A possible association exists between orthodontic treatment and development of an idiopathic bone cavity, especially in adolescent females.

**Objective:** To review a number of cases of idiopathic bone cavity (also known as simple or traumatic bone cyst) in an attempt to determine the etiology.

**Design:** Retrospective analysis of the records of 44 patients diagnosed with idiopathic bone cavity (IBC).

**Methods:** All subject cases had available diagnostic panoramic radiographs, clinical, radiographic, and surgical descriptions of the lesion, and histopathology, if lesional material had been retrieved for biopsy. Also included were symptoms, clinical findings, history of trauma, or history of orthodontic treatment. Radiographic evaluations included lesion size, location, circumscription, cortication and scalloping between roots, displacement of teeth, displacement of mandibular canal, and evidence of root resorption.

**Results:** Mean and median patient ages were 18 and 26 years, respectively. Of patients with IBC lesions, 63% were female (75.0% Caucasian, 13.6% Hispanic, 11.4% African American). Most of the IBCs were found in the posterior mandible (47%). IBCs did not displace the dentition, cause root resorption, or cause pain, paresthesia, or other clinical symptoms. In only 1 of 44 cases did the IBC cause some swelling. Only 7% of patients had a history of trauma to the area. In all, 88% of lesions were unilocular, well-circumscribed, scalloped, and not corticated. Of the patients, 23% had a history of orthodontic treatment, and these patients were a mean age of 17 years. Orthodontic extractions had been done in 4 of these patients, but more of the IBCs were in areas where the extractions had not been accomplished. In some lesions, during surgical exploration of the empty bone cavities, minimal fragments of tissue were obtained and biopsied. None of these tissues had an epithelial component.

**Conclusions:** IBCs are true, essentially empty bone cavities with an unknown cause. There is a predilection for adolescent females who have had orthodontic treatment.

**Reviewer's Comments:** The paper is a very nice review of what we all expect to see clinically and radiographically in order to diagnose an idiopathic bone cavity or so-called "traumatic bone cyst," a misnomer. Traumatic events likely have no role in the development of this lesion, but orthodontic treatment (especially in adolescent females) might. (Reviewer-Sterling R. Schow, DMD).

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Keywords: Pathology & Immunology

Print Tag: Refer to original journal article
A gelatin sponge in the maxillary sinus can cause the formation of new bone around implants.

**Objective:** To verify new bone formation by radiologic results by application of only an absorbable gelatin sponge in the space between the elevated sinus membrane and simultaneously placed implants.

**Design:** Prospective study of patients with inadequate bone in the posterior maxilla who were to receive implants and a sinus lift operation.

**Participants:** 7 patients who were to receive implants.

**Methods:** Under local anesthesia, patients received a sinus lift procedure by opening a bony window into the sinus and elevating the sinus membrane. Implants were then placed in the alveolar ridge and into the sinus. The space around the implants was filled with a resorbable gelatin sponge but no graft material. The window in the lateral wall of the sinus was then closed with the original bone and the flap sutured. X-rays and cone-beam CTs were done before surgery, immediately after surgery, and after 6 months of healing. After 6-month follow-up, the implants were uncovered and 2 were found to be loose and removed due to inadequate integration. The remaining implants were stable, and CTs and plain film showed the development of sound bone around the implants in the original sinus. Implants had final prosthesis done and all, except 2 that were lost, were successfully restored.

**Results:** Only 2 implants were lost due to lack of integration. The remaining implants were successful and were restored after 6 months of healing. New bone was formed around the implants in the sinus.

**Conclusions:** New bone will form in the maxillary sinus without the use of graft material.

**Reviewer’s Comments:** This is a most interesting study showing that it is possible to form new bone in the maxillary sinus without the use of any bone grafting material. (Reviewer-Edwin D. Joy, Jr, DDS).

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Keywords: Implants

Print Tag: Refer to original journal article
Changing the intra-articular environment via arthrocentesis provides reduction of clinical symptoms and an increased range of motion, with or without tenoxicam administration.

**Objective:** To evaluate the effects of tenoxicam injected into the temporomandibular joint following arthrocentesis, and to compare the results with arthrocentesis alone in patients with disk displacement without reduction.

**Design:** Prospective clinical pilot study.

**Participants:** 21 patients (4 male, 17 female) aged 15 to 52 years with 24 joints exhibiting disk displacement without reduction as evidenced both clinically and radiographically by MRI. Patients with previous TMJ surgery, facial fractures, systemic joint disease, and joint tumors or growth disturbances were all excluded from the study. Sudden decreases in mandibular range of motion to <35 mm, or a sudden decrease in opening following disappearance of a click, were diagnostic criteria for inclusion into the study.

**Methods:** A depression score was calculated after random division into 2 groups for arthrocentesis with or without injection of tenoxicam. Group A (14 joints in 14 patients) underwent arthrocentesis alone, and Group AT (10 joints in 7 patients) underwent arthrocentesis followed by an injection of 2 mL of tenoxicam in the intra-articular space. Stabilization splints were used at night for 6 months, and mouth-opening exercises began at 1 week. Evaluations performed weekly during the first postoperative month and then monthly until 6 months provided data collection points for maximum incisal opening (MIO), visual analog scale (VAS) pain scores, TMJ sounds, and muscle palpation. MRI was obtained preoperatively and at 6 months, and images were evaluated and scored for effusions, degenerative bony changes, disk deformity and position, and bone marrow edema by a neuroradiologist blinded to clinical therapy or outcomes.

