

Oral Health Research Review

Making Education Easy

Issue 6 – 2010

In this issue:

- Fluoride release/recharge from fissure sealants
- Asthma and oral health
- Dental sealant use in adults
- OCs and periodontal health
- Screening for eating disorders
- Dental patients' use of the Internet
- CPP-ACP and salivary pH/bacterial plaque
- General and oral hygiene behaviours in adolescents
- Number of teeth as a predictor of CV mortality
- Oral candidiasis in liver/kidney transplant recipients



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

Welcome to the sixth edition of Oral Health Research Review.

The guest reviewer for this issue is Deanna Beckett, a Professional Practice Fellow with the Bachelor of Oral Health programme at the School of Dentistry, University of Otago. This issue includes comprehensive reviews of the relationships between oral health and asthma, and between liver/kidney transplantation and oral candidiasis. Another study found large numbers of missing teeth are an indicator of increased cardiovascular-related mortality. We also get a surprising revelation of just how bad personal hygiene levels can be in adolescent males.

We hope you find this edition interesting and helpful in your everyday practice, and we welcome any feedback you have for us.

Kind regards,

Jonathan Leichter D.M.D

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Fluoride release and recharge from different materials used as fissure sealants

Authors: Bayrak S et al

Summary: The authors of this study compared five commonly used pit-and-fissure sealant materials to assess their fluoride release. The prepared specimens were stored in a test tube of ultrapure water, exposed to 1.23% APF gel on day 21, and fluoride release was then monitored at intervals up until 42 days. Materials tested were a conventional resin sealant (Fissurit F), a glass-ionomer cement (GIC; Fuji VII), a resin-modified GIC (Fuji II LC), a polyacid-modified composite resin (Ionosit) and a flowable composite resin (Aelite Flo). Significant differences were found among the materials, with Fuji VII and Fuji II LC demonstrating significantly higher fluoride release than the other materials at every test ($p < 0.05$). Exposure to APF gel resulted in significant fluoride release for all the materials tested ($p < 0.05$).

Comment (JL): Applying fissure sealants is one of the most effective methods used in the prevention of occlusal caries and, together with topical fluorides, represents the primary preventive treatments for dental caries that are routinely used by dental professionals both in private practice and in the School Dental Service. Although the resin-based sealants possess higher retention rates, they are difficult to place in situations where moisture control is a problem. The GICs have the disadvantage of inferior wear resistance, but do provide an alternative strategy where placement of a resin sealant is a problem. This study showed that their initial fluoride release as well as their higher fluoride recharge capacity is another advantage. Limitations of the study were that the ultrapure water used differs from the liquids in the oral environment, and that simulation of sealant recharge from daily brushing with a fluoride-containing toothpaste would have been more clinically relevant.

Comment (DB): This study compared the fluoride release and recharge from five different sealing agents. All materials tested had optimum fluoride release at 24 hours and recharge was noted for all; however, Fuji II LC and Fuji VII released significantly more fluoride than the other materials tested. Marketers of Fuji VII promote the product as being 7 times higher in fluoride; however, this study showed the actual release of fluoride measured was only twice the amount of Fuji II and, by day 4, both were at similar levels. This study was *in vitro* and did not replicate exactly the oral cavity environment. The recharge was achieved by duplicating the effect of professionally applied topical fluoride applications, as opposed to daily brushing using fluoridated toothpaste. However, the information in this study is useful and supports choosing a GIC sealant for high caries-risk patients.

Reference: *Eur J Dent* 2010;4(3):245-50

http://www.eurjdent.com/images/Volume_4/4-245-250.pdf

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Asthma and oral health

Authors: Thomas MS et al

Summary: This paper reviewed the correlation between asthma and oral health. The potential of asthma treatments, such as inhalers and nebulisers, to increase the risks of caries, erosion, periodontal disease and oral candidiasis was discussed. So, what can we do for these patients? The review also listed precautionary measures, including regular checkups, use of fluoridated mouthrinses, rinsing immediately after inhaler use, chewing sugar-free gum for at least 1 minute after using an inhaler, the use of a spacer device to deliver the drugs directly to the airway and referral to a gastroenterologist where reflux is suspected.

