

Critical Discussion and Commentary



E-quiz code: 31875N

Issue Highlights

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

Critical Discussion and Commentary

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Do Not Forget to Graft if You Inferiorly Reposition a Maxilla

Inferior repositioning of a maxilla for patients with vertical maxillary deficiency is unstable without an interpositional graft

By J. Bruce Bavitz, DMD

Based on: Santos SE, Moreira RW, et al. Skeletal Stability After Inferior Maxillary Repositioning Without Interpositional Graft. *Int J Oral Maxillofac Surg* 2012; 41 (April): 477–481.

On occasion, a patient will present to the oral and maxillofacial surgeon needing a maxillary downgraft. This

rather rare dentofacial deformity presents with an edentulous look, strong muscles of mastication and characteristically has a face that tends to age poorly. Much of the literature on this subject is quite old and was done before the common applications of rigid bone plates. In a recent article, authors presented a report of a retrospective study on eight patients. Their premise was that four strong bone plates, two on each side each receiving 2.0 mm diameter screws, might obviate the need for an interpositional bone graft with its extra costs and expense.

The retrospective study was quite simple and involved eight patients, each operated on by the same senior surgeon. To be included in the study, the downgraft needed to be at least 3.0 mm, and I think it is important to note that six of the eight patients also had mandibular procedures. Cephalometric radiographs were taken before, immediately after and at least six months postoperatively, with one independent evaluator tracing five points — anterior nasal spine, A-point, incisor cusp tip, posterior nasal spine and mesiobuccal cusp tip of the first molar. The average age of the patient was 35 years old, and the average inferior move was 4.65 mm at the incisor, 5.32 mm at anterior nasal spine and 4.7 mm at A-point. Measured at least six months postoperatively, the relapse was 1.6 mm at the incisor, which corresponded to a 35% relapse; 2.23 mm at the anterior nasal spine, a 43% relapse; and

2.1 mm at A-point, a 46% relapse. Several patients actually had impactions in the posterior dimension, measured at the

Inferior repositioning of the maxilla or maxillary downgrafts without interpositional bone grafts remains an unstable procedure.

mesiobuccal cusp tip of the molar and posterior nasal spine, and correspondingly had little if any relapse.

I think this means that, even with good strong rigid bone plates, inferior repositioning of the maxilla or maxil-

lary downgrafts without interpositional bone grafts remains an unstable procedure. This is not particularly surprising, as we often open the vertical dimension of occlusion during this procedure and stretch or lengthen the muscles of mastication, which tend to make most patients want to possibly clench down to restore what they feel is their normal vertical dimension. We are also doing this on patients with known strong musculature, further exacerbating the problem. You would probably get some debate among a roomful of oral surgeons as to which interpositional bone graft is superior, but the reality of the matter is there are very little data to suggest which one is superior. Obviously autogenous iliac crest, hydroxyapatite blocks, cadaver patella or iliac crest are all popular choices. As six of the eight patients also had mandibular procedures, a reasonable argument could be made that the relapse would be even greater if the patients' mandibles were intact and fully functional in the immediate perioperative period. This is a simple but well-done study.

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- Describe significant clinical developments and advances in the diagnosis and treatment of diseases and trauma to the facial structures and oral cavity.
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Polyglactin Sutures & Thin KG Increase the Risk of Implant Failures

Consider using silk rather than polyglactin sutures when placing dental implants

By J. Bruce Bavitz, DMD

Based on: Baqain ZH, Moqbel WY, Sawair FA. Early Dental Implant Failure: Risk Factors. *Br J Oral Maxillofac Surg* 2012; 50 (April): 239–243.

In a prospective study conducted between 2006 and March 2010, authors looked at 399 implants placed in 169 patients. All the implants were placed by the same experienced surgeon and at the same university teaching hospital. They concentrated on four different variables — those associated with the patient, the implant itself, the various anatomic places and the operative technique. As the title implied, these were early dental implant failures, and they evaluated success prior to loading the implants with a definitive restoration. All in all, there were about 25 to 30 different variables analyzed, mandating rather sophisticated statistics. The overall average age of the patients was 47 years, and about 4% of the implants failed to integrate.

All the classic variables were assessed such as smoking status, patient's medical history, maxilla versus mandible, male/female, size of the implant, whether it was done in a one-stage or two-stage protocol, placement and grafted bone, bone quality and subjective assessment of fixture primary stability. But they also looked at two unusual variables — whether this operative site was closed with polyglactin sutures versus silk and the width of the keratinized gingiva at the implant insertion site. I mention these latter two variables specifically because, surprisingly, of all the factors looked at, those were the only two statistically linked to implant failure. The third factor that did reach significance was more predictable. Specifically, implants 3.5 mm or less had a slight tendency to increased failures, which many of us would expect. The authors really did not talk too much about why they felt that placing implants in zones of keratinized gingiva 2.0 mm or less might influence success rate, but that was the strongest indicator of implant failure. They also did not say much about why they felt that Vicryl sutures had a higher failure rate than classic silk, mentioning one study where silk actually had a better antimicrobial effect on oral flora than Vicryl, but again the explanation was mostly left up to the imagination of the reader.

There have been numerous studies on the influence of keratinized gingiva (KG) relative to the success of implants. Most of those were done on long-term maintenance, where it was felt that the lack of KG might affect hygiene and predispose the patient to some type of peri-implantitis. Those papers have equivocal and controversial findings. Most readers know that sutures on occasion are recalled for contamination, and I wonder if the polyglactin sutures they were using perhaps were contaminated, although no mention was made that the implants failed due to local site infections. As I am unaware of any other papers ever talking about sutures relative to implant success or failure, it would be interesting to see if this paper is ever repeated.

Key Most Patients Are Able to Discontinue CPAP Use Following MMA Surgery

Subjective patient-based findings may be helpful in the decision-making process for obstructive sleep apnea syndrome patients considering maxillomandibular advancement surgery

By Melanie S. Lang, DDS

Based on: Goodday R, Bourque S. Subjective Outcomes of Maxillomandibular Advancement Surgery for Treatment of Obstructive Sleep Apnea Syndrome. *J Oral Maxillofac Surg* 2012; 70 (February): 417–420.

