Percutaneous injection laryngoplasty has a significant benefit for improvement of hoarseness and dysphagia associated with acute vocal fold paralysis, with little risk of complications.

_Background:_ Common symptoms of vocal cord paralysis include hoarse voice, aspiration, dysphagia, and weak cough. There are several options for management, but one of the most popular is percutaneous injection to medialize the vocal cord.

_Obstetric:_ To review a recent series of percutaneous injection laryngoplasty using collagen performed by a single surgeon.

_Design:_ Retrospective review.

_Participants:_ 38 consecutive patients injected by a single surgeon.

_Methods:_ Injections were performed using a flexible laryngoscope attached to a video monitor. Local anesthesia was provided with lidocaine and neosynephrine nasal spray. Bovine collagen was injected from a 1-cc syringe into the paralyzed vocal cord while visualizing the results through the laryngoscope. Slight over injection to allow for reabsorption was performed. The amount of injection varied from 0.5 to 2.0 cc.

_Interventions:_ Percutaneous injection laryngoplasty.

_Results:_ In almost half of the patients who were injected, the vocal cord paralysis eventually resolved. Eight patients required subsequent injections. Five patients eventually required thyroplasty. Of the 13 patients with dysphagia, 3 were able to resume oral alimentation after their injection. However, persistent aspiration remained severe enough in 4 patients that a gastrostomy tube was required; however, all of these patients had multiple cranial nerve palsies. Statistically significant improvements were seen between pre- and post-injection in the Glottal Functional Index, the GRBAS Dysphonia Scale, the Functional Outcome Swallowing Scale, and maximum phonation time.

_Conclusions:_ Percutaneous injection laryngoplasty can be done under local anesthesia and improves hoarseness, dysphagia, and aspiration.

_Reviewer's Comments:_ Although this is a well-done retrospective case series, it is a retrospective review. It is difficult to know for sure why these patients improved. Almost half of the patients in this series had a spontaneous improvement in their vocal cord paralysis. Thus, a significant fraction would have experienced improvement even without therapy. Furthermore, even those who did not experience a resolution in their vocal cord paralysis may have benefited from traditional speech therapy techniques. (Reviewer: Benjamin T. Crane, MD).

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Keywords: Vocal Cord Paralysis, Percutaneous Injection Laryngoplasty

Print Tag: Refer to original journal article
Advanced ORN of Mandible Remains a Clinical Challenge

Disease Relapse After Segmental Resection and Free Flap Reconstruction for Mandibular Osteoradionecrosis.

Suh JD, Blackwell KE, et al:
Otolaryngol Head Neck Surg 2010; 142 (April): 586-591

Higher wound complication and disease relapse rates are seen in mandibular osteoradionecrosis patients who undergo microvascular free tissue transfer.

Background: Mandibular osteoradionecrosis (ORN) is a severe complication of head and neck radiation therapy. Controversy exists not only in ORN management but also its pathophysiology. Vascularized bone grafts (e.g. fibular free flap) are widely regarded to be the most reliable method of immediate bony reconstruction. However, studies have shown a higher incidence of early and delayed complications after microvascular reconstruction of ORN cases.

Objective: To assess the clinical outcome of mandibular ORN after single-stage resection and reconstruction with free flaps.

Participants/Methods: A retrospective review of 40 patients with documented mandibular ORN treated by segmental mandibullectomy and free flap reconstruction between 1995 and 2009 at a tertiary academic medical center was performed. There were 26 males and 14 females. The median age of participants was 62 years, and the median follow-up was 17.4 months. All patients received prior radiation therapy to the head and neck for cancer treatment, and 12 of the patients also received adjuvant chemotherapy.

Results: Every patient underwent resection of all visible necrotic bone and soft tissue determined by surgical exploration. The presence of active bleeding from the margins of resection was used as the criterion to judge adequacy of mandibular resection. Flap donor sites included fibula (n=36), latissimus dorsi/serratus anterior/rib (n=3), and iliac crest (n=1). No cases of free flap failure were noted. The postoperative wound complication rate was 55%. Seventeen patients (43%) required removal of mandibular hardware due to infection or extrusion. Ten patients (25%) developed residual or recurrent ORN primarily in the condylar and subcondylar segments near the site of ORN. The median time to wound-related complication was 10.6 months.

Conclusions: Microvascular free tissue transfer is a reliable treatment of mandibular ORN. However, higher wound complication rates can be expected in these patients, and the clinical challenge of determining the amount of appropriate resection remains.

Reviewer's Comments: ORN is a late effect of radiation defined as exposed bone that fails to heal over 3 months. In the head and neck region, it occurs most commonly in the mandible, with a rate of 2% to 22%. Microvascular reconstruction for mandibular ORN has an increased incidence of wound-related postoperative complications compared with free flaps for other indications. Disease recurrence is high even with microvascular reconstruction as shown in this study. It is likely that in addition to the disease process itself, the sacrifice of the inferior alveolar neurovascular bundle and loss of adjacent periosteum to the resection margin contributes to disease recurrence. Additional investigations into the pathophysiology of ORN would help with prevention of wound complications and disease recurrence. (Reviewer-Tang Ho, MD).

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Keywords: Mandibular Osteoradionecrosis, Free Flaps, Segmental Resection, Relapse

Print Tag: Refer to original journal article
Patients with a homozygous polymorphism in NFκB1 have a greater than 3-fold higher risk of bleeding after tonsillectomy.

**Background:** The most common serious complication of tonsillectomy is post-tonsillectomy bleed. This complication also has a risk of mortality, which is probably about 1 death in 10,000 tonsillectomies.

**Objective:** To determine if alleles of the promoter of NFκB1 put patients at increased risk of post-tonsillectomy bleeding.

**Design:** Retrospective study.

**Participants:** 148 patients who had undergone tonsillectomy were included; 68 of the participants were male. The mean age was 25 years. Postoperative bleeding was experienced by 56 of the 148 patients.

**Methods:** Patient DNA was extracted from tonsil tissue or blood. The genotype of NFκB1 was classified using pyrosequencing.

**Interventions:** Tonsillectomy using cold knife dissection and bipolar electrocautery and genetic analysis of blood or tissue.