Comment (JL): This article is both interesting and very informative, particularly as asthma is a growing health problem, currently affecting >300 million people worldwide. Asthma medications consist of bronchodilators, corticosteroids and anticholinergic drugs, and are mostly inhaled using an inhaler or a nebuliser. This article looked at the effect of asthma and the medications on several oral health conditions. Not only do asthma medications reduce flow, pH and buffering capacity of saliva, they also alter the constituents of saliva and some contain fermentable carbohydrates. Increased consumption of cariogenic drinks (due to excessive thirst, oral dehydration and an attempt to wash away the taste of the inhaled medication), a drug pH <5.5 and an increased incidence of gastro-oesophageal reflux all contribute to the onset and progression of the aforementioned oral conditions.

Comment (DB): There have been a number of studies conducted to see if there is a correlation between asthma and oral health. Medications used to control asthma can reduce salivary flow or change the chemical environment of the mouth, and some have a sugar component to make them more palatable. Asthmatics also have a higher incidence of mouth-breathing and reflux. Mouth dryness may also lead to a higher consumption of sugary drinks. These issues may increase caries risk and other oral health problems. Studies on whether there is a correlation between asthma and oral health show conflicting results. However, there does appear to be enough evidence to indicate that patients with asthma should take special care with their oral health. Oral health professionals can recommend that asthmatic patients use spacers, rinse their mouths with water after taking medications and chew sugar-free gum.

Reference: *Aust Dent J* 2010;55(2):128-33

<http://onlinelibrary.wiley.com/doi/10.1111/j.1834-7819.2010.01226.x/abstract>

The use of dental sealants in adults: a long-neglected preventive measure

Author: Gore DR

Summary: The rationale for, and substantiation of, the use of dental sealants among adults for reducing occlusal pit-and-fissure caries were described in this paper. The authors make a strong case for the use of fissure sealants in adults. Not only are the posterior teeth susceptible to caries throughout the lifetime, sealants can also significantly improve the longevity of occlusal restorations by protecting against secondary recurrent caries. If a portion of the sealant is lost over time, it can simply be repaired, thus providing continued protection. It has been estimated that, in an adult patient with eight sealants, one could need to be repaired every five years.

Comment (JL): We routinely place fissure sealants in the mouths of our young patients as a cost-effective caries preventive measure for pits and fissures. But why do we not extend sealant therapy to our adult patients when we know that the occlusal surfaces, and lingual and buccal pits and grooves, are especially susceptible to caries attack? It has been estimated that even though the occlusal surfaces make up 12% of the total number of tooth surfaces of the mouth, the pits and fissures are eight times more vulnerable than the smooth surfaces. Considering that our aim is to provide our patients with the highest standard of care, perhaps the simple, relatively inexpensive strategy described in this review is one we should be using far more routinely.

Comment (DB): The differences between America and NZ are particularly relevant when considering the information within this article, as many of the supporting arguments were based on American figures and statistics. NZ has a government-funded dental service for children until the age of 18 years, and while the placement of fissure sealants is based on individual caries risk assessments, NZ would have more children with sealed permanent molars. Of more relevance, perhaps, is who takes responsibility for continuing the maintenance and replacement of sealants into adulthood? This article promotes the hygienist or assistant for this role. In NZ, most therapists are registered to provide care for children under 18 years of age; however, hygienists and oral health graduates are able to provide fissure sealants for all ages.

Reference: *Int J Dent Hyg* 2010;8(3):198-203

<http://onlinelibrary.wiley.com/doi/10.1111/j.1601-5037.2009.00425.x/abstract>

The impact of oral contraceptives on woman's periodontal health and the subgingival occurrence of aggressive periodontopathogens and *Candida* species

Authors: Brusca MI et al

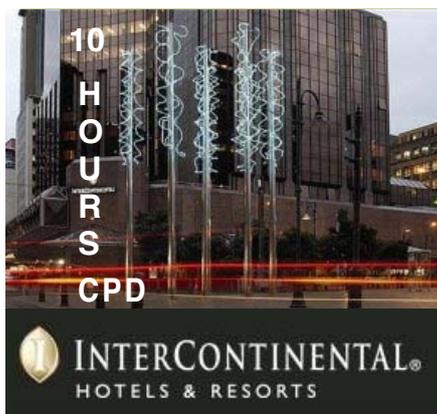
Summary/comment (JL): This study included 92 women with an average age of 30 years, with the test and control groups matched for socioeconomic status, oral habits, ethnicity, occupation and educational levels. The group was divided into oral contraceptive (OC) users and nonusers, all were systemically healthy, had not received antibiotics or a professional cleaning in the previous 6 months, and were not pregnant. The type of OC and the duration of medication were recorded, and all patients were examined by an experienced periodontist with plaque and gingival inflammation measured, a comprehensive periodontal examination carried out and full-mouth radiographs taken. In addition, pooled subgingival samples were cultured. The results of this study suggest that OC use has a role to play in periodontal health, with OC users having a 20% higher proportion of GI scores, significantly higher BOP scores and higher prevalences of moderate and severe periodontitis. Higher percentages of *Candida* spp. colonisation and a higher prevalence of *Porphyromonas gingivalis*, *Prevotella intermedia* and *Aggregatibacter actinomycetemcomitans* were found in women using OCs. The authors concluded that OC use may increase the risk of severe periodontitis, but acknowledge that the sample size was relatively small.

