

# Oral Health Research Review

Making Education Easy

Issue 3 – 2009

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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.*

## Welcome to the third edition of Oral Health Research Review.

Each edition summarises what we think are the ten most important recently published papers in oral health and provides local commentary. In this edition we investigate the significant role anxiety can play in the duration and intensity of pain perceived by our patients when they require dental injections. There is also the rather concerning revelation that many dentist's knowledge on how to manage patients with eating disorders is quite limited. On a more positive note, we report an interesting development in dental calculi prevention in the form of phytate, the main storage form of phosphorus in plant tissue.

We hope you find this edition informative and helpful to your everyday practice, and we welcome your feedback.

Kind regards,

**Jonathan Leichter D.M.D**

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## The *in vitro* erosive potential of a range of baby drinks

**Authors:** Hunter L et al

**Summary:** This *in vitro* investigation into the erosive potential of five baby drinks available in the UK revealed that they had initial pHs of 3.5–4.0 and neutralisable acidities of 5.76–16.02mL of 0.1M NaOH, compared with an orange juice control, which had a pH and neutralisable acidity of 3.86 and 37.0mL of 0.1M NaOH, respectively. The amounts of primary and permanent enamel removed after 1-hour of immersion in the drinks were 3.77–8.10µm and 1.09–4.86µm, respectively, compared with 6.39µm and 5.32µm for the orange juice control.

**Comment (JL):** It was a matter of days after seeing Bernadette Drummond interviewed about fruit juices on Petra Bagust's television show 'What's really in your food' that I picked up this article. The researchers' aim was to assess the erosive potential of a range of baby drinks, as tooth wear in younger school-age children shows a disturbing trend, with a recent study in the UK reporting over 50% of 5- and 6-year-olds as having eroded incisal surfaces. The erosive potential of a range of baby drinks was assessed by looking at their initial pH and neutralisable acidity, as well as the amount of enamel loss (permanent and primary teeth) that followed immersion in 250mL of each drink for 1h at 37°C. Although the initial pH of all drinks tested fell within a narrow range, the neutralisable acidity (which is dependant on levels of citric, lactic and malic acids) was variable ranging from 5.76 to 16.02mL of sodium hydroxide. Enamel loss in the permanent teeth was 1–5 microns and, as expected, higher in the deciduous teeth.

Although the sample size was small and the enamel unprotected by the pellicle and/or plaque layer, this study reinforced the advice we should be giving parents. Acidic drinks are often introduced into children's diets at weaning and used in a feeding bottle, which is drunk from for protracted lengths of time. Preventive and dietary advice is an essential part of our role in the comprehensive care of our patients.

**Comment (RB):** Previous research and clinical cases have shown us that fruit juice and carbonated beverages have a destructive effect on enamel surfaces. The researchers hypothesised that baby juices would be less erosive than orange juice; however, I learnt from this article that, although the baby juices' initial pH fell within the expected acidity level, the neutralising acidity value of the juice makes it comparable to alcoholic soda, cider and white wine! This study, although performed *in vitro*, still gives us information to support the view that labelled 'baby drinks' are more than likely to be not suitable for baby teeth at all. This also provides evidence to support our on-going battle with the marketers and sellers of orange juice and other acidic and sugar-filled beverages. As part of the provision of dental health advice, it is best practice to educate our patients on the dangers of the so-called 'healthy' beverages on our supermarket shelves, by explaining the erosive properties of juice and carbonated sodas.

**Reference:** *Int J Paediatr Dent* 2009;19(5):325–9

<http://www3.interscience.wiley.com/journal/122269823/abstract>

*Independent commentary by Rebecca Baird BHSc (Dental Therapy) Otago. Becky is employed as a Professional Practice Fellow, with the Bachelor of Oral Health programme at the School of Dentistry, University of Otago, and is also a paper coordinator for the first-year clinical paper. Before being employed by the University of Otago, Becky worked for the Auckland Regional Dental Service as a Dental Therapist. In 2010, Becky hopes to enrol for postgraduate study in Public Health.*

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## Anxiety and pain during dental injections

**Authors:** van Wijk AJ & Hoogstraten J

**Summary:** A higher level of anxiety among 247 patients increased the intensity and duration of pain associated with dental injections in this study. Fear of dental pain, use of surface anaesthesia and gender accounted for 28% of the variance associated with pain duration, while injection anxiety and general dental anxiety accounted for 22% of the variance associated with pain intensity.

