Background: For many years, phosphoric acid has been used for etching enamel, and it is now also used for etching dentin. Trichloracetic acid (TCA) has been used as a cauterizing agent in medicine. Contamination at the treatment site by blood and moisture reduces the bond strength. If TCA was applied to the enamel, the authors sought to determine if it could also create the same enamel etching as phosphoric acid.

Objective: To evaluate the effect of TCA on prepared tooth surfaces and its ability to increase bond strength of the composite resin to enamel.

Methods: 75 extracted human maxillary anterior teeth were used, divided into 5 groups of 15 teeth. In group 1, the teeth were etched with 35% phosphoric acid for 30 seconds. Groups 2 and 3 were etched with a TCA gel of 35% and 50%, respectively. Groups 4 and 5 were etched with TCA of 35% and 50%, respectively, but were also etched with 35% phosphoric acid. Single bond adhesive was applied and light cured, followed by bonding composite cylinders onto the enamel surfaces. After 24 hours, the samples were placed under 500 pounds of thermocycling and tested for their shear bond strength.

Results: Statistically significant differences were seen between the 5 groups. The highest bond strength was seen in group 5, where the highest-strength (50%) TCA was used, followed by application of 35% phosphoric acid. The groups using TCA alone (groups 2 and 3) also reported favorable bond strengths. However, this does not necessarily apply to all acidic materials that may be used, since some leave deposits on the tooth structure that would interfere with the bonding. Similar enamel morphology was seen on the enamel surfaces etched with TCA as on those etched solely with phosphoric acid. However, use of 50% TCA with phosphoric acid can cause enamel erosion.

Conclusions: Similar bond strength and enamel morphology occurs with TCA gel as with phosphoric acid. The resin composite to enamel bond is increased on adjacent tooth enamel when TCA is used as a hemostatic agent on the marginal gingiva.

Reviewer's Comments: The authors present a good analysis of the use of TCA instead of and in conjunction with phosphoric acid during resin composite bonded restorations. The pH of TCA is 1, making it very acidic. Before it is more widely used, its effects on the dental tissue need to be further explored. It may cause excessive enamel demineralization and has been seen to cause coagulation necrosis on soft tissues. Additional clinical trials using TCA would prove helpful to assess the long-term remineralization of enamel after contact with TCA. At the present time, the authors recommend using phosphoric acid as the primary choice of etching material. (Reviewer—Edward N. Friedman, DDS).

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Keywords: Trichloracetic Acid, Etching Agent, Shear Bond Strength, Resin Composite

Print Tag: Refer to original journal article
The relationship between the type of light curing unit and the type of composite used is important to achieve optimal polymerization and limit heating in the pulp chamber.

**Background:** The technology of light curing units (LCUs) used with the photo-polymerizable dental composites have been evolving over the past few years. Today, light-emitting diodes (LEDs) are the instrument of choice due to their narrower spectrum and ergonomic superiority. The light emitted is absorbed better by the composite, and the unit consumes low amounts of power, enabling the use of batteries. These factors represent an improvement over the previously used ultraviolet lights, visible-light systems such as the quartz-tungsten halogen type, plasma-arc curing units, and lasers. The 2 primary advantages of LEDs also allow a reduction in tooth heating and irradiation time, while still attaining sufficient microhardness of the composite restorative material.

**Objective:** To evaluate the polymerization efficiency of different types of LED curing lights when used for varying amounts of exposure times. The authors analyzed the thermal effects of these different conditions on the pulp chamber and on the composite hardness.

**Methods:** 4 LED lights and 2 shades of composite with different photo-initiating properties were selected. A conventional halogen light was used as a control. Five samples of each composite were polymerized for 10, 20, or 40 seconds by each of the light curing units. Measurements were taken of the Vickers microhardness number and of the pulpal temperature rise with each of the lights during the irradiation.

**Results:** The time of polymerization was a significant factor. Hardness was enhanced at a greater depth (beyond 2 mm) in the material with the longer exposure times. However, at the surface of the composite, the hardness values were statistically similar between the types of composite, with only small variations. This is due mainly to the different shades and photo-initiator content of the material.

**Conclusions:** There are multiple variables to consider when analyzing the effects on the pulp of the heat produced by light curing units, such as dentin thickness, preparation depth, intensity of the light output, and time of exposure. Since all LEDs may potentially heat the pulp, efforts should be made to minimize this. Shorter curing times are possible by using a superior centered spectrum of LEDs with a higher power density, but the reduction of time is limited by the need to achieve acceptable hardness values. This compromise must achieve sufficient hardness of the material while minimizing pulpal damage from the heat generated by the polymerization.

**Reviewer’s Comments:** The authors present a good review of several variables the dentist must consider when restoring teeth with curing lights and composite. This study measures the relevance of these variables on their own, as well as to each other, and discusses their effects on the final restoration and the tooth. (Reviewer-Edward N. Friedman, DDS).

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Keywords: Pulpal-Temperature Rise, Polymerization Efficiency, LED Curing Lights

Print Tag: Refer to original journal article
**Background:** Peripheral stem cell therapy (PSCT) is a common method of treatment for many malignant blood diseases such as lymphoma, leukemia, and myeloma. It is also used as rescue treatment (returning patients’ own immune system after lethal doses of chemotherapy are given) for many solid organ tumors. For transplants to be successful, conditioning (suppression of bone marrow) is required. This causes significant leukopenia and thrombocytopenia (reduction of WBCs and platelets), which increases patients’ perioperative risk of infection and bleeding. It has been estimated that approximately 2 of 1000 patients die from odontogenic infections during PSCT treatment. Partially erupted third molars (PEMs) have always been thought to be a significant potential risk for infection and, therefore, are usually removed before PSCT.

**Objective:** To evaluate whether patients receiving PSCT display signs or symptoms of systemic infection from partially erupted third molars.

**Design:** Retrospective study of the records of 627 patients treated with PSCT (171 allogeneic/456 autogenous between 1999 and 2007). A total of 44 patients were included in this study, 22 with PEMs and 22 without. As much as possible, groups were matched regarding gender, age conditioning, diagnosis, and type of transplant (allogeneic vs autologous). All patients received a pre-PSCT dental evaluation by an experienced dentist and were treated appropriately with restorative, periodontal, endodontic, and surgical extractions of non-restorable teeth as required. PEMs with chronic infection were initially treated conservatively using scaling with 0.2% chlorhexidine rinsing, but teeth were extracted if healing took longer than a week. All patients were monitored bedside 3 times a week during PSCT treatment.

