

Dental & Oral Health Research Review™

Making Education Easy

Issue 1 – 2015

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Research Review publications are intended for New Zealand health professionals.

Welcome to the first combined issue of Dental and Oral Health Research Review.

This publication reviews papers from each field, with Colleen Murray providing commentary for Dental Health and Jonathan Leichter for Oral Health.

We discuss a variety of topics, including a literature review on the genetic aspects of dental caries, a text messaging intervention that markedly improved oral health behaviour and knowledge, and research from Germany demonstrating worse oral health among overweight/obese schoolchildren compared with their low-normal weight counterparts.

We hope you find the papers in this issue useful in your practice and we welcome your comments and feedback.

Kind regards

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Fractured root tips during dental extractions and retained root fragments. A clinical dilemma?

Authors: Nayyar J et al.

Summary: This article describes a risk:benefit matrix for clinicians to use when deciding upon the most appropriate way to deal with root tip fracture during dental extractions.

Comment (CM): Fractured root tips have been encountered by most readers. Retained roots are the most common finding on radiographic examination of edentulous patients with a reported prevalence of 15.4–37.3%. This paper reviewed current evidence regarding the advantages and disadvantages of removing root fragments compared to leaving them *in situ*. Successful healing is likely to occur where the pulp within the fragment is vital, the fractured root has not been mobilised to any great extent during extraction, and complete wound closure takes place. Where the fragment is non-vital, or in communication with the oral cavity, the likelihood of infection is high. The authors did not find any literature that quantified the size of fragment acceptable to leave behind. Key points taken from this paper were as follows: Carry out a risk-benefit matrix analysis when considering root fragment removal; keep your patient informed; ensure regular follow-up (clinical and radiographic) if a retained fragment is left; and finally keep in mind at all times the time-honoured principle of “non nocere” – “do no harm”.

Reference: *Br Dent J.* 2015;218(5):285-90

[Abstract](#)

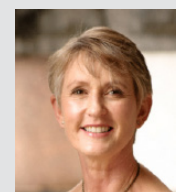


New Zealand Dental Therapists' Association
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Dental & Oral Health Research Review is also made available to Dental Therapists through the kind support of the New Zealand Dental Therapists' Association

Independent commentary by Colleen Murray.

Colleen Murray graduated from the University of Pretoria with a BChD in 1984, followed by an Honours degree in Oral Radiology and Diagnostics in 1987. After a combination of private practice and university teaching, she emigrated to New Zealand in 1992, took a break from dentistry and obtained her BED degree. She has been in Dunedin since 2003 when the pull back to dentistry resulted in a BDS and return to private practice. This was followed by a change to the academic setting and a PGDipClinDent in Paediatric Dentistry. Colleen is currently a Senior Lecturer in the Department of Oral Rehabilitation at the University of Otago, Pacific Island student support officer for the Faculty, NZDREX examiner and is on the ANZSPD committee. This is interspersed with her own research projects, particularly in the area of Dental Education, as well as student research supervision.



Genetic factors affecting dental caries risk

Authors: Opal S et al.

Summary: According to this literature review on the genetic aspects of dental caries, both genes and environmental factors have been implicated in the aetiology of caries. The reviewers ask for further studies and for the identification of genetic risk factors to help screen susceptible patients, to better understand the contribution of genes in caries aetiology and pathogenesis. It is hoped that such research will enable clinicians to target individuals and/or populations for a more efficient and effective implementation of newer preventive measures and diagnostic and novel therapeutic approaches in caries management.

Comment (CM): It is not uncommon to hear our patients blaming their poor dental health on genetics, forgetting all the sugary snacks, the weeks without brushing, and the incredulous stares when asked about flossing! Do they have a point or is genetics used as a convenient excuse for neglect? This review paper looked at the genetic aspects of dental factors affecting caries. Literature investigating a range of topics was reviewed: caries incidence in twins; family studies identifying the genes involved in tooth development, defective mineralisation and susceptibility of the enamel; genetic variations that contribute to differences in dietary habits; genetic effects on immunity; and differences in salivary proteins that appear to be genetically controlled. The authors concluded that genes do indeed play a role in dental caries, but that more research is needed. This paper made for an interesting read, but as environmental factors still decidedly play their role in the aetiology of caries, oral hygiene instruction and dietary advice will still remain firmly on the menu in my practice of dentistry.