Comment (DB): Natural variations of female sex hormones are known to cause gingivitis, and *Candida* spp. have a higher incidence in females as opposed to males. Of the 92 subjects studied, 41 were taking OCs. The incidence of severe periodontal problems was higher among those taking OCs than those not taking OCs. Overall, the highest incidence of periodontal problems occurred in smokers taking an OC. The findings suggest that those women who take OCs and/or smoke may be at more risk for developing periodontal disease; however, the sample size in this study was relatively small and further research is indicated.

Reference: *J Periodontol* 2010;81(7):1010-8

<http://www.jonline.org/doi/abs/10.1902/jop.2010.090575>

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Eating disorders: screening in the dental office

Author: Hague AL

Summary: This article presents us with screening techniques that can be implemented during routine preventive care appointments. The SCOFF questionnaire consists of five questions, takes around 30 seconds to complete and can be included in the patient's medical history. A positive result (a "yes" response to two or more questions) indicates that a patient may have an eating disorder and that further investigation is needed. Screening test results should be reviewed with the patient in a supportive, nonjudgmental way, and all findings, discussions, recommendations and referrals documented. Referral should be to a professional who specialises in eating disorders, and the oral healthcare professional should remain part of the interdisciplinary team. Early detection and referral may reduce oral health risks and improve the chance of long-term recovery.

Comment (JL): Three distinct eating disorders have been classified, namely anorexia nervosa, bulimia nervosa and eating disorders not otherwise specified, such as binge-eating disorders or partial syndromes. Oral healthcare professionals are often the first healthcare professional to encounter patients with undiagnosed eating disorders, because some of the initial signs and symptoms are found in, and around, the oral cavity. These include angular cheilitis, candidiasis, caries, erosion, dentine hypersensitivity, salivary gland hypertrophy, xerostomia, glossitis and trauma to the soft palate and pharynx.

Comment (DB): In a world where picture-perfect models grace our magazine stands, it is little wonder that young men and women feel pressured to conform to society's perceived expectations in regards to body size. Oral health professionals may be the first to identify clinical manifestations of eating disorders, which may lead to a diagnosis and psychological treatment for patients. The patient screening questionnaire used seemed confrontational and lacked the subtlety required when dealing with a psychological disorder. Health professionals need to be able to discuss findings with patients in an empathetic manner that will encourage them to seek referral. As adolescents are one of the groups most at risk for eating disorders, dental therapists can play an important role in the identification and referral process.

Reference: *J Am Dent Assoc* 2010;141(6):675-8

<http://jada.ada.org/cgi/content/abstract/141/6/675>

Independent commentary by Deanna Beckett. Deanna Beckett graduated as a Dental Therapist in 1996 and is currently employed as a Professional Practice Fellow with the Bachelor of Oral Health programme at the School of Dentistry, University of Otago. In addition to her University position, Deanna holds a fortnightly weekend clinic at the Fiordland Dental Centre, providing oral health care for children and adolescents in the greater Fiordland area. Before joining the University staff, Deanna also worked as a Dental Therapist in a variety of schools in the Mid Central, Nelson/Marlborough and Otago areas.

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.

Dental patients' use of the Internet

Authors: Ni Riordáin R & McCreary C

Summary: The aims of this study were to determine the use of the Internet by patients to search for information regarding dental procedures and also to investigate their interest in online dental consultations and dental tourism. A self-administered, anonymous questionnaire consisting of 15 questions was randomly distributed to 520 adult patients attending Cork University Dental School and Hospital. The response rate was 96.2%. The majority of patients used the Internet daily, with 34.5% of patients either having researched their condition themselves or had a family member or friend research it for them. Google was the most frequently used search engine. Using the Internet to plan a trip abroad for dental treatment was an option that 37% of patients would consider.