With obstructive sleep apnea affecting about 4% of middle-aged men and 2% of middle-aged women, it is a significant population problem we as oral and maxillofacial surgeons will encounter on a fairly frequent basis. Obstructive sleep apnea is characterized by frequent episodes of partial to complete airway obstruction that results in multiple arousals from sleep. This is assessed by the apnea/hypopnea index. Sleep, unfortunately for obstructive sleep apnea patients, is not rejuvenating, as they are unable to acquire REM sleep. This subsequently leads to excessive daytime somnolence, which in prior studies has been linked to changes in mood, concentration, memory, personality, morning headaches as well as traffic and workplace accidents. Considering this, obstructive sleep apnea can have significant consequences on many components of life including work, home and interpersonal relationships. Although CPAP is considered the gold standard of treatment for sleep apnea, it is unfortunately poorly tolerated by a number of patients; therefore, long-term compliance may be suboptimal. A major driving force for patients that pursue surgical intervention of any type, including maxillomandibular advancement surgery, is the elimination of CPAP and improvement in their excessive daytime sleepiness.

The objective of this study focused on subjective outcomes and continued use of CPAP following maxillomandibular advancement surgery for obstructive sleep apnea syndrome. This was a prospective study in which a self-administered questionnaire was filled out by 116 patients preoperatively and again at six months postoperatively following maxillomandibular advancement surgery. The study was conducted between February of 2000 and September of 2010. Of the 116 patients, 33 were female and 79 were males. Age ranged from 23 to 68 years, with an average age of 45.6 years. Excessive daytime sleepiness was assessed via the Epworth Sleepiness Scale, as well as further questions that related to snoring, continued CPAP use, witnessed apnea events and overall patient satisfaction.

Based on the Epworth Sleepiness Scale, preoperatively 40% of patients were very sleepy. This corresponded to an Epworth Sleepiness Scale of greater than 16. Preoperatively 32% of the patients were sleepy, corresponding to an Epworth Sleepiness Scale of 10–16, and a total of 28% of the

patients were not sleepy preoperatively, which corresponded to an Epworth Sleepiness Scale of less than 10. Comparing this to postoperatively, 90% of the patients were not sleepy, 9% of the patients were sleepy, and less than 1%, or one patient, continued to be very sleepy. Prior to the surgery, 102 patients utilized CPAP as compared to four patients on a postoperative basis, showing a 96% reduction in necessary CPAP use following surgery. There was a reduction in snoring of 83% and reduction in witnessed apnea events of 94%. Overall, 89% of the patients felt that maxillomandibular advancement surgery was worthwhile, and 95% of the patients reported they would recommend maxillomandibular advancement surgery to other sleep apnea patients. This led to the conclusion that patients can be informed preoperatively that there is a high probability they will have reduction in sleepiness and may be able to discontinue CPAP following maxillomandibular advancement surgery.

Although maxillomandibular advancement surgery is quite effective for most patients, unfortunately it is often a last-resort modality for patients who have failed CPAP and other surgical treatments. Most maxillomandibular advancement outcome studies in the past have looked at objective outcomes such as apnea/hypopnea index and oxygen saturations. However, considering the primary patient motivator for seeking surgery is to decrease or eliminate excessive daytime somnolence and the need for CPAP, I find this study to be extremely valuable and reassuring for presurgical patients, showing 90% of postsurgical maxillomandibular advancement patients were subjectively not sleepy. Also, the postoperative CPAP use was decreased by 96%. Due to the extremely devastating effects on patients' health, quality of life and professional and personal relationships, I find this patient population to be one of the most rewarding and appreciative populations that I treat. I find it very encouraging for these patients who have failed other treatment modalities to have a potential option in maxillomandibular advancement surgery that is both objectively and subjectively successful for a high percentage of patients.

Betuline Superior to Standard Wound Dressings for Long-Term Aesthetics

Betuline may be beneficial for reepithelialization with superficial wounds, including laser skin treatment

By Melanie S. Lang, DDS

Based on: Metelmann H-R, Podmelle F, Waite PD. Long-Term Cosmetic Benefit of Wound Healing by Betuline. *Am J Cos Surg* 2012; 29 (1): 19–24.

Certainly the most important goal in cosmetic surgery is long-term benefit for the patient, and rapid reepithelialization of superficial wounds is a vital aspect of aesthetic recovery. Purified Betuline as a triterpene dry extract from birch cork stimulates wound healing by induction of basal cell proliferation and the promotion of keratinocyte differentiation. The objective of a recent study was

to assess the more long-term, in this case one year, efficacy of Betuline treatment on superficial wounds.

This was a prospective, multicenter, randomized, controlled clinical trial that utilized intra-individual controls comparing Betuline to a standard moist wound dressing. Sixteen patients were involved in the original study, of which 10 of the patients were male and six were female, with an age range from 26 to 80 years. The patients were undergoing treatment in which a split-thickness skin graft was harvested for use in other sites. The upper leg donor site was then equally divided into halves, with one-half of the donor site for each patient being randomized to treatment for the first 14 days after surgery with Betuline and the other half treated with a moist dressing alone.

Outcome of the two treatments was then evaluated by distant blinded expert examiners at one year post-treatment via photographic assessment. All 16 of the patients completed the initial 14-day treatment, with wound care being performed by the surgeon during that initial 14-day period. At one year, 14 of the 16 patients remained for assessment. Unfortunately, in the interim two of the 16 patients had passed away from cancer unrelated to the Betuline treatment. At one year, superior healing was noted in 12 of the 14 patients in the area treated by Betuline, and nine of the 14 patients had obvious aesthetic benefit from the Betuline.

The authors conclude that, at one year post-treatment, Betuline appears to be cosmetically superior to moist dressing alone for split-thickness graft-donor areas. They also went on to state that they believe Betuline may be beneficial in laser skin rejuvenation.

Certainly this patient sample size is relatively small. This original article shows a distinct positive advantage of Betuline over moist dressings alone. However, as far as whether this may be beneficial in laser skin rejuvenation at this point this seems plausible. However, further clinical trials are certainly necessary to fully support this statement. This was a well-designed article.

Are Leonard Buttons a Reliable Alternative to Arch Bar for Intraoperative IMF?

Using Leonard buttons for intraoperative intermaxillary fixation may be a reliable and cost-effective method, but further randomized studies are needed

By Rod M. Griffeth, DDS

Based on: Ghazali N, Benlidayi ME, et al. Leonard Buttons: A Reliable Method of Intraoperative Intermaxillary Fixation in Bilateral Mandibular Fractures. *J Oral Maxillofac Surg* 2012; 70 (May): 1131–1138.

