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Accuracy and measures of association of anthropometric indexes of obesity to identify the presence of hypertension in adults: A population-based study in Southern Brazil

Prevalence of preterm birth according to birth weight group: A systematic review

Effects of fluoridated drinking water on dental caries in Australian adults

Management of isolated fractures of the medial orbital wall

Non-carious cervical lesions: Influence of morphology and load type on biomechanical behaviour of maxillary incisors

Biomarkers of chemotherapy-induced diarrhoea: a clinical study of intestinal microbiome alterations, inflammation and circulating matrix metalloproteinases

Dental behaviours among older adults over an 11-year period

Factors associated with prevalence of oral lesions and oral self-examination in young adults from a birth cohort in Southern Brazil

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INTRODUCTION

I am pleased to present the 2013 School of Dentistry Research Report. This report serves as a record of the School’s research achievements. In very trying times with diminishing funding, increased demands on staff to undertake increased teaching loads, 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. I am sure that this continued high level of activity will position our School for another high ranking in the forthcoming Excellence in Research Australia (ERA) assessment.

In this report we document 120 journal articles (an impressive increase on the 87 publications in 2012) and 8 book chapters. Graduation of higher degree students included 2 PhD and 6 DClinDent. Research funding was obtained from 24 different sources and included 14 new ADRF grants, 2 new NH&MRC project grants and 2 new NH&MRC Career Development Fellowships.

The School of Dentistry is very proud of its strong research tradition and its standing 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. Such an impressive track record makes the School of Dentistry a preferred location for many overseas and local students to undertake research training in oral health research.

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 13 research groups, without whom none of the success would have been possible.

P. Mark Bartold
Assistant Dean, Research
September 2014
RESEARCH GROUPS AND ACTIVITIES

1. AUSTRALIAN RESEARCH CENTRE FOR POPULATION ORAL HEALTH

- Professor KF Roberts-Thomson
- Professor M Peres
- Emeritus Professor AJ Spencer
- Associate Professor DS Brennan
- Associate Professor J Armfield
- Associate Professor K Peres
- Associate Professor LG Do
- Associate Professor LM Jamieson
- Professor GD Slade (Adjunct Professor)
- Dr A Pradhan
- Dr D Ha
- Dr D Keuskamp
- Dr E Parker
- Dr G Mejia
- Dr H Tan
- Dr J Harford
- Dr K Jones
- Dr K Plutzer
- Dr L Crocombe
- Dr L Luzzi
- Dr N Amarasena
- Dr P Liu
- Dr R Lalloo
- Dr W Cheung
- Mr C Kempster
- Mr E Gnanamanickam
- Mr M Balasubramanian
- Mr S Gnanamanickam
- Ms A Ellershaw
- Ms C Koster
- Ms C Wong
- Ms D Teusner
- Ms H Mills
- Ms J Aldis
- Ms J Hedges
- Ms J Miller
- Ms J Tepsic
- Ms K Beckwith
- Ms K Plastow
- Ms L Trio
- Ms S Gardner
- Ms S Islam
- Ms T Phung
- Ms X Ju

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, the Australian Institute of Health and Welfare Dental Statistics and Research Unit (AIHW DSRU), the Colgate Oral Care funded Dental Practice Education Research Unit (DPERU), the state and territory supported National Oral Health Promotion Clearinghouse (NOHPC), the Indigenous Oral Health Unit (IOHU) and the Health Services Research Unit (HSRU). Additional support for ARCPOH is received through DSRU from the Australian Government Department of Health, and the South Australian Dental Service (SADS). A range of competitive grants e.g. NH&MRC, 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
- Oral health services and labour force research
- Oral health policy analysis
- Oral health promotion data warehouse and information clearinghouse
- Indigenous oral health
- Geriatric oral health
In 2013, work commenced on projects funded by the Centre for Research Excellence (CRE) Primary Health Care grant from the Australian Primary Health Care Research Institute. The ARCPOH component of the CRE undertakes oral health research in the areas of ageing, Indigenous health and health of people with disabilities. ARCPOH’s Director, Professor Marco Peres, explored opportunities for new research collaborations particularly on the North West Adelaide Health Survey, a cohort of adults, a development of a global oral health inequalities research agenda and partnership with a number of overseas research groups in the US, the UK, Brazil and New Zealand. In June 2013, the National Oral Health Promotion Clearinghouse (NOHPC) organised a pre-conference workshop alongside the Australian Health Promotion Association (AHPA) Conference in Sydney, Australia. Professor Marco Peres, Emeritus Professor A John Spencer and Associate Professor Loc Do were appointed as members of the Nutrient Reference Values – Fluoride Expert Working Group. Professor Peres is the deputy chair of the group.

2. **CRANIOFACIAL BIOLOGY**

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

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 25 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 Orofacial 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.
4. **DENTAL EDUCATION RESEARCH**

- Professor G Townsend
- Associate Professor J Kaidonis
- Associate Professor T Winning
- Dr C Redwood
- Dr D Alomair
- Dr D Lekkas
- Dr M Stanners
- Dr T Hughes
- Dr V Skinner
- Ms C Snelling
- Ms S Karanicolas
- Mrs S Bryant

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.

5. **ENDODONTICS AND PULP BIOLOGY**

- Associate Professor G Rossi-Fedele
- Associate Professor N Gully
- Clinical Professor G Heithersay
- Dr D Parker
- Dr P Zilm
- Mr V Marino

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.

6. **FORENSIC ODONTOLOGY**

- Dr A Lake
- Dr D Higgins
- Dr G Cirillo
- Dr H James
- Dr J Berketa

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.

7. **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.
8. 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.

9. ORAL PATHOLOGY

- Professor R Logan
- Professor D Keefe
- Professor A Goss
- Professor K Roberts-Thomson
- Associate Professor R Gibson
- Associate Professor L Jamieson
- Dr J Bowen
- Dr S Liberali
- Dr J McIntyre
- Dr G Mejia
- 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.

10. ORTHODONTICS

- Professor R Logan
- Professor L Richards
- Professor W Sampson
- Professor G Townsend
- Dr C Dreyer
- Dr T Hughes
- 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.
11. PAEDIATRIC DENTISTRY

- Professor A Goss
- Professor D Keefe
- Professor R Logan
- Associate Professor S Gue
- Associate Professor P Anderson
- 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.

12. PERIODONTICS

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

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.

13. RESTORATIVE DENTISTRY

- Professor L Richards
- Professor G Townsend
- Associate Professor J Kaidonis
- Dr J Dudley
- Dr I White
- Dr J McIntyre
- Dr L Rupinskas
- Dr S Ranjitkar
- 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.
Porphyromonas gingivalis Peptidylarginine Deiminase Substrate Specificity

Abdullah SN, Farmer EA, Spargo L, Logan R, Gully N.

While a group of oral commensals have been implicated in the aetiology of chronic periodontitis; the asaccharolytic Gram negative anaerobe Porphyromonas gingivalis is most commonly reported to be associated with severe forms of the disease. Although a variety of human tissues can produce a number of peptidylarginine deiminase (PAD), enzymes that convert peptide bound arginine residues to citrulline, P. gingivalis is one of the few prokaryotes known to express PAD. Protein and peptide citrullination are important in the development of rheumatoid arthritis and in recent years a number of authors have suggested a possible link between periodontitis and rheumatoid arthritis (RA). Indeed, some have linked P. gingivalis directly to RA via the action of PAD. Accordingly, the prime purpose of this study was to further characterise PAD in P. gingivalis cells particular emphasis on substrate specificity, using arginine containing peptides and RA relevant proteins.

Methods: P. gingivalis W50 was anaerobically cultured in BHI broth, cells harvested and resuspended in assay buffer. A colourimetric assay was developed to measure citrulline and employed to determine enzyme activity using the substrate BAEE. The assay was employed to investigate the effects of environmental pH and temperature on activity. Citrullination of BAEE by sonicated cells allowed the proportion of intracellular enzyme to be estimated. Enzyme specificity and substrate preference were investigated by using various arginine containing peptides, proteins and arginine analogues, as substrates and measuring the rate of citrullination. The influence of gingipains on citrullination was assessed by measuring the rates of citrullination of bovine serum albumin in the presence of protease inhibitors.

Results: Enzyme activity decreased by 13% following exposure of cells to 60 °C for 10 min. A comparison of intact and disrupted cells indicated that 90% of PAD activity is cell surface associated and the remainder cytoplasmic. Optimal pH for enzyme activity was between pH 7.5 and 8. All small arginine-containing peptides were citrullinated with reaction rates faster than that for free arginine with rates that varied with arginine residue position and number. Arginine analogues exhibited minimal effect and influence when tested as either substrates or competitive inhibitors. Cells were able to citrullinate yeast enolase, human vimentin and fibrin at varying rates. All proteins were modified at slower rates than those for peptide substrates. Inhibition of gingipains had no influence on the rate of protein citrullination.

Conclusions: P. gingivalis PAD is a primarily cell surface associated, heat stable, enzyme that exhibits optimal activity under alkaline conditions similar to those present in the inflammatory environment. The enzyme displays high specificity for arginine residues in peptides and modified arginine in all positions and the gingipains did not influence the rate of protein citrullination. The ability of the enzyme to convert arginine residues in all proteins tested would indicate that its presence in inflamed tissue may promote autoimmune reactions by creation of altered host epitopes.

Sequencing Ancient Calcified Dental Plaque Shows Changes in Oral Microbiota with Dietary Shifts of the Neolithic and Industrial Revolutions


The importance of commensal microbes for human health is increasingly recognized, yet the impacts of evolutionary changes in human diet and culture on commensal microbiota remain almost unknown. Two of the
greatest dietary shifts in human evolution involved the adoption of carbohydrate-rich Neolithic (farming) diets (beginning ~10,000 years before the present) and the more recent advent of industrially processed flour and sugar (in ~1850). Here, we show that calcified dental plaque (dental calculus) on ancient teeth preserves a detailed genetic record throughout this period. Data from 34 early European skeletons indicate that the transition from hunter-gatherer to farming shifted the oral microbial community to a disease-associated configuration. The composition of oral microbiota remained unexpectedly constant between Neolithic and medieval times, after which (the now ubiquitous) cariogenic bacteria became dominant, apparently during the Industrial Revolution. Modern oral microbiotic ecosystems are markedly less diverse than historic populations, which might be contributing to chronic oral (and other) disease in postindustrial lifestyles.

**MATRIX METALLOPROTEINASES: DO THEY PLAY A ROLE IN MUCOSAL PATHOLOGY OF THE ORAL CAVITY?**

Al-Azri AR, Gibson RJ, Keefe DM, Logan RM.

Matrix metalloproteinases (MMPs) are critical factors in maintaining the integrity of mucosa and mediating normal biological processes. An imbalance between tissue levels of these mediators and their natural inhibitors is believed to underlie the pathophysiology of many diseases, including those affect the gastrointestinal and oral mucosae. The ongoing development of synthetic inhibitors of these mediators may provide opportunities to develop treatment modalities for patients suffering from these diseases. Understanding the role of MMPs in the pathophysiology of many diseases, however, is far from complete, and the improvement of pharmaceutical management strategies can only be achieved if the underlying process of these diseases is completely comprehended. This paper reviews the functions of matrix metalloproteinases and addresses their role in mediating mucosal pathologies with emphasis on oral mucosa.

**EMERGING EVIDENCE ON THE PATHOBIOLOGY OF MUCOSITIS**

Al-Dasooqi N, Sonis ST, Bowen JM, Bateman E, Blijlevens N, Gibson RJ, Logan RM, Nair RG, Stringer AM, Yazbeck R, Elad S, Lalla RV; Mucositis Study Group of the Multinational Association of Supportive Care in Cancer/International Society of Oral Oncology (MASCC/ISOO).

Background: Considerable progress has been made in our understanding of the biological basis for cancer therapy-induced mucosal barrier injury (mucositis). The last formal review of the subject by MASCC/ISOO was published in 2007; consequently, an update is timely.
Methods: Panel members reviewed the biomedical literature on mucositis pathobiology published between January 2005 and December 2011.
Results: Recent research has provided data on the contribution of tissue structure changes, inflammation and microbiome changes to the development of mucositis. Additional research has focused on targeted therapy-induced toxicity, toxicity clustering and the investigation of genetic polymorphisms in toxicity prediction. This review paper summarizes the recent evidence on these aspects of mucositis pathobiology.
Conclusion: The ultimate goal of mucositis researchers is to identify the most appropriate targets for therapeutic interventions and to be able to predict toxicity risk and personalize interventions to genetically suitable patients. Continuing research efforts are needed to further our understanding of mucositis pathobiology and the pharmacogenomics of toxicity.
DENTO-FACIAL RELATIONSHIPS IN INDIVIDUALS WITH NORMAL OCCLUSION

Al-Khatib AR, Rajion ZA, Masudi SM, Hassan R, Townsend GC.

The aim of this study was to evaluate the relationships of selected facial measurements with mesio-distal crown widths and dental arch dimensions in individuals with normal occlusions. A cross-sectional study was conducted on 276 subjects with Angle’s Class I normal occlusions. Three-dimensional images of the face and dental casts were captured and analyzed using stereophotogrammetric systems. Significant correlations were found between the sagittal facial variables and both upper and lower dental arch dimensions and to lesser degree with the horizontal and vertical variables. The values of correlation coefficients calculated between facial and dental crown measurements ranged from .01 to .50 for upper teeth and .01 to .49 for lower teeth. The values of correlation coefficients between facial and upper dental arch dimensions ranged from .01 to .55 and those between facial and lower dental arch dimensions ranged from .01 to .60. A principal components analysis showed that the sagittal dimensions, face height, nose, labial fissure, binocular widths were positively associated with dental arch dimensions and mesio-distal crown diameters in males. On the other hand, only the sagittal variables were associated with dental dimensions in females. The results of this study confirm that positive associations exist between facial and dental arch dimensions. These relationships should be taken into consideration when attempts are made to modify dental arch size as part of orthodontic treatment. Moreover, these relationships are also relevant to prosthodontists involved with selecting tooth sizes that display optimal functional balance with the craniofacial structures.

MUENCKE SYNDROME WITH CLEFT LIP AND PALATE

Anderson PJ, Snell B, Moore MH.

Muencke syndrome results from mutations in the FGFR3 gene, and although it is well recognized that the clinical presentation is variable, the important key finding includes coronal synostosis. We present a family where a mother with proven FGFR3 Pro250Arg mutation gave birth to identical twins both of whom had craniosynostosis but had coexisting bilateral cleft lip and palate. We believe that this is the first description of clefting occurring in conjunction with Muencke syndrome and so further extends the range of phenotypic variation that can occur in this syndrome.

HOUSEHOLD INCOME MODIFIES THE ASSOCIATION OF INSURANCE AND DENTAL VISITING

Anikeeva O, Brennan DS, Teusner DN.

Background: Dental insurance and income are positively associated with regular dental visiting. Higher income earners face fewer financial barriers to dental care, while dental insurance provides partial reimbursement. The aim was to explore whether household income has an effect on the relationship between insurance and visiting.
Methods: A random sample of adults aged 30-61 years living in Australia was drawn from the Electoral Roll. Data were collected by mailed survey in 2009-10, including age, sex, dental insurance status and household income.
Results: Responses were collected from n = 1,096 persons (response rate = 39.1%). Dental insurance was positively associated with regular visiting (adjusted prevalence ratio (PR) = 1.18; 95% CI: 1.01-1.36). Individuals in the lowest income tertile had a lower prevalence of regular visiting than those in the highest income group (PR = 0.78; 95% CI: 0.65-0.93). Visiting for a check-up was less prevalent among lower income earners (PR = 0.65; 95% CI: 0.50-0.83). Significant interaction terms indicated that the associations between insurance and visiting varied across income tertiles showing that income modified the effect.
Conclusions: Household income modified the relationships between insurance and regular visiting and visiting for a check-up, with dental insurance having a greater impact on visiting among lower income groups.

PREDICTING DENTAL AVOIDANCE AMONG DENTALLY FEARFUL AUSTRALIAN ADULTS

Armfield JM.

Dental fear is related to poorer oral health outcomes, and this might be explained by the less frequent dental visiting of many fearful people. The objectives of this study were to investigate differences between dentally fearful people who regularly attend the dentist and fearful people who infrequently visit the dentist. A random sample of 1,082 Australians ≥ 15 years of age completed a mailed questionnaire (response rate = 71.6%), and 191 dentate, high-fear adults (≥ 18 years of age) were selected for further analysis. Dental avoidance was recorded if a person was currently avoiding or delaying dental care and if he/she had not been to a dentist in the previous 2 yr. Among the selected dentally fearful adults, dental avoidance was predicted by smoking status, toothbrushing frequency, coping strategy use, perceptions of dental visits as uncontrollable and unpredictable, and by anxiety relating to numbness, not knowing what the dentist is going to do, and cost. In a multivariate logistic regression model, smoking, toothbrushing, coping, and anxiety about numbness and cost remained as statistically significant predictors, with the model accounting for 30% of the variance. While several variables were associated with dental avoidance among fearful adults, the nature and causal directions of these associations remain to be established.

WHAT GOES AROUND COMES AROUND: REVISITING THE HYPOTHESIZED VICIOUS CYCLE OF DENTAL FEAR AND AVOIDANCE

Armfield JM.

Objectives: A vicious cycle is believed to operate in the maintenance of dental fear, whereby greater dental fear leads to the delay or avoidance of dental visiting, deteriorated oral health and problem-oriented treatment, which then serves to reinforce the fear. The current study sought to uncover the existence of this vicious cycle pattern and to investigate the role of both dental fear and avoidance in terms of their hypothesized effect on treatment needs and visiting for problems.

Methods: Study participants were 1036 (response rate = 71.6%) dentate Australians (aged 15+) from all Australian states and territories.

Results: Dental fear was associated with avoidance, treatment need and problem-oriented visiting. For people with moderate to high dental fear, 38.5% fit the hypothesized vicious cycle pattern of avoiding dental visiting because of fear, having treatment need and visiting for a problem. This compared with only 0.9% of people with no dental fear. Avoiding going to the dentist was an important predictor of treatment need and problem-oriented visiting independent of dental fear. Dental fear was a statistically significant predictor of treatment need and problem-oriented visiting and also acted as an effect modifier on avoidance because of fear.

Conclusion: The results support the premises underlying the vicious cycle model of dental fear maintenance. Dental fear appears to act as a determinant of avoiding or delaying dental visit, which has flow-on effects in terms of greater treatment need and problem-oriented visiting.

MANAGEMENT OF FEAR AND ANXIETY IN THE DENTAL CLINIC: A REVIEW

Armfield JM, Heaton LJ.

People who are highly anxious about undergoing dental treatment comprise approximately one in seven of the population and require careful and considerate management by dental practitioners. This paper presents a review of a number of non-pharmacological (behavioural and cognitive) techniques that can be used in the
dental clinic or surgery in order to assist anxious individuals obtain needed dental care. Practical advice for managing anxious patients is provided and the evidence base for the various approaches is examined and summarized. The importance of firstly identifying dental fear and then understanding its aetiology, nature and associated components is stressed. Anxiety management techniques range from good communication and establishing rapport to the use of systematic desensitization and hypnosis. Some techniques require specialist training but many others could usefully be adopted for all dental patients, regardless of their known level of dental anxiety. It is concluded that successfully managing dentally fearful individuals is achievable for clinicians but requires a greater level of understanding, good communication and a phased treatment approach. There is an acceptable evidence base for several non-pharmacological anxiety management practices to help augment dental practitioners providing care to anxious or fearful children and adults.

SOCIOECONOMIC AND PSYCHOSOCIAL CORRELATES OF ORAL HEALTH

Armfield JM, Mejía GC, Jamieson LM.

Background: It has been proposed that psychosocial variables are important determinants of oral health outcomes. In addition, the effect of socioeconomic factors in oral health has been argued to work through the shaping of psychosocial stressors and resources. This study therefore aimed to examine the role of psychosocial factors in oral health after controlling for selected socioeconomic and behavioural factors.

Methods: Logistic and generalised linear regression analyses were conducted on self-rated oral health, untreated decayed teeth and number of decayed, missing and filled teeth (DMFT) from dentate participants in a national survey of adult oral health (n = 5364) conducted in 2004-2006 in Australia.

Results: After controlling for all other variables, more frequent dental visiting and toothbrushing were associated with poorer self-rated oral health, more untreated decay and higher DMFT. Pervasive socioeconomic inequalities were demonstrated, with higher income, having a tertiary degree, higher self-perceived social standing and not being employed all significantly associated with oral health after controlling for the other variables. The only psychosocial variables related to self-rated oral health were the stressors perceived stress and perceived constraints. Psychosocial resources were not statistically associated with self-rated oral health and no psychosocial variables were significantly associated with either untreated decayed teeth or DMFT after controlling for the other variables.

Conclusion: Although the role of behavioural and socioeconomic variables as determinants of oral health was supported, the role of psychosocial variables in oral health outcomes received mixed support.

WATER FLUORIDATION AND THE ASSOCIATION OF SUGAR-SWEETENED BEVERAGE CONSUMPTION AND DENTAL CARIES IN AUSTRALIAN CHILDREN

Armfield JM, Spencer AJ, Roberts-Thomson KF, Plastow K.

Objectives: We examined demographic and socioeconomic differences in the consumption of sugar-sweetened beverages (SSBs), its association with dental caries in children, and whether exposure to water fluoridation modifies this association.

Methods: In a cross-sectional study, we used a stratified, clustered sampling design to obtain information on 16 508 children aged 5 to 16 years enrolled in Australian school dental services in 2002 to 2005. Dental staff assessed dental caries, and parents completed a questionnaire about their child's residential history, sources of drinking water, toothbrushing frequency, socioeconomic status (SES), and SSB consumption.

Results: Children who brushed their teeth less often and were older, male, of low SES, from rural or remote areas consumed significantly more SSBs. Caries was significantly associated with greater SSB consumption after controlling for potential confounders. Finally, greater exposure to fluoridated water significantly reduced the association between children's SSB consumption and dental caries.
Conclusions: Consumption of SSBs should be considered a major risk factor for dental caries. However, increased exposure to fluoridated public water helped ameliorate the association between SSB consumption and dental decay. These results reconfirm the benefits of community water fluoridation for oral health.

CHILD ORAL HEALTH-RELATED QUALITY OF LIFE (COHQoL), ENAMEL DEFECTS OF THE FIRST PERMANENT MOLARS AND CARIES EXPERIENCE AMONG CHILDREN IN WESTERN AUSTRALIA

Arrow P.

Published reports suggest that children with enamel defects, especially where enamel is missing or breaking down, experience considerable discomfort and are generally more fearful of dental treatment. However, children's oral health-related quality of life in relation to enamel defects has not been reported. The aim of this study was to examine the association between oral health-related quality of life among children (COHQoL) with enamel defects of the first permanent molars and deciduous caries experience.

Methods: Children attending pre-primary schools in metropolitan Perth, Western Australia, were recruited and classified for enamel defects using the modified Developmental Defects of Enamel index. Caries experience of deciduous molars and canines was also recorded. Parents completed a child oral health-related quality of life questionnaire. Data were analysed using Kruskal-Wallis, Spearman's rank correlation, chi-square, multiple linear regression and ordered logistic regression to test the factors for their influence on the COHQoL.

Results: From the 550 children assessed (mean age 7.2 years) 522 COHQoL questionnaires were returned. Mean COHQoL score was 8.9 (sd 8.8). Bivariate tests showed no association of COHQoL with enamel defect status of the first permanent molars. COHQoL was associated with dmft (mean dmft 1.96, sd 2.62). Higher caries experience children had poorer reported oral health-related quality of life.

Conclusion: The presence of enamel defects in the first permanent molars did not affect the children's oral health-related quality of life.

BRIEF ORAL HEALTH PROMOTION INTERVENTION AMONG PARENTS OF YOUNG CHILDREN TO REDUCE EARLY CHILDHOOD DENTAL DECAY

Arrow P, Raheb J, Miller M.

Background: Severe untreated dental decay affects a child's growth, body weight, quality of life as well as cognitive development, and the effects extend beyond the child to the family, the community and the health care system. Early health behavioural factors, including dietary practices and eating patterns, can play a major role in the initiation and development of oral diseases, particularly dental caries. The parent/caregiver, usually the mother, has a critical role in the adoption of protective health care behaviours and parental feeding practices strongly influence children's eating behaviours. This study will test if an early oral health promotion intervention through the use of brief motivational interviewing (MI) and anticipatory guidance (AG) approaches can reduce the incidence of early childhood dental decay and obesity.

