Practice Leaders Must Strive for Clarity, Consistency, Good Attitude

Leadership Mistakes Doctors Make and How to Fix Them.
Joan Garbo, BA, Med

As practice owners, making leadership mistakes is normal. Some common mistakes are use of an autocratic management style, lack of clarity in communications, and lack of consistency in policy enforcement.

As practice owners, making leadership mistakes is normal. Developing your leadership skills will reward you with financial gains and a windfall of joy and fulfillment. **Mistake #1:** If your management style is autocratic, a deep divide will be generated between you and the team. While you should not be friends with your team, you should be friendly, compassionate, and empathetic toward them. As the leader, you must display humility, clarity, and courage. Your goal is to cultivate a team of practice stakeholders, not minions. **Mistake #2:** A lack of clarity in communications is another common mistake. The people you hire are an extension of you, so you must (1) clearly communicate your vision and mission and (2) train employees as to exactly how that works. The mission statement tells your team what you value and the principles that guide your practice. Actively review the mission statement with your team every day. **Mistake #3:** Often, doctors hire people just to fill a position instead of hiring people to fulfill their vision. Look first at a candidate’s core values, especially integrity, accountability, contribution, and gratitude. Consider testing with the Wonderlic cognitive ability tests (assesses learning aptitude, problem-solving), the Personalysis Profile (assesses motivation, drive, intellect), and the 4 colors personality test (assesses situational responses). **Mistake #4:** Another common mistake is lack of consistency in your requests and orders, enforcement of policies, follow-through, and holding others accountable. Lack of consistency can erode teamwork. As the leader, you must consistently enforce and follow the rules. **Mistake #5:** Remember that "attitude is everything." Doctors often overlook the need to train the team on how to be! Attitude is a critical factor in creating a good practice. If the practice is not a happy place, patients will go elsewhere. Your patients want to feel special and appreciated, as do you and your team. As the leader, you must ensure the practice's emotional space. The 3 keys to creating and maintaining healthy relationships are (1) do no harm, (2) tell no lies, and (3) resolve tolerances. **Mistake #6:** Tolerating the intolerable in an employee is another common mistake. Many doctors express regret for keeping poor employees too long. Give people direction, coaching, and sufficient chances to succeed, but when all efforts fail, let them go! **Mistake #7:** Doctors often believe that paychecks and bonuses are sufficient for motivating team members and making them feel appreciated. However, bonuses can be detrimental. The author of *Drive: The Surprising Truth About What Motivates Us* explains that people are motivated by autonomy, purpose, and mastery. Praise is one of the most effective tools for training, improving performance, and creating employee loyalty. What's more, someone who feels appreciated does more than expected. Hearing praise is one of the most uplifting things a team member can receive. Remember, your attitude of gratitude determines your altitude. (Reviewer-).

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Keywords: Practice Management, Doctor's Leadership Role, Common Leadership Mistakes

Print Tag: Refer to original journal article
Limited Research on Effectiveness of Surgical Interventions to Accelerate Orthodontic Tx

Surgical Adjunctive Procedures for Accelerating Orthodontic Treatment.

Fleming PS, Fedorowicz Z, et al:

Cochrane Database Syst Rev 2015; 6 (June 30): CD010572

Surgically assisted orthodontic subjects had 0.61 mm more movement for the first month and 2.03 mm more movement after 3 months compared to conventional subjects.

**Background:** There is great interest in techniques to shorten the duration of orthodontic treatment. Both surgical and nonsurgical methods have been proposed in this effort to accelerate tooth movement and thus reduce treatment length.

**Objective:** To review the literature and assess the quality of the available articles concerning the effects of surgically assisted orthodontics on the outcome and duration of orthodontic treatment.

**Methods:** A number of electronic databases were searched up until September 2014 for clinical and controlled trials that evaluated the effect of surgical adjunctive procedures for accelerating tooth movement compared with conventional treatment (no surgical adjunctive procedure). The articles were assessed for treatment effect and heterogeneity with reference to both clinical and methodological factors.

**Results:** 4 randomized controlled trials were selected from 1076 references, with a total resulting sample of 57 subjects (aged 11 to 33 years). The surgical procedures evaluated were all corticotomies performed to enhance orthodontic space closure or ectopic maxillary canine alignment. One of the studies assessed the effect of repeated surgical procedures. The primary outcome assessed in the evaluated studies was the rate of tooth movement, with pain assessed in 1 paper and periodontal effects in another. None of the studies were deemed to meet the criteria of having a low risk of bias. When compared with conventional treatment, tooth movement was found to be slightly faster with surgically assisted orthodontics with 0.61 mm more movement for the first month and 2.03 mm more movement after 3 months. Periodontal health was assessed in 1 study, with no significant differences found between the operated and nonoperated sides other than significantly higher gingival index scores on the operated side. One study assessed pain and no significant differences were reported between a surgical and nonsurgical group undergoing appliance activation. Secondary outcomes of patient satisfaction, stability, improved occlusion, and adverse events were not measured. The investigators suggested that their results and conclusions should be interpreted with caution because of the small number of included studies.

**Conclusions:** Limited research is available in the reviewed literature concerning the effectiveness of surgical interventions to accelerate orthodontic treatment. Based on the small number of participants, these surgical procedures do appear to result in slightly faster tooth movement in the short term.

