

# Dental Review

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**Welcome** to the first edition of **Dental Review**, a unique New Zealand publication bringing you the most important dental research from around the world every two months.

The Dental Review has been established to help make life easier for the dental community in New Zealand. Every month thousands of scientific publications are printed worldwide containing a multitude of new studies. Many are devoted entirely to dental research. In short, keeping up is hard and requires significant time to screen out what is irrelevant to your practice. We aim to save you time sorting the 'wheat from the chaff' so you can spend more time doing what you're best at.

The Dental Review is a summary of what we think are some of the most significant new papers, plus a local commentary on why they are important and how they can potentially affect practice. Selection and review of the trials is carried out independently. The Review also provides references to the abstract or fully published papers so you can make your own judgements.

The creation of this publication would not have been possible without support from our sponsors and to them we give our thanks. Also, thanks to the New Zealand Dental Therapists' Association for supporting distribution to Dental Therapists.

If you have discovered or been involved in what you think is significant research let us know and we will consider it for inclusion next time. If you have colleagues or friends involved in dentistry within New Zealand who would like to receive our publication, send us their contact email and we will include them next issue.

We hope you find this first edition stimulating reading and look forward to hearing your comments.

Kind regards,

**Associate Professor Nick Chandler**

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## Temporary anchorage devices for tooth movement

**Authors:** Scheyer ET and Gallerano RL

**Summary:** Orthodontic anchorage usually relies on intra and/or extra oral devices. Miniscrews (diameter less than 2.5 mm) and miniature osseointegrated palatal implants may be inserted and used to control tooth movement during orthodontic treatment and removed at completion of treatment. They may replace extraoral appliances for some orthodontic patients, and can be used regardless of the number and position of teeth.

**Comment:** This paper (commissioned by the American Academy of Periodontology) notes that the placement of osseointegrated implants is an established procedure in most periodontal specialist practices in the USA. Temporary anchorage devices are somewhat different, and can probably be placed by any dentist with suitable experience and training. Perhaps the best people to place them are the orthodontists themselves, as they are familiar with the tooth movement and anchorage requirements of their individual patients. It seems that in the USA at least, the orthodontists are not particularly interested in this work.

**Reference:** *Journal of Periodontology* 2006;77:1613-1624

**PMID:** 17032102

## Masticatory efficiency and pathomorphologic changes in gastric mucosa

**Authors:** Sierpinska T et al

**Summary:** This study aimed to determine relationships between masticatory efficiency, *Helicobacter pylori* infection, and histopathologic gastric mucosal changes in edentulous and partially edentulous patients with complaints of dyspepsia. There was a dentate control group included. Subjects chewed a silicone impression material as artificial food, and this was sieved to assess masticatory efficiency. Endoscopy was performed, biopsy material gathered and stained to reveal *H. pylori* (a common pathogen in chronic gastritis and related to gastric efficiency). The results showed that comminution of the 'food' was impaired in the two groups with missing teeth. Inflammatory gastric changes were more common in the masticatory deficiency group, and the severity of *H. pylori* infection generally higher in these groups.

**Comment:** There is good reason to think that loss of teeth might be related to chronic gastritis and dyspeptic symptoms, but there has been very little literature to support this. This paper explains recent research advances in the measurement of masticatory efficiency. The authors cautiously suggest a causal role for impaired masticatory efficiency in the development of gastric pathology. Cooperation between prosthodontists and gastroenterologists is suggested.

**Reference:** *Quintessence International* 2007;38:31-37  
**PMID:** 17216905

## The role of apical size in the reduction of intracanal bacteria

**Authors:** Mickel AK et al

**Summary:** These researchers used 100 single rooted teeth infected with *Enterococcus faecalis* and during preparation divided them into 3 master apical file groups. Scanning electron microscopy revealed organisms in all the samples, on the dentine surface or within dentinal tubules, but the microbial reductions after preparation were considered promising when compared to the positive controls.