Reference: *Aust Dent J.* 2015;60(1):2-11

[Abstract](#)

Text2Floss: the feasibility and acceptability of a text messaging intervention to improve oral health behavior and knowledge

Authors: Hashemian TS et al.

Summary: This US-based Text2Floss Study explored the feasibility and utility of a 7-day text messaging intervention to improve oral health knowledge and behaviour in mothers of young children. Mothers were recruited from a private practice and a community clinic and randomly assigned to either a text group, in which they received text messages for 7 days, asking about flossing and presenting oral health information, or to a control group (no such interventions). Outcomes are reported from 129 mothers who completed the trial (60 in the text group, 69 in the control group). At baseline, oral health knowledge and behaviours did not differ between the groups. Post-intervention, text group mothers flossed more, had higher total and specific knowledge, and tried to improve their child's oral health behaviours and decrease their soda and sugary snacks more than control mothers (all comparisons $p \leq 0.05$). Text messages were accepted and perceived as useful.

Comment (CM): A quick Google search showed that, in 2013, 2.82 million adult New Zealanders owned mobile phones. Studies have shown that text messaging can be an effective intervention to improve health behaviours such as sunscreen application, medication use, and smoking cessation. It was with this in mind that the authors of this paper examined the feasibility of a 7-day text messaging intervention with an oral health focus. This randomised controlled trial involved 129 mothers of children aged 5 years or younger. The control group received printed material, while the text group received printed material and a daily text message asking if they had flossed and presenting a brief piece of oral health information. All participants were surveyed pre-intervention, when no differences were found. After the 7-day trial the text group reported greater increases in flossing, trying to improve their child's oral health behaviours, decreasing their child's sugar intake and had significantly higher total knowledge scores. It would be interesting to know how long these positive changes persisted for.

Reference: *J Public Health Dent.* 2015;75(1):34-41

[Abstract](#)

Effectiveness of and tooth sensitivity with at-home bleaching in smokers: A multicenter clinical trial

Authors: De Geus JL et al.

Summary: This study recruited 60 smokers and 60 nonsmokers with central incisors of shade A2 or darker. All study participants performed at-home bleaching with 10% carbamide peroxide for 3 hours daily for 3 weeks. At 1 week after bleaching, colour measurements with a shade guide and a spectrophotometer demonstrated significant colour change in both groups that was statistically equivalent to within ± 2.0 units. At 1 month post-bleaching, colour shade was improved by 4.1 shade guide units (95% CI, 3.7 to 4.5) and by 7.8 units of colour change measured using the spectrophotometer (95% CI, 7.1 to 8.5). Patients scored tooth sensitivity on a 0–4 scale and a visual analogue scale. Tooth sensitivity absolute risk and intensity were similar between groups, with an overall estimate of 47% (95% CI, 38% to 56%).

Comment (CM): The demand for tooth bleaching has increased in recent years but the resulting tooth sensitivity can range from mild discomfort to such severity that patients abandon the procedure. As tooth discolouration is common in smokers they may be prime candidates for bleaching but are generally excluded from trials investigating bleaching effectiveness and tooth sensitivity. This controlled clinical trial included 60 nonsmokers and 60 smokers (at least 10 cigarettes a day) who kept a daily record of sensitivity during the three weeks of 3 hours daily 10% carbamide peroxide home bleaching. Results showed the same bleaching effectiveness after one week of bleaching and no statistically significant difference in tooth sensitivity between the two groups. However, as expected, one month after the bleaching protocol, the smokers had slightly darker teeth than the nonsmokers and it is likely that this would worsen. While it is good to know that smokers did not have more tooth sensitivity during bleaching, quitting smoking before tooth whitening procedures would be a far healthier and more sensible option.