**Reviewer’s Comments:** The authors suggested that the reviewed available evidence is of low quality, which hopefully will be enhanced by future well-designed research over the full course of treatment to clarify the effects and benefits of these surgical approaches. They also felt that there was evidence of a potential acceleration of tooth movement and a possible benefit with these procedures that remains to be confirmed.

(Reviewer-John Kanyusik, DDS, MSD).

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Keywords: Accelerating Orthodontic Treatment

Print Tag: Refer to original journal article
The Best Wire to Use for a Bonded Retainer Is a 5-Stranded 0.215-Inch Wire

Multistranded Wire Bonded Retainers: From Start to Success.

Zachrisson BU:


Extended retention periods of ≥10 years might be beneficial while waiting for third molars to erupt.

**Background:** The most common form of retention in the United States is a combination of a maxillary Hawley appliance and a mandibular bonded lingual appliance. What is the best way to construct a bonded retainer?

**Objective:** To discuss the background and evolution of multistranded fixed retainers and to present the author's clinical recommendations for their use. **Discussion:** The concept that adhesive materials combined with stainless steel wires might be useful for orthodontic retention was introduced in the mid-1970s. Dr Zachrisson's experience originated from clinical experiments with direct contact splinting and using sealants and composite resins to splint the contact points of the maxillary and mandibular incisors and canines without using wire. However, the sealant bridges were found to be too weak. This led him to conclude that a bonded retainer must have some elastic properties that lead to the use of multistranded wires. In 1991, Dr Zachrisson reported that the optimal retainer wire when the wire is bonded to all teeth in a segment would be a 5-stranded 0.0215" wire. This wire resulted in fewer fractures and loosenings than thinner or 3-strand wires of the same thickness. To be successful, he emphasizes that these fixed wires must fit accurately; therefore, he shapes them on a plaster model rather than attempting to shape them intraorally. He notes that the success rates decreased dramatically when a maxillary multistranded retainer was bonded not only to the 4 incisors but also to the canines, the critical area being the contacts between the lateral incisor and the canine. Therefore, the optimal maxillary retainer for most young and adolescent patients should be a 4-unit retainer bonded to the incisors. Dr Zachrisson concludes that the use of permanent retention should be restricted to orthodontic patients who really need it, such as those with periodontal tissue breakdown for whom the bonded retainer serves a dual purpose of preventing unwanted tooth movements and acting as a stabilizing periodontal splint.

**Conclusions:** The most effective bonded retainer wire is a 5-stranded 0.0215" wire.

**Reviewer's Comments:** I'm not sure there is anyone who has a longer research experience with the use of bonded retainers than Dr Bjorn Zachrisson. Because of this, sharing the results of his work is a significant contribution to our specialty. Many successful orthodontists that I know use a round stainless steel retainer wire bonded only to the mandibular canines for mandibular retention. It would be interesting to see the results of a long-term study comparing the performance of these 2 types of fixed retention. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Multistranded Retainers

Print Tag: Refer to original journal article
Impacted Canines Associated With Reduced Ridge Dimensions


Tadinada A, Mahdian M, et al:

Eur J Orthod 2015; 37 (December): 596-602

The alveolar ridge bone height and width as well as the arch perimeter can be expected to be reduced on the side of a palatally impacted canine.

Objective: To investigate the vertical and transverse dimensions of alveolar bone associated with palatally impacted maxillary canines.

Design: Retrospective split-mouth study.

Methods: Cone beam CT (CBCT) scans of 207 orthodontic patients imaged for the evaluation of ectopic canines were reviewed for cases with unilateral palatal impaction of a maxillary canine, without a retained primary canine, and the contralateral canine fully erupted. The scans were initially segmented and reconstructed to include 2 fiducial lines to allow for standardize orientation and measurement. The buccal-palatal width of the alveolar ridge was measured in the sagittal sections at 2, 6, and 10 mm apically to the alveolar crest. The alveolar height was measured from the level of the crest to the floor of the nasal fossa. On the impacted side, the measurements were made at the center of the edentulous space, and the non-impacted side was measured at the center of the canine. Two investigators working independently performed all measurements, which were repeated again after a 2-week interval.

Results: The scans of 39 patients (23 females, 16 males; mean age, 17 years) met all eligibility criteria and were included for final analysis. The inter-examiner reliability for the various measurements ranged from moderate to high. The mean alveolar height and arch perimeter was significantly ($P <0.05$) smaller for the impacted compared to the non-impacted sides. Ridge width was smaller on the impacted side only at 2 mm below the crest, while no differences between sides were found for ridge width at 6 mm and 10 mm below the alveolar crest. There was no statistically significant difference in the distribution of the outcomes between genders.

Conclusions: Compared to the unaffected side, there are significant decreases in alveolar ridge dimensions and in the arch perimeter on the side of palatally impacted maxillary canines.

Reviewer’s Comments: The study, though limited by a relatively small sample size, was able to demonstrate with CBCT data that the palatal impaction of a canine is associated in significant reductions in the alveolar ridge in 3 dimensions. However, this finding is rather intuitive, so I would be more interested in knowing if the impaction is the cause or result of this reduced bone volume. Hopefully this more interesting question can be answered with similar studies in the future. (Reviewer-Benjamin T. Pliska, DDS, MS, FRCD(C)).

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Keywords: Impacted Canines, Alveolar Bone

Print Tag: Refer to original journal article
Are Archwire Sizes Accurate?

Comparative Analysis of Real and Ideal Wire-Slot Play in Square and Rectangular Archwires.