Methods: The study will be a randomised controlled study with parents and their new-born child/ren who are seen at 6-12 weeks of age by a child/community health nurse. Consenting parents will complete a questionnaire on oral health knowledge, behaviours, self-efficacy, oral health fatalism, parenting stress, prenatal and peri-natal health and socio-demographic factors at study commencement and at 12 and 36 months. Each child-parent pair will be allocated to an intervention or a standard care group, using a computer-generated random blocks. The standard group will be managed through the standard early oral health screening program; "lift the lip". The intervention group will be provided with tailored oral health counselling by oral health consultants trained in MI and AG. Participating children will be examined at 24, and 36 months for the occurrence of dental decay and have their height and weight recorded. Dietary information obtained from a food frequency chart will be used to determine food and dietary patterns. Data analysis will use intention to treat and per protocol analysis and will use tests of independent proportions and means. Multivariate statistical
tests will also be used to take account of socio-economic and demographic factors in addition to parental knowledge, behaviour, self-efficacy, and parent/child stress.

Discussion: The study will test the effects of an oral health promotion intervention to affect oral health and general health and have the potential to demonstrate the "common risk factor" approach to health promotion.

EPHB4 ENHANCES THE PROCESS OF ENDOCHONDRAL OSSIFICATION AND INHIBITS REMODELING DURING BONE FRACTURE REPAIR

Arthur A, Panagopoulos RA, Cooper L, Menicanin D, Parkinson IH, Codrington JD, Vandyke K, Zannettino AC, Koblar SA, Sims NA, Matsuo K, Grontos S.


Previous reports have identified a role for the tyrosine kinase receptor EphB4 and its ligand, ephrinB2, as potential mediators of both bone formation by osteoblasts and bone resorption by osteoclasts. In the present study, we examined the role of EphB4 during bone repair after traumatic injury. We performed femoral fractures with internal fixation in transgenic mice that overexpress EphB4 under the collagen type 1 promoter (Col1-EphB4) and investigated the bone repair process up to 12 weeks postfracture. The data indicated that Col1-EphB4 mice exhibited stiffer and stronger bones after fracture compared with wild-type mice. The fractured bones of Col1-EphB4 transgenic mice displayed significantly greater tissue and bone volume 2 weeks postfracture compared with that of wild-type mice. These findings correlated with increased chondrogenesis and mineral formation within the callus site at 2 weeks postfracture, as demonstrated by increased safranin O and von Kossa staining, respectively. Interestingly, Col1-EphB4 mice were found to possess significantly greater numbers of clonogenic mesenchymal stromal progenitor cells (CFU-F), with an increased capacity to form mineralized nodules in vitro under osteogenic conditions, when compared with those of the wild-type control mice. Furthermore, Col1-EphB4 mice had significantly lower numbers of TRAP-positive multinucleated osteoclasts within the callus site. Taken together, these observations suggest that EphB4 promotes endochondral ossification while inhibiting osteoclast development during callus formation and may represent a novel drug target for the repair of fractured bones.

TUNING DRUG LOADING AND RELEASE PROPERTIES OF DIATOM SILICA MICROPARTICLES BY SURFACE MODIFICATIONS

Bariana M, Aw MS, Kurkuri M, Losic D.


Diatomaceous earth (DE), or diatomite silica microparticles originated from fossilized diatoms are a potential substitute for its silica-based synthetic counterparts to address limitations in conventional drug delivery. This study presents the impact of engineered surface chemistry of DE microparticles on their drug loading and release properties. Surface modifications with four silanes, including 3-aminopropyltriethoxy silane (APTES), methoxy-poly-(ethylene-glycol)-silane (mPEG-silane), 7-octadecyltrichlorosilane (OTS), 3-(glycidyloxypropyl)trimethoxysilane (GPTMS) and two phosphonic acids, namely 2-carboxyethyl-phosphonic acid (2 CEPA) and 16-phosphono-hexadecanoic acid (16 PHA) were explored in order to tune drug loading and release characteristics of water insoluble (indomethacin) and water soluble drugs (gentamicin). Successful grafting of these functional groups with different interfacial properties was confirmed using X-ray photoelectron spectroscopy (XPS) and Fourier transform infrared spectroscopy (FTIR). Thermogravimetric analysis (TGA) was applied to determine the amount of loaded drugs and UV-spectrophotometry to analyse in vitro drug release from modified DE microparticles. Differences in drug release time (13-26 days) and loading capacity (14-24%) were observed depending on functional groups on the surface of DE microparticles. It was found that hydrophilic surfaces, due to the presence of polar carboxyl, amine or hydrolyzed epoxy group, favor extended release of indomethacin, while the hydrophobic DE surface modified by organic hydrocarbons gives a better sustained release profile for gentamicin. This work demonstrates that by changing surface functionalities on DE microparticles, it is possible to tune their drug loading and release characteristics for both hydrophobic and hydrophilic drugs and therefore achieve optimal drug delivery performance.
Macrolide antibiotics have been found to possess not only antimicrobial properties, but also modulate inflammation. In this review the multi-faceted properties of azithromycin are discussed. Due to the unique anti-inflammatory and antimicrobial properties, macrolides, and especially azithromycin, are currently used for a number of conditions which have both an inflammatory and microbial component. For the same reason, azithromycin may be of value as an adjunct in the management of periodontitis which, although driven by an infectious component, is largely a result of uncontrolled chronic inflammation.

The periodontium is a very dynamic organ that responds rapidly to mechanical and chemical stimuli. It is very complex in that it is composed of two hard tissues (cementum and bone) and two soft connective tissues (periodontal ligament and gingiva). Together these tissues are defined by the molecules expressed by the resident periodontal cells in each compartment and this determines not only the structure and function of the periodontium but also how it responds to infection and inflammation. The biological activity of these molecules is tightly regulated in time and space to preserve tissue homeostasis, influence inflammatory responses and participate in tissue regeneration. In this issue of *Periodontology 2000* we explore new experimental approaches and data sets which help to understand the molecules and cells that regulate tissue form and structure in health, disease and regeneration.

New concepts evolve when existing ones fail to address known factors adequately or are invalidated by new evidence. For decades periodontitis has been considered to be caused by specific bacteria or groups of bacteria and, accordingly, treatment protocols have largely been based on anti-infective therapies. However, close inspection of current data leads one to question whether these bacteria are the cause or the result of periodontitis. Good evidence is emerging to suggest that it is indeed the host response to oral bacteria that leads to the tissue changes noted in gingivitis. These changes lead to an altered subgingival environment that favors the emergence of 'periodontal pathogens' and the subsequent development of periodontitis if the genetic and external environmental conditions are favorable for disease development. Thus, it seems that it is indeed the initial early host-inflammatory and immune responses occurring during the development of gingivitis, and not specific bacteria or their so-called virulence factors, which determine whether periodontitis develops and progresses. In this review we consider these concepts and their potential to change the way in which we view and manage the inflammatory periodontal diseases.
SOFT TISSUE ATTACHMENT TO TITANIUM IMPLANTS COATED WITH GROWTH FACTORS

Bates C, Marino V, Fazzalari NL, Bartold PM.

Background: Enhancing the connective tissue seal around dental implants may be an important factor in implant survival.
Purpose: The objective of the study was to investigate the effect of implant surface modification with either platelet-derived growth factor (PDGF) or enamel matrix derivative (EMD) on connective tissue attachment to titanium implants.
Materials & Methods: Eighteen implants (Branemark® Mk III Groovy NP 3.3 mmØ × 10 mm, Nobel Biocare) were implanted subcutaneously into 12 rats. Six implants each were coated with either PDGF or EMD immediately prior to implantation and six implants were left uncoated. Implants were retrieved at 4 and 8 weeks and assessed histologically to compare the soft tissue adaptation to the implant surfaces.
Results: Ingrowth by soft connective tissue into the threads of all implants was noted at 4 and 8 weeks. Coating with growth factors did not alter the orientation of fibroblasts and collagen fibers. The depth of connective tissue penetration into the implant grooves was significantly greater for the implants coated with PDGF at 4 weeks. The thickness of the connective tissue in growth was significantly less for the implants coated with PDGF at 8 weeks.
Conclusion: Coating of the implant surface with rhPDGF-BB or EMD can increase the speed and quantity of soft tissue healing around the implant surface.

COCHLEAR IMPLANTS IN THE FORENSIC IDENTIFICATION PROCESS

Berketa J, James H, Langlois N, Richards L.

Purpose: Decedents who are severely decomposed, skeletonized or incinerated present challenges for identification. Cochlear implants aid hearing and bear unique serial numbers that can be used to assist with identification of bodies that are not visually identifiable. The purpose of this paper was to highlight companies that have or had manufactured cochlear type implants and demonstrate the appearance of the implants to assist crime scene investigators, pathologists, anthropologists and odontologists.
Method: Investigation of cochlear implants was conducted on the internet and companies were contacted for information regarding their implants.
Results: The functional appearance of a cochlear implant is explained, brands of implants are tabulated and pre and post-incineration images are presented.
Conclusion: The prevalence of cochlear implants is predicted to increase, thus they are likely to become relevant to the identification process. Company brand and serial markings can be retrieved from post-incineration implants making them a valuable aid in identification when other identifiers that may be present are not useful because they are heat-sensitive.

MAMMALIAN TARGET OF RAPAMYCIN INHIBITOR-ASSOCIATED STOMATITIS

Boers-Doets CB, Raber-Durlacher JE, Treister NS, Epstein JB, Arends AB, Wiersma DR, Lalla RV, Logan RM, van Erp NP, Gelderblom H.

With the recent introduction of inhibitors of mammalian target of rapamycin (mTOR) in oncology, distinct cutaneous and oral adverse events have been identified. In fact, stomatitis and rash are documented as the most frequent and potentially dose-limiting side effects. Clinically, mTOR inhibitor-associated stomatitis (mIAS) more closely resembles aphthous stomatitis than oral mucositis due to conventional anticancer therapies. While most cases of mIAS are mild to moderate and self-limiting, more severe and persistent mIAS can become a dose-limiting toxicity. Small ulcerations may cause significant pain and mucosal sensitivity may
occur in the absence of clinical changes. Use of clinical assessment tools that are primarily driven by ulceration size may underestimate mIAS, and assessment should include patient-reported outcomes. This article provides an up-to-date review of the clinical presentation, terminology, pathogenesis, assessment and management of mIAS and other mTOR inhibitor-associated oral adverse events. In addition, areas of future research are considered.

ACCESS TO MEDICINES IN THE PUBLIC SECTOR: ANALYSIS OF USERS OF THE BRAZILIAN UNIFIED NATIONAL HEALTH SYSTEM

Boing AC, Bertoldi AD, Boing AF, Bastos JL, Peres KG.

This study aimed to describe the prevalence of access to medicines in the Brazilian Unified National Health System and associated factors among patients that received prescriptions in the public system. The study analyzed data from the National Household Sample Survey (2008). The sample consisted of individuals with prescriptions written in the National Health System in the two weeks prior to the interview (n = 19,427). The dependent variable was access to all the prescribed medicines inside the system itself. Slightly fewer than half of the sample with prescriptions received the medicines in the public health system; the proportions were higher in the South of Brazil, among black patients, those with less schooling and lower income, and those registered in the Family Health Strategy. When analyzing prescriptions written by the private sector, access to all the prescribed drugs was associated with higher income, higher education, and white skin color. The results emphasize the need for policies to decrease inequalities in access to medicines in Brazil.

ORAL HEALTH IMPACT PROFILE, EUROQOL, AND ASSESSMENT OF QUALITY OF LIFE INSTRUMENTS AS QUALITY OF LIFE AND HEALTH-UTILITY MEASURES OF ORAL HEALTH

Brennan DS.

Oral-specific measures are often preferred to examine outcomes of oral disorders. However, generic measures can add additional information, including health utility. The aim was to assess the Oral Health Impact Profile (OHIP), EuroQol (EQ-5D), and Assessment of Quality of Life (AQoL) instruments in relation to oral health in terms of their discriminative and convergent validities. Data were collected from adults, 30-61 yr of age, in Australia by mailed survey during 2009 and 2010, including the OHIP-14, the EQ-5D, and the AQoL, a range of self-reported oral health variables, and by self-rated oral and general health. Responses were collected from 1093 subjects (a response rate of 39.1%). The OHIP, the EQ-5D, and the AQoL were associated with oral health variables, with effect sizes ranging from 0.6 to 1.1 for the OHIP, from 0.3 to 0.5 for the EQ-5D, and from 0.4 to 0.6 for the AQoL. The OHIP tended to be more strongly correlated with self-rated oral health (rho = -0.5) than with general health (rho = -0.3), whilst the EQ-5D and the AQoL were less strongly correlated with oral health (rho = -0.3 and -0.3, respectively) than with general health (rho = -0.4 and -0.5, respectively). Whilst the OHIP was more sensitive to differences in oral health, the generic measures of EQ-5D and AQoL both exhibited discriminative validity and convergent validity in relation to oral health variables, supporting their use in oral health studies.

DENTAL VISITING BY INSURANCE AND ORAL HEALTH IMPACT

Brennan DS, Anikeeva O, Teusner D.

Background: The aim of this study was to explore whether oral health has an influence on the association between dental insurance and dental visiting.
Methods: A random sample of adults aged 30-61 years living in Australia was drawn from the Australian Electoral Roll. Data were collected by mailed survey in 2009-2010, including age, gender, household income, dental insurance status, dental visiting and oral health impact.

Results: Responses were collected from n = 1096 persons (response rate = 39.1%). Dental insurance was positively associated with visiting a dentist in the last 12 months (prevalence ratio (PR) = 1.48; 95% CI: 1.31-1.67), while oral health impact was not associated with recent visiting PR = 1.01; 95% CI: 0.89-1.14). Visiting for the purpose of pain relief was less prevalent among insured participants (PR = 0.60; 95% CI: 0.44-0.81), but more prevalent among those with poor oral health (PR = 2.85; 95% CI: 2.15-3.76). It was found that oral health impact did not alter the relationship between dental insurance and visiting.

Conclusions: Oral health impacts were not associated with recent dental visits, but were associated with visits for pain relief. Dental insurance was associated with a greater likelihood of recent visits and lower levels of relief of pain visits.

REDUCING DISEASE BURDEN AND HEALTH INEQUALITIES ARISING FROM CHRONIC DISEASE AMONG INDIGENOUS CHILDREN: AN EARLY CHILDHOOD CARIES INTERVENTION IN AOTEAROA/NEW ZEALAND

Broughton JR, Maipi JT, Person M, Thomson WM, Morgaine KC, Tiakiwai SJ, Kilgour J, Berryman K, Lawrence HP, Jamieson LM.


Background: Maaori are the Indigenous people of New Zealand and do not enjoy the same oral health status as the non-Indigenous majority. To overcome oral health disparities, the life course approach affords a valid foundation on which to develop a process that will contribute to the protection of the oral health of young infants. The key to this process is the support that could be provided to the parents or care givers of Maaori infants during the pregnancy of the mother and the early years of the child. This study seeks to determine whether implementing a kaupapa Maaori (Maaori philosophical viewpoint) in an early childhood caries (ECC) intervention reduces dental disease burden among Maaori children. The intervention consists of four approaches to prevent early childhood caries: dental care provided during pregnancy, fluoride varnish application to the teeth of children, motivational interviewing, and anticipatory guidance.

Methods/Design: The participants are Maaori women who are expecting a child and who reside within the Maaori tribal area of Waikato-Tainui. This randomised-control trial will be undertaken utilising the principles of kaupapa Maaori research, which encompasses Maaori leadership, Maaori relationships, Maaori customary practices, etiquette and protocol. Participants will be monitored through clinical and self-reported information collected throughout the ECC intervention. Self-report information will be collected in a baseline questionnaire during pregnancy and when children are aged 24 and 36 months. Clinical oral health data will be collected during standardised examinations at ages 24 and 36 months by calibrated dental professionals. All participants receive the ECC intervention benefits, with the intervention delayed by 24 months for participants who are randomised to the control-delayed arm.

Discussion: The development and evaluation of oral health interventions may produce evidence that supports the application of the principles of kaupapa Maaori research in the research processes. This study will assess an ECC intervention which could provide a meaningful approach for Maaori for the protection and maintenance of oral health for Maaori children and their family, thus reducing oral health disparities.

Trial Registration: Australia and New Zealand Clinical Trials Register (ANZCTR): ACTRN12611000111976.

THE MODERATING ROLE OF DENTAL EXPECTANCIES ON THE RELATIONSHIP BETWEEN COGNITIVE VULNERABILITY AND DENTAL FEAR IN CHILDREN AND ADOLESCENTS

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


Objective: Recently, cognitive approaches have been successfully applied to the understanding of child dental anxiety. Our study aimed to analyze the interplay between cognitive variables and their associations with
dental fear. In particular, we proposed that the observed relationship between dental treatment-related cognitive vulnerability (i.e., uncontrollability, unpredictability, dangerousness, and disgustingness appraisals) and dental fear is moderated by the expectancies of the probability and aversiveness of negative events during dental treatments.

Methods: A questionnaire survey was conducted with data obtained from 179 participants (8-18 years, 55.9% female) who attended 12 randomly selected educational establishments in Madrid (Spain).

Results: Dental fear was associated with an irregular pattern of dental visits. As expected, cognitive vulnerability was strongly linked to dental anxiety. For those children who expected a lower likelihood of negative dental events or appraised them in a less aversive way, the relationship between cognitive vulnerability and fear was attenuated.

Conclusions: As dental fear and oral health are connected, the prevention and reduction of dental fear among children and adolescents might be a worthwhile target for public health interventions. Our study sheds some light on how this could be achieved, that is, by modifying the children's vulnerability appraisals as well as their fearful dental expectancies.

PERIODONTITIS AND TYPE II DIABETES: A TWO-WAY RELATIONSHIP

Chee B, Park B, Bartold PM.

For many years an association between diabetes and periodontitis has been suspected. In more recent times this relationship has been suggested to be bidirectional with each condition being able to influence the other. In this review the two-way relationship between diabetes and periodontitis is considered. For this narrative review a very broad search strategy of the literature was developed using both EMBASE and MEDLINE (via PubMed) databases. The reference lists from the selected papers were also scanned, and this provided an additional source of papers for inclusion and further assessment. The data available suggest that diabetes is a risk as well as a modifying factor for periodontitis. Individuals with diabetes are more likely to have periodontitis and with increased severity when diabetes is uncontrolled/poorly controlled. Possible mechanisms of how diabetes affects periodontitis include adipokine-mediated inflammation, neutrophil dysfunction, uncoupling of bone and advanced glycation end-products-receptor for advanced glycation end-products interaction. Evidence is accruing to support how periodontitis can affect diabetes and complications associated with diabetes. There is some evidence demonstrating that periodontal therapy can result in a moderate improvement in glycaemic control. Available evidence indicates that diabetes and periodontitis are intricately interrelated and that each condition has the capacity to influence clinical features of each other.

ASSESSMENT OF RESTORATIVE TREATMENT OF PATIENTS WITH AMELOGENESIS IMPERFECTA

Chen CF, Hu JC, Estrella MR, Peters MC, Bresciani E.

Purpose: The purpose of this study was to assess restorative treatment outcomes in the mixed dentition of amelogenesis imperfecta (AI) patients and determine the postrehabilitation oral health status and satisfaction of the patients.

Methods: Clinical and radiographic examinations were performed on eight AI patients, who had 74 restorations placed in permanent incisors and molars, to allow evaluation of the integrity of the restorations and periodontal status post-treatment. Subjects completed a survey regarding esthetics, function, and sensitivity.

Results: Among the 74 restorations evaluated, seven were lost; of the remaining restorations, 31 were posterior, and 36 were anterior. Ten were rated clinically unacceptable. Teeth with stainless steel crowns had a moderate gingival index (mean=2.3) and plaque index (mean=2.0) scores. Widening of the periodontal ligament and pulp canal obliteration were common radiographic findings. Subject's recall of satisfaction regarding esthetics (P=.002) and sensitivity (brushing-P=.03; eating-P=.01) showed a statically significant difference before and after treatment.
Conclusions: During mixed dentition, teeth with amelogenesis imperfecta may be restored with conventional treatment modalities. Direct restorations should be considered "interim" with multiple repairs anticipated. Post-treatment, gingival inflammation and plaque accumulation were observed. Subjects were satisfied with their appearance and reported a decrease of hypersensitivity.

**EFFECT OF PDGF-BB AND BETA-TRICALCIUM PHOSPHATE (β-TCP) ON BONE FORMATION AROUND DENTAL IMPLANTS: A PILOT STUDY IN SHEEP**

Choo T, Marino V, Bartold PM.

Objectives: The aim of this investigation was to examine the effect of a combination of purified recombinant human platelet-derived growth factor (rhPDGF-BB) mixed with a synthetic beta-tricalcium phosphate (β-TCP) on bone healing around dental implants with critical size circumferential defects.

Materials & Methods: Three critical size circumferential defects were prepared in the ilium of six sheep. Three dental implants were placed into the centre of each defect and the 3.25 mm circumferential gap was filled with (a) blood clot alone; (b) β-TCP; (c) rhPDGF-BB (0.3 mg/ml) with β-TCP. All the defects in each group were covered with a Bio-Gide® resorbable barrier membrane. The sheep were sacrificed at 2 and 4 weeks and histological and histomorphometric analyses were performed to determine the percentage of new mineralized bone formation and residual β-TCP graft particles in the defects.

Results: Defects filled with rhPDGF-BB/β-TCP showed the highest rate of bone formation after 2 and 4 weeks with limited degradation of the β-TCP particles over 4 weeks. Defects filled with β-TCP showed the least bone fill after 2 and 4 weeks, and faster degradation of the β-TCP particles over 4 weeks compared with defects filled with rhPDGF-BB/β-TCP. Percentage of new mineralized bone was comparable in defects to blood clot alone and β-TCP after 4 weeks of healing, but there was a collapse in the defect area in defects with blood clot alone. In comparison, the space was maintained when β-TCP was used in defects at 4 weeks.

Conclusions: Defects which had β-TCP alone showed an inhibition in bone healing at 2 and 4 weeks; however, the combination of rhPDGF-BB with β-TCP enhanced bone regeneration in these peri-implant bone defects at the same time intervals.

**TRENDS IN DENTAL VISITING AVOIDANCE DUE TO COST IN AUSTRALIA, 1994 TO 2010: AN AGE-PERIOD-COHORT ANALYSIS**

Chrisopoulos S, Luzzi L, Brennan DS.
*BMC Health Serv Res.* 2013 Oct 3;13:381.

Background: The cost of dental care may be a barrier to regular dental attendance with the proportion of the Australian population avoiding or delaying care due to cost increasing since 1994. This paper explores the extent to which age, period and cohort factors have contributed to the variation in avoiding or delaying visiting a dentist because of cost.

Methods: Data were obtained from four national dental telephone interview surveys of Australian residents aged five years and over conducted in 1994, 1999, 2004 and 2010 (response rates 48%-72%). The trend in the percentage of persons avoiding or delaying visiting a dentist because of cost was analysed by means of a standard cohort table and more formal age-period-cohort analyses using a nested models framework.

Results: There was an overall increase in the proportion of people avoiding or delaying visiting a dentist indicating the presence of period effects. Financial barriers were also associated with age such that the likelihood of avoiding because of cost was highest for those in their mid-late twenties and lowest in both children and older adults. Cohort effects were also present although the pattern of effects differed between cohorts.

Conclusion: The findings of this study suggest that, in addition to the increase in costs associated with dental care, policies targeting specific age groups and income levels may be contributing to the inequality in access to dental care.
DO SOCIOECONOMIC DETERMINANTS AFFECT THE QUALITY OF POSTERIOR DENTAL RESTORATIONS? A MULTILEVEL APPROACH.

Correa MB, Peres MA, Peres KG, Horta BL, Barros AJ, Demarco FF.

Objectives: This study aimed to evaluate posterior restorations placed in young adults, investigating the association between social determinants experienced during the life course and the quality of tooth fillings.

Methods: A representative sample (n=720) of all 5914 individuals who were born in Pelotas in 1982 was prospectively investigated, and posterior restorations were assessed at 24 years of age. Exploratory variables included demographic and socioeconomic, oral health and dental service payment mode during the life course. Tooth-related variables (type of tooth, material and size of cavity) were also analysed.

Results: Multilevel logistic regression models showed that individuals who were always poor from birth to age 23 [odds ratio (OR) 2.35 (1.38-4.00)] and whose mothers had less years of education at their birth (OR 2.60 (1.44-4.68)] were with unsatisfactory restorations in posterior teeth more often. In addition, caries presence at age 15 (high decayed, missing, filled teeth (DMFT) tertile) (OR 1.95 (1.25-3.03)) and cavities with four or more surfaces (OR 18.67 (9.25-37.68)) were associated with the outcome.

Conclusions: These results show that socioeconomic characteristics of the individuals play an important role in restoration failures, reinforcing the need for preventive dental strategies and public policies to reduce inequalities as a major topic of oral health. In addition, the size of cavity appears as the most important determinant for restoration failure.

Clinical Significance: Individual socioeconomic characteristics were associated with failure in posterior restorations in detriment of other clinical variables such as restorative material and type of tooth.

