

Oral Health Research Review

Making Education Easy

Issue 12 - 2012

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Welcome to issue 12 of Oral Health Research Review.

This issue includes reviews on the roles of dental healthcare professionals in identifying patients with coeliac disease and on patient education and counselling on nutrition and diet, with focus on sugar-sweetened beverages. Oral health effects associated with the use of antiepileptics are also systematically reviewed. We conclude this edition with a paper examining the effectiveness of messages used to promote oral health.

We hope you enjoy the selection for this edition, and we look forward to your comments or feedback.

Kind regards,

Jonathan Leichter D.M.D

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Dental fear in children and adolescents: a comparison of forms of anxiety management practised by general and paediatric dentists

Authors: Diercke K et al

Summary: Email interviews of German dentists revealed that paediatric dentists utilised a wider spectrum of management techniques for anxious children than general dentists, including more psychotherapeutic interventions and anxiety assessment questionnaires. Furthermore, attendees of continuing education courses considered treatment of anxious children less difficult and employed psychotherapeutic interventions more often than their peers who did not attend such courses.

Comment (JL): It is estimated that approximately 11% of children and adolescents suffer from dental fear. From the dentist's perspective, this causes stress. From the patient's perspective, avoidance of treatment is often the result. Eight hundred and twenty dentists in Germany were emailed questionnaires for this self-reported study. From the 230 responses received, the favoured techniques were reduced waiting times, appropriate description of instruments, making treatment easier to control ('tell-show-do', signs for interrupting treatment, explanation of procedure), using cuddly toys, distraction, local anaesthesia and splitting the treatment into several short sessions. Paediatric dentists applied a wider range of techniques than general dentists. The authors advised that children with severe anxiety should be referred to a paediatric dentist. These specialists have a broader spectrum of treatment techniques and can adapt treatment to the individuality of fearful children in a more appropriate way. They also suggest continuing education for dental professionals who treat children to reduce their own stress levels and to facilitate improved treatment of their dentally anxious paediatric patients.

Comment (DB): This study looked at the patient management techniques adopted by dentists and paediatric dental specialists in Germany. Results of an emailed questionnaire concluded that paediatric dentists and dentists who had undertaken ongoing education in managing anxious patients had a broader range of management options. Common techniques adopted by the majority of practitioners included 'tell-show-do', having an agreed 'sign' for the patient if they wish to interrupt treatment and reducing waiting times. Paediatric dentists placed high importance on understanding their patients' fear and often adopted psychotherapeutic interventions to help relax the patient. I found it interesting that children who were difficult to manage were the leading cause of anxiety in dentists. Given that a dentist's own anxiety will affect not only their own health but also the stress levels of the patient, it has been recommended that more ongoing education be available in this area. For those dentists not confident in managing fearful children, it is advisable to refer patients to a paediatric specialist before deciding to treat them with sedation or general anaesthesia.

Reference: *Int J Paediatr Dent* 2012;22(1):60-7

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-263X.2011.01158.x/full>

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Oral manifestations of celiac disease: a clinical guide for dentists

Authors: Rashid M et al

Summary: This review of coeliac disease highlighted that dental health professionals need to be aware of the common oral manifestations associated with the condition (i.e. enamel defects, recurrent aphthous ulcers). Clinical guidelines for the management of patients suspected of having coeliac disease were detailed. The authors concluded that timely diagnosis and prevention of complications can be facilitated with careful questioning about other symptoms, family history, serological screening tests and appropriate referral.

Comment (JL): Coeliac disease is a common, chronic, hereditary disease where a permanent intolerance to gluten results in damage to the small intestine mucosa. This leads to malabsorption of a range of nutrients including iron, calcium, folate and fat-soluble vitamins. Family dentists, therapists and hygienists play an important role in identifying patients who should be screened for coeliac disease. Although physicians may well examine the oral cavity, they seldom assess the teeth and may not recognise dental abnormalities. Aphthous ulcers and enamel defects, such as pits, grooves or even complete loss of enamel, are the most common oral manifestations found in both children and adults suffering from coeliac disease. This article provides a good overview for oral health professionals and is well worth a read. The list of clinical tips is helpful and, considering the estimation that 1% of the population may have it, adding coeliac disease to our medical health questionnaire is a valid and advisable idea. Timely diagnosis and referral can help prevent complications of untreated coeliac disease.