**Results:** Among the 56 patients who had post-tonsillectomy bleeding, 42 required surgical treatment. The remaining 14 patients were adequately treated with conservative treatment only. The average time when bleeding occurred was 6 ± 4 days (mean ± SD) after surgery. The frequency of the DD genotype was significantly higher ($P < 0.05$) in the cohort of patients who had bleeding. The odds ratio of the DD genotype versus the ID and II genotypes was 3.8. There were no other significant demographic factors between patients who had postoperative bleeding and those who did not. Laboratory values and coagulation studies had no prognostic value.

**Conclusions:** Patients with the DD genotype of the NFκB1 promoter had a more than 3-fold higher risk of post-tonsillectomy bleeding.

**Reviewer's Comments:** This paper was an interesting one, although I think it currently has few implications for selection of tonsillectomy patients or management of post-tonsillectomy bleeding. These genetic tests are not commonly available, and even if they were, the sensitivity and specificity of predicting a bleed would likely be too low to make them useful tests. I suspect that the gene examined in this paper is only one of several that may put these patients at risk for bleeding. As genetic testing becomes cheaper and the relevant genes are understood, I suspect more papers of this type will be published. (Reviewer-Benjamin T. Crane, MD).

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**Keywords:** Tonsillectomy, Bleeding, Genetics, Coagulopathy

**Print Tag:** Refer to original journal article
Calcium channel blockers may decrease the risk of skin flap necrosis in active smokers.

**Background:** Smoking has a well-established detrimental effect on wound healing and skin flap survivability. Calcium channel blockers are potent peripheral vasodilators primarily used to treat hypertension but have also been used in the treatment of Raynaud disease to increase arterial perfusion of the extremities. Experimentally, calcium channel blockers have also been shown to reverse many of the adverse effects of nicotine.

**Objective/Design:** This animal study examines whether the perioperative administration of enteral calcium channel blockers can reverse the effects of smoking on skin flap survival.

**Methods:** A total of 40 rats were divided into 4 groups. Groups A, B, and C were exposed to cigarette smoke in a chamber 20 minutes daily for a total of 21 days. Group D acted as the healthy control. A caudally-based dorsal skin flap was raised on day 14 for all animals. From days 14 through 21, group B animals received verapamil in feeding (20 mg/kg per day) while group C received nifedipine (10 mg/kg per day). Standardized photographs were taken on day 21 and flap survival areas were measured. Homogeneity of smoking exposure was determined by the measurement of urine cotinine concentrations.

**Results:** The mean area of flap survival in the control group was 79.1%, compared to 63.7% for the smoking but untreated group A ($P=0.003$). The mean flap survival for group B (verapamil) was 72.8% and 73.7% for group C (nifedipine). Both were significantly greater than group A ($P=0.04$ and $P=0.008$, respectively). The amount of smoking exposure was not significantly different between the groups.

**Conclusions:** The administration of enteral calcium channel blockers was associated with a statistically significant increase in the amount of skin flap survival compared with untreated animals with an equal amount of exposure to smoking.

**Reviewer's Comments:** Nicotine is a potent vasoconstrictor and has been shown to decrease cutaneous blood flow by as much as 30% to 40%. However, the mechanism by which smoking induces skin flap necrosis is complex. Calcium channel blockers have a vasodilatory effect and experimentally have been shown to reverse some of the adverse effects of nicotine. In this animal study, enteral administration of calcium channel blockers at the time of surgery improved skin flap survival. Given the relatively low adverse effect profile of calcium channel blockers, this could have significant clinical usefulness. It would be interesting to see additional research on the ideal timing and dosages. (Reviewer-Tang Ho, MD).

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Keywords: Skin Flaps, Smoking, Necrosis, Calcium Channel Blockers

Print Tag: Refer to original journal article
High Levels of Esophageal Disorders Identified After HNCA Tx

Esophageal Pathology in Patients After Treatment for Head and Neck Cancer.

Farwell DG, Rees CJ, et al:
Otolaryngol Head Neck Surgery 2010; 143 (September): 375-378

High levels of esophageal anomalies may be found after head and neck cancer treatments.

Objective: To determine the prevalence of esophageal abnormalities after treatment for head and neck cancers (HNCA).

Design: Case series.

Participants: 100 consecutive patients being seen for follow up care >3 months following completion of treatment for HNCA.

Methods: Transnasal esophagoscopy (TNE) was performed in the clinic for all participants. The esophagus was visualized to the squamocolumnar junction, and biopsies were taken when appropriate. The Los Angeles Classification system was used to quantify erosive esophagitis. In addition, subjective questions regarding swallowing were asked, and participants were rated as either symptomatic or asymptomatic. Finally, all participants completed the 10-item Eating Assessment Tool (EAT-10).

Results: 81% of participants had a history of advanced-stage HNCA. The most common primary sites were the oropharynx (38%) and the larynx (33%). The average time since treatment was 40.3 months (range, 3 to 240). Eighty-five percent of the subjects completed radiation as part of their oncologic treatment, and all standard treatment modalities were represented. Thirteen percent of the participants were judged to have a normal esophageal examination. The most common finding on TNE was peptic esophagitis, seen in 63% of participants. The following prevalence figures were identified: stricture in 23%; esophageal candidiasis in 9%; Barrett metaplasia in 8%; gastritis in 4%, and carcinoma in 4%. Patients’ swallowing complaints were not correlated with endoscopic findings. However, EAT-10 scores >25 were significantly associated with stricture (P <0.001). Second primaries and candidiasis were associated with late-stage disease.

Conclusions: A variety of esophageal abnormalities are common in patients previously treated for HNCA.

Reviewer's Comments: Patients are known to be at risk for dysphagia after treatment for HNCA. Abnormalities in oropharyngeal swallowing after treatment have been described in the literature (Starmer et al, 2008). Details regarding esophageal disorders have been less prevalent in the literature, but greater interest in this aspect of swallowing has been observed recently. This study is an important addition to the body of literature concerned with esophageal disorders after HNCA treatments, and identifies high levels of abnormalities ranging from esophagitis to carcinoma. A relatively high rate of stricture is noted in contrast to earlier series. This may be related to the method of evaluating consecutive patients rather than those who are symptomatic. As these authors and many before have noted, patient reports of swallowing difficulty do not always match actual objective findings. One consideration in the interpretation of these data is the wide range of times post-treatment, with some individuals completing treatment as little as 3 months prior and others as long as 20 years later. Certainly, we might expect there to be significant differences according to time. There is no mention of sub-analysis of outcomes by time from treatment, but this information could be quite useful in determining when patients are at greatest or least risk. This understanding would assist in determining the most appropriate clinical care recommendations. (Reviewer-Heather Starmer, MA, CCC-SLP).