Comment (JL): Our patients have access to vast amounts of information and resources. Unfortunately, the ability to interpret medical information is an acquired skill that many do not have, and the risks exist that they may fail to realise that important information is missing, that the information provided is biased, or they may misinterpret information or not recognise non-evidence-based material. Realising that our patients are actively seeking information on the Internet, it is up to us to provide them with reputable and appropriate websites so that they can take an active role in researching their condition or proposed treatment. We also need to caution them about the pitfalls of dental tourism, such as lack of follow-up care and the risk of receiving substandard treatment.

Comment (DB): Today, more than ever before, patients are acutely aware of their rights regarding informed consent, and while 'the word of a good dentist' was once gospel, times have changed and professionals must be prepared for a new era of patients. The world of the Internet has opened up a whole new dimension for those wishing to further educate themselves on all the options before making expensive treatment decisions. Given the massive amount of information available, it is imperative that dental professionals are able to guide their patients to reputable websites and help them to critically assess and analyse information. The Cochrane Collaboration has become an invaluable source for both health professionals and the general public alike.

Reference: *Br Dent J* 2009;207(12):583-6

<http://www.nature.com/bdj/journal/v207/n12/full/sj.bdj.2009.1137.html>

Salivary pH level and bacterial plaque evaluation in orthodontic patients treated with Recaldent® products

Authors: Marchisio O et al

Summary: This study was carried out on 25 patients with fixed orthodontic appliances over a 12-week period. At each of the appointments (first evaluation, 3 weeks, 6 weeks and 12 weeks), a salivary test, a plaque test and an assessment of oral hygiene index (OHI) were carried out. GC Tooth Mousse was used twice a day for the first 3 weeks, after which use was suspended. It was found that plaque pH increased in 48% of the patients, while salivary pH increased in 64%. OHI improved in 20 of the patients.

Comment (JL): Although the title of this article sounded promising, unfortunately the results were inconclusive. GC Tooth Mousse is a water-based sugar-free topical cream containing casein phosphopeptide – amorphous calcium phosphate (CPP-ACP) which binds to the enamel, biofilm and soft tissues providing a bioavailable source of calcium and phosphate for tooth remineralisation. It is common to see an increased prevalence of enamel demineralisation during fixed appliance therapy. The brackets and wires create areas for plaque build-up, tooth cleaning is more difficult and the self-cleansing mechanisms, such as saliva and movements of the tongue, are limited. Although, OHI improved in 20 of the patients in this study, I cannot see that this can be attributed to the use of the tooth mousse. Our patients undergoing orthodontic treatment need to be particularly vigilant with respect to their oral hygiene. Although GC Tooth Mousse may help combat demineralisation in some patients, it is certainly no substitute for good oral hygiene practices.

Comment (DB): CPP-ACP is an exciting development in the world of dentistry, and has been marketed as the 'miracle cure' for a wide variety of clinical symptoms/ailments. This article assessed the long-term benefits of CPP-ACP-containing Recaldent® products after an intensive 3-week, twice-daily homecare application. The results were inconclusive due to a number of variables. Individual habits affecting the outcome included personal oral hygiene standards, DMFT, diet and compliance, given that treatment was self-administered. For more conclusive results, it would be necessary to increase the number of participants, use clinical applications of CPP-ACP as opposed to homecare applications, and follow the participants on a long-term basis.

Reference: *Int J Dent Hyg* 2010;8(3):232-6

<http://onlinelibrary.wiley.com/doi/10.1111/j.1601-5037.2009.00374.x/abstract>

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Modelling the factors influencing general and oral hygiene behaviours in adolescents

Authors: Dorri M et al

Summary: The main objective of this study was to develop and test a rationale model of factors affecting hygiene behaviours in adolescents. A 37-item questionnaire was completed by 1132 sixth-grade Iranian students, their average age being 12.4 years. Questions covered topics such as sociodemographic background, sex, education, oral and general hygiene behaviours, peer social networks and Sense of Coherence. Statistical analysis showed significant correlations between several variables, with a strongly significant relationship between oral hygiene behaviours and general hygiene behaviours. Girls were significantly more likely than boys to report brushing teeth at least twice a day, while boys were significantly more likely than girls to report changing underwear only once a week or less. The authors suggested that oral and general hygiene promoting programmes should be designed and implemented in close collaboration with each other to improve outcomes and avoid duplication of efforts.

Comment (JL): The difference between hygiene behaviours and other health behaviours is that many people practice hygiene as grooming behaviours. Habits that people develop during adolescence are relatively stable and tend to continue through into their adulthood. I was not surprised that girls brushed their teeth more than boys, but what concerned me is that boys were more likely than girls to report changing underwear only once a week or less!

