

Research Reviews

Recently published research topics reviewed by Abstracts Editor, Peter G. Miles.

DECONTAMINATION OF DENTAL UNIT WATER SYSTEMS: A REVIEW OF CURRENT RECOMMENDATIONS

S.A. Fayle and M.S. Pollard

It is now accepted that lines carrying water from dental units to dental handpieces or triple syringes can become contaminated and represent a potential source of infection/cross-contamination. Although this risk is small, it has resulted in some case reports and the fatality of a dentist. The original source of microbes in the lines is mainly from the water supply; they form biofilms which completely coat the inner surface of the lines. Microbial aggregates are continually lost from this surface and then enter the tube lumen. This biofilm is not removed by flushing and is resistant to chemical disinfection. Flushing lines with water regularly between each patient for a minimum of 30 seconds has been recommended; this will reduce the risk of cross-infection but does not eliminate it. Flushing with disinfectants reduces the bacterial contamination but again does not eliminate it. Clean water systems are separate self-contained pressurised water reservoirs that have the advantage of simplifying the process of regular flushing with disinfectants. Weekly disinfection with one part household bleach (5.25% sodium hypochlorite) in nine parts water left to stand in the units for 10 minutes, followed by flushing with sterile water is the recommended approach. The system can then be filled with sterile water and will deliver non-contaminated water for at least one week.

British Dental Journal
1996; 181: 369-72

TRANSALVEOLAR TRANSPLANTATION OF MAXILLARY CANINES: A CRITICAL EVALUATION OF A CLINICAL PROCEDURE

S. Sagne and B. Thilander

This study describes a surgical procedure for repositioning impacted canines into the arch. A total of 101 maxillary canines (85 patients aged 11-76 years; mean = 31) were exposed and surrounding bone was removed except for a thin layer close to the root surface. This was removed with an elevator, and the tooth then gently repositioned into the arch and orthodontically stabilised for a period of three to six weeks. The pulp was removed and calcium hydroxide paste placed in the root canal immediately after the fixation was removed. Within one year of the operation the endodontic treatment was completed. The cases have been followed for periods ranging from one to seventeen years. Contact with five patients was lost during the observation period. The survival rate of the sample (N=63) was 87.5 per cent, with a success rate of 93.7 per cent over a five year period. This is a potentially useful technique for those patients whose other options are limited, or for selected adults not wishing to undergo lengthy orthodontic treatment for impacted canines.

Acta Odontologica Scandinavica
1997; 55: 1-8

THE EFFECT OF AUTOCLAVING ON ENERGY TRANSMISSION THROUGH LIGHT-CURING TIPS

F.A. Rueggeberg, W.F. Caughman and R.W. Comer

This article evaluated the ability to transmit light in three groups of light-curing tips subjected to 25 sterilisation cycles of autoclaving. Group 1 acted as a comparison group with autoclaving and measurement of curing-light transmission. Group 2 was polished using a commercially available light-tip cleaning kit (Demetron) prior to the first autoclaving cycle. Group 3 was polished every five cycles. After one cycle, the intensity dropped to 74 per cent, while after only three cycles, transmitted intensity decreased to 50 per cent of its pre-autoclaved value. Polishing the tips only once before autoclaving decreased the rate at which light intensity declined. In Group 3, after five cycles the intensity had dropped to 50 per cent but returned to 100 per cent after polishing. After five more cycles, the intensity was down to 80 per cent and returned to baseline after polishing. After five additional cycles, the intensity reduced to 95 per cent and was restored to 100 per cent after polishing. Scanning electron microscopic examination revealed a dark, non-continuous film of boiler scale forming over the surface after autoclaving, which polishing removed. Polishing also appeared to inhibit boiler scale build-up during subsequent autoclaving exposures.

Reviewer's note: Curing-light intensity is important for satisfactory bond strength of light-cured adhesives. Clinicians can choose several methods to prevent cross-infection from light tips (disposable plastic covers, autoclaving, et cetera). All clinicians should consider regularly monitoring the intensity of the light transmitted from their curing tips. Based on the results of this study, those who autoclave their tips may wish to polish them on a regular basis.

Journal of the American Dental Association
1996; 127: 1183-7

EVALUATION OF AN INTRA-ORAL MAXILLARY MOLAR DISTALIZATION TECHNIQUE

J. Gosh and R.S. Nanda

This retrospective study evaluated the effects on the molars and anchorage units of Class II patients treated with a pendulum appliance. Cephalometric radiographs taken prior to treatment and immediately upon appliance removal were available for 41 subjects (26 female, 15 male; aged from 9 years, 6 months to 17 years, 11 months) treated by three practitioners. Dental casts were available for

31 patients. The mean maxillary first molar distalisation was 3.37mm, with a distal tipping of 8.36 degrees. The mean reciprocal mesial movement of the first premolars was 2.55mm with a mesial tipping of 1.29 degrees. The maxillary second molars were also distalised 2.27mm and tipped distally 11.99 degrees; the effect on developing third molars was highly variable. The distalisation of the first molars was independent of the stage of eruption of the second molars. The lower anterior face height increased an average 2.79mm, this increase being greater in high angle patients (average 4.13mm). The authors suggested including the incisors and canines in the framework, and complete palatal coverage with acrylic to increase anchorage.