**Results:** 8 of 22 patients developed a local infection around the PEM; 5 of these infections occurred while WBC counts were very low (<1.0 x 10⁹). There was no significant difference between groups developing a positive blood culture (5 of 22 PEMs vs 6 of 22 non-PEMs).

**Conclusions:** Partially erupted third molars do not predispose patients to systemic infections while being treated with peripheral stem cell transplantation.

**Reviewer’s Comments:** This study was concerning and could be misleading as the number evaluated was very small, only 22 patients. Additionally, all patients were monitored bedside 3 times a week and were quickly treated early if the patient developed any signs of local infection. I concur that PEM may not predispose patients to systemic infections if treated early and aggressively. I believe the oral care discussed in this study is not representative of most medical treatment facilities, and the reader must understand that a systemic infection can become life-threatening very quickly in the neutropenic patient. This study strongly supports a finding that PEM can develop local infections; however, if these infections are caught and treated early, they can be treated successfully, preventing systemic infections. (Reviewer-Timothy J. Halligan, DMD).

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Keywords: Chemotherapy, Immunosuppression, Pericoronitis, Third Molars

Print Tag: Refer to original journal article
Be sure your patients know about the medications they are taking, but also be sure they do not discontinue them without their physicians’ knowledge.

**Background:** Bisphosphonate osteonecrosis (BON) is an uncommon complication of bisphosphonate therapy. A better cooperative effort between medical, dental, pharmaceutical, and governmental agencies could result in faster recognition of adverse reactions from medications being used.

**Objective:** To determine if patients taking bisphosphonates were aware about the indications for treatment, length of treatment, and possible adverse reactions.

**Design:** A single-center observational study was performed involving 73 consecutive patients taking either oral or intravenous bisphosphonates who were seeking dental treatment. They were interviewed by questionnaire and follow-up. Information on the drug being taken, specific medical condition, expected duration of treatment, bone density test utilization, and improvement in the specific disease was obtained.

**Results:** The mean age of the interview group was 66 years. The most common diagnosis was osteoporosis (74%) and osteopenia (22%). The average treatment time was 23 weeks; 84% of subjects reported having been told why they were taking the medications, 80% did not know how long they would be taking the medications, and 82% indicated they had not been told of the possible complications of the medication. No participant had knowledge of BON, and none reported that their physicians told them to discuss this with their dentists or to be sure their dentists were aware they were taking the medication. Forty-seven patients remembered having bone density tests, and only 22 had been told there was any improvement in their condition since initiation of medication therapy. **Discussion:** Of the 82% of patients who did not receive information about the possible side effects of the medications, all expressed concern about undergoing dental treatments after being presented with this information. There were 2 other similar studies in the literature that bore confirming results. It was acknowledged by the authors that the information given by the patients was not able to be confirmed for accuracy. As more patients’ lives are extended and they often take multiple medications that can interfere with, affect, or complicate dental treatment, it is necessary for dentists to have knowledge of the medications their patients are using. The prevalence of BON in IV usage is 3% to 12% versus <1% for oral administration. These risks are published in the medication inserts and should be explained to patients before invasive dental procedures. Several points should be discussed. Bisphosphonates can reduce the risk of bone fracture 35% to 50%. Patients with osteoporosis are at risk of fracture. Patients should not discontinue usage without discussion with their physician. Good oral hygiene and preventive dental care can prevent BON.

**Conclusions:** Patients may not be fully aware of the complications of taking bisphosphonates, and more effective communication is necessary.

**Reviewer’s Comments:** There was no assessment for mental acuity or memory in the interviewed patients, nor was there a cross reference to physician records. However, the authors did acknowledge that the information obtained from patients could not be confirmed for accuracy. (Reviewer-Charles R. Hoopingarner, DDS).

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**Keywords:** Bisphosphonates, Osteonecrosis

**Print Tag:** Refer to original journal article
Practitioners should continue to be alert to evidence of oral cancer, particularly in high-risk patients.

**Background:** The American Cancer Society estimated that there would be 35,720 new cases of cancer of the oral and pharyngeal region in the United States in 2009. Also, there would be 7600 deaths from this disease. Tobacco usage and heavy alcohol usage are extremely strong risk factors. In recent years, the incidence of cancers in the tongue, oropharynx, and tonsillar areas are increasing. There is a relationship between HPV and some forms of squamous cell carcinoma, and the relative survival rate was nearly twice as high for white men as for black men.

**Objective:** To evaluate the possible risks and benefits of screening for oral squamous cell cancer.

**Design/Methods:** A large panel was formed, and a systematic MEDLINE search resulted in 332 systematic reviews and 1499 clinical studies. Five reviews and 4 studies were used to develop consensus recommendations. The panel, in addition to evaluating visual and tactile screening methods, evaluated devices to assist detections by tissue reflectance, auto fluorescents, or transepithelial cytology: light-based devices, such as MicroLux/DL, Orascoptic DK, ViziLite Plus (based on tissue reflectance); VELscope (based on auto fluorescence); Identafi 3000 (based on both); and Oral CDx (a transepithelial cytology evaluation). The panel reviewed the studies and systematic reviews, and then assigned graded evidence statements according to the system developed by Shekelle and colleagues.

**Results:** Community-based screening by visual and tactile examination in general adults and asymptomatic patients seeking dental care divisions did not present sufficient evidence that these screenings altered disease-specific mortality; however, community-based screening in high-risk patients may decrease cancer-specific mortality or result in the detection of oral cancers at an early stage. The suggestion was made to follow up seemingly innocuous lesions in 7 to 14 days to confirm persistence before biopsy. Lesions that are suspicious may be referred for biopsy, but this should be in the context of informed consent, with the patient being warned of false-positive results. The last recommendation simply stated that assessment devices were not adequate, and that surgical biopsy was the only definitive diagnosis. Future technologies were discussed, such as saliva testing, identification of bacterial markers (both in biofilm and protein, via tissue biopsies), and the use of other imaging modalities.

**Conclusions:** Surgical biopsy and pathology remain the diagnostic gold standard.

**Reviewer’s Comments:** There was a persistent theme that a false-positive diagnosis is an extremely negative problem because it might lead to biopsy. Quite honestly, a determination that any test resulting in a negative biopsy finding would not be upsetting in the least to me. I would prefer a number of false positives over 1 missed malignancy that leads to mortality. Why are we not questioning the concept that using strictly evidence-based evaluation and community-based screening using visual and tactile examination may not alter the disease-specific mortality rates? (Reviewer-Charles R. Hoopingarner, DDS).
Bell's palsy and acute dental infection can occur on the same side simultaneously.