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Keywords: Esophagus, Head and Neck Cancer, Dysphagia, Pathology, Cancer

Print Tag: Refer to original journal article
Primary care physicians likely underestimate the expertise of otolaryngologists in areas like allergy and facial plastics.

**Background:** The field of otolaryngology is often mysterious to the lay public as well as some primary care physicians. This may be due to limited exposure to the field during medical school and primary care residencies.

**Objective:** To identify areas of otolaryngology where primary care physicians may not fully appreciate the role of otolaryngologists.

**Design:** Cross-sectional survey.

**Participants:** 1064 residents in primary care specialties, including family medicine, internal medicine, and pediatrics, were included.

**Methods:** 889 emails were sent to primary care residency program directors who were asked to redistribute them to their residents. The survey was done on-line, and no compensation was offered. Residents were asked which specialty was an expert in allergy, oral cancer, restoring a youthful face, sleep apnea, thyroid surgery, and tracheostomy. Choices were general surgery, plastic surgery, ophthalmology, oral maxillofacial surgery, dermatology, and pulmonology. More than 1 specialty could be given for each response.

**Results:** 1064 responses were received; 41% of respondents were men, with the remainder being women. The responses were divided approximately equally between all 3 years of residency. The specialty of the respondents was internal medicine (32%), family medicine (26%), and pediatrics (41%). The percentage of residents who picked otolaryngology as the expert for each respective area was 14% for allergy, 74% for oral cancer, 3% for restoring a youthful face, 32% for sleep apnea, 47% for thyroid surgery, and 73% for tracheostomy. For 2 of the areas, otolaryngology did not even rank in the top 3. For restoring a youthful face, the most common answer was plastic surgery (>90% of responses) followed by dermatology and oral maxillofacial surgery. Similarly, for allergy the top 3 were allergists, pulmonologists, and dermatologists.

**Conclusions:** The scope of otolaryngology practice may be underestimated by many primary care physicians.

**Reviewer's Comments:** I would agree that many primary care physicians do not have an understanding of the scope of otolaryngology. However, I also think that this survey could have been better structured. Many of the survey items, such as allergy, restoring a youthful face, and sleep apnea, are primarily practiced by otolaryngologists with additional training beyond residency. In fact, many general otolaryngology residencies offer little or no training in allergy. Otolaryngologists who focus on cosmetics usually have to problem with outreach to the community, but market themselves as "plastic surgeons" rather than as "otolaryngologists."

(Reviewer-Benjamin T. Crane, MD)
Sinonasal melanoma is most aggressive when margin-free resection is not feasible due to involvement of essential structures.

**Background:** Sinonasal melanoma is a rare and aggressive malignancy that has been typically poorly characterized compared to its cutaneous counterpart. While it is known that outcomes are generally poor, staging and risk factors have not been well described.

**Objective:** To review the authors’ experience in patients with sinonasal melanoma.

**Design:** Single-institution retrospective review.

**Participants:** 25 patients treated between 1992 and 2007 were identified and analyzed.

**Methods:** Charts were reviewed for outcomes, nature of treatment, and presenting characteristics.

**Results:** The mean age was 71 years, and there were 17 women (68%) and 8 men (32%). The most common presentation was recurrent epistaxis, followed by nasal obstruction and facial pain. Nineteen patients were treated with curative intent, while 6 patients received palliative treatment. None of the patients presented with cervical nodal involvement, and only 1 patient presented with accompanying distant metastases. In the 6 patients treated palliatively, the tumor was debulked, while 2 patients received radiotherapy for pain control. The median survival in this palliative group was 12.5 months (range, 7.0 to 22.0 months). In those patients treated for curative intent, the median disease-free survival was 18 months. Overall, patients with maxillary or ethmoid sinus involvement did worse, with a median disease-free survival of 2.0 months and 6.0 months, respectively, compared to the nasal cavity (25.5 months), septum (17.0 months), or turbinate (16.5 months). The median survival of the 16 patients who underwent radical surgery with clear margins was 18 months (range, 4 months to 10 years). There did appear to be a difference in survival between the endoscopic surgery group compared to the open surgery group, but this did not account for initial disease status. The average time to local recurrence was 32 months and for distant metastasis it was 30 months. Of the 17 patients who died during the study period, all but 1 patient (93%) died due to disease. The 5-year overall survival rate was 33%.

**Conclusions:** Sinonasal melanoma is an aggressive, unpredictable disease process that, when possible, is best treated with aggressive resection and postoperative radiotherapy. There is a low rate of cervical metastasis, suggesting that metastasis occurs in a hematogenous fashion. Invasion of the skull base, orbit, or soft tissue portends a poor prognosis, as well as involvement of the ethmoid or maxillary sinuses.

**Reviewer’s Comments:** Sinonasal melanoma is a rare entity, so having 25 cases in 1 center can help provide further insight into this disease. It is notable that regional metastasis is rare, but otherwise, its pattern of locally aggressive behavior, along with a propensity for distant metastasis is expected. Treatment outcomes are especially difficult to ascertain in a retrospective fashion, but certainly wide excision with radiotherapy seems to be the best approach. (Reviewer-Patrick K. Ha, MD).
Interventions for cricopharyngeal dysfunction can improve pharyngeal strength and pharyngoesophageal segment opening, particularly in individuals undergoing muscular dissection.

**Objective:** To evaluate the impact of cricopharyngeal surgery on pharyngeal space and strength.

**Design:** Retrospective case series.

**Participants:** Individuals undergoing surgical management of cricopharyngeal dysfunction (CPD) who underwent fluoroscopic swallowing assessment.

**Methods:** Objective measures of pharyngeal area, constriction, and cricopharyngeal opening were obtained. All measures were compared for each individual in the preoperative and postoperative setting, as well as between groups depending on the procedure.

**Results:** The subject sample included 54 patients. Patients undergoing CP myotomy experienced the greatest degree of improvement in respect to pharyngoesophageal segment (PES) opening. Those individuals undergoing muscular resection procedures also had a significantly greater change in pharyngeal constriction. When comparing preoperative and postoperative measures, pharyngeal constriction significantly improved, but pharyngeal area did not significantly change.

**Conclusions:** Interventions for CPD can improve pharyngeal strength and PES opening, particularly in individuals undergoing muscular dissection. Pharyngeal area does not appear to change in response to such surgeries.