Lombardo L, Arreghini A, et al:

Angle Orthod 2015; 85 (September): 848-858

Some of the actual archwire sizes are significantly different than the sizes declared by the manufacturers, with a range of 6.5% smaller to 5.0% larger.

Background: In order for straight wire edgewise systems to predictably move teeth, the archwire dimensions and bracket slot size must be precise and standardized.

Objective: To assess the real archwire dimensions and edge bevel of square and rectangular archwires and the effects of the play of archwires and the bracket slot.

Methods: 43 archwires from different manufacturers of different alloys and various dimensions and cross-sections were selected. The height, width, and edge bevel of each selected wire was measured, and the mean of the 3 samples was calculated for each archwire type and compared statistically to the manufacturer's stated dimensions. The cross-sections of the wires were examined microscopically to assess the curvature of the edge bevels in order to calculate the actual magnitude of the wire play in the bracket slot as compared to the ideal value. This rounding of the wire edges increased the amount of play in the bracket slot.

Results: The measured height was greater than claimed in 21 archwires and smaller in 22. The height difference ranged from 4.0% larger to 6.5% smaller. The width was greater than claimed in 18 wires and smaller in 25. The width differences ranged from 5.0% larger to 2.3% smaller. The analysis of the archwire play in the bracket slot was found to be significantly greater than the ideal in all of the tested wires. The range of additional play compared to the ideal was from 1° to >17°. The curvature of the wire edge bevels on cross-section varied within each archwire, which increased the play between the wire and the bracket slot significantly. There were some variations in dimensional discrepancies between the manufacturers, but the differences between real and ideal slot play were highly significant for all manufacturers tested.

Conclusions: Some of the actual archwire sizes are significantly different than the sizes declared by the manufacturers, with a range of 6.5% smaller to 5.0% larger. The curvature of each wire's beveled edge on cross-section was shown to differ, resulting in increased real play between the archwire and slot as compared to the manufacturer's ideal. The real archwire-slot play was greater than the play stated by the manufacturers, with a range of 1.0% to 17.4% greater.

Reviewer's Comments: With previous investigations indicating a general imprecision with stated slot sizes in both 0.018" and 0.022" bracket systems, this information on the imprecision of archwire sizes should give us pause. In spite of our various "straight wire" appliances, we need to be critically observant when finishing our treatments and not be surprised that tooth positions require individual wire adjustments because of variability in tooth morphology, bracket positions, and the imprecision of the bracket slot and archwire sizes. (Reviewer- John Kanyusik, DDS, MSD).

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Keywords: Archwire Sizes

Print Tag: Refer to original journal article
Is Bracket Placement With a Boone Gauge Accurate?

Evaluation of the Vertical Accuracy of Bracket Placement With the Boone Gauge.
Mota Júnior SL, de Andrade Vitral J, et al:


Vertical positioning of brackets is less accurate with incisors when compared with canines and premolars.

**Background:** A key element of achieving excellent clinical orthodontic results is the accuracy of bracket placement. If you use a Boone gauge to place your brackets, does it result in accurate bracket placement?

**Objective:** To measure the accuracy of bracket placement using a Boone gauge.

**Participants:** 4 groups of 6 participants each were developed. Group 1 consisted of undergraduate dental students, group 2 graduate students, group 3 orthodontists with a maximum of 5 years of clinical experience, and group 4 orthodontists with >5 years of clinical experience.

**Methods:** A typodont with a Class I crowded malocclusion was developed and duplicated for bracket placement by each of the participants using a Boone gauge for guidance with the goal of placing brackets 4 mm from the incisal edge or cusp tip. A standardized photographic system was used to measure the accuracy of bracket placement, which was statistically analyzed and compared between the 4 groups.

**Results:** The means of group 4, the professionals with >5 years of clinical experience, and group 2, the graduate students, demonstrated a statistically significant difference when measured against the goal of 4 mm placement. Group 1, consisting of undergraduate dental students, demonstrated the most accurate placement.

**Conclusions:** Experience in orthodontic treatment does not appear to be a significant factor in accurately positioning brackets with a Boone gauge.

**Reviewer’s Comments:** I should point out that the significant difference recorded in this study was a statistically significant difference and not necessarily a clinically significant difference. I believe the study would have benefited greatly by comparing >1 bracket placement instrument and also including a group that visually placed brackets without using a guidance instrument. A study like this would provide much more clinically relevant results and provide a basis for practitioners to use when evaluating their method of bracket placement. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Boone Gauge, Accuracy

Print Tag: Refer to original journal article
Though wide individual variation is present, a low mandibular plane angle and small hyoid bone distance tend to predict greater improvement when treating obstructive sleep apnea with oral appliances.

**Background:** Mandibular advancement devices (MADs) have been shown to be an effective treatment modality in some, but not all, obstructive sleep apnea (OSA) patients. Methods to predict treatment outcome using readily available measurements from lateral cephalometry are highly desirable in order to improve treatment efficiency.

**Objective:** To summarize the current literature on the predictive value of cephalometry for OSA treatment success with oral appliances.

**Methods:** Several literature databases were searched with relevant terms for studies published after 1990 that focused on the effects of MAD treatment assessed by a full sleep study in adult OSA patients who had undergone a baseline cephalometric evaluation. Following PRISMA guidelines, 2 researchers independently screened the initial search results for relevant articles, which were then reviewed in full. The articles included for final analysis were determined by consensus, after which data extraction and quality assessments were performed.