APPLYING THE COGNITIVE VULNERABILITY MODEL TO THE ANALYSIS OF COGNITIVE AND FAMILY INFLUENCES ON CHILDREN'S DENTAL FEAR

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

Negative experiences, cognitions, and family variables are involved in the etiology of child dental fear, but previous research has frequently considered them separately. This study uses the Cognitive Vulnerability Model to explore the influence of negative dental experiences and family members on children's dental anxiety. The participants were 185 children who completed a questionnaire comprising measures of dental fear and cognitive vulnerability-related perceptions. Measures were obtained for 88 of the participants' fathers and for 97 of the participants' mothers. Cognitive vulnerability perceptions had the strongest association with children's dental fear ($\beta = 0.40$), explaining 14-21% of the variance in dental fear scores beyond that explained by other variables. Furthermore, vulnerability perceptions mediated the relationship between negative dental experiences and dental fear. Children's dental fear and cognitive vulnerability perceptions were significantly associated with those of their fathers ($r = 0.23$ and $r = 0.40$, respectively) and mothers ($r = 0.28$ and $r = 0.35$, respectively). Moreover, fathers' ($\beta = 0.24$) and mothers' ($\beta = 0.31$) levels of cognitive vulnerability significantly predicted the children's levels of dental fear. The Cognitive Vulnerability Model offers a framework to understand child dental fear. Furthermore, this cognitive approach may help explain why some children develop dental fear problems after suffering a negative dental experience and how dental anxiety is passed on from parents to children.

THE INFLUENCE OF THE VOLUME OF DENTAL TREATMENT ON CHANGE IN SELF-REPORTED ORAL HEALTH

Crocombe LA, Brennan DS, Slade GD.

Objectives: To find an association between self-reported change in oral health and dental treatment volume.
Methods: Baseline data were obtained from the Tasmanian component of the National Survey of Adult Oral Health 2004-06 and 12-month follow-up data from service use logbooks and mail self-complete questionnaires. The global oral health transition statement indicated change in oral health. Many putative confounders were analyzed and Poisson regression with robust variance estimation was used to calculate the prevalence ratios and 95 percent confidence intervals for bivariate- and multivariate-adjusted relationships.

Results: One-eighth (12.4 percent) of the participants reported that their oral health had improved. Over half visited a dentist (n=176, 52.6 percent), of whom 105 received less than six dental services and 71 received six or more dental services. Baseline oral disease (P=0.01), having a treatment need (P<0.01), usually visiting a dentist for a problem (P<0.05), and having a lot of difficulty paying a $100 dental bill (P=0.01) were significantly associated with the same or worsening oral health. The regression model indicated that having six or more dental services (P<0.01) was significantly associated with improvement in oral health, indicating a threshold effect. Usually visiting a dentist for a check-up was significantly associated with improvement in oral health (P<0.01).

Conclusion: Having six or more dental services was significantly associated with a greater self-reported improvement in oral health than having less than six dental services. The greater prevalence ratios with increasing dental service volume suggested a threshold effect.

WILL IMPROVING ACCESS TO DENTAL CARE IMPROVE ORAL HEALTH-RELATED QUALITY OF LIFE?

Crocombe LA, Mahoney GD, Spencer AJ, Waller M.

Background: The aim of this study was to determine if Australian Defence Force (ADF) members had better oral health-related quality of life (OHRQoL) than the general Australian population and whether the difference was due to better access to dental care.

Methods: The OHRQoL, as measured by OHIP-14 summary indicators, of participants from the Defence Deployed Solomon Islands (SI) Health Study and the National Survey of Adult Oral Health 2004-06 (NSAOH) were compared. The SI sample was age/gender status-adjusted to match that of the NSAOH sample which was age/gender/regional location weighted to that of the Australian population.

Results: NSAOH respondents with good access to dental care had lower OHIP-14 summary measures [frequency of impacts 8.5% (95% CI = 5.4, 11.6), extent mean = 0.16 (0.11, 0.22), severity mean = 5.0 (4.4, 5.6)] than the total NSAOH sample [frequency 18.6 (16.6, 20.7); extent 0.52 (0.44, 0.59); severity 7.6 (7.1, 8.1)]. The NSAOH respondents with both good access to dental care and self-reported good general health did not have as low OHIP-14 summary scores as in the SI sample [frequency 2.6 (1.2, 5.4), extent 0.05 (0.01, 0.10); severity 2.6 (1.9, 3.4)].

Conclusions: ADF members had better OHRQoL than the general Australian population, even those with good access to dental care and self-reported good general health.

IS CLINICAL ORAL HEALTH POORER IN REGIONAL AREAS COMPARED WITH MAJOR CITY AREAS?

Crocombe LA, Stewart JF, Brennan DS, Slade GD, Spencer AJ.

Objective: To determine if clinical oral health outcomes differ between people who reside in major city, inner regional and outer regional areas of Australia.

Design: Data from the National Survey of Adult Oral Health 2004-06 that used a clustered stratified random sampling design with telephone interviews, standardised oral epidemiological examinations and self-complete questionnaires were used to compare the clinical oral health.

Main Outcome Measures: Decayed, missing and filled permanent teeth.

Participants: Australians aged 15 years or more. Data were weighted by age, sex and regional location to the Estimated Resident Population, bivariate analysis undertaken to determine confounders and multivariate analysis completed with dental caries clinical measures as dependent variables.
Results: Inner regional people had a significantly higher decayed, missing and filled teeth than people from major cities (Estimate = 1.15, P < 0.01), but there was no difference between inner and regional areas. Older people had higher outcomes for decayed, missing and filled teeth (15.42, P < 0.01) and missing teeth (9.66, P < 0.01), but less decayed teeth (-0.37, P < 0.01), and people with the highest incomes had lower dental caries experience (-1.34, P < 0.01) and missing teeth (-1.42, P < 0.01).

Conclusion: Dental caries experience was greater in inner regional areas than in major city areas, but not outer regional areas. Dental caries experience was similar in outer regional and major city areas.


Background: It is commonly assumed that cardiovascular disease risk factors are associated with affluence and Westernization. We investigated the associations of body mass index (BMI), fasting plasma glucose, systolic blood pressure, and serum total cholesterol with national income, Western diet, and, for BMI, urbanization in 1980 and 2008.

Methods & Results: Country-level risk factor estimates for 199 countries between 1980 and 2008 were from a previous systematic analysis of population-based data. We analyzed the associations between risk factors and per capita national income, a measure of Western diet, and, for BMI, the percentage of the population living in urban areas. In 1980, there was a positive association between national income and population mean BMI, systolic blood pressure, and total cholesterol. By 2008, the slope of the association between national income and systolic blood pressure became negative for women and zero for men. Total cholesterol was associated with national income and Western diet in both 1980 and 2008. In 1980, BMI rose with national income and then flattened at ≈Int$7000; by 2008, the relationship resembled an inverted U for women, peaking at middle-income levels. BMI had a positive relationship with the percentage of urban population in both 1980 and 2008. Fasting plasma glucose had weaker associations with these country macro characteristics, but it was positively associated with BMI.

Conclusions: The changing associations of metabolic risk factors with macroeconomic variables indicate that there will be a global pandemic of hyperglycemia and diabetes mellitus, together with high blood pressure in low-income countries, unless effective lifestyle and pharmacological interventions are implemented.

CLUSTERING OF PHYSICAL INACTIVITY IN LEISURE, WORK, COMMUTING AND HOUSEHOLD DOMAINS AMONG BRAZILIAN ADULTS

Del Duca GF, Nahas MV, de Sousa TF, Mota J, Hallal PC, Peres KG.


Objectives: To identify the clustering of physical inactivity in leisure, work, commuting and household contexts, and the sociodemographic factors associated with the clustering of inactive behaviour in different domains among Brazilian adults.

Study Design: Cross-sectional population-based study.

Methods: The study was performed in Florianopolis, capital of Santa Catarina, one of the southern states of Brazil, from September 2009 to January 2010. Adults aged 20-59 years were interviewed. Physical inactivity in each domain was defined as non-participation in specific physical activities, using a validated Brazilian questionnaire. Clustering of physical inactivity was identified by the ratio between observed prevalence and expected prevalence of 16 different combinations. Multinomial logistic regression was used in the analysis of sociodemographic factors associated with clustering of physical inactivity.

Results: Of the 1720 interviewees, the greatest differences between the observed and expected proportions were observed in simultaneous physical inactivity in the leisure and household domains for men, and physical
inactivity in the leisure domain alone for women (59% and 88%, respectively); these differences were higher than expected if the behaviours were independent. Physical inactivity in two or more domains was observed more frequently in men and in individuals with a higher per-capita family income. Ageing was associated with physical inactivity in three or four domains.

Conclusions: Physical inactivity was observed in different domains according to gender. Men and older individuals with a higher per-capita family income were more likely to exhibit physical inactivity when all domains were considered together.

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATES OF ALL DOMAINS OF PHYSICAL ACTIVITY IN BRAZILIAN ADULTS


Objective: To estimate the prevalence and sociodemographic indicators associated with physical inactivity in leisure, commuting, work, and household in adults in Florianopolis, Brazil.

Methods: Population-based cross-sectional study was conducted from September 2009 to January 2010, with adults between 20 to 59 years of age (n=1720). Sociodemographic indicators and physical inactivity in each domain were assessed by a validated questionnaire, applied through face-to-face interviews.

Results: The prevalence of physical inactivity in each domain was: leisure (52.5%); commuting (50.4%); work (80.9%); and household (57.6%). Women were 27% more inactive in leisure, while men were significantly more inactive at commuting and household (p<0.001). Older adults were more inactive in leisure (p=0.04) and commuting (p=0.05). Physical inactivity in leisure was higher in black adults and those who living with a partner and with lower educational level and lower income. In commuting, those living with a partner and who had higher income were more inactive. Physical inactivity at work was higher in white or brown adults, who had higher educational level and higher income. Physical inactivity in household was found to be higher in adults with higher educational level and higher income.

Conclusions: Sociodemographic indicators presented different associations with physical inactivity in each domain.

PHYSICAL ACTIVITY INDICATORS IN ADULTS FROM A STATE CAPITAL IN THE SOUTH OF BRAZIL: A COMPARISON BETWEEN TELEPHONE AND FACE-TO-FACE SURVEYS


The aim of this study was to compare estimates of prevalence of physical activity indicators and associated sociodemographic factors obtained from telephone and face-to-face interviews with adults. Data from a cross-sectional population based survey of adults living in Florianópolis, Santa Catarina State, Brazil was compared to data collected through the telephonic system VIGITEL. There was no significant difference between the results from telephone interviews (n = 1,475) and face-to-face interviews (n = 1,720) with respect to prevalence of sufficient leisure time physical activity (19.3% versus 15.5%, respectively), sufficient leisure time and/or commuting physical activity (35.1% versus 29.1%, respectively) and physical inactivity (16.2% versus 12.6%, respectively). Some differences were observed with respect to the sociodemographic factors associated with leisure time and/or commuting physical activity and physical inactivity. The two techniques yielded generally similar results with respect to prevalence and sociodemographic factors associated to physical activity indicators.
MULTILEVEL ANALYSIS OF THE ASSOCIATION BETWEEN POSTERIOR RESTORATIONS AND GINGIVAL HEALTH IN YOUNG ADULTS: A POPULATION-BASED BIRTH COHORT

Demarco FF, Correa MB, Horta B, Barros AJ, Peres KG, Peres MA.

Objective: To investigate the association of direct posterior restorations with gingival bleeding and dental calculus in young adults from a birth cohort.

Methods: A representative sample (n = 720) of 5914 infants born live in Pelotas, Brazil, in 1982, were prospectively investigated, and posterior restorations and periodontal health outcomes assessed when they were 24 years of age. Tooth-level exploratory variables included the presence and number of restoration's surfaces. Demographic and socio-economic characteristics, oral health instructions, dental floss usage, dental caries presence and smoking were also considered whilst gingival bleeding and dental calculus were the outcomes. Multilevel logistic regression was carried out.

Results: Class I cavities were found in 15.2% (95% CI 14.5-15.9) of the teeth and class II in 3.6% (3.3-4.0). Percentage of teeth with gingival bleeding was 6.1% (5.6-6.6) and that with dental calculus 22% (21.2-22.8). Even after all the individual variables were controlled for, the presence of a class I [OR 1.51 (1.14-2.00)] and class II [OR 1.76 (1.04-2.97)] cavities was positively associated with gingival bleeding. Class I [OR 1.36 (1.13-1.65)] and Class II [OR 1.80 (1.28-2.53)] cavities were associated with dental calculus also.

Conclusions: Posterior restoration and higher number of restored surfaces was associated with a higher prevalence of gingival bleeding and dental calculus around the restoration.

MAXILLARY IMPLANT OVERDENTURES: CURRENT CONTROVERSIES

Dudley J.

Mandibular implant overdentures have established and predictable benefits over traditional mucosa-borne mandibular dentures and now form part of mainstream dentistry. Maxillary implant overdentures present a number of different challenges. This selective review highlights the paucity of evidence and inconsistent findings in the maxillary implant overdenture literature.

REGULATION OF BONE MORPHOGENETIC PROTEIN SIGNALLING AND CRANIAL OSTEOGENESIS BY GPC1 AND GPC3

Dwivedi PP, Grose RH, Filmus J, Hii CS, Xian CJ, Anderson PJ, Powell BC.

From birth, the vault of the skull grows at a prodigious rate, driven by the activity of osteoblastic cells at the fibrous joints (sutures) that separate the bony calvarial plates. One in 2500 children is born with a medical condition known as craniosynostosis because of premature bony fusion of the calvarial plates and a cessation of bone growth at the sutures. Bone morphogenetic proteins (BMPs) are potent growth factors that promote bone formation. Previously, we found that Glypican-1 (GPC1) and Glypican-3 (GPC3) are expressed in cranial sutures and are decreased during premature suture fusion in children. Although glypicans are known to regulate BMP signalling, a mechanistic link between GPC1, GPC3 and BMPs and osteogenesis has not yet been investigated. We now report that human primary suture mesenchymal cells coexpress GPC1 and GPC3 on the cell surface and release them into the media. We show that they inhibit BMP2, BMP4 and BMP7 activities, which both physically interact with BMP2 and that immunoblockade of endogenous GPC1 and GPC3 potentiates BMP2 activity. In contrast, increased levels of GPC1 and GPC3 as a result of overexpression or the addition of recombinant protein, inhibit BMP2 signalling and BMP2-mediated osteogenesis. We demonstrate that BMP signalling in suture mesenchymal cells is mediated by both SMAD-dependent and SMAD-independent pathways and that GPC1 and GPC3 inhibit both pathways. GPC3
inhibition of BMP2 activity is independent of attachment of the glypican on the cell surface and post-translational glycanation, and thus appears to be mediated by the core glypican protein. The discovery that GPC1 and GPC3 regulate BMP2-mediated osteogenesis, and that inhibition of endogenous GPC1 and GPC3 potentiates BMP2 responsiveness of human suture mesenchymal cells, indicates how downregulation of glypican expression could lead to the bony suture fusion that characterizes craniosynostosis.

**CHEWING IMPAIRMENT AND ASSOCIATED FACTORS AMONG ADULTS**

Figueiredo Dde R, Peres MA, Luchi CA, Peres KG.  

Objective: The aim of this study was to estimate the prevalence of chewing impairment according to sex, and its associated factors in adults.

Methods: A cross-sectional population-based study was carried out with 2,016 subjects aged between 20 and 59 years in Florianopolis, SC, Southern Brazil, in 2009. The sampling was undertaken in two stages, census tracts and households. The outcome 'chewing impairment' was obtained from the question "How often do you have chewing impairment due to teeth or denture problems?". Analyses were carried out with demographics and socioeconomic factors, dental services utilization, and self-related oral health using multivariable logistic regression and stratified by sex.

Results: The response rate was 85.3% (1,720 adults). The prevalence of chewing impairment was 13.0% (95%CI 10.3;15.8) and 18.0% (95%CI 14.6;21.3) among men and women, respectively. Women and men fifty years old and over, who had ten or fewer natural teeth and those who reported toothache were more likely to have chewing impairment. The combination of tooth loss and toothache on chewing impairment was almost four times higher among women.

Conclusions: The magnitude of the associations among socioeconomic, demographics and self-related oral health factors was different according to sex, in general higher for women, with emphasis on toothache. The findings suggest that the impact of oral conditions varies by sex.

**FACIAL AESTHETICS AND PERCEIVED NEED FOR FURTHER TREATMENT AMONG ADULTS WITH REPAIRED CLEFT AS ASSESSED BY CLEFT TEAM PROFESSIONALS AND LAYPERSONS**

Foo P, Sampson W, Roberts R, Jamieson L, David D.  

The objectives of this study were to compare the ratings of professionals and laypeople with and without a cleft regarding the facial aesthetics of adult patients previously treated for orofacial clefting. The necessity for further treatment, as perceived by the respective groups, is also compared. The design of the study was a cross-sectional study. Professionals (two plastic surgeons, one dentist, one orthodontist, and one psychologist) and laypeople (one male and one female adult without a cleft and one male and one female adult with a cleft) were recruited to rate photographs of 80 non-syndromic cleft patients treated by the Australian Craniofacial Unit from 1975 to 2009. Facial aesthetics were measured by a visual analogue scale (VAS; 0-100 mm). High values indicated good aesthetics. Necessity for further treatment was also measured by a VAS (0-100 mm). High values indicated high perceived need for further treatment. The professionals rated facial aesthetics significantly lower and had a lower perception of need for further treatment than the raters with and without a cleft. The laypeople with a cleft rated facial aesthetics significantly higher and had a lower perceived need for further treatment than laypeople without a cleft. The non-surgical professionals rated facial aesthetics significantly lower and had a lower perceived need for further treatment than the surgical professionals. Differences exist in the facial aesthetics ratings and perceived need for further surgery between professionals and laypeople with and without a cleft. This should be considered when managing cleft treatment expectations.
INDIVIDUAL AND CONTEXTUAL DETERMINANTS OF DENTAL CARIES IN BRAZILIAN 12-YEAR-OLDS IN 2010

Freire Mdo C, Reis SC, Figueiredo N, Peres KG, Moreira Rda S, Antunes JL.

Objective: To estimate the prevalence and severity of dental caries in Brazilian children and the association with individual and contextual factors.

Methods: Data were taken from the Brazilian Oral Health Survey (SBBrisol 2010) a sample of 7,247 12-year-olds. The data were collected using clinical examinations and interviews. The dependent variables were the prevalence of dental caries (decayed, missing and filled teeth [DMFT] ≥ 1 and DMFT ≥ 4). Bivariate (Rao Scott test) and multivariate (Poisson regression) analyses were carried out. The individual variables were sociodemographic variables, periodontal health and reporting discomfort while brushing. Contextual factors were the presence of water fluoridation, the percentage of residences connected to the water supply and median income of the municipality.

Results: The prevalence of DMFT ≥ 1 was 56.0%. Mean DMFT was 2.04 (95%CI 1.76;2.31) and 22.2% of children had DMFT ≥ 4. Caries experience was significantly more common in children with black, brown or yellow skin; in low-income families; in children with dental calculus or bleeding gums and in those who reported discomfort while brushing. Living in towns with fluoridated tap water, with low coverage of water supply and with low median income were contextual factors associated with the disease.

Conclusions: The prevalence of dental caries in Brazilian 12-year-olds was low, according to World Health Organization criteria. There were significant geographical and socioeconomic inequalities in levels of the disease.

SURGICALLY-ASSISTED RAPID MAXILLARY EXPANSION OF NARROWED MAXILLAE: A CASE-COHORT STUDY

Gamage SN, Goss AN.

Aims: The aim of this study was to investigate a consecutive cohort of surgically-assisted rapid maxillary expansion cases to determine the indications, results and relapse associated with the procedure.

Methods: The records of 21 cases of SARME treated by the Oral and Maxillofacial Surgery and Orthodontic units at the University of Adelaide were examined. Overall expansion and subsequent relapse were compared on study models and posteroanterior cephalometric radiographs against the variables of age, gender, surgeon, surgical technique, final occlusion and the retention period. Statistical analysis was performed on paired variables.

Results: Maximum expansion was gained across the intermolar width and the most relapse identified across the canines. Male patients showed statistically greater stability across the intercanine width. There were otherwise no significant relationships between the treatment variables, stability or relapse.

Conclusions: SARME is a safe surgical technique for narrowed maxillae requiring intermolar expansion of 6 mm or more. Overexpansion of up to 60% is required to compensate for relapse.

AZITHROMYCIN SUPPRESSES HUMAN OSTEOCLAST FORMATION AND ACTIVITY IN VITRO

Gannon SC, Cantley MD, Haynes DR, Hirsch R, Bartold PM.

Azithromycin is an antibiotic with anti-inflammatory properties used as an adjunct to treat periodontitis, a common inflammatory mediated condition featuring pathologic alveolar bone resorption. This study aimed to determine the effect of azithromycin on human osteoclast formation and resorptive activity in vitro. Osteoclasts were generated from peripheral blood mononuclear cells stimulated with macrophage colony stimulating factor.
(M-CSF) and receptor activator of nuclear factor kappa B (RANK) ligand. The effects of azithromycin at concentrations ranging from 0.5 to 40 µg/ml were tested. Osteoclast formation and activity, acidification, actin ring formation and expression of mRNA, and protein encoding for key osteoclast genes were assessed. The results demonstrated that azithromycin reduced osteoclast resorptive activity at all concentrations tested with osteoclast formation being significantly reduced at the higher concentrations (20 and 40 µg/ml). mRNA and protein expression of key osteoclast transcription factor Nuclear Factor of Activated T cells (NFATc1) was significantly reduced by azithromycin at later stages of osteoclast development (day 17). Azithromycin also reduced tumor necrosis factor receptor associated factor-6 (TRAF6) mRNA expression at day 14, and cathepsin K mRNA expression at days 14 and 17. Integrin β3 and MMP-9 mRNA expression was reduced by azithromycin at day 17 in osteoclasts cultured on dentine. The osteoclast proton pump did not appear to be affected by azithromycin, however formation of the actin ring cytoskeleton was inhibited. This study demonstrates that azithromycin inhibits human osteoclast function in vitro, which may account for at least some of the beneficial clinical effects observed with azithromycin treatment in periodontitis.

**EXPRESSION OF PEPTIDYLARGININE DEIMINASE-2 AND -4, CITRULLINATED PROTEINS AND ANTI-CITRULLINATED PROTEIN ANTIBODIES IN HUMAN GINGIVA**

Harvey GP, Fitzsimmons TR, Dhamarpatni AA, Marchant C, Haynes DR, Bartold PM.


**Background & Objective:** The presence of citrullinated proteins, and peptidylarginine deiminase types -2 (PAD-2) and -4 (PAD-4) in periodontal tissues, determine the presence of anti-cyclic citrullinated protein antibodies (anti-CCP) in gingival crevicular fluid (GCF) and compare the expression of these proteins between inflamed and non-inflamed sites.

**Material & Methods:** Tissue sections were stained using antibodies against citrullinated proteins, PAD-2 and PAD-4. RT-PCR was performed to investigate PAD-2 and PAD-4 mRNA in inflamed and non-inflamed gingival tissues. Anti-CCP antibodies in gingival crevicular fluid were detected by ELISA.

**Results:** Citrullinated proteins, PAD-2 and PAD-4 were detected in gingiva. There was a correlation between inflammation and expression of these proteins. mRNAs for PAD-2 and PAD-4 were detected in both inflamed and non-inflamed gingival tissues. Antibodies to CCP were found mostly in the GCF of individuals with periodontitis.

**Conclusion:** PAD-2 and PAD-4 (protein and mRNA) as well as citrullinated proteins are present in inflamed gingiva, and anti-CCP antibodies can be detected in the GCF of some patients. Tissue expression of citrullinated proteins and PAD increased with the severity of inflammation. The presence of anti-CCP antibodies in GCF was almost exclusive to a subset of patients with periodontitis. Increased expression of these proteins in inflamed gingiva lends support to the notion that periodontal inflammation contributes to the inflammatory burden in a similar way to rheumatoid arthritis.

**RETINOL-BINDING PROTEIN 4 IS EXPRESSED IN CHONDROCYTES OF DEVELOPING MOUSE LONG BONES: IMPLICATIONS FOR A LOCAL ROLE IN FORMATION OF THE SECONDARY OSSIFICATION CENTER**

Hatfield JT, Anderson PJ, Powell BC.

*Histochem Cell Biol.* 2013 May;139(5):727-34.