**Comment (JL):** The aim of this study was to investigate the link between anxiety and pain in the dental setting. The data collected included levels of dental anxiety, fear of dental pain, type of treatment and use of topical anaesthetic. 247 participants were involved, with 249 injections being given, 83 mandibular and 166 buccal. Male and female patients were distributed equally over all groups.

Not surprisingly, the authors found that anxious patients felt more pain and of longer duration than those who were less anxious. Besides fear, the use of surface anaesthesia and gender were also shown to affect the intensity of pain felt. Although confirming what I always intuitively felt to be the case, this study serves to remind us that we can expect some patients to feel elevated levels of pain during dental injection. For these patients extra care and attention, the use of topical anaesthetic and good explanations may well serve to reduce anxiety and therefore decrease their level of pain perception.

**Comment (RB):** 'Am I going to get a needle?' is a question that I often hear as a dental therapist. The use of local anaesthetic in dental procedures invokes fear, anxiety and varying levels of perceived and actual discomfort in small patients. This study uses the administration of dental injections to measure the relationship between pain and anxiety in adult patients. It reports that the more anxious a patient is, the more likely they are to feel pain, and feel it for longer than their nonanxious counterparts. Other aspects, such as using topical anaesthetic pre-injection, the location of the injection, the amount of liquid and time it takes to inject it, all affect the level of pain and anxiety experienced. In current practice there are a number of ways to minimise pain and anxiety in the dental environment. This paper emphasises that the dentist's ability to create preparative, explanatory dialogue before the dental injection and then reassurance during administration of anaesthesia helps to minimise the impact of pain and anxiety experience.

**Reference:** *J Dent* 2009;37(9):700-4

<http://tinyurl.com/JDent-37-700>

## Dentists and eating disorders – knowledge, attitudes, management and experience

**Authors:** Johansson AK et al

**Summary:** Swedish dentists (n=258) responding to a questionnaire reported that most of the knowledge they had acquired regarding eating disorders (EDs) was from newspapers, TV and other media sources. Most dentists believed they had only treated a few patients with EDs, and few were aware of their local specialised referral units. Even though female dentists appeared to have a greater level of perceived knowledge around EDs, they found it more difficult to discuss suspected cases with the affected patients or their relatives. Despite this, female dentists did make more referrals to specialists than their male counterparts. The need for more education on dental management in patients with eating EDs was deemed necessary by 86% of respondents.

**Comment (JL):** Oral health problems such as caries and erosion, impaired salivary function and parotid gland enlargement are common findings in patients with an ED. Early detection of EDs is of utmost importance so that patients can be referred for professional help for the primary disease, and also so that the oral complications can be prevented or reduced. This study explored the level of knowledge and attitudes among dentists in relation to EDs. A 29-question/statement questionnaire was sent to 367 dentists all working in a clinical setting more than 20 hours per week. The response rate was 70%.

The overall findings showed that knowledge of, and experience in, managing ED patients, is insufficient. Female dentists had a higher perceived knowledge, but were still under-informed with the major source of information for all dentists being the media! Most respondents felt they needed more training. Would you recognise the oral and physical signs of either anorexia nervosa or bulimia nervosa? And would you know what to do regarding referrals and treatment options?