Have you found your preferred method of intraoperative intermaxillary fixation that is quicker and more cost effective when compared to the “gold standard” of arch

bars? If you have not, a recent paper may be beneficial. With open reduction internal fixation (ORIF) becoming the mainstay in the modern management of mandibular fractures, various methods of achieving intraoperative intermaxillary fixation (IMF) continue to surface.

In 1977, Leonard described the use of circular metal buttons secured to the teeth with stainless steel wires. These devices have been used for intraoperative IMF in the ORIF of mandible fractures. However, their effectiveness for achieving correct maximal intercuspation leading to proper reduction and occlusion has not been well-documented. The study compares Leonard buttons to Erich arch bars for the intraoperative IMF of bilateral mandible fractures. Primary outcome measures were the postoperative fracture reduction and occlusion. Secondary outcome measures were length of operation, postoperative complication rates and cost incurred per patient in relation to the device.

The study was a retrospective review of 77 patients with bilateral mandible fractures treated at King’s College Hospital in London, a busy tertiary trauma center. The fractures were treated by multiple providers and method of intraoperative IMF was not randomly selected, with 62 patients receiving Leonard buttons and 15 treated with arch bars. The number of Leonard buttons was variable depending on multiple factors. The fracture reduction was measured based on postoperative panoramic tomograms and posteroanterior mandible radiographs using a three-tiered scoring system. Postoperative occlusion scores were also graded on a three-tiered system. Data collected also included demographic data, operative time, periodontal status and complication rates.

Primary outcome measures showed that reduction scores were not statistically significant in comparison between the arch bar and Leonard Button groups. However, statistically significant differences in support of the Leonard buttons were reported for postoperative occlusion. There was no correlation between overall reduction and occlusion scores.

Secondary outcome measures were statistically significant in support of Leonard buttons over arch bars for reduced operative time and improved periodontal status. The estimated cost was roughly 10 times greater per patient for the Leonard Button devices compared to the arch bars, approximately \$40 for the Leonard buttons and \$4 for the arch bars.

The authors propose that Leonard buttons are a viable alternative to arch bars for intraoperative intermaxillary fixation for management of bilateral mandible fractures. However, they state that this should be regarded as a pilot study, and further prospective, randomized studies are needed to obtain conclusive evidence.

After reviewing this paper, I feel that Leonard buttons may serve as a viable alternative to arch bars for intraoperative intermaxillary fixation for treatment of bilateral mandible fractures. However, the paper leaves much to be desired, and I personally will not be ordering Leonard buttons any time soon. I believe any facial trauma surgeon is looking for a quicker and cost-effective method to obtain intermaxillary fixation. While I appreciate the comments on decreased operative time and the cost analysis of arch bars compared to Leonard buttons, my concerns with the paper are many. First is the non-random assignment of patients to each treatment

group stating ultimately that it was based on surgeon preference. The Leonard Button group had 62 patients with only 15 in the arch bar group, suggesting a strong surgeon bias. Second is that the paper states there were multiple operative surgeons with varying levels of experience. All fractures after intraoperative IMF had ORIF; however, there is little information about the methods of ORIF used or the degree of fracture displacement. In my experience, the fracture type, access and plating method, and level of experience of the operating surgeon contribute more to the postoperative reduction and occlusion results than the type of intraoperative intermaxillary fixation method used.

In summary, I believe that the final sentence of the paper summarizes the paper well when it states that future prospective randomized studies can clarify the use and efficacy of this method. While Leonard buttons may serve as a viable alternative, I am not persuaded on their use with the data provided.

Patient Satisfaction High With MN Lateralization for Implant Placement

Mandibular nerve lateralization is a useful treatment method for placing implants in the posterior mandible when indicated

By David G. Cleverly, DDS

Based on: Hashemi HM. Neurosensory Function Following Mandibular Nerve Lateralization for Placement of Implants. *Int J Oral Maxillofac Surg* 2010; 39 (May): 452–456.

Is there recent literature that shows good outcomes with mandibular nerve lateralization for placement of dental implants? You have a patient that presents and needs implants placed in the posterior mandible, but you are limited by the inferior alveolar nerve, and there really are no other good alternative treatment options. Can you place dental implants with a nerve lateralization technique with anticipated good neurosensory outcomes?

There have been various articles with varying techniques reported in the literature about repositioning the mandibular nerve for placement of dental implants with varying outcomes for neurosensory disturbances. Generally, the literature supports a better neurosensory outcome with nerve lateralization as opposed to nerve transposition. Transposition involves repositioning the mental foramen more distally. Lateralization is a technique that moves the mandibular nerve laterally for

placement of an implant and then allows it to rest passively against the implant. This article presents patient-reported outcomes of nerve lateralization performed by one surgeon. This is a prospective study that evaluates the types and duration of neurosensory deficits of mandibular nerve lateralization for placement of dental implants in the posterior mandible.

This study included 87 patients over six years. All of the patients were evaluated preoperatively with a panoramic radiograph and CT scan. For evaluation, patients filled out postoperative questionnaires to report neurosensory disturbances at one week and at the end of each month for one year. Of the 87 patients involved in the study, 23 had bilateral surgery with a total of 110 operative sites.

All patients reported neurosensory disturbances at the one-week questionnaire. At this point, the reported neurosensory disturbances included anesthesia in 81 sites, hypoesthesia in nine sites, burning in nine sites, pain in eight sites, pinching in two sites and tickling in one site. The number of sites with neurosensory disturbances at the end of the first month was 29. Eighty-one sites had returned to normal sensation at the end of the first month. The reported neurosensory disturbances at the one-month point included hypoesthesia, tickling, burning and pain. At the end of the second month, 95 of the 110 sites had returned to a normal sensation as reported by the patients. This decreased to only two patients or three sites at the end of six months, with no changes to one year. This included 3% of sites, and the reported disturbance in these patients was a tickling sensation. Ninety-four percent of patients, or 82 of 87, reported they were satisfied with the results at one year. The reason cited for dissatisfaction in three of the patients was tickling. Two of the patients were dissatisfied due to the prolonged hypoesthesia they experienced for five months, though their feeling then returned to normal. The author concludes that the findings of the study indicate mandibular nerve lateralization is a useful treatment method for placing implants in the posterior mandible when indicated.