**Background:** Bell's palsy is a unilateral paralysis of the facial nerve. Primary Bell's palsy is caused by reactivation of Herpes simplex virus type 1 (HSV-1). Secondary cases can be caused by trauma, surgery, infection, tumor, or stroke.

**Objective:** To report a case of Bell's palsy associated with an acute dental infection. **Case Report:** A 33-year-old Asian man presented with toothache and left-sided facial swelling associated with a severely decayed mandibular left second molar and partially impacted, carious third molar. He also had a well-defined periapical radiolucency associated with these teeth, submandibular lymphadenopathy, and left buccal swelling extending to the border of the mandible. His mouth opening was limited to 20 mm. Three days previously, the left jaw swelled after the patient bit into a cracker. At the same time, he developed the inability to close his left eye, wink, lift his eyebrow, or smile on the left side. He reported he had been feeling tired and stressed at work before this occurred. Examination showed unilateral facial paralysis: lack of forehead wrinkles and the inability to lift the eyebrow, close the left eye, smile, or purse his lips. **Diagnosis:** (1) Left buccal cellulitis, infected second molar, and chronic periodontitis of left third molar. (2) Left Bell's palsy, with the onset coinciding with the onset of acute dental infection. The 2 teeth were extracted under local anesthesia, and the wound was debrided, followed by incision, drainage, and irrigation of the buccal vestibule. Clindamycin 600 mg was given preoperatively, followed by 300 mg 3 times a day for 5 days. A neurologist was consulted who decided no prednisone should be given to treat the Bell's palsy because of the ongoing infection.

**Results:** Swelling and pain decreased within 2 to 3 days, and the infection completely resolved by day 5. Two months later, there was almost complete resolution of the Bell's palsy without any treatment. Possible pathophysiology of this current case was discussed.

**Conclusions:** Further research is needed to better understand the causes of Bell's palsy and other facial paralyses as well as the association between the facial nerve and dental disease.

**Reviewer's Comments:** The simultaneous appearance of Bell's palsy and symptoms of acute dental infection can be explained by a common etiology of immune compromise. This is supported by the patient's report of feeling tired and stressed before the onset of symptoms of both conditions. If the dental infection caused the Bell's palsy, the symptoms of dental infection should have preceded the Bell's palsy. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Bell's Palsy, Dental Infection

Print Tag: Refer to original journal article
More Toothpaste, Brushing Longer Improves Effectiveness of Fluoride Toothpaste

The Effect of Brushing Time and Dentifrice Quantity on Fluoride Delivery In Vivo and Enamel Surface Microhardness In Situ.

Zero DT, Creeth JE, et al:

Caries Res 2010; 44 (May): 90-100

Brushing with more toothpaste is an effective way to improve fluoride retention within the mouth and remineralization of enamel.

**Background:** Fluoride dentifrice is an efficacious caries preventive therapy, but it is not known how brushing time and the amount of dentifrice used affect this.

**Objectives:** To determine the effect of brushing time and dentifrice quantity on fluoride distribution after brushing, fluoride retention, fluoride uptake in early lesions, and the effect of fluoride on enamel remineralization.

**Design:** Randomized, single-center, single-product, multiuse, 6-way crossover study.

**Participants:** 57 subjects between 26 and 65 years of age participated; 51 completed all treatments. The inclusion criteria were good physical and oral health and unstimulated salivary flow rate ≥0.2 mL/minute and stimulated salivary flow rate ≥0.8 mL/minute. Patients were excluded if they were pregnant or lactating.

**Methods:** A palatal appliance containing 2 slots with plastic holders mounted with sticky wax to hold 4 flat polished slabs of bovine enamel held in place with orthodontic ligature wire were made for each subject. A total of 1368 bovine enamel slabs are randomized into 6 balanced experimental groups based on microhardness after demineralization in vitro. Each group had 228 specimens in 4 replicates within 57 experimental units randomly assigned to the 57 subjects. Subjects brushed with fluoride-free dentifrice for 2 days before treatment. One treatment per week: subjects brushed with a silica-based dentifrice containing 1,100 µg/g sodium fluoride for different time periods (30, 45, 60, 120, and 180 seconds) and with different amounts of dentifrice in random order (1.5 g for all time periods or 0.5 g for 60 seconds). Response variables included percentage of surface microhardness (%SMHR) and enamel fluoride uptake (EFU) of the enamel slabs. Fluoride delivery during brushing and salivary fluoride was also measured.

**Results:** The average age of the 57 participants was 34.7 years (range, 19 to 60 years). Thirty males and 27 males were in the group; 43 were Caucasian, 10 were African American, 2 were Hispanic, and 2 were Asian. The groups were as follows: 1.5 g dentifrice and 30 seconds (n=54); 60 seconds (n=54); 120 seconds (n=55); 45 seconds (n=56); 180 seconds (n=55); and 60 seconds/0.5 g (n=51). Longer brushing times increased salivary fluoride concentration for at least 2 hours after brushing. Longer brushing times were associated with increased enamel strengthening and EFU (dose-dependent effect). Brushing with 1.5 g of dentifrice more than doubled the amount of fluoride in saliva compared to brushing with 0.5 g and was associated with significantly higher EFU (P <0.001). Brushing time was significantly associated with higher %SMHR (P=0.048) and EFU (P=0.040) across 30 to 120 seconds of brushing time.

**Conclusions:** In adults, both brushing time and dentifrice quantity determine fluoride retention in the oral cavity and subsequent enamel remineralization.

**Reviewer's Comments:** Brushing times and dentifrice amounts were all within the range of common practice. The finding that small differences in duration of brushing and the amount of dentifrice used have significant impact on fluoride retention and remineralization of enamel is significant. These findings could change how dentists educate their patients about brushing for improved plaque removal as well as effectiveness of fluoride. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Fluoride Dentifrice, Caries Prevention

Print Tag: Refer to original journal article
Does Thermocycling Improve Push-Out Bond Strength of Various Luting Strategies?

*Mazzoni A, Marchesi G, et al*


Using fiber post system components from the same manufacturer may prevent material incompatibilities and allow for assessment of the system's full adhesive potential.