Reference: *J Am Dent Assoc.* 2015;146(4):233-40

[Abstract](#)

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Increased prevalence of celiac disease in patients with oral lichen planus

Authors: Cigic L et al.

Summary: This study involved 56 patients with erosive and reticular oral lichen planus (OLP) and 57 healthy controls. Sera from each participant was measured for tissue transglutaminase antibodies (anti-tTG) and antibodies against gliadin (AGA), and typed for human leukocyte antigen (HLA).

Comment (CM): This study investigated the prevalence of coeliac disease in patients with erosive and reticular OLP. Coeliac disease (CD) is not always diagnosed, as a clear clinical presentation is not always present. However, if detected early and a gluten-free diet adhered to, complications such as infertility, osteoporosis and cancer, can be prevented. Fifty-six histologically-confirmed OLP patients were included in this study, none of whom had previously been diagnosed with CD. Anti-tTG and AGA antibody analysis and HLA typing was done in both cases and age- and sex-matched controls. Those positive for one or both antibodies were offered a duodenal biopsy. Eight new cases of CD were detected and confirmed in the OLP group, of which only three had gastrointestinal symptoms. The authors suggest that dentists should play a more significant role in CD screening. Referral of patients with OLP may well result in the diagnosis of silent CD that would otherwise go undetected.

Reference: *Clin Oral Investig.* 2015;19(3):627-35

[Abstract](#)

Comparison of effectiveness of abrasive and enzymatic action of whitening toothpastes in removal of extrinsic stains – a clinical trial

Authors: Patil PA et al.

Summary: At study entry, extrinsic stains were measured using Macpherson's modification of Lobene Stain Index and the subjects were randomly assigned to either Group 1 (whitening toothpaste with enzymatic action using papain and bromelain; n=45) or to Group 2 (whitening toothpaste with abrasive action using perlite/calcium carbonate; n=45). After 1 month, stain scores were assessed for the effectiveness of the two toothpastes: the total stain score was reduced from a mean of 37.24 at baseline to 30.77 in Group 1, and from 35.08 to 32.89 in Group 2; these reductions were significant in both groups (Group 1, $p=0.0233$ and Group 2, $p=0.0324$). At 2 months, this effect persisted in Group 1 ($p=0.0356$).

Comment (JL): Consumers are bombarded with advertisements for products to improve their appearance. It is therefore not surprising that dental professionals are often asked for their opinions on whitening toothpastes. This triple-blind randomised clinical trial involved 90 healthy 15–40-year-olds with dental staining. Subjects were divided into 2 groups – one using an enzymatic whitening toothpaste, the other an abrasive whitening toothpaste. They were instructed to brush for at least 1 minute twice daily for a month, after which mean stain scores were assessed. After a further month of regular toothpaste use, staining was again assessed. Results showed that the enzymatic paste reduced staining more efficiently and still had a residual tooth whitening effect after 2 months. The abrasive toothpaste removed the outer stained plaque but did not change tooth colour. Considering the risk of tooth wear associated with abrasive toothpastes, and consumer demand for “natural solutions”, a toothpaste containing natural enzymes such as papain (derived from papayas) and bromelain (derived from pineapples) may be a viable alternative.

Reference: *Int J Dent Hyg.* 2015;13(1):25-9

[Abstract](#)

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Effects of fatigue from sleep deprivation on experimental periodontitis in rats

Authors: Nakada T et al.

