Abstracts

Select Craniomaxillofacial Abstracts
Abstracts From Ohio Valley Society of Plastic Surgeons (OVSPS) 2020 Virtual Meeting

We are pleased to announce a partnership between FACE and the Ohio Valley Society of Plastic Surgeons (OVSPS). In the inaugural issue of FACE, we have published the craniomaxillofacial abstracts presented at the 2020 OVSPS meeting, held virtually because of the ongoing COVID-19 pandemic. OVSPS leadership is eager to enhance the society’s position through this partnership with the American Society of Maxillofacial Surgeons (ASMS) and the American Society of Craniofacial Surgeons (ASCFS). This partnership fits well with OVSPS’ mission to disseminate the research and innovation present among its institutions within the Ohio Valley. The partnership also fits well with FACE’s mission to increase our readership. We look forward to the annual publication of OVSPS craniomaxillofacial abstracts in the summer issues of FACE.

The abstracts are published without editing because they were peer-reviewed prior to acceptance for presentation at the OVSPS meeting.

Sincerely,
Ananth Murthy, MD (President, OVSPS)
John A. van Aalst, MD (Editor-in-Chief, FACE)

ORAL PRESENTATIONS

1204: Standardized Schematics for Facial Trauma Planning: A Clinical Education Tool
Brandon J. De Ruiter, BS; Robert P. Lesko, BA; Edward H. Davidson, MD

Background: Learning facial fracture management principles can be challenging for surgical trainees. Residents must assimilate nuanced information on fixation techniques, skeletal biomechanics, and hardware use while managing acute work-flow limitations. The aim of this study was to design a standardized schematic for teaching facial fracture management and evaluate its performance improving resident operative planning.

Methods: Printable schematics of the facial skeleton with soft-tissue overlay were developed. Instructions on depicting fracture pattern, incisions, plating sequence, load-bearing/sharing plates, locking/non-locking screws, and monocortical/bicortical screws were given. Senior residents (n=5) evaluated computed tomography of three mandibular fractures and submitted three operative plans per case: first without guidance, then with written instruction, and finally using the schematic (total n=45). Performance in each trial was graded on content and conceptual correctness. Likert-scale surveys were given assessing understanding, communication, and operative planning.

Results: Schematic use improved operative plan content and facilitated communication of resident operative schemes. Of seven content domains spanning approach, plating strategy, and screw selection, a mean of 2.3, 3.7, and 6.5 were included with no guidance, written instruction, and schematic use respectively. Information on approach (p=0.001), plating type (p=0.02), screw location (p<0.000), monocortical/bicortical screw type (p=0.000), and screw locking status (p=0.000) were significantly improved when comparing pre- and post-intervention plans. All subjects “agreed” (n=2) or “strongly agreed” (n=3) that schematic use aided operative planning and communication.

Conclusion: Simple, guided interventions can enhance surgical training by identifying knowledge gaps, improving visuospatial conceptualization, and facilitating targeted discussions with attendings.

1239: Reconstruction of Calvarial Wounds Complicated by Infection: Effect of Varying Doses of Bone Morphogenetic Protein 2
Lucas A. Dvoracek, MD; Kyle S. Parks, PhD; F. Paul Marji, MD; Saigopalakrishna Yerneni; Phil G. Campbell, PhD; Greg Cooper, PhD; James Gilbert, PhD; Joseph E. Losee, MD

Introduction: Calvarial defects complicated by infection and scarring are a reconstructive challenge. BMP-2 bioprinted on acellular dermal matrix (ADM) has shown promise in stimulating osseous regeneration in these calvarial defects in rabbits. The optimal dose has yet to be determined.

Methods: Thirty New Zealand white rabbits underwent subtotal calvariectomy wherein a 15mm x 15mm flap of bone was excised and incubated in a planktonic solution of S. aureus before reimplantation. After subsequent infection the flap was removed and the surgical wound debrided, followed by antibiotic treatment. On postoperative week 6, the scarred calvarial defects were treated with acellular dermal matrix bioprinted with 11ug, 55ug, or 110ug of BMP-2. Bone regeneration was analyzed with serial CT at days 1 and 21 and 2, 4, and 6 months.
**Results:** All groups demonstrated progressive healing of the defects during the follow-up period. One-way ANOVA showed no difference among groups at any time points. The 110ug group trended toward more healing than other doses, with 82% (±5.8% S.E.) bone regeneration, compared to 60% (±9.1%) and 67% (±15.4%) healing in the 11ug and 55ug groups. No formation of heterotopic bone was noted in animals treated with higher doses.

**Conclusion:** Higher doses of BMP-2 biopatterned ADM led to greater amounts of healing, while still requiring orders of magnitude less than the doses administered in commercially available clinical products. An off-the-shelf implantable product based on this technique may be an alternative to existing methods for stimulating bony regeneration in scarred calvarial defects.