**Results:** Success, defined by an MIO >35 mm with masticatory improvement free from pain and a functional and stable occlusion, was achieved by 86% of cases in Group A and 80% of cases in Group AT. Both groups had an increased MIO at all time intervals (statistically significant within Group A). VAS pain scores decreased in all groups at all time intervals (statistically significant within Group A). Muscle palpation and joint sounds evaluations were unrelated, and insignificant statistically, and attained disk mobility was not significant in either Group A or Group AT. Joint effusions were insignificant between groups. The increase in ROM was more significant for Group A. Bone irregularities remained the same in both groups, as expected.

**Conclusions:** Both groups had success rates consistent with previous publications; however, the addition of tenoxicam did not increase measured success parameters.

**Reviewer’s Comments:** The etiology and progression of inflammatory TMJ pain is an ill-defined entity. Direct application of anti-inflammatory and analgesic agents to an affected joint is efficacious in a temporal way, with intended avoidance of systemic and direct destructive process. Arthrocentesis, as well demonstrated in this paper, reduces the concentration of pain mediators known to exist in an inflamed joint and thus reduces symptoms. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Tenoxicam, TMJ, Arthrocentesis

Print Tag: Refer to original journal article
Is Discontinuing LMWH Necessary Before Dental Extractions?

**Frequency of Bleeding Following Invasive Dental Procedures in Patients on Low-Molecular-Weight Heparin Therapy.**

Hong CH, Napenas JJ, et al:

J Oral Maxillofac Surg 2010; 68 (May): 975-979

| Altering or discontinuing low-molecular-weight heparin therapy prior to dental extractions is not necessary to prevent bleeding. |

**Objective:** To investigate the frequency of bleeding events associated with invasive dental procedures in patients on low-molecular-weight heparin (LMWH) therapy.

**Design:** Retrospective review of the records of patients who underwent dental extractions or biopsies while taking LMWH therapy.

**Methods:** Records of 41 patients (40 inpatients, 1 outpatient) were reviewed. All patients were taking LMWH therapy for prophylaxis for deep-vein thrombosis. All patients underwent either dental extractions or biopsy procedures. Records were analyzed for any instance of unusual bleeding following the procedure. Patients were visited on the night of surgery if in the hospital or queried by telephone as an outpatient.

**Results:** 3 patients had minor postoperative bleeding after surgery. Of these patients, 1 required a transfusion of fresh frozen plasma and the administration of vitamin K. The other 2 patients responded to minor postoperative management.

**Conclusions:** It is not necessary to remove patients from LMWH therapy because of the risk of serious bleeding events after either tooth extraction or minor oral surgery. Bleeding after the procedure is rare and generally easily managed.

**Reviewer's Comments:** This study adds further evidence to the concept of keeping patients on anticoagulants for minor oral surgery since the risk of thromboembolic events when anticoagulants are removed is far greater than the risk of postoperative bleeding. (Reviewer-Edwin D. Joy, Jr, DDS).

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Keywords: Dentoalveolar Surgery

Print Tag: Refer to original journal article
Free fibula transfer carries significant possibilities of morbidity, so it is important to visit frankly with this patient population prior to surgery regarding potential harvest-site adverse sequelae.

**Objective:** To evaluate morbidities associated with fibula harvest, and to investigate possible correlations between technique, flap type, and donor site impairment.

**Design:** Non-random case review.

**Participants:** 62 free fibular donor sites in 57 patients were closely examined from of a total of 165 patients. The sample included 33 men and 24 women who were followed up for a mean of 45 months.

**Methods:** Tissue harvested from the lateral calf approach included osseous, osseocutaneous, osseomyocutaneous, and osseomuscular free tissue. A tourniquet was used for all cases, and mean harvest time was 64 minutes. Cutaneous defects >3.5 cm were full-thickness skin grafted from the abdomen, and elastic bandages were used below the knee for 6 weeks. Patients began standing between 1 and 7 days and used crutches for 4 to 6 weeks with full weight-bearing. Risk factors considered to influence donor site morbidity included sex, age, duration of follow-up, preoperative leg conditions, smoking, immobilization, elastic bandage wear, therapy, angiography results preoperatively, tourniquet duration, type of flap, wound closure with or without skin graft, wound problems, and need for wound revision. In addition, the Kitaoka ankle-hindfoot score was used to evaluate functional impairment. Appropriate statistical analyses were then used to assess risk factors against outcomes.

**Results:** 21% of patients had wound healing issues managed by systemic antibiotics, and 13% (n=8) required calf wound revision. Of 8 patients requiring wound revisions, 5 received a skin graft. A total of 48 of 57 patients (84%) had no or minimal gait disturbance, but 5 patients (8%) had significant abnormalities, including an unstable ankle joint. Of the patients, 17 had hammer or claw toes, but none of these were correlated with gait disturbance.

**Conclusions:** The authors were unable to statistically assign correlation between risk factors, Kitaoka score, and donor site impairments. The need for wound revisions, specifically in areas where skin grafting was accomplished, was thought to be due to below-the-knee elastic bandages; however, no "pseudo" compartment syndrome was discovered in these pressure areas. The authors assign the serious abnormalities of gait in 3 patients to the operation but admit the complication is unexplainable. Dysesthesia was reported in 48% of the study population, markedly higher than previously reported ranges of 0% to 30%. None of the risk factors revealed a statistically significant correlation to morbidities.