Comment (DB): I found this a particularly interesting and thought-provoking study, and would be interested to see a modified version trialled with NZ teenagers. Iranian schools are single-sex and this may have influenced the study. Comparing co-ed and single-sex schools would also be interesting. Socioeconomic status was accounted for; however, we also need to look at cultural differences and practices. Does promiscuity or religion affect hygiene behaviours? The study only looked at sixth-grade children, of approximately 12 years of age, and many would not have begun puberty yet. A comparative study with the 16-year age group would be interesting, to see if hygiene habits differ pre- and postpuberty. The study did show a correlation between personal and oral hygiene. It would be fascinating to carry out the same study in different countries, and see if a common link can be identified across the cultures.

Reference: *Int J Pediatr Dent* 2010;20(4):261-9

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-263X.2010.01048.x/abstract>

Number of teeth as a predictor of cardiovascular mortality in a cohort of 7,674 subjects followed for 12 years

Authors: Holmlund A et al

Summary: This large prospective study, with a prolonged follow-up period, investigated if oral health parameters could predict future mortality in different cardiovascular (CV) disorders in a dose-dependent manner. These parameters were the number of remaining teeth, severity of periodontal disease, number of deepened periodontal pockets and bleeding on probing. Four experienced specialists assessed the 7674 subjects, full-mouth radiographs were taken and each subject was categorised according to a periodontal severity index. During the 12-year follow-up period, 629 of the subjects died. Of these, 167 died of coronary heart disease, 83 from a stroke and 49 from aortic aneurism. This gives a total of 299 who died as a result of CV disease. Statistical analysis showed a 7-fold increased risk for mortality caused by coronary heart disease in subjects with <10 teeth compared with those with >25 teeth.

Comment (JL): Low-grade systemic inflammation has been proposed as an important aetiological factor for CV disease with chronic infection, such as periodontal disease, a possible source for this low-grade systemic inflammation. Because teeth are generally removed due to some type of infection, the number of teeth present could be an important and easily obtained risk indicator. With this in mind, we should consider advising those patients with severe tooth loss or periodontal disease to have a full medical examination.

Comment (DB): This large study did not provide a clear definitive correlation between the number of teeth in a patient and the incidence of CV disease. Oral pathogens and inflammation could influence the development of atherosclerosis by increasing the number of circulating inflammatory markers. However, other factors can also increase the incidence of CV disease (e.g. smoking, diabetes and socioeconomic status). These additional factors were unable to be accounted for in this study, due to its semiretrospective design. However, there is evidence to indicate advising patients with periodontal disease and/or severe tooth loss to seek a general medical examination.

Reference: *J Periodontol* 2010;81(6):870-6

<http://www.joponline.org/doi/abs/10.1902/jop.2010.090680>

Oral candidiasis in immunosuppressed children and young adults after liver or kidney transplantation

Authors: Olczak-Kowalczyk D et al

Summary: This study included 185 kidney and liver transplant recipients and 70 control patients aged between 1.5 and 25.2 years. A clinical examination of the oral mucous membranes and diagnostic mycological tests were carried out, and the results statistically analysed. It was found that colonies of *Candida* spp. were present in 34% of transplant recipients receiving an immunosuppressive regimen and in 27% of the control subjects. This was not statistically significant. The presence of *Candida* spp. was not affected by the type of organ transplant, treatment, age or graft survival time. In the immunocompetent subjects, only *Candida albicans* was found, while in the transplant recipients, a variety of *Candida* spp. were found. In addition, different colony densities were found in transplant patients. Oral candidiasis in adult transplant patients was described as angular cheilitis, pseudomembranous plaques, erythematous lesions and atrophic candidiasis.

Comment (JL): All patients with organ transplants and immunosuppressive therapy should be frequently followed up, not only with clinical examinations, but also mycological tests. As kidney and liver transplants predispose to increased colony density, the sooner an increased density of *Candida* spp. is diagnosed, the earlier antifungal therapy can be initiated.

Comment (DB): The purpose of this study was to evaluate the frequency of *Candida* spp. and identify their presence in the oral lesions of graft recipients. The findings suggest that *Candida* spp. were higher in transplant patients than in the immunocompetent control group. The study concluded that there may be some relationship between the frequency of *Candida* spp. and lesions of graft recipients. Research cited in this article does not fully assist in determining a relationship. Further research is required. Until then, immunocompromised patients with *Candida* spp. colonisation should be treated as having a heightened risk of developing clinical manifestations.

Reference: *Pediatr Dent* 2010;32(3):189-94

<http://tinyurl.com/PedDent-32-189>

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