**Background:** Bond longevity and stability of fiber post systems are adversely affected by physical and chemical factors over time.

**Objective:** To evaluate the contribution of chemical and mechanical artificial aging factors induced by thermocycling on the retention of fiber posts cemented with different luting strategies. The authors hypothesized that no difference exists in bond strength or nanoleakage among luting agents, and that thermocycling does not affect the retention of fiber posts.

**Materials/Methods:** 84 extracted human incisors were prepared by standard endodontic techniques of cleaning and gutta-percha obturation, and an 8-mm deep post space was created. The teeth were then divided into 3 groups (n=28 per group) according to luting strategy: Group 1 (etch and rinse) used XP-Bond and CoreXFlow2 with DT Light-Posts; Group 2 (self etch) used Panavia F2.0/ED primer with Tech 21 posts; and Group 3 (self adhesive) used RelyX Unicem with RelyX posts. Of these 84 specimens, 60 were cut into 1-mm transverse sections and then subdivided into 3 groups of 20 each. Half of these specimens were subjected to thermocycling (40,000 cycles from 5°C to 55°C for 30 seconds each in artificial saliva), while the remaining slices were stored in artificial saliva at 37°C for the same period of time. After thermocycling or storage, the push-out test was performed. All specimens were analyzed to determine whether the failure mode was between dentin and the luting agent, between the luting agent and the post, within the luting agent, or a mixed failure. The remaining 24 post-luted roots (n=8 per group) were sectioned in 1-mm intervals and selected for the evaluation of interfacial nanoleakage expression. Specimens were varnished and immersed in ammoniacal silver nitrate solution and then photodeveloping solution. Sections were bonded onto a glass slide, stained, and observed at 100x magnification for the amount of deposited silver tracer (nanoleakage). Slides were scored on a 0 to 4 scale by 2 observers: (0, no nanoleakage; 1, <25%; 2, 25% to 50%; 3, 50% to ≤75%; and 4, >75%).

**Results:** No difference in bond strength was observed among the various luting strategies under control conditions, whereas after thermocycling, Groups 1 and 3 showed higher bond strengths compared with Group 2. Thermocycling reduced the push-out bond strength and increased interfacial nanoleakage in Groups 2 and 3, while the luting procedure itself had no effect on nanoleakage. No difference in failure mode was observed between groups, irrespective of luting strategy or thermocycling.

**Conclusions:** In vitro use of thermocycling produced significant effects on the bond and push-out bond strength of various luting strategies.

**Reviewer’s Comments:** Although thermocycling showed observable effects on coronal dentin in vitro, periodontal tissues and surrounding bone minimize thermal changes in vivo. Therefore, acceptable levels of retention may be even more promising under clinical conditions. (Reviewer—Kelly A. Halligan, DDS)

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Keywords: Fiber Post Systems, Thermocycling, Push-Out Bond Strength, Nanoleakage

Print Tag: Refer to original journal article
Successful Infiltration of Adult Mandibular Lateral Incisors Requires Labial, Lingual Injections

Anesthetic Efficacy of Articaine for Combination Labial Plus Lingual Infiltrations versus Labial Infiltration in the Mandibular Lateral Incisor.

Nuzum FM, Drum M, et al:

J Endod 2010; 36 (June): 952-956

Because lateral incisor teeth have relatively low incidences of pulpal anesthesia following the inferior alveolar nerve block, supplementary anesthesia using articaine for infiltration can be used successfully on the labial and lingual aspects.

Background: Recent studies have suggested that articaine 4% may provide better success rates than other local anesthetics when used for mandibular infiltrations, but most of these studies focused on the mandibular first molar.

Objective: To evaluate the anesthetic efficacy of articaine 4% when used by labial only and labial plus lingual infiltration of the mandibular lateral incisor tooth.

Design: Prospective, randomized, single-blind, crossover, human clinical trial.

Participants: 82 adult subjects of both sexes.

Methods: All subjects received 2 sets of injections, one with a single administration of 1.8 mL 4% articaine with 1:100,000 epinephrine infiltrated at the labial surface of a nondiseased lateral incisor plus a mock lingual injection and another (after at least 1 week of recovery) with the local anesthetic agent and dose administered by infiltration on both the labial and lingual sides of the contralateral, nondiseased lateral incisor. Electric pulp testing was performed in 2-minute cycles for 60 minutes. Successful local anesthesia was determined when 2 consecutive 80 readings with the pulp tester were obtained.

Results: Single labial infiltration of 1.8 mL of the articaine solution resulted in a success rate of 76%, while the combination of labial and lingual infiltration of a total of 3.6 mL of anesthetic yielded a significantly greater success rate of 98%. Eighty-four percent of labial only injections resulted in short duration of anesthesia, while only 34% of the labial plus lingual infiltrations resulted in short duration.

Conclusions: The authors concluded that infiltration with 4% articaine with 1:100,000 epinephrine produces a higher success rate for infiltration anesthesia of mandibular lateral incisors when administered on both labial and lingual surfaces than seen with infiltration on only the labial side. However, neither technique produces local anesthesia lasting 1 hour.

Reviewer's Comments: Another excellent local anesthetic study from the Ohio State University's endodontic program. Because of the relatively short duration of anesthesia produced by infiltration of adult lateral incisors, however, operators should expect to have to readminister the injections for procedures of 1-hour duration. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Articaine, Labial & Lingual Infiltrations, Lateral Incisor, Mandibular

Print Tag: Refer to original journal article
Add Prednisolone to List of Drugs to Consider for Pre-Emptive Analgesia

Effect of Pretreatment Prednisolone on Postendodontic Pain: A Double-Blind Parallel-Randomized Clinical Trial.
Jalazadeh SM, Mamavi A, et al:

J Endod 2010; 36 (June): 978-981

Prednisolone 30 mg oral given 30 minutes before endodontic treatment appears to reduce postoperative pain, but more studies are needed before this can be regarded as a routine practice tool.

**Background:** Pain control is important in many endodontic cases, both prior to and following endodontic therapy. Several pre-emptive strategies to minimize postoperative pain have been suggested, but there are few studies on the use of prednisolone for this purpose.

**Objective:** To evaluate the effect of prednisolone administered as a single, oral, 30-mg dose prior to root canal treatment for the prevention and control of postoperative pain.

