in Brazil between 2002-2003 and 2008-2009 increased significantly, becoming 5.20 times higher among the poorest and 4.17 times higher among the least educated.

Conclusions: There was an increase in catastrophic health expenditure among Brazilian families, principally among the poorest and those headed by the least-educated individuals, contributing to an increase in social inequality.

THE INFLUENCE OF HEALTH EXPENDITURES ON HOUSEHOLD IMPOVERISHMENT IN BRAZIL

Boing AC, Bertoldi AD, Posenato LG, Peres KG.

Objective: To analyse the variation in the proportion of households living below the poverty line in Brazil and the factors associated with their impoverishment.

Methods: Income and expenditure data from the Household Budget Survey, which was conducted in Brazil between 2002-2003 (n = 48,470 households) and 2008-2009 (n = 55,970 households) with a national sample, were analyzed. Two cutoff points were used to define poverty. The first cutoff is a per capita monthly income below R$100.00 in 2002-2003 and R$140.00 in 2008-2009, as recommended by the Bolsa Família Program. The second, which is proposed by the World Bank and is adjusted for purchasing power parity, defines poverty as per capita income below US$2.34 and US$3.54 per day in 2002-2003 and 2008-2009, respectively. Logistic regression was used to identify the sociodemographic factors associated with the impoverishment of households.

Results: After subtracting health expenditures, there was an increase in households living below the poverty line in Brazil. Using the World Bank poverty line, the increase in 2002-2003 and 2008-2009 was 2.6 percentage points (6.8%) and 2.3 percentage points (11.6%), respectively. Using the Bolsa Familia Program poverty line, the increase was 1.6 (11.9%) and 1.3 (17.3%) percentage points, respectively. Expenditure on prescription drugs primarily contributed to the increase in poor households. According to the World Bank poverty line, the factors associated with impoverishment include a worse-off financial situation, a household headed by an individual with low education, the presence of children, and the absence of older adults. Using the Bolsa Familia Program poverty line, the factors associated with impoverishment include a worse-off financial situation and the presence of children.

Conclusions: Health expenditures play an important role in the impoverishment of segments of the Brazilian population, especially among the most disadvantaged.

EPIFLORIPA HEALTH SURVEY: THE METHODOLOGICAL AND OPERATIONAL ASPECTS BEHIND THE SCENES

Boing AC, Peres KG, Boing AF, Hallal PC, Silva NN, Peres MA.

The present study aims at describing the sampling plan, operational aspects and strategies used to optimize the field work of a cross-sectional, population-based study conducted in a southern capital of Brazil. For this purpose, the sample design, data collection instrument, selection of interviewers, pilot study, data collection, field logistics, quality control, consistency control, costs, and divulgation of results are herein described. The study's response rate was 85.3%. We found that the comparison of frequency
measurements with and without self-assessment had no significant impact on the estimates, and that the design effect, estimated at 2, was sufficient for most calculations. The reproducibility of the questionnaire was satisfactory, with Kappa values and intraclass correlation coefficients ranging from 0.6 to 0.9. The strategies used to overcome operational problems, such as counting of households, use of maps, questionnaire structuring, rigorous organization of the field work and monitoring of the estimates were fundamental in conducting the study.

**PROTOCOL IN MANAGING ORAL SURGICAL PATIENTS TAKING DABIGATRAN**

Breik O, Cheng A, Sambrook P, Goss A.

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New anticoagulants are being introduced into the market. These drugs are orally administered, have predictable pharmacokinetics and dose response, do not require monitoring and have an acceptable safety profile when used appropriately, and so avoid many of the disadvantages and possible complications of warfarin and heparin. Dabigatran is the most widely used, and has been approved by the Therapeutic Goods Administration. The use of dabigatran will likely increase in the coming years, and so it is important for dentists to be aware of its mechanism of action, the possible complications, and how to reverse the bleeding if it occurs. This review discusses dabigatran and reports on our experience of five cases, and provides practical clinical advice on how to manage patients on dabigatran who require dental treatment, particularly extractions.

**CHILDHOOD ORAL HEALTH AND SES PREDICTORS OF CARIES IN 30-YEAR-OLDS**

Brennan DS, Spencer AJ.


Background/Aims: To assess whether childhood socio-economic status modifies the relationship between childhood caries and young adult oral health.

Methods: In 1988-1989, a total of 7,673 South Australian children aged 13 years were sampled, with 4,604 children (60.0%) and 4,476 parents (58.3%) responding. In 2005-2006, 632 baseline study participants responded (43.0% of those traced and living in Adelaide).

Results: Adjusted analyses showed significant interactions for card status by DMFT at age 13 for decayed, missing and filled teeth at age 30, but not for DMFT. Higher DMFT at age 13 was associated with more decayed teeth at age 30 for those with no health card, while there were similar numbers of decayed teeth for card holders regardless of their DMFT at age 13. While higher DMFT at age 13 was associated with more missing teeth at age 30 for card holders, there were similar numbers of missing teeth for those with no card regardless of their DMFT at age 13. The interaction for filled teeth showed that even though higher DMFT at age 13 was associated with more fillings at age 30 for both card holders and those with no card, this relationship was more pronounced for card holders.

Conclusions: SES modified the relationship between child oral health and caries at age 30 years. Card holders at age 13 were worse off in terms of their oral health at age 30 controlling for childhood oral health, supporting social causation explanations for oral health inequalities.

**DENTAL VISITING HISTORY BETWEEN AGES 13 AND 30 YEARS AND ORAL HEALTH-RELATED IMPACT**

Brennan DS, Spencer AJ.


Background: The aim was to assess the role of visit history factors between the age of 13 and 30 years on oral health-related impact.
Materials and Methods: In 1988-89, n=7,673 South Australian school children aged 13 years were sampled with n=4,604 children (60.0%) and n=4,476 parents (58.3%) returning questionnaires. In 2005-06, n=632 baseline study participants responded (43.0% response of those traced and living in Adelaide). Oral health impact was measured at age 30 years using OHIP-14.

Results: Multivariate regression showed that OHIP scores were significantly higher (P<0.05) for those with episodes of relief of pain visits once (β=1.487) or two or more times (β=2.883), and episodes of extraction once (β=1.301) or two or more times (β=3.172). Higher positive dental visit attitude scores were associated with lower OHIP scores (β=-1.265), as were being male (β=-0.637), having a job (β=-1.555) and being tertiary educated (β=-0.632).

Conclusions: History of adverse dental events between the age of 13 and 30 years such as episodes of relief of pain visits and episodes of extraction was associated with higher impact of oral health problems at age 30 suggesting a cumulative effect.

HEALTH-RELATED QUALITY OF LIFE AND INCOME-RELATED SOCIAL MOBILITY IN YOUNG ADULTS

Brennan DS, Spencer AJ.

Background: To assess the association of income-related social mobility between the age of 13 and 30 years on health-related quality of life among young adults.

Methods: In 1988-89 n = 7,673 South Australian school children aged 13 years were sampled with n = 4,604 children (60.0%) and n = 4,476 parents (58.3%) returning questionnaires. In 2005-06 n = 632 baseline study participants responded (43.0% of those traced and living in Adelaide).

Results: Multivariate regressions adjusting for sex, tooth brushing and smoking status at age 30 showed that compared to upwardly mobile persons social disadvantage was associated (p < 0.05) with more oral health impact (Coeff = 5.5), lower EQ-VAS health state (Coeff = -5.8), and worse satisfaction with life scores (Coeff = -3.5) at age 30 years, while downward mobility was also associated with lower satisfaction with life scores (Coeff = -1.3).

Conclusions: Stable income-related socioeconomic disadvantage was associated with more oral health impact, and lower health state and life satisfaction, while being downwardly mobile was associated with lower life satisfaction at age 30 years. Persons who were upwardly mobile were similar in health outcomes to stable advantaged persons.

THE DENTITION: THE OUTCOMES OF MORPHOGENESIS LEADING TO VARIATIONS OF TOOTH NUMBER, SIZE AND SHAPE

Brook AH, Jernvall J, Smith RN, Hughes TE, Townsend GC.

The clinical importance of variations of tooth number, size and shape is seen in many dental disciplines. Early diagnosis allows optimal patient management and treatment planning, with intervention at an appropriate time to prevent complications in development and so reduce later treatment need.

Understanding the process of dental morphogenesis and the variations in outcomes is an important contribution to the multidisciplinary clinical team approach to treatment. Tooth number, size and shape are determined during the initiation and morphogenetic stages of odontogenesis. The molecular evidence of repetitive signalling throughout initiation and morphogenesis is reflected clinically in the association of anomalies of number, size and shape. This association has been statistically modelled from epidemiological evidence and confirmed by 2D and 3D measurement of human dental study casts.

In individuals with hypodontia, the teeth that are formed are smaller than the population mean and often show reduced and simplified shape. In contrast, in individuals with supernumerary teeth, the other teeth are larger than average and may show an enhanced shape. Clinical observations in humans and studies of laboratory animals gave rise to the concept of morphogenetic fields within the dentition. The
findings, which can also be considered as reflecting gene expression territories, have been developed to incorporate field, clone and homeobox theories. The clinical distribution of developmental anomalies tends to follow the pattern of these fields or territories. Improved care for patients with these anomalies will come not only from utilizing a multidisciplinary clinical team but also by expanding the approach to include other relevant scientific disciplines.

**GENERAL AND CRANIOFACIAL DEVELOPMENT ARE COMPLEX ADAPTIVE PROCESSES INFLUENCED BY DIVERSITY**

Brook AH, O'Donnell MB, Hone A, Hart E, Hughes TE, Smith RN, Townsend GC.  

Complex systems are present in such diverse areas as social systems, economies, ecosystems and biology and, therefore, are highly relevant to dental research, education and practice. A Complex Adaptive System in biological development is a dynamic process in which, from interacting components at a lower level, higher level phenomena and structures emerge. Diversity makes substantial contributions to the performance of complex adaptive systems. It enhances the robustness of the process, allowing multiple responses to external stimuli as well as internal changes. From diversity comes variation in outcome and the possibility of major change; outliers in the distribution enhance the tipping points. The development of the dentition is a valuable, accessible model with extensive and reliable databases for investigating the role of complex adaptive systems in craniofacial and general development. The general characteristics of such systems are seen during tooth development: self-organization; bottom-up emergence; multitasking; self-adaptation; variation; tipping points; critical phases; and robustness. Dental findings are compatible with the Random Network Model, the Threshold Model and also with the Scale Free Network Model which has a Power Law distribution. In addition, dental development shows the characteristics of Modularity and Clustering to form Hierarchical Networks. The interactions between the genes (nodes) demonstrate Small World phenomena, Subgraph Motifs and Gene Regulatory Networks. Genetic mechanisms are involved in the creation and evolution of variation during development. The genetic factors interact with epigenetic and environmental factors at the molecular level and form complex networks within the cells. From these interactions emerge the higher level tissues, tooth germs and mineralized teeth. Approaching development in this way allows investigation of why there can be variations in phenotypes from identical genotypes; the phenotype is the outcome of perturbations in the cellular systems and networks, as well as of the genotype. Understanding and applying complexity theory will bring about substantial advances not only in dental research and education but also in the organization and delivery of oral health care.

**UKAIPŌ NIHO: THE PLACE OF NURTURING FOR ORAL HEALTH**


Objectives: To report on oral-health-related characteristics, beliefs, and behaviours among participants in a randomised control trial of an intervention to prevent early childhood caries (ECC) among Māori children, and to determine whether there were any systematic differences between the intervention and control groups at baseline.  
Design: Baseline measurements from a randomised control trial (involving 222 pregnant Māori women allocated randomly to either Intervention or Delayed groups) which is currently underway.  
Setting: The rohe (tribal area) of Waikato-Tainui.  
Methods: Self-report information collected on sociodemographic characteristics, pregnancy details, self-reported general and oral health and health-related behaviours, and oral health beliefs.  
Results: Other than those in the Delayed group being slightly older, on average, there were no significant differences between the two groups. Some 37.0% were expecting their first child. Most
reported good health; 43.6% were current smokers, and 26.4% had never smoked. Only 8.2% were current users of alcohol. Almost all were dentate, and 57.7% described their oral health as fair or poor. One in six had had toothache in the previous year; 33.8% reported being uncomfortable about the appearance of their teeth, and 27.7% reported difficulty in eating. Dental service-use was relatively low and symptom-related; 78.9% needed to see a dentist. Overall, most of the sample believed that it was important to avoid sweet foods, visit dentists and to brush the teeth, while about half thought that using fluoride toothpaste and using floss were important. Some 38.2% felt that drinking fluoridated water was important. Oral-health-related fatalism was apparent, with 74.2% believing that most people usually get dental problems, 58.6% believing that most people will need extractions at some stage, and that most children eventually get dental caries.

Conclusions: Mothers’ important role in nurturing the well-being of the young child includes the protection and maintenance of the growing child's oral health (or ukaipo niho). The findings provide important insights into Māori mothers' oral health knowledge, beliefs and practices.

**TIME TRENDS IN PROSTATE CANCER MORTALITY ACCORDING TO MAJOR GEOGRAPHIC REGIONS OF BRAZIL: AN ANALYSIS OF THREE DECADES**

Conceição MB, Boing AF, Peres KG.  

The aim of this study was to analyse prostate cancer mortality and time trends in Brazil, according to major geographic regions, States, and age brackets. Data on deaths from 1980 to 2010 were obtained from the Mortality Information System. Mortality trends were estimated using Prais-Winsten generalized linear regression. An upward time trend was observed in mortality in all regions of Brazil, with a mean annual increase of 2.8%. The upward trend in mortality occurred in most of the age brackets, with a concentration of deaths in men 70 to 79 years of age (41%) and a significant increase in the 40 to 60-year age bracket. The mortality rate increased significantly in all age brackets in the Northeast, compared to the other regions of Brazil. The study highlighted the importance of redistributing deaths from ill-defined causes in order to correct the mortality rates. The results point to significant regional differences and the need for continuous monitoring of mortality from prostate cancer in Brazil.

**TRENDS IN DENTAL CARIES AMONG BRAZILIAN SCHOOLCHILDREN: 40 YEARS OF MONITORING (1971-2011)**

Constante HM, Souza ML, Bastos JL, Peres MA.  

The study aimed to estimate the prevalence, severity, and inequality in the distribution of dental caries in schoolchildren from Florianópolis, Santa Catarina, Brazil, in 2011, and to compare the results with data from previous studies carried out since 1971. All 12- and 13-year-old schoolchildren enrolled in a public school were eligible. Dental caries were assessed according to the World Health Organisation diagnostic criteria. Decayed, missing and filled surfaces and teeth (DMFS/DMFT) indexes, the Significant Caries Index (SiC) and the Gini coefficient (to assess inequalities in the distribution of dental caries) were estimated. The response rate was 82.3% (n = 130). The prevalence of dental caries decreased from 98.0% (95% CI 96.0-100.0) in 1971 to 36.9% (95% CI 28.5-45.3) in 2011. The mean DMFT ranged from 9.2 in 1971 to 0.7 in 2011. The mean DMFS index was 1.2 (95% CI 0.8-1.6) in 2011. The Gini coefficient was 0.624 in 2002 but increased to 0.725 in 2011; the Lorenz curve showed that 70-75% of dental caries attacks was restricted to 20% of the population in 2011. A reduction of 41.2% in the mean SiC index was observed between 2002 (3.4, 95% CI 3.0-3.8) and 2011 (1.9, 95% CI 1.6-2.1). An effective decline in the prevalence and severity of dental caries in schoolchildren was observed throughout 40 years of monitoring. However, a small proportion of the population has experienced most of the caries burden in the recent years studied.
FROM PUBLIC MENTAL HEALTH TO COMMUNITY ORAL HEALTH: THE IMPACT OF DENTAL ANXIETY AND FEAR ON DENTAL STATUS

Crego A, Carrillo-Díaz M, Armfield JM, Romero M.

Dental fear is a widely experienced problem. Through a "vicious cycle dynamic," fear of dental treatment, lower use of dental services, and oral health diseases reinforce each other. Research on the antecedents of dental anxiety could help to break this cycle, providing useful knowledge to design effective community programs aimed at preventing dental fear and its oral health-related consequences. In this regard, frameworks that analyse the interplay between cognitive and psychosocial determinants of fear, such as the Cognitive Vulnerability Model, are promising. The onset of dental fear often occurs in childhood, so focusing on the child population could greatly contribute to understanding dental fear mechanisms and prevent this problem extending into adulthood. Not only can public mental health contribute to population health, but also community dentistry programs can help to prevent dental fear. Regular dental visits seem to act in a prophylactic way, with dental professionals playing an important role in the regulation of the patients' anxiety-related responses. Both public mental health and community dentistry could therefore benefit from a multidisciplinary approach to dental fear and oral health.

THE CHANGING ORAL HEALTH SITUATION IN AUSTRALIA AND MOVING TOWARDS PRIMARY ORAL HEALTH CARE

Crocombe LA, Slack-Smith L, Bell E, Barnett T.
Asia Pacific J Health Manage. 2014;9:45-49.

Background: Oral health has a substantial influence on quality of life and has been linked to general health, yet there is much work required to determine its optimal management. Methods: This discussion paper drew upon government reports, research literature, existing reviews and media releases to discover the challenges and opportunities when incorporating dentistry into primary healthcare. Results: Oral health outcomes have improved over the generations, the dental practice service mix has changed, the number of dental clinicians has increased and the workforce mix is changing, possibly leading to a change in perspectives on work-life balance. There is unequal access to dental care alongside a dental workforce maldistribution. Dental care is funded separately to general healthcare and is largely supplied by the private sector. Subsidised dental care has been managed by the states but federal politicians of major political parties are investigating new funding arrangements. Conclusions: The challenges to incorporating dentistry into primary healthcare are great. However, major political parties are interested in oral health. The oral workforce is going through a process of rapid change in practitioner number, type and possibly attitudes, thereby giving an opportunity to modify its delivery systems.

A QUALITATIVE INVESTIGATION OF RANKL, RANK AND OPG IN A RAT MODEL OF TRANSIENT ANKYLOSIS

Curl L, Tan CW, Dreyer CW, Sampson W.

Introduction: Previous studies have found ankylosis occurs as a part of the inflammatory process of aseptic root resorption initiated in a rat model. The physiologic mechanisms behind the development of dentoalveolar ankylosis and healing response are still unclear. While receptor activator of nuclear factor-κβ ligand (RANKL), receptor activator of nuclear factor-κβ (RANK) and osteoprotegerin (OPG) have gained momentum in the understanding of resorption, no study to date has investigated their role in dentoalveolar ankylosis.
Aims: The aims of this study were to investigate if, and when, ankylosis occurred in the rat PDL, whether the resolution of ankylosis occurred with time and, finally, to observe the expression of RANKL, RANK and OPG during the ankylotic process.

Materials and Methods: Dry ice was applied for 20 minutes to the upper right first molar crown of 15 eight-week-old, male Sprague-Dawley rats. An additional three rats served as untreated external controls. Groups of three rats were sacrificed after the thermal insult on day 0, 4, 7, 14 and 28 respectively. Each maxilla was dissected out and processed for histological examination and RANKL, OPG and RANK immunohistochemistry.

Results: By the use of light microscopy and H&E staining, no ankylosis was detected in the external control group and the experimental groups at days 0 and 4. On day 7, disruption within the periodontal ligament was observed in the interradicular region and the initial signs of ankylosis were seen in the form of finger-like projections extending from the alveolar bone towards the cementum. Fourteen days after the thermal insult, all animals exhibited extensive ankylosis that spanned the entire interradicular periodontal space. At 28 days, the development of ankylosis appeared to have ceased and repair was observed, together with an intact periodontal ligament in all but one rat. Positive staining results were obtained with RANKL, RANK and OPG antibodies. The expressions of RANKL, RANK and OPG were similar in the external control group, 0-, 4-, and 28-day experimental groups. In the 7- and 14-day experimental groups, RANKL, RANK and OPG were expressed in the blood vessels within the ankylotic regions.

Conclusions: During the development of ankylosis and its resolution, it was concluded from their simultaneous presence that there is a complex interaction between RANKL, RANK and OPG that requires further investigation.

LEISURE-TIME PHYSICAL ACTIVITIES AMONG ADULTS IN FLORIANOPOLIS, STATE OF SANTA CATARINA, BRAZIL: A POPULATION-BASED STUDY ON THE CHARACTERISTICS OF THE PRACTICES AND THE PRACTITIONERS


The study established characteristics of practices and practitioners of leisure-time physical activities among adults in Florianopolis, Brazil. It was a population-based, cross-sectional survey conducted between September 2009 and January 2010. Leisure-time physical activity was assessed using a validated questionnaire. Walking and weight lifting were the most frequently reported activities. Vigorous physical activities were more frequent among men and young adults. There were no gender or age differences in relation to the frequency and duration of physical activities. Walking and gymnastics were more frequently practiced by women, and jogging and soccer by men. Age was positively associated with walking, and negatively with soccer and weight lifting. Caucasian and black males practiced gymnastics and soccer more frequently. Adults living with a partner practiced more walking and soccer, and less weight lifting. Educational level was directly associated with jogging and gymnastics, but inversely with soccer. Income was inversely associated with soccer and directly associated with weight lifting. Policies to promote physical activity should consider the different interests of the population to stimulate the scope of their practice in leisure-time.

