September 30, 2012 | Original Rel.: September 2012 | Termination: September 2014

Practical Reviews™ presents Critiques in Orthodontics

Vol. 26 No. 8

Literature review and critical analysis from the publisher of *Practical Reviews*

Endorsed by American Association of Orthodontists

ADA C·E·R·P Continuing Education Recognition Program

E-quiz code: **32053N**

Issue Highlights

These articles have been selected by the Coordinating Editor as Key Reviews.

Dialogue

White Spot Lesions/Decalcification – An Orthodontic Dilemma

Although usually caused by poor oral hygiene, it should be the goal of all orthodontists to prevent white spot lesions to avoid remineralization

By Phillip M. Campbell, DDS, MSD

White spot lesions/decalcification are an orthodontic dilemma. What can be done? It is gratifying to me to see the recent interest in research relating to prevention and resolution of white spot lesions in patients undergoing fixed orthodontic treatment. In fact, there were at least six such presentations on this topic at our recent American Association of Orthodontists annual session in Hawaii. A white spot lesion is a subsurface enamel porosity from carious demineralization that presents itself as a milky white opacity on smooth enamel surfaces. White spot lesions are the first visible signs of enamel demineralization. They reflect changes in the optical properties, giving the surface an opaque chalky white appearance. They begin as subsurface demineralizations, but may lead to surface cavitation. White spot lesions have been shown to occur in as little as four weeks, although they are not generally visible at this point. White spot lesions are most frequently seen on the gingival aspect of maxillary lateral incisors, mandibular canines and first premolars. Nothing is more frustrating to the clinical orthodontist than to remove braces from an otherwise well-treated case and see these enamel scars that could have been prevented by good oral hygiene during treatment. The patient came for orthodontic alignment, not permanent scars on the teeth that may require restorative care.

> Attempting to determine the etiology of such a difference in incidence of white spot lesions between banding and bonding continues to be challenging.

Prevalence of visible white spot lesions ranges from 11–97% depending on the assessment method used and whether pretreatment white spot lesions have been controlled for. In the largest study of prevalence conducted to date, approximately 23% of orthodontic patients developed white spot lesions during treatment. With one-fourth of our patients developing white spot lesions, prevention should be foremost in the mind of every clinical orthodontist. It appears the prevalence of white spot lesions has increased with the advent of bonding on anterior teeth, possibly due to acid etching of these teeth prior to bonding, which increases the likelihood of decalcification. Acid etching prior to bonding orthodontic brackets demineralizes the enamel surface, exposes enamel rods and prisms and removes the acquired pellicle to a depth of 5–25 microns. The deeper enamel is much softer than surface enamel, making it more acid soluble. While partial remineralization occurs after acid etching, recovery is incomplete. Even with partial remineralization, the unsightly enamel scars remain as permanent sequelae of poor oral hygiene during treatment.

Clinicians whose careers have spanned both the banding and bonding eras of practice have reported conflicting opinions concerning the prevalence of white spot lesions during each era. In my practice, there was no doubt. This included nine years of full banding and 23 years of a combination of banding molars and bonding all other teeth. Surveys of successive finished cases during each era revealed a dramatic difference in prevalence of white spot lesions with bonded brackets, but also an exponential increase in severity that generally extended all the way from the bracket to the free

Practical Reviews in Periodontics
Critiques in Orthodontics
Literature review and critical analysis from the publisher of *Practical Reviews*

Coordinating Editor
John S. Casko, DDS, MS, PhD
Professor, Department of Orthodontics
The University of Iowa College of Dentistry
Iowa City, IA

Reviewers
Vincent G. Kokich, Sr, DDS, MSD
Professor, Department of Orthodontics
University of Washington
Seattle, WA

Brent E. Larson, DDS, MS
Associate Professor
Division of Orthodontics
University of Minnesota
Minneapolis, MN

Guest:
Phillip M. Campbell, DDS, MSD
Robert E. Gaylord Endowed Chair
Department of Orthodontics
Baylor College of Dentistry
Dallas, TX

Oakstone Medical Publishing is committed to the free exchange of dental and medical education. Inclusion of any presentation in the program, including presentations on off-label uses, does not imply an endorsement by Oakstone Medical Publishing of the uses, products, or techniques presented.

Method of Participation: To receive credit for this activity, answer the practice quiz questions, read the content, and complete the online post-activity quiz at www.practicalreviews.com. Log in using your email address and password, click on "Take a Quiz," and enter the e-quiz code located on the front page or above the quiz questions. To obtain documentation of participation, you are required to submit an activity evaluation.

Hardware/Software Requirements: The web-based activity requires a version 4.x web browser or newer and is best experienced using a current-generation browser such as Internet Explorer 6.0 or newer or Firefox 1.5 or newer. The presentation component is designed for 1024×768 screen resolution or better. Cookies must be enabled to take the self-assessment, complete the evaluation, and print the CME certificate.

Media: Internet access to pdf.

Intended Audience: Orthodontists and others interested in orthodontics.

Learning Objectives: At the conclusion of this activity, participants will demonstrate the ability to:
- Provide orthodontists with an understanding, overview, and critical analysis of the most current and clinically useful information available in the literature related to orthodontics.
- Read reviews of the latest basic scientific findings and the impact of these on clinical problems, as well as concise, targeted lectures by noted specialists on the most important practice-oriented subjects in these areas.
- Evaluate where controversy exists and, with our distinguished editorial board of orthodontists, examine the evidence and present advantages and disadvantages of the method in question. Also, controversies, advantages, and disadvantages of diagnosis and treatment plans will be emphasized.
- Find useful guidance on integrating non-conventional principles and practices with conventional ones — and learn how to select and use the best of all available approaches.
- Expand upon, reinforce, and give additional perspective to the participant's own regular journal review.
- After completing each issue's activity, the participant is expected to have a working familiarity with the most clinically important information gleaned from the articles reviewed.

Special Prerequisites for Participants: There are no prerequisites for participants.

Accreditation: This continuing education activity has been planned and implemented in accordance with the standards of the ADA Continuing Education Recognition Program (ADA CERP) through joint efforts between the American Association of Orthodontists and Oakstone Medical Publishing.

The American Association of Orthodontists is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

The American Association of Orthodontists designates this activity for:
Critiques: 24 continuing education credits per 12-issue subscription.

Estimated Time to Complete Each Issue: 2 hours.

Minimum Performance Level: Questions should be answered based on information presented in the issue within 24 months of publication date, and 70% of questions must be answered correctly to pass the quiz and receive credit for the issue.

Disclaimer: The opinions and recommendations expressed by faculty and other experts whose input is included in this program are their own. This enduring material is produced for educational purposes only. Use of the Oakstone Medical Publishing name implies review of educational format design and approach. Please review the complete prescribing information of specific drugs or combinations of drugs, including indications, contraindications, warnings, and adverse effects, before administering pharmacologic therapy to patients.

Full Disclosure Policy: Oakstone Medical Publishing has assessed conflicts of interest with its faculty, authors, editors, and any individuals who were in a position to control the content of this CDE activity. Any identified relevant conflicts of interest were resolved for fair balance and scientific objectivity of studies used in this activity. Oakstone Medical Publishing's planners, medical reviewers, and editorial staff disclose no relevant commercial interests.