**Reviewer’s Comments:** This candid review of morbidities associated with free-fibula donor site is a helpful primer for developing an adequate consent process for this patient group. As is often the case with reconstructive surgery, the patient is improving one surgical site at the expense of another! Being aware of harvest-specific problems will help with both preoperative counseling and postoperative management in an attempt to minimize adverse treatment sequelae. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Free Fibula Flaps, Donor Site Morbidity

Print Tag: Refer to original journal article
Including facial CT scans in patients undergoing CT scans to assess the head and cervical spine in evaluating trauma should be considered and analyzed further.

**Objective:** To determine the incidence of facial fractures in patients with head and cervical spine injuries.

**Design:** Retrospective chart review of International Classification of Disease, Ninth Revision (ICD-9) diagnosis and procedure codes from data on >2.7-million reported traumatic events from the National Trauma Data Bank over a 4-year period.

**Methods:** Accumulated data analyzed consisted of 1,309,311 incidents with 4,893,319 diagnosed injuries, as well as 1,297,067 incidents with 5,944,599 performed procedures. Facial fracture diagnosis included any fracture of the frontal, parietal, orbit, maxilla, nasal, ethmoid, zygomatic, palate, alveolar processes, and mandible. Cervical spine injuries included fracture, dislocation, and cervical spinal cord injuries. Head injuries included any injury that required a CT scan for evaluation, such as skull fracture, brain contusions or lacerations, intracranial hemorrhage, and concussion with loss of consciousness.

**Results:** Of the injury victims, there were 117,417 with ≥1 facial fracture, 58,272 with a cervical spine injury, and 334,864 with a head injury. A total of 13.5% of patients with a cervical spine injury also had facial fractures, as did 21.7% of those with a head injury. When patients had both cervical spine and head injuries, 24% also had facial fractures. Head injuries were diagnosed in 40.2% of patients with a cervical spine injury and in 67.9% of those with a facial fracture. Cervical spine injuries were diagnosed in 6.7% of patients who had facial fractures and in 7.0% of those who had head injuries.

**Conclusions:** Diagnostic CT scans in patients with head and cervical spine injuries may detect facial fractures but not with adequate detail to totally evaluate the facial skeleton. Given the high incidence of facial fractures in cervical spine and head injury patients, a better initial CT scan protocol might include a dedicated facial bone scan to include coronal and axial cuts not included in the standard cervical spine and head series. Pending a good cost-to-benefit analysis, current head and neck trauma imaging protocols might need modification.

**Reviewer's Comments:** The additional time to include good facial scans while the head or cervical spine injured patient with suspected facial fractures is on the gantry is minimal. In our institution, we often have to send patients back to the scanner sometime later, which is an inconvenience and possibly avoidable waste of resources. (Reviewer-Sterling R. Schow, DMD).
Intranasal administration of ketorolac is highly effective in controlling postoperative pain after impaction surgery.

**Objective:** To evaluate the efficacy and safety of the intranasal administration of ketorolac for postoperative pain from the removal of bony impacted third molars.

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

**Participants/Methods:** 78 patients were divided into 2 groups by random selection. Both groups included 39 subjects. All patients underwent removal of third molars, at least 1 of which was a bony impaction, under local anesthesia alone. Postoperative pain was evaluated by use of a visual analog scale. When pain reached a 5 on a 10-cm scale, either intranasal ketorolac or intranasal placebo was administered. Pain relief and pain intensity was then measured at 20 and 40 minutes, 1.0 hour, 1.5 hours, and 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, and 8.0 hours after the first dose. Pain intensity differences and pain relief were calibrated, and the groups were compared statistically for pain relief. A rescue drug was administered if requested by the patients in either group.

**Results:** Intranasal administration of ketorolac statistically exceeded in pain relief that which followed intranasal placebo. This occurred at all time frames and lasted out to the 8-hour period.

**Conclusions:** Intranasal ketorolac administration following third molar surgery was significantly superior to placebo in this carefully designed prospective study.

**Reviewer’s Comments:** This is a well-designed prospective clinical trial of nasal administration of a nonsteroidal anti-inflammatory that has been proven to be an excellent analgesic drug when taken either intramuscularly or orally. (Reviewer-Edwin D. Joy, Jr, DDS).

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Keywords: Anesthesia/Analgesia

Print Tag: Refer to original journal article
Botulinum toxin type A may be injected into the external pterygoid muscles to effectively treat recurrent neurogenic TMJ dislocation.

**Objective:** To present the authors' experience treating recurrent episodes of temporomandibular joint (TMJ) dislocation with an injection of botulinum toxin type A.

**Design:** Clinical experience.

**Participants:** 4 patients with recurrent TMJ dislocations who suffered from conditions of neurologic origin.

**Methods:** The 4 patients included a 26-year-old male who had neurogenic TMJ dislocations after suffering severe head and brain injury. Another patient, a 72-year-old female with Alzheimer's and Parkinson's diseases and widespread muscle spasticity, also suffered recurrent dislocations. The third patient was an 88-year-old female with a similar problem with Parkinson's and Alzheimer's diseases. The fourth patient was a 23-year-old male with myotonic dystrophy. In each of the patients, 25 UI of botulinum toxin type A was injected into each of the external pterygoid muscles under electrical control with patients sedated or under general anesthesia. In 1 patient who underwent reinjection a year after recurrence of TMJ dislocation, 10 UI of botulinum toxin type A was also injected into the anterior bellies of the digastric muscles. This caused the patient moderate dysphagia. After initial external pterygoid injections, repeat injections were given when TMJ dislocation became a recurrent problem.