LIFE COURSE EPIDEMIOLOGY AND ITS IMPLICATION FOR ORAL HEALTH

Demarco FF, Peres KG, Peres MA. Braz Oral Res. 2014 Jan-Feb;28(1).

Life course epidemiology has been defined as the study of the long-term effects of biological, behavioural and psychosocial pathways that operate across the life course as well as across generations, and influence the development of chronic disease. These studies are designed to help the
establishment of causal relationships between exposures and outcomes, taking into consideration the duration and the time of disease development.

Chronic diseases have a long period of development, generating a mismatch between the exposure, the beginning of the disease and the first clinical signals. Oral health is an excellent area to study life course determinants of the diseases since the most impacting oral diseases and disorders are cumulative and chronic, present relatively high prevalence and are easy to be identified. Several models have been postulated to explain the relationship between exposure and outcome during the life course.

**COMMON RISK FACTOR APPROACH TO ADDRESS SOCIOECONOMIC INEQUALITY IN THE ORAL HEALTH OF PRESCHOOL CHILDREN--A PROSPECTIVE COHORT STUDY**


Background: Dental caries remains the most prevalent chronic condition in children and a major contributor to poor general health. There is ample evidence of a skewed distribution of oral health, with a small proportion of children in the population bearing the majority of the burden of the disease. This minority group is comprised disproportionately of socioeconomically disadvantaged children. An in-depth longitudinal study is needed to better understand the determinants of child oral health, in order to support effective evidence-based policies and interventions in improving child oral health. The aim of the Study of Mothers’ and Infants’ Life Events Affecting Oral Health (SMILE) project is to identify and evaluate the relative importance and timing of critical factors that shape the oral health of young children and then to seek to evaluate those factors in their inter-relationship with socioeconomic influences.

Methods/Design: This investigation will apply an observational prospective study design to a cohort of socioeconomically-diverse South Australian newborns and their mothers, intensively following these dyads as the children grow to toddler age. Mothers of newborn children will be invited to participate in the study in the early post-partum period. At enrolment, data will be collected on parental socioeconomic status, mothers’ general and dental health conditions, details of the pregnancy, infant feeding practice and parental health behaviours and practices. Data on diet and feeding practices, oral health behaviours and practices, and dental visiting patterns will be collected at 3, 6, 12 and 24 months of age. When children turn 24-30 months, the children and their mothers/primary care givers will be invited to an oral examination to record oral health status. Anthropometric assessment will also be conducted.

Discussion: This prospective cohort study will examine a wide range of determinants influencing child oral health and related general conditions such as overweight. It will lead to the evaluation of the inter-relationship among main influences and their relative effect on child oral health. The study findings will provide high level evidence of pathways through which socio-environmental factors impact child oral health. It will also provide an opportunity to examine the relationship between oral health and childhood overweight.

**ORAL MUCOSAL LESIONS: FINDINGS FROM THE AUSTRALIAN NATIONAL SURVEY OF ADULT ORAL HEALTH**

Do LG, Spencer AJ, Dost F, Farah CS.


Background: The prevalence of oral mucosal lesions (OMLs) and factors associated with these has not previously been reported in the Australian population. This study aimed to report on the prevalence of OMLs in Australian adults and to evaluate their association with socio-demographic factors.

Methods: This study utilized data from the Australian National Survey of Adult Oral Health 2004-06, which employs a multi-stage, stratified random sample selection procedure. Information on socio-demographics, smoking and presence of OMLs were collected using telephone interview, self-reported
questionnaires and comprehensive oral examination. A multivariate regression model was generated to estimate effect of factors on the prevalence of non-ulcerated OMLs.

Results: A total of 3551 dentate adult Australians had complete data for this analysis. Over 20% of study participants presented with an OML on the day of examination. The prevalence of suspected malignancy was less than 1% and over 17% for non-ulcerated OMLs. Prevalence of non-ulcerated OMLs was associated with age, gender, residential location, household income and smoking.

Conclusions: The study reported that epidemiological survey can provide useful information on OMLs. Certain population groups had a higher risk of having the condition. Preventing smoking uptake and smoking cessation can reduce the prevalence of OMLs in the population.

DENTAL CARIES AND FLUOROSIS EXPERIENCE OF 8-12-YEAR-OLD CHILDREN BY EARLY-LIFE EXPOSURE TO FLUORIDE

Do LG, Miller J, Phelan C, Sivaneswaran S, Spencer AJ, Wright C.

Background: It is important to evaluate concurrently the benefit for dental caries and the risk for dental fluorosis from early exposure to fluoride among children.

Aim: To evaluate associations of different levels of exposure to fluoride in early childhood with dental caries and dental fluorosis experience in school children.

Methods: A Child Dental Health Survey (CDHS) was conducted among school children in the Australian state of New South Wales (NSW) in 2007. Trained and calibrated examination teams conducted oral epidemiologic examinations to assess caries experience as decayed, missing or filled tooth surfaces of the primary and permanent dentitions (dmfs/DMFS) and fluorosis using the Thylstrup & Fejerskov (TF) index on the maxillary central incisors only. A parental questionnaire collected information on residential histories and tap water usage to enable calculation of percentage of 3-year lifetime exposure to fluoride in water. Use of dietary fluoride supplements was also collected. Dental caries and fluorosis experience were compared among groups by levels of exposure to fluoride from water and fluoride supplements in bivariate and multivariable analysis, controlling for socioeconomic factors.

Results: Exposure to different fluoride sources varied in the group of 2611 children aged 8-12 years. Lower household income was significantly associated in both bivariate and multivariable analyses with the greater prevalence and severity of primary tooth caries among 8-10-year-old children and permanent tooth caries among 8-12 year old. Exposure to fluoride in water during the first 3 years of life was associated with both caries and fluorosis experience observed at age 8-12 years. Having higher percentage of 3-year lifetime exposure to fluoride in water was associated with higher prevalence of mostly mild fluorosis, but significantly lower prevalence and severity of caries in the primary and permanent dentitions.

Conclusion: There were significant associations of dental caries and fluorosis experience with sources of early childhood fluoride exposure among children aged 8-12 years in New South Wales. Exposure to fluoridated water during the first 3 years of life was associated with better oral health of school-age children.

CLINICAL IMPORTANCE OF INCIDENTAL FINDINGS REPORTED ON SMALL-VOLUME DENTAL CONE BEAM COMPUTED TOMOGRAPHY SCANS FOCUSED ON IMPACTED MAXILLARY CANINE TEETH

Doğramacı EJ, Rossi-Fedele G, McDonald F.

Objective: To investigate the clinical importance of incidental findings reported for small-volume cone beam computed tomography (CBCT) scans of impacted maxillary canine teeth.

Study Design: Radiology reports of CBCT examinations performed as part of diagnosis and treatment planning for impacted or ectopically erupting maxillary canine teeth for 183 consecutive patients were
assessed retrospectively. The scans were obtained with a small-volume unit (3 D Accuitomo 80) with a field of view that was either 40 × 40 or 60 × 60 mm. The findings were graded according to their clinical importance as low, intermediate, or high.

Results: Three hundred and forty incidental findings were reported. One of the incidental findings was of high importance (0.3%), 97 were of intermediate importance (28.5%), and 242 were of low importance or anatomic variant (71.1%).

Conclusions: Incidental findings reported on small-dimension CBCT scans of impacted maxillary canine teeth rarely require immediate attention; nonetheless, 28.8% would require follow-up.

THE 2-IMPLANT MAXILLARY OVERDENTURE: A CLINICAL REPORT

Dudley J.

Maxillary implant overdentures present a number of different challenges in comparison to the established and predictable benefits of mandibular implant overdentures. This report highlights the lack of evidence and conflicting findings in the maxillary implant overdenture literature and presents a clinical treatment of a 2-implant and subsequently 1-implant maxillary overdenture with reduced palatal coverage.

DENTAL ATTENDANCE PATTERNS OF AUSTRALIAN ADULTS

Ellershaw A, Australian Research Centre for Population Oral Health.

A person's usual attendance behaviour is frequently described by reference to individual characteristics of their dental visits including their frequency of dental visiting, their usual reason for making a dental visit and whether they visit a usual dental care provider. The concept of developing a composite indicator to reflect a person's usual dental attendance behaviour was initially explored using data from the 2004–06 National Survey of Adult Oral Health. Adults were described as having a ‘favourable’ pattern of dental attendance if they had a usual dental provider they visited once a year for the purpose of a dental check-up. An ‘unfavourable’ pattern of dental attendance was defined as adults who visited the dentist infrequently (less often than once every two years) for the purpose of a dental problem and did not have a usual dental care provider. The remaining adults were classified to an ‘intermediate’ category to reflect their mixed pattern of dental attendance. The concept of a ‘favourable’ through to ‘unfavourable’ pattern of dental attendance was formed to reflect how closely a person's pattern of dental attendance aligned with that recommended by the dental profession.

INTRINSIC REWARDS EXPERIENCED BY A GROUP OF DENTISTS WORKING WITH UNDERSERVED POPULATIONS

Gardner SP, Roberts-Thomson KF, Winning TA, Peterson R.

Background: The aim of this study was to explore, using qualitative methods, the intrinsic reasons why dentists work with underserved groups. Minority and marginalized groups of Australians suffer a greater burden of dental disease than the general population due to disparities in accessing care. Recruitment and retention of dentists to care for underserved groups is problematic due to personal, professional and structural reasons. What drives dentists to work with underserved groups is not widely known.

Methods: Sixteen dentists were recruited using 'snowball' purposeful sampling. Semi-structured in-depth interviews were conducted. Thematic analysis was conducted on the transcriptions to identify themes.

Results: Five key themes emerged: (1) 'tapped on the shoulder', being personally approached or invited; (2) 'dental school experience', the challenges faced as a student; (3) 'empathic concern', the non-
judgemental expressions of care toward others; (4) ‘resilience’, the ability to bounce back after setbacks; (5) ‘intrinsic reward’, the personal gain and satisfaction received. This study focuses on the intrinsic rewards which were found to be simple, unexpected, and associated with relieving pain, community engagement and making a difference.

Conclusions: Emphasizing personal fulfilment and intrinsic reward could be useful when promoting dentistry as a career and when encouraging graduates to consider working with disadvantaged groups.

THE EFFECT OF A CHANGE IN SELECTION PROCEDURES ON STUDENTS’ MOTIVATION TO STUDY DENTISTRY

Gardner SP, Roberts-Thomson KF.

Background: The aim of this study was to determine whether changes in student selection criteria at The University of Adelaide effected a change in motivation and influencing factors to study dentistry by comparing cohorts.


Results: All 666 students completed the questionnaire with 647 suitable for analysis. The likelihood of students being motivated for a career in dentistry because it 'fits with family' was greater for the 1997-2005 cohort (OR = 1.68, 95% CI = 1.14-2.49, p < 0.01) than it was for 1993-1996 enrolees, whereas 'status' became less important (OR = 0.47, 95% CI = 0.30-0.73, p < 0.01). Being influenced by a dentist (OR = 2.41, 95% CI = 1.63-3.55, p < 0.001) or a dental employee (OR = 3.19, 95% CI = 0.90-4.85, p < 0.001) was much greater for the 1997-2005 group than it was for the 1993-1996 cohort. Where students came from, parents' level of education and gender were not significant in the multivariate analysis of factors associated with motivation and influences of students' career choice.

Conclusions: Changes to the selection procedure were associated with increased emphasis on lifestyle factors and the dental profession, but not with the desire to help people or the importance of the work itself in students' decision to study dentistry.

EFFECT OF SUPER-OXIDIZED WATER, SODIUM HYPOCHLORITE AND EDTA ON DENTIN MICROHARDNESS

Ghisi AC, Kopper PM, Baldasso FE, Stürmer CP, Rossi-Fedele G, Steier L, Figueiredo JA, Morgental RD, Vier-Pelisser FV.

The present study aimed to evaluate the influence of the following irrigating solutions on the microhardness of root canal dentin: 2% sodium hypochlorite (2NaOCl), 5% sodium hypochlorite (5NaOCl), super-oxidized water (400 ppm Sterilox - Sx) and 17% EDTA (E). Eighty roots from bovine incisors were randomly divided into 8 groups (n=10): 2NaOCl, 5NaOCl, Sx, and 2NaOCl + E, 5NaOCl + E, Sx + E (associated with E as final irrigant for 5 min), E solely and distilled water (dH2O) as the negative control. Root canal preparation was performed by hand instruments, using one of the irrigation protocols for 30 min. Then, 5 mm of the cervical root third were cut out from each sample and subjected to the Vickers microhardness test, at two points, one at approximately 500-1000 µm from the root canal lumen (distance 1), and the other at approximately 500-1000 µm from the external root surface (distance 2). Data were analysed by Wilcoxon and Kruskal-Wallis tests at 5% significance level. Microhardness values at distance 1 were significantly lower than those at distance 2 for all groups, except 5NaOCl and 5NaOCl + E groups (p>0.05). EDTA showed the lowest microhardness values. However, no statistically significant difference was detected among groups at distance 1 and EDTA was significantly different only from Sx at distance 2. In conclusion, all tested solutions showed lower microhardness at the most superficial root canal dentin layer compared to the one found near the
external root surface, except 5NaOCl and 5NaOCl + E; EDTA promoted lower microhardness values in comparison to Sterilox at this site.

**CARDIOVASCULAR DISEASE, CHRONIC KIDNEY DISEASE, AND DIABETES MORTALITY BURDEN OF CARDIOMETABOLIC RISK FACTORS FROM 1980 TO 2010: A COMPARATIVE RISK ASSESSMENT**


Background: High blood pressure, blood glucose, serum cholesterol, and BMI are risk factors for cardiovascular diseases and some of these factors also increase the risk of chronic kidney disease and diabetes. We estimated mortality from cardiovascular diseases, chronic kidney disease, and diabetes that was attributable to these four cardiometabolic risk factors for all countries and regions from 1980 to 2010.

Methods: We used data for exposure to risk factors by country, age group, and sex from pooled analyses of population-based health surveys. We obtained relative risks for the effects of risk factors on cause-specific mortality from meta-analyses of large prospective studies. We calculated the population attributable fractions for each risk factor alone, and for the combination of all risk factors, accounting for multicausality and for mediation of the effects of BMI by the other three risks. We calculated attributable deaths by multiplying the cause-specific population attributable fractions by the number of disease-specific deaths. We obtained cause-specific mortality from the Global Burden of Diseases, Injuries, and Risk Factors 2010 Study. We propagated the uncertainties of all the inputs to the final estimates.

Findings: In 2010, high blood pressure was the leading risk factor for deaths due to cardiovascular diseases, chronic kidney disease, and diabetes in every region, causing more than 40% of worldwide deaths from these diseases; high BMI and glucose were each responsible for about 15% of deaths, and high cholesterol for more than 10%. After accounting for multicausality, 63% (10·8 million deaths, 95% CI 10·1-11·5) of deaths from these diseases in 2010 were attributable to the combined effect of these four metabolic risk factors, compared with 67% (7·1 million deaths, 6·6-7·6) in 1980. The mortality burden of high BMI and glucose nearly doubled from 1980 to 2010. At the country level, age-standardised death rates from these diseases attributable to the combined effects of these four risk factors surpassed 925 deaths per 100 000 for men in Belarus, Kazakhstan, and Mongolia, but were less than 130 deaths per 100 000 for women and less than 200 for men in some high-income countries including Australia, Canada, France, Japan, the Netherlands, Singapore, South Korea, and Spain.

Interpretation: The salient features of the cardiometabolic disease and risk factor epidemic at the beginning of the 21st century are high blood pressure and an increasing effect of obesity and diabetes. The mortality burden of cardiometabolic risk factors has shifted from high-income to low-income and middle-income countries. Lowering cardiometabolic risks through dietary, behavioural, and pharmacological interventions should be a part of the global response to non-communicable diseases.

**DENTAL PRACTITIONER RURAL WORK MOVEMENTS: A SYSTEMATIC REVIEW**

Godwin DM, Hoang H, Crocombe LA, Bell E.  

Introduction: There is a globally observed unequal distribution of dental and other health practitioners between urban and rural areas in OECD countries. Dental practitioners provide important primary healthcare services to rural populations. Workforce shortages and stability issues in underserved areas can have negative effects on rural communities. Strategies used to fix the dental practitioner workforce maldistribution need to be investigated.

Method: The study had primary focus on Australia and included relevant international literature. Databases used were PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL),
Informit, Web of Science, Scopus and Summon. Search terms included dental practitioner, rural, remote, retention, recruitment and strategies.

Results: Sixteen articles met the inclusion criteria. The articles described a total of eight different positive factors and 12 negative factors towards rural practice. The positive factors related to the nature of the type of clinical work being a 'challenge', close social and professional support networks, enjoyment of rural lifestyle and successful integration into the rural community. The negative factors mentioned included social and professional isolation, workload and type of clinical work, access to further education opportunities, access to facilities, education for children and job opportunities for a partner, and inability to integrate into the rural community. The articles that analysed recruitment incentives described three strategies currently used to influence recruitment, all of which were financial or contractual in nature. Articles mentioning retention factors described seven long-term retention motivators; of these, six of them were personal reasons. The most commonly mentioned motivational factor for recruitment and retention of the rural dental practitioner workforce was the effect of prior rural exposure for dental practitioners.

Conclusions: The results of this review indicate that the most important influences on rural dental practitioner workforce recruitment and retention were a combination of financial reimbursement and personal reasons. There was also a large influence of rural medical workforce research on untested assumptions and drivers of the rural dental practitioner workforce. The high recruitment rate compared with the low retention rate indicates that current strategies were not effective in addressing rural dental practitioner workforce shortages in the long term.

**PORPHYROMONAS GINGIVALIS PEPTIDYLARGININE DEIMINASE, A KEY CONTRIBUTOR IN THE PATHOGENESIS OF EXPERIMENTAL PERIODONTAL DISEASE AND EXPERIMENTAL ARTHRITIS**

Gully N, Bright R, Marino V, Marchant C, Cantley M, Haynes D, Butler C, Dashper S, Reynolds E, Bartold PM.


Objectives: To investigate the suggested role of Porphyromonas gingivalis peptidylarginine deiminase (PAD) in the relationship between the aetiology of periodontal disease and experimentally induced arthritis and the possible association between these two conditions.

Methods: A genetically modified PAD-deficient strain of *P. gingivalis* W50 was produced. The effect of this strain, compared to the wild type, in an established murine model for experimental periodontitis and experimental arthritis was assessed. Experimental periodontitis was induced following oral inoculation with the PAD-deficient and wild type strains of *P. gingivalis*. Experimental arthritis was induced via the collagen antibody induction process and was monitored by assessment of paw swelling and micro-CT analysis of the radio-carpal joints. Experimental periodontitis was monitored by micro CT scans of the mandible and histological assessment of the periodontal tissues around the mandibular molars. Serum levels of anti-citrullinated protein antibodies (ACPA) and *P. gingivalis* were assessed by ELISA.

Results: The development of experimental periodontitis was significantly reduced in the presence of the PAD-deficient *P. gingivalis* strain. When experimental arthritis was induced in the presence of the PAD-deficient strain there was less paw swelling, less erosive bone damage to the joints and reduced serum ACPA levels when compared to the wild type *P. gingivalis* inoculated group.

Conclusion: This study has demonstrated that a PAD-deficient strain of *P. gingivalis* was associated with significantly reduced periodontal inflammation. In addition the extent of experimental arthritis was significantly reduced in animals exposed to prior induction of periodontal disease through oral inoculation of the PAD-deficient strain versus the wild type. This adds further evidence to the potential role for *P. gingivalis* and its PAD in the pathogenesis of periodontitis and exacerbation of arthritis. Further studies are now needed to elucidate the mechanisms which drive these processes.
ORAL HEALTH OF AUSTRALIAN INDIGENOUS CHILDREN COMPARED TO NON-INDIGENOUS CHILDREN ENROLLED IN SCHOOL DENTAL SERVICES

Ha DH, Australian Research Centre for Population Oral Health.

The oral health of children is important as dental caries often starts early in life and is considered predictive of later disease experience. In addition to the dental consequences that can include early tooth loss and malocclusion, children with high levels of decay experience have been associated with higher rates of behavioural problems, affecting their families, schooling and self-esteem. There has been a marked improvement in the oral health of children in the general Australian population in the last decade. However, there are still groups of children who experience higher levels of dental caries such as children who live in remote areas which are populated with Indigenous communities. Dental caries is a widespread disease within Indigenous communities and it has a particularly severe impact on children. Indigenous children are recognized as having, on average, twice as much decay experience as other Australian children. In some communities, levels of decay for Indigenous children are even up to five times higher than that of non-Indigenous children.

Although there are a number of studies reporting Indigenous children's oral health status, there is a need to update this information with recent data. The aim of this article is to report the oral health status of Indigenous children attending a school dental service during 2010. More importantly, this article will compare dental caries experience between Indigenous and non-Indigenous children by state and territory.