Comment (DB): It has become widely accepted that there are oral and dental manifestations of coeliac disease, and that these can be the first indication that a patient has the disease. This highlights the importance for oral health practitioners to be familiar with signs and symptoms that may lead to an early diagnosis. This review presents an informative clinical guide to assist practitioners who suspect their patients may have coeliac disease. Aphthous ulcers, while often benign, have been highlighted as a potential indicator that there may be a more serious underlying cause. Of particular interest to me were the images of various grades of enamel defects that have been associated with coeliac disease. These are more evident in children who develop the disease under 7 years of age when the permanent teeth are forming. Of importance, it has been reiterated that if it is suspected that a patient may have coeliac disease, they are not advised to commence a gluten-free diet before a diagnosis has been confirmed – doing so may eliminate the symptoms and further delay a definitive diagnosis.

Reference: *J Can Dent Assoc* 2011;77:b39

<http://www.jcda.ca/article/b39/>

Sugar-sweetened beverages: general and oral health hazards in children and adolescents

Authors: Mishra MB & Mishra S

Summary: These authors reviewed hazards associated with sugar-sweetened beverage consumption in children and adolescents, and concluded that: i) toothbrushing should not be performed during the first hour after consumption of such beverages to allow the teeth time to remineralise and enamel harden; ii) individuals with exposed dentine should brush with a soft toothbrush and fluoridated toothpaste, and undergo regular check-ups and have a fluoride regimen planned; iii) counselling for changing family lifestyles, particularly in high-risk individuals, may help improve children's and young adults' general and oral health; and iv) all individuals should think before drinking sugar-sweetened beverages.

Comment (JL): In addition to examinations, preventive care and restorative dentistry, education of our patients is an integral part of our role as health professionals. In the last 50 years, soft drink consumption has increased 500-fold with the main consumers being children, teenagers and young adults. A 20oz (~600mL) can of soda contains 16 teaspoons of sugar, 250 calories, 90mg of caffeine and has a pH of 3 or lower. This article is full of worthwhile information and contains many startling facts that we can pass on to our patients. Many people who consume these beverages are unaware of the potential damage that sugar-sweetened drinks can cause, not only to their teeth but also to their general health. Consuming four or more soft drinks between meals is associated with a 179% increase in the odds of having a high DMF. Daily consumption of a single 12oz (~350mL) can, with no increase in physical activity, can lead to a bodyweight gain of 15lb (~7kg) per year. Although spelling mistakes and poor grammar detract from the readability of this article, it is still worth reading.

Comment (DB): The frequent consumption of fast food and sweet drinks has become an established 'norm' of the modern lifestyle. Given the affordability of these easy-to-manufacture products and the ever increasing costs of milk, meat, fresh fruit and vegetables, families who are financially compromised become most at risk. However, it is not only those in areas of high deprivation that are susceptible, with fast food being the easy option for those living a fast-paced, on-the-run, quick-fix lifestyle. Regardless of reasons why people adopt unhealthy eating practices, the resulting consequences include an increase in diseases such as obesity, diabetes and dental disease. This article concluded that appropriate counselling for patients should include ways to reduce risks for those who continue to consume sweetened beverages. Suggestions include consuming sweet drinks through a straw to limit contact with teeth, increasing dairy foods when consuming acidic foods and beverages and avoiding brushing immediately after drinking these beverages when the enamel has become softened.

Reference: *Int J Clin Pediatr Dent* 2011;4(2):119-23

Internet access via: <http://www.ijcpd.com/>

The effect of 1% chlorhexidine varnish and 40% xylitol solution on *Streptococcus mutans* and plaque accumulation in children

Authors: Simões Moraes R et al

Summary: Children aged 2–5 years with medium-to-very high salivary levels of *Streptococcus mutans* ($\geq 1 \times 10^3$) received 1% chlorhexidine varnish, 40% xylitol solution, chlorhexidine and xylitol combined or 0.05% sodium fluoride (n=17 per group). *S. mutans* levels and plaque decreased significantly in all groups during follow-up assessments (15 days and 1, 3 and 6 months), with no significant between-group differences, although the *S. mutans* reductions did appear to be greater in the chlorhexidine and sodium fluoride groups.