Summary: This study randomised 24 3-week-old male Sprague-Dawley rats into the following groups: control; fatigue (deep sleep deprivation for 7 days); infection (rats inoculated with carboxymethyl cellulose containing periodontopathic bacteria); and compound (combined fatigue and infection conditions). Weight, serum corticosterone levels, serum albumin levels, interleukin (IL)-1 β and tumour necrosis factor (TNF)- α expression levels and distance between the cement-enamel junction (CEJ) and the alveolar bone crest were measured at baseline, then again on Days 36 (before sleep deprivation), 43 (immediately after sleep deprivation) and 57 (end of experiment). Immediately after sleep deprivation and at the end of the experiment, weight gain was significantly lower in the fatigue and compound groups than in control animals ($p<0.05$). Immediately after sleep deprivation, serum corticosterone levels were significantly higher and serum albumin levels were significantly lower in the fatigue and compound groups than in control animals (both $p<0.05$). Immediately after sleep deprivation, IL-1 β expression was significantly higher in the infection and compound groups than in control animals and TNF- α expression was significantly higher in the compound group than in control animals (both $p<0.05$). At study end, the distance between the CEJ and the alveolar bone crest was significantly increased in the infection and compound groups compared with control animals ($p<0.05$). Moreover, the distance was increased by a significantly greater amount in the compound group versus the infection group.

Comment (JL): It is known that fatigue influences the hypothalamic-pituitary-adrenal axis, with reports relating fatigue to systemic resistance and correlating fatigue status and disease. The aim of this paper was to determine if fatigue is a modifying factor for periodontal disease in rats. Fatigue was induced by depriving the rats of deep sleep for a period of 7 days. Results showed that gingival inflammation and alveolar bone loss was worse in the “experimental periodontitis plus fatigue” group than in the rats with experimental periodontitis alone. Although both IL-1 β and TNF- α increased significantly in the former group of animals, further studies with larger sample sizes are needed. Results suggested that fatigue is indeed a modifying factor for periodontal disease in rats. As it is estimated that between 17.4% and 36.7% of adults feel fatigue over long periods, advising our periodontal patients to take a break, relax and escape from the rat race periodically may benefit more than just their mental health.

Reference: *J Periodontal Res.* 2015;50(1):131-7

[Abstract](#)



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Independent commentary by Jonathan Leichter DMD, Cert Perio (Harvard).

Dr Leichter is currently Senior Lecturer in the Department of Oral Sciences at the University of Otago. Dr Leichter joined the faculty after 20 years in fulltime private practice in New York and Boston, 18 of which were spent in specialist practice limited to periodontology and implant dentistry. Trained at Tufts University and obtaining his specialist training at Harvard University, he has been actively involved in clinical dental implant practice since 1984. Since 2002, he has supervised and mentored postgraduate students in periodontology, endodontics and prosthodontics. His research interests and publications are in the field of periodontology, dental trauma and laser applications in dentistry.



Relationship between xerostomia and gingival condition in young adults

Authors: Mizutani S et al.

Summary: Examinations were performed in a cohort of 2077 students (1202 males and 875 females) aged 18–24 years to assess gingival disease activity and severity, the percentage of teeth with bleeding on probing (%BOP) and the presence of teeth with probing pocket depth of ≥ 4 mm. Participants completed a questionnaire on xerostomia, oral health behaviours, coffee/tea intake and nasal congestion. One-hundred and eighty-three students (8.8%) reported that their mouths frequently or always felt dry. Xerostomia was related to %BOP and dental plaque formation, but not to the presence of probing pocket depth ≥ 4 mm. Analyses revealed that xerostomia was related to dental plaque formation ($p < 0.01$); a lower level of dental plaque formation was associated with a lower %BOP. Significant associations were observed between xerostomia and coffee/tea intake ($p < 0.01$) as well as nasal congestion ($p < 0.001$).

Comment (JL): Few studies reporting a correlation between xerostomia, a subjective perception of dry mouth, and oral conditions in young adults have been published. Data from oral examinations and questionnaires from 2077 18–24-year-old students were included in this study. Smokers, students on medications and those with systemic diseases were excluded. Standard Likert-style dry mouth questions were used to assess xerostomia. Coffee/tea consumption and nasal congestion were investigated and oral examinations were carried out by 5 calibrated dentists. Results showed that 8.8% of the participants were xerostomic, with males and females equally affected. The prevalence of xerostomia was significantly increased with increased frequency of both tea/coffee intake and nasal congestion. The xerostomic group also had a higher level of plaque accumulation and increased %BOP. We often consider xerostomia in our more senior patients. Considering that almost one-tenth of these young adults were xerostomic, we should keep this in mind during history taking and intra-oral examinations, as xerostomia affects not only the periodontium but also increases caries risk.