CLINICAL ORAL HEALTH OF AUSTRALIA'S RURAL CHILDREN IN A SAMPLE ATTENDING SCHOOL DENTAL SERVICES

Ha DH, Crocombe LA, Mejia GC.

Objective: To examine the association between children's clinical oral health status and their residential location using the latest available data (2009) and to ascertain whether poor oral health among rural children is related to being Indigenous, having less access to fluoridated water or being of lower socioeconomic status (SES), than children from urban areas.

Design: Cross-sectional survey.

Setting and Participant: Data were collected on 74, 467 children aged 5-12 years attending school dental services in Australia (data were not available for Victoria or New South Wales).

Main Outcome Measures: Clinical oral health was determined by the mean number of permanent teeth with untreated caries, missing and filled permanent teeth, and the mean decayed, missing and filled permanent teeth index (DMFT) of 8 to 12-year-old-children and the mean number deciduous teeth with untreated caries, missing and filled deciduous teeth, and the mean decayed, missing and filled deciduous teeth index (dmft) of 5-10-year-olds.

Results: The multivariable models that included coefficients on whether the child was Indigenous, from an area with fluoridated water and SES, were controlled for age and sex. The mean DMFT of 8-12-year-old children and the mean dmft of 5-10-year-old children were significantly higher in rural areas compared with urban centres after accounting for Indigenous status, fluoridated water and SES.

Conclusion: Children's oral health was poorer in rural areas than in major city areas.
THE ACCURACY OF CARIES RISK ASSESSMENT IN CHILDREN ATTENDING SOUTH AUSTRALIAN SCHOOL DENTAL SERVICE: A LONGITUDINAL STUDY

Ha DH, Spencer AJ, Slade GD, Chartier AD.

Objectives: To determine the accuracy of the caries risk assessment system and performance of clinicians in their attempts to predict caries for children during routine practice.

Design: Longitudinal study.

Setting and Participants: Data on caries risk assessment conducted by clinicians during routine practice while providing care for children in the South Australian School Dental Service (SA SDS) were collected from electronic patient records. Baseline data on caries experience, clinicians' ratings of caries risk status and child demographics were obtained for all SA SDS patients aged 5-15 years examined during 2002-2005.

Outcome Measure: Children's caries incidence rate, calculated using examination data after a follow-up period of 6-48 months from baseline, was used as the gold standard to compute the sensitivity (Se) and specificity (Sp) of clinicians' baseline ratings of caries risk. Multivariate binomial regression models were used to evaluate effects of children's baseline characteristics on Se and Sp.

Results: A total of 133 clinicians rated caries risk status of 71,430 children during 2002-2005. The observed Se and Sp were 0.48 and 0.86, respectively (Se+Sp=1.34). Caries experience at baseline was the strongest factor influencing accuracy in multivariable regression model. Among children with no caries experience at baseline, overall accuracy (Se+Sp) was only 1.05, whereas it was 1.28 among children with at least one tooth surfaces with caries experience at baseline.

Conclusions: Clinicians' accuracy in predicting caries risk during routine practice was similar to levels reported in research settings that simulated patient care. Accuracy was acceptable in children who had prior caries experience at the baseline examination, while it was poor among children with no caries experience.

ASSESSMENT OF THE REGENERATIVE POTENTIAL OF ALLOGENEIC PERIODONTAL LIGAMENT STEM CELLS IN A RODENT PERIODONTAL DEFECT MODEL

Han J, Menicanin D, Marino V, Ge S, Mrozik K, Grontos S, Bartold PM.

Background and Objective: The complex microenvironment of the periodontal wound creates many challenges associated with multtissue regeneration of periodontal lesions. Recent characterization of mesenchymal stem cell-like populations residing in periodontal ligament tissues has shown that these cells exhibit features of postnatal stem cells. Despite these advances, a lack of consistency in design of preclinical studies and a limited study of allogeneic transplantation applications has restricted our understanding of their clinical utility in the treatment of periodontal disease. The aim of this study was to assess the regenerative potential of allogeneic periodontal ligament stem cells (PDLSCs) in a rat periodontal fenestration defect mode and to identify an optimal end time-point suitable for quantitative assessment of tissue regeneration.

Material and Methods: Periodontal fenestration defects, created in Sprague Dawley rats, were treated with allogeneic PDLSCs seeded onto Gelfoam® (Absorbable gelatin sponge; Pharmacia Corporation, Kalamazoo, MI, USA) or with Gelfoam® alone, or remained untreated. Experimental rats were killed at 7, 14, 21 or 28 d after surgery and the tissues were processed for immunohistochemical and histomorphometric examination.

Results: Defects treated with PDLSCs showed significantly greater percentage bone fill and length of new bone bridge compared with the untreated group or the group treated with Gelfoam® alone on days 14 and 21. Similarly, a statistically significant difference was achieved within specimens retrieved on day 21 for analysis of regeneration of cementum/periodontal ligament (PDL)-like structures.
Conclusion: The present investigation shows that allogeneic PDLSCs have a marked ability to repair periodontal defects by forming bone, PDL and cementum-like tissue in vivo. The results suggest that treatment periods of 14 and 21 d are optimal end time-points for quantitative assessment of periodontal regeneration within the rodent fenestration-defect model utilized in the present study.

**STEM CELLS, TISSUE ENGINEERING AND PERIODONTAL REGENERATION**

Han J, Menicanin D, Gronthos S, Bartold PM.

The aim of this review is to discuss the clinical utility of stem cells in periodontal regeneration by reviewing relevant literature that assesses the periodontal-regenerative potential of stem cells. We consider and describe the main stem cell populations that have been utilized with regard to periodontal regeneration, including bone marrow-derived mesenchymal stem cells and the main dental-derived mesenchymal stem cell populations: periodontal ligament stem cells, dental pulp stem cells, stem cells from human exfoliated deciduous teeth, stem cells from apical papilla and dental follicle precursor cells. Research into the use of stem cells for tissue regeneration has the potential to significantly influence periodontal treatment strategies in the future.

**EVALUATION OF CARRIER RNA AND LOW VOLUME DEMINERALIZATION FOR RECOVERY OF NUCLEAR DNA FROM HUMAN TEETH**

Higgins D, Kaidonis J, Townsend G, Austin JJ.

Purpose: Teeth and bones are frequently used in the genetic analysis of degraded and ancient human and animal remains. Standard extraction methods, including most commercially available systems, may not yield sufficient DNA to enable successful genetic analysis. Addition of a carrier molecule and demineralization (via EDTA) can increase yields from samples containing limited amounts of DNA. However the benefits of carrier molecules have not been demonstrated for bones and teeth and demineralization introduces large reagent volumes that are difficult to integrate into commercial DNA extraction systems.

Methods: We compared nuclear DNA yields recovered from small samples of partially decomposed human teeth using a commercial silica-based DNA extraction system with and without the addition of carrier RNA and/or a low-volume demineralization step.

Results: DNA yield was significantly improved with demineralization, but there was no significant effect of carrier RNA. The DNA content of a sample did not influence the significance of the effect of demineralization.

Conclusion: Using a simple low-volume (1 mL) demineralization step, prior to DNA extraction with the QIAmp DNA Investigator kit (Qiagen), as little as 50 mg of tooth powder can yield more than 500 ng of nuclear DNA.

**THE TEETH AND FACES OF TWINS: PROVIDING INSIGHTS INTO DENTOFACIAL DEVELOPMENT AND ORAL HEALTH FOR PRACTISING ORAL HEALTH PROFESSIONALS**

Hughes TE, Townsend GC, Pinkerton SK, Bockmann MR, Seow WK, Brook AH, Richards LC, Mihailidis S, Ranjitkar S, Lekkas D.

The continuing studies of the teeth and faces of Australian twins and their families in the Craniofacial Biology Research Group in the School of Dentistry at the University of Adelaide began 30 years ago. Three main cohorts of twins have been recruited, enabling various objectives and specific hypotheses to be addressed about the roles of genetic, epigenetic and environmental influences on human dentofacial
growth and development, as well as oral health. This paper highlights some key findings arising from these studies, emphasizing those of direct relevance to practising oral health professionals. We also draw on published literature to review the significant developments in relation to the use of precision 2D and 3D imaging equipment, the application of modern molecular techniques, and the development of sophisticated computer software for analysing genetic relationships and comparing complex shapes. Such developments are valuable for current and future work. Apart from the classical or traditional twin model, there are several other twin models that can be used in research to clarify the relative contributions of genetic, epigenetic and environmental contributions to phenotypic variation. The monozygotic (MZ) co-twin model is one particularly valuable method, given that examination of only one pair of MZ twins can provide considerable insights into underlying causes of observed variation. This model can be used in a dental practice environment, with oral health professionals having the opportunity to explore differences in orofacial structures between MZ co-twins who are attending as patients. As researchers have become more aware of the complexities of the interactions between the genome, the epigenome and the environment during development, there is the need to collect more phenotypic data and define new phenotypes that will better characterize variations in growth processes and health status. When coupled with powerful new genetic approaches, including genome-wide association studies and linkage analyses, exciting opportunities are opening up to unravel the causes of problems in craniofacial growth and common oral diseases in human populations.

A C-TERMINAL CROSSLINKING TELOPEPTIDE TEST-BASED PROTOCOL FOR PATIENTS ON ORAL BISPHOSPHONATES REQUIRING EXTRACTION: A PROSPECTIVE SINGLE-CENTER CONTROLLED STUDY


Purpose: Patients undergoing extraction are at risk for bisphosphonate-related osteonecrosis of the jaws (BRONJ). A C-terminal crosslinking telopeptide (CTX) level lower than 150 pg/mL has been suggested as a predictor of BRONJ risk. The authors aimed to increase the precision of estimates of the risk of BRONJ in osteoporosis after extraction and to assess value of CTX testing at extraction time in cases of BRONJ in a large prospective cohort.

Patients and Methods: All patients on oral bisphosphonates for osteoporosis referred for extractions over a period of 6.5 years were included in a standard protocol. Pre-extraction fasted CTX levels were obtained. All patients were followed until healing. If the CTX level was lower than 150 pg/mL, they were offered a drug holiday. If they declined, if the CTX level was above 150 pg/mL at baseline, or after the drug holiday, they had extractions performed under local anesthesia. Age-matched controls not on bisphosphonates were identified.

Results: Nine hundred fifty patients had 2,461 extractions. One hundred eighty-one patients had a CTX level lower than 150 pg/mL. Four patients developed BRONJ; all had a CTX level lower than 150 pg/mL. All were on alendronate. The case-control comparison approached significance (<150 pg/mL; P = .073). Alendronate was associated with a low CTX level (P < .05). A CTX level lower than 150 pg/mL had a sensitivity of 100% and specificity of 81%. Bayesian analysis yielded a population expected risk of BRONJ of 0.29% (95% confidence interval, 0.12-0.52); the expected risk was 0.42% for a CTX level lower than 150 pg/mL and 0.13% for a CTX level higher than 150 pg/mL.

Conclusion: The risk of BRONJ for patients with osteoporosis on bisphosphonates having extractions is approximately 0.2%. A CTX level lower than 150 pg/mL is sensitive and is associated with an approximately 3-fold greater risk of BRONJ.
The therapeutic potential of mesenchymal stem cells (MSC) has highlighted the need for identifying easily accessible and reliable sources of these cells. An alternative source for obtaining large populations of MSC is through the controlled differentiation of induced pluripotent stem cells (iPSC). In the present study, colonies of iPSC were cultured in MSC culture media for 2 weeks. Serial passaging then selected for fast growing MSC-like cells with a typical fibroblastic morphology and the capacity to proliferate on standard culture flasks without feeder cells. MSC-like cells were developed from iPSC lines arising from three different somatic tissues: gingiva, periodontal ligament (PDL), and lung. The iPSC-like cells expressed key MSC-associated markers (CD73, CD90, CD105, CD146, and CD166) and lacked expression of pluripotent markers (TRA160, TRA181, and alkaline phosphatase) and hematopoietic markers (CD14, CD34, and CD45). In vitro iPSC-MSC-like cells displayed the capacity to differentiate into osteoblasts, adipocytes, and chondrocytes. In vivo subcutaneous implantation of the iPSC-MSC-like cells into NOD/SCID mice demonstrated that only the PDL-derived iPSC-MSC-like cells exhibited the capacity to form mature mineralized structures which were histologically similar to mature bone. These findings demonstrate that controlled induction of iPSC into fibroblastic-like cells that phenotypically and functionally resemble adult MSC is an attractive approach to obtain a readily available source of progenitor cells for orthopedic and dental-related tissue-engineering applications. However, a detailed characterization of the iPSC-MSC-like cells will be important, as MSC-like cells derived from different iPSC lines exhibit variability in their differentiation capacity.

IPSC FOR DENTAL TISSUE REGENERATION

Hynes K, Gronthos S, Bartold PM.

The realisation that adult somatic cells can be reprogrammed into pluripotent cells is revolutionising the way diseases are researched and is set to transform the way diseases are treated. In recent years the use of induced pluripotent stem cells (iPSC) in dentistry has begun to be investigated. Whilst this work is still in its infancy, iPSC are demonstrating great potential for use in the regeneration of dental tissues. In this review we will provide a brief introduction to the properties of iPSC and their potential application as therapeutic agents to enhance medical research. Furthermore, this review will summarise recent developments in the use of iPSC in dental tissue regeneration.

MULTIPHASIC SCAFFOLDS FOR PERIODONTAL TISSUE ENGINEERING

Ivanovski S, Vaquette C, Gronthos S, Hutmacher DW, Bartold PM.

For a successful clinical outcome, periodontal regeneration requires the coordinated response of multiple soft and hard tissues (periodontal ligament, gingiva, cementum, and bone) during the wound-healing process. Tissue-engineered constructs for regeneration of the periodontium must be of a complex 3-dimensional shape and adequate size and demonstrate biomechanical stability over time. A critical requirement is the ability to promote the formation of functional periodontal attachment between regenerated alveolar bone, and newly formed cementum on the root surface. This review outlines the current advances in multiphasic scaffold fabrication and how these scaffolds can be combined with cell- and growth factor-based approaches to form tissue-engineered constructs capable of recapitulating the
complex temporal and spatial wound-healing events that will lead to predictable periodontal regeneration. This can be achieved through a variety of approaches, with promising strategies characterized by the use of scaffolds that can deliver and stabilize cells capable of cementogenesis onto the root surface, provide biomechanical cues that encourage perpendicular alignment of periodontal fibers to the root surface, and provide osteogenic cues and appropriate space to facilitate bone regeneration. Progress on the development of multiphasic constructs for periodontal tissue engineering is in the early stages of development, and these constructs need to be tested in large animal models and, ultimately, human clinical trials.

DEVELOPMENT AND EVALUATION OF THE STAGES OF CHANGE IN ORAL HEALTH INSTRUMENT


Objectives: Oral health personnel are limited in their ability to assess the readiness of patients to make changes to improve oral health. We aimed to develop and test the Stages of Change in Oral Health (SOCOH) model, a scaled index of the stages of change - pre-contemplative, contemplative or active - with particular emphasis on pregnancy.

MATERIALS AND Methods: Items were collected in a self-report questionnaire conducted among a convenience sample of 446 mothers (age range: 14-43 years) pregnant with Aboriginal children in South Australia, Australia. Scales representing openness (four items; Cronbach's alpha = 0.73), value (four items; Cronbach's alpha = 0.71), inconvenience (six items; Cronbach's alpha = 0.79) and permissiveness (four items; Cronbach's alpha = 0.66) were developed. Participants were categorised according to the Stages of Change model and were evaluated against key self-reported oral health outcomes.

Results: Some 11.9% of participants were classified as pre-contemplators, 46.4% as contemplators and 41.7% as active. A higher proportion of active participants had a higher education, last visited a dentist less than a year previously, had no dental fear, owned a toothbrush, brushed the previous day, used toothpaste, had no difficulties paying a $100 dental bill, self-reported their dental health as 'excellent' and in the previous 12 months did not experience dental pain, embarrassment related to their dental appearance or difficulties eating food.

Conclusions: The SOCOH model offers an internally consistent and valid instrument for detailed assessment of the readiness for change in regarding oral health behaviours in pregnancy and has potential benefits for clinical decision making and research.

SELF-EFFICACY AND SELF-RATED ORAL HEALTH AMONG PREGNANT ABORIGINAL AUSTRALIAN WOMEN


Background: Self-efficacy plays an important role in oral health-related behaviours. There is little known about associations between self-efficacy and subjective oral health among populations at heightened risk of dental disease. This study aimed to determine if low self-efficacy was associated with poor self-rated oral health after adjusting for confounding among a convenience sample of pregnant women.

Methods: We used self-reported data from 446 Australian women pregnant with an Aboriginal child (age range 14-43 years) to evaluate self-rated oral health, self-efficacy and socio-demographic, psychosocial, social cognitive and risk factors. Hierarchical entry of explanatory variables into logistic regression models estimated prevalence odds ratios (POR) and 95% confidence intervals (95% CI) for fair or poor self-rated oral health.

Results: In an unadjusted model, those with low self-efficacy had 2.40 times the odds of rating their oral health as 'fair' or 'poor' (95% CI 1.54-3.74). Addition of socio-demographic factors attenuated the effect
of low self-efficacy on poor self-rated oral health by 10 percent (POR 2.19, 95% CI 1.37-3.51). Addition of the psychosocial factors attenuated the odds by 17 percent (POR 2.07, 95% CI 1.28-3.36), while addition of the social cognitive variable fatalism increased the odds by 1 percent (POR 2.42, 95% CI 1.55-3.78). Inclusion of the behavioural risk factor 'not brushing previous day' attenuated the odds by 15 percent (POR 2.11, 95% CI 1.32-3.36). In the final model, which included all covariates, the odds were attenuated by 32 percent (POR 1.80, 95% CI 1.05, 3.08).

Conclusions: Low self-efficacy persisted as a risk indicator for poor self-rated oral health after adjusting for confounding among this vulnerable population.

**EFFECTIVENESS OF WATER FLUORIDATION IN CARIES REDUCTION IN A REMOTE INDIGENOUS COMMUNITY IN FAR NORTH QUEENSLAND**

Johnson NW, Laloo R, Kroon J, Fernando S, Tut O.  

**Background:** Children in remote Indigenous communities in Australia have levels of dental caries much greater than the national average. One such, the Northern Peninsula Area of Far North Queensland (NPA), had an oral health survey conducted in 2004, shortly before the introduction of fluoridated, reticular water. Children were again surveyed in 2012, following five years exposure.

**Methods:** An oral examination was conducted on all consenting children enrolled in schools across the community, using WHO Basic Oral Health Survey methodology.

**Results:** Few teeth had restorations in both surveys. Age-weighted overall caries prevalence and severity declined from 2005 to 2012 by 37.3%. The effect was most marked in younger children, dmft decreasing by approximately 50% for ages 4-9 years; at age 6, mean decayed score decreased from 5.20 to 3.43. DMFT levels also decreased by almost half in 6-9 year olds. However, significant unmet treatment needs exist at all ages.

**Conclusions:** There has been considerable improvement in child dental health in the NPA over the past 6-7 years. In light of continued poor diet and oral hygiene, water fluoridation is the most likely explanation. The cost-effectiveness for this small community remains an issue which, in the current climate of political antagonism to water fluoridation in many quarters, requires continued study.

**ACCESS, LITERACY AND BEHAVIOURAL CORRELATES OF POOR SELF-RATED ORAL HEALTH AMONGST AN INDIGENOUS SOUTH AUSTRALIAN POPULATION**

Jones K, Parker EJ, Jamieson LM.  

**Objective:** To better understand the determinants of self-rated oral health within an Indigenous population by: 1, examining potential individual-level correlates of socio-demographic, health behaviours, dental care access and oral health literacy-related outcomes with self-rated oral health; and, 2, examining the relative contribution of these domains to self-rated oral health in multivariable modelling.

**Methods:** We conducted nested logistic regression analyses on self-reported status of 'fair or poor' versus 'better' oral health using data from a convenience sample of rural dwelling Indigenous Australians (n = 468). Data were collected on background characteristics, health behaviours, access to dental care, oral health literacy-related outcome variables and REALD 30, an oral health literacy scale.

**Results:** Overall 37.0 % of the Indigenous adult population reported fair or poor oral health. In multivariable modelling, risk indicators for fair or poor self-rated oral health that persisted after adjusting for other covariates included being aged 38+ years (OR 2.9, 95%CI 1.9,4.6), holding a Government Health Concession card (OR 2.3, 95%CI 1.1,4.5), avoiding the dentist due to financial constraints (OR 2.3, 95%CI 1.4,3.6), not knowing how to make an emergency dental visit (OR 1.7, 95%CI 1.1,2.7) and poor understanding of the prevention of dental disease (OR 1.7, 95%CI 1.1,2.7).
Conclusions: In this vulnerable population, risk indicators contributing to poor self-rated oral health included socio-demographic, dental care access and oral health literacy-related factors. Health behaviours were not significant.