Reviewer's note: As with any retrospective study, the sample and selection criteria should be reported fully. For example, the results of this study may lack external validity and not be applicable to other clinical situations as post-treatment records may have been taken only in cases with favourable outcomes, thereby biasing the results. In addition to the risk of pressure atrophy as the acrylic is pushed into the mucosa, the recommendation by the authors to extend the acrylic coverage may also periodontally compromise some patients by limiting cleaning access to the palatal margin.

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and Dentofacial Orthopedics*
1996; 110: 639-46

LINGUAL NERVE INJURY ASSOCIATED WITH OVERPENETRATION OF BICORTICAL SCREWS USED FOR FIXATION OF A BILATERAL MANDIBULAR SAGITTAL SPLIT RAMUS OSTEOTOMY

S.R. Schow, R.G. Triplett and J.M. Solomon

Lingual nerve injury is a rarely reported complication of mandibular sagittal split osteotomy. Previous reports have dealt mainly with damage associated with inadequate reflection and protection of the soft tissues in the area. This report described bilateral lingual nerve injury in a 15 year-old male undergoing correction of a Class II malocclusion. Three weeks after surgery the patient complained of bilateral lingual paraesthesia, which was confirmed by clinical examination including pinprick, brushstroke, and two-point discrimination tests. A postero-anterior radiograph demonstrated that the centre fixation screws had extended beyond the lingual cortical plate some 4-5mm. The following week, surgery revealed the lingual nerves firmly adhered to the lingual mandibular

periosteum, with the screws penetrating the body of the nerve. On one side the free nerve ends were then anastomosed; on the other they were treated by neurolysis. The screws were shortened to be flush with the bone. Eight months after the operation the patient reported a return of sensation in both sides, which the authors described as 'nearly normal'. The authors suggested that screws should be of adequate length to engage the lingual cortex but not extend beyond it.

Reviewer's note: Along with other aspects of orthognathic surgery, the risk that treatment may cause lingual nerve injury should be discussed with patients as part of an informed-consent protocol. However, with due surgical care, including adequate reflection and protection of soft tissue and appropriate screw lengths, the risk can be reduced. Patients who do suffer damage have the option of attempting nerve repair.

Journal of Oral and Maxillofacial Surgery
1996; 54: 1451-2

DISTRACTION OSTEOGENESIS IN THE MANDIBLE WITH A MOTOR-DRIVEN PLATE: A PRELIMINARY ANIMAL STUDY

H. Schmelzeisen, G. Neumann and R. von der Fecht

Distraction osteogenesis for the lengthening of the mandible has been described previously using extra-oral and intra-oral devices. One of the disadvantages of these appliances is that they are placed percutaneously so part of the appliance is exposed to allow periodic activation. This article describes an experimental subcutaneous motor-driven distraction plate used in miniature pigs. Three animals had appliances placed and the power supply and timer unit were adjusted to apply distraction of 1mm per day for a period of 14-21 days. The first appliance achieved 11mm in 21 days, which the authors believe was delayed due to the use of polyethylene in the fixation plate which allowed the shaft to distort during distraction. The subsequent two appliances were constructed of stainless steel. The second animal suffered a ramal fracture one week after placement, which the authors felt was due to poor screw positioning. The third animal gained 13mm in fourteen days. Currently, smaller plates and motors are being tested, and future design improvements and miniaturisation may allow this to be an effective and more aesthetic option for the distraction lengthening of mandibles and maxillas or other bones in appropriate cases.

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Maxillofacial Surgery*
1996; 34: 375-8

NUTRITIVE AND NON-NUTRITIVE SUCKING HABITS: A REVIEW

H. Turgeon-O'Brien, D. Lachapelle, P.F. Gagnon, I. Larocque and L. Maheu-Robert

Sucking is a reflex that is essential to the newborn for feeding. As an infant matures, feeding habits alter, and the oral environment changes with the eruption of the incisors while the tongue undergoes a transition in its role in swallowing towards the adult swallowing pattern. Little data exists to determine any effects of breast-feeding or bottle-feeding on dental and facial development; some of the related anecdotal arguments are presented in this review article. Various nipple designs for babies' bottles are discussed, including the so-called 'orthodontic' nipple, which is designed to allow a feeding mechanism similar to breast-feeding, although the long-term benefits are unclear. The authors present articles supporting the belief that dummy suckers are less prone to thumb or finger sucking. If sucking habits are discontinued prior to the age of six, dental changes are often transitory.

Journal of Dentistry for Children
1996: 321-7