The following faculty report no relevant financial interests: Dr. Phillip M. Campbell and Drs John S. Casko, Vincent G. Kokich, Sr, and Brent E. Larson.

Oakstone Publishing, LLC • 100 Corporate Parkway • Suite 600 • Birmingham, AL 35242 • (800) 633-4743

gingival margins of the affected teeth, whereas white spot lesions with bands usually involved the small line where the cement had washed out. Since there was absolutely no possibility of returning to a full-banded appliance, I had to attempt to find a solution. The obvious question was: What were the significant differences in the banding and bonding eras? During the full-banded era, for me 1973–82, preformed bands were generally well-fitted. However, due to the conical shape of all teeth, there were consistently open margins gingivally. When the cement washed out, the white spot lesions that occurred were much smaller and usually did not extend to the free gingival margin. The band cements used were usually zinc oxyphosphate, which have been shown to demonstrate some antibacterial properties. There were some exceptions, for example, when a given band had been loose for a long period of time and it was not detected and recemented. During the bonded area, for me from 1982–2005, brackets were generally bonded on all teeth except molars with an obvious increase in white spot lesions following my transition from banding to bonding, 3% versus 21%. I became concerned with the etiology of the significant increase in number and severity of white spot lesions.

Attempting to determine the etiology of such a difference in incidence of white spot lesions between banding and bonding continues to be challenging. There are a number of possible reasons why white spots lesions are more prevalent and severe with bonded brackets: 1) acid etching removes the pellicle and fluoride-rich layer and increases the solubility of enamel, 2) affinity to and colonization by *Streptococcus mutans* around bonding resins adjacent to brackets, 3) bacteriostatic cements like zinc oxyphosphate are no longer used to cement anterior bands, and 4) there appears to have been an increased consumption of sodas and sports drinks among our patient population. Proposed methods for the prevention of white spot lesions include an excellent in-office oral hygiene program including regular monitoring, grading or reward systems; an organized oral hygiene class for patients with oral hygiene problems prior to initiation of treatment and a separate session for patients already in treatment with problems; a prescription for a 1.1% sodium fluoride gel; monthly in-office fluoride rinses; regular application of fluoride varnish; an encouraged limitation of carbonated beverages and sports drinks; application of filled resin sealants and reapplication as necessary; and development of a bracket bonding adhesive that does not require acid etching and is bacteriostatic.

Admittedly, remineralization of white spot lesions is a noble undertaking, and there is some evidence of success. However, the unsightly enamel scars are still mostly visible unless cosmetic bonding or resin infiltration is done. These permanent scars remain for costly follow-up care for many years to come and may precipitate negative comments from associates and even other dentists, such as, "It is obvious that you had braces. I see those white spots on your teeth." Certainly, the goal of all clinicians should be to prevent white spot lesions from occurring in the first place rather than having to remineralization or restore them. Currently, we must rely on excellent oral hygiene, fluorides and filled resin sealants. In lieu of excellent oral hygiene in every patient, filled resin sealants appear to be the best method for prevention of white spot lesions during active orthodontic treatment. Filled resin sealants placed on the smooth enamel surfaces of all adolescent patients prior to bonding of brackets

provides a rain coat covering, which has been shown to be at least partially protective even in non-compliant patients.

Even though application of filled resin sealants may be time consuming for the clinician, we feel the benefits outweigh the chair time involved. In my opinion, prevention of a single white spot lesion in one patient is worth the effort. The patient came for orthodontic alignment, not permanent scars which require restorative care and follow-up maintenance. Was specific informed consent given and the risks thoroughly explained in lay terms to both patients and parents? Was treatment discontinued when white spot lesions were first noticed? Was the oral hygiene so poor that treatment should not have been initiated in the first place?

White spot lesions do actually have litigious ramifications. Apparently, there have been some six-figure settlements or judgments related to white spot lesions recently. Although poor oral hygiene for the patient is the etiology, our solemn responsibility as professionals is always to do no harm. The discipline of orthodontics has provided a wonderful service for millions of patients over the last century and is in greater demand today than ever before. We should not rest until we have totally solved the problem of white spot lesions and the solution should not require patient compliance. Our patients and profession will be better served by our concerted efforts.

Critical Discussion and Commentary

Cognitive Behavioral Therapy Is Effective for Managing Orthodontic Pain

Cognitive behavioral therapy is a useful tool for managing orthodontic pain following bracketing and archwire placement

By Vincent G. Kokich, Sr, DDS, MSD
Based on: Wang J, Jian F, et al. Cognitive Behavioral Therapy for Orthodontic Pain Control: A Randomized Trial. *J Dent Res* 2012; 91 (June): 580–585.

Suppose you are about to place orthodontic appliances on a 12-year-old female. The mother informs you that the child is highly susceptible to any sort of dental pain. The mother is concerned that the pain from the initial archwire placed after bracket bonding will be difficult for her daughter. You suggest the mother give the daughter ibuprofen after the orthodontic bonding to reduce the incidence of pain. The mother states that she does not want to give her child any sort of drugs. Are there any alternatives? How do you help your patients to manage orthodontic pain following appliance placement? That question was addressed in a recent study.

The purpose of this study was to assess the efficacy of cognitive behavioral therapy intervention for managed orthodontic pain. This was a randomized clinical trial. The sample consisted of 450 individuals who were receiving orthodontic appliances. One hundred and fifty of these individuals received ibuprofen every six hours for the first day following orthodontic banding and wire placement. The second group of 150 subjects received cognitive behavioral therapy coaching from a group of 15 therapists. The third group received no intervention. Brackets were placed on all teeth in this group of subjects who averaged around 12 years of age, and an initial archwire was placed. A visual analog scale was used for subjects to measure and for evaluators to interpret the degree of orthodontic pain that they perceived in each of the three groups.

Is it possible, with cognitive behavioral therapy teaching, to reduce the perception of orthodontic pain following appliance placement to a level that matches the effect of ibuprofen therapy? The answer to that question is yes, definitely. Based upon this large randomized clinical trial, the authors found that cognitive behavioral therapy was just as successful as ibuprofen in reducing the perception of orthodontic pain following appliance and initial archwire placement. Both of these groups performed equally well compared to the control subjects who received no drugs or cognitive behavioral therapy.

I would advise you to read this article, if possible. In the digital format, there are references to the psychological intervention that is used in cognitive behavioral therapy, and these references can be accessed directly by clicking on the link following the reference. This is good information that could help any orthodontist.

Do You Have a Mission Statement for Your Practice?

A mission statement can create a sense of purpose for the team members in your practice

By John S. Casko, DDS, MS, PhD
Based on: Levin RP. Leadership and Purpose. *J Am Dent Assoc* 2012; 143 (July): 793–794.

For as long as I have been reviewing articles on practice management, it seems that the need for having a mission statement for your practice is a topic repeatedly discussed. Do you have a mission statement for your practice? If so, how do you use it? I believe that for many practices that do have a mission statement, it is either framed and hung on a wall or placed in an operations manual and rarely referred to. The important questions are do you need a mission statement for your practice and, if you do, why do you need it and how should you use it? These questions are addressed in a recent article.