DEVELOPMENT AND PSYCHOMETRIC VALIDATION OF A HEALTH LITERACY IN DENTISTRY SCALE (HELD)


Background: Oral health literacy is emerging as a new public health challenge and poor oral health literacy is increasingly seen as an important predictor of poor oral health outcomes. Within Indigenous populations, there may be benefits to research in using a culturally acceptable, internally consistent and valid instrument to assess oral health literacy. We translated a general health literacy measure, the Health Literacy Management (HeLM) scale to make a dentally relevant scale; Health Literacy in Dentistry (HeLD).

Objective: This study describes the development and assessment of the reliability and validity of the HeLD in an Indigenous Australian population.

Design and Methods: The 29 item HeLD scale assesses the components of oral health literacy. The reliability and validity of the seven HeLD subscales were evaluated in a convenience sample of 209 Indigenous Australians with mean age 35 years (range 17-81) and of which 139 were female.

Results: The scale was supported by exploratory factor analysis and established seven distinct and internally consistent domains of oral health literacy: Communication, Access, Receptivity, Understanding, Utilisation, Support and Economic Barriers (Cronbach's alpha = 0.91). Discriminative ability was confirmed by HeLD associations with socio-demographic variables and self-reported health ratings in the expected direction. The convergent validity and predictive validity were confirmed by HeLD scores being significantly associated with toothbrush ownership, use of a toothbrush, time since last dental visit and knowledge of the effect of cordial on the teeth.

Conclusions: The HeLD appears to be an internally valid and reliable instrument and can be used for measuring oral health literacy among rural Indigenous Australian adults.

AN EVALUATION OF THE DISCRIMINANT AND PREDICTIVE VALIDITY OF RELATIVE SOCIAL DISADVANTAGE AS SCREENING CRITERIA FOR PRIORITY ACCESS TO PUBLIC GENERAL DENTAL CARE, IN AUSTRALIA

Jones K. BMC Health Serv Res. 2014 Mar 4;14:106.

Background: Most public dental care services provide preventive, general dental care on a chronological, first come-first served basis. There is concern about lack of transparency, equity and timeliness in access to public dental services across Australia. Using social determinants as screening criteria is a novel approach to triage in dental care and is relatively untested in the literature. The research evaluated the discriminant and predictive validity of relative social disadvantage in prioritising access to public general dental care.

Methods: A consecutive sample of 615 adults seeking general dental care was selected. The validation measure used was clinical assessment of priority. Nine indicators of relative social disadvantage (RSD) were collected: Indigenous status; intellectual disability; physical disability; wheelchair usage; dwelling conditions; serious medical condition; serious medical condition and taking regular medication; hospitalised within 12 months; and, regular medical visits. At the first dental visit, dentists rated care as a priority if treatment was required ≤6 months (PriorityTx) and otherwise non-priority (non-PriorityTx). A standardised dental examination was conducted. Sensitivity, specificity, positive and negative predictive value and area under the ROC curve analyses of 1+ of RSD in predicting clinical priority were calculated.
Results: In bivariate analyses, one or more indicators of relative social disadvantage status were significantly associated with PriorityTx (P < 0.001; χ2). In multivariate analyses, one or more indicators of relative social disadvantage persisted as an independent predictor of PriorityTx (OR 3.8, 95% CI = 2.6-5.6). Compared with clinicians’ classification of PriorityTx, one or more indicators of relative social disadvantage had a sensitivity of 77.1%, and specificity of 53.3%, together with a positive predictive value of 81.9% and negative predictive value of 46.0%. ROC curve analysis supported one or more indicators of relative social disadvantage as a predictor of greater priority for access to general dental care (0.66).

Conclusions: Considerable heterogeneity exists among persons seeking public general dental care in New South Wales. RSD performs as a valid predictor of priority for access to treatment and acts as valid screening criteria for triaging priority access to treatment. Such indicators may address issues of inequality in access to general public oral health services.

AGE, PERIOD AND COHORT ANALYSIS OF PATIENT DENTAL VISITS IN AUSTRALIA

Ju X, Brennan DS, Spencer AJ.
BMC Health Serv Res. 2014 Jan 10;14:13.

Background: Understanding dentists’ capacity to supply dental services over time is a key element in the process of planning for the future. The aim was to identify time trends and estimate age, period and cohort effects in patients’ visits supplied per dentist per year.

Methods: Mailed questionnaires were collected from a random sample of Australian private general practice dentists. The response rates were 73%, 75%, 74%, 71%, 67% in 1983, 1988, 1993, 1998, 2003 and 2009, respectively. The time trends in the mean number of patient visits supplied per dentist per year (PPY) was described by using a standard cohort table and age-period-cohort analyses applying a nested general linear regression models approach.

Results: The mean number of PPY decreased across most age groups of dentists over the time of study. The age-period model showed that younger dentists (20-29 years) and older dentists (65-74 and 80-84 years) had lower PPY than middle-aged dentists, and the age-cohort model showed higher PPY among earlier cohorts, and lower PPY among more recent cohorts.

Conclusion: The study found a period effect of declining PPY over the observation period. More recent cohorts of dentists provide lower numbers of PPY than earlier cohorts at similar ages, but the provision of PPY among these younger cohorts appeared to be stable as they moved into middle age.

FUNCTIONAL DENTAL OCCLUSION: AN ANTHROPOLOGICAL PERSPECTIVE AND IMPLICATIONS FOR PRACTICE

Kaidonis JA, Ranjitkar S, Lekkas D, Brook AH, Townsend GC.

Physiologic changes occur in dental occlusion throughout life, resulting from the interplay between functional demands and reciprocating adaptive responses. These changes have been reported in the anthropological literature and they reflect evolutionary changes in the human stomatognathic system during the Paleolithic, hunter-gatherer period. Specific occlusal changes occur in response to different environments, leading to extensive variation within and between extinct and extant human populations. For example, functional demands can cause occlusal and interproximal tooth wear, resulting in shortening of the dental arch, continual tooth eruption and changes in masticatory patterns. Since the advent of farming through to our current industrialized culture, functional demands on the human masticatory system, and its adaptive responses to these demands, have been reduced considerably. Indeed, it is only occasionally that functional demands are severe enough to lead to obvious pathology in the modern human dentition. In contrast to normal masticatory activity, ‘modern-day conditions’ such as dental caries, periodontal disease and erosion, can lead to significant changes in dental occlusion that are pathological and need to be treated. The masticatory system is a dynamic, functional unit that
displays considerable change over a lifetime. In this concept paper, it is proposed that modern human populations living in industrialized environments display dental occlusions that can be considered to be 'neotenous'; that is, our dentitions tend to reflect an unworn stage of our ancestors that was only seen in infants, juveniles and young adults. Clinicians can draw on both phylogenetic and ontogenetic perspectives of 'functional dental occlusion' to differentiate continual physiological changes occurring over time that require ongoing review, from pathological responses that require intervention.

**EFFECT OF PERIODONTAL THERAPY ON ARTERIAL STRUCTURE AND FUNCTION AMONG ABORIGINAL AUSTRALIANS: A RANDOMIZED, CONTROLLED TRIAL**


Observational studies and nonrandomized trials support an association between periodontal disease and atherosclerotic vascular disease. Both diseases occur frequently in Aboriginal Australians. We hypothesized that nonsurgical periodontal therapy would improve measures of arterial function and structure that are subclinical indicators of atherosclerotic vascular disease. This parallel-group, randomized, open label clinical trial enrolled 273 Aboriginal Australians aged ≥18 years with periodontitis. Intervention participants received full-mouth periodontal scaling during a single visit, whereas controls received no treatment. Prespecified primary end points measured 12-month change in carotid intima-media thickness, an indicator of arterial structure, and 3- and 12-month change in pulse wave velocity, an indicator of arterial function. ANCOVA used complete case data to evaluate treatment group differences. End points could be calculated for 169 participants with follow-up data at 3 months and 168 participants at 12 months. Intima-media thickness decreased significantly after 12 months in the intervention group (mean reduction=-0.023 [95% confidence interval (CI), -0.038 to -0.008] mm) but not in the control group (mean increase=0.002 [95% CI, -0.017 to 0.022] mm). The difference in intima-media thickness change between treatment groups was statistically significant (-0.026 [95% CI, -0.048 to -0.003] mm; P=0.03). In contrast, there were no significant differences between treatment groups in pulse wave velocity at 3 months (mean difference, 0.06 [95% CI, -0.17 to 0.29] m/s; P=0.594) or 12 months (mean difference, 0.21 [95% CI, -0.01 to 0.43] m/s; P=0.062). Periodontal therapy reduced subclinical arterial thickness but not function in Aboriginal Australians with periodontal disease, suggesting periodontal disease and atherosclerosis are significantly associated.

**PERIODONTAL DISEASE AND DENTAL CARIES AMONG INDIGENOUS AUSTRALIANS LIVING IN THE NORTHERN TERRITORY, AUSTRALIA**

Kapellas K, Skilton MR, Maple-Brown LJ, Do LG, Bartold PM, O'Dea K, Brown A, Celermajer DS, Jamieson LM. 


Background: The aim of this study was to describe the caries experience and severity of periodontal disease in a convenience sample of Indigenous Australians living in the Northern Territory. 

Methods: Data were gathered via self-reported questionnaire and dental examination by calibrated examiners. Socio-demographic characteristics were compared with data from the 2011 Australian census while prevalence of periodontal disease and dental caries was compared against weighted estimates from the National Survey of Adult Oral Health 2004-2006. In each comparison, non-overlapping 95% confidence intervals inferred a significant difference. Within-study comparisons were assessed via chi-square, t-tests and analysis of variance for differences among study participants. 

Results: A total of 312 Indigenous Australian participants provided completed data (average age 39.5 ± 10.5 years, 174 males). Of these, 87.5% were confirmed periodontitis cases; 3.5 times that of national-level estimates. The experience of untreated caries was five times that of national estimates (mean
decayed 3.0 versus 0.6). Periodontitis case status was positively associated with older age, male gender and presence of diabetes.

Conclusions: Periodontal disease and untreated caries were significantly more prevalent in this sample of Indigenous Australians compared to the general Australian population. The prevalence of periodontal disease was markedly higher than that previously described for Indigenous Australians.

ASSOCIATIONS BETWEEN PERIODONTAL DISEASE AND CARDIOVASCULAR SURROGATE MEASURES AMONG INDIGENOUS AUSTRALIANS


Background/Objectives: Inflammation is a key pathogenetic factor in atherogenesis. Periodontitis is a chronic inflammatory source which can have systemic impacts. Indigenous Australians have a higher prevalence of periodontal disease and experience cardiovascular disease earlier than non-Indigenous Australians. The aim was to describe the association between severity of periodontal inflammatory disease and measures of arterial structure and function.

Methods: Periodontal disease in a convenience sample of Indigenous Australians was assessed clinically; for those with periodontal disease, the extent of periodontal pockets \( \geq 4 \) mm was stratified into quartiles. Vascular health was measured non-invasively via carotid-dorsalis pedis pulse-wave velocity (PWV), and via B-mode ultrasound of the common carotid intima-media (IMT). Non-fasting blood samples were collected for lipid and inflammatory marker evaluation. Linear regression models were constructed to determine the associations between extent of periodontal pocketing and vascular health, adjusting for traditional cardiovascular common risk factors.

Results: 273 Indigenous Australian adults were recruited and complete data was available for 269 participants (154 males), median age 39 years. Arterial stiffness (PWV) significantly increased with increasing extent of periodontal pocketing (p trend=0.001). By contrast, carotid IMT did not differ across quartiles.

Conclusions: Periodontal pocketing was associated with central arterial stiffness, a marker of presymptomatic arterial dysfunction, in Indigenous Australian adults with periodontal disease.

GLOBAL, REGIONAL, AND NATIONAL LEVELS AND CAUSES OF MATERNAL MORTALITY DURING 1990-2013: A SYSTEMATIC ANALYSIS FOR THE GLOBAL BURDEN OF DISEASE STUDY 2013

Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, et al.

Background: The fifth Millennium Development Goal (MDG 5) established the goal of a 75% reduction in the maternal mortality ratio (MMR; number of maternal deaths per 100,000 livebirths) between 1990 and 2015. We aimed to measure levels and track trends in maternal mortality, the key causes contributing to maternal death, and timing of maternal death with respect to delivery.

Methods: We used robust statistical methods including the Cause of Death Ensemble model (CODEm) to analyse a database of data for 7065 site-years and estimate the number of maternal deaths from all causes in 188 countries between 1990 and 2013. We estimated the number of pregnancy-related deaths caused by HIV on the basis of a systematic review of the relative risk of dying during pregnancy for HIV-positive women compared with HIV-negative women. We also estimated the fraction of these deaths aggravated by pregnancy on the basis of a systematic review. To estimate the numbers of maternal deaths due to nine different causes, we identified 61 sources from a systematic review and 943 site-years of vital registration data. We also did a systematic review of reports about the timing of maternal death, identifying 142 sources to use in our analysis. We developed estimates for each country
for 1990-2013 using Bayesian meta-regression. We estimated 95% uncertainty intervals (UIs) for all values.

Findings: 292,982 (95% UI 261,017-327,792) maternal deaths occurred in 2013, compared with 376,034 (343,483-407,574) in 1990. The global annual rate of change in the MMR was -0·3% (-1·1 to 0·6) from 1990 to 2003, and -2·7% (-3·9 to -1·5) from 2003 to 2013, with evidence of continued acceleration. MMRs reduced consistently in south, east, and southeast Asia between 1990 and 2013, but maternal deaths increased in much of sub-Saharan Africa during the 1990s. 2070 (1290-2866) maternal deaths were related to HIV in 2013, 0·4% (0·2-0·6) of the global total. MMR was highest in the oldest age groups in both 1990 and 2013. In 2013, most deaths occurred intrapartum or postpartum. Causes varied by region and between 1990 and 2013. We recorded substantial variation in the MMR by country in 2013, from 956·8 (685·1-1262·8) in South Sudan to 2·4 (1·6-3·6) in Iceland.

Interpretation: Global rates of change suggest that only 16 countries will achieve the MDG 5 target by 2015. Accelerated reductions since the Millennium Declaration in 2000 coincide with increased development assistance for maternal, newborn, and child health. Setting of targets and associated interventions for after 2015 will need careful consideration of regions that are making slow progress, such as west and central Africa.

**DOES PERIODONTAL TREATMENT INFLUENCE CLINICAL AND BIOCHEMICAL MEASURES FOR RHEUMATOID ARTHRITIS? A SYSTEMATIC REVIEW AND META-ANALYSIS**

Kaur S, Bright R, Proudman SM, Bartold PM.


Objective: Periodontitis is a potential risk factor for rheumatoid arthritis (RA). This systematic review considers the evidence for whether non-surgical treatment of periodontitis in RA patients has any effect on the clinical markers of RA disease activity.

Methods: MEDLINE/PubMed, CINAHL, DOSS, Embase, Scopus, Web of Knowledge, MedNar, Lilacs and ProQuest Theses and Dissertations were searched till September 2013 for quantitative studies examining the effect of non-surgical periodontal treatment on disease activity of RA. The following were the inclusion criteria: (1) patients diagnosed with both RA and chronic periodontitis, aged 30 years or older; (2) no antibiotics in the past 3 months or periodontal treatment in the past 6 months; (3) non-surgical periodontal therapy; (4) age- and gender-matched control group; (5) measures of RA activity and (6) published in English.

Results: Five studies met the inclusion criteria. Non-surgical periodontal treatment was associated with significant reductions in erythrocyte sedimentation rate and a trend towards a reduction in TNF-α titres and DAS scores. There was no evidence of an effect on RF, C-reactive protein, anti-cyclic citrullinated protein antibodies and IL-6.

Conclusions: Based on clinical and biochemical markers, non-surgical periodontal treatment in individuals with periodontitis and RA could lead to improvements in markers of disease activity in RA. All studies had low subject numbers with the periods of intervention no longer than 6 months. Larger studies are required to explore the effect of non-surgical periodontal treatment on clinical indicators of RA, using more rigorous biochemical and clinical outcome measures as well as giving consideration to potential confounding factors of co-morbidity.

**ODONTOMETRIC SEX VARIATION IN MALAYSIANS WITH APPLICATION TO SEX PREDICTION**

Khamis MF, Taylor JA, Malik SN, Townsend GC.


Information about the sex of individuals is important for human identification. This study was conducted to quantify classification rates of sex prediction models for Malaysians using odontometric profiles. Mesiodistal (MD) and buccolingual (BL) crown dimensions of the permanent dentition were studied in 400 young adult Malaysians, giving a total of 28 tooth size variables. The sample consisted of three
major ethnic groups, the Malays, Chinese and Tamils, since the aim was to assess sex dimorphism in Malaysians as a whole. Results showed that the mesiodistal diameter of the lower canine was the most sexually dimorphic dimension in Malaysian Malays and Tamils. Univariate analyses showed that the magnitude and pattern of sex dimorphism varies between these three ethnic groups, with Malaysian Chinese and Tamils being more dimorphic than the Malaysian Malays. Stepwise discriminant functions were generated bearing in mind their application in practical forensic situations. The range of classification rates was from 70.2% to 78.5% for the composite Malaysian group, and 83.8%, 77.9%, 72.4% for Malaysian Chinese, Malays and Tamils, respectively. The 'Area Under the Receiver Operating Characteristic Curve statistics' indicated good classification rates for three prediction models obtained using a combination of all tooth size variables, mandibular teeth, and mesiodistal dimensions in the composite Malaysian group, and for all tooth size variables in each ethnic group. The present study provides strong support for the value of odontometry as an adjunct scientific method for sex prediction in human identification.

RADIATION-INDUCED ORAL MUCOSITIS AND PERIODONTITIS - PROPOSAL FOR AN INTER-RELATIONSHIP

Khaw A, Logan R, Keefe D, Bartold M.

Virtually all patients who receive head and neck radiotherapy develop some degree of oral mucositis. Severe oral mucositis may necessitate an interruption of the course of radiotherapy and thus can serve as a dose-limiting factor. Periodontitis is a host-driven inflammatory response to a pathogenic bacterial biofilm in the subgingival environment, resulting in the progressive destruction of the tissues that support the teeth, specifically the gingiva, periodontal ligament and alveolar bone. This disease affects more than 50% of the population. Considering that radiation-induced oral mucositis and periodontitis are both linked with continuing presence of systemic inflammation, they may be associated through a primed inflammatory response as proposed by the 'two-hit' model. Alternatively, both conditions may be correlated as they represent a dysregulation of the inflammatory response. To date, no studies have looked into the association between these conditions. This review considers the current evidence that provides a rationale for proposing a link between periodontitis and oral mucositis.

INFLUENCE OF PERIODONTITIS ON THE EXPERIENCE OF ORAL MUCOSITIS IN CANCER PATIENTS UNDERGOING HEAD AND NECK RADIOThERAPY: A PILOT STUDY

Khaw A, Liberali S, Logan R, Keefe D, Bartold PM.

Background and Aim: Periodontitis and radiation-induced oral mucositis are both inflammatory conditions which may be associated through a common underlying dysregulation of the inflammatory response. This pilot study aimed to determine whether the severity of oral mucositis is associated with the severity of periodontitis in cancer patients undergoing head and neck radiotherapy. Materials and Methods: In this pilot study, 41 patients met the inclusion criteria. The severity of oral mucositis was measured according to the WHO system. The severity of periodontitis was assessed clinically and radiographically. Gingival crevicular fluid was sampled and levels of eight cytokines were determined using a multiplexed bead immunoassay. Associations between radiation-induced oral mucositis and periodontitis were analysed using logistic and linear regression. Results: There was a trend towards a greater proportion of periodontitis patients in the mucositis groups (grades = 1-4) than in the non-mucositis group (grade = 0). However, due to the small sample size of this pilot study, these trends were not statistically significant. Conclusion: This pilot study did not demonstrate a positive statistical correlation between periodontitis experience and severity of radiation-induced oral mucositis. Nonetheless, a trend towards increased bone loss, pocket depth and clinical attachment levels was noted in patients with mucositis grades 1-4.
Larger studies with more stringent inclusion criteria are now required to further investigate this possible relationship between periodontitis experience and severity of radiation-induced oral mucositis.

**ACCELERATING ORTHODONTIC TOOTH MOVEMENT WITH THE AID OF PERIODONTAL SURGERY - THE PRACTITIONER VIEWPOINT**

Kim B, Dreyer CW, Sampson W.  

**Introduction:** There has been a revival of interest in the acceleration of orthodontic tooth movement (OTM) by inducing injury to dentoalveolar cortical bone. Termed corticotomy, the procedure offers an advantage to adult patients whose bone metabolism is such that any reduction in treatment time would be welcomed. The procedure has been refined for over 100 years and recent research indicates treatment duration may be reduced often by as much as a third, but it is not clear how widely the method is applied in practice. For the procedure to be successful, careful interdisciplinary management by orthodontists and periodontists is required. However, information regarding the attitude and knowledge of practitioners and the frequency of the procedure performed in Australia and New Zealand is lacking.

**Methods:** A questionnaire was formulated and tested in a pilot study on postgraduate orthodontic and periodontic students at The University of Adelaide. As a consequence of the responses, the wording of several questions was clarified and the sequence modified to produce the final format. Separate questionnaires were developed for specialist orthodontists and periodontists in keeping with their different backgrounds and were distributed at two relevant conferences.