Comment (JL): Control of levels of *S. mutans* – the main causative agent in caries – is an important target of caries prevention and control. Two chemotherapeutic regimens, chlorhexidine and xylitol, were used in this blinded study to determine their effect on *S. mutans* levels. The study subjects were 68 children aged 2–5 years. Very few investigations have been done on the association between chlorhexidine and xylitol, and no studies involving young children had previously been documented. After a 6-month application period, overall reductions in *S. mutans* levels were found for all groups. Overall, the best performance occurred in the chlorhexidine group. Treatment acceptance was measured with the Faces Scale (satisfaction, indifference or dissatisfaction) and showed excellent children's acceptance of all the tested products. It is always helpful to have a range of products for use in our fight against caries, particularly in our very young patients. Habits can be difficult to change, and these products can easily be incorporated into our armamentarium of preventive measures.

Comment (DB): Previous studies have investigated the performance of a chlorhexidine/xylitol combination on *S. mutans* count; however, this is the first study done specifically with children. Children aged 2–5 years (n=68) were recruited to participate, and an *S. mutans* count was performed at baseline. Children were treated with one of four treatment options. Children accepted chlorhexidine treatments well, despite the bitter taste, and it was felt that the delivery of the agent via a varnish instead of a gel was the reason for this. There were no statistically significant differences between the groups post-treatment; however, all groups did show an overall reduction in *S. mutans* count. All children in the study were identified with having a cariogenic diet, and were given dietary and oral hygiene instruction at baseline. It is not clear whether some or any of the participant's habits were altered as a result of this instruction, and this may have interfered with the performance of the agents.

Reference: *Pediatr Dent* 2011;33(7):484-90

<http://tinyurl.com/PedDent-33-484>



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Relationships between eating habits and periodontal condition in university students

Authors: Tomofuji T et al

Summary: This cross-sectional study of 801 Japanese university students, including 21%, 62% and 7% who were underweight (body mass index <18.5 kg/m²), normal weight (18.5–22.9 kg/m²) and overweight (≥23 kg/m²) respectively, found that among overweight participants, the risk of periodontitis was significantly increased with frequent fatty-food consumption and significantly decreased by high vegetable consumption (adjusted odds ratios 2.3 [95% CI 1.1, 5.2; p<0.05] and 0.2 [0.1, 0.7; p<0.01], respectively). There were no significant associations between eating habits and periodontitis in under- or normal-weight participants.

Comment (JL): Overweight and obesity are risk factors for several chronic diseases, including periodontitis. This study compared overweight with nonoverweight Japanese university students. Eating habits, oral hygiene habits, periodontal health, body mass index and blood pressure were assessed. Eight hundred and one students took part, with smokers and alcohol drinkers excluded. Periodontal condition was assessed using a community periodontal index, and eating and oral hygiene information was obtained from a questionnaire. Results indicated a possible relationship between bodyweight, eating habits and periodontal condition, with periodontitis and high blood pressure significantly more common in the overweight than in the underweight or normal-weight students. However, the generalisability of this study is questionable, as the subjects were all university students from the same institution, and the effect of ethnic variations may be a factor. Regardless of this, motivating healthy food choices in our patients, regardless of bodyweight, age or ethnicity, is certainly to be encouraged.

Comment (DB): This study looked to find relationships between individual eating habits, being overweight and periodontal condition. Participants were selected from first-year university students attending the Okayama University in Japan. Groups were classified by bodyweight and gender. A series of questions designed to investigate eating and oral hygiene habits, as well as exercise patterns, were administered, and a full oral examination was conducted by four dentists. The results showed that a diet high in vegetables had the potential to decrease the risk of periodontal disease, but only in those who were already overweight. The reverse was also true, with those frequently consuming fatty foods showing an increased risk of periodontal disease, once again only within the overweight cohort. Having said this, those who were underweight or of normal weight were, of course, less likely to consume fatty foods on a regular basis, so this can be difficult to evaluate. It was concluded that those who were overweight were more likely to have periodontal disease.