**Comment (RB):** The incidence of EDs among our patients remains somewhat unknown. Unless there is clinical evidence to support damage to tooth structure or the patient appears emaciated, EDs are often not identified. In addition, a detailed investigation of the patient's medical history may not reveal an underlying ED. The authors of this paper surveyed dentists on their knowledge and identification of EDs. EDs appear to be illnesses that the study cohort of dentists had limited knowledge on. An ED is a highly personal and often hidden illness, associated with feelings of guilt, shame and embarrassment. This may lead to the patient not disclosing a past or current battle with an ED. Establishing trust within the dental environment will hopefully enable the patient to discuss all aspects of their health. Clinicians are well equipped to cope with the treatment of the intra-oral clinical effects of an ED; however, they may not have enough experience to recognise these disorders or deal with them appropriately. Further education on eating disorders, and close collaboration with the patient's support people and other medical professionals will enable clinicians to treat these patients appropriately and with sensitivity.

**Reference:** *Swed Dent J* 2009;33(1):1-9

<http://www.ncbi.nlm.nih.gov/pubmed/19522312>

## Clinical detection of caries in the primary dentition with and without bitewing radiography

**Authors:** Newman B et al

**Summary:** This study compared identification of caries in primary teeth by visual-tactile methods and bitewing radiography in 611 children aged 6.4–12.1 years. Bitewing radiography identified significantly more occlusal caries and primary molar proximal surface caries than the visual-tactile technique (74% vs. 62%;  $p < 0.001$  and 91% vs. 43%;  $p < 0.001$ , respectively); the 'hidden' occlusal caries prevalence was 12%.

**Comment (JL):** Worldwide paediatric dentistry recommendations are that bitewing radiography should be a routine procedure at the initial dental examination where children are old enough to co-operate and have interproximal surfaces that cannot be clearly visualised. Most studies confirming the value of bitewing radiography for caries detection have been carried out in adults or adolescents. This study investigated the benefits of bitewing radiography for detection of occlusal and interproximal caries in the primary dentition. The study sample consisted of 611 randomly selected primary schoolchildren living in a nonfluoridated region in Queensland. The visual-tactile technique of caries detection, as well as bitewing radiography, were used in diagnosis.

The authors found a prevalence of occlusal 'hidden' caries of 12% – these lesions were detected from the radiographs, but were not detectable by visual-tactile examination alone. The sensitivity of the visual-tactile technique for detecting proximal lesions was half that of bitewing radiography. This article highlights and reinforces the importance of taking bitewing radiographs where proximal surfaces cannot be visualised. Not to do so would severely compromise the expected standard of care for our littler patients.

**Comment (RB):** Historically, the use of posterior bitewing radiographs, to detect occlusal and interproximal carious lesions, has been under-utilised in the primary dentition. In this paper, the authors investigate the benefits of using radiographs to enhance the visual-tactile diagnosis of carious lesions, and also look at the incidence of 'hidden' occlusal caries in the primary dentition. This study resulted in bitewing radiographs identifying a high percentage of proximal caries, which the visual-tactile observation would potentially have left undetected. For occlusal caries, diagnosis is similar between visual-tactile examination and radiographic detection. This paper highlights the need for bitewing radiographs on examination for all children (depending on co-operation). In the NZ School Dental Service, the trend has been to not take radiographs on young children who appear caries free and that radiographs have not been available to all (unless the children fit certain criteria). This study shows that the frequency of undetected proximal lesions is too high not to take radiographs as part of a routine examination in order to provide the best possible care for our children.

**Reference:** *Aust Dent J* 2009;54(1):23-30

<http://www3.interscience.wiley.com/journal/122209182/abstract>



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## Periodontal disease and nutrition: separating the evidence from current fads

**Authors:** Schifferle RE

**Summary:** This review of nutrition and periodontal disease reached the following conclusions: 1) infectious periodontal disease can be treated and prevented by plaque removal in patients with a nutritionally adequate diet; 2) good nutrition helps to maintain both host resistance and periodontal tissue integrity; 2) a diet rich in whole grains, fruits, vegetables and dietary sources of calcium while avoiding refined carbohydrates is recommended; and 3) evidence suggests that vitamin and supplements are unnecessary in adequately nourished individuals, and should only be necessary in selected individuals with inadequate nutrition.