**Comment:** The optimum dimension for the apical preparation during root canal treatment has been the subject of much debate and research. An appropriate size is essential for successful debridement, with a minimum size of 30 being necessary for the penetration of irrigants into the apical third of canals. Larger sizes may demonstrate increased microbial reduction. While 'three sizes above the first file to bind' is still taught in many dental schools, recent work shows initial flaring of canals gives more accurate measurement of the apex, with the choice of instrument for preflaring having a role in determining the anatomical diameter at the working length. Is there a magic number for apical cleanliness? The authors state that instrumenting to larger sizes may not be prudent for every case, and minimal preparations based on clinical opinions may be detrimental.

**Journal of Endodontics** 2007;33:21-23  
**PMID:** 7185122

## Removable implant overdentures: failures of soldered bars

**Authors:** Waddell JN et al

**Summary:** This literature review from New Zealand with 50 references examines factors in the failure of soldered bars used for removable implant overdentures. When clinical studies on prosthodontic maintenance complications were examined, there was evidence of low failure rates of interabutment bars, with more problems with distal cantilever extensions. However, the position of the fractures when they arose were not identified, and the nature of the failures was not described or explained. In reviewing the fixed prosthodontic literature several factors were identified, including solder joint strength, soldering method, abrasive used to prepare joint surfaces, porosity, diffusion of metal into parent metal and voids acting as crack initiation points. These affect the quality, strength, and fatigue resistance of bar attachments.

**Comment:** This paper alerts the reader to the complexity and importance of the many technique-sensitive laboratory stages involved in this type of advanced rehabilitation work involving implants.

**Reference:** *Journal of Prosthetic Dentistry* 2006;96:283-288  
**PMID:** 17052473

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## Association between optimism and self-reported facial pain

**Authors:** Sipila K et al

**Summary:** Facial pain related to temporomandibular disorders has been estimated to occur in between 5-18% of adults. Psychological factors are related to its aetiology and pathogenesis. Optimism is the expectation of positive outcomes for the future. It is associated with some health outcomes, including lower pain levels. In this study of 8463 subjects asked to attend for examination, 5696 responded (67%) and were given questionnaires on facial pain, optimism and depression. Four levels of optimism were measured and these were inversely associated with depressiveness; this is in agreement with other studies. In the non-depressive subjects, the 2 highest levels of optimism were associated with a lower likelihood of experiencing facial pain. In the depressive there was no association of optimism with facial pain.

**Comment:** This study gathered data from subjects born in Northern Finland in 1966 and represents a massive amount of data. While the authors suggest that optimism and depressiveness are independent determinants of facial pain, they also note that as the study was cross-sectional causality cannot be inferred.

**Reference:** *Acta Odontologica Scandinavica* 2006;64:177-182

**PMID:** 16809196

## Improved aesthetic results with traumatised anterior teeth

**Authors:** Arhun N et al

**Summary:** Maxillary central incisors may suffer horizontal root fractures as a result of trauma. If a crown/root fracture is just subgingival any restoration is complicated by problems of maintaining periodontal health. Orthodontic extrusion of the root portion may be helpful. The authors report two teeth with unfavourable fractures, adjacent to a tooth with another horizontal root fracture in the mid-root in a 19 year old patient. The mobile crown portions of the unfavourable teeth were extracted and the remaining roots filled in a single appointment. Over a period of 8 weeks the roots were extruded using a fixed orthodontic appliance attached with prefabricated screw posts and resin cement. Fibrotomy and gingival recontouring preceded the construction of porcelain fused to metal crowns.

**Comment:** At last! A paper supporting extensive efforts to conserve natural roots rather than proceed directly to implants, and in a 19 year old! The treatment may seem a little old-fashioned, but it can work well, and the writers are careful to emphasize the length of treatment and multidisciplinary nature of their treatment plan. Their final note is that for teeth with root fractures and no mobility or displacement of the coronal fragment no treatment may be necessary. This is important; almost one third of root fractures in the middle third of roots are unknown to the patient, and are revealed only by radiographs.