1238: Virtual 3D Reduction of Displaced Mandible Fractures: A Validation Study Comparing Surgical Reductions with Virtual Reductions

Lucas A. Dvoracek, MD; Justin Beiriger, BA; Erin Anstadt, MD; Joseph E. Losee, MD; Jesse A. Goldstein, MD

**Introduction:** Open reduction and internal fixation (ORIF) of displaced mandible fractures may lead to inadequate reduction and requires time while fixation plates are contoured. Computer-based reduction of 3D reconstructed mandible fragments and 3D printed models solve these problems by enabling plate contouring preoperatively which may guide optimal reduction. This study assesses the feasibility and characteristics of virtual mandible fracture reduction compared to surgical reduction.

**Methods:** Patients with displaced, noncomminuted mandible fractures who underwent ORIF and had both a pre- and post-operative CT scan were included. 3D meshes of the mandible were segmented from pre-operative and post-operative CT scans, virtual reduction of the fracture fragments was performed, and the virtually reduced and surgically reduced mandibles optimally overlayed with evaluation of qualitative and quantitative differences.

**Results:** Ten patients matched inclusion criteria (8:2 m:f, mean age 14 years). Fracture types included parasymphysial (80%), angle (20%), body (10%), ramus (10%), and condylar (30%), and number of major fragments (excluding condyles) was 2 (80%) or 3 (20%). Virtually reduced mandibles were extremely similar to the surgically reduced mandibles, and several had improved reduction of displaced fragments. The root mean square for the average distance difference was 0.61mm (0.42-0.79, 95% CI).

**Conclusion:** Virtual mandible reduction can yield mandibular models which are remarkably similar to surgically reduced mandibles, with the advantage of being able to manipulate the fragments freely to maximize bony contact and alignment. Models printed from this technique may enable pre-contouring of fixation plates to help guide reduction and decrease operative time.

1269: Maxillofacial burn trauma preclinical model to study scar management

Mohamed El Masry, MD,PhD; Nandini Ghosh, PhD; Amitava Das, PhD; Sashwati Roy, PhD; Chandan K. Sen, PhD

**Background:** Face thermal injury is a challenge for plastic surgeons particularly managing its complications such as skin contracture, ectropion and macro or microstomia with excessive scar formation. The consequential facial deformity burdens the subject socially, emotionally, and psychologically. The primary objective of this work was to study the of scarring outcomes in a preclinical porcine preclinical model of maxillofacial burn trauma using traditional dressings compared to split-thickness skin grafting (STSG).

**Methods:** Burn wounds were made using a standardized electrical burner that created burn affected up to 50% of the facial surface. Wounds were treated with either placebo dressing (Acticoat) or Polymer-based gel wound dressing once weekly or skin grafted at d7 post burn. Progression of burn wound healing were followed using non-invasive imaging until d84. Histopathological examination of the burn was performed using standard histopathology/immunohistochemistry.

**Results:** Thermal injury resulted in a fourth degree burn and excessive Contracture and scarring (n=7, p<0.05) that were evident at d84 post burn. STSG significantly improved face deformity with diminished (n=5, p<0.05) inflammatory response concomitant with improved angiogenesis. Polymer-based gel wound dressing application significantly (p<0.05; n = 3) enhanced the wound closure during the acute phase and less scarring (p<0.05; n = 3) with near normal ratio of collagen I:III (p<0.05; n=3) as compared to Acticoat treatment.

**Conclusion:** In summary, this pre-clinical model recapitulates features characteristic of human facial burns with severe contracture involving the muco-cutaneous junctions. STGS significantly improved the scar outcomes. Application of Polymer-based gel wound dressing improved early phase responses including improved wound closure.

1207: Enhanced Recovery Protocol after Fronto-Orbital Advancement Reduces Blood Transfusions, Narcotic Usage and Hospital Length of Stay

Rebecca Knackstedt, MD, PhD; Niyant Patel, MD

**Introduction:** Enhanced recovery after surgery (ERAS) protocols utilize multi-modal approaches to decrease morbidity, narcotic usage and length of stay. In 2013, we made several changes to our peri-operative approach to children
undergoing complex craniofacial procedures. The goal of this study is to analyze our protocol for children undergoing fronto-orbital advancement (FOA) for craniosynostosis.

Methods: A retrospective chart review was performed after IRB approval for children who underwent FOA for craniosynostosis from 2010-2018. The ERAS protocol involves hemoglobin optimization, cell-saver technology, tranexamic acid, specific post-operative fluid titration and a transfusion algorithm. The analgesic regimen focuses on narcotic reduction through the utilization of scheduled acetaminophen, ibuprofen or ketorolac, and a dexmedetomidine infusion with opioids only for breakthrough pain.

Results: Fifty-five ERAS protocol children and 23 control children were analyzed. ERAS children had a decreased rate (13/53 versus 23/23, \(p=0.05\)) and volume of intraoperative transfusion (183.4cc versus 339.8cc, \(p<0.0001\)). Fewer ERAS children required morphine/dilaudid (12/55 versus 22/23 \(p<0.0001\)) and for children who required morphine, fewer doses were required (2.8 versus 11, \(p=0.02\)). For ERAS protocol children who required PO narcotics, fewer doses were required (3.2 compared to 5.3, \(p=0.02\)). ERAS children had a decreased length of stay (2.3 versus 3.6 nights, \(p<0.0001\)). No patients were re-admitted due to poor oral intake, pain, hemodynamic or pulmonary concerns.