The results of this study are based on patient questionnaire surveys and have to be interpreted with some degree of caution, as objective testing was not performed postoperatively. However, the patient surveys show a high degree of satisfaction and a low rate of long-term sensory disturbances. This is in general agreement with previous studies reporting improved neurosensory outcomes with nerve lateralization as opposed to nerve transposition. It reveals that there were a couple of patients who reported they were dissatisfied even though they had complete return of sensation. Thus, a demanding patient may be dissatisfied even with an optimal outcome due to the prolonged neurosensory disturbances they might experience before eventually returning to baseline. It confirms mandibular nerve lateralization is a useful technique to implement when alternative options are not feasible. It also confirms it can be done with a low rate of permanent complications.

Two New Oral Anticoagulants Now in Use



Take Home Pearl:

The new anticoagulants have a much shorter half-life than warfarin, but no reversal agents exist.

Background: Patients with recurrent pulmonary embolism, paroxysmal atrial fibrillation, prosthetic heart valves, recent infarctive strokes, or myocardial infarctions are often placed on long-term oral anticoagulation, which meant warfarin for about the last 50 years.

Objective: To review 2 new classes of oral agents currently approved and in use in the United States.

Discussion: Known problems with warfarin include multiple drug interactions, labile efficacy mandating frequent international normalized ratio (INR) levels and adjustments of dose, and a long (approximately 40-hour) half-life. Although effective, many patients become over titrated, resulting in hemorrhagic strokes, subdural hematomas, and excess bleeding. The 2 new agents, dabigatran (Pradaxa®), a direct thrombin inhibitor, and rivaroxaban (Xarelto®), a factor Xa inhibitor, were

developed to minimize these shortcomings. Dabigatran requires 2 doses a day, and its most common side effect is gastritis. It has a 12- to 14-hour half-life, but no reversal agents. Patients suffering from excess bleeding while on this agent should be managed with local hemostatic measures if possible, with possible packed red cell and frozen plasma transfusions as necessary. It does not need routine INR monitoring like warfarin, and in fact does not affect the INR value much. A partial thromboplastin time is the recommended test to monitor anticoagulation effects. Rivaroxaban inactivates factor Xa, which is responsible for converting prothrombin to thrombin. It is dosed once a day, and has a 6- to 9-hour half-life. Minor bleeding is the most frequent side effect, and there is no antidote. Major excess bleeding should be managed as with dabigatran above.

Conclusions: Just like with warfarin, most minor oral surgery can take place without modifying the patient's anticoagulant routine. NSAIDs and aspirin should be used with some caution in the postoperative period.

Reviewer's Comments: Oral and maxillofacial surgeons are already

seeing patients on these drugs, with several similar products coming soon. Although likely safer than warfarin, performing major oral surgery with a patient who is on these new drugs (orthognathics, full-mouth extractions) may yield impressive blood loss, and we will need to address the question of whether the patient should be taken off the medicines versus preparing for and managing extra bleeding. Patients with impaired renal function may require extra caution, and more than a 24-hour hold period, as it may take longer for the drug to clear the body. Also, note that these agents act quicker than warfarin, something to consider if persistent postoperative oozing is expected. Of interest, naturally occurring direct thrombin inhibitors exist in the saliva of leeches, which act, just like dabigatran, to bind to thrombin and prevent it from catalyzing the conversion of fibrinogen to fibrin.

Reviewer: J. Bruce Bavitz, DMD
Article Reviewed: Firriolo FJ, Hupp WS. Beyond Warfarin: The New Generation of Oral Anticoagulants and Their Implications for the Management of Dental Patients. *Oral Surg, Oral Med, Oral Pathol, Oral Radiol* 2012; 113 (April): 431-441.

BIS Monitoring May Reduce Drug Consumption in Oral Surgery Patients



Take Home Pearl:

In this study, drug consumption was about 30% lower when bispectral index monitoring was used during IV sedation.

Background: For over a decade, bispectral index (BIS) monitoring has been used to assess central nervous system (CNS) status during general anesthesia and IV sedation. It applies proprietary software to an electroencephalogram, and generates a number between 0 and 100, with 100 being an awake patient and <60 corresponding to general anesthesia. The Ramsay scale (1 to 6) is another

method of calculating sedation depth and utilizes an observer's assessment of sedation with a value of 1 assigned to an anxious restless patient and a value of 6 when patients fail to respond to a surgical stimulus.

Objective: To compare the BIS and the Ramsay scale in patients undergoing IV sedation for dental implants.

Design/Methods: 43 patients were studied; they all received an initial bolus of fentanyl and midazolam followed by a propofol infusion at a rate of 2 to 4 mg/kg/hour, plus local anesthesia. The Ramsay scale was recorded at baseline and every 5 minutes for all patients. In total, 23 of 43 also had BIS monitoring. Additional

boluses of fentanyl and midazolam were given to patients if their Ramsay score increased beyond 2; the same drugs were given if BIS values >90. The quantity of drugs used, incidence of adverse effects, and the patient's own assessment of anxiety and satisfaction utilizing a 0 to 10 visual analog and numeric scale (VAS) were all determined.

Results: There was no difference in incidence of adverse effects or patient's ratings, but the patients monitored with the BIS had statistically less drug consumption for all 3 agents, on average using about two-thirds as much. The authors felt that the ideal BIS score for patients undergoing

implants with local anesthesia and IV sedation was 85, which corresponded to a Ramsay score of 3.

Conclusions: BIS monitoring may reduce drug consumption for patients undergoing oral surgery under IV sedation.

Reviewer's Comments: Most oral and maxillofacial surgeons (OMFS) assess how the CNS is responding during sedation by patient response to

surgical stimuli with the pulse oximeter, BP machine, and possibly the ECG employed to monitor the respiratory and cardiovascular systems. This study failed to show any improved safety using the BIS monitor, but inferred that complications may be less if drug consumption is reduced. The costs of the monitor and the disposable electrodes were not addressed. The authors did feel, however, that any artifacts induced by head motion

during OMFS are not a problem with the modern BIS machines available today. Analogous to capnography, some OMFS may feel that this monitor is desirable in some patients, but few would argue that it improves safety.

Reviewer: J. Bruce Bavitz, DMD
Article Reviewed: Munoz Garcia J, Vidal Marcos AV, et al. Utility of Bispectral Index Monitoring During Intravenous Sedation in the Dental Office. *Int J Oral Maxillofac Implants* 2012; 27 (March–April): 375–382.