In this article, Dr. Levin discusses why it is important to have a mission statement for your practice and how the mission statement should be used. He emphasizes that a mission statement is an important tool of leadership for any practice

and can be used to create and promote a clear sense of purpose for employees. When things get hectic, it is not uncommon for employees to concentrate on getting through the day and forget why they are there. Dr. Levin stated that he has encountered many non-dental companies in which the first agenda item of every meeting is reading the mission statement. This is simply to remind staff members why they come to work each day. He also noted that many practices start each day reading the mission statement, which he suggests should be no more than two to four sentences.

As the leader in your practice, one of your more important roles is to maintain a sense of purpose for your employees, and a mission statement which is regularly reviewed is one way to do this. If you do not have a mission statement for your practice or if you do have one and rarely refer to it, I would suggest that you read this article in detail.

Ideal Method for Rebonding a Lingual Retainer

Removing all composite remnants is recommended prior to rebonding lingual retainers, as greater variability in bond strength exists when composite remnants remain

By Brent E. Larson, DDS, MS
Based on: van Westing K, Algera TJ, Kleverlaan CJ. Rebond Strength of Bonded Lingual Wire Retainers. *Eur J Orthod* 2012; 34 (June): 345–349.

Although lingual bonded retainers can provide a wonderful service for our patients that need constant retention following orthodontic treatment, maintenance can be a clinical headache. If a retainer comes loose, we would like to rebond it quickly and predictably to eliminate the chance that it will come loose again next week. One important clinical question to answer is whether complete removal of the old composite is necessary prior to rebonding, or whether the retainer can be bonded to the composite remnants that remain. Researchers from the Netherlands recently published a paper to help us answer this clinical question.

The study was conducted in the laboratory under controlled conditions. Lingual retainer wire was bonded to 38 bovine teeth etching for 30 seconds with 37% phosphoric acid, applying a bonding adhesive and then a flowable composite. A metal mold was used to standardize the bonding area to a diameter of 4 mm and a height of 2 mm. After curing for 20 seconds, samples were stored for two weeks in distilled water. Bond strength was tested on a universal testing machine, and the strength was recorded for all samples. After debonding, the teeth were randomly assigned to have the composite remnants roughened with a tungsten carbide bur or to have all adhesive remnants removed. Bonding and bond strength testing was then repeated. Each tooth was then rebonded a second time using a repeated crossover design so the opposite composite removal technique was used. Therefore, each tooth was tested three times with different enamel conditions — initial clean enamel, roughened composite and all composite remnants removed.

The researchers discovered there were no significant differences in the average bond strength among the three testing conditions. However, rebonding teeth with adhesive remnants remaining showed a higher standard deviation in bond strength, that is, more variability. They also found that most bond failures occurred at the wire-composite interface. The authors' conclusion is that complete removal of composite prior to rebonding lingual retainers is recommended to reduce variability in bond strength even though they found the average bond strength was not different. So, if you are looking for predictability in rebonding, it would seem to make sense to remove all composite remnants if possible. On the other hand, if some remnants remain, you still may have adequate strength but a bit less certainty.

It would be nice to have a clinical study to confirm these recommendations, but for now it seems wise to follow the authors' advice when feasible.

Is Ultrasonography Acceptable for Diagnosis of TMJ Disc Displacement?

Ultrasonography provides an acceptable range of accuracy for preliminary detection of TMJ disc displacement, but positive findings should be confirmed by MRI

By Vincent G. Kokich, Sr, DDS, MSD
Based on: Li C, Su N, et al. Ultrasonography for Detection of Disc Displacement of Temporomandibular Joint: A Systematic Review and Meta-Analysis. *J Oral Maxillofac Surg* 2012; 70 (June): 1300–1309.

How would you handle this situation? An adult patient who has been in orthodontic treatment for about six months complains to you of popping of the left temporomandibular joint. She has recently been wearing Class II elastics. You tell her to stop wearing the rubber bands and plan to check her in another month. After a month, the popping of the left joint is continuing, and it occurs when she opens and closes. She complains to you that this is painful. You suspect that she has an anteriorly displaced disc that reduces when she closes. In order to confirm this diagnosis, you refer her to have an MRI performed. However, when the patient finds out the cost of the MRI, she suggests that her sister, who is an ultrasound technician, could use sonography or ultrasound to check the temporomandibular joint for no fee. Is ultrasound an accurate tool for determining anterior disc displacement? That question was addressed in a recent study.

The purpose of this study was to perform a systematic review to assess and explore the reliability of ultrasonography in diagnosing disc displacement of the TMJ. Multiple databases

were explored. The authors identified 15 studies to include in the meta-analysis. All studies had used sonography to evaluate whether or not the disc had been displaced in a series of patients.

Most researchers regarded MRI as the gold standard. So, what was the diagnostic accuracy of MRI in predicting or determining a displaced disc? The MRI had an accuracy of 95% to detect disc displacement. What did the systematic review show for the accuracy of ultrasound? Good question. The authors found that the diagnostic accuracy of ultrasonography in both closed and open mouth positions was acceptable and was in the range of between 79% and 90%. What does this mean? These authors believe that ultrasound provides a strong diagnostic basis but is not completely accurate.

The authors suggest that ultrasonography is an acceptable method that can be used as a rapid preliminary diagnostic tool to exclude clinical suspicions. It is also much more reasonable in terms of cost compared to MRI. However, positive ultrasonographic findings should be confirmed by MRI. In addition, the authors point out that ultrasonography has not been shown to accurately detect lateral or posterior displacement of the disc.

In the scenario that I described previously, it could be beneficial for your patient to have her sister use ultrasound to determine if the temporomandibular joint disc is being displaced. If this suspicion were positive, then an MRI might be performed to validate this diagnosis.

Bolton Analysis? There's an App for That

A new smartphone application allows calculation of Bolton discrepancies and arch-length discrepancies by inputting the mesiodistal dimensions of the dentition

By Brent E. Larson, DDS, MS
Based on: Pavan KM, Praveen KN, Vasu Murthy S. Model Analysis on a Smartphone. *J Clin Orthod* 2012; 46 (June): 356–358.

As you walk down the street and nearly bump into someone who has her face buried in the screen of her smartphone, do you wonder what impact mobile technology will have on orthodontics? We can access our records and schedules and communicate with our colleagues. But now I have an app, or application, for you that does all the calculations for many model analyses. The app I am talking about is previewed in a recent article.

This new app for Android devices was developed by orthodontists in India and is capable of performing the following calculations: Bolton analysis, arch length discrepancies, Howes analysis, Pont and Linder Harth arch width analyses, and Tanaka-Johnston mixed dentition analysis. As you view the home screen, the first link on the menu, labeled "Teeth Dimensions", allows the user to input mesiodistal tooth widths. As you enter values, the program will automatically fill in the same value for the contralateral tooth to save time. Once the tooth sizes have been entered, the Bolton analysis can be run by just selecting the "Bolton" link. Additional analyses require the input of measured arch lengths or arch widths. The program will prompt the user for the required measurement values to complete the desired calculations. Additionally, a help menu describing the various methods of analysis is available for reference. The app is called iModelAnalysis and is available for download from the Google Play store.

I was quickly and easily able to download this app and load it onto my Android phone using the QR code published in the article. It is actually quite easy to use, even though it requires manual input of tooth measurements to do the calculations. I quickly entered the tooth size data for the upper and lower 3-3, and it immediately calculated the anterior Bolton tooth size discrepancy for me.