**Results:** Injections of external pterygoid muscles bilaterally were effective in eliminating recurrent TMJ dislocation in all 4 patients with no side effects or adverse events. Additional injections into the digastric muscles in 1 patient caused moderate dysphagia and are no longer recommended. TMJ dislocation recurred in 3 patients 13, 6, and 5 months after injection, and injections were repeated with good effect.

**Conclusions:** Injection of botulinum toxin type A into the external pterygoid muscles under electrical guidance is effective in treating chronic neurologic TMJ dislocation. Recurrence of joint dislocation can be treated again after a minimum 3-month interval.

**Reviewer's Comments:** This would appear to be a very effective, minimally invasive treatment for a significant problem. Other surgical treatments, such as eminectomy or interpositional procedures, are more invasive, more expensive, and likely no more effective. The paper's discussion briefly reviews the pharmacology of botulinum toxin and its contraindications. (Reviewer-Sterling R. Schow, DMD).

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Keywords: Pathology & Immunology

Print Tag: Refer to original journal article
As Operating Time Lengthens, Blood Loss Is Increased

Intraoperative Blood Loss in Bimaxillary Orthognathic Surgery With Multisegmental Le Fort I Osteotomies and Additional Procedures.

Kretschmer WB, Baciu G, et al:

Br J Oral Maxillofac Surg 2010; 48 (June): 276-280

Increasing operative time for iliac crest graft procurement and additional osteotomies performed concomitant with bimaxillary orthognathic procedures will increase intraoperative blood loss and the need for vigilant perioperative monitoring.

**Objective:** To identify factors that lead to an increased transfusion rate in multisegmental bimaxillary surgeries performed in conjunction with additional procedures.

**Design:** Retrospective review of records of 225 consecutive bimaxillary surgery patients aged 16 to 54 years with multisegmental maxillas. All patients were American Society of Anesthesiologists grade I, devoid of coagulopathy, cleft palate, or craniofacial syndromes. Of the patients, 134 were female and 91 were male. A total of 49 patients received iliac crest harvests for grafting, and 64 underwent additional osteotomies.

**Methods:** Total IV anesthesia with propofol and remifentanil served to provide hypotensive anesthesia, and each patient received 500 cc of 6% hydroxyethyl starch as a volume expander before maxillary segmentation. Hemoglobin and hematocrit values were obtained on the day before and the day after surgery. Transfusion indications were either a hemoglobin concentration of <7.0 grams per deciliter or a hematocrit of <20%.

Statistical analyses were performed across several patient groups. Patients receiving only bimaxillary surgery and no additional procedures were classified as Group N, and those with additional procedures were classified as Group AP. Subgroups of Group AP included Group I if they received iliac crest graft procurement, Group AO if they received additional osteotomies, and Group IAO if they underwent iliac crest grafting and additional osteotomies. Influences of sex, age, operating time, and hemoglobin and hematocrit values were assessed.

**Results:** Notably, no surgical or anesthetic complications occurred. Mean preoperative hemoglobin was 14.2 g/dL, and mean hematocrit was 40%. Postoperatively, the hemoglobin decreased by a mean of 25% and the hematocrit decreased 26%. Operating time averaged 258 minutes, with a range of 129 to 389 minutes, representing significant correlation with decrease in hemoglobin concentration. No differences or correlations were noted between men and women or with variable age. Group AP (additional procedures) had a statistically significant blood loss compared to Group N (no additional procedures); however, no significant differences between additional procedure subgroups were noted. Nine patients were cross-matched, but no transfusions were given intraoperatively. Four patients (2%) were transfused; 3 were patients who received iliac crest harvest. No patient received >2 units of blood.

**Conclusions:** Segmentation of the maxilla results in greater blood loss, and this blood loss is increased when additional procedures requiring increased operating time are provided. Reductions of hemoglobin concentration rarely meet transfusion criteria with hypotensive anesthesia techniques.

**Reviewer's Comments:** This study supports our intuitive sense and understanding of blood loss and the rare need for blood replacement products with orthognathic surgery, with or without maxillary segmentation and with or without additional procedures. As operating time lengthens, blood loss is increased with the potential for reduction of hemoglobin concentration. Careful attention to surgical detail, hypotensive anesthetic techniques, and close perioperative follow-up with lab values will continue to guide our clinical decision-making. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Blood Loss, Multisegmental Maxillary Osteotomy, Additional Procedures

Print Tag: Refer to original journal article
Partial Crown Removal From Impacted Molar Lessens Chance of Nerve Injury

A Novel Surgical Approach to Impacted Mandibular Third Molars to Reduce the Risk of Paresthesia: A Case Series.

Landi L, Manicone PF, et al:

J Oral Maxillofac Surg 2010; 68 (May): 969-974

Removing part of the crown of a mandibular impacted third molar may allow migration away from the inferior alveolar nerve.

**Objective:** To present a novel approach for the extraction of a mandibular third molar when there is risk of neurologic damage to the inferior alveolar nerve.

**Design:** Case series of patients requiring removal of mandibular third molars in contact with the inferior alveolar nerve.

**Participants/Methods:** 9 patients with 10 impacted third molars were entered into the study. All patients had third-molar roots in contact with the inferior alveolar nerve and were at risk of nerve injury during extraction. All patients had the mesial portion of the crown removed, which created space for mesial migration of the tooth away from the inferior alveolar nerve.