Retinol-binding protein 4 (Rbp4) is the major carrier of retinol in the bloodstream, a retinoid whose metabolites influence osteogenesis, chondrogenesis and adipogenesis. Rbp4 is mainly produced in the liver where it mobilizes hepatic retinol stores to supply other tissues. However, Rbp4 is also expressed in several extrahepatic tissues, including limbs, where its role is largely unknown. This study aimed to identify the cellular localization of Rbp4 to gain insight into its involvement in limb development and bone growth. Using immunohistochemistry, we discovered that Rbp4 was present in a variety of locations in developing embryonic and postnatal mouse hindlimbs. Rbp4 was present in a restricted population of epiphyseal chondrocytes and perichondral cells correlating to the future region of secondary ossification. With the onset of secondary
ossification, Rbp4 was detected in chondrocytes of the resting zone and in chondrocytes that bordered invading cartilage canals and the expanding front of ossification. Rbp4 was less abundant in proliferating chondrocytes involved in primary ossification. Our data implicate the involvement of chondrocytic Rbp4 in bone growth, particularly in the formation of the secondary ossification center of the limb.

UNMET DENTAL NEED IN COMMUNITY-DWELLING ADULTS WITH MENTAL ILLNESS: RESULTS FROM THE 2007 MEDICAL EXPENDITURE PANEL SURVEY

Heaton LJ, Mancl LA, Grembowski D, Armfield JM, Milgrom P.

Background: Mental illness (MI) affects approximately one in five U.S. adults, and it is associated with oral disease and poor dental treatment outcomes. Little is known about dental care utilization or unmet dental need in this population.

Methods: The authors examined data regarding presence or absence of dental visits and unmet dental need in community-dwelling adults with MI from the 2007 Medical Expenditure Panel Survey. They tested differences between adults with and without MI by using multivariate logistic regression.

Results: Eighteen percent of adults (N = 19,368) had MI, and of these, 6.8 percent had unmet dental need. Although people with MI were not significantly more likely to have had a dental visit (46.3 percent) than were those without MI (42.2 percent; odds ratio [OR], 1.09; 95 percent confidence interval [CI], 0.97-1.23), they were significantly more likely to report unmet need (11.0 versus 5.3 percent; OR, 2.00; 95 percent CI, 1.67-2.41). Those with mood or anxiety disorders were most likely to report having an unmet dental need (P < .001 for all values).

Conclusions: Although people with MI did not visit the dentist significantly more often than did adults without MI, their higher level of unmet need suggests that current use of dental services is not addressing their needs adequately.

Practical Implications: Dentists should be familiar with MI conditions as patients with MI may have greater unmet dental need.

HEALING RESPONSES FOLLOWING TRANSVERSE ROOT FRACTURE: A HISTORICAL REVIEW AND CASE REPORTS SHOWING HEALING WITH (A) CALCIFIED TISSUE AND (B) DENSE FIBROUS CONNECTIVE TISSUE

Heithersay GS, Kahler B.

Background: The understanding and management of transverse intra-alveolar root fractures has evolved to its current high level of sophistication and clinical success from foundations laid down by histological studies as early as the mid-nineteenth century.

Significance: The aim of the review was to highlight those earlier histological reports and studies that have contributed to the current understanding of the biological processes involved in the healing of transverse root fractures. Healing of a transverse root fracture by calcified tissue was demonstrated histologically by Howe in 1926, while Boulger in 1928 showed the two other patterns of root fracture healing, namely the interposition of fibrous connective tissue and the interposition of bone and periodontal ligament around both fractured segments. Other major histological reports around that time came from members of the so-called ‘The Vienna group of Illinois’, who had a significant influence in the development of oral biology worldwide. Other important reports and an experimental study emanated from Germany and Switzerland in the late 30s and early 40s, followed in the 1950s and early 1960s by histological material principally from Sweden, Denmark, France, the USA and Britain. Jens Andreassen and Erik Hjörting-Hansen's landmark paper in 1967 included new histological reports and a classification of healing responses following transverse root fractures. The expansion of knowledge related to root fractures since that time has been exponential, with major contributions from Scandinavia and several other countries.
Case Reports: Accompanying the historical review are two case reports with histology of root fracture healing by (a) calcified tissue and (b) dense fibrous connective tissue. The role of the pulp and the periodontal ligament in the repair process is described and the clinical significance discussed with particular emphasis to diagnosis and orthodontic management.

TEETH AS A SOURCE OF DNA FOR FORENSIC IDENTIFICATION OF HUMAN REMAINS: A REVIEW

Higgins D, Austin J.
Science and Justice. 2013 Jun 53:433

Teeth and bones are frequently the only sources of DNA available for identification of degraded or fragmented human remains. The unique composition of teeth and their location in the jawbone provide additional protection to DNA compared to bones making them a preferred source of DNA in many cases. Despite this, post-mortem changes in the structure and composition of teeth, and the location and diagenesis of DNA within them are poorly understood. This review summarises current knowledge of tooth morphology with respect to DNA content and preservation, and discusses the way in which post-mortem changes will affect the recovery of DNA from teeth under a range of commonly used extraction protocols. We highlight the benefits and pitfalls of using specific tooth tissues for DNA extraction and make recommendations for tooth selection and sampling that will maximise DNA typing success. A comprehensive understanding of tooth structure and an appreciation of the relationship between DNA and mineralized tissues in post-mortem teeth are critical for optimal sample selection. More informed sampling methods that target specific tooth tissues will increase the likelihood of successful genetic analysis and allow for efficient and timely missing persons case work and disaster victim identification response.

TARGETED SAMPLING OF CEMENTUM FOR RECOVERY OF NUCLEAR DNA FROM HUMAN TEETH AND THE IMPACT OF COMMON DECONTAMINATION MEASURES

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

Background: Teeth are a valuable source of DNA for identification of fragmented and degraded human remains. While the value of dental pulp as a source of DNA is well established, the quantity and presentation of DNA in the hard dental tissues has not been extensively studied. Without this knowledge common decontamination, sampling and DNA extraction techniques may be suboptimal. Targeted sampling of specific dental tissues could maximise DNA profiling success, while minimising the need for laborious sampling protocols and DNA extraction techniques, thus improving workflows and efficiencies. We aimed to determine the location of cellular DNA in non-degraded human teeth to quantify the yield of nuclear DNA from cementum, the most accessible and easily sampled dental tissue, and to investigate the effect of a common decontamination method, treatment with sodium hypochlorite (bleach). We examined teeth histologically and subsequently quantified the yield of nuclear DNA from the cementum of 66 human third molar teeth. We also explored the effects of bleach (at varying concentrations and exposure times) on nuclear DNA within teeth, using histological and quantitative PCR methods.

Results: Histology confirmed the presence of nucleated cells within pulp and cementum, but not in dentine. Nuclear DNA yields from cementum varied substantially between individuals but all samples gave sufficient DNA (from as little as 20 mg of tissue) to produce full short tandem repeat (STR) profiles. Variation in yield between individuals was not influenced by chronological age or sex of the donor. Bleach treatment with solutions as dilute as 2.5% for as little as 1 min damaged the visible nuclear material and reduced DNA yields from cementum by an order of magnitude.

Conclusions: Cementum is a valuable, and easily accessible, source of nuclear DNA from teeth, and may be a preferred source where large numbers of individuals need to be sampled quickly (for example, mass disaster victim identification) without the need for specialist equipment or from diseased and degraded teeth, where pulp is absent. Indiscriminate sampling and decontamination protocols applied to the outer surface of teeth can destroy this DNA, reducing the likelihood of successful STR typing results.
PERCEIVED NEIGHBORHOOD PROBLEMS: MULTILEVEL ANALYSIS TO EVALUATE PSYCHOMETRIC PROPERTIES IN A SOUTHERN ADULT BRAZILIAN POPULATION

Höfelmann DA, Diez-Roux AV, Antunes JL, Peres MA.

Background: Physical attributes of the places in which people live, as well as their perceptions of them, may be important health determinants. The perception of place in which people dwell may impact on individual health and may be a more telling indicator for individual health than objective neighbourhood characteristics. This paper aims to evaluate psychometric and ecometric properties of a scale on the perceptions of neighbourhood problems in adults from Florianopolis, Southern Brazil.

Methods: Individual, census tract level (per capita monthly familiar income) and neighbourhood problems perception (physical and social disorders) variables were investigated. Multilevel models (items nested within persons, persons nested within neighbourhoods) were run to assess ecometric properties of variables assessing neighbourhood problems.

Results: The response rate was 85.3%, (1,720 adults). Participants were distributed in 63 census tracts. Two scales were identified using 16 items: Physical Problems and Social Disorder. The ecometric properties of the scales satisfactory: 0.24 to 0.28 for the intra-class correlation and 0.94 to 0.96 for reliability. Higher values on the scales of problems in the physical and social domains were associated with younger age, more length of time residing in the same neighbourhood and lower census tract income level.

Conclusions: The findings support the usefulness of these scales to measure physical and social disorder problems in neighbourhoods.

THE HEALING OF DENTAL EXTRACTION SOCKETS IN PATIENTS WITH TYPE 2 DIABETES ON ORAL HYPOGLYCAEMICS: A PROSPECTIVE COHORT

Huang S, Dang H, Huynh W, Sambrook PJ, Goss AN.

Background: The aim of this study was to determine whether there is a difference in delayed healing following dental extractions for Type 2 diabetics on oral hypoglycaemics and non-diabetic patients.

Methods: Prospective patients referred for dental extractions were recruited into two groups: known diabetics and non-diabetics with no conditions associated with poor healing. All had a random blood glucose level (BGL). Extractions were performed using local anaesthesia. Delayed healing cases were identified and statistical evaluation performed to identify risk factors.

Results: There were 224 Type 2 diabetics on oral hypoglycaemics (BGL 7.51, range 4.1-17.4) and 232 non-diabetics. The diabetic group were older, more males and less smokers than the control group. Twenty-eight patients, 12 (5%) diabetic and 16 (7%) control group, had socket healing delayed for more than one week but all healed in four weeks. There were no statistical differences between delayed healing and age, gender, diabetic state, BGL or smoking. The younger control group had more healing problems.

Conclusions: The traditional view that diabetics have increased delayed healing was not supported. Type 2 diabetics on oral hypoglycaemics should be treated the same as non-diabetic patients for extractions.

GENETIC, EPIGENETIC, AND ENVIRONMENTAL INFLUENCES ON DENTOFACIAL STRUCTURES AND ORAL HEALTH: ONGOING STUDIES OF AUSTRALIAN TWINS AND THEIR FAMILIES


The Craniofacial Biology Research Group in the School of Dentistry at The University of Adelaide is entering an exciting new phase of its studies of dental development and oral health in twins and their families. Studies
of the teeth and faces of Australian twins have been continuing for nearly 30 years, with three major cohorts of twins recruited over that time, and currently we are working with twins aged 2 years old to adults. Cross-sectional data and records relating to teeth and faces of twins are available for around 300 pairs of teenage twins, as well as longitudinal data for 300 pairs of twins examined at three different stages of development, once with primary teeth, once at the mixed dentition stage, and then again when the permanent teeth had emerged. The third cohort of twins comprises over 600 pairs of twins recruited at around birth, together with other family members. The emphasis in this third group of twins has been to record the timing of emergence of the primary teeth and also to sample saliva and dental plaque to establish the timing of colonization of decay-forming bacteria in the mouth. Analyses have confirmed that genetic factors strongly influence variation in timing of primary tooth emergence. The research team is now beginning to carry out clinical examinations of the twins to see whether those who become colonized earlier with decay-forming bacteria develop dental decay at an earlier age. By making comparisons within and between monozygotic (MZ) and dizygotic (DZ) twin pairs and applying modern molecular approaches, we are now teasing out how genetic, epigenetic, and environmental factors interact to influence dental development and also oral health.

MESENCHYMAL STEM CELLS FROM IPS CELLS FACILITATE PERIODONTAL REGENERATION

Hynes K, Menicanin D, Han J, Marino V, Mrozik K, Gronthos S, Bartold PM.

Mesenchymal stem cells (MSC) have been considered as a potential therapy for the treatment of periodontal defects arising from periodontitis. However, issues surrounding their accessibility and proliferation in culture significantly limit their ability to be used as a mainstream treatment approach. It is therefore important that alternative, easily accessible, and safe populations of stem cells be identified. Controlled induction of induced pluripotent stem cells (iPSC) into MSC-like cells is emerging as an attractive source for obtaining large populations of stem cells for regenerative medicine. We have successfully induced iPSC to differentiate into MSC-like cells. The MSC-like cells generated satisfied the International Society of Cellular Therapy's minimal criteria for defining multipotent MSC, since they had plastic adherent properties, expressed key MSC-associated markers, and had the capacity to undergo tri-lineage differentiation. Importantly, the resulting iPSC-MSC-like cells also had the capacity, when implanted into periodontal defects, to significantly increase the amount of regeneration and newly formed mineralized tissue present. Our results demonstrate, for the first time, that MSC derived from iPSC have the capacity to aid periodontal regeneration and are a promising source of readily accessible stem cells for use in the clinical treatment of periodontitis.

ORAL HEALTH AND OTHER CHARACTERISTICS OF PREGNANT ABORIGINAL WOMEN COMPARED WITH GENERAL POPULATION ESTIMATES

Jamieson L.

Aboriginal and Torres Strait Islander Australians have around five times the prevalence of dental disease experience than non-Aboriginal Australians, and profound oral health inequalities have been noted. There are high levels of periodontal disease (up to 90% in some Aboriginal adult groups compared with one-quarter in non-Aboriginal adults), particularly given the links between periodontal disease and a range of chronic conditions such as diabetes, cardiovascular disease and kidney disease. Whilst improvements in many areas of Aboriginal health have been noted, the oral health of this vulnerable population is decreasing. There is evidence that oral health is considered an important component of general health and well-being among Aboriginal groups, who see that ‘Closing the Gap includes Closing the Oral Health Gap’. An important group within the Aboriginal population in terms of oral health risk are pregnant women. Dental services during pregnancy can improve maternal oral health, reduce mother-child transmission of cariogenic bacteria and create opportunities for anticipatory guidance. Many women do not see the importance of oral care during pregnancy, while others experience barriers to care, such as not having dental coverage and access to care.
This report examines the oral health and other key characteristics of pregnant Aboriginal women and compares against population benchmarks. This is a nested study within an over-arching randomized control trial known as ‘Baby Teeth Talk’ (BTT).

**ORAL HEALTH LITERACY COMPARISONS BETWEEN INDIGENOUS AUSTRALIANS AND AMERICAN INDIANS**

Jamieson LM, Divaris K, Parker EJ, Lee JY.

Objectives: To compare oral health literacy (OHL) levels between two profoundly disadvantaged groups, Indigenous Australians and American Indians, and to explore differences in socio-demographic, dental service utilisation, self-reported oral health indicators, and oral health-related quality of life (OHRQoL) correlates of OHL among the above.

Methods: OHL was measured using REALD-30 among convenience samples of 468 Indigenous Australians (aged 17-72 years, 63% female) and 254 female American Indians (aged 18-57 years). Covariates included socio-demography, dental utilisation, self-reported oral health status (OHS), perceived treatment needs and OHRQoL (prevalence, severity and extent of OHIP-14 'impacts'). Descriptive and bivariate methods were used for data presentation and analysis, and between-sample comparisons relied upon empirical contrasts of sample-specific estimates and correlation coefficients.

Results: OHL scores were: Indigenous Australians - 15.0 (95% CL=14.2, 15.8) and American Indians--13.7 (95% CL=13.1, 14.4). In both populations, OHL strongly correlated with educational attainment, and was lower among participants with infrequent dental attendance and perceived restorative treatment needs. A significant inverse association between OHL and prevalence of OHRQoL impacts was found among American Indians (rho=-0.23; 95% CL = -0.34, -0.12) but not among Indigenous Australians.

Conclusions: Our findings indicate that OHL levels were comparable between the two groups and lower compared to previously reported estimates among diverse populations. Although the patterns of association of OHL with most examined domains of correlates were similar between the two groups, this study found evidence of heterogeneity in the domains of self-reported OHS and OHRQoL.

**ASSOCIATIONS BETWEEN AREA-LEVEL DISADVANTAGE AND DMFT AMONG A BIRTH COHORT OF INDIGENOUS AUSTRALIANS**

Jamieson LM, Do LG, Bailie RS, Sayers SM, Turrell G.

Background: Individual-level factors influence DMFT, but little is known about the influence of community environment. This study examined associations between community-level influences and DMFT among a birth cohort of Indigenous Australians aged 16-20 years.

Methods: Data were collected as part of Wave 3 of the Aboriginal Birth Cohort study. Fifteen community areas were established and the sample comprised 442 individuals. The outcome variable was mean DMFT with explanatory variables including diet and community disadvantage (access to services, infrastructure and communications). Data were analysed using multilevel regression modelling.

Results: In a null model, 13.8% of the total variance in mean DMFT was between community areas, which increased to 14.3% after adjusting for gender, age and diet. Addition of the community disadvantage variable decreased the variance between areas by 4.8%, indicating that community disadvantage explained one-third of the area-level variance. Residents of under-resourced communities had significantly higher mean DMFT (β = 3.86, 95% CI 0.02, 7.70) after adjusting for gender, age and diet.

Conclusions: Living in under-resourced communities was associated with greater DMFT among this disadvantaged population, indicating that policies aiming to reduce oral health-related inequalities among vulnerable groups may benefit from taking into account factors external to individual-level influences.
ASSOCIATIONS BETWEEN ORAL HEALTH AND HEIGHT IN AN INDIGENOUS AUSTRALIAN BIRTH COHORT

Jamieson LM, Sayers SM, Roberts-Thomson KF.

Objective: Evidence suggests that taller individuals have better health than their shorter counterparts. This study aimed to test the hypothesis that shorter participants in wave-3 of the Aboriginal Birth Cohort (ABC) study, a prospective longitudinal investigation of Indigenous Australian individuals born 1987-1990 at an Australian regional hospital, would have more caries and periodontal disease experience than their taller counterparts.

Methods: Data were collected through oral clinical examinations, anthropometric measures and self-report questionnaires. The outcome variables were participants' caries (mean DMFT) and periodontal disease experience (moderate or severe periodontal disease as defined by the Centre for Disease Control), with height as an explanatory variable. Antecedent anthropometric, socio-demographic, sugar consumption frequency, dental behaviour and substance use variables were used as possible confounders. Linear regression was used in the analysis of caries experience, while adjusted prevalence ratios were used for prevalence of moderate or severe periodontal disease.

Results: Higher DMFT was found among participants in the shortest tertile (B=1.02, 95% CI=0.02-2.02) and those who consumed sweets every day or a few days a week (B=1.08, 95% CI=0.11-2.05), while lower DMFT was found among those owning a toothbrush (B=0.80, 95% CI=-0.22-1.82). Periodontal disease was positively associated with the shortest tertile (adjusted PR=1.39, 95% CI=0.96-1.82) and negatively associated with toothbrush ownership (adjusted PR=0.50, 95% CI=0.34-0.66).

Conclusion: The hypothesis that shorter participants in wave-3 of the ABC study would have higher levels of caries and periodontal disease was confirmed.

ASSOCIATIONS BETWEEN DISCRIMINATION AND DENTAL VISITING BEHAVIOURS IN AN ABORIGINAL AUSTRALIAN BIRTH COHORT

Jamieson LM, Steffens M, Paradies YC.

Race-based discrimination is associated with a range of adverse health conditions among Indigenous Australians. Studies show links between race-based discrimination, and depression and anxiety as well as smoking, substance use, psychological distress and poor self-assessed health status. The Australian Medical Association reported evidence of ‘inherent discrimination’ in the Australian health system, finding the medical attention received by Indigenous Australians is frequently ‘culturally intolerant’ and unwelcoming.

There is limited information regarding the role of discrimination in access to dental services among Indigenous Australians. We explored whether (i) there were associations between dental service access and self-reported discrimination and (ii) if yes, whether associations between discrimination and access to dental services persisted after adjustment for other risk factors. Participants were Wave-3 members of the Aboriginal Birth Cohort study, a prospective longitudinal investigation of Indigenous Australians living in the Northern Territory's Top End. Participants completed a self-report dental questionnaire. The item pertaining to use of dental services was ‘Have you seen a dentist before?’, with response options of ‘yes’ and ‘no’. Participants additionally completed a social and emotional well-being instrument. Based on items used in the National Aboriginal and Torres Strait Islander Health Survey, respondents were asked if they had ever been treated unfairly or discriminated against because they were Aboriginal. Response options were dichotomised into ‘not really or little bit’ and ‘fair bit and lots of times’. Other risk factors included sex, age, household size, oral health impairment and dental fear. Explanatory variables, which were all significant at the P<0.1 level in bivariate analysis, were entered into a logistical regression model. Adjusted odds ratios were considered statistically significant when p-values derived from the Wald statistic were ≤0.05. Data were analysed using PASW version 18.
IMPACT OF MARGINAL CONTACT OF REMOVABLE ACRYLIC PARTIAL DENTURES ON PERIODONTAL PARAMETERS

Jayasingha RM, Tilakaratne A, Amarasena N, Mack F, Anandamoorthy T.

Aim: To assess the periodontal parameters, plaque score, bleeding on probing, probing pocket depth, gingival recession and loss of attachment of teeth in contact with removable partial dentures and to compare them with teeth in the contra lateral side of the same arch not in contact with the acrylic resin base.

Methods: Sample consisted of 46 partially edentulous patients. Maxillary acrylic partial dentures which were designed as the gingival margin of two teeth on one side of the arch was in contact with the acrylic resin base (control side). The same teeth on contra lateral side of the arch were kept relieved from the denture base. Initial periodontal assessment with plaque score (PLS), bleeding on probing (BOP), probing pocket depth (PPD), gingival recession (GR) and loss of attachment (LOA) was carried out. All patients were periodontally assessed after denture insertions.

Results: Measurements for periodontal parameters were increased significantly at 3 and 6 months of denture wearing in the control side. The changes of all parameters in the test side were not significant.

Conclusions: Acrylic partial dentures tend to adversely affect periodontal parameters when teeth are in contact with resin base. This effect is increased with longer duration of RPD wear.

SUCCESS FOR A NOVEL APPROACH TO PRIORITY SETTING IN SOUTH AUSTRALIAN PUBLIC DENTAL CLINICS

Jones K.

There is increasing use of prognostic models to support evidence based delivery of health care. However, widespread application of such models for use in public dental services to assist in predicting priority of need or treatment planning for patients is not common. Prognostic models facilitate transparent and consistent decision making and remove many of the subjective elements of traditional receptionist methods in determining relative priority between patients calling for same day ‘emergency’ care. Pressures on the Australian public dental system often mean that people are forced in to recidivistic patterns of emergency dental care, receiving treatment only when pain initiates contact with dental health care providers or an inability to access general preventive dental care. Long waiting lists and waiting times for general dental care and an increasing reliance on emergency dental appointments to secure dental care indicate that public dental services are struggling to meet the needs of the community. Contemporary Australian dental health literature consistently suggests that it is a lack of timely and comprehensive access to oral health services that generates oral health inequalities in Australia. Consequently, those relying on public dental services are placed at risk of poor oral health outcomes.

Historically, people seeking priority care with the South Australian Dental Service are allocated care on a ‘first come first served’ basis where self-reported need has been used as the criteria for access to care. The South Australian Dental Service provides general or basic dental care to 87,000 low income adult patients annually. In 2005–2006, approximately 57% of treated patients had sought ‘urgent’ care (n = 52,000). The small proportion (<1%) with life-threatening infection, trauma, etc. are seen on the day they seek care. However, resources do not permit all other patients to be seen on the same day. Reception staff have traditionally acted as the gatekeepers to public dental care. This has required the use of subjective judgement by non-clinicians about a person’s clinical need, based on their self-reported symptoms and typically reception staff have tried to accommodate peoples' requests for same day care.

In response to the need for systematic and transparent demand management strategies in South Australia (SA), some clinics administered basic priority systems, developed by reception staff, using reported oral symptoms. None of these approaches have been validated nor officially mandated or supported by the dental service. A substantial (unknown) minority are denied care. There had been concern that receptionists’ judgements were both inaccurate – possibly allowing higher proportions of people to be treated more urgently.
than was necessary, and inconsistent leading to inequity between equally deserved patients, both within and between clinics. These equity factors were a primary driver in the development and testing of a new triage method known as the Relative Needs Index (RNI) prognostic model in an attempt to be able to quickly screen, identify and prioritize those patients who might most benefit from care. Development and testing of this prognostic model (which comprises eight questions) is reported elsewhere.

This report uses data from two distinct data collection phases to test the accuracy and clinical efficacy of the model on a sample of SA Dental Service patients by the Australian Research Centre for Population Oral Health and the SA Dental Service.

**REORIENTATING DENTAL CURRICULA TO REFLECT A MINIMALLY INVASIVE DENTISTRY APPROACH FOR PATIENT-CENTRED MANAGEMENT**

Kaidonis JA, Skinner VJ, Lekkas D, Winning TA, Townsend GC.