**Reviewer's Comments:** The authors of this series previously demonstrated pharyngeal dilation and weakness of a progressive nature in patients with CPD. The directionality of this relationship has not been established, although it is postulated that obstruction at the level of the CP leads to increased pressure in the pharynx leading to dilation and muscular weakness. Whether these changes are permanent or temporary can have a significant impact on functional outcomes and post-surgical expectations. Certainly there are a variety of factors that can contribute to CPD including a protective response to reflux, post-radiation changes, or incoordination between pharyngeal and esophageal musculature. There is potential that etiology of CPD may impact the extent of pharyngeal dysfunction as well as pharyngeal recovery after management of CPD. Unfortunately, as this is a relatively small retrospective series, analysis of other factors such as cause of CPD was not feasible. Patients undergoing surgical procedures are understandably curious regarding expected outcomes. As CPD interventions are designed to improve swallowing, it is critical that the entire swallowing system be considered. It is not uncommon to see limited pharyngeal propulsive forces unable to clear a bolus, even after CPD management. The finding that muscular dissection was more effective in improving pharyngeal constriction is an important consideration. It supports the need for careful evaluation of pharyngeal swallowing ability prior to surgery in order to determine the most appropriate technique. For patients with intact pharyngeal constriction, minimally invasive approaches (dilation/Botox) may be adequate, but for those with more advanced dysfunction, muscular resection may be preferred. Of course, as the authors state, the patients in this series were not randomly assigned to their treatment groups. As a result, there may be some selection bias impacting the results. As the authors state, a prospective trial examining such factors is certainly warranted. (Reviewer-Heather Starmer, MA, CCC-SLP).

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**Keywords:** Dysphagia, Cricopharyngeal Disorders

**Print Tag:** Refer to original journal article
Geriatric patients, regardless of age, with age-related voice changes can benefit substantially from voice therapy.

**Objective**: To determine the impact of therapy on the presbyphonic voice and to determine if any factors are predictive of greater success.

**Design**: Retrospective analysis.

**Participants**: 67 individuals aged >55 years with a primary complaint of hoarseness, vocal fold atrophy, and absence of laryngeal or neurological pathology.

**Methods**: Medical records were reviewed for participants seen during a 3-year period. Videostroboscopy ratings included degree of glottic closure and degree of vocal fold atrophy. Therapy was provided according to standard of care. Voice therapy outcomes were measured through the American Speech-Language-Hearing Association (ASHA) National Outcomes Measurement System (NOMS) scale. Comorbidities and number of medications were used as proxies for health status.

**Results**: 85% of participants demonstrated significant improvement in response to voice therapy. On the 7-point ordinal ASHA-NOMS scale, 85% of participants improved by 1 to 3 levels. Patients who began therapy at lower functional levels demonstrated greater gains. Larger glottic gaps and greater vocal fold atrophy were negatively correlated with therapeutic improvement, indicating those with smaller gaps and less atrophy had better response to therapy. A weak negative correlation was found between comorbidity index scores and treatment outcomes, suggesting that ill patients are less likely to progress. There was no identified difference between the 85% who improved and the 15% who did not improve.

**Conclusions**: Based on their findings, the authors conclude that geriatric patients should be offered voice therapy to improve quality of life.

**Reviewer's Comments**: Voice difficulties are common among the aged population with recent estimates as high as 29% in senior living communities (Roy et al, 2007). Dysphonia in the setting of individuals at risk for hearing impairment can have a substantial impact on communicative effectiveness and subsequent quality of life. Despite the major impact dysphonia may have on individuals, patients are seldom referred for vocal rehabilitation. This is likely due to a myriad of factors including lack of treatment efficacy, difficulty with mobility/transportation, comorbid illness of self or spouse, or lack of awareness in the medical community that such therapy is available. This important paper demonstrates that voice therapy, a low-risk, low-cost intervention has the potential to significantly improve communication and quality of life. It is important to acknowledge that not all patients may respond equally to therapeutic intervention. As is mentioned by the authors, the majority (72%) of subjects had minimal glottic incompetence. As a result, the overwhelmingly positive impact of voice therapy may not be reflective of expected outcomes in a larger population with greater laryngeal deficits. Patients with larger gaps had smaller gains in response to therapy; however, they did have positive outcomes from therapy. Patients should be counseled to ensure appropriate expectations, but it appears that even the oldest, sickest, and most impaired individuals can obtain some benefit from voice therapy. (Reviewer-Heather Starmer, MA, CCC-SLP).

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Keywords: Presbylarynx, Presbyphonia, Vocal Fold Bowing, Voice Therapy

Print Tag: Refer to original journal article
Mechanical Stimulation May Aid in Facial Nerve Recovery After Repair

Daily Facial Stimulation to Improve Recovery After Facial Nerve Repair in Rats.
Lindsay RW, Heaton JT, et al:
Arch Facial Plast Surg 2010; 12 (May-June): 180-185

This finding supports the role of early soft-tissue manipulation after facial nerve repair and may have clinical implications for the postoperative management of patients after facial nerve manipulations.

**Background:** Facial paralysis carries significant social and functional impairment. Even with microsurgical repair, the functional recovery after facial nerve transection injury is often poor. Few treatment options are available to accelerate or improve functional recovery after facial nerve injury, and none prevents the adverse effect of aberrant nerve regeneration that leads to synkinesis.

**Objective:** To determine whether mechanical stimulation improves the recovery of facial nerve function after repair.

**Methods:** 40 rats underwent facial nerve transection and microsurgical repair. The animals were then randomized into 2 experimental groups, 20 in each group. Both groups received 5-minute manual stimulation of the whiskers with one group undergoing protraction mechanical stimulation and the other group undergoing retraction stimulation. Functional recovery was assessed using a validated quantitative whisking kinematics scale on postoperative week 1, 4 through 8, and week 15.

**Results:** Measurable whisking recovery was noted by postoperative week 4 in both the protraction and retraction groups. Compared with historical controls, both protraction and retraction groups demonstrated statistically significant functional recovery at multiple time points during the 15 weeks (P <0.005). Recovery was similar for both groups but there was a trend toward better recovery in the protraction group. A plateau of recovery was achieved for whisking amplitude, velocity, and acceleration between weeks 7 and 15.

**Conclusions:** Mechanical stimulation of rat whiskers significantly improves facial nerve function recovery after transection injury and microsurgical repair.