**Results:** In all cases, the tooth did migrate within 3 months. One tooth required a second procedure to create sufficient room for migration away from the inferior alveolar nerve. All teeth were removed successfully at a second surgical procedure.

**Conclusions:** Removal of part of the crown of an impacted mandibular third molar that is in contact with the inferior alveolar nerve will allow for migration of the tooth away from the nerve, which will lessen the chance of nerve injury during extraction.

**Reviewer’s Comments:** This procedure is similar to partial intentional coronectomy for lessening the chance of nerve injury. It certainly presents a viable surgical alternative in patients with mandibular third molars at great risk for nerve injury during extraction. (Reviewer-Edwin D. Joy, Jr, DDS).

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Keywords: Dentoalveolar Surgery

Print Tag: Refer to original journal article
Free abdominal fat harvest is a simple, predictable procedure that yields ample material for many procedures.

**Objective:** To present the authors' technique for harvest of suprapubic abdominal fat, and to discuss the pertinent anatomy, complications, and uses for harvested fat. **Discussion:** Autologous fat is a near-ideal filler, or augmentation material, in various areas and may be the best available material for facial soft-tissue augmentation. It is often used for frontal sinus obturation to prevent regrowth of the sinus mucoperiosteum. It is used for augmentation of the malar, lip, nasolabial, and mental areas of the face. It is also used by many surgeons when performing temporomandibular joint surgery to prevent heterotopic bone formation and to minimize fibrosis. It has been used to correct contour defects in the head and neck that have resulted from surgery, trauma, or congenital deformities. Discussion of the anatomy of the abdominal fat harvest site from inferior to the umbilicus includes a description of the 7 layers of the abdominal wall. The described technique uses a transverse 3- to 5-cm incision 2 to 3 cm below the umbilicus through skin and subcutaneous tissue to expose the abdominal fat pad, which limits the dissection to superficial of the abdominal muscular fascia overlying the rectus abdominis muscles. Skin and subcutaneous tissues are undermined, leaving a 3- to 5-mm layer of fat attached to skin to minimize wound dehiscence and the uncosmetic result. A bloc of fat is undermined superficial to the rectus abdominis fascia and excised. Because fat shrinkage will occur after transplantation, about 30% more than the estimated volume needed should be harvested. The donor site is closed by advancing the superior and inferior fat flaps toward the skin incision to help eliminate dead space after good hemostasis is obtained. After skin closure, a pressure dressing is recommended for 72 hours. Possible complications of abdominal fat harvest include hematoma or seroma formation, infection, ileus, peritoneal perforation, and incision breakdown. Reported incidences of ileus and peritoneal perforation are rare. The most common reported complication is seroma formation. **Conclusions:** Abdominal fat harvest is a predictable, low-complication, and minimal-morbidity procedure that provides an ideal graft for many uses. **Reviewer's Comments:** A nicely written technique paper covering the anatomy, harvest procedure, and multiple uses of autologous free fat for augmentation or obturation. (Reviewer-Sterling R. Schow, DMD).
Mandibular Advancement Devices Can Cause Malocclusions

Severe Dental Malocclusion: A Rare and Insidious Complication of Mandibular Advancement Devices for Obstructive Sleep Apnea Syndrome Treatment.

Hugentobler M, Scolozzi P:


Objective: To report several cases of malocclusion as a complication of use of mandibular advancement devices used in treatment of obstructive sleep apnea syndrome.

Design: Case reports and discussion.

Participants/Methods: 4 patients were studied: a 49-year-old male, a 42-year-old male, a 33-year-old male, and a 46-year-old female. All had been referred for evaluation and treatment of obstructive sleep apnea symptoms, which included snoring, daytime fatigue, and concentration difficulties. All patients had a normal Class I occlusal relationship. They all had pretreatment polysomnography that revealed moderate-to-severe obstructive sleep apnea syndrome with apnea hypopnea indices of 29.3, 21.6, 66.0, and 41.0, respectively. The first 3 patients underwent treatment with soft acrylic articulated Herbst-like mandibular advancement devices, which advanced the mandible 6 to 8 mm during sleep. The fourth patient underwent treatment with a soft elastomeric monobloc mandibular advancement device, which advanced the mandible 6 mm. The patients were evaluated for development of severe malocclusions 6 months to 6 years later.

Results: Of the patients, 3 underwent 6-month post-treatment polysomnography with the mandibular advancement device in place and had marked improvements in apnea-hypopnea index and symptoms. The fourth patient did not undergo post-treatment polysomnography but reported symptom improvement and continued to use the appliance for 6 years. All 4 patients developed significant open-bite deformities that necessitated appliance discontinuance and a return to continuous positive airway pressure (CPAP) for 1 patient and combined surgical/orthodontic treatment for another. Two patients did not tolerate CPAP and, again the authors’ advice, continued to use their mandibular advancement device. Overall, the appliances caused a mean reduction of 3.0 mm in overbite and 3.1 mm in overjet and only molar occlusal contact in the 4 patients.

Conclusions: Patients should be counseled about the potential alteration of their occlusion when starting mandibular advancement device treatment for snoring and/or obstructive sleep apnea. In addition, an appropriate follow-up schedule to look for occlusal changes or other complications should be maintained.