Minimally invasive dentistry (MID), together with patient-centred care (PCC), can be considered central to patient management. These approaches have been incorporated in the structure of various dental curricula and indeed formally assessed. However, there is limited evidence that students have an integrated skill-set and are able to apply these skills when providing direct patient care within the clinical setting. Assessment of students’ application of core clinical skills has identified numerous deficiencies that need to be addressed. The revised Bachelor of Dental Surgery curriculum at the School of Dentistry, The University of Adelaide, provides an example of how MID, underpinned by PCC, can be presented throughout a dental curriculum. Essentially, MID and PCC are not considered as separate subjects but as a patient management approach that is ‘woven into the whole fabric’ of the curriculum. The programme relies on the development of empathic communication skills that enable students to obtain key patient information, including their patients' values, beliefs, needs, preferences and expectations, thereby allowing management to be tailor-made. As a result, patients are empowered to be a part of the oral health care team. The Adelaide undergraduate dental curriculum consists of one clinical stream called Dental Science and Practice (DSP), that promotes the application of student knowledge, skills and behaviours in the clinical setting. Vertical and horizontal integration, aligned with an integrated approach to assessment, drives the learning throughout the programme. Clearly-defined outcomes are introduced by Integrated Learning Activities (ILAs) that provide a focus for associated learning activities (e.g. class meetings, tutorials, simulation laboratories, etc). The aim of this approach to learning and teaching is to ensure the required learning outcomes are achieved. It also requires coordinated teaching teams including trained external tutors who clearly understand all aspects of MID and PCC within the curriculum structure.

**EFFECTS OF FULL-MOUTH SCALING ON THE PERIODONTAL HEALTH OF INDIGENOUS AUSTRALIANS: A RANDOMIZED CONTROLLED TRIAL**


Background: Simplified periodontal therapy might be a pragmatic strategy for public health programmes targeting Indigenous Australian adults. The objective of this randomized controlled trial was to evaluate oral health effects of single-visit, non-surgical periodontal therapy compared to no treatment.

Methods: This parallel-group, randomized, open label clinical trial enrolled 273 Indigenous Australians aged ≥18 years with periodontitis. Intervention participants received full-mouth periodontal scaling and root planing during a single visit while the control group received no treatment. Endpoints were summary variables derived from clinical assessments of probing depth, clinical attachment loss, plaque, calculus and gingival bleeding before treatment and 3 months later.

Results: Endpoints could be calculated for 169 participants with follow-up data. Compared to the control group, there were statistically significant reductions in extent of shallow pockets: PD ≥4 mm (mean difference -2.86,
[95% CI -5.01 to -0.71], p = 0.009) and gingival bleeding (mean difference -0.25, [95% CI -0.43 to -0.08], p = 0.005) but not deeper pockets PD ≥5 mm (mean difference -0.48, [95% CI -1.78 to 0.82], p = 0.468) or plaque scores.

Conclusions: Periodontal therapy produced improvements in shallow periodontal pockets and measures of gingival bleeding in these Indigenous Australians.

PAEDIATRIC SLEEP-DISORDERED BREATHING DUE TO UPPER AIRWAY OBSTRUCTION IN THE ORTHODONTIC SETTING: A REVIEW

Katyal V, Kennedy D, Martin J, Dreyer C, Sampson W.

The essential feature of paediatric sleep-disordered breathing (SDB) is increased upper airway resistance during sleep presenting clinically as snoring. Paediatric SDB is a continuum ranging from primary snoring (PS), which is not associated with gas exchange abnormalities or significant sleep fragmentation, to obstructive sleep apnoea (OSA) with complete upper airway obstruction, hypoxaemia, and obstructive hypoventilation. Adenotonsillar hypertrophy, obesity and craniofacial disharmonies are important predisposing factors in the development and progression of paediatric SDB. Clinical symptoms are significant and domains affected include behaviour, neurocognition, cardiovascular morbidity and quality of life. Overnight polysomnography is the current diagnostic gold standard method to assess SDB severity while adenotonsillectomy is the recommended first line of treatment. Other treatments for managing paediatric SDB include nasal continuous airway pressure, the administration of nasal steroids, dentofacial orthopaedic treatment and surgery. However, there are insufficient long-term efficacy data using dentofacial orthopaedics to treat paediatric SDB. Further studies are warranted to define the characteristics of patients who may benefit most from orthodontic treatment.

CRANIOFACIAL AND UPPER AIRWAY MORPHOLOGY IN PEDIATRIC SLEEP-DISORDERED BREATHING AND CHANGES IN QUALITY OF LIFE WITH RAPID MAXILLARY EXPANSION

Katyal V, Pamula Y, Daynes CN, Martin J, Dreyer CW, Kennedy D, Sampson WJ.

Introduction: The association between pediatric sleep-disordered breathing caused by upper airway obstruction and craniofacial morphology is poorly understood and contradictory. The aims of this study were to evaluate the prevalence of children at risk for sleep-disordered breathing, as identified in an orthodontic setting by validated screening questionnaires, and to examine associations with their craniofacial and upper airway morphologies. A further aim was to assess the change in quality of life related to sleep-disordered breathing for affected children undergoing rapid maxillary expansion to correct a palatal crossbite or widen a narrow maxilla.

Methods: A prospective case-control study with children between 8 and 17 years of age (n = 81) at an orthodontic clinic was undertaken. The subjects were grouped as high risk or low risk for sleep-disordered breathing based on the scores from a validated 22-item Pediatric Sleep Questionnaire and the Obstructive Sleep Apnea-18 Quality of Life Questionnaire. Variables pertaining to a screening clinical examination, cephalometric assessment, and dental cast analysis were tested for differences between the 2 groups at baseline. Ten children who underwent rapid maxillary expansion were followed longitudinally until removal of the appliance approximately 9 months later with a repeated Obstructive Sleep Apnea-18 Quality of Life Questionnaire. All data were collected blinded to the questionnaire results.

Results: The frequency of palatal crossbite involving at least 3 teeth was significantly higher in the high-risk group at 68.2%, compared with the low-risk group at 23.2% (P <0.0001). Average quality of life scores in the high-risk group indicated reduced quality of life related to sleep-disordered breathing by 16% compared with children in the low-risk group at baseline (P <0.0001). Cephalometrically, mean inferior airway space, posterior nasal spine to adenoidal mass distance, and adenoidal mass to soft palate distance were reduced in the high-risk group compared with the low-risk group by 1.87 mm (P <0.03), 2.82 mm (P <0.04), and 2.13 mm (P
The mean maxillary intercanine, maxillary interfirst premolar, maxillary interfirst molar, mandibular intercanine, and mandibular interfirst premolar widths were reduced in the high-risk group compared with the low-risk group by 4.22 mm (P <0.0001), 3.92 mm (P <0.0001), 4.24 mm (P <0.0001), 1.50 mm (P <0.01), and 1.84 mm (P <0.01), respectively. Children treated with rapid maxillary expansion showed an average improvement of 14% in quality of life scores in the high-risk group compared with the low-risk group, which showed a slight worsening in quality of life related to sleep-disordered breathing by an average of 1% (P <0.04), normalizing the quality of life scores in the high-risk children to the baseline scores compared with the low-risk group.

Conclusions: Children at high risk for sleep-disordered breathing are characterized by reduced quality of life, reduced nasopharyngeal and oropharyngeal sagittal dimensions, palatal crossbite, and reduced dentoalveolar transverse widths in the maxillary and mandibular arches. No sagittal or vertical craniofacial skeletal cephalometric predictors were identified for children at high risk for sleep-disordered breathing. In the short term, rapid maxillary expansion might aid in improvement of the quality of life for children with a narrow maxilla in the milder end of the sleep-disordered breathing spectrum.

CRANIOFACIAL AND UPPER AIRWAY MORPHOLOGY IN PEDIATRIC SLEEP-DISORDERED BREATHING: SYSTEMATIC REVIEW AND META-ANALYSIS


Introduction: Pediatric sleep-disordered breathing is a continuum, with primary snoring at one end, and complete upper airway obstruction, hypoxemia, and obstructive hypoventilation at the other. The latter gives rise to obstructive sleep apnea. An important predisposing factor in the development and progression of pediatric sleep-disordered breathing might be craniofacial disharmony. The purpose of this systematic review and meta-analysis was to elucidate the association between craniofacial disharmony and pediatric sleep-disordered breathing.

Methods: Citations to potentially relevant published trials were located by searching PubMed, Embase, Scopus, and the Cochrane Central Register of Controlled Trials. The MetaRegister of controlled trials database was also searched to identify potentially relevant unpublished trials. Additionally, hand-searching, Google Scholar searches, and contact with experts in the area were undertaken to identify potentially relevant published and unpublished studies. Inclusion criteria were (1) randomized controlled trials, case-control trials, or cohort studies with controls; (2) studies in nonsyndromic children 0 to 18 years of age with a diagnosis of sleep-disordered breathing or obstructive sleep apnea by either a sleep disorders unit, screening questionnaire, or polysomnography; and (3) principal outcome measures of craniofacial or upper airway dimensions or proportions with various modalities of imaging for the craniofacial and neck regions. The quality of the studies selected was evaluated by assessing their methodologies. Treatment effects were combined by meta-analysis with the random-effects method.

Results: Children with obstructive sleep apnea and primary snoring show increased weighted mean differences in the ANB angle of 1.64° (P <0.0001) and 1.54° (P <0.00001), respectively, compared with the controls. An increased ANB angle was primarily due to a decreased SNB angle in children with primary snoring by 1.4° (P = 0.02). Children with obstructive sleep apnea had a distance from the posterior nasal spine to the nearest adenoid tissue measured along the PNS-basion line reduced by 4.17 mm (weighted mean difference) (P <0.00001) and a distance from the posterior nasal spine to the nearest adenoid tissue measured along the line perpendicular to the sella-basion line reduced by 3.12 mm (weighted mean difference) (P <0.0001) compared with the controls.

Conclusions: There is statistical support for an association between craniofacial disharmony and pediatric sleep-disordered breathing. However, an increased ANB angle of less than 2° in children with obstructive sleep apnea and primary snoring, compared with the controls, could be regarded as having marginal clinical significance. Therefore, evidence for a direct causal relationship between craniofacial structure and pediatric sleep-disordered breathing is unsupported by this meta-analysis. There is strong support for reduced upper airway width in children with obstructive sleep apnea. Larger well-controlled trials are required to address the
relationship of craniofacial and upper airway morphology to pediatric sleep-disordered breathing in all 3 dimensions.

PERIODONTAL DISEASE AND RHEUMATOID ARTHRITIS: A SYSTEMATIC REVIEW

Kaur S, White S, Bartold PM.
J Dent Res. 2013 May;92(5):399-408.

This systematic review considers the evidence available for a relationship between periodontal disease and rheumatoid arthritis. MEDLINE/PubMed, CINAHL, DOSS, Embase, Scopus, Web of Knowledge, MedNar, and ProQuest Theses and Dissertations were searched from the inception of the database until June 2012 for any quantitative studies that examined the association between periodontal disease and rheumatoid arthritis. Nineteen studies met our inclusion criteria. Good evidence was found to support an association between these conditions with regard to tooth loss, clinical attachment levels, and erythrocyte sedimentation rates. Moderate evidence was noted for C-reactive protein and interleukin-1β. Some evidence for a positive outcome of periodontal treatment on the clinical features of rheumatoid arthritis was noted. These results provide moderate evidence based on biochemical markers and stronger evidence with regard to clinical parameters that common risk factors or common pathologic processes may be responsible for an association between rheumatoid arthritis and periodontal disease. Further studies are required to fully explore both the biochemical processes and clinical relationships between these 2 chronic inflammatory conditions. There is a need to move from case-control studies to more rigorous studies using well-defined populations and well-defined biochemical and clinical outcomes as the primary outcome measures with consideration of potential confounding factors.

EXPLORING THE IMPACT OF ORAL DISEASES AND DISORDERS ON QUALITY OF LIFE OF PRESCHOOL CHILDREN

Kramer PF, Feldens CA, Ferreira SH, Bervian J, Rodrigues PH, Peres MA.

Objective: To assess the impact of oral health outcomes on Oral Health-Related Quality of Life (OHRQoL) in a school-based sample of Brazilian preschool children and their families.

Methods: A cross-sectional study was conducted in 1036 children aged 2-5 years attending all the public nurseries in Canoas, Brazil. Caregivers were asked to complete questionnaire on socioeconomic status and the Early Childhood Oral Health Impact Scale (ECOHIS) on their perception of the children's OHRQoL. Clinical assessment included dental caries, traumatic dental injuries (TDI) and malocclusion. Multivariable Poisson regression models with robust variance were fitted to assess covariates for the prevalence of impacts on OHRQoL following a theoretical hierarchical framework.

Results: 17.4% of the caregivers reported that their child had an impact on at least one ECOHIS item. Negative impacts were more prevalent on items related to pain, difficult drinking and eating some foods. The multivariable Poisson regression analysis showed that dental caries, TDI and malocclusion were associated with the outcome. The prevalence of having any impact on OHRQoL was almost three times higher for children with dental caries (PR 2.74 95% CI 2.02-3.72) compared to those who were caries free; and approximately 1.5 times higher for those who presented TDI (PR 1.70 95% CI 1.27-2.27) and malocclusion (PR 1.42 95% CI 1.04-1.94).

Conclusions: The findings showed that caregivers of young children with oral disease and disorders perceived that both the children and other family members had poorer quality of life. Oral health policies should be included into general health programs based on common risk approach.
The prevalence of oral cancers (OC) is high in Asian countries, especially in South and Southeast Asia. Asian distinct cultural practices such as betel-quid chewing, and varying patterns of tobacco and alcohol use are important risk factors that predispose to cancer of the oral cavity. The aim of this review is to provide an update on epidemiology of OC between 2000 and 2012. A literature search for this review was conducted on Medline for articles on OC from Asian countries. Some of the articles were also hand searched using Google. High incidence rates were reported from developing nations like India, Pakistan, Bangladesh, Taiwan and Sri Lanka. While an increasing trend has been observed in Pakistan, Taiwan and Thailand, a decreasing trend is seen in Philippines and Sri Lanka. The mean age of occurrence of cancer in different parts of oral cavity is usually between 51-55 years in most countries. The tongue is the leading site among oral cancers in India. The next most common sites in Asian countries include the buccal mucosa and gingiva. The 5 year survival rate has been low for OC, despite improvements in diagnosis and treatment. Tobacco chewing, smoking and alcohol are the main reasons for the increasing incidence rates. Low socioeconomic status and diet low in nutritional value lacking vegetables and fruits contribute towards the risk. In addition, viral infections, such as HPV and poor oral hygiene, are other important risk factors. Hence, it is important to control OC by screening for early diagnosis and controlling tobacco and alcohol use. It is also necessary to have cancer surveillance at the national-level to collect and utilise data for cancer prevention and control programs.

Graphene Oxide Decorated Diatom Silica Particles as New Nano-Hybrids: Towards Smart Natural Drug Microcarriers

Kumeria T, Bariana M, Altalhi T, Kurkuri MD, Gibson C, Yang W, Losic D.

Herein, we demonstrate the fabrication of a novel nano-hybrid material based on diatom silica microparticles from diatomaceous earth (DE) and graphene oxide (GO). Two different approaches for the fabrication of nano-hybrids were used, including covalent coupling of GO sheets onto the diatom surface and electrostatic attachment. Covalent attachment was carried out through a facile amine coupling strategy via activation of carboxyl groups on GO, followed by covalent attachment to amine terminal groups of 3-aminopropyltriethoxysilane (APTES) functionalized DE particles. Electrostatic attachment of GO (i.e. negatively charged) was carried out on positively charged APTES functionalized DE particles. The GO decorated DE nano-hybrids prepared with both the fabrication processes were extensively characterized by SEM, TEM, FTIR, and Raman spectroscopy to confirm the new chemical composition and structure. The application of the GO–DE nano-hybrid as a smart pH sensitive micro-drug carrier at pH 7.4 and pH 3.5 was demonstrated using a model drug, indomethacin (IMC). Finally, the drug release data were fitted to zero-order and Korsmeyer–Peppas models to understand the mechanism of drug release.

Endodontic Bacteria from Primary and Persistent Endodontic Lesions in Chinese Patients as Identified by Cloning and 16S Ribosomal DNA Gene Sequencing

Li X, Zhu XF, Zhang CF, Cathro P, Seneviratne CJ, Shen S.

Background: Few literatures pertain to the 16S ribosomal DNA (16S rDNA) analysis of bacteria contributing to primary and persistent endodontic lesions, with no information available for the Chinese population. As such, we investigated endodontic bacteria associated with primary and persistent endodontic lesions in adult Chinese patients living in Beijing, China using 16S rDNA gene sequencing techniques.
Methods: Endodontic microbial samples were obtained from fourteen adult Chinese patients and subjected to DNA extraction. Polymerase chain reaction (PCR) products were cloned and 100 clones from each generated library were randomly selected. Purified plasmid DNA with 16S rDNA gene inserts was sequenced, and the sequences were searched against GenBank databases using the BLASTN algorithm. Only significant identification with the highest-scored BLAST result and 99% minimum similarity was considered for phyotyping.

Results: More than 150 taxa were obtained. Primary endodontic infection was mainly associated with Burkholderia cepacia, Actinomyces, Aranicola spp. and Streptococcus sanguinis, whilst Burkholderia cepacia was predominant in the persistent endodontic infections.

Conclusion: There is a difference in the species profile associated with endodontic infections of Chinese patients living in Beijing in comparison to other geographical or ethnic reports.

**ORAL CONDITIONS AND THEIR SOCIAL IMPACT AMONG HIV DENTAL PATIENTS, 18 YEARS ON**

Liberali SA, Coates EA, Freeman AD, Logan RM, Jamieson L, Mejia G.


Background: A study undertaken in 1992-1993 identified that HIV-infected dental patients were substantially disadvantaged with regard to the social impact of their oral disease. The oral pain experienced by HIV-positive patients prior to the introduction of combination antiretroviral therapy (cART) was attributable to specific features of HIV-related periodontal disease and other oral manifestations of HIV such as candida infections and xerostomia. A repeat of this study in 2009-2010 provided additional information in the post-cART era.

Methods: Data were collected from three sources: the 2009-2010 HIV-positive sample, the National Survey of Adult Oral Health (NSAOH) and the original 1992-1993 study. Collation of data was by clinical and radiographic oral examination. Information about the social impact of oral conditions was obtained from the Oral Health Impact Profile.

Results: The caries experience of the 2009-2010 HIV-positive sample was improved with statistical significance for both mean DMFT and mean DT, while the presence of HIV-related periodontal disease still occurs. Statistically significant improvements were achieved for prevalence and severity of oral health related quality of life.

Conclusions: The need for timely access to oral health care with a focus on prevention is essential for HIV-positive individuals whose health is impacted by chronic disease, smoking and salivary hypofunction.

**FIRST ORAL HEALTH SURVEY AMONG ADOLESCENT AND ADULT URUGUAYAN POPULATION:**

*Methodological issues*

Lorenzo S, Alvarez R, Blanco S, Peres MA.


The object of this article is to present the methodology of the first Uruguayan national wide young and adult oral health survey. It was carried out by the School of Dentistry Universidad de la Republica, during 2010-2011 in order to provide epidemiological data. The survey was performed in the context of the implementation of the National Health System. Methodological aspects followed those suggested by WHO for oral health surveys. A stratified, double phase cluster sampling design was adopted. The capital and the rest of the provinces were considered in two independent samples: one for the provinces (n=922: 8418: 15-24 years; 229: 35-44 years; 275: 65-74 years) and another for the capital (n=563: 279: 15-24 years; 131: 35-44 years; 153: 65-74 years). The survey included a household questionnaire about participants’ risk factors for oral and general health as well as socioeconomic status and dental exams which assessed dental caries, periodontal disease, malocclusions and mucosal lesions. The mean response rate was 61%. Inter-examiner reliability for all conditions varied from 0.6 to 1(Kappa).
INEQUALITIES IN SELF-RATED ORAL HEALTH IN ADULTS

Luchi CA, Peres KG, Bastos JL, Peres MA.

Objective: To investigate the link between self-rated oral health and socio-demographic inequalities.

Methods: Cross-sectional study, carried out with 2,016 adults between 20 and 59 years of age in 2009, in Florianopolis, SC, Southern Brazil. We adopted a two-stage sampling design (census tracts and households). Data were collected through face-to-face interviews, conducted in the participants' households. The outcome was self-rated oral health. The exploratory variables were demographic characteristics, indicators of socioeconomic position, dental service utilization and adverse self-reported oral health conditions. Analysis was performed using multivariable poisson regression, which allowed the estimation of prevalence ratios and 95% confidence intervals.

Results: The prevalence of negative self-rated oral health was 33.2% (95%CI 29.8;36.6). In the adjusted analysis, being of an older age, self-classifying as light-skinned black, lower education, the most recent dental appointment being three years or more ago, attending public dental surgeries, having less than 10 natural teeth in at least one arch, self-reporting need for dental treatment, reporting dry mouth, and difficulty eating due to tooth problems were associated with negative self-rated oral health.

Conclusions: Self-rated oral health reflects social inequalities in health, and it is associated with low socioeconomic status, less frequent use of dental services and poorer self-reported oral health conditions.

EFFECT OF PORPHYROMONAS GINGIVALIS ON CITRULLINATION OF PROTEINS BY MACROPHAGES IN VITRO

Marchant C, Smith MD, Proudman S, Haynes DR, Bartold PM.

Background: Citrullination of proteins within inflamed periodontal tissues may provide an important link between periodontitis and rheumatoid arthritis. The aim of this study is to determine whether the presence of Porphyromonas gingivalis peptidylarginine deiminase (PPAD) can influence citrullination of proteins by either increasing the amount of local citrullinated protein or influencing the peptidylarginine deiminase (PAD) enzymes found in the monocyte/macrophage population.

Methods: Human peripheral blood monocytes and macrophages were incubated in the presence of live or heat-killed P. gingivalis. Expression of PAD2 and PAD4, PPAD, and citrullinated proteins were assessed by either a combination of real-time polymerase chain reaction, Western blotting, or a colorimetric assay.

Results: PPAD was detected only in mononuclear cells incubated in the presence of live P. gingivalis and resulted in increased extracellular citrullination. Endogenous PAD (mRNA and protein) expression was detected in monocytes and macrophages but was not affected by P. gingivalis.

Conclusion: Although P. gingivalis produces a PAD that can citrullinate extracellular proteins and may contribute to the citrullinated protein load in gingival tissues, it does not appear to affect PAD expression or citrullination by host monocytes or macrophages.

PREVALENCE OF BLOOD DONATION AND ASSOCIATED FACTORS IN FLORIANÓPOLIS, SANTA CATARINA: POPULATION-BASED STUDY IN SOUTHERN BRAZIL

Mariano Gislon da Silva R, Kupek E, Peres KG.

The main objectives of this study were to estimate the prevalence of blood donation and to identify associated factors. A populated-based cross-sectional study was carried out (n = 1,720) including subjects 20 to 59 years of age in Florianópolis, Santa Catarina State, Brazil. Blood donation any time in life and in the previous year was reported by 30.6% and 6.2% of respondents, respectively. Among the latter, 31.8% reported repeat
donation (at least twice in the previous year), 80.4% reported voluntary donation, and 15.9% replacement
donation. Multivariate Poisson regression (p < 0.05) showed that male gender, black or brown self-reported
skin color, higher age group, higher educational level, and living with other blood donors were all associated
with ever donating blood, whereas younger age, single marital status, and higher educational level were
associated with donating in the previous year. We found higher prevalence of blood donation in the previous
year and higher percentage of young donors in this group, as well as lower percentage of replacement donors
than previously reported in Brazil.

ROOT CARIES PREVALENCE AND SEVERITY IN BRAZILIAN ADULTS AND OLDER PEOPLE

Marques RA, Antunes JL, Sousa Mda L, Peres MA, Frazao P.

Objective: To estimate the prevalence of root caries in Brazilian adults and elderly.
Methods: We assessed data from the Brazilian Oral Health Survey (SBBrasil 2010). Dental examinations were
performed on 9,564 adults and 7,509 elderly individuals in households in the 26 state capitals, the Federal
District and 150 provincial towns. Diagnostic criteria and data assessment tools were those standardized by
the World Health Organization. The outcome was measured by using root caries index and the index of
decayed and filled dental roots.
Results: The prevalence of root caries was 16.7% in adults and 13.6% in the elderly. The index of decayed
and filled dental roots was 0.42 and 0.32 for adults and the elderly respectively, with most of the index
represented by untreated caries. The prevalence of root caries differed significantly among states capitals and
provincial towns, with higher values being reported in the state capitals in the North and Northeastern Brazilian
regions. In adults, the root caries index ranged from 1.4% in Aracaju to 15.1% in Salvador (both in the
Northeast). Among the elderly, this index ranged from 3.5% in Porto Velho to 29.9% in Palmas (both North). Root
caries was more prevalent in men than in women in both age groups.
Conclusions: There is a wide variation in root caries indices in adults and in the elderly, and between and
within Brazilian regions. Most root caries is untreated. We recommend the incorporation of this disease into
the oral health surveillance system.