**Reviewer's Comments:** Functional results of most surgical nerve repairs remain generally disappointing, and there is significant interest in stimulating nerve recovery in addition to surgical repair. The findings in this study are exciting and verify the results of other similar types of studies in the past. The findings potentially support the clinical use of early soft-tissue manipulation after facial nerve repair. Further studies looking at the mechanism by which the recovery occurs would be of significant interest. (Reviewer-Tang Ho, MD).

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Keywords: Facial Nerve Injury, Facial Nerve Repair

Print Tag: Refer to original journal article
Amount of cartilage morselization is inversely proportional to chondrocyte viability.

**Background:** Intact nasal cartilage grafts can leave contour abnormalities because of sharp edges and step-offs, especially in thin-skinned individuals. Crushed cartilage grafts are more pliable and easier to mold and are often used to soften transitions, conceal irregularities, and fill defects where structural support is not required. However, there is perceived clinical unpredictability with crushed cartilage.

**Objective:** To examine the distribution of viable chondrocytes in crushed cartilage.

**Methods:** Nasal septal cartilage from 6 patients was crushed to variable degrees according to a validated clinical scale. Chondrocyte viability analysis was then carried out in 12 hours with confocal microscopy. Digital images were obtained for each specimen and cell counts were obtained. Viability was calculated by dividing the number of live cells by the total number of cells for each image.

**Results:** Chondrocyte viability was 74% for intact cartilage, 67% for slightly crushed cartilage, 55% for moderately crushed cartilage, 39% for significantly crushed cartilage, and 25% for severely crushed cartilage. Slightly and moderately crushed cartilages have uniform distribution of viable and non-viable cells. Significantly and severely crushed cartilages have clusters of non-viable cells.

**Conclusions:** Increased intensity of morselization results in increased chondrocyte death, which may result in clinically unpredictable cartilage grafts.

**Reviewer's Comments:** The result from this small clinical study is certainly not surprising, and the study is limited by the small sample size and the lack of long-term chondrocyte viability analysis. However, the authors are to be applauded for providing concrete scientific data on this topic. As the authors have pointed out, the survivability of cartilage graft depends not only on the cartilage graft itself but also the grafting environment. Furthermore, it would be interesting to see whether chondrocyte viability really is correlated with graft survival, since there are data to suggest that irradiated cadaver cartilage may offer predictable cartilage graft options. (Reviewer-Tang Ho, MD).

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Keywords: Cartilage Graft, Chondrocyte Viability

Print Tag: Refer to original journal article
Chemoradiotherapy with intensity-modulated radiotherapy aiming to reduce dysphagia can be performed safely for oropharyngeal cancers and has high locoregional tumor control rates.

**Background:** In the intensity-modulated radiotherapy/chemotherapy era, outcomes have largely improved. However, dysphagia is a feared complication of nonoperative management of head and neck cancer. Dr Eisbruch’s group has previously identified the pharyngeal constrictors, the glottis, and the supraglottic larynx as structures critical to development of dysphagia. For example, sparing the medial constrictors, which cover the medial retropharyngeal nodes and are thought rarely to be at risk for metastatic spread, may be one method for improving late function.

**Objective:** To demonstrate whether reduction of the doses to these critical structures is safe as well as efficacious.

**Design:** Prospective study from University of Michigan.

**Participants:** 73 patients had Stage III or IV oropharyngeal cancers. Cancers involving the posterior pharyngeal wall or with evidence for retropharyngeal nodal involvement were excluded.

**Methods:** Gross target volumes (GTV) and clinical target volumes (CTV) were each expanded by 3 mm to define the planning target volumes (PTV). Doses of 70 Gy and 59 to 63 Gy were delivered to the GTV and subclinical CTVs, respectively. These were delivered in 35 daily fractions. The lateral, but not the medial, retropharyngeal nodes were targeted for all patients. Planning objectives included the sparing of the pharyngeal constrictors, esophagus and the glottic and supraglottic larynx, the major salivary glands, and oral cavity as long as these were not part of the target volumes. Chemotherapy was weekly carboplatin and paclitaxel. Videofluoroscopy was performed at 3, 12, and 24 months and scored. Patient-reported dysphagia information was captured with questionnaires.

**Results:** All patients received their radiotherapy without interruption. In total, 93% received 6 of 7 planned courses of chemotherapy. With a median follow-up of 36 months, 4% had locoregional failure, 2 within the ipsilateral level II CTV and 1 within the GTV of a locally advanced tonsil cancer. Thirty percent underwent neck dissections and 29% of those had microscopic neck disease. Average mean dose to the pharyngeal constrictors, larynx, and esophagus was 58 Gy, 48 Gy, and 34 Gy, respectively. During treatment, 29% of patients required a feeding tube, with enteral feeding still required in 6% to 7% of patients 3 to 6 months after treatment. By 12 months, one patient required a feeding tube and 94% had normal diets (dysphagia grades of 0 to 1). Weight loss peaked at 1 to 3 months (70% and 40% had >10% and >15% weight loss, respectively). Questionnaires showed worsening of dysphagia at 1 month and significant improvement thereafter. Outcomes correlated with pharyngeal constrictor, laryngeal, and esophageal mean doses.

**Conclusions:** Efficacy of treatment was not compromised by efforts to spare the critical swallowing organs located outside the PTVs.

**Reviewer’s Comments:** This is another excellent contribution from these authors. One take-home point for me was that, in the eyes of the patients, dysphagia worsened at 1 month post-treatment. I would ask why only 29% received a feeding tube when 70% had weight loss >10%. Follow-up was short. (Reviewer-Jonathan J. Beitler, MD, MBA).

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Keywords: Oropharyngeal Cancer, Dysphagia, Intensity-Modulated Chemotherapy

Print Tag: Refer to original journal article
Genetic testing was able to identify SLC26A4 or GJB2 as the cause of deafness in almost 20% of adult cochlear implantation candidates.

Background: Patients with hearing loss often ask why their hearing loss occurred and what the chance of passing this trait to their children is. The most common gene known to cause non-syndromic deafness is GJB2, which encodes protein Connexin 26. Other common deafness genes include SLC26A4 and GJB6. There have thus far been few studies of the prevalence of these genes in the adult population.

Objective: To determine the prevalence of GJB2, GJB6, and SLC26A4 in the adult population.

Design: Prospective observational study.

Participants: 57 adults who met criteria for cochlear implantation (CI).