Conclusion: Our results demonstrated a consistent presence of the buccal artery in all dissected flaps. Its relatively large diameter and extensive branching toward the corner of the mouth, evidenced by ICG angiography, would allow the harvest of an island flap based only on the buccal artery.

I255: Corneal Neurotization: A Systematic Literature Review and Patient Selection Factors

Marco A. Swanson, MD; Roy D. Swanson, MD; Robert Clark, BS; Anand R. Kumar, MD; Edward H. Davidson, MD

Background: This study aims to characterize patient demographics, techniques, and outcomes in order to better elucidate the indications for corneal neurotization as treatment for neurotrophic keratopathy (NK).

Methods: Following PRISMA guidelines, the MEDLINE and EMBASE databases were systematically reviewed. All literature reviews, animal and cadaveric studies were excluded.

Results: 81 studies were screened and 18 studies met inclusion criteria, totaling 57 patients and 64 eyes. NK was congenitally caused in 21% and acquired in 79%. Neurotization was direct in 38% using the following donors: supraorbital nerve (SON) and supratrochlear nerve (STN) in 96% and great auricular nerve (GAN) in 4%. For indirect neurotization, recipient nerves utilized were SON and/or STN (95%) and infraorbital nerve (ION) in 5%. Donor nerve grafts were sural nerve (98%) and lateral antebrachial cutaneous nerve (3%). Average follow-up was 28.9 months. NK Mackie staging improved in 84%, remained the same in 16% and did not worsen in any patient. Best-Corrected Visual Acuity improved in 77%, remained the same in 20% and only worsened in 1 patient due to poor compliance. Pre-LogMAR was 1.36 ± 0.78 and post-LogMAR 0.98 ± 0.80 (\(p<0.0001\)). Corneal sensation improved in all patients with 0.68 ± 3.13mm and 44.82 ± 17.2mm pre- and post-neurotization (\(p<0.0001\)), respectively.

Conclusion: Denervation duration correlates with corneal scarring severity and is the strongest predictor of improvement in visual acuity and NK staging. Given low complication rates and significant benefit regardless of etiology, corneal neurotization should be considered for all patients with NK early on in disease course before irreversible corneal damage occurs.

I226: Posteriorly Based Buccal Artery Myomucosal Flap: An Anatomical Study

Majid Rezaei, DDS, MSc; Brian Figueroa, MD; Richard Drake, PhD; Francis Papay, MD; Bahar Bassiri Gharb, MD, PhD; Antonio Rampazzo, MD, PhD

Introduction: The Buccinator flap is a versatile flap for the repair of cleft palate defects. Clinical applications of this flap have been well reported, however few anatomical studies have shed light on its vasculature. Therefore, the aim was to study the buccal neurovascular pedicle to design a new posteriorly based island flap.

Methods: 22 hemifacial dissections were performed on 11 fresh adult cadavers. External carotid or buccal artery was injected with red latex. Indocyanine green (ICG) angiography was performed in 6 hemifaces before the application of latex. Diameter of the buccal nerve and artery (extraorally), flap length, distance from pterygomandibular raphe to the pedicle entrance, and vertical distance of the pedicle entrance from maxillary tuberosity were measured intraorally. Then, the whole buccal mucosa and underlying soft tissue were harvested and examined with the surgical microscope.

Results: The mean diameter of buccal artery and nerve was 0.95 ± 0.29 mm and 1.29 ± 0.20 mm, respectively. The mean vertical distance from the pedicle to the maxillary tuberosity was 11.57 ± 3.87 mm. Flap length was on average 67.51 ± 8.82 mm and the neurovascular pedicle entered the flap in the posterior 1:6 of the flap. ICG angiography showed that 84.8% ± 13.9% of the flap length was instantly vascularized through the buccal arterial system.

Conclusion: Our results demonstrated a consistent presence of the buccal artery in all dissected flaps. Its relatively large diameter and extensive branching toward the corner of the mouth, evidenced by ICG angiography, would allow the harvest of an island flap based only on the buccal artery.
**I307: Superior Outcome with Modified-Furlow Repair Compared to Straight Line Palatoplasty – a Matched Cohort Study**

Shoichiro Tanaka, MD; Ananth Murthy, MD

*Introduction:* At our institution, straight line repair was noted to carry an increased need for secondary speech surgery. Modifications included lengthening the palate with a double-opposing z-plasty (modified-Furlow) in addition to the use of an acellular-dermal matrix spacer to mitigate scarring at the hard-soft junction. Our hypothesis is that these modifications will lead to better outcomes after palatoplasty.

*Methods:* This is an IRB-approved retrospective review of all cleft palate patients who underwent palatoplasty by the senior author between 2010 – 2016. Exclusion criteria include loss of follow up, syndromic diagnosis, or Robin sequence. Surgical technique was either straight line or modified-Furlow repair. Patients were gathered consecutively until groups were matched. Variables reviewed include age, sex, Veau classification, fistula, and presence of hypernasality.