**Design:** Double-blind, parallel-randomized human subjects trial.

**Participants:** 40 adult subjects (12 males, 28 females) completed the study.

**Methods:** Participants who had at least 1 asymptomatic or symptomatic multirooted tooth that needed conventional, nonsurgical endodontic treatment were randomized to 1 of 2 experimental groups. The study group received an oral dose of 30 mg of prednisolone 30 minutes prior to endodontic treatment, while the control group received a placebo 30 minutes prior to treatment. Drug and placebo dose form were disguised to maintain operator and patient blinding. Following one-appointment conventional endodontic therapy, patients kept a pain diary with entries at 6, 12, and 24 hour postoperatively, using a conventional visual analog scale (VAS) to score their discomfort. Scores were then categorized as 1 through 4 (no pain to severe pain). A rescue analgesic was provided, but patients who took the rescue drug were not included in the analysis of the data.

**Results:** There were no differences between the 2 study groups with regard to age, sex, teeth, and endodontic diagnosis, although there was a significant difference in preoperative pain (100% in placebo group, 75% in the prednisolone group). Administration of prednisolone resulted in significantly lower pain intensity scores at all time points. In the placebo group, 30% of subjects reported no postoperative pain after 6 hours, while 75% in the prednisolone group were pain-free at 6 hours. Pain subsided proportionately in both groups at 12 and 24 hours, and no adverse effects were attributed to the administration of prednisolone or placebo.

**Conclusions:** The authors concluded that a single preoperative dose of prednisolone reduces postendodontic pain, but further studies are needed to clarify this strategy when applied to multiple-visit treatments and with other doses of prednisolone.

**Reviewer’s Comments:** This was a well-designed trial that was otherwise weakened by 2 factors—a relatively small sample size in each group and a significantly higher number of subjects with preoperative pain in the placebo group than in the active treatment group. This difference tended to increase favorable outcomes with prednisolone, since preoperative pain is known to sensitize patients to pain stimuli to variable degrees. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Postendodontic Pain, Prednisolone, Postoperative Pain

Print Tag: Refer to original journal article
What Are the Effects of Increased Concentrations of Sodium Hypochlorite?

Penetration of Sodium Hypochlorite Into Dentin.

Zou L, Shen Y, et al:

J Endod 2010; 36 (May): 793-796

It appears that increasing concentrations of sodium hypochlorite above those used conventionally in endodontic procedures yields less-than-expected outcomes.

**Background:** Sodium hypochlorite is generally considered to be among the best irrigants for root canal preparation, and the degree to which it penetrates dentin may influence its benefit as a canal disinfectant. **Objective:** To evaluate the effect of concentration, duration of exposure, and temperature of exposure on the penetration of sodium hypochlorite into dentin. **Design/Materials:** In vitro chemical and microscopic study of sections of human dentin exposed to varying concentrations of sodium hypochlorite solutions over varying time period and at 3 temperatures. **Methods:** Roots from 30 extracted human anterior permanent teeth were prepared with standardized endodontic files, sectioned in half, stained with crystal violet, divided into 36 groups of 3 roots each, and then exposed to 1%, 2%, 4% or 6% sodium hypochlorite for 2, 5 or 20 minutes and at temperatures of 20°C, 37°C, and 45°C. Following exposure to these various treatments, penetration of hypochlorite was scored microscopically by assessment of bleaching out of the previously introduced crystal violet stain. **Results:** Generally, increases in hypochlorite concentration, exposure time, and exposure temperature resulted in greater penetration of the irrigant. Only small differences resulted from increased concentration; temperature increases had little effect in increasing penetration into dentin, while time had a relatively greater effect, but when concentration and temperature were highest. **Conclusions:** The authors concluded that all 3 factors, concentration, time of exposure, and temperature, affect the penetration of dentin by sodium hypochlorite, probably with additive effects. **Reviewer's Comments:** No surprises here, except that there appears to be less benefit than expected to be gained from increasing irrigant concentrations of sodium hypochlorite. While increasing temperature and time of exposure appears to improve dentin penetration by hypochlorite, these strategies may not be clinically practical. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Concentration, Dentin, Penetration, Sodium Hypochlorite, Temperature, Time

Print Tag: Refer to original journal article
The LPF is an effective procedure in the treatment of localized gingival recessions.

**Background:** Gingival recession can be caused by many factors, such as periodontal disease, mechanical trauma, anatomical conditions, and incorrect margins of gingival restorations. Many periodontal plastic surgical procedures (PPS) have been used to promote gains in clinical attachment level (CAL) and width of keratinized tissues (KT), but have displayed varying results for complete root coverage. One type of PPS, the laterally positioned flap (LPF), has been evaluated in previous periodontal studies to create complete root coverage. However, only a few of these studies reported complete root coverage outcomes in their results.

**Objective:** To assess the clinical results achieved with LPF for the treatment of localized gingival recession and compare the differences between maxillary and mandibular recessions.

**Participants/Methods:** 32 systemically healthy, nonsmoking patients (17 males and 15 females) ranging in age from 18 years to 55 years (mean age, 39.9 years) with 1 localized gingival recession were chosen from a private practice population to be treated with LPF to achieve root coverage. Recession areas selected for treatment were classified as Miller Class I or II of at least 3 mm depth and length, had no caries, had at least 5 mm of KT, and had not undergone previous PPS procedures. The gingival recessions were divided into 2 groups of 16 subjects each (ie, one group with maxillary recessions and the other with mandibular recessions). Treated areas involved incisors, canines, and premolars. Clinical measurements, including recession depth (RD), probing depth (PD), CAL, and width of KT, were recorded by the same investigator using a Williams style periodontal probe and a metallic bow divider. After local anesthesia, the recipient site was prepared to accommodate the LPF; the LPF was then created and placed. After securing the LPF in place with sutures, the surgical sites were covered with a noneugenol periodontal dressing. Patients were seen every week for 4 weeks, then once a month for 4 months. All clinical measurements were repeated at 24 months postoperatively. Statistical analysis using the paired t-test (P =0.05) was performed to compare the baseline and 24-month postoperative values for both groups as well as intergroup comparison.

**Results:** Statistically significant improvements were found for all clinical measurements for both groups from baseline to 24 months, with an average percentage of root coverage for maxillary sites of 94.5% and 93.2% for mandibular sites. The percentage of sites having complete root coverage was 62.5% and 68.7%, respectively. No clinically significant differences were found between groups at baseline or postoperatively.