Methods: Patients evaluated for CI between November 2007 and April 2009 were approached for participation. Patients gave informed consent and blood was given for genetic testing. The assessment also included family history, medical history, audiometry, otoacoustic emissions, electronystagmography, and computed tomography (CT).

Interventions: Genetic testing.

Results: Of the 57 patients analyzed for GJB2, 14% were found to have their hearing impairment caused by this gene. Three of the patients with GJB2 mutations had serviceable hearing into early adulthood suggesting that the hearing loss is progressive in some. Large deletions in the GJB6 proteins were also looked for in the GJB2 patients, but none of these mutations were found. Thirty patients were examined for SLC26A4 mutations, and 5 (16%) of these patients were found to have mutations that were likely the cause of their deafness. Two of the SLC26A4 patients had enlarged vestibular aqueduct on CT. Thus, of the 57 patients examined, 11 (19%) were confirmed to have a mutation in either GJB2 or SLC26A4.

Conclusions: Genetic testing was able to identify SLC26A4 or GJB2 as the cause of deafness in almost 20% of adult CI candidates.

Reviewer’s Comments: There continues to be a large fraction of patients with profound hearing impairment of genetic origin. Unfortunately, in the majority of these patients in our practices, the genetic cause of the hearing loss will be unclear. This study shows the prevalence of SLC26A4 and GJB2; however, this is a small group of patients in a limited geographic area. Genetic testing is currently a rapidly advancing field and I suspect in the near future we will see larger series of patients with more genes examined. (Reviewer-Benjamin T. Crane, MD).

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Keywords: Hearing Loss, Deafness, Genetic Testing, Cochlear Implantation

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Use of Tissue Expanders in Forehead Flap Reconstruction of Nasal Defect

Extended Forehead Skin Expansion and Single-Stage Nasal Subunit Plasty for Nasal Reconstruction.

Weng R, Li Q, et al:


Extended tissue expansion of the forehead skin combined with immediate rigid nasal framework reconstruction can be useful in reconstruction of complex nasal defects.

**Background:** Forehead flap is one of the best options for nasal reconstruction given its color and texture match. However, the amount of forehead skin available often is insufficient for large nasal defects. Although healing by secondary intention is acceptable, it prolongs the recovery period and leaves unsightly scars.

**Objective:** To examine the authors’ experience with using expanded forehead flaps for nasal reconstruction combining extended forehead skin expansion with structural autologous cartilage grafting.

**Participants/Methods:** 43 patients over a 9-year period were reconstructed using the 3-stage protocol: extended forehead skin expansion (with approximately 4-week delay after completion of expansion), nasal reconstruction utilizing structural grafting with autologous rib cartilage, and pedicle separation. Minimum follow-up was 12 months.

**Results:** No significant secondary shrinkage of the expanded forehead flap tissue was noted. Subjective satisfaction with esthetic outcome was 81%. Subjective satisfaction with functional outcome was 70%. Donor site esthetics was rated satisfactory by 77% of patients. Notable complications included brow elevation in 5 patients, L-strut distortion in 4 patients, and nasal obstruction in 4 patients.

**Conclusions:** Combining extended forehead skin expansion with structural grafting achieves satisfactory esthetic and functional outcomes in nasal reconstruction.

**Reviewer's Comments:** Expansion of forehead skin for use in nasal reconstruction is not widely used because of concerns regarding immediate recoil and secondary contraction of the flap skin. This study shows that with the use of extended tissue expansion sufficient in volume in time combined with immediate single-stage rigid nasal frame support, satisfactory esthetic and functional outcome can be achieved. This also offers the additional advantage of needing minimal defatting of the flap for skin flap refinement. However, with the use of tissue expanders the reconstruction process is prolonged to an average of 3 to 4 months, with an average expansion time of 78 days. Patients will need to be advised and prepared accordingly prior to initiation of the procedure. (Reviewer-Tang Ho, MD).

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Keywords: Forehead Flap, Nasal Reconstruction, Tissue Expansion

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Comparable functional outcomes are seen in segmental mandibulectomy defects reconstructed with osteocutaneous radial forearm free flaps and fibular free flaps.

**Background:** Free flap reconstruction of segmental mandibular defects usually means fibular free flap (FFF). However, osteocutaneous radial forearm free flaps (OCRFFFs) are gaining some popularity.

**Objective:** To compare the functional outcomes and morbidity for these 2 types of flaps for patients undergoing mandibulectomy reconstruction.

**Design/Methods:** A retrospective review was conducted of 168 patients requiring free flap reconstruction of segmental mandibular defects performed from 2001 to 2008. There were 117 FFFs and 51 OCRFFFs. The mean follow-up time was 31 months. Anterior floor of mouth lesions were more commonly reconstructed with FFF, and OCRFF was preferred in lateral alveolar ridge and retromolar trigone lesions.

**Results:** Most of the reconstruction was done for cancer reconstruction (96.2%). Flap failure rates were 3.4% for the FFF group and 3.9% for the OCRFFF group. Donor site complications were noted in 4.3% of the FFF patients, but none were noted in the OCRFFF group ($P=0.13$). Dental implants were rarely placed (only in 2.3% of the patients). Functional outcome was comparable between the 2 groups in regard to resumption of oral diet (72.6% for FFF vs 79.1% for OCRFFF; $P=0.49$) and retention of feeding tube (27.4% for FFF and 20.9% for OCRFFF; $P=0.49$).

**Conclusions:** OCRFFF appears to provide comparable functional outcome with FFF in reconstruction of selected segmental mandibulectomy defects.

**Reviewer's Comments:** FFF has been the first choice for segmental mandibulectomy reconstruction for good reasons. The pedicle is long, and there is plenty of bone stock. However, there is certainly notable donor site morbidity associated with its use. Furthermore, it sometimes may not be an option given factors such as previous trauma or existing peripheral vascular disease. The use of OCRFF is a possible alternative, and as shown in this study, it provides comparable functional outcome. However, the risk of radius fracture, though not seen in this study, is devastating when it does occur, and patients should be advised accordingly. Although not specifically mentioned in this study, the authors appear to prophylactically plate the donor site, which is gaining in popularity, to prevent the complication of radius fracture. (Reviewer-Tang Ho, MD).
The Mitek minianchor system can be a useful adjunctive method in the treatment of facial paralysis.

**Background:** Facial paralysis is a clinical challenge partially because a wide range of treatment options are available, but none is perfect. Static sling in the form of autogenous fascia, Alloderm, or Gore-TEX are relatively easy to perform but offers limited improvement.