*Results:* A total of 136 patients were operated on in that time frame. Of those, 58 were excluded due to syndromic diagnosis (35), inadequate speech data (4), or Robin sequence (19), resulting in 78 patients for review. Twenty-five (51%) patients underwent straight line repair and 24 (49%) underwent modified-Furlow repair. Veau 3 clefts were the most common between both groups. Between straight line and modified-Furlow, fistula was found in 5 patients (25%) and 4 patients (27%), respectively (p-value = 0.91), and hypernasality was identified in 12 patients (50%) and 2 patients (10%), respectively (p-value 0.003).

*Conclusion:* At our center, modified-Furlow palatoplasty is superior to straight line repair with decreased rates of hypernasality and equivalent rates of fistula. By reviewing our data, we optimize care for our cleft palate patients.

**POSTER PRESENTATIONS**

**I251: Characterization of the Saddle Nose Deformity Following Endoscopic Endonasal Skull Base Surgery**

Erin Anstadt, MD; Wendy Chen, MD, MS; James O’Brien, BS; Ilana Ickow, DMD, MS; Ian Chow, MD, Jesse Goldstein, MD; Barton F. Branstetter IV, MD; Carl Snyderman, MD, MBA; Eric W. Wang, MD; Paul Gardner, MD; Lindsay Schuster, DMD, MS

*Background:* Skull base surgeons commonly employ the endoscopic endonasal approach (EEA) and reconstructive techniques to manage CSF leaks. Nasal deformity following the EEA is described, however detailed qualitative and quantitative assessments of the associated saddle nose deformity (SND) do not exist.

*Methods:* A retrospective review of patients with SND after EEA for resection of skull base tumors over a 5-year period was conducted. Fifteen measurements related to the SND were obtained on pre-and post-operative imaging. Statistical analysis evaluated for significant differences between pre- and post-operative anatomy, and compared these values to expected normals. Sub-analysis was performed with stratification by reconstruction type.

*Results:* 20 patients were included. The most common EEA was bilateral transsellar (n=13). Reconstruction type: This cohort had 10 free mucosal grafts, 9 vascularized NSFs, one abdominal fat graft and one fascia lata graft. Imaging analysis: Mean loss of dorsal nasal height was 0.13mm. Sub-analysis by reconstruction type showed that in patients with nasoseptal flaps (n=9), average nasal tip projection was significantly decreased by 1.2mm (p = 0.039), and alar base width increased by 1.2mm (p=0.046). No significant differences were seen on sub-analysis of patients with free mucosal graft skull base coverage (n=10).

*Conclusion:* While EEA is an effective tool for skull base surgery, patients are at risk for SND. In contrast to patients with free mucosal graft coverage alone, those with NSFs displayed significant loss in nasal tip projection and an increase in alar base width. Future analysis may include using 3D photography to assess 3D volumetric changes.

**I242: National Trends in Hospitalization Charges and Utilization of Oral and Maxillofacial Surgery for Cleft Lip and Palate Patients**

Yida Cai, BA; Bailyn Hogue, BS; Cristin Coquillard, MD; Sam Boas, BS; Lesley Summerville, BS; Marvin Nicoleau, BA; Anand Kumar, MD

*Background:* Patients with cleft lip and palate often require multiple maxillofacial and orthognathic surgeries, but utilization trends remain poorly understood. This study examined national trends in resource utilization and hospitalization charges associated with oral and maxillofacial surgeries for cleft lip and palate.

*Methods:* The Healthcare Cost and Utilization Project National Inpatient Sample database was analyzed from January 2007 to December 2014. All patients diagnosed with cleft lip or palate who underwent oral or maxillofacial procedures were included. Univariate and generalized linear models were used to examine associations between factors of interest, final adjusted hospitalization charge, and changes in factors over time.

*Results:* 62,471 patients were diagnosed cleft lip or palate. 1292 (2.1%) received oral or maxillofacial surgery including osteoplasty of maxilla (879, 68.0%), genioplasty (30, 2.3%) and other facial bone repair and reconstruction (183, 14.2%). Procedure volume did not change significantly (p = 0.199). High procedure volume was associated with large bedsizes.
(p < 0.001), non-profit private hospitals (p < 0.001) and urban teaching hospitals (p < 0.001). Average total hospital charge was $61,157.47 (interquartile range: $33,099.62 – $72,180.56). Charges increased significantly (p = 0.042), with an average hospital stay of 2.54 days that did not change significantly (p = 0.693).

**Conclusion:** Oral and maxillofacial procedures for patients with cleft lip and palate center around large, urban teaching, and non-profit private hospitals. While length of stay and procedure volume was stable year to year, hospitalization charges rose significantly. Further studies are necessary to examine other factors contributing to increasing hospitalization charges.