MOTORCYCLE ACCIDENT MORTALITY TIME TRENDS IN BRAZIL, 1996-2009

Martins ET, Boing AF, Peres MA.

Objective: To analyze motorcycle accidents mortality trends in Brazil.
Methods: A descriptive time series study of mortality from motorcycle accidents in Brazil between 1996 and
2009 according to state and age group. The data on mortality were obtained from the National Mortality
Information System of Ministry of Health and the population data from the Brazilian Institute of Geography and
Statistics. Standardized mortality rates were calculated for the entire period for the country as a whole and for
each state. Annual variability in mortality rates was estimated using Prais-Winsten generalized linear
correlation.
Results: Between 1996 and 2009 the mortality rate increased from 0.5 to 4.5 per 100,000 habitants (an
increase of 800.0% in mortality rates during the period studied and an average annual increase of 19.0%).
High mortality rates in 2009 were observed in the states of Piauí, Sergipe and Mato Grosso. The largest
increases were observed in states in the North, Northeast and Midwest of Brazil.
Conclusions: There was a significant increase in motorcycle accident mortality rates for the country as a whole
during the studied period, mainly in states in the Northeast.
THE DENTIST’S ROLE IN PROMOTING COMMUNITY WATER FLUORIDATION: A CALL TO ACTION FOR DENTISTS AND EDUCATORS

Melbye ML, Armfield JM.


**Background & Overview:** Community water fluoridation is an important public health intervention that reduces oral health disparities and increases the health of the population. Promotion of its safety and effectiveness is critical to maintaining its widespread acceptance and ensuring its continued use. Dentists are a potentially important source of knowledge regarding the oral health benefits and safety of water fluoridation. However, few dentists regularly discuss fluorides, and water fluoridation in particular, with patients. The authors aim to describe and discuss the role and importance of dentists’ promotion of public water fluoridation, barriers to dentists’ involvement and some approaches that might influence dentists to promote water fluoridation more actively.

**Conclusions & Practice Implications:** Ongoing promotion of fluoridation by dentists is a key factor in ensuring sustained municipal water fluoridation. However, current undergraduate dental curricula do not adequately prepare dentists for this role, and continuing dental education may be insufficient to change clinical practice. Although smoking-cessation literature can shed some light on how to proceed, changing dentists’ practice behavior remains a largely unstudied topic. Dental associations are a key resource for dentists, providing information that can assist them in becoming advocates for water fluoridation.

PREVALENCE AND PATTERNING OF MAXILLARY PREMOLAR ACCESSORY RIDGES (MXPARS) IN SEVERAL HUMAN POPULATIONS

Mihailidis S, Scriven G, Khamis M, Townsend G.


We present new data on the prevalence and patterning of the maxillary premolar accessory ridge (MxPAR), a common but understudied morphological dental trait that is expressed as a linear elevation extending from the buccal cusp ridge to the medial sulcus of maxillary premolar teeth. A total of 579 sets of dental casts, representing six ethnic groups, were scored using the five-grade system proposed by Burnett et al. (2010). The frequency and distribution of the MxPAR were determined by tooth type, sex, side, locus and ethnicity, and the applicability of the scoring system was assessed. The MxPAR was found in approximately two-thirds of premolar teeth, more often on second than first premolars, and more often on the distal aspect of the occlusal surface than the mesial. There was some evidence that more pronounced forms of the feature occurred more often in males than females, and that there may be some directionality in its expression between sides. Variation was also noted in the frequency of occurrence and degree of expression of the MxPAR between ethnic groups. Intra- and inter-observer concordance rates for scoring the MxPAR were low, confirming that it was difficult to score the trait identically on two different occasions. Our findings have clarified the distribution of the MxPAR within the dentition and between ethnic groups, and highlighted the need for researchers to carry out thorough replicability studies and to decide on an appropriate breakpoint for determining presence or absence of this feature before embarking on genetic studies or bio-distance analyses.

DETERMINANTS OF DENTAL SERVICES UTILIZATION BY ADULTS: A POPULATION-BASED STUDY IN FLORIANÓPOLIS, SANTA CATARINA STATE, BRAZIL

Miranda CD, Peres MA.


This study aimed to estimate the prevalence of dental services utilization by adults and to identify associated socioeconomic, demographic, behavioral, and self-awareness factors. A cross-sectional population-based study was conducted with adults living in the urban area of Florianópolis, Santa Catarina State, Brazil, in 2009.
Associations were tested between use of dental services and predisposing, enabling, and needs-based variables. Multivariate analysis was conducted using Poisson regression with estimates of prevalence ratios and was stratified by place of last dental appointment. Prevalence of dental services utilization was 66% (95% CI: 62.9-70.7). Dental visits were 20% more frequent among women and 72% more frequent among individuals with more schooling (the latter in both public and private dental services). Individuals with private dental plans used dental services 13% more than those without. Schooling was the most important variable in predicting utilization. The study's results show the importance of monitoring associated factors in order to promote more equitable use of dental services.

REGENERATION OF PERIODONTAL TISSUES USING ALLOGENEIC PERIODONTAL LIGAMENT STEM CELLS IN AN OVINE MODEL


Aim: To investigate the capacity of allogeneic periodontal ligament stem cells (PDLSCs) to regenerate periodontal tissues using an ovine periodontal defect model.

Materials & Methods: Surgically created zero-wall dehiscence periodontal defects created in Merino sheep were filled with 1 × 10(7) allogeneic PDLSCs attached to Gelfoam®, Gelfoam alone or left untreated. After 4 weeks, histological analysis was performed to assess periodontal regeneration.

Results: Allogeneic PDLSCs were well tolerated by recipient animals. The mean area of new alveolar bone was significantly greater in the PDLSC + Gelfoam treatment group compared with the defect-alone group. The PDLSC + Gelfoam and Gelfoam-only treatment groups displayed significantly greater length of new cementum and percentage of cementum regrowth compared with the defect-alone group. New Sharpey's fibers were generally more organized and significantly thicker within the PDLSC + Gelfoam treatment group. The PDLSC + Gelfoam treatment group also showed a trend of increased Sharpey's fiber attachment length compared with the Gelfoam-only and defect-alone groups.

Conclusion: These studies support the potential use of allogeneic PDLSC preparations as viable therapies for periodontal regeneration in the clinical setting.

FACTORS ASSOCIATED WITH DENTAL CONSULTATION IN CHILDREN IN TALCA (CHILE) AND IN CHILEAN IMMIGRANTS IN MONTREAL (CANADA)


Objective: To identify the factors that influence the use of dental services in 4-7-year-olds and in 10-13-year-olds resident in the cities of Talca (Chile) and Montreal (Canada).

Methods: A nonprobabilistic cross-sectional study was carried out in 147 boys and girls in Talca and in 94 boys and girls in Montreal between 2009 and 2011. Sociodemographic variables were recorded in parents and children, including age and sex. Data were also gathered on parental education, family composition, and proximity to health centers within neighborhoods. The data were analyzed with Fisher's exact test and the robust Cox regression model (with constant time) with a significance level of 0.05.

Results: In Talca, parental education was significantly associated with dental care visits at least twice a year. The children of parents with university education were 2.20 times more likely to consult a dentist (95% CI: 1.30-3.73). Children whose parents perceived their children's health positively were 53% (OR = 0.47; 95% CI: 0.28-0.77) less likely to consult a dentist. In Montreal, the children of parents with university education were 2.10 times more likely to consult a dentist (95% CI: 1.17-3.76), while older children (10-13 years) were 2.11 (95% CI: 1.15-3.88) times more likely to consult a dentist.

Conclusions: In both cities, parental education level was associated with the use of dental services.
GABA HETERORECEPTORS MODULATE NORADRENALINE RELEASE IN HUMAN DENTAL PULP

Parker DA, Marino V.

γ-aminobutyric-acid-containing neurons and GABA(B) receptors have been identified in human dental pulp; however, their significance in pulpal physiology is unclear. The purpose of this study was to determine whether pre-synaptic GABAergic heteroreceptors influence the release of noradrenaline (NA). Segments of vital pulp were incubated in [(3)H]NA (0.6 µM) and superfused with Krebs solution. GABA, a GABA(B) receptor agonist (baclofen), GABA(A and B) receptor antagonists [bicuculline and (+)-(S)-5, 5-dimethylmorpholinyl-2-acetic acid (Sch 50911), respectively], and a GABA(A) receptor-mediated Cl(-) channel inhibitor (picrotoxin) were added to the superfusion medium at least 10 min prior to the second period of stimulation (S2). Sympathetic nerves were stimulated electrically after 70 (S1) and 115 (S2) min. We determined the effects of agonists/antagonists by comparing the overflow of [(3)H]NA at S2 with that at S1 in the presence and absence of the compound. Baclofen (3 µM) inhibited the release of [(3)H]NA (IC50 = 2 µM), an action reversed by Sch 50911 (10 µM). GABA (100 µM) inhibited the release of [(3)H]NA (IC50 = 75 µM), an effect reversed by Sch 50911 (10 µM) but not by bicuculline (10 µM). However, picrotoxin (100 µM) prevented the inhibitory action of GABA. GABA(B) and GABA(A) heteroreceptors mediate the release of NA from sympathetic nerves in human dental pulp in vitro.

SOCIODEMOGRAPHIC AND CLINICAL ASPECTS OF QUALITY OF LIFE RELATED TO ORAL HEALTH IN ADOLESCENTS

Peres KG, Cascaes AM, Leao AT, Cortes MI, Vettore MV.

Objective: To estimate the prevalence and to identify sociodemographic and oral health factors associated with the negative impact of oral health conditions on the quality of life in adolescents.

Methods: Data from 5,445 adolescents aged 15-19, who took part in the Brazilian Oral Health Survey (SBBrasil 2010) were analyzed, using a multistage sampling design. The outcome was quality of life related to oral health, which was assessed using the Oral Impacts on Daily Performance questionnaire and analyzed as a discrete variable. The independent variables were sex, skin color, schooling, household income, age, untreated dental caries, malocclusion, gingival bleeding, dental calculus, and periodontal pocket. Poisson regression analysis was carried out and mean ratios (MR) with their respective 95% confidence intervals (95%CI) were presented.

Results: Of the total, 39.4% reported at least one negative impact on their quality of life. After adjustment, the mean negative impact was 1.52 (95%CI 1.16;2.00) times higher in females and 1.42 (95%CI 1.01;1.99), 2.66 (95%CI 1.40;5.07) and 3.32 (95%CI 1.68;6.56) higher in those with brown, yellow, and indigenous skin color, respectively, when compared to those with white skin. The lower the level of schooling, the greater the negative impact (MR 2.11, 95%CI 1.30;3.41), likewise for individuals with household income below R$ 500.00 (MR 1.84, 95%CI 1.06;3.17) compared with those with higher incomes. The greatest impact on quality of life was found among adolescents with four or more teeth with untreated dental caries (MR 1.53, 95%CI 1.12;2.10), one or more missing teeth (MR 1.44, 95%CI 1.16;1.80), those with dental pain (RM 3.62, 95%CI 2.93;4.46) and with severe (MR 1.52, 95%CI 1.04;2.23) and very severe malocclusion (MR 1.32, 95%CI 1.01;1.72).

Conclusions: Brazilian adolescents reported a high negative impact of oral health on their quality of life. Inequalities in distribution should be taken into account when planning preventive, monitoring and treatment strategies for oral health problems in groups with the highest impact on their quality of life.
EPIDEMIOLOGICAL PATTERN OF SEVERE MALOCCLUSIONS IN BRAZILIAN ADOLESCENTS

Peres KG, Frazao P, Roncalli AG.

Objective: To describe the distribution of malocclusion and its associated factors in Brazilian adolescents.
Methods: Data from 7,328 subjects aged 12 years and 5,445 adolescents aged 15-19 years were analyzed. The adolescents took part in the Brazilian Oral Health Survey (SBBrasil 2010). The outcome was severe malocclusion according to the dental aesthetic index. The independent variables were sex, skin color, monthly household income, possessions, number of individuals in the household, untreated dental caries, missing teeth and dental appointments or lack thereof, frequency, and reason. Logistic regression analysis was carried out, considering the complex sampling cluster design, based on a hierarchical model.
Results: The prevalence of severe malocclusion was 6.5% and 9.1% in the 12-year-olds and the 15-19-year-olds, respectively. After adjustment, those with lighter- skinned black or black skin were 1.59 (95%CI 1.08;2.34) times more likely to present the outcome compared with those with white skin. The loss of one or more first molars increased 2.66 (95%CI 1.26;5.63) the chance to present severe malocclusion by the age of 12. Adolescents aged 15-19 whose household income was below R$ 1,500.00 (OR 2.69 [95%CI 1.62; 4.47]) and those who had seen a dentist for treatment (OR 2.59 [95%CI 2.55;4.34]) had the greatest chance of having severe malocclusion compared with those with higher incomes and those who visited the dentist for prevention.

TOOTH LOSS IN BRAZIL: ANALYSIS OF THE 2010 BRAZILIAN ORAL HEALTH SURVEY

Peres MA, Barbato PR, Reis SC, Freitas CH, Antunes JL.

Objective: To estimate the mean number of missing teeth, lack of functional dentition and total tooth loss (edentulism) among adolescents, adults and the elderly in Brazil, comparing the results with those of 2003.
Methods: Data from 5,445 adolescents aged 15-19, 9,779 adults aged 35-44 and 7,619 elderly individuals aged 65-74, participants in the Brazilian Oral Health Survey (SBBrasil) 2010, were analyzed. The mean missing teeth, proportion of lack of functional dentition (< 21 natural teeth) and proportion of edentulism (total tooth loss) were estimated for each age group, each state Capital and each macro region. Multivariable logistic regression (tooth loss) and Poisson (absence of functional dentition and edentulism) analyses were performed in order to identify socioeconomic factors and demographic characteristics associated with each outcome.
Results: The prevalence of tooth loss among adolescents was 17.4% (38.9% in 2002-03) ranging from 8.1% among those earning higher income to almost 30% among those with less schooling. Among adolescents, females, those with black or brown skin and those with the lowest levels of income and schooling had a higher prevalence of tooth loss. Lack of functional dentition affected nearly ¼ of adults, it was higher among women, among those with black or brown skin and those with the lowest levels of income and schooling had a higher prevalence of tooth loss. Mean missing teeth in adults decreased from 13.5 in 2002-03 to 7.4 in 2010. More than half of elderly is edentulous (similar to the 2002-03 findings); higher prevalence of edentulism was found among women and those with the lowest levels of income and schooling. Among the elderly the mean missing teeth ranged from 0.1 (in Curitiba, South Brazil and Vitória, Southeast Brazil) to 1.2 (in the North countryside). Among adults the lowest mean missing teeth was found in Vitória (4.2) and the highest in Rio Branco, North Brazil (13.6). Conclusions: A remarkable reduction in tooth loss among adolescents and adults was identified between 2010 and 2003. Among the elderly, tooth loss figure remained the same. In spite of important achievements in tooth loss figures, social and regional inequalities persist.
ORAL HEALTH IMPACT ON QUALITY OF LIFE AMONG ADULTS WITH DISABILITIES: CARER PERCEPTIONS

Pradhan A.

Quality of life is recognized as an important outcome of health care for people with all abilities. There has been a marked increase in interest and the number of oral health-related quality of life (OHRQoL) instruments. In the absence of adequate care, resulting oral diseases like dental caries and periodontal problems can have not only physical and functional but also social, psychological and economic impacts. However, there is no such study on people with disabilities for whom it is difficult to assess the quality of life, especially those with limited or no communication skills, who are unable to express pain and discomfort. They depend greatly on their carers for their daily activities including oral care and for seeking appropriate dental treatment that could have an impact on their quality of life.

Carers play the ‘gate keeper role’ as a contact person of the care recipient making decisions on their behalf and the ‘supportive role’, assisting with oral care and making visits to the dentist. The most widely reported reason for dental visits is when a carer suspects that the care recipient might be experiencing pain by noting changes in behaviour particularly at mealtimes, followed by secondary reasons including halitosis, drooling and aspiration of food and/or liquids. It is the carer who is best placed to note small changes in behaviour and detect any problem. It is the carer’s perceived impact of conditions that will drive them to take their care recipient for treatment.

Therefore, the overall aim was to assess oral health-related quality of life (OHRQoL) among adults with disabilities, from the carer's perspective. The specific aims were to: (1) compare reported negative impacts with indicators like oral health problems and treatment need; and (2) determine factors that are associated with reports of one or more negative impacts on OHRQoL.

IMPLEMENTATION OF A HOSPITAL ORAL CARE PROTOCOL AND RECORDING OF ORAL MUCOSITIS IN CHILDREN RECEIVING CANCER TREATMENT: A RETROSPECTIVE AND A PROSPECTIVE STUDY

Qutob AF, Allen G, Gue S, Revesz T, Logan RM, Keefe D.

Purpose: This retrospective/prospective study was carried out to implement a standardized hospital oral care protocol and record the incidence of oral mucositis for inpatients with childhood cancer.

Methods: The implementation process included stages of collaboration, consultation, education, and evaluation. The retrospective part of the study documented the existing hospital oral care protocol and audited medical records of all pediatric patients diagnosed with cancer over a 12-month period. The frequency of recorded oral mucositis and the rate of referral to the pediatric dentistry department were assessed. Following evaluation of the retrospective study, the literature was searched to create a new hospital oral care protocol. Referral to the dental department was standardized and frequent in-service presentations were given to staff. The oral mucositis scale was recorded daily for all inpatients, and compliance rates were assessed.

Results: Fifty-nine patients’ medical records were audited during the retrospective study. Oral mucositis prevalence was clearly documented at 34%, while an additional 20% lacked a definitive diagnosis. During the prospective study, 38 patients were followed and had a verified incidence of oral mucositis of 33%. The rate of compliance of implementing the oral mucositis scale improved from 41% during the first 4 months to 87% during last 3 months. Referral rates to the dental department increased from 53% during the retrospective study to 100% during the prospective study.

Conclusions: Mutual understanding and collaboration between the oncology and dental departments in hospitals is crucial for standardizing patient care and for improving oral care standards.
## Prevention of Oral Mucositis in Children Receiving Cancer Therapy: A Systematic Review and Evidence-Based Analysis

**Qutob AF, Gue S, Revesz T, Logan RM, Keefe D.**  

This systematic review investigated, critically appraised, and rated the evidence on agents used to prevent oral mucositis in children. A comprehensive search of the relevant literature was performed up to December 2011. Articles were included according to the inclusion/exclusion criteria and were critically appraised for validation and quality assessment using a checklist consisting of 18 categories. Each article was then rated for its strength of evidence. 16,471 articles were retrieved from 19 different databases and then reduced to 27 articles that fit the inclusion criteria. Five articles on oral care protocols supported their use to prevent oral mucositis in children. Seven articles on chlorhexidine mouthwash and three on laser therapy had conflicting evidence of its use. The preventative agents that were supported by one or two articles included: benzydamine mouthwash, iseganan mouthwash, granulocyte-macrophage colony-stimulating factor (GM-CSF) mouthwash, oral/enteral glutamine, oral propantheline and cryotherapy, oral cryotherapy, oral sucralfate suspension, prostaglandin E2 tablets, and chewing gum. The reduction in the rates of occurrence of oral mucositis when using agents of fair (B) to good (A) evidence ranged from 22% to 52%. In conclusion, this review suggests the use of oral care protocols to prevent oral mucositis in children because of their strength of evidence (fair to good). The authors suggest avoiding agents with fair to good evidence against their use (oral sucralfate suspension, prostaglandin E2 tablets, and GM-CSF mouthwash). Agents with conflicting evidence (chlorhexidine mouthwash (used solely), laser therapy, and glutamine) should also be avoided until further research confirms their efficacy.

## Systematic Review of Cytokines and Growth Factors for the Management of Oral Mucositis in Cancer Patients


Purpose: The aim of this project was to review the literature and define clinical practice guidelines for the use of cytokines and growth factor agents for the prevention or treatment of oral mucositis induced by cancer chemotherapy or radiotherapy.

Methods: A systematic review was conducted by the Mucositis Study Group of the Multinational Association of Supportive Care in Cancer/International Society for Oral Oncology (MASCC/ISOO). The body of evidence for each intervention, in each cancer treatment setting, was assigned an evidence level. Based on the evidence level, one of the following three guideline determinations was possible: Recommendation, Suggestion, No guideline possible.

Results: Sixty-four clinical studies across 11 interventions were evaluated. A recommendation was made for the use of recombinant human KGF-1 (palifermin) at a dose of 60 μg/kg per day for 3 days prior to conditioning treatment and for 3 days post-transplant for prevention of oral mucositis in patients receiving high-dose chemotherapy and total body irradiation followed by autologous stem cell transplantation for hematological malignancies. A suggestion was made against using granulocyte macrophage colony-stimulating factor mouthwash for the prevention of oral mucositis in the setting of high-dose chemotherapy followed by autologous or allogeneic stem cell transplantation. No guideline was possible for any other cytokine or growth factor agents due to inconclusive evidence.

Conclusions: Of the cytokine and growth factor agents studied for oral mucositis, the evidence only supports use of palifermin in the specific population listed above. Additional well-designed research is needed on other cytokine and growth factor interventions and in other cancer treatment settings.
AN EVALUATION OF WORKSHOP TRAINING IN MOTIVATIONAL INTERVIEWING FOR ORAL HEALTH COUNSELLORS

Raheb J, Arrow P.

The aim of the study was to describe the findings of workshop training of clinical and non–clinical oral health personnel in a motivational interviewing (MI) approach to oral health counselling. A two–day workshop was conducted to provide training in MI as part of the training for a randomised controlled trial. The training involved a series of short presentations covering the principles, practice and the ‘spirit’ of the MI approach, structured practice exercises and role–play demonstrations. Participants (n=10) undertook structured practice exercises in the use of open–ended questions, non–verbal listening and reflective skills, summaries and affirmations in MI. Trainees then undertook simulated parent practice exercises using role–play with performance feedback and MI with parents of preschool children in a dental care setting. The workshop was evaluated using a knowledge–based questionnaire, trainer evaluation and a Helpful Response Questionnaire. Data were analysed using the paired t–test and the Wilcoxon Signed Rank test. Mean MI knowledge (from 4.3±1.5 to 6.4±1.4, p < 0.01) and Helpful Response Questionnaire scores (from 6.9 to 11.3, p < 0.01) significantly improved. The two–day workshop improved knowledge in MI and empathy among participants.

DIAGNOSTIC VALIDITY OF SELF-REPORTED ORAL HEALTH OUTCOMES IN POPULATION SURVEYS: LITERATURE REVIEW

Ramos RQ, Bastos JL, Peres MA.

Population-based health surveys are increasingly including self-reported oral health measures. However, their validity is frequently questioned. This study aimed to review the diagnostic validity of self-reported oral health measures - regarding periodontal conditions, number of remaining teeth and use and need of prostheses - and to present prototypes of oral health items to assess periodontal conditions. Papers published between 1991 and 2011 were identified through PubMed database. The sample profile, the sample size and the methods used in each study were analyzed, as well as the sensitivity, specificity, positive and negative predictive values of the oral health items. Periodontists were contacted, using a standardized text, sent by e-mail, which asked them to provide self-reported items regarding periodontal conditions. We reviewed 19 studies; 13 assessed periodontal conditions; five, the number of remaining teeth and four, the use and need of prosthesis - some studies evaluated two or more conditions simultaneously. Five of the eight periodontists suggested questions to assess periodontal conditions. The maximum and the minimum sensitivity values to assess periodontal conditions, number of remaining teeth and use and need of prosthesis were 100 and 2%; 91 and 21%; 100 and 100%; respectively; the maximum and the minimum specificity values were 100 and 18%; 97 and 96%; 93 and 93%; respectively. In conclusion, there are acceptable sensitivity and specificity values for number of remaining teeth and use and need of prosthesis only. Finally, we consider there is the need for further studies in the national context, in order to assess the impact of the questions about self-reported oral health conditions in epidemiological analyses. Therefore, it will be possible to empirically verify if self-reported questions can be used in such studies.

INTRAUTERINE HORMONE EFFECTS ON TOOTH DIMENSIONS

Ribeiro DC, Brook AH, Hughes TE, Sampson WJ, Townsend GC.