Reviewer's Comments: For sure, problems such as these and other joint, tooth, and mucosal changes can also result from prolonged wear of such appliances. Should devices of this type be used as a permanent treatment for snoring or sleep apnea, or are they better suited for diagnostic purposes alone? (Reviewer-Sterling R. Schow, DMD).

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Keywords: Pathology & Immunology

Print Tag: Refer to original journal article
CT imaging is highly accurate in determining cervical spine injuries in obtunded trauma patients.

**Objective:** To compare the accuracy of CT scanning with dynamic radiographs for cervical spine clearance in obtunded blunt trauma patients.

**Design:** Prospective study of consecutive obtunded blunt trauma patients admitted to a single level I trauma center.

**Participants:** 402 blunt trauma patients.

**Methods:** Consecutive intubated blunt trauma patients aged >18 years were included in the study. All patients had undergone both CT scans and flexion-extension radiographs to identify or rule out clinically significant cervical spine injuries. Patients with normal CT scans of the cervical spine and no evidence of fracture, subluxation, or disc prolapse then underwent dynamic flexion-extension radiographs to rule out ligamentous injury. Measure of interest in the study was to locate flexion-extension views that were abnormal when CT scans had been interpreted as normal.

**Results:** 80% of patients were men with a mean age of 40 years. Only patients who survived through their ICU stay were included in the study. Mean stay in an ICU was 7 days. Mean hospital stay was 23 days. Only 1 patient had an abnormal flexion-extension radiographic series after having a negative CT scan of the cervical spine. CT scans and flexion-extension radiographs for injury missed on the CT were reviewed again by 3 radiologists. Each independently concluded that the injury was apparent on the original CT but had been missed by the reporting neuroradiologist at the time. The 23-year-old male with the missed injury had been in a motor vehicle collision with polytrauma. His injury was noted on flexion-extension 10 days after admission and represented instability at C-1 to C-2. He had surgical repair on day 12 with a screw fixation and iliac graft and underwent 3 months of immobilization with an Aspen collar.

**Conclusions:** CT imaging is highly accurate in determining cervical spine injuries, and flexion-extension views of the cervical spine do not substantially improve or contribute to identifying injuries in obtunded patients. The authors are against the routine use of flexion-extension views for cervical spine clearance when CT scans are negative.

**Reviewer’s Comments:** Several other studies, in addition to this one, have helped establish CT as the method of choice for clearing the cervical spine in obtunded trauma patients. Some authors have proposed MRI as being better suited than CT to uncover ligamentous injuries, but the majority of those injuries seen on MRI, but not on CT, have not been clinically significant in those the authors quote. (Reviewer-Sterling R. Schow, DMD).

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Keywords: Trauma, Cervical Spine Clearance

Print Tag: Refer to original journal article
The discomfort and disability associated with anterior iliac crest harvesting is more closely correlated with size of the harvest than operating time or incision length.

**Objective:** To determine if single-dose bupivacaine reduces short- or long-term harvest site pain following anterior superior iliac crest harvest.

**Design:** Prospective, randomized, controlled clinical trial.

**Participants:** 200 consecutive patients requiring anterior hip harvest for reconstructive procedures. Excluded were patients with conditions that could bias the scores.

**Methods:** Following randomization through patient selection of envelopes, the patients were divided into those who received single-dose bupivacaine 25 mg in 10 cc with 1:80:000 epinephrine following hip harvest (Group A) and those who did not receive bupivacaine postoperatively. The following measurements were noted on each patient: age, sex, weight, height, body mass index, incision length, procedure duration, surface area of harvest, effect on walking, and blood loss. In addition, questionnaires were provided to each patient with visual analog scale (VAS) and standardized pain score measurements. Patients scored the intensity of pain on the day of surgery and on postoperative days 1 to 7, 14, 21, and 28. Questionnaires were sent out to only 58 available subjects at 1 year. A standard surgical approach and closure for anterior superior iliac crest harvest was used for each patient. Group 1 received the single bupivacaine dose described above on the medial and superior aspect of the harvest site. IV morphine and diclofenac were provided for immediate postoperative pain control, and patients ambulated on the day following surgery. Acetaminophen and ibuprofen were prescribed for home use to control pain. Statistical variables were analyzed with the statistical analysis software package SPSS.

**Results:** Of 200 original questionnaires, 132 were returned and 32 were excluded due to errors. This left 42 in Group B and 56 in Group A. Four lateral cortex perforations were noted in Group B and 5 in Group A. One patient had a fracture of the anterior superior iliac spine, and 1 had a hematoma. All except 1 patient (body mass index, 40.2) stayed in the hospital only 1 day, and this patient required an incision of >9 cm for harvesting bone. There were no significant differences related to the pain VAS at any time measurement or with postoperative ambulation. Group B displayed a higher use of acetaminophen, which was significant at days 4, 5, 6, and 7. Duration of surgery was significantly correlated to VAS pain score on day 2, and surface area of harvested graft significantly impacted walking scores at days 7, 14, 21, and 28. Paresthesia of the lateral femoral cutaneous nerve persisted in 6% of those queried at 1 year after surgery. All patients were satisfied at 1 year.

**Conclusions:** The larger the harvest, the greater the complaints.

**Reviewer’s Comments:** No surprises with this study, other than the seemingly large number of lateral cortex perforations. Indwelling bupivacaine pump catheters have been shown to be very effective for postoperative pain control in these cases and are recommended by this reviewer. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Bupivacaine, Donor Site Pain, Anterior Iliac Crest Bone Harvesting

Print Tag: Refer to original journal article
A Look at Neurosensory Deficit and Recovery Following Mandibular Third Molar Surgery

Incidence of Neurosensory Deficits and Recovery After Lower Third Molar Surgery: A Prospective Clinical Study of 4338 Cases.

