

# Dental Review™

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Issue 27 - 2011

## In this issue:

- > LED curing lights
- > Viruses in periapical disease
- > Nausea, vomiting and hiccups
- > Local anaesthetic efficacy
- > Periodontitis and diabetes knowledge
- > Dental student's stress
- > Dry field techniques
- > Furnace temperatures
- > Antibiotics for fractured mandibles
- > Blood-contaminated aerosols

**Welcome.** This issue seems to involve a number of environmental studies, with quite a lot of words from physics books appearing. But temperatures, humidity, aerosols and the performance of lights are all key players in making dentistry work. It should be a stress-free read, and if it isn't, you can read about others under stress in item 6!

Best Wishes,

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## Shortest exposure time possible with LED curing lights

**Authors:** Busemann I et al

**Summary:** When the first composite curing devices were introduced, the aim was to reduce their exposure time of 40 seconds. These researchers used a clinically relevant laboratory model to investigate the effectiveness of 9 lights in curing two brands of composite in shades from A1 to A4. The surface hardness of the bottom surface of the samples was measured 10 minutes after exposure. As some proximal boxes in posterior teeth may be 7 mm deep the model used had a mould 5 mm high. Ten seconds was the minimal exposure time for lighter shades under absolutely ideal conditions.

**Comment:** Curing devices have evolved through lasers and quartz tungsten halogen types, but the manufacturers of some LED types still recommend 40-second exposures. Even longer times have been suggested, but reported as unacceptable to practitioners. This paper makes clear the problems of research of this type, with cavity shape, thickness and shade of material, type of light, heat generated and duration of exposure being factors that are all involved.

**Reference:** *American Journal of Dentistry* 2011;24(1):37-44

<http://www.amjdent.com/Archive/Abstracts/2011/February%202011%20Abstracts.html>



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<sup>1</sup> Harrel S, Molinari J. J Am Dental Assoc. 2004; 139: 429-37. <sup>2</sup> Fine DH, et al. J Am Dental Assoc. 1993; 124(5): 56-8. Medicines have benefits and some may have risks. Always read the label and use only as directed. Listerine® Antiseptic Mouthwash contains: Benzoic acid 0.12% w/v, Cineole (Eucalyptol) 0.0922% w/v, Ethanol 27.0% w/v, Thymol 0.064% w/v. Johnson & Johnson (New Zealand) Ltd, Auckland. TAPS PP9948 2033/11

### Identification of herpesviruses types 1 to 8 and human papillomavirus in acute apical abscesses

**Authors:** Ferreira DC et al

**Summary:** Do some viruses, especially herpesviruses, have a role in marginal and apical periodontitis? The investigators aspirated material from the acute apical abscesses of 24 patients, with healthy pulp material from 5 premolars used as controls. The viruses were detected using single or nested polymerase chain reaction assays; 61% of samples had viruses present. Human herpesvirus-8 was found in about half the samples (no patients reported they were HIV-positive). Human papillomavirus was in 13% of samples, and herpesviruses present in two of the control samples. There may be an association between viruses and marginal and apical periodontitis, perhaps with the virus presence in immunocompetent patients reducing host defences.

**Comment:** How the presence of specific viruses may be involved in apical abscesses needs more investigation. Perhaps the challenge of bacteria in the infected root canal attracts defence cells which are already infected with viruses, or maybe the viruses get into the pulp space by coronal leakage, since herpesviruses and papillomavirus can be shed in saliva.

**Reference:** *Journal of Endodontics* 2011;37(1):10-16

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### Nausea, vomiting, and hiccups: a review of mechanisms and treatment

**Author:** Becker DE

**Summary:** Postoperative nausea and vomiting (PONV) is miserable for the patient and treatment provider and a huge number of publications discuss its prevention and management. A hiccup is a sudden contraction of the diaphragm and intercostal muscles, followed immediately by laryngeal closure. The reflex is not properly understood. Episodes lasting longer than 48 hours are considered persistent, with intractable cases lasting longer than 2 months. More than 100 causes have been identified.

**Comment:** This article, written by a dentist, is relevant, as nausea and vomiting are the most common complaints of patients after general anaesthesia (after pain). Both PONV and hiccups are related to swallowing blood after procedures in the mouth.

**Reference:** *Anesthesia Progress* 2010;57(4):150-157

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3006663/?tool=pubmed>

### Clinical efficacy of lidocaine, mepivacaine, and articaine for local infiltration

**Authors:** Srisurang S et al

**Summary:** The researchers investigated the efficacy of buccal and palatal infiltrations of these 3 agents for the extraction of 48 maxillary first premolars from 33 patients in a double-blind randomised trial. They recorded pulpal anaesthesia, extent of soft tissue effect, pain of injection and any other adverse findings. The area of anaesthesia provided by articaine was significantly larger than for the other agents, and it successfully anaesthetised adjacent pulps well.

**Comment:** Articaine provided the longest duration of anaesthesia of remote teeth (lateral incisor to first molar!) and none of the agents had serious adverse effects. Interestingly, pulpal anaesthesia was most marked one tooth distally, and was effective further distally after one hour.

**Reference:** *Journal of Investigative and Clinical Dentistry* 2011;2(1):23-28

<http://onlinelibrary.wiley.com/doi/10.1111/j.2041-1626.2010.00035.x/abstract>




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

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### Knowledge about the association between periodontal diseases and diabetes mellitus: Contrasting dentists and physicians

Authors: Al-Khabbaz et al

**Summary:** Diabetes is a risk factor for developing periodontal diseases, and there is evidence that treating periodontal infections can contribute to glycaemic control management. This was a cross-sectional survey of 510 medical and dental practitioners in Kuwait (278 dentists). Only half of the participants believed that patients with diabetes were more susceptible to tooth loss because of periodontal disease. The dentists were more aware of gingival bleeding, tooth mobility and alveolar bone loss than the medics. Older age, female sex and being a dentist were factors associated with knowledge of the diseases.