**Results and Conclusions:** The number of practitioners who had been involved with at least one corticotomy per annum was low for orthodontists (12%) and periodontists (18%). The majority of those surveyed believed that more research was required on corticotomy-facilitated OTM and would not recommend the procedure to patients without greater investigation of the technique. More than half of the sampled orthodontists indicated that they would never recommend corticotomy-facilitated orthodontics to their patients. The minority who were willing to recommend the procedure would limit involvement to adult patients, the management of ankylosed teeth, impacted canines and patients susceptible to root resorption. Over 90% of the sampled periodontists believed that there were adverse side effects.

**MORPHOLOGICAL VARIATION OF THE MAXILLARY LATERAL INCISOR**

Kondo S, Townsend G, Matsuno M.  
*Jpn Dent Sci Rev* 2014 Nov;50:(4);100-107

The maxillary lateral incisor is a variable tooth morphologically. This tooth frequently shows reduction in size, and also various alterations in shape, for example, peg-shaped, cone-shaped, barrel-shaped and canine-shaped. The lateral incisor variant can be analyzed by family studies and using twin models, and these approaches have shown that genetic, epigenetic and environmental factors can all contribute to variation in the trait. Discordance of the phenotype in monozygotic twin pairs could be explained by the following two hypotheses: (1) the embryological environment of monochorionic twin pairs who share the same placenta and chorionic membrane during the prenatal period may differ, (2) phenotypic variation may be caused by epigenetic influences. Possible developmental factors are discussed in this review. Recent studies suggest that Msx1, Pax9 and Axin2 genes predispose to lateral incisor agenesis. Tooth reduction and agenesis seem to represent inter-related complex multifactorial traits, influenced by a combination of gene expression and function, environmental interaction and developing timing. Thus, accumulation of large data banks of morphological data is needed to support and clarify ongoing molecular genetic studies of dental development.
REGIONAL USE OF THE AUSTRALIAN CHRONIC DISEASE DENTAL SCHEME

Kraatz J, Qin D, Hoang H, Godwin D, Crocombe LA.

Objective: To determine whether a different number and type of services were provided in Australian regional areas under the Australian Government-funded Chronic Disease Dental Scheme (CDDS).

Design: Retrospective analysis of administrative payments data.

Setting: Australia.

Participants: Patients receiving dental services under the Medicare CDDS.

Interventions: The CDDS.

Main Outcome Measures: Number and type of services.

Method: CDDS service categories Australian Statistical Geography Standard (ASGS) regions were collected by the Australian Department of Human Services between 2008 and 2013 and compared by Australian Bureau of Statistics ASGS estimated resident regional 2011 population, and by employed number of dentists, dental specialists and dental prosthetists from the 2011 National Health Workforce Dataset.

Results: Number of services provided was greatest in major cities (79.0%), followed by inner regional (15.4%), outer regional (5.2%) and remote/very remote Australia (0.4%). Number of services per head of population decreased from 1.088 in major cities to 0.16 in remote/very remote areas. Number of services provided per dental practitioner showed minimal variation between major city (1672), inner (1777) and outer regional (1627) areas, but was lower in remote/very remote areas (641). Crown and bridge, periodontic, endodontic and removable prostheses per dental practitioner were most frequently supplied in the major cities, but restorative care and oral surgery were more frequently supplied in inner and outer regional areas.

Conclusion: The number of CDDS services provided declined with regional remoteness. There was a marked difference in the utilisation of the scheme between major cities and remote/very remote areas in both number and type of service levels.

MASCC/ISOO CLINICAL PRACTICE GUIDELINES FOR THE MANAGEMENT OF MUCOSITIS SECONDARY TO CANCER THERAPY


Background: Mucositis is a highly significant, and sometimes dose-limiting, toxicity of cancer therapy. The goal of this systematic review was to update the Multinational Association of Supportive Care in Cancer and International Society of Oral Oncology (MASCC/ISOO) Clinical Practice Guidelines for mucositis.

Methods: A literature search was conducted to identify eligible published articles, based on predefined inclusion/exclusion criteria. Each article was independently reviewed by 2 reviewers. Studies were rated according to the presence of major and minor flaws as per previously published criteria. The body of evidence for each intervention, in each treatment setting, was assigned a level of evidence, based on previously published criteria. Guidelines were developed based on the level of evidence, with 3 possible guideline determinations: recommendation, suggestion, or no guideline possible.

Results: The literature search identified 8279 papers, 1032 of which were retrieved for detailed evaluation based on titles and s. Of these, 570 qualified for final inclusion in the systematic reviews. Sixteen new guidelines were developed for or against the use of various interventions in specific
treatment settings. In total, the MASCC/ISOO Mucositis Guidelines now include 32 guidelines: 22 for oral mucositis and 10 for gastrointestinal mucositis. This article describes these updated guidelines.

Conclusions: The updated MASCC/ISOO Clinical Practice Guidelines for mucositis will help clinicians provide evidence-based management of mucositis secondary to cancer therapy.

CULTURAL CHALLENGES TO ORAL HEALTHCARE IMPLEMENTATION IN ELDERS


For successful implementation of oral healthcare services for elders, there is a need to understand and respond to their oral health beliefs, perceived needs and preferred type of care services, all of which are shaped by their cultural beliefs and values. This poses challenges to oral healthcare providers, especially when serving a diverse elderly population with people coming from different cultural backgrounds. The general principles of oral healthcare provision and their adaptation to serve culturally diverse elderly populations are discussed. The oral health beliefs and behaviours of Chinese, an ethnic group that can be found in many countries across the world, are highlighted and used as examples. Chinese elders generally attach a higher value to the physical functions than to the appearance of their dentition and prefer to use traditional self-care methods to deal with their oral health problems rather than to seek professional services. There is need to incorporate into the training of oral healthcare providers the competence to adapt their services to the beliefs and practices of culturally diverse elderly population groups in different settings.

FINANCIAL BURDEN OF DENTAL CARE AMONG AUSTRALIAN CHILDREN


While the oral health of children in Australia improved in the latter part of the twentieth century, there has been no decrease in the proportion of children reporting financial barriers and hardship associated with use of dental services over the past 20 years. In Australia, the cost of dental care falls largely on the individual. As a result, financial burden reflects both the direct and indirect cost of dental services to the individual, the disposable income of a household and the number of persons dependent on that income. Subsidized dental care is available to children in all states and territories, although eligibility, coverage and co-payment arrangements vary across jurisdictions. Nevertheless, only 27% of children who made a dental visit in 2010 did so at a public provider.

DECLINE IN USUALLY VISITING THE DENTIST FOR A PROBLEM IN AUSTRALIA, 1994 TO 2010: AN AGE–PERIOD–COHORT ANALYSIS


Objectives: To determine the extent to which age, period and cohort factors have contributed to variation in problem-oriented dental visiting over time. Methods: Data were obtained from four National Dental Telephone Interview Surveys of Australian residents aged 5 years and over conducted in 1994, 1999, 2004 and 2010 (response rates 48–72%). The trend in the percentage of persons usually visiting the dentist for a problem was analysed by means of a standard cohort table and by a nested models framework for age–period–cohort analyses. Results: The percentage of persons usually visiting the dentist for a problem generally decreased over the periods examined (from 42.5% in 1994 to 31.5% in 2010). Problem visiting tended to be lower for children and adolescents compared with adult age groups at each point in time. Model fit tests revealed that the age–period–cohort model provided the best fit for the data (Hosmer–Lemeshow test statistic = 5.3; d.f. = 8; P-value = 0.72), indicating that both period
and cohort factors were influential in problem visiting. Conclusion: This study found similar, consistent stories for both the age–period and age–cohort models, with usually visiting for a problem tending to be higher in older age groups and older cohorts. Problem visiting tended to decline over time for most age groups and most age cohorts. Understanding patterns of dental service use over time can be used to help inform service delivery policies that promote and facilitate appropriate use of dental services.

TECHNIQUE TIPS - DYNAMIC WORKING LENGTH DETERMINATION

Malagnino VA, Rossi-Fedele G.

Accurate determination of working length is an important step in root canal instrumentation, as incorrect preparation length can lead to:
- Inadequate cleaning and shaping of root canal space;
- Apical foramen perforation;
- Periapical tissue damage;
- Difficulties in controlling obturation length; and
- Post-operative pain.

It has been shown that the working length of a canal decreases after root canal preparation Therefore, constant reconfirmation of the preparation endpoint is desirable. This is normally achieved by using an ‘apex locator’ in combination with regular radiographic controls.

THREE-DIMENSIONAL PROFILOMETRIC ASSESSMENT OF EARLY ENAMEL EROSION SIMULATING GASTRIC REGURGITATION

Mann C, Ranjitkar S, Lekkas D, Hall C, Kaidonis JA, Townsend GC, Brook AH.

Objectives: A priority research area in minimal intervention dentistry is the characterization of the early stages of dental erosion. The aim of this in vitro study was to assess the effect of short, repetitive erosive challenges to human enamel over 2 min at pH 1.5 and 3.0 under conditions simulating gastric regurgitation.

Methods: Enamel surfaces were subjected to erosive challenges at pH 1.5 (Group 1, n=10) and pH 3.0 (Group 2, n=9) for periods of 30s (stage 1), 60s (stage 2) and 120 s (stage 3). Quantitative changes were assessed longitudinally by measuring the 3D average surface roughness (Sa) values using 3D confocal microscopy. Qualitative micrographic assessment of surface changes was also conducted by using environmental scanning electron microscopy.

Results: Linear mixed model analysis showed significant effects of the pH values (p<0.001) and the stages (p<0.001) on the observed Sa values. Post hoc tests showed significant increases in the Sa values between baseline and other stages in both groups (p<0.01). The mean Sa values also increased significantly from stage 1 to stage 2 in Group 1 (p<0.05). Micrographic analysis displayed severely etched enamel rods in Group 1, but only subtle changes in Group 2.

Conclusions: The complexity of the enamel surface is influenced by both acid concentration (pH value) and duration of acid exposure during early stages of erosion. Erosion occurring under conditions simulating GORD can be detected in its initial stages, opening up the possibilities of early diagnosis and management of this condition.

Clinical Significance: Erosive tooth wear occurs progressively and insidiously, often creating complex treatment challenges. This emphasizes the need for early diagnosis and management in accordance with minimal intervention philosophy. Our findings provide a foundation for further research that could lead to the development of highly-sensitive clinical diagnostic tools and preventive strategies.
SELF-RATED ORAL HEALTH AND ORAL HEALTH-RELATED FACTORS: THE ROLE OF SOCIAL INEQUALITY

Mejia G, Armfield JM, Jamieson LM.

Background: The reasons why social inequality is associated with oral health outcomes is poorly understood. This study investigated whether stratification by different measures of socio-economic status (SES) helped elucidate these associations.

Methods: Cross-sectional survey data were used from Australia's 2004-06 National Survey of Adult Oral Health. The outcome variable was poor self-rated oral health. Explanatory variables comprised five domains: demographic, economic, general health behaviour, oral health-related quality of life and perceived need for dental care. These explanatory variables were each stratified by three measures of SES: education, income and occupation.

Results: The overall proportion of adults reporting fair or poor oral health was 17.0% (95% CI 16.1, 18.0). Of these, a higher proportion were older, Indigenous, non-Australian born, poorly educated, annual income <$20 000, unemployed, eligible for public dental care, smoked tobacco, avoided food in the last 12 months, experienced discomfort with their dental appearance, experienced toothache or reported a need for dental care. In stratified analyses, a greater number of differences persisted in the oral health impairment and perceived need for dental care domains.

Conclusions: Irrespective of the SES measure used, more associations between self-rated oral health and dental-specific factors were observed than associations between self-rated oral health and general factors.

GREATER INEQUALITIES IN DENTAL TREATMENT THAN IN DISEASE EXPERIENCE

Mejia G, Jamieson LM, Ha D, Spencer AJ.

This study aimed to (1) describe social gradients in dental caries in a population-level survey and (2) examine whether inequalities are greater in disease experience or in its treatment. Using data from Australia's National Survey of Adult Oral Health 2004-2006, we examined absolute and relative income inequalities for DMFT and its separate components (DT, MT, FT) using adjusted proportions, means, and health disparity indices [Slope Index of Inequality (SII) and Relative Index of Inequality (RII)].

Approximately 90% of Australian adults had experienced caries, with prevalence ranging from 89.7% in the highest to 96.6% in the lowest income group. Social gradients in caries were evident across all components of DMFT, but particularly notable in Missing (SII = -15.5, RII = -0.3) and untreated Decay (SII = -23.7, RII = -0.9). Analysis of age- and gender-adjusted data indicated less variation in levels of disease experienced (DMFT) than in the health outcomes of its management (missing teeth). The findings indicate that social gradients for dental caries have a greater effect on how the disease was treated than on lifetime disease experience.

PERIODONTAL-LIGAMENT-DERIVED STEM CELLS EXHIBIT THE CAPACITY FOR LONG-TERM SURVIVAL, SELF-RENEWAL, AND REGENERATION OF MULTIPLE TISSUE TYPES IN VIVO

Menicanin D, Mrozik KM, Wada N, Marino V, Shi S, Bartold PM, Gronthos S.
Stem Cells Dev. 2014 May 1;23(9):1001-11.

Primary periodontal ligament stem cells (PDLSCs) are known to possess multidifferentiation potential and exhibit an immunophenotype similar to that described for bone-marrow-derived mesenchymal stem cells. In the present study, bromo-deoxyuridine (BrdU)-labeled ovine PDLSCs implanted into immunodeficient mice survived after 8 weeks post-transplantation and exhibited the capacity to form
bone/cementum-like mineralized tissue, ligament structures similar to Sharpey's fibers with an associated vasculature. To evaluate self-renewal potential, PDLSCs were recovered from harvested primary transplants 8 weeks post-transplantation that exhibit an immunophenotype and multipotential capacity comparable to primary PDLSCs. The re-derived PDLSCs isolated from primary transplants were implanted into secondary ectopic xenogeneic transplants. Histomorphological analysis demonstrated that four out of six donor re-derived PDLSC populations displayed a capacity to survive and form fibrous ligament structures and mineralized tissues associated with vasculature in vivo, although at diminished levels in comparison to primary PDLSCs. Further, the capacity for long-term survival and the potential role of PDLSCs in dental tissue regeneration were determined using an ovine preclinical periodontal defect model. Autologous ex vivo-expanded PDLSCs that were prelabeled with BrdU were seeded onto Gelfoam(®) scaffolds and then transplanted into fenestration defects surgically created in the periodontium of the second premolars. Histological assessment at 8 weeks post-implantation revealed surviving BrdU-positive PDLSCs associated with regenerated periodontium-related tissues, including cementum and bone-like structures. This is the first report to demonstrate the self-renewal capacity of PDLSCs using serial xenogeneic transplants and provides evidence of the long-term survival and tissue contribution of autologous PDLSCs in a preclinical periodontal defect model.

**RELATIONSHIP BETWEEN PERIODONTAL DISEASE AND OBESITY: THE ROLE OF LIFE-COURSE EVENTS**


Periodontal disease is ranked among the 10 most prevalent chronic diseases worldwide, and is considered a major public health problem. It's etiology has been associated with local and general conditions that could interfere in the host immune response. Obesity, like periodontal disease, has emerged as a prevalent chronic disease in high-, low- and medium-income countries, recognized as risk factor for cardiovascular disease and cancer. A relationship between periodontal health and obesity may exist, but the mechanism that would explain this association remains unclear. Life-course epidemiology could be a useful instrument to investigate a casual association between early exposures and later outcomes, being appropriate for understanding the establishment of chronic conditions. This approach comprehends different theories, considering the time, the duration and the intensity of early exposition, and its impact on the development of chronic diseases in later life. Thus, the aim of this study is to hypothesize the different life-course epidemiology theories to explain the possible association between periodontal health and nutritional status in adulthood.

**RETHINKING ATTITUDES TO STUDENT CLINICAL SUPERVISION AND PATIENT CARE: A CHANGE MANAGEMENT SUCCESS STORY**


Background: The aim of this project was to explore the process of change in a busy community dental clinic following a team development intervention designed to improve the management of student supervision during clinical placements.

Methods: An action research model was used. Seven members of a community dental clinic team (three dentists, two dental therapists, one dental assistant and the clinic manager), together with the university clinical placement supervisor participated in the team development intervention. The intervention consisted of two profiling activities and associated workshops spread six months apart. These activities focused on individual work preferences and overall team performance with the aim of improving the functioning of the clinic as a learning environment for dental students. Evaluation data consisted of 20 participant interviews, fourteen hours of workplace observation and six sets of field notes. Following
initial thematic analysis, project outcomes were re-analysed using activity theory and expansive learning as a theoretical framework.

Results: At project commencement students were not well integrated into the day-to-day clinic functioning. Staff expressed a general view that greater attention to student supervision would compromise patient care. Following the intervention greater clinical team cohesion and workflow changes delivered efficiencies in practice, enhanced relationships among team members, and more positive attitudes towards students. The physical layout of the clinic and clinical workloads were changed to achieve greater involvement of all team members in supporting student learning. Unexpectedly, these changes also improved clinic functioning and increased the number of student placements available.

Conclusions: In navigating the sequential stages of the expansive learning cycle, the clinical team ultimately redefined the 'object' of their activity and crossed previously impervious boundaries between healthcare delivery and student supervision with benefits to all parties.

BACTERIAL COLONIZATION, ENAMEL DEFECTS AND DENTAL CARIES IN 4-6-YEAR-OLD MONO- AND DIZYGOTIC TWINS

Ooi G, Townsend G, Seow WK.


Background: Knowledge of the genetic and environmental influences in caries aetiology has relevance for preventive dentistry.

Aims: This classical twin study compared concordance of mutans streptococci (MS) and lactobacilli (LB) colonization, enamel defects, and caries in a cohort of 4-6-year-old mono- (MZ) and dizygotic (DZ) twin pairs.

Design: The twins were examined for prevalence and concordance of enamel opacities and hypoplasia, oral counts of MS and LB, and dental caries. Bacterial counts were assessed using a commercial microbiological kit.

Results: Thirty-four MZ and 50 DZ twins (mean gestational age 35.0 ± 2.4 weeks, and birthweight 2.4 ± 0.6 kg) were examined. There were no statistically significant differences between MZ and DZ twins in the prevalence of MS, LB, and enamel hypoplasia. Concordance rates for MS and LB presence and prevalence of enamel defects within MZ and DZ twin pairs were not significantly different. There were more children with caries in DZ compared with MZ twins (18% vs 3%, P = 0.0029), most likely due to increased daily frequency of sugar consumption and less toothbrushing.

Conclusions: Concordance data from MZ and DZ twins did not demonstrate any statistically significant difference in susceptibility for enamel defects and colonization of MS and LB.

PHARMACOLOGICAL ACTIONS OF THYMOL AND AN ANALOGUE AT GABAB AUTORECEPTORS

Parker DA, Marino V, Ong J.


GABAB autoreceptors inhibit release of GABA from GABAergic nerve terminals. Agonists of these receptors (e.g. baclofen) inhibit, whereas antagonists (e.g. (+)-(S)-5,5-dimethylmorpholinyl-2-acetic acid; Sch 50911) enhance release of the transmitter. The actions of thymol (2-isopropyl-5-methylphenol) and the structurally related compound 2-tert-butyl-4-methylphenol, (4MP) on the release of [(3) H]-GABA were examined in rat neocortical slices where the GABAergic nerves had been preloaded with [(3) H]-GABA and subsequently stimulated electrically on two occasions (S1 and S2 ). Test agents, baclofen and Sch 50911 were added to the superfusion medium prior to the second period of stimulation (S2 ). Stimulation-induced overflow (SIO) of [(3) H]-GABA as a consequence of these stimulations (SIO1 and SIO2 ) were calculated and the effects of agents determined by comparing the SIO2 /SIO1 ratio in the presence of each agent with that in control tissue. Thymol potentiated the release of [(3) H]-GABA.
(EC50 170 μmol/L), an action reversed by baclofen (2 μmol/L). Baclofen alone had little effect on GABA release. Release of [(3)H]-GABA was inhibited by 4MP (IC50 3 μmol/L) and this effect was blocked by Sch 50911 (10 μmol/L). Alone, Sch 50911 markedly potentiated the release of GABA. These results imply that 4MP is an agonist of GABAB autoreceptors; however, further studies are needed to confirm that thymol is indeed a GABAB autoreceptor antagonist. Of interest are structural differences in these agents. Thymol has a propyl group in the ortho position relative to the phenolic hydroxyl, whereas in 4MP this is a butyl group and the methyl group moves from position 5 to 4. Whether one or both of these changes was responsible for the above actions is unknown.

THE ORAL HEALTH STUDIES IN THE PELOTAS BIRTH COHORT STUDIES, RS, BRAZIL

Peres KG, Peres MA, Demarco FF, Gigante DP, Horta BL, Menezes AM, Hallal PC, Matijasevich A, Santos IS, Barros AJ.