**Conclusions:** Both groups (maxillary and mandibular recessions) exemplified significant improvements from baseline to the 24-month examination with the LPF procedure.

**Reviewer's Comments:** Even though the study population was small, the investigators used an appropriate study period (24 months) to evaluate their surgical results. (Reviewer-Kelly A. Halligan, DDS).

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Keywords: Gingival Recession, Periodontal Plastic Surgery, Laterally Positioned Flaps

Print Tag: Refer to original journal article
Proper Laboratory, Impression Technique Necessary for Accurate Master Casts

Evaluation of Impression Accuracy for Implant at Various Angulations.

Assunção WG, Britto RC, et al:


The inclination of an implant, as well as the splinting technique used, may affect the accuracy of the master cast.

**Background:** The accuracy of the master cast and the impression is the main determinant of the fit of implant-supported restorations. Proper technique at the clinical and laboratory stage will enhance the proper fit of the superstructure and the abutments and thereby minimize mechanical failure.

**Objective:** To compare the 2 splinted impression transfer techniques used when doing implant-borne restorations.

**Design:** This in vitro study used 4 implant copings positioned at 90°, 80°, 75°, and 65° in relation to the horizontal surface. In one group of 10, they were splinted with self-curing acrylic resin (Duralay), while another 10 models with impression copings were splinted with condensation silicone.

**Methods:** 20 custom impression trays were fabricated and adapted to allow for the placement of the impression copings. Polyether impressions (Impregum F) were taken, and subsequently, the implant analogs were attached. The impressions were poured and allowed to set. The casts were analyzed, and the implant analog inclinations were measured and recorded using image analysis software. A metal matrix of anodized aluminum was fabricated and used as a control.

**Results:** The splinting stabilized the impression copings, reducing the rotation within a resilient impression material, and achieved an accurate cast. The metal matrix of the control and the acrylic resin-splinted group had no significant differences in the accuracy of their casts. However, there was a difference between the control and the sample using condensation silicone as the splinting material. At 75° of implant-analog inclination, there was a significant difference in the accuracy between the groups using different splinted impression techniques. This discrepancy was not significant when measurements were taken of more perpendicular positioned implant copings.

**Conclusions:** Greater long-term success of the treatment is dependent upon reducing detrimental mechanical forces by achieving an accurate fit between the abutments and the superstructure. The inclination of the implants may affect the accuracy of the resulting master casts that are used to fabricate the final restorations. When comparing the different implant-analog inclinations, the use of acrylic resin for splinting was superior to using condensation silicone, and did not significantly differ from the control group that used metal splinting.

**Reviewer's Comments:** This study reinforces the importance of proper laboratory and impression technique to obtain accurate master casts. The authors conclude the superiority of acrylic resin to condensation silicone as a means of splinting, and their data also showed that some inaccuracy of the models may result in situations with greater implant-analog angulation. More studies are necessary to determine the amount of discrepancy that can be tolerated physiologically and mechanically when restoring implant cases. (Reviewer-Edward N. Friedman, DDS).

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Keywords: Dental Implants, Prosthodontics, Impression Technique

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Nanocomposites show minimal changes with respect to color stability and microhardness after treatment with 15% carbamide peroxide and 35% hydrogen peroxide.

**Background:** Home and office bleaching have become increasingly popular in the last decade. Hydrogen peroxide is the fundamental agent responsible for whitening, whether it exists initially or was formed after decomposition of carbamide peroxide or sodium perborate. The final active agent is always hydrogen peroxide. It is this hydrogen peroxide that interacts and decomposes forming free radicals, reactive oxygen, or hydrogen peroxide anions. Whitening is achieved by these reactive molecules splitting long chained stain causing molecules into smaller less colored molecules. Recently, resin nanocomposites have been released on the market, but research studies are obviously limited to include the effects hydrogen peroxide bleaching materials on microhardness and color.

**Objective:** To evaluate the effect of hydrogen peroxide-based bleaching materials on microhardness and color stability of 3 resins that contain nanofillers.

**Design:** Benchtop study of 3 resin nanocomposites with 3 different shades (Ceram X, Grandio, and Z350).

**Methods:** All samples were treated for 3 weeks divided into 2 test groups and a control group: (1) 7 hours/day in 15% carbamide peroxide; (2) 1 hour/week in 35% hydrogen peroxide; or (3) 24 hour/day in distilled water (controls) All samples were stored in distilled water when bleaching materials were not being used. Microhardness and color changes were compared to initial color and hardness 24 hours after initial sample construction.

**Results:** Changes in microhardness were not significant regardless of bleaching agent used. Color change of test bleaching samples was similar to those observed immersed in distilled water.

**Conclusions:** Changes in microhardness and color stability of the 3 tested nanocomposites after treatment in 15% carbamide peroxide and 35% hydrogen peroxide were similar to specimen's immersed in distilled water.

**Reviewer's Comments:** Nanofillers are becoming very common due to better mechanical properties secondary to higher filler content and greater translucency/aesthetics over conventional composites. In today's esthetic driven practice, it is good to see that nanocomposites test well for microhardness and color stability after common home and office bleaching systems are used. (Reviewer-Timothy J. Halligan, DMD).

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**Keywords:** Hydrogen Peroxide, Microhardness, Resin Nanocomposites, Color Stability

**Print Tag:** Refer to original journal article
Psoriasis may affect the oral cavity, and dentists should include it in the differential diagnosis of patients with fissured tongue, especially if skin lesions are present.

**Background:** The differential diagnosis for fissured tongue includes geographic tongue, a psoriasiform mucositis, and oral psoriasis, which is a rare condition.

**Objective:** To present an unusual case of deeply fissured tongue, its differential diagnosis, and its treatment.

**Case Report:** This case report described a 72-year-old male who presented with a 5-week history of painful and deeply ulcerated fissured tongue. He had type 2 diabetes, hypertension, and hypercholesterolemia. He had a surgical history of coronary artery bypass graft and nephrectomy for a kidney tumor. The patient was taking repaglinide, glipizide, simvastatin, aspirin, clopidogrel, and lisinopril. Examination showed a normal symmetrical face and no skin or nail lesions. Three deep grooves were seen on the tongue dorsum, with erythema and white plaques that could not be wiped off; no other oral mucosal lesions were observed. The differential diagnosis included erosive lichen planus, oral lichenoid drug reactions, psoriasis, traumatic ulcerative granuloma with stromal eosinophilia, candidiasis, leukoplakia, and syndromes associated with fissured tongue.