Articaine Without Vasoconstrictor Effective for Dental Extractions



Take Home Pearl:

Four percent articaine inferior alveolar block without epinephrine is an effective local anesthetic option for lower extractions when a vasoconstrictor is contraindicated.

Background: Vasoconstrictors in local anesthetics may be contraindicated in some patients. Some prior clinical trials have shown poor success rates for articaine without epinephrine (epi), particularly with pulpal anesthesia.

Objective: To compare anesthetic efficacy of 4% articaine with and without epi for lower extractions with inferior alveolar blocks.

Design/Methods: This double-blind, prospective, randomized clinical study included 88 patients undergoing single tooth extractions in the mandible (group 1 [n=41]: 4% articaine with epi; group 2 [n=47]: 4% articaine without

epi). Differences in onset of local anesthetic (LA) effect and length of soft-tissue anesthesia were assessed as well as amount of LA solution used; need for a second injection; other complications; and pain with injection, treatment, and postoperatively.

Results: In group 1, LA onset was faster (7.2 minutes) and soft-tissue duration was longer (3.8 hours). In group 2, LA onset was 9.2 minutes and duration was 2.5 hours. LA was sufficient to complete extractions in both groups, and there was no significant difference in the amount of LA utilized, need for a second injection, complications, or pain parameters.

Conclusions: 4% articaine without epi is an acceptable LA option for mandibular extractions with inferior alveolar nerve blocks.

Reviewer's Comments: Since its release in the United States, articaine has become a commonly used LA, particularly in general dentistry, due to

excellent diffusion in soft and hard tissues; however, its use in surgery and endodontics has not been as widespread. This randomized prospective study was limited to routine single extractions without signs of infection. Whether results would be similar for more complex surgical procedures or with signs of infection is unclear. Also, there was no assessment of adequate pulpal anesthesia, which has been an issue for articaine use without a vasoconstrictor in endodontic intervention. In addition, with a follow-up time of only 1 day by phone, any potential later complications may have been overlooked.

Reviewer: Melanie S. Lang, DDS
Article Reviewed: Kämmerer PW, Palarie V, et al. Comparison of 4% Articaine With Epinephrine (1:100,000) and Without Epinephrine in Inferior Alveolar Block for Tooth Extraction: Double-Blind Randomized Clinical Trial of Anesthesia Efficacy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2012; 113 (April): 495–499.

Conservative Management of Odontogenic Myxoma Is Indicated



Take Home Pearl:

Image the myxoma in children with a MRI scan, use immunohistochemistry to help diagnose, and treat conservatively.

Background: The odontogenic myxoma is a fairly rare tumor, which explains why there are so few contemporary articles or treatment guidelines.

Objective: To review the current literature and report on the authors' experience with 2 pediatric and 2 adult cases of odontogenic myxoma.

Discussion: The literature review yielded 231 papers reporting on 801 tumors. The overall average age (many papers failed to specify) was 26.4 years. Four papers with a total of 10 patients were limited to patients aged <2 years. For this infant age range, cranial fasciitis is in the differential diagnosis, but this aggressive entity begins outside the bone, and stains positive for smooth muscle actin. Myxomas stain positive for vimentin, and exist predominately in the facial bones. There were no recurrences in this age range or in the authors' 2 infant patients, with the average follow-up interval about 3 years. As MRI imaging is

radiation free, it is preferred in these patients who obviously are still growing and likely will have several follow-up scans to test for recurrence. These infant cases showed a predilection for the anterior maxilla. For adults, the authors questioned the rationale for more aggressive resections, as the recurrence rate was not clearly superior with this approach. The accepted recurrence rate is in the 5% to 10% range, with many published papers failing to be specific regarding this factoid.

Conclusions: Careful diagnosis using special stains and subsequent conservative management seems reasonable

for this slow-growing, non-metastasizing, but locally aggressive odontogenic tumor.

Reviewer's Comments: Although the authors did not give details of how they performed the literature review or a range of times when the review was conducted (eg, 1945 to 2011), it appeared to be very thorough. Their 2 infant cases were relatively large and aggressive on imaging, were diagnosed intraoperatively, and responded

well to conservative excision consistent with the authors' statement that aggressive margins are not necessary. Their one adult patient had a recurrence 15 years after initial treatment, which was surprising. The authors make a good case for having some type of international database for relatively rare lesions such as this, as their review only reported on 801 tumors, many of which had poor data relative to location, treatment regimes, and

follow-up. In the age of the Internet with instantaneous worldwide communication, establishing such databases seems very attainable.

Reviewer: J. Bruce Bavitz, DMD
Article Reviewed: Kansy K, Juergens P, et al. Odontogenic Myxoma: Diagnostic and Therapeutic Challenges in Paediatric and Adult Patients — A Case Series and Review of the Literature. *J Craniomaxillofac Surg* 2012; 40 (April): 271–276.

Consider Mandibular Midline Distraction for Transverse Hypoplasia



Take Home Pearl:

Using tooth- or bone-borne distraction devices, the mandible can be widened.

Background: Due to late fusion of the midpalatal suture, transverse hypoplasia of the maxilla can be predictably managed with rapid palatal expansion up until around the age of 16 years. The same problem in the mandible is more difficult, as the midline of the symphysis fuses at age 1 year.

Objective: To review the literature looking at the success and complication rate of mandibular midline distraction osteogenesis (MMD) to correct transverse mandibular hypoplasia.

Design/Methods: Several electronic databases were reviewed up until September 2010. To be included, the paper had to report on at least 5 patients. Of the 79 articles initially discovered, 22 met the inclusion criteria.

Results: Common indications were severe anterior dental crowding and posterior crossbites, with syndromic

and post-traumatic defects occasionally encountered. Data from 375 patients were obtained, with the longest follow-up being only 3 years. Many patients had additional orthognathic procedures performed, but those just having MMD devices applied often had that done in an office setting under IV sedation. Both tooth-borne and bone-borne distractors were used, and in some, a combination of both. The average expansion total measured 5.8 mm; the average distraction rate was 0.69 mm per day. The mean time the distractors were left on to consolidate was 2.6 months. A small anterior movement of the mandible was encountered, useful for Class II patients. As expected, tooth-borne devices yielded dental tipping and some subsequent relapse. Complications related to the procedure included loss of tooth vitality, device breakage, irritation of the soft tissue, infection, and transient temporomandibular joint complaints.