**Results:** Following the screening and review process, 13 articles were included in the final analysis, and were scored as medium to high quality. A meta-analysis could not be performed due to significant heterogeneity of the study (sleep and cephalometric) data, so correlations between cephalometric anatomy and treatment outcome were reported. The 2 most commonly reported features correlating with treatment success were low mandibular plane angle/decreased anterior facial height and small hyoid distance to the mandibular plane.

**Conclusions:** Due to weak correlations and inconsistent findings, no significant clinical treatment recommendations can be made on the basis of this review. However, the mandibular plane angle and hyoid-to-mandible plane distance were found to have some predictive value for oral appliance effectiveness in adult OSA patients.

**Reviewer’s Comments:** While this review does provide a good summary of our current understanding of cephalometric prediction of treatment success with an oral appliance, the take-home message is best stated by the authors themselves: “further studies are required before the fragmental literature…can be translated into evidence-based clinical recommendations.” (Reviewer-Benjamin T. Pliska, DDS, MS, FRCD(C)).

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Keywords: Cephalometrics, Treatment Outcome, Mandibular Advancement Splints

Print Tag: Refer to original journal article
What Is the Prevalence of Malocclusions From Primary to Early Permanent Dentition?

Prevalence and Change of Malocclusions From Primary to Early Permanent Dentition: A Longitudinal Study.
Dimberg L, Lennartsson B, et al:

Angle Orthod 2015; 85 (September): 728-734

Self-correction occurred for anterior open bite, sagittal malocclusions, and posterior crossbite, while deep bite incidence, contact point displacements, and spacings increased.

**Background:** The prevalence of malocclusions in growing subjects has been previously reported with wide ranges at various ages and in a number of ethnic groups. Longitudinal studies to assess changes in the prevalence of malocclusion as subjects age would be helpful in treatment-planning decisions.

**Objective:** To assess the prevalence, self-correction, development of new malocclusions, orthodontic treatment need, and the possible influences of habits, breathing disturbances, and allergies in a group of children from primary to early permanent dentition.

**Design/Methods:** This was a longitudinal study of 277 children who were examined for malocclusion and orthodontic treatment needs at ages at 3.0, 7.0, and 11.5 years. A questionnaire, interview, and dental records were used to gather information on sucking habits, breathing disturbances, allergies, dental trauma, and orthodontic treatments.

**Results:** At least 1 malocclusion was found in 71% of participants at age 3.0 years, 56% at age 7.0 years, and 71% at age 11.5 years. At least 2 malocclusions were found in 18% at 3.0 years, 7% at 7.0 years, and 37% at 11.5 years. The most common malocclusion at 3.0 years was anterior open-bite, followed by Class II, excessive overjet, and unilateral posterior crossbite. Class II and excessive overjet were the most prevalent malocclusions at age 7 years. At 11.5 years, contact point displacement was the most common malocclusion followed by excess overjet. Between ages 3.0 and 11.5 years, significant self-correction occurred for anterior open bite, sagittal malocclusions, and posterior crossbite, while deep bite incidence, contact point displacements, and spacings increased. At 11.5 years, 22.0% had a severe or extreme orthodontic treatment need and 54.5% showed little or no need. Habits and breathing disturbances decreased with age and had no associations with malocclusions at 11.5 years.

**Conclusions:** By age 11.5 years, 43.5% of this sample had significant malocclusions and orthodontic treatment needs. There were a substantial number of malocclusion types that self-corrected and others that emerged from primary to early permanent dentition.

**Reviewer's Comments:** The findings in this study are helpful in clarifying the prevalence and areas of malocclusion at 3 specific ages in young patients. The information concerning the specific malocclusions that have a tendency to self-correct, those that typically do not change, and malocclusions that may worsen or develop at a later age should have an impact on the rationale for treatment at specific ages. (Reviewer-John Kanyusik, DDS, MSD).

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Keywords: Malocclusion Prevalence

Print Tag: Refer to original journal article
Defective Restorations -- Repair or Replace?

Repair or Replacement of Restorations: A Prospective Cohort Study by Dentists in the National Dental Practice-Based Research Network.

Gordan VV, Riley JL III, et al:

J Am Dent Assoc 2015; 146 (December): 895-903

Repairs of restorations are less likely to need aggressive treatment when compared with replaced restorations.

**Background:** If you have a defective restoration, there are 2 basic alternatives for treatment. One is to repair the restoration and the second is to replace it. What difference does it make if one or the other of these alternatives is chosen?

**Objective:** To evaluate if there were significant differences if defective restorations were repaired or replaced.

**Design:** Prospective cohort study.

**Methods:** The sample for this study consisted of recorded data on 5889 restorations recorded by 195 dentists who participated in the Dental Practice-Based Research Network. Each dentist documented the treatment of patients who had defective restorations either repaired or replaced in their practice. The status of the restoration was evaluated 12 months after placement and classified as either acceptable or non-acceptable. These data were statistically analyzed.

**Results:** Additional treatment at 1 year was more likely if the defective restoration had been repaired, which occurred 7% of the time compared with 5% for replaced restorations. However, repaired restorations were less likely than replaced restorations to need aggressive treatment.

**Conclusions:** Repaired defective restorations are less likely to require aggressive treatment compared to replaced restorations.