**Comment:** The awareness of diabetic patients about periodontal disease is reported as low, compared with their knowledge of heart disease, eye problems, and kidney and circulatory disorders. Only 58% of the dentists thought there was a bidirectional effect between diabetes and periodontal disease. The authors recommend that specialist periodontists educate medics and general dentists about these relationships.

**Reference:** *Journal of Periodontology* 2011;82(3):360-366

<http://www.joponline.org/doi/pdf/10.1902/jop.2010.100372>

### Evaluation of stress in final-year Saudi dental students using salivary cortisol as a biomarker

Authors: Pani SC et al

**Summary:** The perceived sources of stress among 40 final-year dental students were investigated using a modified dental environment stress scale of 25 questions and acute stress as measured by salivary cortisol. Cortisol levels were measured in the first week of the semester, the final week of clinical training and one hour before an examination. The final clinical week was a source of stress, but not as much as the examination.

**Comment:** The dental course in Saudi Arabia is 6 years long and in a private institution among the most expensive courses of study. It is a unique system of education, with segregation of males and females. There were differences in the perceived and actual stress as the semester progressed; stress among the students and their methods of coping with it need more investigation. Financial security, marital status and many other factors are involved.

**Reference:** *Journal of Dental Education* 2011;75(3):377-384

<http://www.jdentaled.org/cgi/content/abstract/75/3/377>

### The effects of three dry-field techniques on intraoral temperature and relative humidity

Authors: Kameyama A et al

**Summary:** Many dental techniques are best performed under rubber dam isolation, with some materials sensitive to environmental factors such as relative humidity. Many dentists do not use a dam. This experiment investigated intraoral vacuum devices that maintain dry conditions and continuously remove fluids and debris while keeping the mouth open. The investigators compared a dam and two vacuum devices in 5 patients recording temperature and relative humidity for 20 minutes. All of the techniques reduced the intraoral temperature and relative humidity.

**Comment:** The vacuum devices are quicker to place than a rubber dam and provided environments similar to room conditions, but how well they cope with gingival bleeding needs investigation. Not recommended for root canal treatment!

**Reference:** *Journal of the American Dental Association* 2011;142(3):274-280

<http://www.jada-plus.com/content/142/3/274.short>

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### Firing temperature accuracy of four dental furnaces

Authors: Haag P et al

Summary: Low-fired dental porcelain produces more unsatisfactory results than porcelain fired at higher temperatures. Twenty examples of 4 types of furnace were tested for accuracy of temperature, comprising two firing sequences at each temperature level (i.e. 40 in total) and testing of three firing holding temperatures (i.e. a total of 120 sequences were recorded). None of the machines reached the temperatures shown on their displays, with the discrepancy varying from 11 to 48°C. The staff at 68 Swedish dental laboratories were asked about their brand of furnace and their furnace maintenance schedule. Six did not respond. Eleven types of furnaces were in use, the oldest being 28 years old. Nine laboratories had a maintenance programme, and 53 performed maintenance work 'when needed'.

Comment: Room for improvement, as the firing process influences the aesthetic, physical and mechanical properties of the restoration made. The Multimat MCII furnace (Dentsply) was the best performer.

Reference: Swedish Dental Journal 2011;35(1):25-31

http://pubget.com/paper/21591597

### Use of antibiotics in the treatment of mandible fractures: a systematic review

Author: Kyzas PA

Summary: The use of prophylactic antibiotics in the treatment of mandibular fractures is almost mandatory, in the belief that these fractures are prone to infection by the oral flora. The authors extracted data from randomised and nonrandomised trials, finding 31 eligible studies involving 5,437 patients. Many did not describe the antibiotic used, its route of administration or the duration of the course. Almost three-quarters did not describe the dose.

Comment: Fractures of the mandible are one of the most common facial injuries. The writers describe 'scattered signals' that prophylactic antibiotics may be better than nothing in preventing infection. What antibiotic, what dose, and how long for are unknowns. Large randomised clinical trials are called for.

Reference: Journal of Oral and Maxillofacial Surgery 2011;69(4):1129-1145

http://www.ijoms.org/article/S0278-2391%2810%2900344-7/abstract

### Aerial dispersal of blood-contaminated aerosols during dental procedures

Authors: Yamada H et al

Summary: Large volumes of aerosols are produced by high-speed instruments, but are they blood-contaminated and can they be reduced by evacuator systems? Samples were taken at half and one metre behind patients and an additional extraoral evacuator introduced. Third molar surgery, Black Class II cavities and crown preparations and scaling were carried out for between 47 and 66 patients for each task. All procedures featured aerosols with blood, which were reduced by the additional evacuator.

Comment: In previous work, aerosols with oral bacteria have been detected two metres away from patients. In this experiment, even ultrasonic scaling without direct contact with soft tissue produced a blood-contaminated aerosol. Dental students have been found to have higher rates of tuberculosis than medical students; this could be among the reasons why. Improvements to vacuum tips, handpieces and the skills of assistants are recommended, but there is no mention of a rubber dam.

Reference: Quintessence International (Berlin, Germany : 1985) 2011;42(5):399-405

http://qi.quintessenz.de/index.php?jid=qi&doc=toc&year=2011&issue=5

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