Conclusions: Overall, this technique is useful, but the authors correctly point out that long-term, high-quality prospective studies are lacking.

Reviewer's Comments: Using distraction osteogenesis to correct mandibular midline hypoplasia is likely a procedure rarely performed by the typical oral and maxillofacial surgeon (OMFS). It has been done for about 20 years. This article reveals it is feasible, albeit with not much data regarding its success and complication rate. It was suggested that 3 to 5 mm of space exists between the teeth where the osteotomy is made in order to minimize loss of tooth vitality and the creation of periodontal defects, something difficult to do in a patient with hypoplasia to begin with. On cases where the diagnosis is equivocal between mandibular transverse hypoplasia versus hyperplasia of the maxilla, surgically narrowing the latter may be preferable. However, there are some patients, perhaps post-traumatic, where widening of the mandible is definitely indicated, and OMFS should be aware that MMD is a viable option.

Reviewer: J. Bruce Bavitz, DMD
Article Reviewed: de Gijt JP, Vervoorn K, et al. Mandibular Midline Distraction: A Systematic Review. *J Craniomaxillofac Surg* 2012; 40 (April): 248–260.

Is Grafting Adult Third Molar Extraction Sockets Beneficial?



Take Home Pearl:

Grafting of adult extraction sockets with xenograft and a resorbable collagen membrane predictably resulted in enhanced periodontal measures.

Background: Several studies have been published with regard to the management of mandibular third molar sites to prevent periodontal defects. Conflicting results have been reported. In 2004, Dodson's study suggested

that attachment levels and probing depths improve after third molar removal. Grafting or guided tissue regeneration therapy did not offer a predictable benefit. Other studies report successful periodontal probing depth reduction and increased clinical attachment levels.

Objective: To determine whether the use of xenograft plus a membrane, when compared to no intervention, enhances the periodontal measures on the distal aspect of the mandibular second molar after third molar extraction.

Design/Participants: A split-mouth, single-blind, controlled clinical trial for patients aged 30 to 35 years with bilateral horizontally impacted third molars was designed.

Methods: Specific inclusion and exclusion criteria were clearly stated. Each participant had a test site, which was filled with an anorganic xenograft plus a membrane (Bio-Oss covered by Bio-Gide), and a control site with the identical flap design for removal of the third molar, but received no grafting materials. Twenty-eight sites (14 patients)

were randomly assigned, and the same surgeon performed all the procedures. The primary predictor variables of gingival index, pocket probing depth (PPD), and clinical attachment level (CAL) were assessed at baseline and at 3, 6, 9, and 12 months postoperatively using standardized periapical radiographs.

Results: There was a statistically significant reduction in PPD and a statistically significant gain in the CAL when comparing the xenograft and membrane group to the nongrafted sites.

Conclusions: Grafting with xenograft and a membrane predictably resulted in significant reduction in PPD, CAL, and bone fill on the distal aspect of mandibular second molars. This

suggests that grafting in this subset of the population could prevent periodontal disease in the future.

Reviewer's Comments: Management of third molar extraction sites in attempt to enhance periodontal measures on the distal aspect of the second molar continues to challenge clinicians. The question of grafting versus no grafting is only part of the dilemma. Other questions may include: Should grafting be limited to only high-risk patients? What is the best grafting material and method? Is the added expense validated by improved periodontal measures of the second molar? Are these improvements long lasting? While several of these questions are still up for debate, I feel this article has convincing

evidence for the use of this treatment method in this specific subset of the population. The inclusion and exclusion criteria and follow-up were clearly defined and I believe commendable. The results seem almost too good to be true when compared to similar studies previously published. For improvement on this or future studies, a double-blind study method is preferable. Single-blind studies raise the question of whether the examiner was biased when making clinical measurements.

Reviewer: Rod M. Griffeth, DDS
Article Reviewed: Hassan KS, Marei HF, Alagl AS. Does Grafting of Third Molar Extraction Sockets Enhance Periodontal Measures in 30- to 35-Year-Old Patients? *J Oral Maxillofac Surg* 2012; 70 (April): 757–764.

Comparing Doctor Vs Patient Assessments of Treated TMDs



Take Home Pearl:

Patient assessments differ from the treating surgeon's in nearly 50% of cases in a recent study.

Background: There has been increasing interest among multiple surgical specialties in using patient-based outcome assessments. Patient-based outcome assessments increase the accuracy of the evaluation regarding the effectiveness of a particular procedure. Assessments completed by the treating doctor often involve inherent bias and are often simply global evaluations rather than based on specific criteria. As there are several different recommended treatment modalities for the various temporomandibular disorders (TMD), determining the effectiveness of a particular procedure from the patient's assessment is valuable.

Objective: To compare the doctor's and patient's assessments for treatment outcomes for patients with various temporomandibular disorders and to more accurately assess treatment outcomes with the knowledge gained from this comparison.

Participants/Methods: 52 patients treated by 1 surgeon completed a

questionnaire on their first visit and all subsequent visits. The questionnaire contained 10 questions, each with 5 possible answers listed in terms of increasing severity from 1 to 5, with 5 being the most severe. Scores of 10 to 19 were considered an excellent response to treatment; 20 to 29, good; 30 to 39, fair; and 40 to 50, poor. The post-treatment values were compared to pretreatment baseline. The treating doctor also assessed the patient's progress as excellent, good, fair, or poor at each appointment and was blinded to the patient's questionnaire scores.

Results: The doctor's global assessment differed from the patient's evaluation in 44% of cases (55 to 124). When there was a discrepancy, the doctor scored the improvement better than the patient 54.4% of the time and 45.5% worse. There was no significant difference in the amount of discrepancy based on the diagnosis or treatment provided.

Conclusions: For the treatment of various TMDs, relying solely on the treating doctor's global opinion is unreliable. For a more accurate evaluation, a patient questionnaire should be used. Further studies are needed to establish the best questionnaire.

Reviewer's Comments: When it comes to the treatment of various TMDs, information to accurately assess treatment outcomes is valuable. The use of a patient questionnaire that helps the treating provider better understand the perceived outcome from the patient's perspective is essential in helping providers make better treatment recommendations for their patients. There is no doubt that a global assessment by the treating surgeon is subjective and improvement is often overestimated by many providers. I try to learn from the multiple providers in my residency regarding which patients to offer surgical treatment. Some attendings, in my evaluation, are much better at selecting patients to offer surgery and thus have significantly higher surgical success rates and happier patients. Although not used routinely in my training program or by myself currently, I feel that a patient questionnaire would help make better treatment recommendations.