**Reviewer's Comments:** The establishment of the Dental Practice-Based Research Network has provided a means of collecting valuable clinical research data, and the dentists who participate in this Network are to be commended. Because of the large amount of documented clinical data that they provide, more valid treatment decisions can be made by practicing dentists. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Repair or Replacement of Restorations

Print Tag: Refer to original journal article
Infant Orthopedic Treatment Does Not Improve Maxillary Arch Dimensions

Transverse Dental Arch Relationship at 9 and 12 Years in Children With Unilateral Cleft Lip and Palate Treated With Infant Orthopedics: A Randomized Clinical Trial (DUTCHCLEFT).

Noverraz RL, Disse MA, et al:
Clin Oral Investig 2015; 19 (December): 2255-2265

There is no short- or long-term benefit to orthopedic treatment using passive maxillary plates of infants with unilateral cleft lip and palate.

Background: Infant orthopedics, where an appliance is used to approximate or passively align the cleft, has been advocated as a means of improving the esthetic and functional outcomes of cleft repair.

Objective: To assess the long-term effects of infant orthopedics on maxillary dental arch relationships of children with unilateral cleft lip and palate.

Design: Prospective, randomized controlled trial.

Participants: 54 otherwise healthy children with complete unilateral cleft lip and palate who were enrolled in the DUTCHCLEFT trial.

Methods: As part of the larger trial, infants were randomly assigned to receive infant orthopedic treatment in the form of a passive maxillary plate during the first year of life or no treatment. Other than the infant orthopedics, all interventions were standardized and kept the same between groups. Lip surgery was performed at 18 weeks of age and the soft palate was closed at the age of 52 weeks, at which time the orthopedic treatment was stopped in the treatment group. At around 9 years of age, the hard palate was closed in combination with alveolar bone grafting. Patients were recalled at 9 and 12 years of age and the transverse and anterior dental arch relationships were assessed on dental casts by calibrated examiners using a segmental scoring system.

Results: The average duration of appliance use in the treatment group was 50 weeks. Some of the patients were lost to follow-up, resulting in 22 controls and 22 children from the treatment group presenting for 12-year follow-up. At both the 9- and 12-year time points, no significant differences in total arch constriction were found between the groups. The cleft side showed a higher frequency and severity of crossbites compared to the non-cleft side at both the 9- and 12-year time points.

Conclusions: Transverse and anterior maxillary dental arch relationships at 9 and 12 years of age do not differ between unilateral cleft lip and palate children treated with or without infant orthopedics.

Reviewer's Comments: This excellent study was just a small component of the larger DUTCHCLEFT trial, which has been instrumental in our understanding of the effects of early orthopedic treatment of cleft lip and palate infants. The other studies from this trial have also shown that infant orthopedics using passive maxillary plates does not improve feeding, general body growth, parents’ satisfaction, esthetic outcome, maxillofacial growth, speech, or language development during the first 6 years of life. (Reviewer-Benjamin T. Pliska, DDS, MS, FRCD(C)).

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Keywords: Infant Orthopedics, Randomized Controlled Trial

Print Tag: Refer to original journal article
Is CAT Effective in Controlling Orthodontic Tooth Movement? Yes and No

Rossini G, Parrini S, et al:

Angle Orthod 2015; 85 (September): 881-889

Clear aligners are effective in controlling anterior intrusion, posterior buccolingual inclination, and upper molar bodily movements up to 1.5 mm.

Background: Many patients are electing to receive orthodontic treatment utilizing clear aligners. They are an aesthetic and removable alternative to fixed orthodontic appliances. Questions have been raised about aligner effectiveness in orthodontic tooth movements.

Objective: To review the current scientific literature about the efficacy of clear aligner treatment (CAT) in controlling orthodontic tooth movement.

Design/Methods: This was a systematic search of the medical literature from January 2000 to June 2014 to identify all peer-reviewed articles potentially relevant to CAT effectiveness. This review's outcome was the efficacy of CAT in accomplishing intrusion, extrusion, rotation, tipping, and alignment tooth movements. Case reports were excluded and the methodological quality of the selected articles was assessed and ranked independently by 2 investigators.

Results: 11 relevant articles were selected from the literature search: 2 studies were randomized clinical trials, 5 were prospective non-randomized, and 4 were retrospective non-randomized. The methodological quality was judged to be moderate for 6 studies and limited for 5. The resulting sample size from the selected studies was 480 patients all treated with Invisalign aligners. The summary of tooth movement effects is as follows. Intrusion was achieved with a mean accuracy or percentage of predicted tooth movement <50%. Extrusion was the least accurate tooth movement at 30% accuracy. Rotation accuracy ranged from 55% for maxillary centrals to 19% for maxillary canines. Mesiodistal and buccolingual tipping was near 50% accuracy. Distalization of upper molars had the highest predictability of 88% when a bodily movement up to 1.5 mm was prescribed. For alignment, there were improvements in mean Peer-Assessment Rating score and Little's Irregularity Index with CAT.

Conclusions: Most of the reviewed studies were of limited quality with methodological concerns. Thus, evidenced-based conclusions could not be made. CAT is effective in controlling anterior intrusion, posterior buccolingual inclination, and upper molar bodily movements up to 1.5 mm. CAT is not effective in controlling anterior extrusion, anterior labiobuccal inclination, and rotations, particularly of rounded teeth. Auxilliary attachments, elastics, and interproximal reduction all can be helpful in CAT.