**Comment (JL):** Although diet is a major factor in the development of dental caries, its role in periodontal disease is not as clear. However, sufficient host resources do need to be available for optimal healing to occur. This article provides us with a concise and easy-to-read summary of nutrients with their functions, the recommended dietary allowances (the amount of the nutrient which meets the needs of 98% of all people in a given age and gender group) and adequate intakes (the amount adequate to maintain a defined nutritional state) given for all major and minor nutrients. In addition to the comprehensive overview of nutrition, I learnt many new facts regarding oral health. Did you know that excess vitamin A consumption can lead to gingival pathology (erosions, ulcerations, bleeding, swelling and loss of keratinisation) or that low serum levels of vitamin D have been linked with a loss of periodontal attachment? We are all aware of vitamin C deficiency and scurvy, but I had not previously heard of rebound or conditional scurvy where cessation of chronic vitamin C intake can result in oral scurvy with petechial haemorrhages, crevicular bleeding and mucosal ulcerations. We need to recommend a nutritionally adequate diet to our patients, and in some individuals a vitamin and/or mineral supplement may be necessary. This article is well worth reading.

**Comment (RB):** 'You are what you eat', the saying goes, and how true it is. The food that we consume has a direct effect on the systemic processes in our bodies. For oral health, malnutrition can affect the growth, development and repair of tooth, bone and supporting structures. Diet has long been identified as a key player in the development and rate of progression of dental caries. Obesity is a risk factor for periodontal disease, but how our diet directly affects the periodontium is not well understood. This paper reviews general concepts in nutrition, identifies components of the food we eat and looks at possible links between nutrition and periodontal disease. For the dental therapist, dietary analysis of the patient's food intake is an integral part of the overall treatment plan. Having an understanding of what is in our patient's diet, allows for appropriate dietary advice to be given to the patient and parent. Advocating for a balanced diet that is rich with fruit and vegetables will be beneficial to not just oral health, but to our patient's overall health.

**Reference: Periodontol 2000 2009;50(1):78-89**

<http://www3.interscience.wiley.com/cgi-bin/fulltext/122311787/HTMLSTART>

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## Clinical *in situ* study investigating abrasive effects of two commercially available toothpastes

**Authors:** SGiles A et al

**Summary:** In this *in situ* study, 34 participants power brushed bilateral, lower buccal appliances fitted with four dentine sections with two marketed desensitising toothpastes three times daily for 10 days. Contact profilometry confirmed previous *in vitro* findings that dentine losses at days 5 and 10 were significantly greater with the use of Colgate® Sensitive Multi Protection toothpaste than they were for Sensodyne® Total Protection toothpaste ( $p < 0.0001$ ), with a difference between the two products of  $1.4 \mu\text{m}$  at 10 days. Similar results were obtained with noncontact profilometry, with a significant difference of  $0.9 \mu\text{m}$  on day 10 ( $p = 0.0057$ ).

**Comment (JL):** Patients with gingival recession or exposed dentine are particularly at risk with regards to the potential abrasion that can be caused by brushing with toothpaste. It is well recognised by researchers that it is the toothpaste, rather than the abrasivity of the brush alone, that is responsible for abrading the hard tissues. We all see noncarious cervical lesions on a daily basis and, while we accept that toothpaste needs to be efficient, the potential for causing or exacerbating tooth wear is a concern. This study compared two commercially available toothpastes, Colgate® Sensitive Multi Protection toothpaste, which has a higher relative dentine abrasivity (RDA) and Sensodyne® Total Protect (lower RDA), to evaluate their abrasive effects. Thirty-four subjects were involved with assessment of tooth surface loss measured after 5 and 10 days of use. Dentine samples from caries-free human third molars were incorporated into bilateral lower buccal appliances, which were power brushed three times a day. Contact and noncontact profilometry were used to record dentine loss.