Although this specific app may not prove useful for you, it is just the beginning of mobile applications we will see for our smartphones to help us with orthodontic treatment planning and management. I think we will see a great deal more of these developments in the future as mobile devices continue to grow in popularity and performance.

What Is the Effect of Tooth Bleaching on Shear Bond Strength?

Clinical

Take Home Pearl:

Tooth bleaching prior to bonding of orthodontic brackets does not reduce the shear bond strength when fluoride-releasing sealants are used.

Background: Currently, increasing numbers of adults are seeking orthodontic treatment. Many adults have bleached their teeth. Does tooth bleaching prior to bonding of orthodontic brackets cause a problem with shear bond strength, especially if fluoride-releasing sealants are used?

Objective: To investigate the effects of bleaching on shear bond strength of orthodontic attachments bonded with fluoride-releasing sealants.

Design/Methods: This was a laboratory investigation. In total, 160 extracted human molars were divided into 2 main groups. One group of molars received 45% carbamide peroxide bleaching simulating an in-office technique, followed by 5 sessions of 20% carbamide peroxide bleaching to simulate at-home bleaching. These teeth were then stored in water for 2 weeks. The other group was the unbleached group. Then, both groups had the tooth surfaces etched with phosphoric acid, and some teeth were primed with Pro Seal sealant containing fluoride. The remaining groups were primed with Transbond XT primer. Then brackets were bonded to all teeth. After 24 hours, brackets were removed and shear bond strength was recorded for half the sample. After 3 months, the remaining brackets were debonded and the shear bond strength was calculated.

Results: Shear bond strengths were always greater in the patients whose teeth were bleached compared to the group where bleaching was not performed. In addition, the Pro Seal sealant showed a reduction in shear bond strength after 3 months in the unbleached group, but the shear bond strength was still within clinically acceptable limits.

Conclusions: Bleaching and waiting for 2 weeks does not have a negative effect on shear bond strength of brackets when fluoride-releasing sealants are used.

Reviewer's Comments: This study provides valuable information for orthodontists who treat adults. The key thing to remember is that the teeth that were bleached did not have brackets bonded immediately. A 2-week interval allowed the residual oxygen present on the tooth surface during the bleaching procedure to be removed. The residual oxygen can have an effect on the curing of the composite.

Reviewer: Vincent G. Kokich, Sr, DDS, MSD
Article Reviewed: Phan X, Akyalcin S, et al. Effect of Tooth Bleaching on Shear Bond Strength of a Fluoride-Releasing Sealant. *Angle Orthod* 2012; 82 (May): 546–551.

Orthodontic Treatment Leads to Improvement in Quality of Life

Clinical

Take Home Pearl:

This article provides a valid research basis for concluding that orthodontic treatment does lead to an improvement in quality of life.

Background: When patients ask you what the benefits of orthodontic treatment are, what do you tell them? Would you have a valid basis for telling them that it leads to an improvement in quality of life?

Objective: To assess the oral health-related quality of life of patients who completed orthodontic treatment compared with subjects awaiting orthodontic treatment.

Participants: The sample for this study consisted of 2 groups of patients. The treatment group consisted of 100 consecutive patients who concluded orthodontic treatment at least 6 months before the study, and the second group was a control group of 100 patients with similar orthodontic problems who were awaiting the initiation of orthodontic treatment.

Methods: Data were collected through face-to-face interviews, self-completed questionnaires, and oral examinations by a trained orthodontist. The oral health-related quality-of-life assessment (a validated assessment form) was administered to each subject and the scores were statistically evaluated.

Results: Statistical analysis revealed that the non-treated young adults had mean oral health impact profile scores over 5 times greater than the treated group, indicating that the untreated group had a significantly poorer oral health-related quality of life than did the patients who received orthodontic treatment.

Conclusions: Patients who complete orthodontic treatment have a higher oral health-related quality of life than patients who do not receive orthodontic treatment.

Reviewer's Comments: I thought this was an excellent study. From just seeing the changes in patients that they have treated, I believe most orthodontists would feel comfortable saying that orthodontic treatment usually results in an improved quality of life. It is helpful, however, to be able to refer to a valid research study that reaches the same conclusion when talking to patients.

Reviewer: John S. Casko, DDS, MS, PhD
Article Reviewed: Palomares NB, Celeste RK, et al. How Does Orthodontic Treatment Affect Young Adults' Oral Health-Related Quality of Life? *Am J Orthod Dentofacial Orthop* 2012; 141 (June): 751–758.

Evaluating Root Resorption Using CBCT Imaging

Clinical

Take Home Pearl:
Cone-beam CT imaging provides a more accurate assessment of root resorption compared to studies using two-dimensional radiographs.

Background: Root resorption is common during orthodontic treatment. This fact has been substantiated in several past studies. However, the degree of root resorption that occurs during orthodontics can be underestimated because of the type of radiographs that are typically used, ie, 2-dimensional films. With cone-beam CT (CBCT) imaging, perhaps the extent of root resorption and its location can be assessed more accurately.

Objective: To investigate the incidence and severity of root resorption during orthodontic treatment and to explore factors that have a possible influence on the degree of root shortening.

Design/Methods: This was a prospective study of 152 patients who had orthodontic treatment with extraction of at least 1 premolar in each quadrant. All subjects had Class I malocclusions. About half the sample was male and the other half was female. The average patient age was 15 years at the start of treatment. The average time in orthodontic treatment was 20 months. CBCT images were taken on all subjects before treatment, after 6 months of treatment, and at the completion of orthodontics. Assessments of the incidence and location of root resorption were made at 6 months and at treatment completion.

Results: At 6 months, the highest frequencies of root resorption occurred in the maxillary arch on the premolars and lateral incisors. Very few roots had shortening >2 mm and none had shortening >4 mm. At the completion of orthodontics, the most significant root resorption was found on maxillary lateral incisors followed by maxillary central incisors. Root shortenings >4 mm were found on 2.6% of the maxillary incisors. Of all patients, 94.0% had at least 1 root with shortening >1 mm and 6.6% of the sample had ≥1 teeth with root shortening >4 mm. Root resorption of the incisors was slanted, with greater resorption occurring on the palatal side.

Conclusions: CBCT imaging accurately assesses the amount and location of root resorption. The authors believe that CBCT imaging more accurately represents the amount of root resorption that occurs compared to 2-dimensional radiographs.

Reviewer's Comments: The authors could not make a direct comparison of CBCT imaging and 2-dimensional radiographs because they did not include the latter protocol. However, they conclude that because the resorption, especially on maxillary central incisors, is slanted with a greater amount occurring on the palatal surface, a 2-dimensional radiograph would underestimate the true degree of root resorption. This is probably true.

Reviewer: Vincent G. Kokich, Sr, DDS, MSD
Article Reviewed: Lund H, Gröndahl K, et al. Apical Root Resorption During Orthodontic Treatment: A Prospective Study Using Cone Beam CT. *Angle Orthod* 2012; 82 (May): 480–487.

Intrusion Arches, Mini-Implant Systems Both Effectively Intrude Maxillary Incisors

Clinical

Take Home Pearl:
Mini-implant supported maxillary incisor intrusion systems do not have a reciprocal effect on the maxillary first molars.

Background: For a patient with an anterior deep bite due to a stepdown of the maxillary incisors, it is usually indicated to intrude the incisors. What difference would it make if you used a maxillary depressing archwire or a mini-implant system to intrude the incisors?