**Results:** A biopsy showed evidence of psoriasiform mucositis, and culture was positive for *Pseudomonas aeruginosa*. Treatment consisted of topical dexamethasone elixir (0.5 mg/5 ml, 5-mL swish and spit 4 times per day until resolved). Twice daily rinsing with chlorhexidine gluconate was prescribed to treat the *Pseudomonas* infection. At follow-up, scaly white skin lesions were visible on the patient's back and thigh and were confirmed by the dermatologist as psoriasis. Culture confirmed the absence of *P. aeruginosa* and *Candida*. At 6-months follow-up, the tongue ulcers and erythema were absent, but asymptomatic fissured tongue remained.

**Conclusions:** Dentists should be aware that psoriasis may affect the oral cavity and include it in the differential diagnosis of patients with fissured tongue, especially if skin lesions are present.

**Reviewer's Comments:** The title of this case report was misleading. The photographs clearly show a tongue dorsum that had 2 deep, painful, chronic ulcers in a background of white plaques and erythema. The most important clinical feature was the chronic ulceration, not the fissures. Chronic oral ulcers, erythema, and hyperkeratotic plaques have previously been reported in patients with cutaneous psoriasis. The oral lesions preceded the skin lesions in this case by at least 1 month. This occurs with other autoimmune skin diseases as well. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Oral Ulcers, Fissured Tongue, Psoriasis

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Can CMC-Based Saliva Substitutes Remineralize Enamel Lesions?

Effects of Carboxymethyl Cellulose-Based Saliva Substitutes with Varying Degrees of Saturation With Respect to Calcium Phosphates on Artificial Enamel Lesions.

Meyer-Lueckel H, Cölfen H, et al:

Caries Res 2010; 44 (May): 127-134

Carboxymethyl cellulose-based saliva substitutes that are supersaturated with octacalcium phosphate do not favor more remineralization of enamel lesions.

Background: Saliva substitutes are prescribed to prevent dental caries in patients with salivary hypofunction. Evidence shows that some saliva substitutes may enhance demineralization of enamel. The impact of calcium phosphate concentration is not clear.

Objectives: To compare the effects of experimental carboxymethyl cellulose (CMC)-based solutions with different degrees of saturation of octacalcium phosphate (S_{OCP}) and dicalcium phosphate dihydrate (S_{DCPD}) on mineral loss of demineralized bovine enamel.

Methods: 32 bovine incisors were cut into 3 x 4 mm² slabs (n=126), embedded in epoxy resin, and polished to remove the outer (200 µm) layer of enamel. One quarter of each surface was covered with nail polish to serve as control. Lesions were prepared by immersing the slabs in solution (pH value, 4.92 to 4.98) under controlled conditions. One half of each demineralized surface was covered with nail polish. Slabs were randomly divided into 9 groups (n=14) and stored in prepared solutions at 37°C for 10 weeks: Glandosane (positive control), pH 5.3; CMC-based solutions, S_{OCP} = 0 (S0), 0.5 (S0.5), 1 (S1), 2 (S2), 4 (S4), 8 (S8), pH=6.5; water solutions (negative controls), S_{OCP} = 0 (C0), 1 (C1). Mineral loss and lesion depth were measured on microradiographs before and after storage. Free and bound calcium and fluoride concentrations were determined. Changes in these variables over time were compared among the groups.

Results: All specimens developed subsurface lesions; 17 specimens were lost. At baseline, there was no difference in mineral loss and lesion depth between the groups. After 5 and 10 weeks, there was significantly increased mineral loss and lesion depth in Glandosane and water-based controls (C0 and C1) compared to baseline (P <0.05). Specimens stored in S2 (unsaturated) for 10 weeks had significantly decreased levels of mineral loss and lesion depth. The other CMC-based solutions had a neutral (S4) or slightly demineralizing effect (S8).

Conclusions: CMC-based saliva substitutes that are moderately unsaturated with octacalcium phosphate and dicalcium phosphate dehydrate can enhance remineralization of dental hard tissues when stored over several weeks in vitro.

Reviewer’s Comments: It was a little surprising that the supersaturated CMC-based solutions caused demineralization of enamel. The improved remineralization of artificial caries lesions by CMC-based solutions that were moderately unsaturated may have been due to a better balance between bound calcium adsorbed in the CMC at the enamel-liquid interface and heterogeneous nucleation of calcium phosphates on precipitates in the solution. These results will help develop better salivary substitutes. (Reviewer-Carol Anne Murdoch-Kinch, DDS, PhD).

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Keywords: Saliva Substitutes, Caries, Remineralization

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Endodontic retreatment should be suggested to patients as having a good success rate over a 5-year period when performed by an endodontist. Outcomes from general dentistry practices have not been determined.

**Background:** While orthograde endodontic retreatment by endodontic specialists is not uncommon in dentistry, there is little scientific information to establish the long-term success rates for this procedure.

**Objective:** To perform a retrospective analysis of the outcomes of conventional endodontic retreatment and associated tooth survival over a 5-year follow-up interval.

**Design:** Retrospective, large size, case series.

**Methods:** 4,744 nonsurgical endodontic retreatment cases were identified from a search of an insurance carrier's database of dental patients covered for the period of 2000 to 2007, using American Dental Association procedure codes for nonsurgical retreatment of both anterior and posterior teeth. The teeth were tracked following the retreatment procedure during a 5-year follow-up observation period. The proportion of teeth that required additional treatment, such as apical surgery or extraction, was determined.

**Results:** Overall, 89% of all endodontically retreated teeth were retained for at least 5 years following retreatment, with 4% undergoing apical surgery and 11% extracted at the end of the follow-up period. The success rate for anterior teeth was 93% retained (with 13% requiring additional procedures), for premolars 89% retained (with 15% requiring additional procedures), and for molars 87% retained (with 15% requiring additional procedures).

**Conclusions:** The authors concluded that endodontic retreatment is characterized by a very good overall success rate. Patients can be informed that orthograde retreatment of their root canal may be up to 89% successful, and the retreated teeth can be expected to be retained for at least 5 years.

**Reviewer's Comments:** The authors applied a reasonable and scientifically valid study to substantiate clinical outcomes for endodontic retreatment. In this case, a third-party insurance carrier's database was successfully utilized for this purpose. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Endodontic Epidemiology, Outcome, Prognosis, Endodontic Retreatment

Print Tag: Refer to original journal article
Prior to undertaking root canal treatment, obtain informed consent and continue documentation postoperatively with detailed records.