Reviewer’s Comments: The authors suggest that the reported information in this review should be approached cautiously because of the limited number, quality, and heterogeneity of available studies on aligners. I look forward to well-designed investigations into aligner treatment that hopefully will provide comparative evidence that we can use and share with our patients in the discussion of their treatment options. (Reviewer-John Kanyusik, DDS).

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Keywords: Clear Aligners, Orthodontic Tooth Movement

Print Tag: Refer to original journal article
One application of light-cured fluoride varnish provides 90% to 100% protection, even after 3 months.

**Background:** Preventing demineralization around orthodontic brackets has been a constant challenge for orthodontists. How do you reduce the occurrence of demineralization around orthodontic brackets in your practice?

**Objective:** To evaluate the effect of a single application of Clinpro XT, a light-curable fluoride varnish, on enamel demineralization adjacent to orthodontic brackets.

**Participants:** 38 patients who were scheduled to have 4 first premolars extracted for orthodontic treatment.

**Methods:** 2 first premolars in each patient were assigned to a control group and the other 2 to an experimental group. Each of the first premolars was bonded with a metal bracket containing a T-loop. In the experimental group, a light-cured fluoride varnish was placed on the enamel surrounding the bracket; the control group received no treatment. At 15, 30, 45, 90, and 120 days, brackets were debonded and the premolars were extracted. Polarized light microscopy was used to evaluate enamel demineralization around the brackets.

**Results:** No demineralized enamel lesion was seen during the study period in the experimental group, except for 2 teeth in the 90-day group and 1 tooth in the 120-day group. In the control group, the depths of the demineralized enamel lesions increased from 30 to 120 days, and there was a significant difference in the depths of the demineralized lesions between the 2 groups.

**Conclusions:** A single application of Clinpro XT can prevent demineralization in long-term clinical situations up to 120 days and may be a useful alternative in non-compliant and high-risk patients.

**Reviewer's Comments:** I found the results of this study to be very impressive. There appears to be no question that the use of a light-cured fluoride varnish around orthodontic brackets can significantly reduce demineralization and can be helpful, particularly in patients with a history of poor oral hygiene. (Reviewer- John S. Casko, DDS, MS, PhD).

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Keywords: Fluoride Varnish, Enamel Mineralization

Print Tag: Refer to original journal article
Bone-Anchored Surgically Assisted Maxillary Expansion Similar to Traditional Appliance

One-Stage Tooth-Borne Distraction Versus Two Stage Bone-Borne Distraction in Surgically Assisted Maxillary Expansion (SARME).

Seeberger R, Abe-Nickler D, et al:


Despite being more invasive and requiring a second surgical procedure, use of a bone-borne expansion appliance resulted in only minor improvements over traditional tooth-borne appliances.

Objective: To compare the dental and skeletal effects of tooth-borne and bone-borne expansion appliances used for surgically assisted maxillary expansion.

Design: Retrospective quasi-experimental study.

Methods: 33 healthy, consecutively treated orthodontic-orthognathic surgery patients undergoing surgically assisted maxillary expansion were included. A total of 19 patients (mean age 22 years, 11 females) were treated with the bone-borne appliance, and the tooth-borne group was comprised of 14 patients (mean age 30 years, 8 females). Both appliances were inserted at the time of surgery, which consisted of a subtotal Le Fort I osteotomy, including osteotomy of the pterygoid process. The tooth-borne appliances were banded on the first premolars and first molars, while the bone-borne appliance was screwed directly to the palatal bone at the level of the second premolars. Both types of appliances were activated by the patients starting 5 to 7 days after surgery at 2 turns a day until correction of the posterior crossbite, after which the appliances remained in the mouth for 3 months. Cone beam CT scans were taken before and 3 months after expansion was complete, at the time of appliance removal. Various skeletal and dental variables and transverse distances were measured using OsiriX imaging software, and pre- and post-treatment values were assessed and differences between groups were compared.

Results: The average amount of appliance expansion for the tooth-borne and bone-borne groups was 5.8 mm and 5.0 mm, respectively. Postoperative healing and follow-up were uneventful in both groups. Overall, there was no difference between groups in expansion or tipping measured at the first premolar. However the tooth-borne group had greater expansion of the first molars with more tipping, while the bone-borne group displayed greater bony expansion of the nasal floor.

Conclusions: While both tooth-borne and bone-borne appliances effectively treated maxillary constriction, the bone-borne devices produced greater widening of the skeletal nasal floor and fewer dental side effects at the first molars.

Reviewer's Comments: Though implied by the title, the impact of the second surgery required to remove the bone anchored appliance was not discussed, despite this being the major drawback of its use. It should also be noted that the tooth-borne appliance group was on average 8 years older than the bone-borne group. This significant difference in age would result in more mature suture formation, which may be responsible for the differences shown. Hopefully a randomized prospective trial taking into account this and other significant confounding factors can be conducted in the future so the differences between these appliances can be determined with better clarity. (Reviewer-Benjamin T. Pliska, DDS, MS, FRCD(C)).

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Keywords: Crossbite, Surgically Assisted Palatal Expansion

Print Tag: Refer to original journal article
Facial Sexual Dimorphism in Children Assessed

*Development of Facial Sexual Dimorphism in Children Aged Between 12 and 15 Years: A Three-Dimensional Longitudinal Study.*

Koudelová J, Bružek J, et al:

Orthod Craniofac Res 2015; 18 (August): 175-184

Separations in facial form between males and females became apparent at age 14 years and more pronounced at age 15 years.