Reviewer: Rod M. Griffeth, DDS
Article Reviewed: Ness GM, Laskin DM. Global Doctor Opinion Versus a Patient Questionnaire for the Outcome Assessment of Treated Temporomandibular Disorder Patients. *J Oral Maxillofac Surg* 2012; April 25: epub ahead of print.

Complete Digital Orthognathic Planning System — A Reality?



Take Home Pearl:

Occlusion with fabrication of surgical splints has been a limiting factor for a completely digitized orthognathic virtual surgical plan but is now becoming a reality.

Background: Planning virtual osteotomies for orthognathic surgery offers three-dimensional analysis of planned movements and the ability to assess different surgical scenarios with the control of optimizing surgical outcomes. The challenging area of digital orthognathic planning combines medical imagery, computer graphics, and mathematical modeling. One of the key outcomes in orthognathic surgery is obtaining a stable postoperative occlusion. Typically, a surgical splint from virtual planning is obtained from plaster models correlated with the virtual plan and has been the gold standard.

Objective: To show that it is now possible to digitally set an occlusion and that the digital data can be used to fabricate the surgical splints.

Methods: For the current study, the casts of 11 orthognathic patients were

used to compare a manually set occlusion to a digitally set occlusion. Only casts that did not require adjustments were used. Cone-beam CT scans of the plaster casts were used to obtain digital models. To allow these digitized models to occlude without virtual penetration of the models, a rigid motion engine was implemented and used. A guided movement tool was created to help optimize the process of choosing a final digital occlusion. Three surgeons were asked to set the occlusion of the 11 plaster casts, which were fixed with sticky wax and then scanned/digitized. This was repeated 3 weeks later. Also, the occlusion had to be set digitally in the software. The manually set occlusions were compared to occlusions set digitally by mapping and calculating the differences in position of the data sets.

Results: The median inter-variability between the 3 surgeons' set plaster cast occlusion was 0.55 mm. The intra-variability was 0.46 mm. The median difference between plaster cast occlusion and a digitally set occlusion was 0.60 mm.

Conclusions: The data show that there is reliable digital determination of the desired final occlusion for the

presented software system. The authors disclose that being able to "feel" the occlusion is beneficial and that there is a learning curve with this type of system and one must learn to "see" the occlusion in the software.

Reviewer's Comments: The article does not present all of the authors' data points, and one cannot analyze completely their results. However, the authors do show that there was as much error in the manually set occlusions by the same surgeons 3 weeks apart and between different surgeons, as there was with the digitally set occlusion. The authors have shown that moving toward a complete digital orthognathic planning system with the ability to digitally set the occlusion and automate surgical splints is becoming a reality. This article was published about 2 years ago but is one of the few comparing multiple surgeons (3) versus computer software and is important as more and more OMFS are going to a digital treatment planning technique.

Reviewer: David G. Cleverly, DDS
Article Reviewed: Nadjmi N, Mollemans W, et al. Virtual Occlusion in Planning Orthognathic Surgical Procedures. *Int J Oral Maxillofac Surg* 2010; 39 (May): 457–462.

What Cephalometric Findings Can Be Linked to OSA Syndrome?



Take Home Pearl:

This study shows that no skeletal or soft-tissue parameter on cephalometric studies can be directly correlated with obstructive sleep apnea syndrome.

Background: Many studies have been done with the goal to identify specific hard- and soft-tissue structures of the head and neck that correlate with the presence and severity of obstructive sleep apnea syndrome (OSAS). OSAS is defined as having an abnormal apnea-hypopnea index (AHI) with excessive daytime somnolence. Studies have identified the most important risk factors for OSAS as increased body weight, male gender, age, and craniofacial morphology. A previous meta-analysis by Miles et al in 1996 described the most relevant cephalometric variables for evaluation

for OSAS to be posterior airway space, soft palate length, hyoid to mandibular plane, mandibular plane angle, and mandibular length.

Objective: To analyze these 5 cephalometric measures with body mass index (BMI) and AHI and their correlation to OSA in patients diagnosed with this condition.

Design/Methods: This was a retrospective cohort study of 89 patients with OSAS, diagnosed by overnight polysomnography (PSG) and referred over a 3-year period for functional upper airway surgery. Patients were included in the study if they had an Epworth Sleepiness Scale of >10, PSG with an AHI >5, and a complete cephalometric analysis with all 5 measures identified. Statistical analysis was performed to evaluate for a correlation between cephalometric findings and AHI and BMI.

Results: There were no statistically significant correlates of the 5 cephalometric measures and the AHI. Nor was there any correlation between the cephalometric values and the BMI.

Conclusions: No single hard- or soft-tissue cephalometric variable can be linked and conclusively used in the evaluation and assessment of patients with OSAS. These 5 cephalometric parameters may be less important in the etiology of OSAS than previously suggested.

Reviewer's Comments: This was a simple retrospective analysis aimed at correlating cephalometric variables that were identified in previous studies as significant in the etiology of OSAS, to the diagnosis and severity of OSAS. The results and conclusions agree with some of the other literature on the subject — that OSAS is a complex disorder with multiple contributing factors

and there are no consistent cephalometric findings that correlate with the diagnosis or severity of OSAS.

Reviewer: David G. Cleverly, DDS
Article Reviewed: Cillo JE Jr, Thayer S, et al. Relations Between Obstructive Sleep Apnea Syndrome and Specific

Cephalometric Measurements, Body Mass Index, and Apnea-Hypopnea Index. *J Oral Maxillofac Surg* 2012; 70 (April): e278–e283.

No Loss of Opening With Pedicled Buccal Fat Pad Flap



Soft Tissue/Flaps

Take Home Pearl:

The pedicled buccal fat pad flap does not appear to lead to permanent decreased mouth opening but initially has more swelling.

Background: The pedicled buccal fat pad flap (PBFPP) is in vogue for closing large oral antral defects but has been associated with decreased maximum mouth opening (MMO).

Objective: To compare the PBFPP with the traditional buccal flap approach, evaluating procedure success, MMO, postoperative swelling, and pain.

Design: Prospective study.