Reference: *J Periodontol* 2011;82(12):1642–9
<http://www.joponline.org/doi/abs/10.1902/jop.2011.110061>

Remineralization and acid resistance of enamel lesions after chewing gum containing fluoride extracted from green tea

Authors: Suyama E et al

Summary: Volunteers (n=45) wearing intraoral appliances with human demineralised enamel chewed gum containing fluoride 50µg extracted from green tea leaves and placebo gum in a randomised crossover design. Compared with placebo, elevated salivary fluoride levels (mean peak 3.93 ppm) were associated with a significantly higher fluoride concentration in the remineralised region (656 vs. 159 ppm; p<0.001). The mineral change volume was significantly higher with the fluoride versus placebo gum after remineralisation and significantly lower with the fluoride gum after an acid challenge.

Comment (JL): For patients who prefer the 'natural' approach and dislike chemical additives, the option of a plant-derived fluoride may well be an acceptable option to provide the benefits of low levels of fluoride ions in the oral environment. Plants in the family Theaceae, such as the tea tree, contain high concentrations of fluoride in their leaves. This double-blind, randomised, crossover study involved 45 healthy adults. Removable mandibular appliances, containing enamel blocks in which experimental subsurface lesions had been created, were worn for 80 minutes per day, with the participants chewing either sugar-free placebo gum or gum containing green tea extract (25µg fluoride/piece) for 20 minutes, twice daily. The enamel specimens were studied using microradiography and saliva samples were collected for fluoride measurements. Results showed that the use of fluoride-containing gum produced significantly higher acid-resistance, with the fluoride content of the remineralised lesions twice as high with fluoride-containing gum than with placebo. Fluoride-containing gum with a green tea-derived fluoride could be a useful option for those patients with strong antifluoride convictions, as it could be promoted as a natural alternative.

Comment (DB): In Japan, the use of chemical fluoride as a food additive is prohibited; however, fluoride derived from plants is permissible. Green tea was selected to provide the fluoride content of chewing gum for the purpose of this study, as it contains high concentrations of fluoride in its leaves. Participants wore a removable appliance that contained a segment of enamel from an orthodontically extracted tooth. The appliance was worn for 80 minutes a day, during which time participants chewed either the fluoride-containing gum or a placebo gum. Appliances were stored in a moist plastic container at all other times. I am curious to know if the tooth was from the participant's own mouth or an unknown donor. I made the assumption that the tooth had been heat sterilised, and wonder if this may have affected the composition of the enamel. The results showed that fluoride uptake was significantly higher for enamel lesions treated with fluoride-containing gum, and the salivary fluoride level was markedly increased and sustained over time.

Reference: *Aust Dent J* 2011;56(4):394–400

<http://onlinelibrary.wiley.com/doi/10.1111/j.1834-7819.2011.01359.x/abstract>

Protective effect of pit and fissure sealants on demineralization of adjacent enamel

Authors: Alsaffar A et al

Summary: In this study, ten occlusal fissures of extracted molars were sealed with a glass ionomer cement (GIC; Fuji Triage) or a conventional nonfluoride-containing (Delton Opaque), one of two fluoride-containing (UltraSeal XT plus and Clinpro) or an amorphous calcium phosphate (ACP)-containing (Bosworth Aegis) resin-based sealant (RBS), and immersed in lactic acid gel for 20 days. Mean mineral loss values (volume percentage mineral × µm) were significantly higher for the nonfluoride-containing and the UltraSeal XT plus fluoride-containing RBSs (1975 and 1802, respectively), and significantly lower for the GIC (88), compared with the Clinpro fluoride-containing and the ACP-containing RBSs (1004 and 1275, respectively).

Comment (JL): This *in vitro* study used extracted human teeth to compare a GIC and three RBSs – one conventional, two containing fluoride and one containing ACP. The teeth were cleaned and sealed in the central occlusal groove, with the other surfaces sealed with nail varnish. They were then immersed in an acid gel for 20 days to create a demineralised lesion on the occlusal enamel. Mean mineral loss in the enamel adjacent to the sealants was compared. Although it was found that the GIC was superior to the RBSs in inhibiting lesion formation, we must keep in mind that protection of adjacent enamel is not the main rationale for placing sealants. Although interesting, this article does not address all the factors we take into account when deciding on the choice of sealant to be used.