**1243: National Trends in Hospitalization Charges and Utilization of Services for Cleft Lip and Palate Rhinoplasty**

Yida Cai, BA; Bailyn Hogue BS; Cristin Coquillard, MD; Sam Boas, BS; Lesley Summerville, BS; Anand Kumar, MD

**Background:** Patients with cleft lip and palate often require rhinoplasty for cleft nasal deformity. These are complex procedures requiring significant healthcare resources, but the national healthcare burden and utilization trends are poorly understood. This study examined national trends in utilization and hospitalization charges associated with cleft rhinoplasty over multiple years.

**Methods:** The Healthcare Cost and Utilization Project National Inpatient Sample database was analyzed from January 2007 to December 2014. All patients diagnosed with cleft lip or palate who underwent rhinoplasty were included. Univariate and generalized linear models were used to examine associations between factors of interest, final adjusted hospitalization charge, and the change in factors over time.

**Results:** 62,471 patients were diagnosed cleft lip or palate and 905 (1.4%) received rhinoplasty during hospitalization. Procedure volume increased significantly (p = 0.015). Higher procedure volume was associated with non-profit private hospitals (p < 0.001) and urban teaching hospitals (p < 0.001). Average total hospital charge was $33,248.21 (interquartile range: $19,369.16 – $40,585.97). Hospitalization charges increased significantly (p = 0.014) with an average hospital length of stay of 1.42 days that did not change significantly (p = 0.957).

**Conclusion:** Utilization of services for cleft rhinoplasty center around urban teaching and non-profit private hospitals. While length of stay was stable, procedure demand and charges rose significantly. Further studies will be done to examine other factors that could contribute to increased hospitalization charges, which will help reduce the healthcare burden and improve patient access to this procedure.

**1321: The Satisfaction with Appearance in Patients with Cleft Lip and Palate: Patient-Reported Outcomes Using the Validated CLEFT-Q Survey**

Liliana Camison, MD; Michelle Zhang, BS; Joseph E. Losee, MD; Karen Wong-Riff, MD; Anne F. Klassen, PhD; Jesse A. Goldstein, MD

**Background:** Surgical outcomes after cleft lip and/or palate (CL/P) surgery are usually assessed by others, underestimating what matters to patients. The CLEFT-Q is a validated patient-reported outcome (PRO) instrument for this population. We aimed to evaluate the satisfaction of patients with CL/P with their own appearance, using the CLEFT-Q as a metric.

**Methods:** Patients 8-29 years with CL/P seen in our center between 2015-2016 were included. The questionnaire was administered without parental interference. Only appearance questions were used (face/nose/nostrils/lips/cleft scar/teeth/jaws). Rasch-transformed scores were analyzed (p<0.05).

**Results:** 101 patients with the full spectrum of CL/P were included (Female=53; Male=48). 55% aged 8-11; 37.6% between 12-17; and 6.9% aged 18+. Nose and nostril satisfaction scores were lowest in patients whose deformity included CL. Patients with CP had a significantly higher nose and nostril scores compared to CL, CL+P, CL+Alveolus, and Bilateral CL+P (p=0.003, 0.000, 0.029, and 0.039, respectively). Lip and cleft scar scores were not significantly different between groups. Nose satisfaction did not vary significantly between age groups in males, but trended down with increasing age in females (p=0.012). The same was seen in nostril scores (p=0.038), and trended for significance in lip scores (0.054). Satisfaction was lower at 12-17 years. Females in the 18+ age group scored lower across appearance items.

**Conclusion:** Understanding what patients with CL/P value will help direct surgical efforts. Nasal appearance seems particularly concerning to patients; more than lips. Adolescents are less satisfied. Lower satisfaction rates with increasing age in females may warrant special attention.

**1206: Orthoptic Vision Therapy: Establishing a Protocol for Management of Diplopia Following Orbital Fracture Repair**

Brandon J. De Ruiter, BS; Robert P. Lesko, BA; Barry Tannen, OD, FCQVD, FAAO; Noah Tannen, OD; Edward H. Davidson, MD

**Background:** Non-entrapment associated diplopia following orbital fracture repair is a well-recognized problem. Observation is the standard-of-care, however symptoms may be protracted. Orthoptic therapy is a form of ocular physical therapy that achieves functional rehabilitation through targeted exercises.
This study aims to present baseline data for using orthoptics for managing diplopia following orbital-floor fracture repair.

Methods: Protocols for home-exercise and office-assessment were developed. Exercises and computerized programs to train and assess convergence/divergence, smooth-tracking, and saccades were included. Office-assessment also involved scoring ocular motility and assigning surveys assessing symptom burden. Healthy volunteers (n=10) trialed the office-assessment thrice (n=30) and results were compiled to establish normative data. Comparative measurements were made in those with chronic (>1 year; n=8) and acute (<2 weeks; n=4) orbital fractures. Time-of-therapy was recorded and monetary cost-analysis was performed.

Results: Patients with acute fracture displayed limited fusional ability when comparing convergence (mean break/recovery of 8.0/6.5 prism diopters (pd) vs 31.87/21.23pd; p=0.001/0.015) and divergence (3.00/1.50pd vs 18.37/12.83pd; p=0.000/0.001) to the normative values. Those with chronic fracture had lower convergence (15.71/5.00pd; p=0.01/0.001) and divergence (12.29/4.71pd; p=0.04/0.002) when compared with norms, but better function than those with acute injury. Those with acute fracture reported higher symptom burden than chronic (mean score 19 vs 4.6; p=0.01) or healthy (19 vs 3.4; p=0.01) cohorts. Assessment took 7min 41sec on average. Per patient software cost was <$70.