**Objective:** To evaluate the clinical utility of the Mitek minianchor suture system as an adjunctive procedure for static facial suspension for the treatment of facial paralysis.

**Methods:** The Mitek minianchor system was used in 3 patients for adjunctive static facial suspension. The Mitek screw was anchored in the maxilla at the level of the pyriform aperture with 2 suture arms. One suture arm was used to elevate the oral commissure, and the other was used to adjust upper lip symmetry or external nasal valve opening. Outcome was assessed by photo-documentation and clinical examination.

**Results:** Improvement in oral commissure vertical symmetry averaged 76.9% (range, 43% to 100%). An average of 65.0% improvement in Cupid's bow horizontal alignment was noted (range, 50% to 100%). Improvement in upper lip symmetry averaged 85.3% (range, 67% to 100%). Functional improvement in oral-nasal competency was experienced by all patients.

**Conclusions:** The Mitek minianchor system offers a safe and useful adjunctive method for improvement of facial symmetry and oral-nasal competency in patients suffering from facial paralysis.

**Reviewer's Comments:** There is no perfect solution for the treatment of patients with facial paralysis. The treatment often requires a multistage approach for optimal outcome. Static sling procedures, including the Mitek minianchor system discussed in this study, have obvious limitations in that they do not re-establish movement. However, they can serve as useful adjunctive procedures; in selected patients, a static sling may be all that is necessary or desired by the patient. The main advantages of the Mitek minianchor system lie within its multi-vector fixation and ease of placement. Although no long-term follow-up data are available, it is likely that patients will need additional "tune-up" procedures in the future to maintain the improvement. (Reviewer-Tang Ho, MD).

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Keywords: Facial Paralysis, Static Sling, Mitek Anchor

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Removal of maxillary sinus retention cysts is not responsible for symptomatic response in patients undergoing endoscopic sinus surgery.

**Background:** Retention cysts are commonly found in the maxillary sinus and are often an incidental finding. Although most retention cysts do not result in symptoms, some are associated with headaches, facial pain, nasal discharge, and other complaints.

**Objective:** To establish the utility of endoscopic sinus surgery (ESS) in producing symptomatic relief after excision of maxillary retention cysts.

**Design:** This was a prospective, randomized study conducted at a single tertiary care medical center.

**Participants:** 80 patients with symptomatic maxillary retention cysts that occupied at least 50% of the maxillary sinus were included in the study.

**Methods:** Patients received either endoscopic ethmoidectomy and middle meatal antrostomy with cyst excision or ethmoidectomy and antrostomy without cyst excision. Patients were then followed up for treatment success or failure using a visual analog scale (VAS) rating system.

**Results:** For all patients, the mean Lund-MacKay score on the retention cyst side was 2.75 ± 1.88. Obstruction of the osteomeatal unit was more common on the cyst side than the control side, although this difference did not reach statistical significance. After surgery, there was a statistically significant improvement in facial pain, nasal obstruction, and nasal discharge for both groups, as assessed by the VAS grading system. A similar percentage of treatment failures (9.75% to 13%) was observed in each group.

**Conclusions:** No significant differences in treatment relief were observed between the 2 groups. Retention cyst size was not a significant predictor of treatment success.

**Reviewer's Comments:** Most maxillary sinus retention cysts are asymptomatic. Nonetheless, several studies have shown an association of some retention cysts with multiple patient complaints. In the current study, the most commonly reported symptom was facial pain or pressure. Interestingly, surgical success in the current study was independent of removal of the actual cyst. The authors note that 25% of their patients reported a history of recurrent acute sinusitis, and that their average Lund-MacKay score was 2.75. This suggests that many of these patients were symptomatic due to underlying osteomeatal complex disease, rather than the maxillary retention cysts. This is strengthened by the lack of association between cyst size and VAS scores. Unfortunately, Lund-MacKay scores were not reported for the contralateral side. In general, the authors correctly conclude that the maxillary sinus retention cysts in this study were likely not responsible for the patient's symptoms. It is reasonable to conclude that surgery should be directed at restoring adequate sinus ventilation and drainage rather than at retention cysts themselves, which likely represents an incidental finding. (Reviewer-Justin H. Turner, MD, PhD).

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Keywords: Maxillary Cyst, Endoscopic, Surgery, Symptom Score, Cyst Size, Outcomes

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Simple Methods May Improve Detection of Primary Tumor Site

New Techniques to Detect Unknown Primaries in Cervical Lymph Node Metastasis.

Sakai A, Okami K, et al:

Laryngoscope 2010; 120 (September): 1779-1783

Simple neck maneuvers during flexible laryngoscopy with hooded instruments may improve the detection of primary sites in patients with an unknown primary tumor.

**Background:** Patients with neck cancer require clinical laryngoscopy, but its detection rate of the primary site is still suboptimal. Imaging modalities such as CT scan and PET-CT scan are frequently used, but it is unclear whether these maneuvers improve the determination of the primary site. Invariably, these patients require an operative laryngoscopy and, at times, a blind biopsy and tonsillectomy.

**Objective:** The authors report their clinical practice of improving the detection of primary site in the clinic.

**Design/Participants:** This was a retrospective review of the records of 51 patients seen at a single practice from 2000 to 2005. The selected patients were those with neck cancer with an unknown primary.

**Methods:** The "new" method consisted of using flexible laryngoscopy with a hooded tip and narrow band imaging capability. Endoscopy is performed with the neck in the neutral position, in the head torsion position, with the Valsalva maneuver, and in the Killian position. The control group of patients had flexible endoscopy performed in the neutral head position.

**Results:** The new method of endoscopy detected the primary lesion at a rate of 71% versus 30% in the conventional control group.

**Conclusions:** The modified method of flexible laryngoscopy using a hooded scope with narrow band imaging capability may improve the ability to detect the primary site in patients with an unknown primary tumor.

**Reviewer's Comments:** The use of these neck positions is not novel but should be reviewed with all otolaryngologists. The head torsion maneuver opens up the contralateral piriform sinus, and the Valsalva maneuver expands the mucosa of the piriform sinus to improve its visualization. The Killian maneuver, in which the neck is placed in hyperflexion, improves visualization of the postcricoid region. What is new here is the use of the hooded laryngoscope with a narrow band imaging capability. However, this report is not clean enough to attribute the improvement in detection rate to these novel technologies. In fact, this report lacks any mention of statistics, which is surprising. A simple survey of the results suggests that the improvements may come from detection of the hypopharyngeal region. However, there are no statistics to derive any meaningful statements from these numbers. The improvements may have come from simple neck maneuvers; however, as written, this report cannot determine if this is the case. (Reviewer-Young J. Kim, MD).