**Background:** The most frequent malpractice claims made in dentistry are those associated with root canal therapy, accounting for up to 17% of all such actions.

**Objective:** To categorize and review the types of errors and complications in root canal therapy that lead to litigation.

**Design:** Review of all endodontic claims reported to an international professional liability company from 1992 to 2008.

**Methods:** 2 of the authors evaluated 720 patient cases of malpractice claims based on endodontic therapy, classifying the cases by patient age and sex, tooth location, rationale for root canal treatment, type of complication(s), and reported operator errors. Complaints were then categorized as justifiable (financially risk bearing) or nonjustifiable (financially nonrisk bearing). Teeth were categorized into 6 groups, which included upper or lower anterior, upper or lower premolar, and upper or lower molar. Retreatment, apical surgery, and/or extraction were the basis for the classification of a root canal treatment as negative outcomes, and operator errors included preoperative types (e.g., diagnosis), intraoperative (e.g., detection of canal orifice), and postoperative (e.g., failure to promptly restore the endodontically treated tooth).

**Results:** 520 of the 720 complaints were determined to be justified, with a greater proportion (69%) in females than in males. Diagnostic data for 661 cases were analyzed, with 193 cases classified as “elective” and the remainder caused by pathology. The distribution of operator errors and negative outcomes was similar for elective root canal treatments and those required by pathologic signs and symptoms. With regard to operator errors, most occurred intraoperatively with the following frequencies (cases may have had >1 type of error): access cavity preparation, 36%; detection of canal orifices, 37%; instrumentation, 49%; obturation, 47%; and failure to properly restore, 37%. In lower anterior teeth and in cases involving >1 tooth, instrumentation and filling errors occurred significantly more frequently.

**Conclusions:** The authors concluded that elective endodontic treatment carries the same risk for complications as nonelective treatment. Operators performing root canal therapy need to improve their skills, and the patient must be involved in a careful informed consent process prior to undertaking endodontic care.

**Reviewer's Comments:** The outcomes of this study are probably not surprising, but it is sobering to realize that nearly 75% of complaints made to malpractice carriers about endodontic treatment are justified. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Malpractice Claims, Risk Management, Root Canal Treatment

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If an endodontic file separates and cannot be retrieved, current evidence suggests that careful completion of the procedure, with complete canal disinfection, will result in good outcomes. However, a periapical lesion reduces the prognosis.

**Background:** In spite of careful technique and the use of high-quality files, fractured root canal instruments occasionally separate, or break, during root canal therapy, and some cannot be retrieved. In such cases, the patient should be informed and the procedure completed, but there is little evidence to document the actual success and failure rates.

**Objective:** To assess the available scientific evidence regarding the influence of a retained instrument fragment on the prognosis of endodontic treatment.

**Design:** Systematic review with meta-analysis.

**Methods:** The authors conducted an electronic search of the MEDLINE database using appropriate key words, and identified 2 case-control series that could be included and utilized for the meta-analysis, using inclusion and exclusion criteria. The meta-analysis assessed between-study heterogeneity; the difference in outcome (healing) was used as the primary measure of treatment effect. The included studies utilized both radiographic and clinical criteria to assess healing and considered the presence or absence of a periapical lesion at the time of treatment and changes in the size of these lesions with time. Neither of the included studies reported details of the endodontic technique, descriptions of irrigation, or type of medicament. All procedures were done in an endodontic specialist's office or a university dental clinic.

**Results:** Overall, 81% of lesions healed when a periapical lesion was present and the tooth contained an instrument fragment, and >94% remained healthy when no periapical lesion was present, which is comparable to outcomes achieved when no instrument breakage occurs.

**Conclusions:** The authors remind us that case-control studies are not equivalent in scientific quality to randomized, controlled trials, but concluded that the prognosis for endodontic treatment when a fractured instrument fragment remains within the root canal system is not significantly reduced by the instrument per se. Rather, other factors, such as the presence of a periapical lesion and/or compromise of the root canal system by misguided attempts at retrieval of the instrument, will compromise outcomes to the extent that such circumstances preclude effective canal disinfection. Finally, it is not clear if results from specialty practices and university clinics can be directly applied in other clinical setting.

**Reviewer's Comments:** Obviously, it is impossible to conduct a controlled, randomized study of endodontic outcomes when instruments separate during root canal treatment. However, the authors have presented, in a carefully done systematic review, some useful insights into the effect of this complication on treatment outcomes. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Treatment Outcome, Retained Instrument, Prognosis, Outcomes

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In patients identified with generalized joint hypermobility, clinicians should be cautious in trying to use this condition as a predictor of risk for TMD and TMJ disorders.

**Background:** There is a general belief in the dental profession that generalized joint hypermobility (GJH) is a risk factor for degeneration of the TMJ and other TMD/TMJ-related disorders.

**Objective:** To provide a critical summary of a large-scale European study of subjects reporting GJH, as assessed using the Beighton Classification for excessive mobility in 9 joints (such as ability to hyperextend fingers, knees, etc) and relate GJH to the presence of signs and symptoms of TMD, such as reciprocal click and limitations of mouth opening, as assessed by a survey of the participants.

**Design:** Critical summary using accepted methods of evaluation of scientific methodology and levels of evidence.

**Results:** This large scale survey study established a positive relationship between GJH and reciprocal TMJ clicks, correlating best in female respondents. However, GJH was not associated with TMD, myalgia, or disc displacement.

**Conclusions:** The authors of this review concluded that the study being assessed did not support the clinical view that GJH is a risk factor for TMD-related pain or degenerative disorders of the TMJ. Serious limitations of this study included the study being cross-sectional and based on arbitrarily determined categories of GJH. Therefore, changes in TMD/TMJ signs and symptoms were not evaluated over time in individuals with GJH. GJH in and of itself cannot be relied upon as a scientifically based criterion for making treatment decisions in patients with TMD/TMJ problems. The authors assigned a level of evidence score of 2 to the work (limited-quality, patient-oriented).

**Reviewer's Comments:** More evidence is needed before a definite relationship between GJH and TMD can be established. The focus of treatment should instead be made on the patients presenting signs and symptoms in the orofacial region. (Reviewer-Arthur H. Jeske, DMD, PhD).

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Keywords: Generalized Joint Hypermobility, TMD, Risk Factors

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