Not surprisingly, the results confirmed that the higher RDA toothpaste showed statistically significantly greater dentine loss than the lower RDA toothpaste. Although the aetiology of tooth wear is thought to be multifactorial, it would make sense to keep these results in mind when recommending a toothpaste to our patients, particularly those who already have noncarious cervical lesions and hypersensitivity.

**Comment (RB):** In this paper, the authors pose the question "If one then accepts that brushing with toothpaste can potentially cause abrasion of dentine, this begs the question to what degree and in what circumstances?" The authors discovered the amount of abrasion on the tooth surface varied in the same subjects with the same toothpastes, and in different subjects and same toothpastes. They concluded that the aetiology of tooth wear is multifactorial, and can be exacerbated by the abrasiveness of the toothpaste used, rather than the type of brush bristles, technique or frequency of brushing. It is good to understand the causal factors of tooth wear, in order to advise patients of products and techniques that will minimise the effects.

**Reference: J Oral Rehabil 2009 36(7):498-507**

<http://www3.interscience.wiley.com/journal/122454540/abstract>

## Oral health of children with intractable epilepsy attending the UK National Centre for Young People with Epilepsy

**Authors:** Percival T et al

**Summary:** The oral health of 39 children with intractable epilepsy at a UK residential centre was compared with 39 matched controls in this study. Mean scores for plaque in permanent teeth and gingivitis were significantly greater in children with epilepsy than in controls ( $p < 0.0001$ ), while DMFT, DMFS, dmft and dmfs did not differ significantly. More children with epilepsy had experienced anterior tooth trauma compared with controls (54% vs. 12.5%;  $p < 0.0001$ ).

**Comment (JL):** Epilepsy is the most common neurological disorder in children and, from a medical perspective, can be difficult to manage. The 39 children and adolescents in this study had intractable epilepsy, i.e. epilepsy that is resistant to at least two antiepileptic drugs. They were matched for age, gender and ethnicity with 39 fit and healthy control children. The study subjects were taking a range of medications, with most of them receiving at least two antiepileptic drugs. Co-existing medical problems occurred in 15 of the children. This study looked at dental caries, bacterial dental plaque, gingivitis, developmental enamel defects and incisor tooth trauma. It was found that there was no significant difference in the dental caries scores in the children with epilepsy compared with the controls, and also no difference in developmental enamel defects. The mean plaque score and index, and the mean gingivitis score and index for the permanent teeth, were significantly greater for the children with epilepsy. Not surprisingly, a greater number of children with epilepsy had experienced trauma to their anterior teeth. This included not only fractured, but also avulsed teeth.

For those of us who are treating children with epilepsy, we need to keep in mind that behavioural problems and motor disorders can affect oral hygiene, phenytoin-induced gingival hyperplasia is common, and that trauma to both soft and hard tissues can be sustained during a seizure.

**Comment (RB):** This paper reported that in 2005 in Europe approximately 6 per 1000 people had epilepsy, with 40% of those being children. The study compared the oral health of children with intractable epilepsy (epilepsy not adequately controlled by medication) with children who were medically healthy. The children within the study, who had intractable epilepsy, also had variance in their medications, co-existence of medical problems and differing cognitive abilities. Results showed that study participants who have intractable epilepsy experienced more intra-oral complications, such as soft and hard tissue trauma from the seizures, contraindications from the medications, and increased levels of plaque retention, compared with their control-group counterparts. For the practising dental therapist, it is necessary to be aware and understand the effects of epilepsy on our patients and how it impacts their oral health. It is important to have knowledge of current medications, or at least a MIMMS on hand, to help identify prescribed medications, and the contraindications for oral health. Intra- and extra-oral trauma sustained postseizure should also be managed and documented accurately, and appropriate referrals made for long-term management.