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Keywords: Head & Neck Squamous Cell Carcinoma, Unknown Primary, Flexible Laryngoscopy

Print Tag: Refer to original journal article
For the treatment of Frey's syndrome, botulinum toxin type B may last for more than 12 months.

**Background:** Frey's syndrome is very common after parotidectomy. Fortunately, most patients do not have any symptomatic problems. For those with severe gustatory sweating, there are a few compensatory treatments for this uncommon situation. Simple maneuvers such as antiperspirants have been useful. Others have reported surgical maneuvers to correct this problem. The use of botulinum toxin type A has been reported with success. However, the extensive botulinum experience with face wrinkles and spasmodic dysphonia have revealed that some patients become refractory to botulinum toxin type A due to antibodies.

**Objective:** The authors, therefore, studied the efficacy of botulinum toxin type B for Frey's syndrome. Another rationale was that type B botulinum toxin has been noted to be more efficacious for cholinergic nerves and that the treatment can last >3 months.

**Participants/Methods:** This is a case series of 7 patients who presented with Frey's syndrome for 1 year. All patients were treated with botulinum toxin type B.

**Results:** 6 patients reported resolution of symptoms, and one patient reported a decrease in symptoms. Improved symptoms were noted past 12 months in most of the patients. No facial paresis was seen.

**Conclusions:** The authors report that botulinum toxin type B may be efficacious for symptomatic Frey's syndrome.

**Reviewer's Comments:** Probably for practical reasons, the authors could not compare botulinum toxin type A versus botulinum toxin type B. However, this was a well-designed report with appropriate pretreatment and posttreatment evaluations. The most impressive result was the apparent length of symptom reduction with botulinum toxin type B. Unlike the mean symptom-free and symptom-reduced length of 9 months with botulinum toxin type A, botulinum toxin type B appears to extend beyond 12 months. (Reviewer-Young J. Kim, MD).

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Keywords: Parotidectomy, Frey's Syndrome, Botulinum Toxin

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The type of thyroid surgery as well as intraoperative blood loss cannot predict the degree of postoperative drain output.

**Background:** The use of postoperative drains after thyroidectomy is still not a settled question. This question is more relevant since some consider thyroid surgery an outpatient surgery. There has been a trend to avoid the use of drains, but with inconclusive evidence that drains are not necessary, the authors studied their series on the use of drains after thyroid surgeries.

**Objective:** To define the various factors that may require the use of drains. The authors were able to do this since they quantitated the amount of postoperative drain output with an active drain.

**Design/Participants:** This was a retrospective study involving 100 patients in a single institution from a single surgeon.

**Methods:** The type of surgery (lobectomy vs total), intraoperative blood loss, and postoperative drain output were measured and correlated. Retrosternal goiters were excluded.

**Results:** Total thyroidectomy was associated with more blood loss, but the difference was modest. More postoperative drain output was noted in patients with higher blood loss intraoperatively; however, the difference was modest. The median postoperative drain output was 32 mL for all surgeries.

**Conclusions:** Although there was a statistically significant association of postoperative drain output with the extent of surgery and intraoperative blood loss, the authors cite that there was no clear quantitative evidence to predict who would need postoperative drains.

**Reviewer's Comments:** One take-home message from this report is that the typical drain output after thyroid surgeries are low (around 30 mL), but the range is somewhat broad (10 to 300 mL). Although the authors tried to determine if their analysis could predict which patients would have increased blood loss, they realized that their study could not determine this. Part of the problem may be that they selected a surgical population with low intraoperative blood loss and low postoperative drain output. They do note, however, that some of those with extensive postoperative drain output were those with minimal intraoperative blood loss and those undergoing hemi-thyroidectomy. In short, this paper does not resolve the issue of whether postoperative drains are necessary after thyroid surgeries. (Reviewer-Young J. Kim, MD).

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**Keywords:** Thyroidectomy, Postoperative Drains

**Print Tag:** Refer to original journal article
Polymorphous Low-Grade Adenocarcinoma Is a Misnomer

Polymorphous Low-Grade Adenocarcinoma: The University of Pittsburgh Experience.
Seethala RR, Johnson JT, et al:

Polymorphous low-grade adenocarcinoma has an indolent but aggressive clinical course.

**Background/Objective:** Adenocarcinoma of the salivary glands involves uncommon tumors in the head and neck, and there are still controversies on how to categorize some subtypes of this disease. This is evident in the several different types of names that are thrown around by pathologists. One subtype of adenocarcinoma is polymorphous low-grade adenocarcinoma (PLGA), which was reported to have low-grade histopathology. However, some have reported aggressive behavior clinically. Therefore, the clinicians at the University of Pittsburgh have performed a clinicopathological review of their series with PLGA.

**Design/Methods:** This is a retrospective cohort review of the records of patients with PLGA at a single institution from 1973 to 2005.

**Results:** 30 case specimens were reviewed, and 24 cases with PLGA were analyzed for histologic variables as well as clinical course. Diagnosis was still problematic. Most of these lesions occurred in the palate, and 17% presented with neck disease, particularly those with a base-of-the-tongue primary. After a follow-up that lasted decades, these patients had a 29% rate of recurrence. The use of radiotherapy was not noted in this series. The site of presentation was the only significant determinant of disease-free survival, although these tumors presented with perineural spread and bone invasion.

**Conclusions:** PLGA histology should have a monophasic nature and classic nuclear features to be considered a PLGA. Also, the authors note that this is an aggressive disease despite its innocuous name. However, this is an indolent disease that require decades of follow-up. These tumors can spread to the neck, so the authors tend to favor elective neck dissections.

**Reviewer's Comments:** One problem with PLGA is with the diagnosis. Multiple pathologists at different institutions should examine the slides to confirm the diagnosis. PLGA has an innocuous name, but this disease can behave like an adenoid cyst in that it can have an indolent nature. The recurrent disease is typically resectable, so the benefits of radiotherapy are unknown. Given the low incidence of this disease, we have these case series to direct our management of these patients. The authors recommend elective neck dissection of these patients, particularly those with base-of-the-tongue presentation. (Reviewer-Young J. Kim, MD).

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Keywords: Adenocarcinoma, Salivary Gland, PLGA

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