**Background:** Quantitative evaluation of facial morphology is an important part of orthodontic diagnosis and treatment planning. Typical facial morphology is generally accepted to vary with gender and the stage of growth of the individual.

**Objective:** To utilize 3D optical scanning to assess sexual dimorphism of facial form and shape variation between typical female and male faces from the ages of 12 to 15 years.

**Methods:** Facial surface scans were obtained from 30 healthy Caucasian children (17 boys, 13 girls). In total, 120 uniform facial 3D optical scans were evaluated longitudinally over a 4-year period between the ages of 12 and 15 years. All subjects had a normal body mass index and no history of facial trauma, facial anomalies, or previous orthodontic treatment. Geometric morphometric and statistical methods were used to analyze both facial shape and form.

**Results:** No significant differences were found in facial shape in any age category, and because the female faces were within the area of male form variability, there were no differences in facial form in those aged 12 and 13 years. A statistically significant small differentiation in facial form occurred between the genders after age 14 years. The main differences were associated with size, with males proportionally larger. As compared to girls, typically boys had more deeply set eyes, flatter cheek areas, and more prominent eyebrow ridges as well as nose and chin areas.

**Conclusions:** The variability in male facial form was greater than in females. Facial form was very similar between the sexes at ages 12 and 13 years. Separations in facial form between males and females became apparent at age 14 years and more pronounced at age 15 years.

**Reviewer's Comments:** Additional investigations with larger sample sizes and older age evaluations would be informative. This study's last assessment was at age 15 years, and the typical male still has considerable facial growth potential, which may have further differentiated the facial sexual dimorphism. (Reviewer-John Kanyusik, DDS, MSD).

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Keywords: Facial Sexual Dimorphism

Print Tag: Refer to original journal article
Hawley Appliances Can Be Fabricated Without the Use of Intraoral Impressions

Fabrication of a Resin Appliance With Alloy Components Using Digital Technology Without an Analog Impression.

Al Mortadi N, Jones Q, et al:


In the near future, many types of intraoral appliances will be fabricated from intraoral scans.

**Background:** Computer-aided design/additive manufacturing (CAD/AM) has allowed the fabrication of crowns and other restorations in restorative dentistry without the need for an impression. Does this technology have potential benefits for orthodontics?

**Objective:** To describe the fabrication of a resin appliance incorporating wire components without the use of an analog appliance and dental casts by using an intraoral scanner and computed technology to build the appliance. **Discussion:** This descriptive article detailed the individual steps and computer program technology that were required to fabricate an acrylic Hawley appliance, which contained 2 Adams clasps and a labial bow. Clearly, fabricating the metal aspects of a Hawley retainer and embedding them in acrylic requires very sophisticated computer technology. I have to admit that many of the terms used in this article were way over my head, but fortunately there were numerous photographs that helped to depict the different steps in the fabrication process. After the fabrication of the Hawley appliance without impressions, it was tried in the mouth and fit. CAD/AM technology has been used in restorative dentistry for a number of years to manufacture crowns and other restorations, and the authors of this article believe that it now has the potential to fabricate a number of different orthodontic appliances. It would not surprise me if, in the near future, the technology described in this article eliminated the need for impressions and plaster models in orthodontic practices. **Conclusions:** Technology is now available to fabricate a Hawley retainer appliance from intraoral digital scans.

**Reviewer’s Comments:** While this article contains very technical computer terms, the many photographs clearly describe the different manufacturing steps. I would suggest that you read this article if you want to gain an understanding of how drastically things will change for orthodontic treatment in the near future. Not only does this technology eliminate the need for intraoral impressions but it also eliminates some of the problems associated with impressions such as bubbles and distortions. (Reviewer-John S. Casko, DDS, MS, PhD).

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Keywords: Hawley Retainer, Digital Fabrication

Print Tag: Refer to original journal article
Eugenol Paste Reduces Dry Socket After Third Molar Extraction

Effectiveness of 0.2% Chlorhexidine Gel and a Eugenol-Based Paste on Postoperative Alveolar Osteitis in Patients Having Third Molars Extracted: A Randomised Controlled Clinical Trial.

Jesudasan JS, Wahab PU, Sekhar MR:


Compared to a chlorhexidine gel, the prophylactic placement of a eugenol paste in the socket following third molar extraction reduces the incidence of pain, infection, and alveolar osteitis.

Background: Alveolar osteitis or dry socket is one of the most common post-surgical complications following the extraction of third molars; however, the best method for preventing its occurrence remains unclear.

Objective: To compare the effects of a 0.2% chlorhexidine gel and a eugenol-based paste on the postoperative incidence of alveolar osteitis in patients having third molars extracted.

Design: Prospective, double-blind, randomized, controlled clinical trial.

Participants: Healthy patients with clinical and radiographic evidence of impacted mandibular third molars, with a negative history of factors (smoking, infection, etc) that would interfere with oral wound healing.

Methods: A total of 270 patients were randomly assigned in equal numbers to receive either 0.2% chlorhexidine gel, or Alvogel, or nothing (control) placed in the extraction socket after tooth removal. Using local anesthetic, the third molars were surgically extracted, with bone removal and tooth sectioning used as needed at the discretion of the surgeon. All extraction sockets were sutured following the procedure. Patients were discharged and prescribed metronidazole and an NSAID analgesic for the next 3 days. Patients were recalled and examined on postoperative days 1, 3, and 7.