Comment (DB): GIC has been promoted for its ability to release fluoride; however, it has also been identified as having retention issues, thereby limiting its use. This *in vitro* study investigated whether RBSs, with added fluoride or ACP, could provide not only good retention, but also protect adjacent enamel from acid demineralisation. The results found that a GIC still provided the most effective protection compared with all other products, although RBSs containing fluoride or ACP were shown to give some protection. It was highlighted that teeth demineralise differently depending on composition, therefore differences between teeth may have contributed to high standard deviations. The *in vitro* study design also has limitations, as it can be difficult to accurately replicate the oral environment. The authors of this study recommend that a GIC be the material of choice in situations where isolation may be difficult and caries development is a concern.

Reference: *Pediatr Dent* 2011;33(7):491–5

<http://www.ingentaconnect.com/content/aapd/pd/2011/00000033/00000007/art00004>

*Independent commentary by Jonathan Leichter DMD, Cert Perio (Harvard).
 For full bio [CLICK HERE](#). Independent commentary also by Deanna Beckett,
 Professional Practice Fellow with the Bachelor of Oral Health programme at
 the School of Dentistry, University of Otago.*

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The effects of antiepileptic drugs on oral health

Authors: Cornacchio ALP et al

Summary: This systematic literature review of 15 papers on the effects of antiepileptic drugs on oral health found that reported rates of gingival hyperplasia among phenytoin recipients ranged from 16% to 94%, and use of this agent or carbamazepine was also associated with alveolar bone loss. Gingival hyperplasia was also associated with valproic acid, carbamazepine and phenobarbital use. No papers reporting the oral health effects of new-generation antiepileptics met the inclusion criteria.

Comment (JL): Epilepsy affects 40–70 of every 100,000 people in the developed world, with gingival hyperplasia a well-established side effect of phenytoin – the most common drug used to treat epileptic seizures. This systematic literature review aimed to explore the effects of other antiepileptic drugs on oral health, but found no published studies assessing the oral health of patients taking the newer generation drugs. However, it does provide a good review of gingival hyperplasia as a result of antiepileptic drugs, and stresses the importance of the role of oral healthcare professionals in educating our patients and ensuring regular visits so that the side effects of the therapy can be diminished. The authors also identify the need for prospective, controlled studies on the newer antiepileptic drugs, as this information is profoundly lacking.

Comment (DB): This systematic review of literature looked to fully explore the effects of traditional epilepsy medication on the oral environment and identify if newer generation antiepileptic drugs demonstrate similar side effects to phenytoin. Gingival hyperplasia was identified as the most common oral side effect for patients on phenytoin, although if prescribed for short-term use, this complication was able to be reversed after the completion of the medication. For those on long-term phenytoin, gingival overgrowth, while not painful, has the potential to completely cover the crown of the teeth, putting the patient at risk of gingival trauma. While extensive information was available on the oral health of individuals on phenytoin, the reviewers were unable to find any studies that explored the effect of new-generation antiepileptic drugs on the oral environment. This highlights an urgent need for more research in this area.

Reference: *J Can Dent Assoc* 2011;71:b140

<http://www.jcda.ca/article/b140/>

Reliability of panoramic radiographs for identifying supernumerary teeth in children

Authors: Anthonappa RP et al

Summary: This analysis of panoramic radiographs (PRs) by 18 examiners (25 PRs each), taken from a pool of 75 PRs randomly selected from patient records, investigated variations in the identification of supernumerary teeth (ST) depending on level of dental training. The respective sensitivities and specificities were: i) 50% and 98.3% overall; ii) 39.2% and 99.4% for junior house dental officers; and iii) 60.8% and 95% for postgraduate paediatric dental trainees. The positive and negative predictive values were 90.6% and 83.6%, respectively. The authors concluded that ST identification cannot be reliably achieved with PRs and that a higher level of dental training is necessary.