Objective: To compare the skeletal and dental effects of 2 intrusion systems involving mini-implant and the Connecticut intrusion arch in patients with deep bites.

Participants: The sample for this study consisted of 45 adults who had anterior deep bites due to upright maxillary incisors.

Methods: The 45 adult patients were divided into 3 groups. One group used Connecticut maxillary depression archwires to intrude the maxillary incisors. The second group used a mini-implant supported intrusion system to intrude the maxillary incisors. The third group received no treatment and acted as a control group. Cephalometric radiographs, panoramic radiographs, models, and intraoral and facial photographs were used to evaluate dental and skeletal changes after a maximum of 7 months intrusion with each system.

Results: Both systems effectively intruded and protruded the maxillary incisors. The maxillary intrusion archwire also had a reciprocal effect on the maxillary first molars extruding them due to a distal repositioning of the crown and mesial repositioning of the roots.

Conclusions: Both maxillary depressing archwires and mini-implant systems can effectively intrude the maxillary incisors.

Reviewer's Comments: I was not surprised that both of these systems could effectively intrude the incisors. Because all of the patients had upright maxillary incisors, I was surprised that the maxillary depressing archwires were cinched back distal to the molar tubes. This is usually indicated when you are trying to intrude protrusive maxillary incisors to put a distal force on them. In patients who require intrusion of the maxillary incisors and can benefit from some maxillary molar extrusion, using the depressing archwire would be a simpler and equally effective way to intrude the incisors when compared with the additional work of placing implants.

Reviewer: John S. Casko, DDS, MS, PhD
Article Reviewed: Senişik NE, Türkkahraman H. Treatment Effects of Intrusion Arches and Mini-Implant Systems in Deepbite Patients. *Am J Orthod Dentofacial Orthop* 2012; 141 (June): 723–333.

How Common Is Caries in Adult Third Molars?

Clinical

Take Home Pearl:

Erupted and retained third molars have a lower incidence of caries than do first or second molars and a higher incidence of periodontal pocketing.

Background: A common decision that must be made at the end of orthodontic treatment is whether to extract maxillary and/or mandibular third molars. Often, the decision is clear because of impaction. However, some third molars erupt and function in occlusion. Because these teeth are further posterior in the oral cavity, do they have a higher incidence of periodontal problems and/or caries?

Objective: To assess the prevalence of caries and periodontal pathology in erupted third molars in young adults.

Design/Methods: This was a retrospective assessment of the records of 400 adults who had retained erupted third molars over a 5-year period. Periodontal pocket depths were measured at 6 sites around all teeth. Caries was assessed on all molars.

Results: The incidence of periodontal pocketing >4 mm was more frequent around the third molars than it was on the first or second molars in young adults. The authors also found that caries on the occlusal surface was more prevalent on first molars than it was on third molars.

Conclusions: Periodontal health may be slightly compromised around third molars, but the incidence of caries was not greater than in other teeth.

Reviewer's Comments: This study follows a long list of trials from the University of North Carolina evaluating the potential problems that can occur if third molars are maintained and not extracted. This review clearly shows that caries is not a problem in these teeth; however, the potential for a deeper pocket depth may be more prevalent.

Reviewer: Vincent G. Kokich, Sr, DDS, MSD
Article Reviewed: Garaas RN, Fisher EL, et al. Prevalence of Third Molars With Caries Experience or Periodontal Pathology in Young Adults. *J Oral Maxillofac Surg* 2012; 70 (March): 507–513.

How Does Maxillary Distraction Osteogenesis Affect Pharyngeal Airway Space?

Clinical

Take Home Pearl:

Maxillary distraction osteogenesis results in significant increases in the posterior airway in adult cleft lip and palate patients.

Background: Cleft lip and palate typically is accompanied by underdevelopment of the maxilla, especially if surgery to correct the cleft deformity is performed during childhood. Due to the scarring of the tissue after surgery, there can be a restriction of maxillary forward growth. If the maxilla is restricted significantly, this can result in a deficient airway. Will distraction osteogenesis of the maxilla improve the airway space?

Objective: To determine if maxillary distraction osteogenesis will increase the pharyngeal airway space in adult subjects with cleft lip and palate.

Design/Methods: This was a retrospective analysis of 14 adult subjects with cleft lip and palate. All subjects had maxillary distraction osteogenesis to correct their malocclusion. Cephalometric radiographs were taken preoperatively and postoperatively. The airway space was measured and compared to the amount of distraction of the maxilla.

Results: Significant improvement occurred in the maxilla with an average forward advancement of nearly 9 mm. As a result, the posterior nasal spine moved forward about 7 mm on average. There were mean increases in the posterior pharyngeal airway of 7.5 mm and in the superoposterior airway of 5.1 mm.

Conclusions: Maxillary distraction in adult cleft lip and palate patients results in significant enlargement of the pharyngeal airway space.

Reviewer's Comments: This was an impressive article. Distraction of the maxilla is not easy for the patient or the clinician. However, this study clearly shows that, if maxillary distraction can be facilitated, this will result in substantial increases in the posterior pharyngeal space and airway for the patient.

Reviewer: Vincent G. Kokich, Sr, DDS, MSD
Article Reviewed: Aksu M, Taner T, et al. Pharyngeal Airway Changes Associated With Maxillary Distraction Osteogenesis in Adult Cleft Lip and Palate Patients. *J Oral Maxillofac Surg* 2012; 70 (February): e133–e140.

Is Mandibular Asymmetry Different in Class I & Class II Subjects?

Clinical

Take Home Pearl:
Class II skeletal patterns do not have more skeletal asymmetry than Class I skeletal patterns.

Background: Class II malocclusion may be partially due to insufficient mandibular growth. Is it possible that the growth disturbance causing a Class II relationship could be unilateral and produce a skeletal asymmetry? In other words, are Class II patients more asymmetric than Class I skeletal patients?

Objective: To determine any differences in skeletal asymmetry between subjects with Class I versus Class II skeletal patterns.

Design/Methods: This was a retrospective analysis of the records of 80 consecutive subjects who underwent orthodontic treatment. The inclusion criteria were age 11 to 16 years and cone-beam CT (CBCT) films that fit into a required ANB angle group. Patients did not have crossbites or posterior CR/CO shifts. CBCT images were made of these subjects, and an asymmetry assessment was conducted on the cephalometric landmarks. The landmarks Sella, Nasion, and Dent were used to create 3 reference planes to measure linear landmark distances to determine symmetry or asymmetry.

Results: Discrepant jaw growth resulting in Class II skeletal patterns has no more skeletal asymmetry than Class I skeletal patterns.

Conclusions: Class II skeletal patterns do not have greater mandibular asymmetry than Class I skeletal patterns.

Reviewer's Comments: I did not find this to be an unexpected finding. Although the mandible grows insufficiently in Class II subjects compared to Class I subjects, I did not expect this would be unilateral and produce more asymmetries. This study has verified that finding.

Reviewer: Vincent G. Kokich, Sr, DDS, MSD
Article Reviewed: Sievers M, Larson BE, et al. Asymmetry Assessment Using Cone Beam CT. A Class I and Class II Patient Comparison. *Angle Orthod* 2012; 82 (May): 410–417.