ORAL HEALTH IN THE EPIFLORIPA: A PROSPECTIVE STUDY OF ADULT HEALTH IN SOUTHERN BRAZIL

Peres MA, Peres KG, Boing AF, Bastos JL, Silva DA, González-Chica DA.

Objective: To describe methods and challenges of oral health studies nested in a prospective cohort study of adults.
Methods: A sample of 2,016 adults was investigated in 2009. Household visits were performed in order to apply a questionnaire on socioeconomic, demographic, health related variables, medicine consumption, blood donation, domestic violence and a set of questions related to women's health. Oral health data included self-reported oral health, number of remaining teeth, dental services use, perception of dental treatment needs, occurrence, intensity and impact of dental pain on daily life, xerostomia and chewing impairment due to poor oral health. In addition, participants' blood pressure, weight, height and waist circumference were measured. The second wave of the study was carried out in 2012. A questionnaire on socioeconomic factors, quality of life, discriminatory experiences, 24-hour dietary recall and oral health aspects (the same used in 2009) was applied. In addition, blood pressure, weight, and waist circumference were measured and clinical oral health status was assessed (dental caries, tooth loss, and periodontal outcomes).
Results: Participation rate was 85.3% (n = 1,720) in 2009 and, among those, 1,222 (71.1%) were followed up in 2012.
Conclusions: The follow-up of this population will contribute in the elucidation of the potentially causal associations between oral outcomes and general chronic diseases.

INFLUENCE OF AN INTERVENTION TO PREVENT EARLY CHILDHOOD CARIES INITIATED BEFORE BIRTH ON CHILDREN’S USE OF DENTAL SERVICES UP TO 7 YEARS OF AGE

Plutzer K, Keirse MJ.

Background: In a previously reported randomised controlled trial, advising first time mothers on the prevention of early childhood caries from before their child was born, decreased the prevalence of early childhood caries at 20 months of age 5-fold.
Objective: We examined the effect of the intervention on the frequency and nature of dental visits up to 7 years of age.
Methods: Of 649 expectant mothers who participated in the trial, 277 completed a “Child Oral Health Survey” 7 years later. Their answers were compared with those of a comparison group of 277 mothers
selected at random among those living in the same area with a first child born in the same year enrolled with the South Australian School Dental Services (SA SDS).

Results: Only 1.5% of children had a dental visit before 12 months of age and only 4% before 2 years of age unless a dental problem had arisen. The age at the first visit did not differ among groups, but the reasons for the visit did as did the number of visits and the need for treatment under sedation or anaesthesia. In the trial group, 34% of first visits were for pain, 29% for injury, and 29% for concern with appearance. In the comparison group, pain was the main concern in 49%, injury in 9.5%, and appearance in 25% (p=0.019). Over time, children in the trial had an average of 2.2 visits compared with 3.1 in the comparison group. In the intervention group of the trial, no child had required treatment under sedation or general anaesthesia compared with 2.9% in the control group, and 6.5% in the comparison group. Only 15% of mothers reported that they had received any information on caries prevention from health care professionals other than dental care practitioners.

Conclusion: Providing first-time mothers with guidance on the prevention of childhood caries decreased the use of dental services to deal with problems in preschool children.

UNDER YOUR NOSE: A RARE FINDING DURING DISSECTION PROVIDES INSIGHTS INTO MAXILLARY SUPERNUMERARY TEETH

Redwood C, Townsend GC, Ghabriel M, Brook AH.

Background: A supernumerary tooth was found during anatomical dissection. The position of this tooth, still impacted in the maxilla, and the associated pathology make this a rare case.

Methods: During dissection by dental students of the sagittally-sectioned head of a cadaver, a supernumerary tooth was identified in the mid-palatal area. Further dissection revealed a swelling with a thin bony covering related to the crown of the tooth. The maxilla was removed en bloc and radiographic examination, CT scanning, electron microscopy and histology were undertaken.

Results: The tooth had a crenulated occlusal surface and a single root. It was 25 mm posterior to the root apex of the permanent upper central incisor. The swelling, confirmed by radiographs and CT imaging to be associated with the crown, occupied approximately one-third of the maxillary sinus. The 3D shape of the cystic lesion was visualized by a composite digital movie.

Conclusions: The crown form, position of the tooth and the associated dentigerous cyst suggested it was a palatally developing supernumerary premolar which had been displaced to the palatal midline by the expanding cyst. This rare case highlights the learning and teaching opportunities available during dissection, showing important variations in both development and clinical anatomy.

PREVALENCE, EXTENT AND SEVERITY OF SEVERE PERIODONTAL DESTRUCTION IN AN URBAN ABORIGINAL AND TORRES STRAIT ISLANDER POPULATION

Roberts-Thomson KF, Do LG, Bartold PM, Daniels J, Grosse A, Meihubers S.

Background: The aim of this study was to document the three main indicators of severe periodontal destruction and to evaluate factors associated with those indicators in an urban Indigenous population in Australia.

Methods: A cross-sectional survey of a convenience sample of Aboriginal adults from an Australian urban area was undertaken. Socio-demographic data and smoking status were collected by interview and health status by a medical record audit. Clinical attachment loss (CAL) was used to determine prevalence, extent and severity of severe periodontitis. Factors with significant association with periodontal indicators at bivariate level were further included in multivariable analysis controlling for age and gender.

Results: A total of 251 Aboriginal adults participated in the study. The proportion with severe periodontitis was 11.9% (95% CI: 7.6-16.3), extent: 5.0% (95% CI: 3.3-6.7) and severity: 5.3 mm (95%
CI: 5.0-5.6). These estimates are significantly higher than that of other Australians. Current smokers had significantly higher prevalence rate (PR) of severe periodontitis: PR = 2.8 (95% CI: 1.3-6.0). People with diabetes and current smokers had significantly higher extent of sites with CAL 6+ mm: 1.9 (1.1-3.3) and 2.1 (1.2-3.6) respectively. Having diabetes was associated with significantly higher severity score ($\beta$: 0.96 (SE: 0.47)).

Conclusions: A high proportion of this urban Aboriginal population had severe periodontal disease related to smoking and diabetes.

# OSMOLARITY AND ROOT CANAL ANTISEPTICS

Rossi-Fedele G, Guastalli AR.


Antiseptics used in endodontics for disinfection purposes include root canal dressings and irrigants. Osmotic shock is known to cause the alteration of microbial cell viability and might have a role in the mechanism of action of root canal antiseptics. The aim of this review was to determine the role of osmolarity on the performance of antiseptics in root canal treatment. A literature search using the Medline electronic database was conducted up to 30 May 2013 using the following search terms and combinations: ‘osmolarity AND root canal or endodontic or antiseptic or irrigation or irrigant or medication or dressing or biofilm; osmolality AND root canal or endodontic or antiseptic or irrigation or irrigant or medication or dressing or biofilm; osmotic AND root canal or endodontic or antiseptic or irrigation or irrigant or medication or dressing or biofilm; osmosis AND root canal or endodontic or antiseptic or irrigation or irrigant or medication or dressing or biofilm; sodium chloride AND root canal or endodontic or antiseptic or irrigation or irrigant or medication or dressing or biofilm’. Publications were included if the effects of osmolarity on the clinical performance of antiseptics in root canal treatment were stated, if preparations with different osmolarities values were compared and if they were published in English. A hand search of articles published online, ‘in press’ and ‘early view’, and in the reference list of the included papers was carried out following the same criteria. A total of 3274 publications were identified using the database, and three were included in the review. The evidence available in endodontics suggests a possible role for hyperosmotic root canal medicaments as disinfectants, and that there is no influence of osmolarity on the tissue dissolution capacity of sodium hypochlorite. There are insufficient data to obtain a sound conclusion regarding the role of hypo-osmosis in root canal disinfection, or osmotic in any further desirable ability.

# ROOT CANAL PENETRATION OF A SODIUM HYPOCHLORITE MIXTURE USING SONIC OR ULTRASONIC ACTIVATION


The purpose of this ex vivo study was to determine, in “open” and “closed” systems, whether the design has an influence on the penetration length of sodium hypochlorite mixed with a radiopaque contrast medium, measured in millimeters, when delivered using positive pressure (PP) and using sonic (SI) or passive ultrasonic (PUI) activation. Sixty single-rooted teeth were divided into two groups: open and closed systems (n=30). Root canal shaping was performed to a working length of 17 mm. The samples were divided into three sub-groups (n=10) according to irrigant delivery and activation: PP, and SI or PUI activation. By using radiographs, penetration length was measured, and vapor lock was assessed. For the closed group, the penetration distance means were: PP 15.715 (±0.898) mm, SI 16.299 (±0.738) mm and PUI 16.813 (±0.465) mm, with vapor lock occurring in 53.3% of the specimens. In the open group, penetration to 17 mm occurred in 97.6% of the samples, and no vapor lock occurred. Irrigant penetration and distribution evaluation using open and closed systems provide significantly different results. For closed systems, PUI is the most effective in delivering the irrigant to working length, followed by SI.
The need for more efficient drug delivery strategies to treat resilient diseases and the rise of micro and nanotechnology have led to the development of more sophisticated drug-releasing implants with improved capabilities and performances for localised and controlled therapies. In recent years, implantable drug-releasing systems have emerged as an outstanding alternative to conventional clinical therapies. This new breed of implants has shown promising capabilities to overcome the inherent problems of conventional implants and therapies, making clinical treatments more efficient with minimal side effects. Recent clinical trials have demonstrated that this technology can improve the life of patients and increase their life expectancy. Within this context, this review is aimed at highlighting the different types and concepts of drug-releasing implants incorporating new nanomaterials and nanotechnology-based devices. Furthermore, the principles on which these drug-releasing implants are based as well as their advantages and limitations are discussed in detail. Finally, we provide a future perspective in the development of implantable clinical drug-delivery systems based on micro and nanotechnology.

OROFACIAL PAIN OF MUSCULAR ORIGIN IS NOT ASSOCIATED WITH HERPES VIRUS-6 INFECTION: A PILOT STUDY

Aims: To carry out a pilot study to test the hypothesis that human herpes virus-6 (HHV-6) infection or reactivation plays a role in the pathogenesis of temporomandibular disorders (TMD) of muscular origin (ie, localized myalgia).

Methods: Sixteen patients with localized myalgia participated in this pilot study. Thirty-six healthy individuals served as controls. The participants were examined clinically for the presence of the TMD according to the Research Diagnostic Criteria for TMD, and the salivary levels of HHV-6 were measured by quantitative polymerase chain reaction (qPCR). The Z test, Student t test, and Mann-Whitney U test were used as appropriate.

Results: The results demonstrated that 77.8% of healthy individuals were HHV-6 positive, but a significantly lower proportion (43.8%) of the TMD patients with localized myalgia were positive for HHV-6 (P < .05, Fisher exact test). The levels of HHV-6B DNA were lower in the saliva of HHV-6-positive TMD patients with localized myalgia (median: 564 genome/mL; range: 184 to 5,835 genome/mL) than in that of healthy individuals (median: 1,081 genome/mL; range: 193 to 8,807 genome/mL), but the difference was not statistically significant (P > .05, Mann-Whitney U test).

Conclusion: The results of this pilot study indicate that HHV-6 infection or reactivation does not appear to play a role in the pathogenesis of TMD reflecting a localized myalgia.

VALIDATION OF SELF-REPORTED INFORMATION ON DENTAL CARIES IN A BIRTH COHORT AT 18 YEARS OF AGE

Objective: Estimate the prevalence of dental caries based on clinical examinations and self-reports and compare differences in the prevalence and effect measures between the two methods among 18-year-olds belonging to a 1993 birth cohort in the city of Pelotas, Brazil.

Method: Data on self-reported caries, socio-demographic aspects and oral health behaviour were collected using a questionnaire administered to adolescents aged 18 years (n = 4041). Clinical caries
was evaluated (n = 1014) by a dentist who had undergone training and calibration exercises. Prevalence rates of clinical and self-reported caries, sensitivity, specificity, positive and negative predictive values, absolute and relative bias, and inflation factors were calculated. Prevalence ratios of dental caries were estimated for each risk factor.

Results: The prevalence of clinical and self-reported caries (DMFT>1) was 66.5% (95%CI: 63.6%-69.3%) and 60.3% (95%CI: 58.8%-61.8%), respectively. Self-reports underestimated the prevalence of dental caries by 9.3% in comparison to clinical evaluations. The analysis of the validity of self-reports regarding the DMFT index indicated high sensitivity (81.8%; 95%CI: 78.7%-84.7%) and specificity (78.1%; 95%CI: 73.3%-82.4%) in relation to the gold standard (clinical evaluation). Both the clinical and self-reported evaluations were associated with gender, schooling and self-rated oral health. Clinical dental caries was associated with visits to the dentist in the previous year. Self-reported dental caries was associated with daily tooth brushing frequency.

Conclusions: Based on the present findings, self-reported information on dental caries using the DMFT index requires further studies prior to its use in the analysis of risk factors, but is valid for population-based health surveys with the aim of planning and monitoring oral health actions directed at adolescents.

GENDER DIFFERENCES IN THE CLUSTERING PATTERNS OF RISK BEHAVIOURS ASSOCIATED WITH NON-COMMUNICABLE DISEASES IN BRAZILIAN ADOLESCENTS

Silva KS, Barbosa Filho VC, Del Duca GF, de Anselmo Peres MA, Mota J, Lopes Ada S, Nahas MV.

Objective: The aim of this study is to investigate gender differences in the clustering of risk behaviours associated with chronic non-communicable diseases in Brazilian adolescents.

Methods: A cross-sectional survey was conducted in 2011 comprising 6529 adolescents aged 15-19 years from Santa Catarina State, Brazil. Excessive screen-time, insufficient moderate to vigorous physical activity (MVPA), low fruit/vegetable intake and consumption of alcohol were investigated. Poisson regression was performed in the analysis of sociodemographic factors associated with the clustering of three or more risk behaviours.

Results: Girls presented with higher insufficient MVPA (76.3%), while boys presented with lower fruit or vegetable intake (53.0%) and greater consumption of alcohol (40.8%). A total of 21.2% of the teenagers had one risk behaviour, 37.3% had two, 28.5% had three, and 8.0% had all of the measured risk behaviours. Adolescents who did not work and boys who lived in urban areas exhibited more risk behaviours, whereas girls aged 17-19 years old and boys who had mothers with ≥12 years of study exhibited fewer risk behaviours.

Conclusion: There was a difference between genders for individual risk behaviours, and a high degree of clustering in both genders. Prevention programs could focus on these behaviours in order to reduce negative health outcomes in adolescents.

NEUROPSYCHOLOGIC OUTCOMES IN PATIENTS TREATED FOR COMPLEX MAXILLOFACIAL TRAUMA

Snell BJ, Roberts RM, Anderson P, David DJ.


Complex fractures of the craniofacial skeleton are caused most commonly, in Australia, by motor vehicle accidents, falls, and interpersonal violence. Significant force is required to fracture the facial skeleton, and the long-term effect these forces have on higher brain function is unclear. The study aim was to assess long-term neuropsychologic changes associated with complex fractures of the facial skeleton. Patients managed for complex fractures of the facial skeleton by the Australian Craniofacial Unit, South Australia, between 2002 and 2011, with at least 1-year follow-up, were assessed using the European
Brain Injury Questionnaire. This questionnaire has previously published control data to which results were compared. Of the 2077 patients treated for facial fractures, 46 were identified as having complex fractures of the facial skeleton. Of the 46 patients, 13 were able to be contacted and assessed using the European Brain Injury Questionnaire. Changes in personality and ability to socialize and undertake executive function were noted in approximately 30% of the patients. In addition, approximately 50% of the patients’ family members reported significant changes in the patients’ life after the accident, yet this was only recognized by approximately 30% of the patients. This study shows that, despite the “crumple zone” of the facial skeleton providing some level of protection to the brain, patients having complex fractures of the facial skeleton have long-term neuropsychologic changes that affect both their own and their family's quality of life.

ORAL HEALTH EDUCATION IN THE NATIONAL LEARNING AND TEACHING SPOTLIGHT

Snelling C, Karanicolas S.

In November 2013, oral health educators, Sophie Karanicolas and Cathy Snelling, won an Australian Award for Teaching Excellence given by the Office for Learning and Teaching. These prestigious awards are given annually to the nation’s most outstanding university teachers, renowned for the excellence of their teaching, who have outstanding presentation skills and have made a broad and deep contribution to enhancing the quality of learning in higher education. It recognises over a decade of Sophie and Cathy’s dedication to oral health education at the University of Adelaide's Dental School. Brought together in 2000 to develop a curriculum for the new Bachelor of Oral Health, Sophie and Cathy continue to teach in this successful program, drawing on their varied backgrounds and teaching style to offer an innovative and student-centred curriculum. Their cutting-edge use of online-learning tools, such as blogs, wikis, and Interactive Learning Modules, has earned them a national and international reputation as educational leaders in the field. Cathy and Sophie’s partnership has been recognised through several other teach awards, include the University of Adelaide’s Excellence in Education Award (2009), Stephen Cole the Elder Award for Excellence in Teaching (2010), the Vice-Chancellor and President’s Award for Excellence in Teaching (2010), and an ALTC Citation for Outstanding Contribution to Student Learning (2010).

This article summarises the learning and teaching strategies that earned them this Australian Award for Teaching Excellence, and in doing so, shone a light on oral health undergraduate education on a national stage.

MAXILLARY SINUS UNILATERAL APLASIA AS AN INCIDENTAL FINDING FOLLOWING CONE-BEAM COMPUTED (VOLUMETRIC) TOMOGRAPHY

Steier L, Steier G, Doğramaci EJ, Rossi-Fedele G.

This paper presents a case of maxillary sinus unilateral aplasia, an uncommon condition in adults, diagnosed as an incidental finding during cone-beam computed tomography (CBCT) examination for an endodontic case analysis. The patient was referred to a specialist endodontic practice for management of an upper right central incisor tooth. A CBCT scan was performed. The images of the left maxillary sinus showed a total lack of pneumatisation, prompting the diagnosis of aplasia. The patient's otolaryngologist was made aware of the findings. Clinical evaluation of volumetric images should be performed by an adequately trained dentist or radiologist so the maximum amount of information is gathered for the patient. This requires a systematic approach to ensure that no relevant information is missed and should include the paranasal sinuses and other surrounding structures as incidental findings can be observed during CBCT analysis.
Appl. Anat. Lingual Nerve: Relevance Dental Anaesthesia

Tan VL, Andrawos A, Ghabriel MN, Townsend GC.

Objectives: (1) to classify the external morphology of the lingual nerve and investigate any relationship between its external and internal morphology, (2) to explore the fascicular structure, nerve tissue density and capillary density of the lingual nerve, and (3) to provide an anatomical explanation as to why adverse clinical outcomes more commonly affect the lingual nerve following local dental anaesthesia. Where possible, comparisons were made between the lingual and inferior alveolar nerves.

Materials and Methods: The lingual and inferior alveolar nerves were examined in 23 hemi-sectioned heads macroscopically and microscopically 2 mm above the lingula. The lingual nerve was also examined in the regions of the third and second molars. Specimens underwent histological processing and staining with Haematoxylin & Eosin, Masson's Trichrome, anti-GLUT-1 and anti-CD 34.

Results: The lingual nerve became flatter as it traversed through the pterygomandibular space. There was an increase in the connective tissue and a decrease in nerve tissue density along the lingual nerve (p<0.001). At 2 mm above the lingula, the lingual nerve was uni-fascicular in 39% of cases, whilst the inferior alveolar nerve consistently had more fascicles (p<0.001). The lingual nerve fascicles had thicker perineurium but the endoneurial vascular density was not significantly different in the two nerves.

Conclusions: The greater susceptibility of lingual nerve dysfunction during inferior alveolar nerve blocks may be due to its uni-fascicular structure and the thicker perineurium, leading to increased endoneurial pressure and involvement of all axons if oedema or haemorrhage occurs due to trauma.

Risk Indicators Root Caries Institutionalized Elders

Tan HP, Lo EC.

Objective: To investigate the risk indicators for root caries in institutionalized elders.

Methods: Nonfrail elders living in 21 residential elderly homes who had at least 5 teeth with exposed roots were examined in this cross-sectional study. The dental examinations were conducted by one trained dentist in the elderly homes using a portable clinic light, mouth mirror, and dental explorer. Two-level logistic regression analyses, one using the presence of decay and the other using decay/filling in the root surface as the dependent variable, were conducted to study the relationship between root caries and a number of selected subject-level and site-level factors.

Results: A total of 306 elders with a mean age of 78.8 years were examined. Their mean DS-root and DFS-root scores were 1.3 and 2.1, respectively. Their mean root caries index score was 3.92. Results from the regression analyses revealed a positive correlation between the caries status of the root surfaces in the same subject (ICC1 =0.37, ICC2 =0.29, P < 0.001). Root surfaces with visual plaque, with denture contact, with more gingival recession, and in the upper anterior region were found to have a higher chance of being affected by root caries.

Conclusion: Presence of plaque, proximity to denture, and gingival recession are important site-level risk indicators for root caries in institutionalized elders. More attention should be paid to plaque control on exposed root surfaces and avoiding placement of denture components close to roots so as to lower the risk of root caries in elders.
**SELF-RATED DENTAL HEALTH AND DENTAL INSURANCE: MODIFICATION BY HOUSEHOLD INCOME**

Teusner DN, Anikeeva O, Brennan DS.