Reference: *J Periodontal Res.* 2015;50(1):74-9

[Abstract](#)

Genetic background of supernumerary teeth

Authors: Subasioglu A et al.

Summary: This review discusses the genetic syndromes associated with supernumerary teeth, i.e., any teeth or tooth substance in excess of the usual dental configuration. This condition occurs commonly in several congenital genetic disorders such as Gardner's syndrome, cleidocranial dysostosis and cleft lip and palate. Less commonly, supernumerary teeth are also associated with Fabry disease, Ellis-van Creveld syndrome, Nance-Horan syndrome, Rubinstein-Taybi syndrome and trichorhinophalangeal syndrome. Supernumerary teeth may serve as clues to a syndrome diagnosis.

Comment (JL): A 0.2–3% prevalence of supernumerary teeth has been reported in both dentitions with primary supernumeraries less common, the maxilla affected more than the mandible, and males showing a greater prevalence than females. I always find review papers worthwhile to read as they provide a quick and easy revision of a topic and often introduce new information. This paper reminds us that supernumerary teeth are often, but not always, associated with systemic conditions or syndromes. It lists the clinical complications associated with these teeth and briefly discusses their possible aetiology. Eight conditions/syndromes in which supernumeraries are found are then discussed. These include, among others, cleft lip and palate, cleidocranial dysostosis, Gardner's syndrome, Fabry disease and Rubinstein-Taybi syndrome. While we may never examine a patient with an undiagnosed syndrome, and while the supernumerary teeth we see may be unrelated to any condition/syndrome, an awareness of this possibility should always be kept in mind. Early detection of supernumeraries through clinical examination and radiographic screening, and referral, if any uncertainty exists, is part of our role as dental professionals.

Reference: *Eur J Dent.* 2015;9(1):153-8

[Abstract](#)



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Overweight and dental caries: the association among German children

Authors: Qadri G et al.

Summary: Weight, height, and oral health data, including the number of decayed, missing and filled teeth (DMFT), were analysed from a cohort of 694 German school children (aged 9–12 years) examined at baseline and again at 18 months' follow-up. Socioeconomic status (SES) was determined by questionnaires completed by parents/legal guardians. Body mass index (BMI) was calculated using the international classification system for childhood overweight and obesity (iso-BMI). Iso-BMI was significantly associated with dental caries prevalence and severity in the permanent dentition ($p = 0.039$). A lower mean DMFT was observed in low-normal weight children (0.56) compared with overweight/obese children (0.70). An association between overweight/obese status and caries increment was of borderline significance ($p = 0.055$).

Comment (JL): The prevalence of childhood obesity and overweight is increasing, not only in Germany where this study was carried out, but in our own backyard. Six hundred and ninety-four children aged 9–12 years were included in this cross-sectional study. Height and weight data (to obtain BMI), oral health data (DMFT) and a parental questionnaire (to determine SES) were collected. At baseline, 24% were overweight/obese with significant associations with gender (more boys than girls; $p = 0.026$) and low SES (26%; $p = 0.047$). The overweight/obese children had significantly higher DMFT indices when compared with the low-normal weight individuals. At the 18-month follow-up, 16% of participants had acquired new carious lesions, the majority on the first molars. The higher SES overweight/obese students had a four times higher caries risk than the low-normal weight students in the same SES group. For those dental professionals working with children, it is important to remember our role in identifying and reducing the risk of childhood obesity and caries, and to work in partnership with other health professionals in promoting a healthy diet for all children.

Reference: *Int J Paediatr Dent.* 2015;25(3):174-82

[Abstract](#)

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