Orthodontic Treatment Can Improve Aesthetic Self-Perception

Clinical

Take Home Pearl:
Age and gender do not affect an adolescent's aesthetic self-perception after orthodontic treatment.

Background: There are many benefits to receiving orthodontic treatment. Is there any basis for believing that improvement of adolescents' self-perception is one of them?

Objective: To evaluate "changes in aesthetic self-perception of Brazilian adolescents who were receiving fixed orthodontic treatment during a 2-year period."

Participants: 318 adolescents aged 12 to 15 years were assigned to 1 of 3 groups: a treatment group, a group waiting for treatment, or a school group.

Methods: All subjects completed 3 interviews and clinical evaluations. The first data collection occurred before the beginning of therapy for the treatment group and was contemporaneous with the first interviews of the waiting and school groups. The second time of data collection occurred 1 year after placement of the fixed appliances for the treatment group and 1 year after the first interviews for the school and waiting groups. The third data collection took place 2 years after treatment of the fixed appliances for the treatment group and 2 years after the first interviews for the school and waiting groups. The main outcome variable evaluated in this study was the index of orthodontic treatment need-aesthetic component of each subject analyzed as a discrete variable.

Results: At the 1- and 2-year post-initiation of treatment periods, there was a significant improvement in the aesthetic component self scores in the group that received orthodontic treatment compared to the groups that did not, each of which had no changes. Gender, age, and socioeconomic status were not associated with the adolescents' aesthetic self-perception.

Conclusions: Fixed orthodontic treatment improves aesthetic self-perceptions in Brazilian adolescents aged 12 to 15 years who sought orthodontic care.

Reviewer's Comments: This is another trial you can use to support the benefits of orthodontic treatment. This study was well conducted and clearly demonstrated an improvement in self-perception for adolescents who received orthodontic care, whereas those who did not receive treatment had significantly worse self-ratings.

Reviewer: John S. Casko, DDS, MS, PhD
Article Reviewed: Feu D, Oliveira BH, et al. Influence of Orthodontic Treatment on Adolescents' Self-Perceptions of Esthetics. *Am J Orthod Dentofacial Orthop* 2012; 141 (June): 743–750.

Nonconventional vs Conventional Elastomeric Ligatures

Clinical

Take Home Pearl:
Nonconventional elastomeric ligatures are more expensive but not more efficient than conventional elastomeric ligatures.

Background: The goal of any orthodontic treatment would be to make the retraction of canines more efficient. Would nonconventional elastomeric ligatures improve the efficiency of canine retraction?

Objective: To evaluate the clinical efficiency of nonconventional ligatures with that of conventional elastomeric ligatures during canine retraction.

Participants: The sample consisted of 20 patients who required individual

canine retraction into first premolar extraction spaces in each quadrant.

Methods: A split-mouth design was used to randomly assign nonconventional or conventional ligatures to individual quadrants. The nonconventional elastomeric ligatures were Slide ligatures, which are an innovative ligature made of a special polyurethane mix for medical use manufactured by the injection molding technique. They were introduced in 2005 with a claim of lowering the levels of friction in treatment mechanics with preadjusted Edgewise appliances. The ligature interacts with the bracket slot to form a tube-like structure taking the shape of a passive self-ligating bracket. The rate of canine retraction was measured at monthly intervals and at the completion of retraction. The differences in the rate of retraction were statistically evaluated.

Results: No significant difference was found in the rate of canine retraction in the maxillary arch between the conventional and nonconventional elastomeric ligatures. There was also no significant clinical advantage with nonconventional elastomeric ligatures over conventional elastomeric ligatures with respect to the time required to complete canine retraction. While canine retraction in the mandibular arch was slightly more efficient with the nonconventional ligatures, this difference did not appear to be clinically significant.

Conclusions: Compared to conventional elastomeric ligatures, nonconventional elastomeric ligatures are more costly and do not appear to be more efficient.

Reviewer's Comments: Although this study had a small sample size, I believe it was well designed. We need more studies like this to evaluate claims that manufacturers make regarding the advantages of specific products that they sell. Based on the results of this study, it does not appear that nonconventional elastomeric ligatures provide greater treatment efficiency to warrant their additional cost.

Reviewer: John S. Casko, DDS, MS, PhD
Article Reviewed: Dholakia KK, Bhat SR. Clinical Efficiency of Nonconventional Elastomeric Ligatures in the Canine Retraction Phase of Preadjusted Edgewise Appliance Therapy: An In-Vivo Study. *Am J Orthod Dentofacial Orthop* 2012; 141 (June): 715–722.

Do Thyroid Collars Significantly Alter Radiation Dose During CBCT Scans?

General

Take Home Pearl:
A tight thyroid collar may reduce effective organ dose to the thyroid and esophagus by nearly 50% but does not significantly alter the total effective dose.

Background: The use of a thyroid collar is recommended to reduce radiation exposure to the thyroid when it does not alter the diagnostic value of the radiograph.

Objective: To evaluate the reduction in effective dose provided by a thyroid collar during cone-beam CT (CBCT).

Design: In vitro study.

Methods: An adult male phantom (ART-210) with thermoluminescent dosimeter chips at 21 locations was used to measure the average tissue-absorbed dose during CBCT scans. Five consecutive exposures were performed on a NewTom 9000 CBCT scanner with a large field of view (15 cm × 15 cm cylinder), and the average effective dose was calculated. Five different scan protocols were performed: no thyroid shielding; 1 collar loosely on the front of the neck; 2 collars loosely on the front and back of the neck; 1 collar tightly on the front of the neck; and 2 collars tightly on the front and back of the neck.

Results: Without shielding, the effective organ dose was 31.0 μSv to the thyroid gland and 2.4 μSv to the esophagus. The loosely placed collar or collars did not effectively lower the dose to individual organs, but a tightly placed collar reduced the dose to the thyroid and esophagus by nearly 50% (15.9 μSv and 1.4 μSv, respectively). Two tightly placed collars offered similar protection to a single tight collar. For all test conditions, there were no significant differences in total effective dose.

Conclusions: A tightly placed thyroid collar reduces effective organ dose to the thyroid and esophagus by approximately 50% but does not significantly lower total effective dose.

Reviewer's Comments: I was struck that almost no dose reduction was found with a loosely placed thyroid collar, highlighting the need for proper placement if it is used. The authors recommend a single, tightly placed collar if used, but due to the low overall reduction in total effective dose (approximately 1 μSv), it should only be used if it does not sacrifice diagnostic information.

Reviewer: Brent E. Larson, DDS, MS
Article Reviewed: Qu XM, Li G, et al. Dose Reduction of Cone Beam CT Scanning for the Entire Oral and Maxillofacial Regions With Thyroid Collars. *Dentomaxillofac Radiol* 2012; 41 (July): 373–378.

Faces Judged as Aesthetic Fall Within Cephalometric Norms

Other

Take Home Pearl:
The findings of this study show that the faces considered more attractive fulfilled the cephalometric and facial norms.

Background: One of the key outcomes of orthodontic treatment is improvement of facial aesthetics, so an orthodontist must have a proper understanding of what is perceived as aesthetic.

Objective: To identify faces judged as highly aesthetic and to investigate how their cephalometric measurements compare with cephalometric norms.

Design: Survey.