Background: Previous studies have reported that socioeconomically disadvantaged Australians have poorer self-rated dental health (SRDH), are less likely to be insured for dental services and are less likely to have regular dental visits than their more advantaged counterparts. However, less is known about the associations between dental insurance and SRDH. The aim of this study was to examine the associations between SRDH and dental insurance status and to test if the relationship was modified by household income.

Methods: A random sample of 3,000 adults aged 30-61 years was drawn from the Australian Electoral Roll and mailed a self-complete questionnaire. Analysis included dentate participants. Bivariate associations were assessed between SRDH and insurance stratified by household income group. A multiple variable model adjusting for covariates estimated prevalence ratios (PR) of having good to excellent SRDH and included an interaction term for insurance and household income group.

Results: The response rate was 39.1% (n = 1,093). More than half (53.9%) of the participants were insured and 72.5% had good to excellent SRDH. SRDH was associated with age group, brushing frequency, insurance status and income group. Amongst participants in the $40,000-< $80,000 income group, the insured had a higher proportion reporting good to excellent SRDH (80.8%) than the uninsured (66.5%); however, there was little difference in SRDH by insurance status for those in the $120,000+ income group. After adjusting for covariates, there was a significant interaction (p < 0.05) between having insurance and income; there was an association between insurance and SRDH for adults in the $40,000-< $80,000 income group, but not for adults in higher income groups.

Conclusions: For lower socio-economic groups being insured was associated with better SRDH, but there was no association for those in the highest income group. Insurance coverage may have the potential to improve dental health for low income groups.

**THE EFFECTS OF CRANIECTOMY COMPARED TO CRANIAL VAULT REMODELING ON MORPHOLOGICAL, FUNCTIONAL AND NEUROLOGICAL OUTCOMES IN INFANTS WITH ISOLATED NON-SYNDROMIC SYNSOSTOSIS OF THE SAGITTAL SUTURE: A SYSTEMATIC REVIEW PROTOCOL**

Thwin M, Schultz TJ, Anderson PJ

*JBI Database of Systematic Reviews & Implementation Reports 2014;12(4):37-47*

The objectives of this review are to identify the effectiveness of craniectomy on morphological, functional and neurological outcomes in isolated sagittal synostosis. More specifically, the objectives are to identify: The effectiveness of craniectomy compared with cranial vault remodeling on morphological, functional and neurological outcomes in human infants with isolated non-syndromic sagittal synostosis.

**DENTAL CARIES IS ASSOCIATED WITH DENTAL FEAR IN CHILDHOOD: FINDINGS FROM A BIRTH COHORT STUDY**

Torriani DD, Ferro RL, Bonow ML, Santos IS, Matijasevich A, Barros AJ, Demarco FF, Peres KG.


Objective: This study aimed to investigate the prevalence of dental fear in preschool children and to estimate its association with maternal and children characteristics.

Methods: The study was nested in a population-based birth cohort from Pelotas, Brazil, started in 2004. A sample of 1,129 children aged 5 years was dentally examined, and their mothers were interviewed.
Dental fear was investigated using a validated instrument through the question ‘Do you think that your child is afraid of going to the dentist?’ The possible answers were (1) ‘no’, (2) ‘yes, a little’, (3) ‘yes’ and (4) ‘yes, a lot’. The outcome was dichotomized as ‘children without dental fear’ (answers 1 and 2) and ‘children with dental fear’ (answers 3 and 4). Exploratory variables included demographic characteristics, socioeconomic status, maternal oral health status and maternal behaviors. The main explanatory variables were caries and dental pain. Data were analyzed using multivariable Poisson regression.

Results: The prevalence of dental fear was 16.8% (95% confidence interval 14.6-19.0). Multivariate analysis showed that the lower the family income at birth and the higher the severity of dental caries, the higher the prevalence of dental fear. Children who never visited the dentist and those who frequently experienced dental pain were positively associated with higher dental fear prevalence.

Conclusions: Presence of dental caries and dental pain were associated with dental fear regardless of socioeconomic origin and lack of dental service use in childhood.

THE FACE, THE FUTURE, AND DENTAL PRACTICE: HOW RESEARCH IN CRANIOFACIAL BIOLOGY WILL INFLUENCE PATIENT CARE

Townsend GC, Brook AH.

It has been a privilege to assemble a group of Australian and international researchers to produce a special issue of the Australian Dental Journal that reflects the cutting edge of research in different aspects of craniofacial biology, and also considers how these advances will influence future education and practice within dentistry. The aim of this special issue is to provide a collection of concept papers and critical reviews on key topics that cover both fundamental and applied research in craniofacial biology and to consider the clinical implications. To do this, four questions have been addressed that lead to the four sections of this issue. These are: How have we come to the present exciting position in craniofacial biology with breakthroughs over the past 50 years? What are current fundamental research topics that are helping us to understand more about craniofacial and general development, possibly leading to future clinical developments? What are the current applied research topics that will influence future clinical practice? Looking forward, what new developments in craniofacial biology may come about that will change the face of dental education and practice? The refereed papers in this special issue are grouped into the four sections that seek to respond to these demanding questions.

THE USE OF CONE BEAM COMPUTED TOMOGRAPHY IN THE POSTOPERATIVE ASSESSMENT OF ORBITAL WALL FRACTURE RECONSTRUCTION

Tsao K, Cheng A, Goss A, Donovan D.

Purpose: Computed tomography (CT) is currently the standard in postoperative evaluation of orbital wall fracture reconstruction, but cone beam computed tomography (CBCT) offers potential advantages including reduced radiation dose and cost. The purpose of this study is to examine objectively the image quality of CBCT in the postoperative evaluation of orbital fracture reconstruction, its radiation dose, and cost compared with CT.

Materials and Methods: Four consecutive patients with orbital wall fractures in whom surgery was indicated underwent orbital reconstruction with radio-opaque grafts (bone, titanium-reinforced polyethylene, and titanium plate) and were assessed postoperatively with orbital CBCT. CBCT was evaluated for its ability to provide objective information regarding the adequacy of orbital reconstruction, radiation dose, and cost.

Results: In all patients, CBCT was feasible and provided hard tissue image quality comparable to CT with significantly reduced radiation dose and cost. However, it has poorer soft tissue resolution, which
limits its ability to identify the extraocular muscles, their relationship to the reconstructive graft, and potential muscle entrapment.

Conclusions: CBCT is a viable alternative to CT in the routine postoperative evaluation of orbital fracture reconstruction. However, in the patient who develops gaze restriction postoperatively, conventional CT is preferred over CBCT for its superior soft tissue resolution to exclude extraocular muscle entrapment.

MOVING INTO A NEW ERA OF PERIODONTAL GENETIC STUDIES: RELEVANCE OF LARGE CASE-CONTROL SAMPLES USING SEVERE PHENOTYPES FOR GENOME-WIDE ASSOCIATION STUDIES

Vaithilingam RD, Safii SH, Baharuddin NA, Ng CC, Cheong SC, Bartold PM, Schaefer AS, Loos BG.


Studies to elucidate the role of genetics as a risk factor for periodontal disease have gone through various phases. In the majority of cases, the initial 'hypothesis-dependent' candidate-gene polymorphism studies did not report valid genetic risk loci. Following a large-scale replication study, these initially positive results are believed to be caused by type 1 errors. However, susceptibility genes, such as CDKN2BAS (Cyclin Dependend Kinase 2B AntiSense RNA; alias ANRIL [ANtisense Rna In the Ink locus]), glycosyltransferase 6 domain containing 1 (GLT6D1) and cyclooxygenase 2 (COX2), have been reported as conclusive risk loci of periodontitis. The search for genetic risk factors accelerated with the advent of 'hypothesis-free' genome-wide association studies (GWAS). However, despite many different GWAS being performed for almost all human diseases, only three GWAS on periodontitis have been published - one reported genome-wide association of GLT6D1 with aggressive periodontitis (a severe phenotype of periodontitis), whereas the remaining two, which were performed on patients with chronic periodontitis, were not able to find significant associations. This review discusses the problems faced and the lessons learned from the search for genetic risk variants of periodontitis. Current and future strategies for identifying genetic variance in periodontitis, and the importance of planning a well-designed genetic study with large and sufficiently powered case-control samples of severe phenotypes, are also discussed.

ASSOCIATION BETWEEN DEVELOPMENTAL DEFECTS OF ENAMEL AND DENTAL CARIES IN SCHOOLCHILDREN

Vargas-Ferreira F, Zeng J, Thomson WM, Peres MA, Demarco FF.


Despite improvement, dental caries is still the main public oral health problem worldwide and the major cause of pain, tooth loss and chewing difficulties in children and adolescents; and it impacts negatively on oral health-related quality of life. A cross-sectional study of a multistage representative sample of 8-12-year-old Brazilian school children was carried out in order to investigate the association between enamel defects and dental caries. Children's mothers completed a questionnaire about socio-demographic and behavioural characteristics at home. Firth's bias reduced logistic regression models were undertaken to assess the association between the main exposure (enamel defects) and caries experience. The prevalence of any enamel defect was 64.0%; the prevalence of diffuse opacities, demarcated opacities and enamel hypoplasia was 35.0%, 29.5% and 3.7%, respectively. The prevalence of dental caries was 32.4%, with mean DMFT of 0.6 (SD, 1.2). Dental caries experience was more common among children who had enamel hypoplasia in their posterior teeth (OR=2.79; 95% CI: 1.05, 6.51) than among those with none. In anterior teeth, there was no association. Enamel hypoplasia appears to be an important risk factor for dental caries.
SEMAPHORIN 3A INDUCES MESENCHYMAL-STEM-LIKE PROPERTIES IN HUMAN PERIODONTAL LIGAMENT CELLS


Stem Cells Dev. 2014 Sep 15;23(18):2225-36.

Periodontal ligament stem cells (PDLSCs) have recently been proposed as a novel option in periodontal regenerative therapy. However, one of the issues is the difficulty of stably generating PDLSCs because of the variation of stem cell potential between donors. Here, we show that Semaphorin 3A (Sema3A) can induce mesenchymal-stem-like properties in human periodontal ligament (PDL) cells. Sema3A expression was specifically observed in the dental follicle during tooth development and in parts of mature PDL tissue in rodent tooth and periodontal tissue. Sema3A expression levels were found to be higher in multipotential human PDL cell clones compared with low-differentiation potential clones. Sema3A-overexpressing PDL cells exhibited an enhanced capacity to differentiate into both functional osteoblasts and adipocytes. Moreover, PDL cells treated with Sema3A only at the initiation of culture stimulated osteogenesis, while Sema3A treatment throughout the culture had no effect on osteogenic differentiation. Finally, Sema3A-overexpressing PDL cells upregulated the expression of embryonic stem cell markers (NANOG, OCT4, and E-cadherin) and mesenchymal stem cell markers (CD73, CD90, CD105, CD146, and CD166), and Sema3A promoted cell division activity of PDL cells. These results suggest that Sema3A may possess the function to convert PDL cells into mesenchymal-stem-like cells.

TLR4/PKC-MEDIATED TIGHT JUNCTION MODULATION: A CLINICAL MARKER OF CHEMOTHERAPY-INDUCED GUT TOXICITY?

Wardill HR, Gibson RJ, Logan RM, Bowen JM.


Chemotherapy-induced gut toxicity is a major clinical and economic burden to oncology practice. The mechanisms responsible for its development are ill defined, hampering the development of therapeutic interventions. In light of newly published research foci and clinical practice guidelines in supportive care in cancer, there has been renewed interest in the role tight junctions play in the pathobiology of chemotherapy-induced gut toxicity. Several preclinical studies have identified molecular defects in intestinal tight junctions following chemotherapy. Despite these findings, the mechanisms responsible for chemotherapy-induced tight junction disruption remain unclear. Recent research has highlighted roles for toll-like receptor 4 and protein kinase C signalling in the regulation of tight junctions. This critical review therefore aims to provide evidence linking toll-like receptor 4 expression, protein kinase C activation and tight junction disruption and their relationship to clinical toxicity.

EPIGENETICS: A NEW FRONTIER IN DENTISTRY

Williams SD, Hughes TE, Adler CJ, Brook AH, Townsend GC.


In 2007, only four years after the completion of the Human Genome Project, the journal Science announced that epigenetics was the ‘breakthrough of the year’. Time magazine placed it second in the top 10 discoveries of 2009. While our genetic code (i.e. our DNA) contains all of the information to produce the elements we require to function, our epigenetic code determines when and where genes in the genetic code are expressed. Without the epigenetic code, the genetic code is like an orchestra without a conductor. Although there is now a substantial amount of published research on epigenetics in medicine and biology, epigenetics in dental research is in its infancy. However, epigenetics promises to become increasingly relevant to dentistry because of the role it plays in gene expression during
development and subsequently potentially influencing oral disease susceptibility. This paper provides a review of the field of epigenetics aimed specifically at oral health professionals. It defines epigenetics, addresses the underlying concepts and provides details about specific epigenetic molecular mechanisms. Further, we discuss some of the key areas where epigenetics is implicated, and review the literature on epigenetics research in dentistry, including its relevance to clinical disciplines. This review considers some implications of epigenetics for the future of dental practice, including a ‘personalized medicine’ approach to the management of common oral diseases.

THE EFFECT OF SODIUM HYPOCHLORITE ON Enterococcus faecalis WHEN GROWN ON DENTINE AS A SINGLE- AND MULTI-SPECIES BIOFILM

Yap B, Zilm PS, Briggs N, Rogers AH, Cathro PC.

Enterococcus faecalis is often involved in the aetiology of apical periodontitis after endodontic treatment. This project aimed to establish, on dentine in vitro, a multi-species biofilm containing E. faecalis, and to determine if the organism had an increased resistance to sodium hypochlorite compared with an axenic biofilm. Biofilms were established on dentine discs in flow cells with either E. faecalis alone (axenic) or together with Fusobacterium nucleatum and Streptococcus sanguinis. Following treatment with either 0.9% sodium hypochlorite or saline, the viability of E. faecalis was determined by serial plating and qualitative analysis was performed by scanning electron microscopy and confocal laser scanning microscopy. Viable counts indicated that 0.9% NaOCl is highly effective against E. faecalis grown alone and as part of a multi-species biofilm (P = 0.0005 and P = 0.001, respectively). No significant difference in its survival in the two biofilm types was found (P = 0.8276).

DENTAL PHENOMICS: ADVANCING GENOTYPE TO PHENOTYPE CORRELATIONS IN CRANIOFACIAL RESEARCH

Yong R, Ranjitkar S, Townsend GC, Smith RN, Evans AR, Hughes TE, Lekkas D, Brook AH.

The field of dental phenomics provides many opportunities to elucidate the roles of genetic, epigenetic and environmental factors in craniofacial development. To date, research findings have helped to clarify the pathogenesis of many conditions, aiding diagnosis and clinical management. This paper provides an overview of dental phenomics research in some commonly encountered oral diseases in everyday clinical practice, as well as research relating to craniofacial growth and development. Clinically, advances in cariology and periodontology have led to better diagnostic capabilities and treatment provision. In the study of growth and development, important information regarding the varying clinical presentation and pathogenesis of many disorders is now apparent through the accurate quantification of phenotypes. Improvements in two-dimensional (2D) and three-dimensional (3D) imaging and analytical techniques have allowed for accurate dental phenotyping, and efforts are ongoing to apply these in vitro techniques to the in vivo setting. The field of dental phenomics represents an exciting avenue that links research findings to practical application, and collaboration between researcher and clinicians will help advance the field further.
Books


Book Chapters


70 registrants attended the 12th annual Research Day which was held on Friday 11 July at the Adelaide Convention Centre. Research Day is held as a forum for staff and students of the School of Dentistry to present their ongoing research proposals and findings.

Our plenary lecture was presented by Professor Robert Saint, Pro Vice-Chancellor (Research Strategy), University of Adelaide.

Once again, prizes were awarded for the best presentations in three categories. Our winners were:

**Best PhD presentation**
Madhan Balasubramanian
Characteristics and practice profiles of migrant dentist groups in Australia: implications for dental workforce policy and planning

**Best DClinDent presentation**
Jonathon Race
Efficacy of laser energised irrigation, passive ultrasonic irrigation on eradicating a mixed species biofilm grown in the mesial roots of human mandibular molars

**Best Undergraduate presentation**
Chelsea Mann
Three dimensional imaging of microwear texture in human teeth

We would like to thank Colgate Oral Care for their ongoing sponsorship of this event.

**ORAL PRESENTATIONS**

**Root structure changes following buccal orthodontic movement with or without corticotomy**
Khan N (School of Dentistry, University of Adelaide); Dreyer C (School of Dentistry, University of Adelaide); Sampson W (School of Dentistry, University of Adelaide)

**The role of sclerostin in the formation and repair of a thermally induced ankylotic lesion**
Coburn S (School of Dentistry, University of Adelaide) Dharmapatni AASSK (Discipline of Anatomy and Pathology, School of Medical Sciences, University of Adelaide); Dreyer C (School of Dentistry, University of Adelaide); Sampson W (School of Dentistry, University of Adelaide)

**Serum cytokine profiles and abnormal pregnancy outcomes in mice with induced periodontitis**
Fitzsimmons T (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Marchant C (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Stockham S (School of Dentistry, University of Adelaide); Stamford J (School of Dentistry, University of Adelaide); Roberts C (Robinson Institute, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Zilm P (School of Dentistry, University of Adelaide)

**Impact of omega 3 fatty acids on periodontal inflammation**
Park B (School of Dentistry, University of Adelaide); Chee B (School of Dentistry, University of Adelaide); Fitzsimmons T (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Coates A (Nutritional Physiology Research Centre, University of South
Assessment of the immunomodulatory properties of mesenchymal stem cells derived from induced pluripotent stem cells
Hynes K (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Ng J (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Marino M (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Gronthos S (School of Medical Sciences, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide)

Periodontal ligament derived stem cells exhibit the capacity for long-term survival, self-renewal and regeneration of multiple tissue types in vivo
Menicanin D (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Mrozik KM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Wada N (Kyushu University, Japan); Marino V (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Shi S (University of Southern California, USA); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Gronthos S (School of Medical Sciences, University of Adelaide)

Generation of neural crest-like cells from human induced pluripotent stem cells
Tomokiyo A (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Hynes K (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Ng J (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Menicanin D (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Gronthos S (School of Medical Sciences, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide)

The effect of periodontal therapy on carotid intima-media thickness among Aboriginal Australians: a randomised controlled trial
Kapellas K (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Bartold PM (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide); Do LG (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Skilton M (Boden Institute of Obesity, Nutrition, Exercise and Eating Disorders, University of Sydney); Jamieson L (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)

Efficacy of laser energised irrigation, passive ultrasonic irrigation on eradicating a mixed species biofilm grown in the mesial roots of human mandibular molars
Race J (School of Dentistry, University of Adelaide); Cathro P (School of Dentistry, University of Adelaide/Faculty of Dentistry, University of Otago); Zilm P (School of Dentistry, University of Adelaide)

Porphyromonas gingivalis peptidylarginine deiminase, a key contributor in the pathogenesis of experimental periodontal disease and experimental arthritis
Gully N (School of Dentistry, University of Adelaide); Bright R (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide); Marino V (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide); Marchant C (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide); Cantley M (Anatomy and Pathology, University of Adelaide); Haynes DR (Anatomy and Pathology, University of Adelaide); Butler CA (School of Dental Sciences, University of Melbourne); Dashper S (School of Dental Sciences, University of Melbourne); Reynolds EC (School of Dental Sciences, University of Melbourne); Bartold PM (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide)
Surface scratch assessment of titanium implant abutments and cementum following instrumentation with metal curettes
Anastassiadis P (School of Dentistry, University of Adelaide); Hall C (Ian Wark Research Institute, University of South Australia), Marino V (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide); Bartold PM (Colgate Australian Dental Research Centre, School of Dentistry, University of Adelaide)

In-vitro assessment of 2-body wear of acrylic denture teeth, nano-ceramic composite resin, and monolithic eMax and zirconia dental restorative materials
Innes JM (School of Dentistry, University of Adelaide); Richards L (School of Dentistry, University of Adelaide); Berekally T (School of Dentistry, University of Adelaide)

Maximising postmortem oral-facial data to assist identification following severe incineration
Berketa J (Forensic Odontology Unit, School of Dentistry, University of Adelaide); Richards L (School of Dentistry, University of Adelaide); James H (Forensic Odontology Unit, School of Dentistry, University of Adelaide); Langlois N (Adelaide Centre for Forensic Research, School of Medical Sciences, University of Adelaide)

Micro-computed tomography imaging of teeth associated with odontogenic infection
Ranjitkar S (School of Dentistry, University of Adelaide); Cheung W (School of Dentistry, University of Adelaide); Yong R (School of Dentistry, University of Adelaide); Packianathan M (School of Dentistry, University of Adelaide); Deverell J (Ian Wark Research Institute, University of South Australia); Hall C (Ian Wark Research Institute, University of South Australia); Farmer D (School of Dentistry, University of Adelaide); Heithersay G (School of Dentistry, University of Adelaide)