Cheung LK, Leung YY, et al:


In a recent study, 67% of patients who underwent third molar surgery experienced complete recovery from inferior alveolar nerve deficits at 24 months, and 72% enjoyed complete lingual nerve recovery from deficits at 24 months.

Objective: To define neurosensory deficit incidence of the inferior alveolar nerve (IAN) and lingual nerves (LN), and to identify risk factors associated with neurosensory recovery.

Design: Prospective study of 8 years of consecutive mandibular third molar surgeries in a single clinic.

Participants: 3595 patients with 4338 lower third molar extractions; 61% were female and 39% were male with an age range of 14 to 82 years.

Methods: All patients devoid of overt pathology and neurosensory deficit history were included. Data were gathered to stratify various parameters and included type and depth of impaction, sex, age, operator experience, flap elevation, lingual nerve protection with an elevator, instrumentation of lingual cortices, tooth sectioning, root recovery, surgical difficulties, and complications. Standardization of assigned tooth position by an examiner was found to be statistically sound, and patients were assessed at 1 week following mandibular third molar extractions. Subjective findings were obtained. This was followed by objective testing, which included light touch, 2-point discrimination, and pin-prick nociception. Regular follow-up appointments at 1, 3, and 6 months, followed yearly thereafter, provided further data for statistical evaluation.

Results: Mesioangular impactions (48%) were most common, along with a mean impaction depth of 3.0 to 6.5 mm. A total of 46% of extractions were performed by dental students, 12% by oral and maxillofacial surgery residents, and 2% by trained oral and maxillofacial surgeons. Of the extractions, 0.35% (15/4338) resulted in an IAN deficit, and 0.69% (30/4338) resulted in LN deficits. Distoangular impactions were significant statistically when evaluating LN deficits only. Depth of impaction showed to be statistically significant with regard to IAN deficits only. A total of 77% of LN injuries occurred with dental student operators, and 53% of IAN injuries occurred after surgeries performed by oral and maxillofacial surgery postgraduates. Lingual flap elevation (33.0% of surgeries) and/or protection of this area with an elevator resulted in 0.91% LN deficit. Distolingual cortex removal did not result in any significant increase in IAN or LN deficits, nor did tooth sectioning or perceived difficulty in tooth elevation.

Conclusions: 67% of IAN deficits were completely resolved at a mean of 49 months, half of which had recovered at 3 months. Permanent IAN deficit was defined at 2 years, at a rate of 0.12%. Four of 30 LN-deficit patients did not return after 1 week. At 6 months, 58% of LN deficits recovered fully. Permanent LN deficit was 0.16%.

Reviewer’s Comments: Although this study does not show a correlation between age at surgery and nerve injury risk, others have recommended third molar surgery prior to age 20 years. Classic classification criteria have defined depth and position to be correlated with possible adverse neurosensory outcomes. Look closely for recovery prior to 6 months. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Neurosensory Deficit, Neurosensory Recovery, Third Molar Surgery

Print Tag: Refer to original journal article
Objective: To evaluate types and duration of neurosensory changes in patients undergoing lateralization of the inferior alveolar nerve for implant placement and restoration in atrophied mandibles.

Design: Prospective cohort study of 87 patients requiring mandibular nerve lateralization for implant placement in the posterior mandible.

Participants: 87 patients ranging in age from 28 to 54 years (47 male, 40 female) with 110 posterior mandibular sites requiring nerve lateralization for concomitant implant placement. Excluded from the study were patients with prior oral surgery history other than extractions and those with systemic disease processes.

Methods: Preoperative CT and panoramic images were obtained for precise localization of the mandibular nerve, and standardized surgical exposure and corticotomies were used by a single surgeon. Nerve mobilization and careful protective handling were ensured while implants were placed prior to repositioning the nerve laterally to the implants. Presurgical and postsurgical questionnaires were used to provide monthly subjective recording of any perceived nerve disturbance or improvement on a monthly basis for the first year after surgery.

Results: 100% of patients reported neurosensory changes in the first postoperative week, including anesthesia (73%), hypoesthesia (8%), dysesthesia (15%), and others. Reports of neurosensory disturbance disappeared in 81 of 110 sites after 1 month. Hypoesthesia (improved from anesthesia) was reported in 12 sites after this initial month, but the original 1-week reports of hypoesthesia all returned to normal. After 2 months, neurosensory disturbance remained in only 15 of the original 110 sites. After 6 months, only 3 sites remained as a neurosensory deficit. At the end of the 1-year study, 2 patients reported “tickling.” This patient cohort reported a 94% satisfaction with nerve lateralization. Three patients complained of tickling, and 2 were unhappy with prolonged hypoesthesia for a 5-month period.

Conclusions: In this study, the duration of significant neurosensory deficit following nerve lateralization in the posterior mandible was 37±15 days. Careful corticotomies and handling of the mandibular nerve can yield overall positive outcomes given patience and a clear understanding of possible adverse outcomes in this very difficult atrophic clinical presentation.