Methods: Frontal relaxed, frontal smiling, and profile photographs were taken of 89 dental students (77 females and 12 males). Each set of 3 photographs were displayed together in a Power Point presentation and evaluated by a panel of 34 lay people (30 females and 4 males who were

physiotherapy students aged 20 to 26 years). Each slide was shown for 15 seconds and ranked on a 5-point scale from 1 (very unattractive) to 5 (very attractive). Cephalometric analysis was performed on the 11 subjects ranked the most aesthetic and compared to cephalometric norms.

Results: For the 11 most aesthetic cases, cephalometric measurements all fell within the accepted norms for the combined sample. However, significant gender differences were found, with females tending to display more facial convexity (2.1 mm vs –1.8 mm), a smaller face height ratio (66% vs 79%), and a higher ANB angle (3.2° vs 0.5°) compared to males. Therefore, attractive males had a slightly straighter profile with a stronger lower jaw and more horizontal facial pattern compared to attractive females. None of the 11 most aesthetic cases had a Class II or Class III skeletal relationship.

Conclusions: Attractive subjects had cephalometric measurements within cephalometric norms, but gender differences did exist. Attractive females tended to be slightly Class II with a more convex profile.

Reviewer's Comments: I think it is important to remember when assessing patients that gender differences in cephalometric measurements clearly do exist, and assessment of the individuals' facial aesthetics is essential along with cephalometric characterization. For instance, Class III females may require surgical correction more frequently than males to obtain optimal aesthetics.

Reviewer: Brent E. Larson, DDS, MS
Article Reviewed: Macías Gago AB, Romero Maroto M, Crego A. The Perception of Facial Aesthetics in a Young Spanish Population. *Eur J Orthod* 2012; 34 (June): 335–339.

Risks With Low-Dose Radiation Exposure

Other

Take Home Pearl:
It is best to assume that low-dose maxillofacial imaging exposure presents a small but real radiation risk to patients, especially for pediatric patients.

Background: Over the last few years, public awareness of radiation risk has grown, prompting the development of a position paper to assist in choosing appropriate diagnostic imaging, especially cone-beam CT (CBCT).

Objective: To clarify the risks of low-dose maxillofacial radiation.

Design: Editorial/expert opinion.

Discussion: Radiation risk falls into 2 broad categories: (1) deterministic effects that require a certain high dose of radiation over a short period to cause direct cell death or malfunction; and (2) stochastic effects that result from low radiation levels that cause irreversible alteration of the cell. In dentistry, only stochastic effects are a risk with diagnostic maxillofacial radiology. Although direct evidence is lacking, the safest assumption is that these effects are linearly related to dose, which creates a minor risk even with a very minimal exposure. However, this risk varies depending on the tissue exposed, leading to various tissue weighting factors that together define the effective whole-body dose. In addition, pediatric patients are at a higher risk due to the greater cellular growth rate, the longer expected lifetime, the higher specific organ doses found in children, and the lack of specific pediatric exposure-reduction techniques (in many instances). Therefore, children are considered between 2 and 10 times more sensitive to radiation carcinogenesis compared to adults. Modifying exposure parameters for these patients is extremely important. To simplify explanation of radiation risk, the American College of Radiology is proposing a new 6-point scale to designate risk with certain procedures.

Conclusions: Careful consideration of radiation dose remains important when ordering diagnostic imaging, especially with pediatric patients.

Reviewer's Comments: This editorial provides a nice summary of the various elements of radiation risk. An important quote regarding the risk from the low exposures used for maxillofacial imaging is that it "does not mean that it is known that a risk exists at these levels, but rather that, in the absence of clear evidence of a threshold dose, it is prudent to assume that such a risk exists." I would be interested to see further development of the proposed scale to help providers communicate and understand radiation risk.

Reviewer: Brent E. Larson, DDS, MS
Article Reviewed: Scarfe WC. Radiation Risk in Low-Dose Maxillofacial Radiography. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2012; 114 (September): 277–280.

What Is the Success of Miniscrews Above the Mucogingival Junction?

Surgical

Take Home Pearl:
Miniscrews placed in the buccal mucosa near the mucogingival junction may have higher success than those placed farther from the attached gingiva.

Background: Placement of miniscrews into nonkeratinized buccal mucosa may increase the risk for tissue irritation and overgrowth compared to placement into the attached gingiva. On the other hand, miniscrews placed further apically are more likely to be placed into good cortical bone and will have greater distance from adjacent tooth roots.

Objective: To examine the current research on placement of miniscrews into unattached mucosa and offer guidelines for miniscrew placement.

Design: Expert opinion.

Discussion: When examining the recent literature, no clear consensus was found on whether mucosal quality affects miniscrew failure rates. However, many articles do not differentiate between various vertical positions within the unattached mucosa that may influence results. The nonkeratinized tissue near the mucogingival junction may have very limited mobility, while mucosa at the depth of the vestibule may be very mobile. Therefore, while extreme apical placement

may be contraindicated, miniscrews placed in limited-mobility mucosa near the mucogingival junction may give a favorable soft-tissue response. In addition, this region typically offers good primary stability in cortical bone and allows adequate space between roots.

Conclusions: Implant placement in nonkeratinized tissue should not be immediately disregarded, as placement near the mucogingival junction may still give a favorable tissue response.

Reviewer's Comments: I have occasionally placed miniscrews into mucosa near the mucogingival junction to obtain adequate root divergence and had a good tissue response. Therefore, I tend to agree with this article, although little scientific evidence is presented. Further investigation of these concepts would benefit the clinician and the patient by helping to provide a balance between adequate bone and sufficient tissue stability for health.

Reviewer: Brent E. Larson, DDS, MS
Article Reviewed: Baumgaertel S, Tran TT. Buccal Mini-Implant Site Selection: The Mucosal Fallacy and Zones of Opportunity. *J Clin Orthod* 2012; 46 (July): 434–436.

Effects of Various Oral Appliances on Sleep Bruxism Fairly Similar

Treatment Outcome

Take Home Pearl:

Phasic masseter muscle activity is reduced with the use of an oral appliance, but no significant differences exist between various appliance designs.

Background: Sleep bruxism may be associated with muscle tenderness, muscle stiffness, dental attrition, dental fractures, and locking of the temporomandibular joint. Oral appliances are commonly used to treat sleep bruxism, but many different designs exist.

Objective: To compare the effects of 3 different oral appliances on muscle activity during sleep.

Design: Randomized crossover trial.

Participants: 11 patients (4 males and 7 females) with an average age of 26 ± 3 years and presenting with self-reported sleep bruxism were included in the study.

Methods: The experimental protocol lasted 30 days for all patients. For the first 9 days, no oral appliance was used and electromyographic (EMG) activity was measured in the right and left masseter muscles during the first 3 days. The baseline EMG reading was taken from the average of the second and third nights. For the next week, patients were randomized to 1 of 3 oral appliances: a restricted maxillary and mandibular appliance (MMOA); a free MMOA; or a maxillary oral appliance only (MOA, flat-plane splint with canine guidance). Patients changed appliances weekly until all 3 appliances were worn. EMG activity was recorded at the end of each week and compared to baseline. EMG activity was recorded as phasic (0.25 seconds to 2.0 seconds of activity) or tonic (>2.0 seconds of activity).

Results: The number of phasic episodes was significantly reduced with all oral appliances, with no significant differences between appliances. Interestingly, no significant changes in tonic activity were noted with any appliance.