Participants/Methods: 20 patients with oral antral fistulas were randomly assigned the PBFPP or traditional buccal flap closure; all were performed under local anesthesia alone and by the same experienced surgeon. The size of the bony defect was measured, as was the total operative time. Swelling and pain were assessed on

postoperative days 2 and 7, and the success of closure was assessed at 1 month.

Results: The communication or fistula remained closed on all patients, and there was no statistical difference in the time of the procedure or size of the bony defect between the 2 methods. However, there was significantly more pain and less MMO at days 2 and 7 with the fat pad graft, but no difference was found at 1 month.

Conclusions: The PBFPP performed by an experienced surgeon did not result in any more permanent reduction in MMO as compared to the traditional buccal flap, and both methods yielded excellent results in closing the oro-antral fistula.

Reviewer's Comments: One proposed advantage of the PBFPP as compared to the standard buccal flap is better maintenance of the vestibule, especially important for the complete denture patient. Unfortunately, this parameter was not studied in this paper. This flap has also been used for oronasal communication repairs and as a

novel way of closing overexposed bone, be it from radiation or associated with anti-bone-resorptive agents like bisphosphonates. I was impressed that there were no significant differences in the operative time between the 2 procedures, likely due to the experience of the operator. I would have liked to see the length of time from when the communication occurred until when the repair was done, as the 100% success rate for both techniques was perhaps somewhat attributable to the flaps used to reconstruct an acute injury. With no better closure success and with other authors reporting some complications with the PBFPP (excessive bleeding, facial nerve paresis), I feel that many surgeons would reserve this procedure for the recalcitrant or unusually large oro-antral fistula.

Reviewer: J. Bruce Bavitz, DMD
Article Reviewed: Nezafati S, Vafaii A, Ghojazadeh M. Comparison of Pedicled Buccal Fat Pad Flap With Buccal Flap for Closure of Oro-Antral Communication. *Int J Oral Maxillofac Surg* 2012; 41 (May): 624–628.

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1. The stability of inferior repositioning of the maxilla without grafting is good, with relapse in the 3% to 5% range.

Practice: T F **Answer Submitted: T F**
2. Just like with warfarin, most minor oral surgery can take place without modifying the patient's anticoagulant routine.

Practice: T F **Answer Submitted: T F**
3. Mandibular midline distraction often yields some anterior movement to the dentition.

Practice: T F **Answer Submitted: T F**
4. According to Baqain et al, the use of silk sutures was associated with a higher failure rate for dental implant surgeries when compared to polyglactin sutures.

Practice: T F **Answer Submitted: T F**
5. There is a high probability that patients will have a decrease in subjective sleepiness following maxillo-mandibular advancement surgery.

Practice: T F **Answer Submitted: T F**
6. Betuline shows no long-term cosmetic benefit over moist wound dressings.

Practice: T F **Answer Submitted: T F**
7. A recent study found that 4% articaine without epinephrine provides inadequate local anesthesia for mandibular exodontia.

Practice: T F **Answer Submitted: T F**
8. Grafting with xenograft and a membrane predictably results in significant reduction in pocket probing depth, clinical attachment level, and bone fill on the distal aspect of mandibular second molars.

Practice: T F **Answer Submitted: T F**
9. A recent study found that arch bar intermaxillary fixation provided statistically significant reduction for treatment of bilateral mandible fractures compared to Leonard buttons.

Practice: T F **Answer Submitted: T F**
10. Mandibular nerve lateralization is a useful treatment method for placing implants in the posterior mandible when indicated.

Practice: T F **Answer Submitted: T F**
11. Nadjmi et al show statistically significant differences between manually set occlusion and digitally set occlusion.

Practice: T F **Answer Submitted: T F**
12. Ness et al found that for treatment of various temporomandibular disorders, relying solely on the treating doctor's global opinion is unreliable.

Practice: T F **Answer Submitted: T F**
13. The hyoid to the mandibular plane distance shows a correlation with a higher apnea-hypopnea index in patients with severe obstructive sleep apnea syndrome.

Practice: T F **Answer Submitted: T F**
14. The average age on presentation for odontogenic myxomas is 43.2 years.

Practice: T F **Answer Submitted: T F**
15. Bispectral index monitoring may reduce drug consumption for patients undergoing oral surgery under IV sedation.

Practice: T F **Answer Submitted: T F**
16. As compared to the traditional buccal flap, the pedicled buccal fat pad flap yields increased pain and swelling at postoperative days 2 and 7.

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

1. **T** According to the federal government, about 47 million people live in areas with a shortage of dentists.
2. **T** According to Amato et al, under ideal conditions you can obtain a bone augmentation to tooth extrusion ratio of 69%.
3. **F** Administration of 15 mg of midazolam significantly reduces the incidence of premature ventricular contraction on patients receiving implants under local anesthesia.
4. **F** A study by Emam et al shows significantly increased postoperative complications when not following the traditional 2 lag screw technique for treatment of mandibular symphysis fractures.
5. **T** Navigation-guided surgery provides more predictable treatment outcomes than traditional methods for delayed treatment of orbitozygomatic fractures with enophthalmos.
6. **F** A recent study found that mechanical device failure resulted in 3.2% of Biomet alloplastic joints needing removal over a 3-year follow-up period.
7. **F** Patients in a recent study received 30 preoperative hyperbaric oxygen (HBO) sessions and 10 postoperative HBO sessions as outlined in both the abstract and study design.
8. **T** Crespi et al found the “All on Four” protocol showed stable crestal bone around all implants.
9. **T** Based on a recent study, there is a correlation between the number of facial esthetic surgical procedures completed and the reduction in a patient’s perceived age.
10. **F** Timing of treatment to improve eating issues in head and neck cancer patients has little effect on patients’ long-term quality of life.
11. **T** A recent study by Fermergård et al found that the highest failure rate using the osteotome sinus floor elevation method was on edentulous patients.
12. **T** A recent study reported that stable results for the treatment of anterior open bite can be achieved with surgery 82% of the time and non-surgical approaches 75% of the time.
13. **T** A recent study found that patients with involved margins during the resection of T1 and T2 tongue squamous cell carcinoma had significantly worse survival compared to patients with clear margins.
14. **F** Yip et al found that diabetic patients on bisphosphonates had a higher implant failure rate compared to normal matched controls.
15. **T** Based upon a recent systematic review, there is no evidence to support the use of electromyography in diagnosing temporomandibular disorders.
16. **F** Keratinized tissue will regenerate if AlloDerm® is used as a graft source in vestibuloplasty.

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