Reviewer’s Comments: This very nice review of nerve lateralization is consistent with previous publications and demonstrates a good sample size to strengthen its validity. Although the risks are statistically low when considering permanent nerve injury with lateralization, the procedure is both technique and operator sensitive and requires clinical mastery over multiple procedures to achieve competence. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Mandibular Nerve Lateralization, Neurosensory Function

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In patients requiring hardware removal after bilateral sagittal split osteotomy, about one half of all hardware is removed due to subjective symptoms.

**Objective:** To investigate osteosynthesis complications related to removal of symptomatic titanium miniplates and monocortical screws.

**Design:** Retrospective review of the records of patients receiving only bilateral sagittal split osteotomy with screw and miniplate fixation via an intraoral route.

**Methods:** Reviewed were records of 153 patients (59% female, 41% male; mean age, 35.1 years) who underwent a mean postoperative follow-up of 23.2 months. A total of 95% of cases addressed mandibular hypoplasia with or without asymmetry. Used were 2.0-mm bone plates from 3 manufacturers. The plates were 1.1 mm in thickness and housed 2.0-mm diameter bone screws. Of the patients, 97% had an intraoral drain placed at the time of surgery. All movements were directed with a surgical splint and stabilized with postoperative elastics. All patients received both perioperative and postoperative antibiotics. The necessity for plate removal was the proposed outcome variable, which was answered in this study as either “yes” or “no.” Other variables examined included age at operation, duration and type of procedure, smoking/tobacco use, and magnitude of movement. Logistic regression analysis explored the relationship between the variables

**Results:** 29 patients (19%) had a plate removed at some time during the follow-up period. Of these patients, about 3/4 were female. Of 29 patients, 28 had bilateral plate removal, although the reason for removal was unilateral in nature. In all, 56 plates were addressed and removed for varying reasons and symptoms. These included cold sensitivity, discomfort, screw loosening, palpability, and infection (n=12). Of 56 plates, 29 were removed in the first year. Patients with cold sensitivity were a mean age of 40.7 years, although there was no statistically significant age association with plate removal. A weak association was drawn between gender and plate removal, although this was also insignificant. Type of mandibular move and length of procedure both did not increase the need for plate removal. Smokers provided the only statistically significant predictor of need to remove hardware, and 25% of infected hardware was found in smokers.

**Conclusions:** Smoking, as evidenced in this retrospective study, is positively correlated with the future need for plate removal and is thus identified as a significant risk factor. Routine use of intraoral drains may have influenced the outcome of this study, specifically with regard to infection.

**Reviewer's Comments:** A broad definition for need to remove hardware, as used by this study, makes it difficult to compare true indications for hardware removal against previous publications that largely describe removal in the face of infection or simply as a matter of course. Bone plates, originally intended for stabilization until healing, were routinely advocated for removal after the plate essentially became a "foreign body." Miniplates and screws now used in North America are routinely left in place in the absence of symptoms. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Symptomatic Miniplate Removal, Bilateral Sagittal Split Osteotomy

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Is Virtual Occlusal Planning Within Limits of Acceptability for Orthognathic Surgery?

Virtual Occlusion in Planning Orthognathic Surgical Procedures.
Nadjmi N, Mollemans W, et al:


3-D virtual planning software allows virtual surgery and occlusal predictions for orthognathic surgery; however, plaster is still a necessary adjunct to therapy!

Objective: To explore improvements in 3-dimensional (3-D) virtual planning of orthognathic surgical cases while describing methodology to facilitate digitized treatment planning representing manual versus software-obtained occlusion and relative occlusal movements.

Design: An experimental bench-top study using original plaster models that were subjected to a Cone Beam CT digitized for virtual manipulation.

Participants: Dental casts of 11 orthognathic patients were obtained, digitized, and analyzed to compare virtual versus manual approach occlusal improvements. All casts were from cases that did not require occlusal adjustments prior to splint fabrication.

Methods: 3 oral and maxillofacial surgeons positioned plaster casts of orthognathic surgery patients into a final occlusion. Plaster casts were then digitized to create surface topographic models, and relative positions of the models were manipulated to an intended best-fit occlusion. Virtual modeling entailed fail-safe systems to indicate dental occlusion virtual collisions as the models approached each other in the software to a precise occlusion. Both free-hand movement tools and more specific guided movement tools detailed the occlusion through calculations of occlusal positions based on defined midline and cusp-tip designations. Recognizing that 2 entities are unable to occupy the same place at the same time, expected arch movements were defined by a rigid motion engine within the software until a stable position was reached. At 3 weeks later, each individual surgeon then manipulated each virtual data set into a final occlusion. Distance maps then were calculated to ascertain the differences noted between manual and virtually planned occlusions for each case and each surgeon.

Results: Defined occlusions were within 0.6 mm as an average measurement between manual and virtual planning within a specific observer and within 0.72 mm between examiners.

Conclusions: 3-D virtual planning may predictably proceed now to include occlusal planning, although the margin of error may not fall within occlusal tolerances. Further, the occlusal information transfer requires an expensive optical localizer and the continued need for plaster casts.

Reviewer’s Comments: As the authors freely admit, the complex topography of the dentition makes it nearly impossible to obtain "perfect occlusion" in the software manipulation of the digitized models. Plaster is still a requirement, and error is inherent in the systems that transfer a manual defined occlusion to computer-aided design planning. Very complex multiplane orthognathic corrections are likely beyond the horizon of this system. (Reviewer-Michael L. Ellis, DDS).

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Keywords: Virtual Occlusion, 3D Planning, Orthognathic Surgery

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