Conclusions: The presence of an oral appliance significantly reduced masseter muscle activity, but limiting mandibular movement did not appear to offer any added benefit.

Reviewer's Comments: The short length of the study, limited sample size, and lack of a washout period may influence the results of this study. However, overall, I feel that the findings are consistent with other sleep bruxism research. Oral appliances offer some improvement, but it is difficult to differentiate between appliances.

Reviewer: Brent E. Larson, DDS, MS
Article Reviewed: Arima T, Tomonaga A, et al. Does Restriction of Mandibular Movements During Sleep Influence Jaw-Muscle Activity? *J Oral Rehabil* 2012; 39 (July): 545–551.

Practical Reviews presents Critiques in
Orthodontics quiz Vol. 26 No. 8
Literature review and critical analysis from the publisher of *Practical Reviews*

To receive credit for this activity, answer the practice quiz questions below, read the content, and complete the online post-activity quiz at www.practicalreviews.com. Log in using your email address and password, click on "Take a Quiz," and enter the e-quiz code located below.

E-quiz code: 32053N

1. A recent study has shown that cognitive behavioral therapy is a good tool for reducing and managing orthodontic pain after initial archwire placement.

   Practice: T F ***Answer Submitted:*** **T F**

2. A mission statement can help to motivate staff employees.

   Practice: T F ***Answer Submitted:*** **T F**

3. When rebonding a loose lingual retainer, removal of all composite prior to rebonding appears to increase the mean bond strength.

   Practice: T F ***Answer Submitted:*** **T F**

4. In a recent study, researchers showed that bleaching teeth 2 weeks prior to bonding of brackets always results in a lower shear bond strength.

   Practice: T F ***Answer Submitted:*** **T F**

5. When analyzing faces seen as esthetic by lay people, Macías Gago et al found that females tended to have slightly more convex facial profiles than males.

   Practice: T F ***Answer Submitted:*** **T F**

6. In a recent study, researchers found that ultrasound was reasonably accurate for a preliminary assessment of TMJ disc displacement.

   Practice: T F ***Answer Submitted:*** **T F**

7. Orthodontic treatment leads to an improved level of oral health-related quality of life.

   Practice: T F ***Answer Submitted:*** **T F**

8. Due to the increasing popularity of applications for mobile devices, it is now possible to have a model analysis app to simplify the calculation of Bolton tooth-size discrepancies and other tooth-size/arch-length relationships.

   Practice: T F ***Answer Submitted:*** **T F**

9. A recent study by Lund et al shows that cone-beam CT imaging accurately assesses the amount and location of root resorption during orthodontic treatment.

   Practice: T F ***Answer Submitted:*** **T F**

10. In patients with deep bites, maxillary depressing archwire and mini-implant intrusion systems are equally effective in intruding maxillary incisors.

    Practice: T F ***Answer Submitted:*** **T F**

11. A single tight thyroid collar used during cone-beam CT imaging can reduce the total effective radiation dose by nearly 50%.

    Practice: T F ***Answer Submitted:*** **T F**

12. Miniscrews can be placed in nonkeratinized tissue to limit tissue movement if they are located close enough to the mucogingival junction.

    Practice: T F ***Answer Submitted:*** **T F**

13. Children are considered less sensitive to radiation carcinogenesis because they have more rapid cell repair mechanisms.

    Practice: T F ***Answer Submitted:*** **T F**

14. In patients with self-reported sleep bruxism, the presence of an oral appliance significantly reduces masseter muscle activity, but limiting mandibular movement does not appear to offer any added benefit.

    Practice: T F ***Answer Submitted:*** **T F**

15. Retained and erupted third molars have a slightly higher incidence of caries than do first or second molars in young adults.

    Practice: T F ***Answer Submitted:*** **T F**

16. In a recent study, researchers showed that maxillary distraction in adult cleft lip and palate patients does not significantly improve the pharyngeal airway space after surgery.

    Practice: T F ***Answer Submitted:*** **T F**

17. Subjects with Class II skeletal patterns have greater amounts of mandibular asymmetry than do those with Class I skeletal patterns.

    Practice: T F ***Answer Submitted:*** **T F**

18. Orthodontic treatment significantly improves self-perception in adolescents.

    Practice: T F ***Answer Submitted:*** **T F**

19. Compared to conventional elastomeric ligatures, nonconventional elastomeric ligatures are more costly and do not appear to be more efficient for canine retraction into first premolar extraction spaces.

    Practice: T F ***Answer Submitted:*** **T F**

1. F Although Yang et al were able to demonstrate dental expansion following alveolar bone grafting in cleft subjects, there was no evidence that the midsagittal suture was successfully opened.

2. T When root structure is penetrated by a temporary anchorage device, cementum repair is likely to occur over time.

3. T A recent study shows that if adenoidectomy is performed in conjunction with Le Fort I osteotomy and advancement, a significant increase in the nasopharyngeal airway will occur.

4. T The American Academy of Oral and Maxillofacial Radiology recommends cross-sectional imaging for assessment of implant sites and suggests that cone-beam CT is the best way to get this information.

5. F A recent study has shown that there is no significant increase in periodontopathogenic bacteria in the gingival sulcus following the placement of orthodontic appliances in adolescents.

6. T Just like in many 2D landmark studies, Schlicher et al found that in 3D, the sella landmark shows excellent precision.

7. T Having the "perfect" team in your office is not necessary for building a successful practice.

8. F Researchers have shown that placing a bone graft and membrane over a mandibular third molar extraction site will have a minimal effect on improving periodontal health distal to the adjacent second molar.

9. F A laboratory study by Hirai et al found no more torque delivered with wire ligation compared to elastic ligation under any of their test conditions.

10. F In order to reduce the presence of white spot lesions, there is no difference between etching for 15 seconds versus 30 seconds.

11. T Autotransplantation of completely erupted teeth in experimental animals requires root canal therapy and orthodontic force appliance 2 weeks after autotransplantation to reduce root resorption, enhance success, and prevent ankylosis.

12. F Common at-home bleaching procedures result in the loss of calcium and phosphorus in tooth enamel.

13. T The use of thermoplastic retainers increases the likelihood of *Streptococcus mutans* and *Lactobacillus* accumulation on tooth surfaces.

14. T Rapid maxillary expansion results in an increase in nasal cavity volume.

15. T Researchers have recently shown that placing platelet-rich plasma in third molar extraction sockets compared to nongrafted control sites accelerates the formation and regeneration of alveolar bone during the first 6 months.

16. T During the first 4 months of treatment, an indirect bonding technique can be valuable in reducing plaque accumulation and white spot lesions in patients.

17. T The difference in profile change between extraction and nonextraction in borderline crowding cases is primarily realized in the perioral area.

18. T More instruments can be accommodated in a sterilizer cycle by using pouches rather than wrapped cassettes.

19. T According to a discussion of tooth replacement options for traumatically lost teeth, resin-bonded bridges have a 5-year survival of >85%.

20. T When implant supported teeth are designed, lower cusp inclinations should be favored to minimize lateral loading on the implant.

Practical Reviews

Oakstone Publishing, LLC
100 Corporate Parkway • Suite 600
Birmingham, AL 35242
205-991-5188
1-800-633-4743
www.practicalreviews.com
service@oakstonepub.com