The human dentition is a complex adaptive system that is influenced by genetic, epigenetic, and environmental factors. Within this system, is sexual dimorphism related to the growth promotion of the Y chromosome, or to hormonal influences, or both? This study is the first to investigate both primary and
permanent tooth sizes in females from opposite-sex dizygotic (DZOS) twin pairs compared with females from dizygotic same-sex (DZSS) and monozygotic (MZ) twin pairs to indicate the influence of intrauterine male hormone, including the initial testosterone surge, on dental development. Serial dental models of the primary, mixed, and permanent dentitions of 134 females from DZOS, DZSS, and MZ twins were examined. Mesiodistal, buccolingual, crown height, and intercuspal dimensions of all primary teeth and selected permanent teeth were determined by image analysis. Univariate and multivariate analyses showed statistically significantly larger crown size in DZOS females in both dentitions, with the crown height dimensions displaying the greatest increase in size. These findings strongly support the Twin Testosterone Transfer hypothesis. We propose that the growth-promoting effects of the Y chromosome and intrauterine male hormone levels influence different tooth dimensions and contribute differentially to the sexual dimorphism of human teeth.

**ECCENTRIC MUSCLE DAMAGE INCREASES INTERMUSCULAR COHERENCE DURING A FATIGUING ISOMETRIC CONTRACTION**

Semmler JG, Ebert SA, Amarasena J.

**Aim:** The purpose of this study was to determine the effect of eccentric muscle damage on muscle activation patterns and intermuscular coherence during a fatiguing isometric contraction involving the elbow flexor muscles.

**Methods:** Ten young subjects participated in three experimental sessions that involved the performance of maximum voluntary contractions (MVCs), a constant-force task at 30% MVC, and a fatiguing isometric contraction at 30% MVC. The three sessions were performed before, 2 h after and 2 days after eccentric exercise to induce muscle damage in elbow flexor muscles. Task performance was quantified with electromyography (EMG) from the elbow flexor (biceps brachii, brachialis and brachioradialis) and extensor (triceps brachii) muscles, M-wave amplitude of biceps brachii, elbow flexor force fluctuations and endurance time of a fatiguing contraction. Intermuscular coherence during the fatiguing contraction was quantified from the rectified surface EMGs between muscle pairs.

**Results:** Eccentric exercise resulted in several indicators of muscle damage, such as a prolonged decline in muscle strength and an increase in muscle soreness 2 days after exercise. A 29% reduction in endurance time was observed 2 h after eccentric muscle damage, which returned to baseline 2 days later. The reduced endurance time 2 h after muscle damage was accompanied by an increase in EMG-EMG coherence between biceps brachii and brachialis muscles, which was observed at the end of the fatiguing contraction.

**Conclusion:** These findings suggest that eccentric muscle damage produces a decrease in endurance time that is accompanied by an increase in intermuscular coherence in the presence of fatigue.

**OBESITY AND DENTAL CARIES: SYSTEMATIC REVIEW**

Silva AE, Menezes AM, Demarco FF, Vargas-Ferreira F, Peres MA.

**Objective:** Identifying, through a systematic literature review, evidence of a possible association between obesity and dental caries.

**Methods:** A search of articles published between 2005 and January 2012 was performed in the Medline/PubMed, LILACS and Web of Science databases. The quality of scientific evidence of the selected articles was assessed by the items proposed for observational studies in the Downs & Black instrument.

**Results:** Initially, 537 references were found; after checking the titles and abstracts by two independent researchers, twenty-eight articles were selected for complete reading. Ten of them that assessed the primary and/or permanent dentition observed a positive association between obesity and dental caries and one study found an inverse association. According to the Downs & Black classification, thirteen articles with good scientific evidence were found.

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Conclusions: The present review did not find sufficient evidence regarding the association between obesity and dental caries, and it did not clarify the possible role of diet and other possible effect modifiers on this association.

**CLUSTERING OF RISK BEHAVIOURS FOR CHRONIC NONCOMMUNICABLE DISEASES: A POPULATION-BASED STUDY IN SOUTHERN BRAZIL**

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

Objective: The purpose of this study was to investigate the prevalence and identify factors associated with simultaneous risk behaviours for chronic noncommunicable diseases in adults in a southern capital in Brazil.

Method: A cross-sectional, population-based study was carried out with 1720 adults in Florianópolis, Brazil. The simultaneous occurrence of tobacco smoking, abusive drinking, inadequate or unhealthy diet, and physical inactivity during leisure was assessed. The independent variables were demographic and socioeconomic characteristics.

Results: Only 8.3% of the respondents did not have any of these factors, whereas the simultaneous occurrence of two or more risk behaviours was 59.4%. The simultaneous presence of four risk behaviours (3.4%) was 220% higher of what would be expected by combining the individual prevalence of these factors (1.5%). The likelihood of individuals having two or more risk behaviours simultaneously was greater in young men, with black skin colour, living without a partner, with lower household per capita income, and lower education.

Conclusion: It is necessary to implement programs that reduce the risk behaviours for chronic noncommunicable diseases among adults in Brazil, especially between young men with low education and income.

**ACCURACY AND MEASURES OF ASSOCIATION OF ANTHROPOMETRIC INDEXES OF OBESITY TO IDENTIFY THE PRESENCE OF HYPERTENSION IN ADULTS: A POPULATION-BASED STUDY IN SOUTHERN BRAZIL**

Silva DA, Petroski EL, Peres MA.

Purpose: This study proposes to examine the accuracy of four anthropometric indexes of obesity to identify the presence of hypertension and assess differences in the estimation and strength of effect measures of the association between each anthropometric measure and hypertension in Brazilian adults.

Methods: A population-based cross-sectional study was carried out with a sample of 1,720 adults from Florianópolis, Brazil. Receiver operating characteristic (ROC) curves were performed to identify the sensitivity and specificity of the best cutoff values for anthropometric indexes (body mass index-BMI, waist circumference-WC, waist-to height ratio-WHtR and conicity index-C-index) for prediction of hypertension. The associations between anthropometric indexes and hypertension were analyzed by Poisson regression expressed as Prevalence Ratios (95% CI) adjusted for socio-demographic variables, health behavior, height, and anthropometric indexes.

Results: Of the four anthropometric indexes studied, BMI, WC, and WHtR were found to have the largest areas under the ROC curve relative to hypertension in both sexes. The cutoff values in women and men associated with presence of hypertension were BMI of 24.9 and 24.6 kg/m(2), WC of 86.2 and 89.5 cm, WHtR of 0.49 and 0.50, and C-index of 1.15 and 1.18, respectively. WC and BMI had greater magnitude of association with presence of hypertension, adjusting for socio-demographic variables, health behavior, height, and anthropometric indexes in women and men, respectively.

Conclusions: Anthropometric indexes provide an effective, simple, inexpensive, and non-invasive means for a first-level screening for hypertension.
PREVALENCE OF PRETERM BIRTH ACCORDING TO BIRTH WEIGHT GROUP: A SYSTEMATIC REVIEW


Objective: To estimate the prevalence of preterm birth by categories of birth weight, and to obtain an equation to correct the estimates.

Methods: Systematic review of the Brazilian literature published from 1990 to 2012, to identify studies with primary collection of data on birth weight and gestational age. Twelve studies were selected and contributed for tabulations of preterm prevalence according to 100 g birth weight categories. These results were combined using sex-specific fractional polynomial equations and the resulting curves were compared with results from the Live Birth Information System for the years 2000, 2005, 2010 and 2011.

Results: For all birth weight categories, preterm prevalence estimates based on primary studies had a higher prevalence than those of the Live Birth Information System. The prevalence reported by the Live Birth Information System was of 7.2% in 2010, about 38.0% lower than the estimated prevalence of 11.7% obtained with the correctional equation.

Conclusions: Information reported by the Live Birth Information System on preterm prevalence does not reflect the true magnitude of the problem in Brazil, and should not be used without the correction factors proposed in the present analyses.

EFFECTS OF FLUORIDATED DRINKING WATER ON DENTAL CARIES IN AUSTRALIAN ADULTS

Slade GD, Sanders AE, Do L, Roberts-Thomson K, Spencer AJ.

Systematic reviews produce conflicting conclusions regarding dental caries-preventive effects of water fluoridation in adults. The authors investigated the relationship using data from the nationally representative 2004-2006 Australian National Survey of Adult Oral Health. Effects were compared between the pre-fluoridation cohort born before 1960 (n = 2,270) and the cohort born between 1960 and 1990 (n = 1,509), when widespread implementation of fluoridation increased population coverage from < 1% to 67%. Residential history questionnaires determined the percentage of each person's lifetime exposed to fluoridated water. Examiners recorded decayed, missing, and filled teeth (DMF-Teeth) and decayed and filled tooth surfaces (DF-Surfaces). Socio-demographic and preventive dental behaviors were included in multivariable least-squares regression models adjusted for potential confounding. In fully adjusted models, > 75% of lifetime exposure to fluoridation relative to < 25% of lifetime exposure was associated with 11% and 10% fewer DMF-Teeth in the pre-1960 (p < .0001) and 1960-1990 cohorts (p = .018), respectively. Corresponding reductions in DF-Surfaces were 30% (p < .001) and 21% (p < .001). Findings for intermediate fluoridation exposure suggested a dose-response relationship. Results were consistent in sensitivity analyses accounting for missing data. In this nationally representative sample of Australian adults, caries-preventive effects of water fluoridation were at least as great in adults born before widespread implementation of fluoridation as after widespread implementation of fluoridation.

MANAGEMENT OF ISOLATED FRACTURES OF THE MEDIAL ORBITAL WALL

Snell BJ, Flapper W, Moore M, Anderson P, David DJ.

The purpose of the present study was to retrospectively review the management and outcome of patients treated by the Australian Craniofacial Unit (ACFU) for isolated fractures of the medial orbital wall. A retrospective medical record review of patients treated between 2008 and 2012 was performed. Ethical
approval was granted by the ethics committee of the Women’s and Children’s Hospital. Patient demographics, causes of injury, physical examination findings, management (conservative or surgical), and findings at follow-up were recorded. Computed tomographic scans were reviewed, and values for fracture area and volume of displaced tissue were calculated. Twenty-four patients with this injury were treated by the ACFU between 2008 and 2012. Eighteen were male, and 6 were female. Assault was the most common cause (15/24 patients). Fifteen patients were managed conservatively, and 9 were treated surgically. In those patients managed conservatively, the mean fracture area was 1.44 cm (0.47-2.47 cm), and the mean volume of displaced tissue was 0.48 mL (0.03-1.15 mL). In patients treated surgically, the mean fracture surface area was 2.32 cm (0.07-3.43 cm), and mean volume of displaced tissue was 0.94 mL (0.00-1.47 mL). No patients were found to have clinically significant enophthalmos at follow-up examination. The current practice of managing isolated fractures of the medial orbital wall at the ACFU has been successful in preventing significant enophthalmos. The thresholds for fracture area and, in particular, volume of displaced tissue, proposed by Jin et al (2000), show merit as a tool for determining patient management.

NON-CARIOS CERVICAL LESIONS: INFLUENCE OF MORPHOLOGY AND LOAD TYPE ON BIOMECHANICAL BEHAVIOUR OF MAXILLARY INCISORS

Soares PV, Santos-Filho PC, Soares CJ, Faria VL, Naves MF, Michael JA, Kaidonis JA, Ranjitkar S, Townsend GC.

Background: The aim of this study was to measure the effect of simulating two different loads on maxillary incisors displaying eight morphological types of non-carious cervical lesions, unrestored and restored with an adhesive restoration, by quantifying the stress distributions generated using finite element analysis.

Methods: Virtual models of maxillary incisors were generated using the CAD software (RhinoCeros). After composing virtual dental and supporting structures with and without non-caries cervical lesions, each model was meshed using a control mesh device (ANSYS Finite Element Analysis Software). All of the virtual models were subjected to two load types, oblique load and vertical load, to simulate occlusal forces of 100 N each. Comparisons were made between simulated teeth with non-carious cervical lesions, with and without composite resin restorations, and a simulated sound tooth. Data summarizing the stress distributions were obtained in MPa using von Mises criteria.

Results: Oblique loading on simulated non-caries cervical lesions resulted in greater stress concentration compared with vertical loading, and non-caries cervical lesions with acute angles displayed higher stress concentrations at the depth of the lesion. Restoring the lesions with an adhesive restoration, such as composite resin, appeared to overcome this stress concentration.

Conclusions: Restoring NCCLs with adhesive restorative materials, such as a nanohybrid composite resin, appears to recover the biomechanical behaviour similar to sound teeth.

BIOMARKERS OF CHEMOTHERAPY-INDUCED DIARRHOEA: A CLINICAL STUDY OF INTESTINAL MICROBIOME ALTERATIONS, INFLAMMATION AND CIRCULATING MATRIX METALLOPROTEINASES


Purpose: A common side effect of chemotherapy treatment is diarrhoea. Unfortunately, the underlying mechanisms of chemotherapy-induced diarrhoea (CD) are poorly understood. We aimed to determine if faecal microbes of CD patients were displaced, if faecal calprotectin increased during CD and if there were alterations in circulating matrix metalloproteinases, nuclear factor kappa B (NF-κB), IL-1β and TNF.

Patients & Methods: Twenty-six cancer patients receiving chemotherapy were enrolled and requested to provide stool samples and blood samples at various times during their chemotherapy cycle. Stool samples were analysed using conventional culture techniques and qRT-PCR. ELISA kits determined faecal calprotectin levels, levels of circulating matrix metalloproteinases and circulating NF-κB, IL-1β and TNF.
Results: The majority of patients with CD showed decreases in *Lactobacillus* spp., *Bifidobacterium* spp., *Bacteroides* spp. and *Enterococcus* spp. Increases were observed in *Escherichia coli* and *Staphylococcus* spp. Methanogenic archaea were also quantified, with all patients except one showing a decrease. Faecal calprotectin levels were increased in 81.25 % of patients with CD. Circulating MMP-3 and MMP-9 significantly increased following chemotherapy. Circulating levels of NF-xB, IL-1β and TNF were increased following chemotherapy, although this did not reach significance.

Conclusions: We demonstrated that CD is associated with marked changes in intestinal microflora, methanogenic archaea, matrix metalloproteinase and serum levels of NF-xB, IL-1β and TNF. These changes may result in diminished bacterial functions within the gut, altering gut function and initiating intestinal damage, resulting in the onset of diarrhoea. More importantly, these changes may provide clinicians with a possible new target for biomarkers of toxicity.

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**DENTAL BEHAVIOURS AMONG OLDER ADULTS OVER AN 11-YEAR PERIOD**

**Tan H.**  

Australia faces the challenge of an ageing population. It is projected that the proportion of older people will increase from 13% in 2006 to 26%–28% in 2051. Older adults need to eat and talk comfortably, to feel happy with their appearance, to stay pain and infection free, to maintain self-esteem, and to maintain habits of hygiene and care. Good dental behaviour is an important determinant of good oral health. This article aims to report on dental behaviours including dental attendance per year, usual dental attendance for a regular/check-up visit and toothbrushing twice or more per day among a cohort of older adults in South Australia over an 11-year period.

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**FACTORS ASSOCIATED WITH PREVALENCE OF ORAL LESIONS AND ORAL SELF-EXAMINATION IN YOUNG ADULTS FROM A BIRTH COHORT IN SOUTHERN BRAZIL**

**Tarquinio SB, Oliveira LJ, Correa MB, Peres MA, Peres KG, Gigante DP, Horta BL, Demarco FF.**  
*Cad Saude Publica.* 2013 Jan;29(1):155-64.

The objective of this study was to assess the prevalence and characteristics of oral lesions and oral self-examination and the association between these variables and life course determinants in a young population. A representative sample (n = 720) of all births occurring in Pelotas, Rio Grande do Sul State, Brazil, in 1982, was investigated and the outcomes were assessed in 2006. Data regarding exploratory variables was collected from other cohort waves. The prevalence of oral lesions was 23.3% (95%CI: 20.3-26.6). A total of 31% of individuals (95%CI: 27.6-34.4) reported never having performed oral self-examination. Multivariable analysis showed that low socio-economic status at birth, lack of oral hygiene instruction from a dentist up to the age of 15 years and smoking habits at the age of 22 year were associated with the presence of oral lesions. Performing oral self-examination was associated with high levels of maternal schooling at birth and having received oral hygiene orientation from a dentist up to the age of 15 years. Socioeconomic and behavioural factors are associated with both presence of oral mucosal lesions and the habit of performing self-examination.

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**INDIVIDUAL DENTAL EXPENDITURE BY AUSTRALIAN ADULTS**

**Teusner DN, Brennan DS, Gnanamanickam ES.**  

Background: While dental service use in Australia has been extensively reported, little is known about associated costs. The aim of this article was to describe the annual individual dental expenditure of Australian adults.
Methods: Self-reported service use and expenditure data were sourced from a sample of 3000 adults aged 30 to 61 years who were randomly selected from the electoral roll. Bivariate associations between total individual dental expenditure and out-of-pocket expenditure (fees less insurance rebate) and a range of participant characteristics were explored.

Results: Response rate for the baseline questionnaire was 39.4% and of these, 53.1% responded at 12-month follow-up. The mean total dental expenditure was $702 and mean out-of-pocket expenditure was $489. Toothache was associated with total dental expenditure; adults experiencing toothache had higher median expenditure ($445) than adults who hardly ever/never had toothache ($308) \( (p < 0.05) \). Dental insurance status was not associated with total expenditure, but insured had lower median out-of-pocket expenditure ($146) than uninsured adults ($320) \( (p < 0.01) \).

Conclusions: Affordability variables typically associated with access to dental care, such as insurance status, were not associated with total expenditure, while poorer oral health was associated with higher total expenditures.

**DENTAL INSURANCE, ATTITUDES TO DENTAL CARE, AND DENTAL VISITING**

Teusner DN, Brennan DS, Spencer AJ.


Objective: Dental insurance status is strongly associated with service use. In models of dental visiting, insurance is typically included as an enabling factor. However, in Australia, people self-select into health insurance (privately purchased) and levels of cover for dental services are modest. Rather than enabling access, insurance status may be a "marker" for unmeasured predisposing attitudes. This study aims to explore associations between dental insurance status and visiting while adjusting for dental care attitudes.

Methods: Participants (South Australians aged 45-54 years) of a 2-year prospective cohort study (2005-2007) investigating dental service use were surveyed on their attitudes to dental care and insurance status. Six attitudinal factors were assessed using a 23-item Likert scale. Bivariate associations between insurance, attitudes, visiting, and other known covariates (age, sex, and household income) were explored. A series of regression models assessed whether prevalence ratios of visiting were attenuated after controlling for attitudinal factors.

Results: Response rate was 85.0 percent. Analysis was limited to dentate adults with known dental insurance status \( (n=529) \). The majority had dental insurance (75.2%) and made regular visits (63.7%). Insurance status, visiting, and attitudinal factors were significantly associated. Controlling for covariates, insured adults, compared with the uninsured, were 57 percent more likely to make regular visits. After adjusting for attitudinal factors, the significant association between insurance and visiting persisted.

Conclusion: Dental care attitudes did not confound the association between dental insurance and visiting, indicating that dental insurance status was not a "marker" for predisposing attitudes.

**GENETIC, EPGENETIC AND ENVIRONMENTAL INFLUENCES ON HUMAN TOOTH SIZE, SHAPE AND NUMBER**

Townsend GC, Brook AH.

*eLS Online*

Studies of twins are helping to unravel the roles of genetic, epigenetic and environmental influences on human tooth size, shape and number. There is a relatively strong genetic contribution to variation in these dental phenotypes but comparisons between monozygotic co-twins are also highlighting the roles of environmental and epigenetic factors. Furthermore, by viewing the dentition as a complex adaptive system, with multiple interacting components, a clearer picture is emerging of how common dental anomalies develop and are associated with one another. This article concentrates on providing a synthesis of relevant findings and concepts about variation in the human dentition at a phenotypic level. We focus on patterning within the dentition and dental asymmetry, as well as emphasising the importance of assessing the magnitude of errors when measuring or scoring dental features.
EXPANDING THE GLOBAL CONVERSATION IN DENTAL EDUCATION: GUIDELINES FOR SCHOLARLY RESEARCH AND WRITING FOR INTERNATIONAL AUTHORS

Townsend G, Winning T.

Over the past decade or so there has been a significant growth in the number of dental schools in many countries. For example, the number of schools in Australia (with a population of 23 million) has increased from five to eleven. In Malaysia (with a population of around 30 million), the number has increased from one to twelve. In Brazil (with a population of approximately 200 million), there are over 190 dental schools, with 102 new schools being established over the period from 1995 to 2008. Along with the establishment of these new schools, there is a need to employ dental academics to develop courses and teach students, and, in those schools that are linked with research-based universities, faculty members are also required to participate in scholarly activities.

SOCIAL INEQUALITIES AND PERIODONTAL DISEASE: MULTILEVEL APPROACH IN SBBRASIL 2010 SURVEY

Vettore MV, Marques RA, Peres MA.

Objective: To estimate the prevalence and geographical distribution of periodontal disease in the Brazilian adult population and its associations with contextual and individual social inequalities.

Methods: Data from adults aged 35 to 44 who participated in the 2010 Brazilian Oral Health Survey (SBBBrasil 2010) (n = 9,564) were used. The Community Periodontal Index (CPI) and clinical attachment loss (CAL) were used to define "moderate to severe" periodontal disease (CPI > 2 and CAL > 0) and "severe" periodontal disease (CPI > 2 and CAL > 1). Contextual social inequalities assessed were Human Development Index and income inequality (Gini Index). Other contextual variables were integration of oral health teams in the Family Health Programme and the percentage of adult smokers. Multilevel logistic regression models for participants with complete data (n = 4,594) were used to estimate odds ratios (OR) and 95% confidence intervals (95%CI) between social inequalities and periodontal disease.

Results: The prevalence of "moderate to severe" and "severe" periodontal disease in Brazilian adults was 15.3% and 5.8%, respectively, with considerable variation across municipalities. Of the contextual variables, income inequality was independently associated with "severe" periodontal disease (OR = 3.0, 95%CI 1.5;5.9). Lower oral health teams coverage was associated with both definitions of periodontal disease whereas the percentage of smokers remained associated with "moderate to severe" periodontal disease. Older adults, brown skin color, males and those with lower family income and less schooling were more likely to both periodontal conditions.

Conclusions: In Brazil, the prevalence of periodontal disease varied across the municipalities and according to definition of periodontal disease. Income inequality played a significant role in the occurrence of "severe" periodontal disease. Individual characteristics of social position were associated with both forms of periodontal disease.

IMMUNOMODULATORY EFFECTS OF STEM CELLS

Wada N, Gronthos S, Bartold PM.

Adult-derived mesenchymal stem cells have received considerable attention over the past two decades for their potential use in tissue engineering, principally because of their potential to differentiate into multiple stromal-cell lineages. Recently, the immunomodulatory properties of mesenchymal stem cells have attracted interest as a unique property of these cells that may be harnessed for novel therapeutic approaches in
immune-mediated diseases. Mesenchymal stem cells have been shown to inhibit the proliferation of activated T-cells both in vitro and in vivo but to stimulate T-regulatory cell proliferation. Mesenchymal stem cells are also known to be weakly immunogenic and to exert immunosuppressive effects on B-cells, natural killer cells, dendritic cells and neutrophils through various mechanisms. Furthermore, intravenous administration of allogeneic mesenchymal stem cells has shown a marked suppression of host immune reactions in preclinical animal models of large-organ transplant rejection and in various autoimmune- and inflammatory-based diseases. Some clinical trials utilizing human mesenchymal stem cells have also produced promising outcomes in patients with graft-vs.-host disease and autoimmune diseases. Mesenchymal stem cells identified from various dental tissues, including periodontal ligament stem cells, also possess multipotent and immunomodulatory properties. Hence, dental mesenchymal stem cells may represent an alternate cell source, not only for tissue regeneration but also as therapies for autoimmune- and inflammatory-mediated diseases. These findings have elicited interest in dental tissue mesenchymal stem cells as alternative cell sources for modulating alloreactivity during tissue regeneration following transplantation into human leukocyte antigen-mismatched donors. To examine this potential in periodontal regeneration, future work will need to assess the capacity of allogeneic periodontal ligament stem cells to regenerate periodontal ligament in animal models of periodontal disease. The present review describes the immunosuppressive effects of mesenchymal stem cells on various types of immune cells, the potential mechanisms through which they exert their mode of action and the preclinical animal studies and human clinical trials that have utilized mesenchymal stem cells, including those populations originating from dental structures.

BISPHOSPHONATE-ASSOCIATED OSTEO NECROSIS OF THE EXTERNAL AUDITORY CANAL

Wickham N, Crawford A, Carney AS, Goss AN.

Background: Osteonecrosis is a benign condition characterised by necrotic exposed bone, and is associated with bisphosphonate use. Osteonecrosis of the external auditory canal is rare, with only a few reported cases.
Method: Two case reports of temporal bone osteonecrosis are presented.
Results: A 64-year-old man with a history of immunoglobulin G kappa multiple myeloma developed a right external auditory canal ulcer 6 years after commencement on clodronate. A 72-year-old woman taking alendronate for osteoporosis, initially diagnosed and treated for right-sided otitis externa, was found to have underlying exposed bone in the right external auditory canal, with a computed tomography scan confirming destruction of the temporal bone.
Conclusion: With increasing use of both oral and intravenous bisphosphonates in the community for benign conditions such as osteoporosis and for malignant conditions such as breast cancer and multiple myeloma, the diagnosis of bisphosphonate-associated osteonecrosis should always be considered in patients with a temporal bone lesion, and a relevant drug history taken.