Conclusion: Orthoptic therapy is applicable following orbital fracture repair and may improve fusional capacity and ocular motility. Normative data defined here may serve as a benchmark for clinical use.

I278: Characterization of a Social Media Support Group for Craniosynostosis

Michael S. Hu, MD, MPH, MS; Erin E. Anstadt, MD; Fady P. Marji, MD; Tarek Elgendy, MD; Jesse A. Goldstein, MD; Lucas A. Dvoracek, MD; Francesco M. Egro, MBChB, MSc, MRCS; Joseph E. Losee, MD; Jesse A. Goldstein, MD

The parents and caregivers of patients with craniofacial disorders increasingly rely on social media for information and support, yet little is known in the surgical community about the information shared within these groups. We sought to characterize the content of posts in the largest Facebook support group for craniosynostosis to assess utility for providers.

The Facebook group “Cranio Kids – Craniosynostosis Support” is the largest support group for craniosynostosis with over 17,400 members. We analyzed 1000 posts in this closed group from October 1, 2018 to January 1, 2019. Posts were categorized to identify the type of information shared within the group. An additional 100 posts from January 1, 2019 to February 28, 2019 were characterized focusing on the “reactions” and comments from the support group.

The 1000 examined posts were grouped into two broad categories: questions (n=517) and sharing of information (n=483). Several broad post themes were identified. The 100 posts analyzed for response from the support group received on average 64.74 “reactions” and 24.48 comments (n=100). Of the comments analyzed, 81 were questions, 244 were simple replies lacking medical or anecdotal content, 157 were anecdotal comments, and 18 were comments offering sound medical advice (n=454).

This is the first study to characterize the content of social media support group posts. There is value to craniofacial surgeons in understanding the content of social media support group posts in order to identify general patient concerns, follow up on their outcomes, and identify areas for quality improvement.
FNMA was 127° versus 132°, and median overjet was 2.8 versus 4.15 mm, respectively.

Conclusion: While many patients had normal FMA, majority had abnormally acute FNMA. Alveolar overjet, previously unmentioned in ultrasound literature but routinely assessed on neonatal clinical evaluation, is measurable and may have utility in prenatal diagnosis.

1245: Analysis of Labial Aesthetics Following LeFort I Maxillary Advancement in Cleft Patients Using Three-Dimensional Imaging
Anisha Konanur; Erin Anstadt, MD; Lucas Dvoracek, MD; Paul Marji, MD; Jesse Goldstein, MD

Background: Nasal changes in the cleft patient after orthognathic surgery have been well-documented, however, lip aesthetic changes after cleft orthognathic surgery remain understudied. This study aims to assess labial changes in cleft patients after a LeFort I advancement.

Methods: A retrospective review was performed of patients with cleft-related maxillary hypoplasia who underwent LeFort I osteotomy. Pre- and post-operative measurements of the following metrics were made using three-dimensional images: labial width/height, philtrum height, upper and total vermillion height, crista philtrum superior/inferior width, labial superius/inferius projection). Statistical analysis using Student’s paired T-test for means was performed.

Results: Nine cleft patients underwent either single piece Le Fort I osteotomy with advancement (1 bilateral, 5 unilateral cleft pts), or distraction (2 bilateral, 1 unilateral). Mean age at surgery was 16.8 years. Post-operative images were taken on average at 14 months. Average distraction and advancement distance from the central maxillary incisor was 12.5mm and 6.7mm, respectively. There were statistically significant increases in the means of upper labial height (1.60mm, p=0.006), upper vermillion height (1.46mm, p=0.008), superior crista philtrum width (1.13mm, p=0.004), inferior crista philtrum width (1.16mm, p=0.003), labial superius projection from the stomion (1.18mm, p=0.018), and ratio of vermillion to entire upper lip (0.05mm, p=0.037), as well as a decrease in labial inferiorus projection from the stomion (-3.63mm, p=0.001).

Conclusion: Our study describes several significant labial aesthetic changes in cleft patients which can be used to guide post-operative expectations.

1258: Secondary Cleft Rhinoplasty: A single surgeon’s experience
Ananth Murthy, MD; Dr. Patrick Lamb, MD