**Reference: Eur Arch Paediatr Dent 2009;10(1):19-24**

[http://www.eapd.gr/EAPDJournal/2009v10/Issue\\_1/Vol\\_10\\_1\\_Mar\\_Percival.htm](http://www.eapd.gr/EAPDJournal/2009v10/Issue_1/Vol_10_1_Mar_Percival.htm)



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### Anticalculus effect of a triclosan mouthwash containing phytate: a double-blind, randomized, three-period crossover trial

**Authors:** Grases F et al

**Summary:** The effect of phytate in a mouthwash on the formation of dental calculi was explored in 25 healthy dental plaque-forming volunteers who rinsed with 20mL of the mouthwash for 1 minute twice daily for 3 weeks. Compared with 3-week control and placebo periods, calcium, magnesium and phosphorous levels in dental cleaning residues were significantly lower after use of the phytate mouthwash, signifying a lower degree of plaque crystallisation as calcium phosphate.

**Comment (JL):** This randomised, double-blind, three-period crossover clinical study examined the effects of phytate and zinc on the formation of calculus. My first step after reading the article was a Google search to find out what phytate is. I discovered from Wikipedia that it is the principal storage form of phosphorus in many plant tissues, particularly bran and seeds, and that it is a strong chelator of important minerals such as calcium, magnesium, iron and zinc. Participants in this study used a phytate-containing mouthwash for 1 minute twice a day for a 3-week period. This was preceded by a 3-week 'no mouthwash' control period and 3-week placebo period. Normal dental hygiene practices were continued throughout the study. After each period, all calcified dental plaque was removed from the teeth and analysed. The efficacy of the phytate treatment was assessed by evaluating the amount of calcium, phosphorus and magnesium deposited in the plaque during each treatment period. It was found that the development of calculus was significantly inhibited by the phytate-containing mouthwash. Perhaps this will be the next addition to the mouthwashes of the future?

**Comment (RB):** Significant dental calculus formation affects a proportion of our patients. Removal of calculus can be time consuming and difficult, especially if you are unable to access the correct instruments. A patient who experiences calculus formation can be efficient with plaque removal, yet have recurrent build up in between recalls. A mouthwash containing phytate could be of benefit to this patient. This study investigates the minerals phytate and zinc, in the medium of a mouthwash, and their inhibitory effect on the formation of dental calculus. The phytate has preventive effects on the calcium phosphates within the biofilm, and disrupts the crystallization process. The zinc increases the effect of the phytate. The results of this study showed the phytate-containing mouthwash had a positive and significant effect in prevention of dental calculus formation in the study population. If this mouthwash was to become available on the market, it would be most likely prescribed for the patient group who experience severe calculi formation.

**Reference:** *J Periodont Res* 2009;44(5):616-21

<http://www3.interscience.wiley.com/journal/121477417/abstract>

### Burning mouth syndrome and psychological disorders

**Authors:** Abetz LM & Savage NW

**Summary:** This report on burning mouth syndrome (BMS) identified several psychological factors that, in conjunction with physiological factors, may contribute to the condition's aetiology and symptomatology. These included anxiety, depression, personality, stress and other psychological, psychosocial and even psychiatric disorders. The psychological factors must be managed along with the physiological factors to effectively treat patients with the syndrome. The authors propose several clinical signs that provide visible supportive evidence for BMS, which could be useful for clinical assessments and subsequent patient discussions.

**Comment (JL):** The diagnosis of conditions with abnormal oral sensations, such as found in BMS, can be difficult to make as diagnostic criteria are not consistent and the aetiology of BMS is not well understood. In addition, clinical management is complex and there is no uniform treatment protocol. BMS is a chronic oral dysaesthesia characterised by a burning sensation, most commonly of the tongue and often at more than one site. The mucosa is clinically normal and there is no detectable organic cause. Postmenopausal women are the most commonly affected. Both physiological and psychological factors play a role in the aetiology of BMS. Genetic polymorphisms associated with increased production of interleukin-1 $\beta$ , alteration in the density of GABA<sub>A</sub> receptors in peripheral tissues, a regional neuropathy, and decreased dopaminergic inhibition have all been suggested as possible causes. Chronic stress, post-traumatic stress, depression and chronic anxiety have also been implicated. Psychiatric assessment of patients with BMS has identified abnormal personality profiles in 40-50% of patients. This article successfully highlights the complexity of BMS and the fact that there do not appear to be any answers forthcoming in the near future that will help us in our treatment of these challenging patients.

