

Dental Review

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Issue 3 - 2007

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Welcome to **Dental Review**, a unique independent New Zealand publication bringing you some of the most important research from around the world. We summarise the best we can find to save you time doing the same thing.

Please feel free to pass the publication on to friends and colleagues and thanks to everyone who took the time to provide feedback. Thanks also to our sponsors for their ongoing commitment. We hope you find this issue stimulating and look forward to your comments.

Kind regards,

Associate Professor Nick Chandler

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Contamination of a toothbrush with anti-bacterial properties by oral microorganisms

Authors: Efstratiou M et al

Summary: This study examined contamination and the survival rate of cariogenic and periodontopathic species on toothbrushes. One brush design featured bristles coated with triclosan. The patients were under treatment for chronic periodontitis and used different quadrants, with and without toothpaste, during each trial. Tufts were cut from the brushes for analysis at 0, 4 and 24 hours after storage in a dry environment, and bacterial species and numbers assessed.

Immediately after use there was no significant difference between the regular and antibacterial toothbrush. There was a significant reduction in microorganisms 4 hours later. When toothpaste (which included NaF and triclosan among its ingredients) was used there was a significant reduction in colony-forming units of bacteria.

Comment: Translocation of cariogenic species is possible by dental instruments and oral hygiene aids, and similar findings have been made concerning periodontal pathogens. Immediately after use even new brushes harbour high numbers of bacteria, and the species include anaerobes. A number of solutions have been found effective to disinfect toothbrushes; these include Listerine, 0.12% chlorhexidine solution and sodium hypochlorite. While this study did not support the use of triclosan to reduce the microbiological load on toothbrushes, previous work has shown chlorhexidine as a filament coating to be beneficial.

Reference: *Journal of Dentistry* 2007; 35:331-337

PMID: 17118507



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Effect of a calcium hydroxide-based root canal dressing on periapical repair in dogs: a histological study

Authors: Leonardo MR et al

Summary: Intracanal dressings between endodontic appointments are proposed to aid the preparation of infected root canals. This study involved 66 premolar root canals in 4 dogs. Access was made and the canals left open for 7 days to achieve bacterial contamination. Canals were then either root filled or dressed for periods of 15, 30 or 180 days. After a further 180 days the animals were sacrificed and periapical repair evaluated from histological sections.

Comment: One week has been recommended as the time for which calcium hydroxide should be kept in the root canal. In this work the use of calcium hydroxide was important in repair where periapical lesions were present, and repair was better than when canals were filled in a one-session treatment. Complete apical barrier formation was only present in the dressed teeth; there did not seem to be significant differences between the times for which the dressings were used. While calcium hydroxide-based, the dressing material used in the experiment contained camphorated p-monochlorophenol.

Reference: *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;102:680-685

PMID: 17052647

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Safety of electronic apex locators and pulp testers in patients with implanted cardiac pacemakers or cardioverter/defibrillators

Authors: Wilson BL et al

Summary: Twenty seven patients were investigated in an electrophysiology laboratory or a cardiology clinic while an electronic apex locator (EAL) and two types of electric pulp tester (EPT) were in simulated clinical use. The three devices all generate AC current and produce voltages from 80 mV to 350 V. The manufacturers warn against their use with pacemakers, based on the speculation of potential risk of electromagnetic interference, rather than strong scientific evidence. No adverse events were detected in any of the patients, and none experienced palpitations or any cardiovascular symptom.

Comment: Testing the vitality of pulps and determining working lengths in endodontics are frequent tasks for general dental practitioners and specialists. The first cardiac pacemaker was implanted in 1958, and since then these devices have undergone a massive evolution. A 1974 study found that an EPT caused a pacemaker to switch modes, and it is likely this study has been the main rationale for dentists acting cautiously when treating pacemaker wearers. Called 'A preliminary evaluation of the effects of electrical pulp testers in dogs with artificial pacemakers' (JADA 1974;91:1224-1229) even the title was somewhat misleading, as the experiment only involved one dog, which was under general anaesthetic at the time. This latest work suggests that EPTs and EALs are safe for use in these patients.