This is a 10 year retrospective review of 30 consecutive patients who underwent secondary cleft rhinoplasty performed by a single surgeon. 20 (66.6%) were female, 22 (73.3%) were left sided and 26 (86.6%) were complete clefts who underwent surgery at a mean age of 16.2 years. Subjective ratings utilizing the unilateral cleft lip surgical outcomes evaluation (UCL SOE) which rates 4 components (nose, cupid’s bow, lateral lip, and free vermillion) with a score of 0-2. Multiple anthropometric measurements (Nasal height ratio, width ratio, medial ¼ height ratio, sill ratio, nostril area ratio, columellar angle, tip projection ratio, and nasolabial angle) were taken utilizing a free NIH program, ImageJ. Standardized photographs were compared pre and post operatively (21 had complete records). The techniques utilized, history of previous rhinoplasty (13.3%), and additional concomitant procedures were recorded. There was 1 (3.3%) patient with complication of retained nasal stent requiring removal in clinic and late onset erythema secondary to suture irritation resolved with oral antibiotics. There were no hematomas or infections. Subjective pre-operative ratings were stratified into pre-op nasal ratings of 0-.6, .7-1.3, and 1.4-2 and objective measurements were compared pre and post operatively. Poor subjective ratings did correlate with a higher degree of asymmetry in the objective measurements. Recommended revision cases had poor pre-operative and predictably poor post-operative subjective ratings as well as increased asymmetry on objective measurements. Nostril medial ¼ height, nasal sill height, and nostril area ratios tend to correlate with subjective UCL SOE rating scores.

1315: Posterior Cranial Vault Distraction Osteogenesis Utilizing a Posterior-Superior Distraction Vector in the Treatment of Mercedes Benz Pattern Craniosynostosis
Fady P. Marji, MD; Lisa M. Block, MD; Erin E. Anstadt, MD; Lucas A. Dvoracek, MD; Abraham A. Williams, BS; Jennifer A. Hall, BS; Joseph E. Losee, MD; Jesse A. Goldstein, MD

Background: Bilateral lambdoid and sagittal synostosis (BLSS), or Mercedes Benz Syndrome, is a rare complex craniosynostosis resulting in an anteriorly displaced cranial vertex. It’s ideal surgical correction must result in expansion, skull elongation, and caudal repositioning of the vertex. For this, posterior vault distraction osteogenesis (PVDO) utilizing a posterior-superior distraction vector may be ideal.

Methods: A retrospective review was performed to analyze outcomes of PVDO using a posterior-superior distraction vector from 2016 to 2019. Cranial vertex position was measured as a fraction of the occipitofrontal diameter from rostral to caudal (0-1.0).

Results: Four patients underwent PVDO at mean age 10.61 ± 3.16 months. Linear distraction distance averaged 30.30 ± 0.90 mm with a mean consolidation period of 3.98 ± 0.72 months. Mean corrected change in intra-cranial volume was 236.30 ± 3.71 mL (p = 0.002), at an average rate of 7.81 ±
2.00 mL/mm. Significant mean increases in anterior cranial height (7.83 ± 2.51 mm, p = 0.008), middle cranial height (8.43 ± 4.21 mm, p = 0.03), posterior cranial height (13.15 ± 7.45 mm, p = 0.04), and posterior cranial fossa height (21.99 ± 8.55 mm, p =0.01) were observed. Basofrontal angle did not change significantly (p > 0.05). Cranial vertex demonstrated a significant mean posterior movement of 0.18 ± 0.13 (p = 0.03).

Conclusion: PVDO utilizing a posterior-superior distraction vector for management of BLSS effectively increases intracranial volume and height and provides an aesthetic outcome with posterior movement of the cranial vertex.

1292: Clinical Effectiveness of Peripheral Nerve Blocks for Diagnosis of Migraine Trigger Points
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Background: With a 13% global prevalence, migraine headaches (MH) are the most commonly-diagnosed neurologic disorder, and are a top five cause of visits to the emergency room. Surgical techniques-such as decompression and/or ablation of neurovasculature-have shown to provide relief in patients suffering from MH. Popular diagnostic modalities to identify trigger loci include handheld doppler exams and botulinum toxin injection. This paper aims to establish the positive predictive value (PPV) of peripheral nerve blocks for identifying therapeutic surgical targets for MH surgery.

Methods: Charts of 36 patients were retrospectively analyzed. These patients underwent peripheral nerve blocks using 1% lidocaine with epinephrine and subsequent surgery on identified MH trigger points. Patients were grouped into successful and unsuccessful blocks and further categorized into successful and unsuccessful surgery subgroups. Group analysis was done using paired t-tests and PPV calculations were done on subgroups.

Results: Mean post-surgical follow up was 11.5 months. Prior to surgery, Migraine Headache Index (MHI) of patients was 168.16 vs. 43.69 after surgery (p<0.001). Each of the components of MHI also significantly decreased: frequency (24.54 MH/month vs. 8.43, p<0.001), intensity (7.33 vs. 4.75, p<0.001), and duration (6.8 days vs. 0.39, p<0.001). The PPV of diagnostic peripheral nerve blocks in identifying a MH trigger point responsive to surgical intervention was calculated to be 0.89 (95% CI: 1, 0.74).

Conclusion: Peripheral nerve blocks serve as a clinical tool in mapping migraine trigger points for surgical intervention while offering more flexibility in their administration and recording as compared to established diagnostic methods.