**Comment (RB):** BMS is an abnormal sensation that causes chronic orofacial discomfort and also presents without any detectable clinical abnormalities. This paper offers information on the clinical signs and symptoms that can be used in clinical assessment of BMS and offers background information to support the diagnosis of BMS. There is an emphasis within the paper on the psychological factors associated with BMS. The authors describe a rather bleak picture of patients experiencing BMS and their underlying psychological and behavioural conditions. I found this was an informative paper that increased my awareness of this condition. However, it is a rather complex and multifactorial condition, and it is best practice to refer patients with BMS.

**Reference:** *Aust Dent J* 2009;54(2):84-92

<http://www3.interscience.wiley.com/journal/122400892/abstract>

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### Changes in children's oral health-related behavior, knowledge and attitudes during a 3.4-yr randomized clinical trial and oral health promotion program

**Authors:** Tolvanen M et al

**Summary:** This study involved 1691 schoolchildren from a single town in Finland. In an RCT, 497 children with at least one active caries lesions were assigned to usual oral care or an intervention group, in which they received an individualised regimen for caries control that aimed to identify and eliminate factors associated with the presence of active caries. During the study period, an oral health promotion programme was also implemented, and 807 children from another Finnish town acted as a reference group. Questionnaire responses indicated that there were greater improvements in most oral health-related behaviours among participants who received the oral-health promotion, with or without the individualised risk strategy, compared with the reference group. The improvements were also greater among children in the RCT intervention group (received both the individualised risk strategy regimen and oral health promotion programme) than in those who received the oral health programme alone (control group).

**Comment (JL):** It has been shown in a few studies that health education and preventive procedures performed in dental clinics do not achieve significant results. Behaviours usually originate from home and the surrounding environment, and, to change these, knowledge from different sources is needed as well as social support from parents, peers and other people in the child's daily environment. This RCT was conducted over a 3.4-year time span and involved two similar towns. In one town, children with at least one carious lesion were placed in either the experimental or the control groups. The experimental group had an individualised regimen for caries control while the control group received the ordinary dental care as offered in public dental clinics. In addition, a community-level programme of oral health promotion was implemented, a pupil-oriented school campaign was introduced, a healthy school environment was addressed and the entire community was involved in a promotion to increase daily tooth brushing frequency. The second town was used as the reference.

The results indicated that behaviours improved in the RCT town particularly in the experimental group. There was an improvement in knowledge with differences between towns for eating candy, drinking sports drinks, eating healthy snacks and smoking. This study showed that a multilevel approach can help children improve their oral health-related behaviour.

**Comment (RB):** Dental therapists endeavour to provide oral health messages and create preventive plans that will motivate and encourage children (and parents) to improve oral health. Prior studies have identified ways of improving oral health-related knowledge and attitudes in study participants; however, actually changing behaviour has been shown to be more of a challenge. The authors of this study looked at changes in children's behaviour, knowledge and attitudes towards oral health in different settings. The study included a reference group of children, a group where participants received usual dental care and oral health promotion (promotion group), and a group who received individual caries prevention programmes and oral health promotion (combination group). Oral health promotion was carried out using a multilevel approach. Results showed that the 'combination' and 'promotion' groups improved their oral health behaviour more than the reference group. Dental therapists work within school communities and are well placed to provide multilevel oral health promotion activities within communities. However, due to workforce shortages, they may be unable to be as involved in oral health promotion activities as they would like to be. Fortunately, the Government's strategic plan to improve oral health aims to address the need for oral health promotion in communities and includes oral health promotion as one of its main action areas.

**Reference:** *Eur J Oral Sci* 2009;117(4):390-7

<http://www3.interscience.wiley.com/journal/122512273/abstract>