Reference: *Journal of Endodontics* 2006; 32:847-852

PMID: 16934627

A clinical study of interdental separation techniques

Authors: Loomans BAC et al

Summary: A special separation ring and a wooden wedge were investigated in a split-mouth experiment involving 27 patients. Frictional forces were recorded on removal of a 0.05 mm metal matrix from between adjacent teeth, and contact tightness assessed with a Tooth Pressure Meter. Recordings were made before placement, after 5 minutes of separation device use and 5 minutes after removal of the devices. Traditional 'pre-wedging' gave relatively little separation compared to a separation ring or the ring combined with a wedge.

Comment: Separation devices may be used to displace adjacent teeth in order to achieve tight proximal contacts when placing Class II composite restorations. This compensates for the thickness of the matrix used and for shrinkage of the material. As a wedge is pressed once into the interdental area it is less effective than the continuous force applied by rings. Also, wooden wedges absorb fluids, become more flexible and deform. About 90% of contact tightness is recovered within 30 seconds, but the time taken for complete recovery is unknown.

Reference: *Operative Dentistry* 2007;32:207-211

PMID: 17555170

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Effect of restoration size on the clinical performance of posterior “packable” resin composites over 18 months

Authors: Brackett WW et al

Summary: Fifty patients needing a single moderate or large Class II or multiple surface Class I restoration in a first or second molar were recruited. All teeth were in occlusion. Two packable composites were used. Seven restorations were classed as small, 25 as moderate and 18 as large, with 8 being cusp replacements. Patients were recalled at 18 months, when 3 restorations were found to be fractured and one to have secondary caries (92% success with both materials behaving similarly). No statistical relationship was found between restoration size and failure.

Comment: The authors suggest caution, as this was a relatively short-term study, but they were encouraged by the outcome. The current literature on hybrid composites indicates survival rates of at least 85% over 3 to 7 years. Studies do not usually relate size to clinical performance, with only one report stating there is a greater risk of failure among large posterior composite restorations.

Reference: *Operative Dentistry* 2007;32:212-216

PMID: 17555171

Non-smoking and non-drinking patients with head and neck squamous cell carcinoma: a distinct population

Authors: Farshadpour F et al

Summary: Head and neck squamous cell carcinomas account for 5% of all newly diagnosed cancer cases worldwide. Many studies associate tobacco smoking and alcohol consumption. These are independent risk factors but are synergistic when combined. Individuals smoking 20 cigarettes per day and using more than 100 g of alcohol have a 200 times increased risk. This study of 4402 patients with cancer involved the 195 patients (4.4%) who did not smoke or drink. Most were female (73% vs 26%), were older (73 years vs 64 years), and most of their tumours were in the oral cavity (66% vs 25%).

Comment: Few studies of this disease have considered patients who did not smoke or drink, and this one shows there are two different populations with the condition. Carcinogenesis may be different, and tumorigenic factors may be relevant. Human papilloma virus, gastrointestinal reflux disease, oral lichen planus, diet and familial disposition are considered as possibilities. Worryingly, the rate of occurrence of second primary tumours is as high in both groups at around 16%.

Reference: : *Oral Diseases* 2007;13:239-243

PMID: 17305629

Effectiveness of fluoride in preventing caries in adults

Authors: Griffin SO et al

Summary: This paper presents a meta-analysis to examine the effectiveness of self- and professionally applied fluoride and water fluoridation among adults. A total of 489 articles were examined. Twenty studies were then included, and these involved 13,551 participants as the final body of evidence. The findings suggested that fluoride prevents caries in adults of all ages.

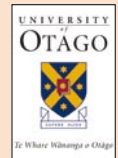
Comment: The first line of the abstract to this paper is somewhat startling, stating ‘To date, no systematic reviews have found fluoride to be effective in preventing dental caries in adults’. The authors comment on the quality and quantity of studies of fluoride effectiveness among adults, and the number of studies of children which could be included in parallel studies. The effectiveness of fluorides in adults supports programmes to serve this population.