**Reference:** *British Dental Journal* 2006;201:509-512

**PMID:** 17057676

## Glass ionomers and recurrent caries

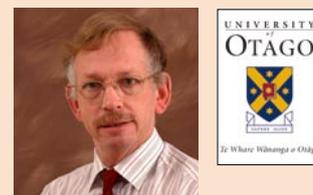
**Authors:** Swift EJ Jr

**Summary:** This 'Ask the Experts' item asks the question "Do glass ionomers prevent or reduce recurrent caries?" The answer is that fluoride release from glass ionomers seems to continue indefinitely at relatively low concentrations. The content can be recharged from a variety of topical sources. The fluoride release is probably too low to have an antimicrobial effect, but could be enough to tip the demineralization/remineralization balance in a favourable direction. Artificial caries models in laboratories demonstrate reduction in recurrent lesions, and are supported by some clinical research.

**Comment:** Systematic review of clinical trials concerning recurrent caries inhibition suggests a positive effect but provides no conclusive evidence. There is a need for randomized controlled clinical trials.

**Reference:** *Journal of Aesthetic and Restorative Dentistry* 2006; 18:233

**PMID:** 16987317



Independent commentary by Associate Professor Nick Chandler, Oral Rehabilitation Dept, University of Otago.

Research Review publications are intended for New Zealand health professionals.

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## Adhesion to laser-prepared tooth structure

**Authors:** Hilton TJ

**Summary:** In this 'Critical Appraisal' the author reviews the potential advantages of lasers for cavity preparation – reduced need for local analgesia, less vibration to the patient and more conservative cavity design – and considers 4 refereed publications which used Er:YAG lasers on extracted human teeth. He concludes that there is adequate evidence to have concerns regarding the routine use of lasers, especially for bonded restorations. The effects on dentine appear to be detrimental in this regard, since an irregular, scaly surface with microfissures may result, giving the dentine a weaker surface structure. Collagen fibres may also be fused and denatured, closing interfibrillar spaces. These effects could be expected to reduce the flow of resins into the prepared surface leading to inferior adhesion.

**Comment:** A note of caution here – further research on the topic and additional development of lasers is suggested.

**Reference:** *Journal of Aesthetic and Restorative Dentistry* 2006; 18:370-374

**PMID:** 17083443

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**Disclaimer:** This publication is not intended as a replacement for regular medical education but to assist in the process. The reviews are a summarised interpretation of the published study and reflect the opinion of the writer rather than those of the research group or scientific journal. It is suggested readers review the full trial data before forming a final conclusion on its merits.

## The relationship between caries in the primary and permanent dentition

**Authors:** Skeie MS

**Summary:** This Norwegian study examined 217 five year-olds with 186 being re-examined at the age of 10 years. No caries was found in a quarter of the children, and 71% of the dentine caries was found in 17% of the subjects. At the 10 year examination a risk group was defined on the basis of dentine caries in any incisors or on the mesial of the first molars. A statistically significant relationship in disease between the dentitions was found. More than two surfaces with caries experience in primary second molars are suggested as a clinically useful predictor at 5 years of age for being at high risk at age 10.

**Comment:** For dental professionals seeing young people over an adequate time period and with good radiographs and records this pattern of caries could be the basis of treatment and advice to children and their parents.

**Reference:** *International Journal of Paediatric Dentistry* 2006;16:152-160  
**PMID:** 16643535

## Enhanced fluoride release from glass ionomer cement following a coating of silver fluoride

**Authors:** Ariffin Z et al

**Summary:** This laboratory study applied 10% AgF to Fuji IX and Fuji VII glass ionomers and the resin modified glass ionomer Vitrebond. Incremental fluoride release was then measured. In uncoated specimens, Vitrebond showed the highest cumulative fluoride release, followed by Fuji VII and Fuji IX. With AgF coating all materials showed increased fluoride release, but the authors caution that an application of potassium iodide would be necessary to prevent staining of the glass ionomer and adjacent enamel. The method may be beneficial to patients with high caries risk and could be used when atraumatic restorative treatment (ART) is carried out.

**Comment:** The application of silver fluoride to the teeth of children with large cavities has been used in the past to slow the progression of caries and prevent pulp exposure until such time as comprehensive operative treatment is possible or available. Quite why resin modified glass ionomers have a higher release of fluoride than conventional glass ionomers is unknown!

**Reference:** *Australian Dental Journal* 2006;51:328-332  
**PMID:** 17256308

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