1316: Repair of Recalcitrant Palatal Fistulas with Free Flaps
Payam Sadeghi, MD; Andrea Sisti, MD; Kenneth Lawrence, DDS; Francis Papay, MD; Antonio Rampazzo, MD, PhD; Bahar Bassiri Gharb, MD, PhD

Background: Reconstruction of large oronasal fistulas (ONF) in bilateral cleft lip and palate (BCLP) patients is challenging. Traditional repair techniques often fall short and have high recurrence rates. Microsurgical reconstruction could be an option to achieve healing in these patients.

Methods: A retrospective study was conducted including BCLP patient that underwent reconstruction of palatal fistulas using free flaps, from 2014 to 2019. Age, sex, number of previous repair attempts, ONF type according to the Pittsburgh Fistula Classification System, free flap type, recipient vessels, further procedures, complications and follow-up were collected.

Results: Four patients were included (three females and 1 male). Age ranged between 7 and 29 years. There were 3 ONFs type 3, 1 type 4 and 1 type 5. Median number of attempts to repair the fistula was 2 (IQR=4.25). All patients underwent two-layer reconstruction of the fistula with mucoperiosteal turn-over flaps and radial forearm free flap (RFFF); 1 osteocutaneous and 3 fasciocutaneous. The recipient artery was facial artery. The recipient vein was facial vein (FV) in 3 cases and external jugular vein (EJV) in one case. Vein grafts were employed in 2 cases to reach FV (at origin) and EJV. The average follow-up was 21.3 months. Flap debulking was necessary to fit partial dentures, in one case. Iliac crest cancellous bone graft was successfully performed in two patients at mixed dentition. In one patient the tricortical iliac crest bone graft failed. No fistula recurrence occurred.

Conclusion: Two-layer reconstruction with RFFF of the large oronasal fistulas in BCLP patients can provide stable healing.

1259. Racial Differences in Evaluation and Management of Patients with Non-Syndromic Craniosynostosis
Casey Tompkins-Rhoades, BS; Erin Anstadt, MD.; Fady Paul Marji, MD; Jesse Goldstein, MD

Craniosynostosis is the premature fusion of the bony plates of an infant's skull. Untreated, this condition can lead to increased intracranial pressure, cognitive impairment, vision problems, and abnormal speech and hearing. These sequelae can be abated or avoided with early recognition of symptoms and referral for intervention.

A retrospective chart review of patients with craniosynostosis who were evaluated between 2012 and 2017 within the
Division of Pediatric Plastic Surgery at a tertiary pediatric hospital was performed. Demographics, clinical history and radiologic data were recorded. Outcomes assessed include age at diagnostic imaging scan and age at definitive treatment. Statistical analysis was performed to analyze differences observed in Black or African-American patients compared to Caucasian patients.

A total of 218 patients were included. 99 identify as Black or African-American and 119 Caucasian. There was a statistically significant difference in mean age at diagnostic head CT between Caucasian and Black or African-American patients, 2.09 years versus 4.02 years respectively (p=0.011). For the Black or African-American patients that went on to receive surgical intervention (n=24, 24%), the mean age at the time of surgery was 2.51 years compared to 2.67 years for Caucasian patients. No significant difference was detected in average age at surgical intervention between the two cohorts (p=0.847).

Diagnostic imaging is a critical component of the evaluation of patients with craniosynostosis. Our data suggest systematic barriers to this evaluation and diagnosis exist in this population. Further studies to determine why this population is experiencing delayed access to care is necessary.

1324. From Experimental to Mainstream: A Review of Face Transplantation Over the Past 15 Years
Siddhi Upadhyaya, BS; Rebecca Knackstedt, MD, PhD; Brian Gastman MD

Background: Face transplantation (FT) remains the only avenue for repairing extensive facial disfigurement in a single procedure. U.S. insurance companies generally deny coverage, citing their “experimental” nature. The cost of a near-total osteomyocutaneous FT in 2008 was estimated to be $250,000-$350,000. In comparison, a 2018 partial osteomyocutaneous FT was estimated to be $1.5 million. This report explores what we know about FTs, and how gaps in data may be improved upon with the ultimate goal of insurance coverage.

Methods: A systematic review was performed utilizing PubMed for face transplantation. Institution websites, press releases, news reports, and interviews were also utilized. Recipient and donor demographics, blood type, and CMV status were recorded. Details of the injury, extent of deficits, allograft, operation, complications, and cost were documented.

Results: Forty-seven FTs have been performed by 19 teams in 11 countries from 2005-2019. Average recipient age is 37.89 ± 12.35 years, and average donor-recipient age difference is 14.22 ± 9.39 years. Average time from injury to FT is 7.15 ± 7.09 years. Average operative time is 20.86 ± 8.38 hours, and average ischemia time is 3.11 ± 1.25 hours. Fifteen (31.9%) myocutaneous FTs were performed compared to 31 (66%) osteomyocutaneous FTs. Twenty-eight (59.6%) were partial compared to 18 (38.3%) full FTs. Estimated cost, reported for seven (14.9%) FTs, averaged $468,486 ± $465,075.

Conclusion: The limited number of FT cases, coupled with scarcity of data on cost, contribute to insurers’ unwillingness to cover FTs. Increased consistency in reporting cost breakdown will provide insurers with the necessary data to decide extent of coverage for FTs moving forward.