Reference: *Journal of Dental Research* 2007;86:410-415

PMID: 17452559



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Independent commentary by Associate Professor Nick Chandler and the Department of Oral Rehabilitation, University of Otago



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Association between factors related to the time of wearing complete dentures and oral health-related quality of life in patients who maintained a recall

Authors: John MT et al

Summary: The time of wearing complete dentures was related to the oral health-related quality of life (OHRQoL) in patients who maintained a recall. A letter was sent to 161 patients who had been provided with complete dentures in the previous 52 months, and 50 participated. Age of dentures, number of previous dentures, time since first complete dentures and age when first complete dentures were provided were recorded. Most subjects had been treated 24 months ago and were about 73 years old. Their OHRQoL was not substantially affected by their total time wearing complete dentures or the age of their current dentures. Patient expectations seemed to be of special importance. Patients who requested implants and received conventional dentures reported little improvement in denture satisfaction. Subjects who requested and received implant-retained prostheses reported significant improvement in satisfaction and OHRQoL, as did those who asked for complete dentures and received complete dentures.

Comment: Patients with complete dentures have lower OHRQoL and more orofacial problems than those with partial dentures. The results related to patients undergoing recall, and might be different among those not attending for regular check ups.

Reference: *International Journal of Prosthodontics* 2007;20:31-36
PMID: 17319359

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Oral health-related quality of life of periodontal patients

Authors: Cunha-Cruz J et al

Summary: Chronic periodontitis may be without symptoms for extensive periods of time and is generally painless. Sufferers may therefore underestimate treatment required. However, periodontal conditions can lead to tooth loss, tooth mobility, eating difficulty, pain and aesthetic problems. Six questions were used to assess the oral-health related quality of life of patients presenting to a periodontal specialist. A further question was used to determine perceived oral health. These were associated with clinical characteristics. Of 3,617 patients attending, 1,497 completed the task. They were aged 35-89 years and the genders were evenly matched.

Comment: The subjects who indicated poorer perceived oral health were significantly more likely to have more than 8 teeth with 5 mm pockets, compared with those with 3 teeth with similar pocket depths. Denture discomfort was more common in patients with more missing teeth. Almost one fifth of the sample had one or more oral health-related quality of life problem. This challenges the perception that chronic periodontitis is a 'silent' condition.

Reference: *Journal of Periodontal Research* 2007; 42:169-176
PMID: 17305876

Effect of dental probing on occlusal surfaces- a scanning electron microscopy evaluation

Authors: Kühnisch J et al

Summary: This study involved 20 third molars with sound occlusal surfaces and 20 with initial carious lesions in young adult patients. Ten molars in each group were probed with a sharp probe before extraction, with the other teeth serving as controls. Under the scanning electron microscope no traumatic defects were found among the unprobed teeth, while the other molars featured surface defects and enlargements and break-offs of the pits and fissures. This damage could favour caries progression. The authors suggest a ball ended periodontal (CPITN) probe or a 3-in-1 syringe as a replacement in the non-mirror hand, as traditional caries probing is an 'unethical' diagnostic procedure. In doubtful cases bitewing radiographs and laser fluorescence techniques are advised.

Comment: Occlusal carious lesions present a difficult diagnostic problem, and while caries prevalence in many studies is declining, occlusal lesions in children and adolescents are on the increase in many countries. Previous studies of the damage done by probes mainly involved light microscopy. Anyone who examines a patient with a mirror in one hand and a conventional dental probe in the other will have cause to rethink after looking at the micrographs in this paper. Probing defects were found in all the teeth with initial carious lesions, and 2 surfaces initially scored as 'sound' were also damaged. Probe marks were seen on cusp slopes as well as at the bottom of fissures. Enlargement of pits and fissures matched the tip of the probe, and were up to 1 mm wide.

Reference: *Caries Research* 2007;41:43-48
PMID: 17167258

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