Results: The average age of patients was 28 years, and age and degree of tooth impaction were not statistically different between groups. Postoperative infection and pain was worse in the control group, followed by the chlorhexidine and then eugenol groups, and this pattern was consistent over the 7-day period. Nine (10%) of the control group and 2 (2%) of the chlorhexidine group developed alveolar osteitis, with the eugenol group having no cases. The distribution of pain and osteitis was statistically different between the groups. The overall incidence of osteitis was 4% (11/270), which is less than reported previously.

Conclusions: A eugenol-based paste resulted in significantly less pain and incidence of osteitis compared to both chlorhexidine gel and no treatment.

Reviewer's Comments: The strength of this study is the large sample size, which was adequately powered to answer this common question related to the removal of third molars. While patients were randomized, unfortunately the distribution of patients requiring bone removal or tooth sectioning among the groups was not reported, so it is unclear if this may have contributed to the results shown. (Reviewer-Benjamin T. Pliska, DDS, MS, FRCD(C)).

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Keywords: Dry Socket, Post-Surgical Complications

Print Tag: Refer to original journal article
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Orthodontics
Volume 30 Number 7: December 30, 2015
Quiz Code: 33569P

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Quiz Questions

1. Praise is one of the most effective tools for improving employee performance and creating employee loyalty.
   Circle one: True False

2. Tooth movement has been found to be slightly faster with surgically assisted orthodontics with 0.61 mm more movement for the first month.
   Circle one: True False

3. Thinner, 3-stranded wires are more effective than 5-strand wires of the same size for use as bonded retainers.
   Circle one: True False

4. The alveolar bone height and arch perimeter are reduced on the side of palatally impacted canines.
   Circle one: True False

5. The curvature of the archwire edge bevels on cross-section does not affect the play between the wire and the bracket slot significantly.
   Circle one: True False

6. Experience in orthodontic treatment does not appear to be a significant factor in accurately positioning brackets with a Boone gauge.
   Circle one: True False

7. Adult obstructive sleep apnea patients with low mandibular plane angles and shorter hyoid-mandibular plane distances tend to have greater success when treated with mandibular advancing appliances.
   Circle one: True False

8. Oral habits increase from age 3.0 years and are associated with malocclusions at age 11.5 years.
   Circle one: True False

9. Repaired defective restorations are less likely to require aggressive treatment compared to replaced restorations.
   Circle one: True False

10. In children with unilateral cleft lip and palate, there is a higher frequency and severity of crossbites on the cleft compared to the non-cleft side at both 9 and 12 years of age.
    Circle one: True False

11. Extrusion is the least accurate tooth movement for clear aligner treatment.
    Circle one: True False

12. Light-cured fluoride varnish placed around orthodontic brackets does not significantly reduce enamel demineralization.
    Circle one: True False

13. While both tooth-borne and bone-borne appliances effectively treat maxillary constriction, bone-borne devices produce greater widening of the skeletal nasal floor and fewer dental side effects at the first molars.
    Circle one: True False

14. Separations in facial form between males and females become less apparent between the ages of 14 and 15 years.
    Circle one: True False

15. Models are no longer needed to fabricate a Hawley retainer appliance.
    Circle one: True False

16. In a recent prospective, randomized clinical trial, a eugenol paste was more effective than a chlorhexidine gel at preventing dry socket following the extraction of third molars.
    Circle one: True False
Orthodontics
Answers for Volume 30 Number 6: Dental Radiation Safety 2015
Quiz Code: 33511P

1. T  Because of the Compton scatter associated with diagnostic x-ray procedures, tissues that may not be in the direct path of the original x-ray beam can become exposed to radiation.

2. F  Radiation-induced stochastic effects occur only when the radiation absorption in a tissue exceeds a threshold dose.

3. T  In theory, even a single x-ray photon could result in DNA damage leading to a cancer-causing mutation.

4. T  As end-users of x-ray imaging, dental clinicians abide by the no-threshold assumption to consider that even the low doses of radiation we deliver during dental radiography carry a risk of radiation-induced cancer.

5. F  Radiation-induced cancer risks are estimated to be 3 to 5 times higher in adults than in children.

6. T  "Effective dose" estimates the radiation dose that a patient is likely to receive from a specific radiographic procedure.

7. T  The "effective dose" for a set of 4 bitewing radiographs is approximately 5 µSv.

8. T  The "effective dose" of a panoramic radiograph is approximately the same as the "effective dose" of radiation acquired during an airplane flight from Los Angeles to Washington, DC.

9. T  Although radiation doses associated with dental radiography are small, they do carry a small risk of radiation-induced cancer.

10. T  Any dental radiographic examination should be performed only after a full history and a complete clinical examination have been performed.

11. T  In orthodontics, cone-beam CT may be beneficial in cases with impacted teeth, craniofacial syndromes, orthognathic surgical treatment planning, and facial asymmetry.

12. T  Using digital sensors for intraoral imaging can reduce the radiation dose to the patient by as much as 60%.

13. F  For intraoral radiography, the use of rectangular collimation decreases radiation by only 10%.

14. T  During the preimplantation phase of gestation, in utero radiation doses ≥100 mGy can be associated with embryonic lethality.

15. T  During a full-mouth radiographic examination of a pregnant woman, the radiation dose is >100,000 times lower than the radiation threshold required to cause lethal and developmental defects in the fetus.

16. T  For individuals who are exposed to radiation as part of their occupation, the recommended annual radiation dose limit is 50 mSv.