Comment (JL): PRs play an important role in the diagnosis and treatment planning of a wide range of dental and maxillofacial diseases and conditions. They are often the first choice for radiographic information gathering in children, as they are noninvasive and easily tolerated. However, although comprehensive information can be gathered, limitations do exist, especially regarding clear visualisation of structures positioned outside the focal trough. The authors of this study evaluated the sensitivity and specificity of PRs for identifying ST, as the majority of these occur in the premaxilla. Dentists at different levels of training were enrolled as examiners to determine if experience influenced results. Four hundred and fifty PRs were examined, of which 22.6% had ST. Not surprisingly, it was found that level of training was a critical factor for identifying ST. The findings also demonstrated that PRs are unreliable, with approximately 50% of ST undiagnosed. As exposure to radiation must always be justified and optimised, we need to carefully consider our choice of radiographic examination. In my opinion, when a ST is suspected in the anterior maxilla, a maxillary anterior occlusal radiograph is a more reliable diagnostic tool.

Comment (DB): PRs are currently the most common type of radiographs used for the diagnosis of ST. This study looked to see how accurate practitioners were in reading these radiographs and diagnosing the presence or nonpresence of ST. It also looked at whether the practitioner's level of training affected accuracy when interpreting these films. Participants were classified by qualification and given a selection of films to read. The results showed that panoramic radiographs were unreliable when used for diagnosing ST and identified that the level of training attained by the practitioner was a significant factor in accurate diagnosis. However, it is important to note that the participants were only given films and did not have access to any clinical notes. While this study highlights the importance of ongoing education in diagnostic radiography, we need to consider that a good clinician should always use radiographs in conjunction with a thorough examination, including dental and family history.

Reference: *Int J Paediatr Dent* 2012;22(1):37–43

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-263X.2011.01155.x/full>

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Research Review publications are intended for New Zealand health professionals.

An effective oral health promoting message?

Authors: Richards W & Filippini T

Summary: These authors questioned the efficacy of current UK health promoting activities for reducing social inequalities in oral health. They concluded that: i) individuals' behaviours, motivations and attitudes can be negatively affected by conflicting dietary messages; ii) the often cited 'healthy' snack option of bread contains hidden sugars and has the potential to confuse; and iii) leaving the mouth empty for 2 hours between food/drink consumption episodes is a common and unambiguous message to promote that "fulfils dental, nutritional and educational principles", although they also note that further research is necessary to validate this message as there is currently no evidence base to support it.

Comment (JL): The common risk factor approach to health promotion recognises that many chronic diseases can be prevented through a unified approach toward healthy behaviours. The authors used the promotion of bread as an acceptable between-meal snack to demonstrate ambiguity in health messages. Bread was approached from both the dental and nutritional perspectives, with the sugar and salt contents reported. While bread is given as an example of a healthy snack from the nutritional perspective, not only does it contain sugar, it is rarely eaten alone and often has a sweet filling such as jam or chocolate spread. The authors suggest that the promotion of safe snacks condones grazing as an acceptable behaviour. From a dental perspective, this is dangerous, particularly in the context of snacks between small frequent meals. Conflicts in dietary messages can negatively affect behaviour, motivation and attitudes of individuals. For this reason, a simple message, such as leaving the mouth empty for 2 hours between episodes of food and/or drink, is suggested. This fulfils dental, nutritional and educational principles.

Comment (DB): This paper identifies income as a major determinant of children's dental health. The affordability of fresh fruit, vegetables and milk products were cited as an inhibiting factor for families on a limited budget. The interesting twist with this paper is the emphasis placed on 'what is being promoted as a healthy food?' and questions whether the messages given are consistent and accurate. This study demonstrates that while bread is generally accepted and often promoted as healthy, it contains hidden sugars that are often overlooked. The repercussions of this can be the delivery of misleading information to patients who then perceive bread as being sugar free when it is not. This paper suggests changing the focus of oral health messages to one of limiting the frequency of snacking by encouraging at least a 2-hour break between eating, rather than promoting one particular food product over another.

Reference: *Br Dent J* 2011;211(11):511–6

<http://www.nature.com/bdj/journal/v211/n11/full/sj.bdj.2011.1001.html>

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