SUPPORTING POSTGRADUATE STUDENTS IN THEIR ROLE AS CLINICAL TEACHERS: A PILOT STUDY

Winning T, Greenwood F, Lekkas D.
Practice and Evidence of Scholarship of Teaching and Learning in Higher Education 2013;8:132-158.

In higher education, reliance on part-time teachers, including postgraduate students (PGs), in our undergraduate (UG) programmes is widespread. Dental education is no exception: the bulk of our UG clinical teaching/supervision is provided by casually-employed clinicians. Consistent with reports highlighting the need for professional development for part-time (including PG) teachers, we identified our PGs needed support. This paper describes the programme we developed for our PGs and the initial evaluation. Recommendations from the literature informed our programme design. Evaluation of the programme involved PG-clinical teachers’ perceptions of their experience and analysis of their learning outcomes, using pre- and post-tests. The tests required PG-clinical teachers to identify behaviours related to UG clinical assessment criteria and clinical teacher attributes, and judge the level of performance portrayed in a series of UG clinic video
simulations. To check that clinical assessment criteria for UGs and clinical teacher attributes were identifiable, experienced-clinical teachers completed the same tests. Learning from repeated viewing of the test-videos was not evident. It was difficult to identify and/or classify UG clinical assessment criteria in the videos. Both PG- and experienced-clinical teachers identified and classified more clinical teacher attributes than UG clinical assessment criteria. There was some improvement by PG-clinical teachers in identifying and classifying clinical teacher attributes. These data indicated the programme may have contributed to PG-clinical teachers’ learning about their role, but it did not consistently contribute to improved outcomes for evaluating UG performance. Implications for our PG-clinical teaching programme and how we evaluate our UG performance are discussed.

VALIDITY OF SCORES FROM COMMUNICATION SKILLS INSTRUMENTS FOR PATIENTS AND THEIR DENTAL STUDENT-CLINICIANS

Winning TA, Kinnell A, Wener ME, Mazurat N, J Schönwetter D.

The development of appropriate communication skills by healthcare providers is central to providing quality patient-centred care. Patients can provide valuable feedback to practitioners about their clinical communication. However, in oral health care, their involvement is uncommon and instruments specific for communication in oral health care have not been available. Recently, two complementary instruments have been developed by the Faculty of Dentistry, University of Manitoba for evaluating student-clinicians’ clinical communication: one for patient evaluation and one for student self-evaluation. The aim of the current study was to provide validity evidence for the scores related to the internal structure of the revised 2007 versions of these instruments in two dental clinical/education contexts, namely the Universities of Manitoba, Canada (UM) and Adelaide, Australia (UA). The proposed factor structure and loadings, and their stability across contexts were assessed using confirmatory factor analysis, and the adequacy of the internal consistency reliability of the scores was analysed using Cronbach's alpha. The factor structure of the current 2007 versions of the patient and student instruments, derived from the previously developed longer versions of these instruments, was confirmed and was consistent across the two clinical/educational contexts. A model of partial invariance provided the best fit for these data due to variations in the magnitude of the factor loadings between sites. The internal consistency reliability of scores was high with a range of 0.88-0.97. In conclusion, the current study provides preliminary evidence regarding the validity of the scores of the current 2007 instruments, in terms of the internal structure, as measuring the five factors well. Replication of the factor structure of these instrument scores with more participants at both UA and other institutions is required.

ROLE OF THE EPITHELIAL CELL RESTS OF MALASSEZ IN THE DEVELOPMENT, MAINTENANCE AND REGENERATION OF PERIODONTAL LIGAMENT TISSUES

Xiong J, Gronthos S, Bartold PM.

Periodontitis is a highly prevalent inflammatory disease that results in damage to the tooth-supporting tissues, potentially leading to tooth loss. Periodontal tissue regeneration is a complex process that involves the collaboration of two hard tissues (cementum and alveolar bone) and two soft tissues (gingiva and periodontal ligament). To date, no periodontal-regenerative procedures provide predictable clinical outcomes. To understand the rational basis of regenerative procedures, a better understanding of the events associated with the formation of periodontal components will help to establish reliable strategies for clinical practice. An important aspect of this is the role of the Hertwig's epithelial root sheath in periodontal development and that of its descendants, the epithelial cell rests of Malassez, in the maintenance of the periodontium. An important structure during tooth root development, the Hertwig's epithelial root sheath is not only a barrier between the dental follicle and dental papilla cells but is also involved in determining the shape, size and number of roots and in the development of dentin and cementum, and may act as a source of mesenchymal progenitor cells for cementoblasts. In adulthood, the epithelial cell rests of Malassez are the only odontogenic epithelial population
in the periodontal ligament. Although there is no general agreement on the functions of the epithelial cell rests of Malassez, accumulating evidence suggests that the putative roles of the epithelial cell rests of Malassez in adult periodontal ligament include maintaining periodontal ligament homeostasis to prevent ankylosis and maintain periodontal ligament space, to prevent root resorption, to serve as a target during periodontal ligament innervation and to contribute to cementum repair. Recently, ovine epithelial cell rests of Malassez cells have been shown to harbor clonogenic epithelial stem-cell populations that demonstrate similar properties to mesenchymal stromal/stem cells, both functionally and phenotypically. Therefore, the epithelial cell rests of Malassez, rather than being ‘cell rests’, as indicated by their name, are an important source of stem cells that might play a pivotal role in periodontal regeneration.

A LABORATORY INVESTIGATION OF COLOUR CHANGES IN TWO CONTEMPORARY RESIN COMPOSITES ON EXPOSURE TO SPICES

Yew HZ, Berekally TL, Richards LC.

Background: The aim of this study was to evaluate colour stability upon exposure to spices of a nano-filled and a micro-hybrid resin composite finished either with Sof-Lex™ discs (SLD) or against plastic strips (PS).

Methods: Forty cylindrical specimens of 3 mm thickness were fabricated from Filtek Supreme XT™ (FS) and Gradia Direct X™ (GD). The top surface of each specimen was polished with SLD while the bottom surface was finished against PS. All samples were immersed in staining solutions (0.1% weight turmeric, paprika and tamarind) and distilled water at 37 °C. Colour after 0, 24, 72 and 168 hours of immersion was recorded with a reflection spectrophotometer using CIE L*a*b* parameters and the results were statistically analysed with repeated measures of ANOVA and Bonferroni post hoc tests.

Results: Among all the staining solutions tested, the highest colour deviation was obtained in the turmeric group. FS finished against PS showed significantly more colour changes compared to specimens polished with SLD, while GD finished against PS were found to be more resistant to colour changes.

Conclusions: Within the limitations of this study all the spices tested have the potential to stain resin composites with turmeric causing the most significant discolouration. Micro-hybrid and nano-filled resin composites appeared to respond differently to staining by spices when either finished with PS or polished with SLD.
**Book Chapters**


**Australian Institute of Health & Welfare Dental Statistics & Research Unit Publications**

AIHW, Harford JE, Islam S. Adult oral health and dental visiting in Australia: results from the National Dental Telephone Interview Survey 2010. 2013; Cat. no. DEN 227; 94pp.


70 registrants attended the 11th annual Research Day which was held on Friday 16 August at the National Wine 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 Marco Peres, the incoming Director of the Australia Research Centre for Population Oral Health. Professor Peres presented “An overview of life course epidemiology”.

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

**Best PhD presentation**
Sree Vidya Krishna Rao
**Socioeconomic conditions, lifestyle factors and oral cancer: A case-control study**

**Best DClinDent presentation**
Arlene Khaw
**Influence of periodontitis on the experience of oral mucositis in cancer patients undergoing head and neck radiotherapy**

**Best Undergraduate presentation**
Justine Stamford
**Pregnancy outcomes in mice with *Fusobacterium nucleatum* based experimental periodontitis**

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

**ORAL PRESENTATIONS**

**Mesenchymal stem cell-like cells derived from induced pluripotent stem cells enhance periodontal bone regeneration**
Hynes K (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); Han J (School of Dentistry, University of Adelaide); Marino V (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Mrozik K (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Gronthos S (Mesenchymal Stem Cell Laboratory, School of Medical Sciences, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide)

**Azithromycin suppresses *P. gingivalis* LPS induced proinflammatory cytokine and chemokine production (IL-6, IL-8, MCP-1 & GRO) by human gingival fibroblasts in vitro**
Doyle CJ (School of Dentistry, University of Adelaide); Fitzsimmons TR (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); Dharmapatni AASSK (Discipline of Anatomy and Pathology, School of Medical Sciences, University of Adelaide); Hirsch R (School of Dentistry, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide)
Influence of periodontitis on the experience of oral mucositis in cancer patients undergoing head and neck radiotherapy
Khaw ABH (School of Dentistry, University of Adelaide); Liberali S (Special Needs Unit, Adelaide Dental Hospital); Logan R (Oral Pathology, School of Dentistry, University of Adelaide); Keefe D (School of Medicine, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide)

Associations between extent of periodontal pocketing and cardiovascular surrogate markers among Indigenous Australians living in the Northern Territory, Australia
Kapellas K (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); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Jamieson L (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)

Next generation sequencing of ancient calculus provides insight into the evolution of the human oral microbiome
Gully N (Oral Microbiology, School of Dentistry, University of Adelaide); Weyrich L (Australian Centre for Ancient DNA, School of Earth and Environmental Sciences, University of Adelaide); Cooper A (Australian Centre for Ancient DNA, School of Earth and Environmental Sciences, University of Adelaide)

Oral features of Crouzon and Pfeiffer Syndromes
Packianathan M (School of Dentistry, University of Adelaide); Anderson P (Australian Craniofacial Unit, Adelaide & School of Dentistry, University of Adelaide); Gue S (Women's & Children's Hospital & School of Dentistry, University of Adelaide)

Evaluation of tooth angulation measured on cone beam computed tomography and panoramic radiographs
Karim E (School Of Dentistry, University Of Adelaide); Dreyer C (Orthodontic Unit, School Of Dentistry, University Of Adelaide); Richards L (Restorative Dentistry, School of Dentistry, University of Adelaide); Sampson W (Orthodontic Unit, School Of Dentistry, University Of Adelaide)

Dynamic response of the alveolar bone to corticotomy facilitated orthodontic tooth movement
Kim B (School of Dentistry, University of Adelaide); Parkinson I (Discipline of Anatomy and Pathology, School of Medical Sciences, University of Adelaide); Dreyer C (Orthodontic Unit, School of Dentistry, University of Adelaide); Bartold PM (Colgate Australian Clinical Dental Research Centre, School of Dentistry, University of Adelaide); Sampson W (Orthodontic Unit, School of Dentistry, University of Adelaide)

Craniofacial and upper airway morphology in paediatric sleep-disordered breathing and changes in quality of life with rapid maxillary expansion
Katyal V (School of Dentistry, University of Adelaide); Pamula Y (Sleep Disorders Unit, Women's & Children's Hospital, Adelaide); Daynes CN (School of Biological Sciences, The University of Sydney); Martin J (Sleep Disorders Unit, Women’s & Children’s Hospital, Adelaide), Dreyer C (Orthodontic Unit, School of Dentistry, University of Adelaide); Kennedy D (Paediatrics, University of Adelaide); Sampson W (Orthodontic Unit, School of Dentistry, University of Adelaide)
Infraocclusion of primary molars and associated dental anomalies in twins and singletons: what is the underlying aetiology?
Odeh R (School Of Dentistry, University Of Adelaide); Townsend GC (Craniofacial Biology, School Of Dentistry, University Of Adelaide); Mihailidis S (Craniofacial Biology, School Of Dentistry, University Of Adelaide); Hughes T (Craniofacial Biology, School Of Dentistry, University Of Adelaide); Lahdesmaki R (Department Of Oral Development And Orthodontics, University Of Oulu, Finland); Brook A (Queen Mary Institute, University of London & Craniofacial Biology, School of Dentistry, University of Adelaide)

Students’ perceptions about the importance of group cohesion and interactions in relation to their learning in collaborative learning environment: 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)

Self-rated oral health among two rural communities in South India
Bhat M (School of Dentistry, University of Adelaide); Do LG (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)

Socioeconomic conditions, life-style factors and oral cancer- A case-control study
Krishna Rao SV (School of Dentistry, University of Adelaide); Mejia G (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); Logan R (School of Dentistry, University of Adelaide)

Development of a socio-economic status index to interpret inequalities in oral health in developing countries
Ghorbani Z (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Ahmady AE (Dental School, Shahid Beheshti University of Medical Sciences, Iran)

POSTER PRESENTATIONS

Pregnancy outcomes in mice with Fusobacterium nucleatum based experimental periodontitis
Samford J (School of Dentistry, University of Adelaide); Zilm P (School of Dentistry, University of Adelaide); Roberts C (The Robinson Institute, University of Adelaide)

The truth in the tooth: the association of tooth morphology and post-mortem degradation with DNA yield
Higgins D (Australian Centre for Ancient DNA, School of Earth and Environmental Sciences, University of Adelaide); Austin J (Australian Centre for Ancient DNA, School of Earth and Environmental Sciences, University of Adelaide); Kaidonis JA (Craniofacial Biology, School of Dentistry, University of Adelaide); Townsend GC (Craniofacial Biology, School of Dentistry, University of Adelaide); Hughes T (Craniofacial Biology, School of Dentistry, University of Adelaide)

State-of-the-art imaging of early enamel erosion in permanent teeth simulating gastric regurgitation
Mann C (School of Dentistry, University of Adelaide); Ranjitkar S (School of Dentistry, University of Adelaide); Lekkas D (School of Dentistry, University of Adelaide); Hall C (Mawson Institute, University of South Australia); Kaidonis JA (School of Dentistry, University of Adelaide); Townsend GC (School of Dentistry, University of Adelaide); Brook A (Queen Mary Institute, University of London & Craniofacial Biology, School of Dentistry, University of Adelaide)
Determination of chemical compositions of incipient and eroded enamel
Jensen S (School of Dentistry, University of Adelaide); Ranjitkar S (School of Dentistry, University of Adelaide); Kaidonis JA (School of Dentistry, University of Adelaide); Townsend GC (Craniofacial Biology, School of Dentistry, University of Adelaide); Lekkas D (School of Dentistry, University of Adelaide); Hall C (Mawson Institute, University of South Australia)

Frames of reference used by Indigenous Australians when rating oral health and association between self-rated general and oral health
Chand R (School of Dentistry, University of Adelaide); Jamieson L (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide); Jones K (Australian Research Centre for Population Oral Health, School of Dentistry, University of Adelaide)
## RESEARCH FUNDING

**Australian Dental Research Foundation**

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<th>Project Title</th>
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<td>2011-2013</td>
<td>What defines expertise in operative technique skills in dentistry (RW Hession Award)</td>
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<td>2013</td>
<td>Analysis of the gene expression changes occurring as induced pluripotent stem cells differentiate into mesenchymal progenitor cells</td>
<td>Hynes K, Bartold PM, Gronthos S</td>
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<td>2013</td>
<td>Proteomic analysis of cell envelope proteins of <em>Enterococcus faecalis</em> V583 and an oral clinical isolate grown in continuous culture at pH 8 &amp; pH 11</td>
<td>Cathro P, Zilm P, Gully N, Hoffmann P</td>
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<td>2013</td>
<td>Phenotypic characterization of Apert syndrome teeth</td>
<td>Ranjitkar S, Anderson P, Hall C, Townsend GC</td>
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<td>2013</td>
<td>The social construction of oral health in Australia</td>
<td>Jones K, Beasley C, Merrick J</td>
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<td>2013</td>
<td>Genetic variability associated with severe oral complications in patients treated with fluorouracil</td>
<td>Logan R, Coller J, Bowen J, Karapetis C</td>
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<td>2013</td>
<td>A new approach to dental morphology analysis</td>
<td>Mihailidis S, Ranjitkar S, Hughes T, Hall C, Townsend GC</td>
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<td>2013</td>
<td>Effect of Azithromycin on cytokine expression by human gingival fibroblasts</td>
<td>Doyle C, Bartold PM, Fitzsimmons T, Marchant C</td>
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<td>2013</td>
<td>The effects of school functionality on child oral health practices and oral health outcomes</td>
<td>Beckwith K, Brennan D, Do LG</td>
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<td>Characteristics and motivation of dentists who provide care to undeserved groups: a mixed methods study</td>
<td>Gardner S</td>
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<td>2013</td>
<td>An evaluation of chair-side caries tests in the prediction of whitespot lesions in patients undergoing orthodontic treatment</td>
<td>Sriram B, Sampson W, Dreyer C, Kaidonis J, Gully N</td>
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<td>2013</td>
<td>The roles of RUNX2 and VEGF during healing of the periodontal ligament following hypothermal insult</td>
<td>Stewart T, Sampson W, Dreyer C, Dharmapatni K</td>
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<td>2013</td>
<td>A longitudinal study of changes in tooth and dental arch dimensions from the primary to permanent dentitions</td>
<td>Tan WH, Townsend GC, Hughes T, Sampson W</td>
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2013  What demographic and program factors are associated with positive and negative patients’ ratings of the quality of dental students’ clinical communication? (GC MI Award)  
Winning T

Australian Government Department of Health and Ageing

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<th>Year</th>
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<td>2012-2013</td>
<td>Adult oral health and access to dental care</td>
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<td>Expert Working Group - Fluoride Nutrient Reference Values</td>
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Australian Institute of Health and Welfare

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Australian Periodontal Research Foundation

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| 2013 | Influence of periodontitis on the experience of oral mucositis in cancer patients undergoing head and neck radiotherapy | $3,000  
Bartold PM, Khaw A |

Australian Research Council Discovery Project Grants

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| 2011-2013     | A powerful new genetic view of the recent evolutionary history of humans and their diseases | $380,000 
Cooper A, Kaidonis JA, Townsend GC, Gully NJ, Bartold PM, Dobney KD, Higham TH, Richards M, Lalueza-Fox C |

Australian Society for Endodontics

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| 2013 | The efficacy of laser activated irrigating solution on eradicating a mixed biofilm in the mesial roots of human mandibular molars: an in-vitro study | $5,253 
Cathro P, Race J |

Australian Society of Forensic Odontology

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| 2013          | Awareness of forensic odontology among dental practitioners in Australia; are they keeping forensically adequate dental records? | $1,500  
James H, Al-Azri A, Harford J |

Barbara Kidman Women’s Fellowship Scheme

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<td>Cancer Australia</td>
<td>Autofluorescence imaging for early detection and surgical margin delineation of oral cancers and pre-cancers</td>
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<td>Central Adelaide Local Health Network</td>
<td>Development of an oral health better practice model for community living older people</td>
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<td>Colgate Oral Care</td>
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<td>Support for Indigenous Oral Health Unit</td>
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<td>High-resolution 3D dental microwear texture analysis</td>
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<td>Understanding influences on oral health of contemporary Australian children</td>
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<td>Understanding the development of dental fear among Australian children and adults</td>
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<td>Associations between diabetes and periodontal disease among Indigenous Australian adults</td>
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<td><strong>2012-2016</strong></td>
<td>CRE in Dental health services research for improved oral health outcomes</td>
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<td>Impact of health policy on the delivery of dental services and child oral health outcomes</td>
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<td>Genetic, environmental and epigenetic influences on human tooth emergence: a twin study</td>
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<td>Townsend GC, Hughes TE, Seow WK</td>
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<td><strong>2011-2014</strong></td>
<td>Randomised control trial of effectiveness of silver fluoride on managing deciduous caries in remote Aboriginal communities</td>
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<td>Roberts-Thomson KF, Do LG, Liu P</td>
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<td><strong>2011-2014</strong></td>
<td>Intergenerational change in oral health in Australia</td>
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<td>Harford JE, Luzzi L, Tan H, Mejia G, Roberts-Thomson KF, Spencer AJ</td>
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<td><strong>2012-2014</strong></td>
<td>Periodontal disease and rheumatoid arthritis</td>
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<td><strong>2013-2015</strong></td>
<td>Comparison of periodontal ligament stem cells and induced pluripotent periodontal ligament stem cells for periodontal regeneration</td>
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<td>Common risk factor approach to address socioeconomic inequality in oral health of contemporary Australian preschool children</td>
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<td>Do LG, Spencer AJ, Thomson M, Scott J</td>
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<td>Hughes T, Townsend GC, Bockmann M, Craig J, Saffery R, Kilpatrick N</td>
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New Zealand Ministry of Health

2012-2013  NZ National Dental Survey  ARCPOH  $21,000

Primary Health Care Research Institute

2012-2016  Primary Oral Health Care CRE  $2,500,00
Brennan DS, Crocombe L, Roberts-Thomson KF, Paul A, Slack-Smith L, Bell E

Queensland Health

2009-2014  Evaluation of health gains resulting from the introduction of water fluoridation in Queensland  $821,200
Spencer AJ

SA Dental Service

2013  ARCPOH contract research  $191,000

SA Department of Health

2012-2013  Research unit in oral epidemiology  $85,588
ARCPOH

Undergraduate Medicine and Health Sciences Admissions Test (UMAT) Consortium Research Funding

2013-2014  Do LG  $100,000

University of Adelaide Implementation Grants for Learning and Teaching Enhancement

2013  Flipping the classroom to enhance the first year student experience through the use of interactive learning technologies for student centric learning  $13,500
COMPLETING HIGHER DEGREES STUDENTS IN 2013

PhD

Denice Higgins
Research Topic: Use of DNA extracted from teeth in forensic situations
Supervisors: Associate Professor John Kaidonis, Professor Alan Cooper, Associate Professor Toby Hughes, Professor Grant Townsend

Rubia Odeh
Research Topic: The prevalence and genetic basis of submerged primary teeth
Supervisors: Professor Grant Townsend, Associate Professor Toby Hughes, Dr Suzanna Mihailidis, Professor Alan Brook

DOCTOR OF CLINICAL DENTISTRY

Ahmad Abdulkarim
Research Topic: A longitudinal study of correlating changes in tooth size and dental arch dimensions with changes in vertical and anteroposterior craniofacial dimensions from the mixed to permanent dentition in Aboriginal Australians
Supervisors: Professor Wayne Sampson, Associate Professor Craig Dreyer

Catherine Doyle
Research Topic: The effect of azithromycin on inflammatory cytokine profiles of human gingival fibroblasts
Supervisors: Professor Mark Bartold, Dr Bryon Kardachi

Antonio Gagliardi
Research Topic: Development of the Curve of Spee in Australian twins
Supervisors: Professor Wayne Sampson, Professor Grant Townsend, Associate Professor Craig Dryer, Associate Professor Toby Hughes

Vandana Katyal
Research Topic: Paediatric sleep-disordered breathing in the orthodontic setting
Supervisors: Professor Wayne Sampson, Associate Professor Craig Dreyer

Arlene Khaw
Research Topic: Periodontitis and risk for development of mucositis in cancer patients
Supervisors: Professor Mark Bartold, Dr Bryon Kardachi, Professor Richard Logan, Professor Dorothy Keefe, Dr Sharon Liberali

Berna Kim
Research Topic: The response of the periodontium to corticotomy enhanced orthodontic tooth movement
Supervisors: Professor Wayne Sampson, Associate Professor Craig Dreyer

Manjara Packianathan
Research Topic: Oral features of Crouzon and Pfeiffer syndromes
Supervisors: Associate Professor Sumant Gue, Associate Professor Peter Anderson
CONTINUING HIGHER DEGREES STUDENTS IN 2013

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

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

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

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-centered 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

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

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

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

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

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

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

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

Eugene Twigge
Supervisors: Professor Wayne Sampson, Associate Professor Lisa Jamieson, Dr Rachel Roberts, Associate Professor Craig Dreyer
Lisa Wong  
Research Topic: Tracking tooth movement in 3D  
Supervisors: Professor Wayne Sampson, Associate Professor Craig Dreyer

**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

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

**PERIODONTICS**

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

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

**PROSTHODONTICS**

Jonathan (Mitch) Innes  
Research Topic: Wear, stress and bonding characteristics of zirconia restorations  
Supervisors: Professor Lindsay Richards, Dr Tom Berekally

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

Benjamin Sellick  
Research Topic: Incidence of veneering porcelain fracture on posterior crowns  
Supervisors: Professor Lindsay Richards, Dr Tom Berekally
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

MASTERS 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

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

MASTERS IN CLINICAL SCIENCE (DENTISTRY)

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

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

Catherine Sims
Research Topic: Tooth wear and oral pathology in Australian Aboriginal skulls from the Narungga tribe of Yorke Peninsula South Australia
Supervisors: Dr Helen James, Dr Sarbin Ranjitkar, Professor Richard Logan

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