Endodontic motor skills learnt implicitly are maintained under multi-tasking conditions
El-Kishawi M (School of Dentistry, University of Adelaide); Winning T (School of Dentistry, University of Adelaide); Townsend GC (School of Dentistry, University of Adelaide); Cathro P (School of Dentistry, University of Adelaide/Faculty of Dentistry, University of Otago); Masters R (School of Dentistry, University of Hong Kong)

Characteristics and practice profiles of migrant dentist groups in Australia: implications for dental workforce policy and planning
Balasubramanian M (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Spencer AJ (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Short SD (Faculty of Health Sciences, the University of Sydney); Watkins K (Australian Dental Council, Melbourne, Victoria); Chrisopolous S (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Brennan DS (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)

Career motivation associated with orientation of dental practice toward disadvantaged groups
Gardner SP (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Winning TA (School of Dentistry, University of Adelaide); Peterson R (Faculty of Health Sciences, University of Adelaide); Roberts-Thomson KF (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)

Oral health and its relationship with prospective dental service use
Gnanamanickam ES (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Teusner D (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Brennan DS (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)
POSTER PRESENTATIONS

Platelet rich and platelet poor plasma scaffolds for dental pulp regeneration
Al Taii M (School of Dentistry, University of Adelaide); Kaidonis X (Research Assistant, School of Medicine, University of Adelaide, Adelaide, South Australia); Koblar S (School of Medicine, University of Adelaide); Cathro P (School of Dentistry, University of Adelaide/Faculty of Dentistry, University of Otago); Richards L (School of Dentistry, University of Adelaide)

Three dimensional imaging of microwear texture in human teeth
Mann C (School of Dentistry, University of Adelaide); Ranjitkar S (School of Dentistry, University of Adelaide); Brook AH (School of Dentistry, University of Adelaide/Queen Mary Institute, University of London); Kaidonis J (School of Dentistry, University of Adelaide); Lekkas D (School of Dentistry, University of Adelaide); Townsend GC (School of Dentistry, University of Adelaide)

Self-rated oral health among rural-dwelling Indigenous adults in South Australia: Comparisons with nationally representative data
Parker E (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Jamieson L (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Roberts-Thomson K (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Spencer AJ (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)

Medical and dental students’ perceptions and experiences of collaborative learning: A comprehensive systematic review
Almajed A (School of Dentistry, University of Adelaide); Skinner V (School of Dentistry, University of Adelaide), Peterson R (Faculty of Health Sciences, University of Adelaide); Winning T (School of Dentistry, University of Adelaide)

Development of psychomotor skills in dentistry: implicit versus explicit learning
El-Kishawi M (School of Dentistry, University of Adelaide); Townsend GC (School of Dentistry, University of Adelaide); Cathro P (School of Dentistry, University of Adelaide/ Faculty of Dentistry, University of Otago); Masters R (School of Dentistry, University of Hong Kong)

Effect of implicit learning on the acquisition of fine motor skills in pre-clinical endodontics
El-Kishawi M (School of Dentistry, University of Adelaide); Townsend GC (School of Dentistry, University of Adelaide); Cathro P (School of Dentistry, University of Adelaide/ Faculty of Dentistry, University of Otago); Masters R (School of Dentistry, University of Hong Kong/ Faculty of Education, University of Waikato)
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<td>2014</td>
<td>Assessment of the immunomodulatory properties of mesenchymal stem cells derived from induced pluripotent stem cells and their utility for inhibiting bone loss in periodontal disease</td>
<td>Hynes K, Bartold PM, Gronthos S, Marino V</td>
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<td>2014</td>
<td>Cytokine profiles in serum and placenta of pregnant mice following experimentally induced periodontitis</td>
<td>Zilm P, Fitzsimmons T, Roberts C</td>
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<td>Maternal and perinatal factors associated with early childhood caries</td>
<td>Mejia G, Cheung W</td>
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<td>2014</td>
<td>Investigating the transcriptome of <em>Fusobacterium nucleatum</em> to explain its role in periodontal disease, adverse birth outcomes and systemic health</td>
<td>Zilm P, Kidd S, Samawi F, Roberts C</td>
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<td>2014</td>
<td>Characteristics and motivation of dentists who provide care to underserved population. A mixed methods study Stage 2.</td>
<td>Gardner S, Roberts-Thomson K, Winning T</td>
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<td>Fish oil as an adjunct therapy for periodontitis - a pilot study</td>
<td>Chee B, Park B, Coates A, Howe P, Bartold PM</td>
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<td>Development of a modular index of children's dental anxiety and fear</td>
<td>Armfield J, Chrisopoulos S, Chi D</td>
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<td>2014</td>
<td>ADIA Award: Development of a modular index of children's dental anxiety and fear</td>
<td>Armfield J, Chrisopoulos S, Chi D</td>
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<td>The application of novel nanoengineered implants for craniosynostosis therapy</td>
<td>Bariana M, Ranjitkar S, Anderson P, Kaidonis J, Losic D, Townsend G</td>
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<td>Chemotherapy-induced alimentary mucositis: do tight junction disruptions translate from the gut to the oral cavity?</td>
<td>Wardill H, Logan R, Gibson R</td>
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<td>2014</td>
<td>Dental anxiety and past experiences: a qualitative study with dentally fearful Australian adults</td>
<td>Armfield J, Merrick J</td>
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<td>Collaborative learning: Understanding dental students' perceptions and</td>
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<td>El-Kishawi M, Winning T, Townsend G, Cathro P, Masters R</td>
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<td>The evaluation of thiourea's scavenging effect of hydroxyl radicals during</td>
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<td>intracoronal bleaching on blood-stained root filled teeth</td>
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<td>Lou L, Cathro P, Heithersay G, Damiani F</td>
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<td>Surface topographic analysis and three-dimensional imaging of teeth with</td>
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<td>James H, Stow L, Richards L, Karanicolas S, Snelling C</td>
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<td>Autofluorescence imaging for early detection and surgical margin</td>
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<td>delineation of oral cancers and pre-cancers</td>
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<td>Farah C, Do LG</td>
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Dentsply

2014  An evaluation of the effect of bacterial contamination on staining and subsequent bleaching of teeth stained with blood in vitro
Wang S, Cathro P, Zilm P

2014  Surface sensitive spectroscopic analysis of chemical changed during early enamel erosion
Diep A, Ranjitkar S, Hall C, Kaidonis J, Townsend G

International Association of Dental Research

2014  Improving students’ learning and performance in pre-clinical endodontics
Winning T, El-Kishawi M, Townsend G, Cathro C, Masters R

National Health & Medical Research Council Career Development Fellowships

2012-2015  Understanding influences on oral health of contemporary Australian children
Do LG

2013-2017  Associations between diabetes and periodontal disease among Indigenous Australian adults
Jamieson L

2013-2017  Understanding the development of dental fear among Australian children and adults
Armfield J

National Health & Medical Research Council Centres for Research Excellence

2012-2016  CRE in Dental health services research for improved oral health outcomes
Brennan DS, Do LG, Roberts-Thomson KF, Spencer AJ

National Health & Medical Research Council International Collaborative Indigenous Health Research Partnership

Jamieson L, Nasir R, Chong A, Parker E, Roberts-Thomson KF, Misan G, Spencer AJ

National Health & Medical Research Council Partnership Project Grants

2011-2014  Impact of health policy on the delivery of dental services and child oral health outcomes
Spencer AJ, Do LG, Roberts-Thomson KF, Brennan DS, Mejia G

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<td>Randomised control trial of effectiveness of silver fluoride on managing deciduous caries in remote Aboriginal communities</td>
<td>Roberts-Thomson KF, Do LG, Liu P</td>
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<td>2012-2014</td>
<td>Periodontal disease and rheumatoid arthritis</td>
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<td>Comparison of periodontal ligament stem cells and induced pluripotent periodontal ligament stem cells for periodontal regeneration</td>
<td>Bartold PM, Gronthos S, Ivanovski S, Hutmacher D</td>
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<td>2013-2016</td>
<td>Common risk factor approach to address socioeconomic inequality in oral health of contemporary Australian preschool children</td>
<td>Do LG, Spencer AJ, Thomson M, Scott J, Ha DH</td>
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**National Institute of Dental & Craniofacial Research**

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**Primary Health Care Research Institute**

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<td>Centre of Research Excellence in Primary Oral Health Care</td>
<td>Brennan DS, Crocombe L, Roberts-Thomson KF, Paul A, Slack-Smith L, Bell E</td>
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**Queensland Health**

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<td>Evaluation of health gains resulting from the introduction of water fluoridation in Queensland</td>
<td>Spencer AJ</td>
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**SA Dental Service**

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**SA Department of Health**

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<td>2013-2014</td>
<td>Research unit in oral epidemiology</td>
<td>ARCPHOH</td>
<td>89,439</td>
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### Undergraduate Medicine and Health Sciences Admissions Test (UMAT) Consortium Research Funding

<table>
<thead>
<tr>
<th>Year</th>
<th>Principal Investigator</th>
<th>Funding</th>
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<tbody>
<tr>
<td>2013-2014</td>
<td>Do LG</td>
<td>$100,000</td>
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COMPLETING HIGHER DEGREES STUDENTS IN
2014

PhD

Meghashyam Bhat
Research Topic: Indicators of periodontal disease in a disadvantaged Indian population
Supervisors: Professor Kaye Roberts-Thomson, Associate Professor Loc Giang Do

Sree Vidya Rao
Research Topic: Oral cancer – a life course approach
Supervisors: Professor Kaye Roberts-Thomson, Dr Gloria Mejia, Professor Richard Logan

DOCTOR OF DENTAL SCIENCE

Alan Brook
Research Topic: Research contributions to paediatric dentistry in the areas of dental development, orofacial pathology, prevention, education and patient management

DOCTOR OF CLINICAL DENTISTRY

Jonathon Race
Research Topic: The efficacy of laser activated irrigating solution on eradicating a mixed biofilm in the mesial roots of human mandibular molars: an in vitro study
Supervisors: Associate Professor Peter Cathro, Dr Peter Zilm

Brian Chee
Research Topic: Fish oil as an adjunct for treatment of periodontitis
Supervisors: Professor Mark Bartold, Dr Bryon Kardachi

Shelley Coburn
Research Topic: The role of sclerostin and RANKL in ankylosis in the rat model
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson

Nida Khan
Research Topic: The response of the periodontium to corticotomy assisted tooth movement in a rat model
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson

Boram Park
Research Topic: Impact of omega 3 fatty acids on periodontal inflammation
Supervisors: Professor Mark Bartold, Dr Bryon Kardachi

Benjamin Sellick
Research Topic: Incidence of veneering porcelain fracture on posterior crowns
Supervisors: Professor Lindsay Richards, Dr Tom Berekally, Associate Professor James Dudley
Jonathan (Mitch) Innes  
Research Topic: Wear, stress and bonding characteristics of zirconia restorations  
Supervisors: Professor Lindsay Richards, Dr Tom Berekally

Lisa Wong  
Research Topic: Tracking relative tooth movement in 3D  
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson

GRADUATE DIPLOMA IN FORENSIC ODONTOLOGY

Abdul Al-Azari  
Research Topic: Awareness of Forensic Odontology among dental practitioners in Australia  
Supervisors: Dr Helen James, Dr Jane Harford

Lauren Stow  
Research Topic: Oral health records: assessment of adherence to recording guidelines and forensic value  
Supervisors: Dr Helen James, Professor Lindsay Richards
CONTINUING HIGHER DEGREES STUDENTS IN 2014

PhD

Milad Al Taii
Research Topic: Comparison of chemical and anti-microbial properties of mineral trioxide aggregate
Supervisors: Professor Lindsay Richards, Associate Professor Peter Cathro

Fawzia Al Zahrani
Research Topic: Fracture resistance and micro-CT evaluation of endodontically treated teeth restored with new short glass fibre reinforced composite used as post and core
Supervisors: Professor Lindsay Richards, Associate Professor James Dudley

Abdulaziz Ali R Almajed
Research Topic: What are students’ understandings and experiences of collaborative learning?
Supervisors: Associate Professor Tracey Winning, Dr Vicki Skinner, Associate Professor Ray Petersen

Mary Apps
Research Topic: Social determinants of Indigenous child oral health
Supervisors: Associate Professor Lisa Jamieson, Dr Gloria Mejia

Nor Atika MD Ashar
Research Topic: Individuality of the human dentition: Implication to Forensic Odontology
Supervisors: Associate Professor Toby Hughes, Professor Grant Townsend, Dr Helen James, Associate Professor John Kaidonis

Madhan Balasubramanian
Research Topic: Migration of international dental graduates
Supervisors: Associate Professor David Brennan, Professor John Spencer

Manpreet Bariana
Research Topic: Nanoengineering approach for craniosynostosis therapy
Supervisors: Associate Professor Peter Anderson, Associate Professor John Kaidonis, Dr Sarbin Ranjitkar, Dr Dusan Losic

John Berketa
Research Topic: Maximising post mortem data from incinerated remains
Supervisors: Professor Lindsay Richards, Dr Helen James, Associate Professor Neil Langlois

Peter Cathro
Research Topic: Proteomic analysis of cell surface proteins by Enterococcus faecalis in response to stress conditions
Supervisors: Dr Peter Zilm, Associate Professor Neville Gully

Sofia Christophis
Research Topic: Inequalities in child oral health
Supervisors: Associate Professor Karen Peres, Dr Liana Luzzi
Mohamed El-Kishawi  
Research Topic: Improving student’s learning and performance in pre-clinical endodontics  
Supervisors: Associate Professor Tracey Winning, Professor Grant Townsend, Associate Professor Peter Cathro, Professor Rich Masters

Sue Gardner  
Research Topic: Difference in characteristics in dentists who work with people underserved in oral health compared to those who work in general practice  
Supervisors: Professor Kaye Roberts-Thomson, Associate Professor Tracey Winning, Associate Professor Ray Petersen

Emmanuel Gnanamanickam  
Research Topic: Cost-effectiveness and cost-utility of dental health insurance  
Supervisors: Associate Professor David Brennan, Dr Peter Arrow

Kamal Hana  
Research Topic: The impact of patient-centred dental open educational resources (DOER) on enhancing shared clinical decision-making and effective health care outcomes  
Supervisors: Associate Professor David Brennan, Associate Professor Jason Armfield, Dr Paul Sambrook

Saima Islam  
Research Topic: Evaluating the long term impact of oral health screening linked to priority dental care among community dwelling older people: A randomised 2 year intervention study  
Supervisors: Associate Professor David Brennan, Professor Kaye Roberts-Thomson

Xiangqun Ju  
Research Topic: Longitudinal study of the relationship between periodontal disease and tooth loss in elderly people in South Australia  
Supervisors: Professor John Spencer, Associate Professor Loc Giang Do, Dr Gloria Mejia

Kostas Kapellas  
Research Topic: The effect of non-surgical periodontal therapy on pulse wave velocity – a marker of arterial stiffness  
Supervisors: Associate Professor Lisa Marie Jamieson, Associate Professor Loc Giang Do, Professor Mark Bartold

Jenny Miller  
Research Topic: Social gradients in child oral health  
Supervisors: Professor John Spencer, Professor Kaye Roberts-Thomson, Professor Anthony Blinkhorn

Eleanor Parker  
Research Topic: Indigenous oral health literacy  
Supervisors: Professor John Spencer, Dr Lisa Jamieson, Professor Kaye Roberts-Thomson

Helena Schuch  
Research Topic: Social Behaviours and risk factors for periodontal disease in adulthood – a life course approach  
Supervisors: Professor Marco Peres, Associate Professor Loc Do, Associate Professor Karen Peres
Ankur Singh  
Research Topic: Theoretical and empirical explanations for the relationship between social inequalities and population oral health outcomes  
Supervisors: Professor Marco Peres, Dr Jane Harford

Richard Taduran  
Research Topic: The nature and extent of sexual dimorphism in dental and dermatoglyphic traits of twins  
Supervisors: Professor Alan Brook, Associate Professor Toby Hughes, Dr Sarbin Ranjitkar

Dana Teusner  
Research Topic: Dental insurance and use of services  
Supervisors: Associate Professor David Brennan, Professor John Spencer

DOCTOR OF CLINICAL DENTISTRY

ENDODONTICS

Elizabeth Lou  
Research Topic: An evaluation of the scavenging effect of thiourea on hydroxyl radicals released during intracoronal bleaching of blood-stained root-filled teeth  
Supervisors: Associate Professor Peter Cathro, Dr Peter Zilm

Suzy Wang  
Research Topic: An evaluation of the effect of bacterial contamination on teeth stained with blood in vitro  
Supervisors: Associate Professor Peter Cathro, Dr Peter Zilm

ORAL PATHOLOGY

Ying Guo  
Research Topic: Oral pathology associated with dental implants  
Supervisors: Professor Richard Logan, Professor Lindsay Richards, Associate Professor James Dudley

Asfizahrasby Mohd Rasoul  
Research Topic: Matrix metalloproteinase expression in keratocystic odontogenic tumours  
Supervisors: Professor Richard Logan, Associate Professor Rachel Gibson

ORTHODONTICS

Ravi Kamisetty  
Research Topic: The stability of orthognathic surgery in cleft lip and palate patients  
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson, Dr Ben Grave

Adam Leung  
Research Topic: Assessment of craniofacial growth and development in white Northern Europeans using counterpart analysis- a longitudinal study  
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson

Melissa Nguyen  
Research Topic: Microcrack formation associated with TAD insertion – A histomorphometric study  
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson
Eugene Twigge
Research Topic: Study 1: A qualitative evaluation of pre-treatment patient concerns in orthodontics using videography/Study 2: The psycho-social impact of malocclusions and treatment expectations of adolescent orthodontic patients
Supervisors: Professor Craig Dreyer, Associate Professor Lisa Jamieson, Dr Rachel Roberts, Emeritus Professor Wayne Sampson

Benlee Yap
Research Topic: Craniofacial, orthodontic and upper airway morphology in a cohort of growing patients with suspected paediatric sleep disordered breathing (SDB) and identification of cases at risk for non-curative adenotonsillectomy
Supervisors: Professor Craig Dreyer, Emeritus Professor Wayne Sampson, Dr Declan Kennedy

PAEDIATRIC DENTISTRY

Gabrielle Allen
Research Topic: Assessment and validation of a diagnostic scale, oral care protocol, prevention and treatment of oral mucositis in a paediatric population – A prospective study
Supervisors: Associate Professor Sumant Gue, Associate Professor Tom Revesz, Professor Richard Logan, Professor Dorothy Keefe

Gwendolyn Huang
Research Topic: A retrospective analysis of oral and maxillofacial pathology at the AWCH
Supervisors: Associate Professor Sumant Gue, Associate Professor Lynette Moore, Professor Richard Logan

Lloyd Hurrell
Research Topic: The management of oral mucositis in paediatric cancer patients
Supervisors: Associate Professor Sam Gue, Professor Richard Logan, Professor Dorothy Keefe, Associate Professor Tom Revesz

Hannah Prouse
Research Topic: A 9-year retrospective audit of all severe maxillofacial infections admitted by the Paediatric Dentistry Department from 1st February 2004 to 31st January 2013 at the Women’s and Children’s Hospital, Adelaide, South Australia
Supervisors: Associate Professor Sumant Gue, Professor Alastair Goss

PROSTHODONTICS

Amandeep Badwal
Research Topic: Fit of screw retained implant frameworks fabricated by different methods
Supervisors: Associate Professor James Dudley, Professor Lindsay Richards

Tony Leung
Research Topic: Systematic review of outcome studies comparing all ceramic versus all metal crowns
Supervisors: Professor Lindsay Richards, Associate Professor James Dudley

Melati Mahmud
Research Topic: Relationship between treatment outcome and psychological profile with SCL-90-R
Supervisors: Professor Lindsay Richards, Associate Professor James Dudley
SPECIAL NEEDS DENTISTRY

Narmin Nasr  
Research Topic: Management of oral mucositis in cancer treatment facilities: a survey among oral health care providers in Australia and Oman  
Supervisors: Professor Alastair Goss, Dr Archana Pradhan, Professor Richard Logan, Professor Dorothy Keefe

MASTER OF PHILOSOPHY (DENTISTRY)

Katie Beckwith  
Research Topic: The effects of school environment and societal functionality on child oral health practices and oral health outcomes  
Supervisors: Associate Professor David Brennan, Associate Professor Loc Giang Do

Priscilla Agavi  
Research Topic: Oral cancer prevention and early detection in PNG  
Supervisors: Professor Richard Logan, Dr John McIntyre

MASTER IN CLINICAL SCIENCE (DENTISTRY)

Peter Knowles  
Research Topic: Ocular and maxillofacial prosthetic treatment and associated issues  
Supervisors: Professor Alastair Goss, Dr Dinesh Selva-Nayagam

Catherine Sims  
Research Topic: Tooth wear and other dental characteristics in Aboriginal Australian skulls, Narungga, Yorke Peninsula, SA  
Supervisors: Dr Helen James, Dr Sarbin Ranjitkar, Professor Richard Logan