hospital data. Charleston Comorbidity Index was calculated and compared. Bivariate and multivariate analyses analyses were conducted between high volume and non-high volume centers (NHVC) across all cohorts of cleft repair.

RESULTS: 4563 (61.7%) total cleft palate surgeries were performed in HVC and 3388 (38.3%) were performed in NHVC. NHVC treated a higher percentage of Medicaid patients, while HVC treated more patients with private insurance (p=0.005). Older and total patients treated at HVC were more often from higher income quartiles (p<0.001; p=0.018). HVC across all 4 groups had larger bedsizes (p<0.001), were more often government/private owned (p<0.001), and were more often teaching hospitals (p<0.001) located exclusively in urban settings (p<0.001).

Primary patients treated at HVC were repaired at significantly younger ages (p=0.008) and were more often males (p=0.032). Across total, primary, and older patients, the most common diagnosis at HVC was complete cleft palate with incomplete cleft lip, while the most common diagnosis at NHVC was incomplete cleft palate without lip. In older patients, both HVC and NHVC patients were most commonly diagnosed with complete cleft palate with incomplete lip. In the primary, revision, and total cohort, significantly more concurrent procedures were performed in HVC (p=0.047; p=0.001; p<0.001).

Overall, primary, and revision length of stay (LOS) was significantly longer in NHVC (p=0.048; p=0.001; p=0.010) and approached significance in the older group (p=0.060). Overall, HVC were associated with a lower specific complication rate (p=0.042). Primary HVC experienced lower specific complication rates (p=0.023) and pneumonia rates (p=0.009). Revision HVC were associated with fewer cardiac complications (p=0.040) and older HVC with less wound disruption, approaching significance (p=0.050), but also more hemorrhage (p=0.040).

CONCLUSION: The majority of cleft palate cases nationwide are performed at the top 10% case volume centers. Our analysis revealed HVC are associated with better short-term outcomes across all patient groups and surgery types. HVC may be better equipped to handle complex patients, such as those with more extensive defects receiving multiple concurrent procedures. Furthermore, HVC treated patients from higher income brackets with private insurance, while NHVC treated lower income patients paying with Medicaid. Among many factors, this may reflect challenges faced by disadvantaged patients living in rural areas in accessing HVC. We recommend future efforts to focus on equilibrating access to care for all patients seeking cleft palate surgeries, particularly to HVC.

NAM Vs Lip Adhesion: A Cephalometric Comparison

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BACKGROUND: Patients with cleft lip and palate frequently undergo nasoalveolar molding (NAM) or lip adhesion (LA) to guide the cleft segments together in preparation for definitive repair. This study reports the effect of these primary interventions on eventual permanent incisor inclination.

METHODS: This is a retrospective study at a tertiary craniofacial center. Patients with unilateral or bilateral cleft lip and palate, who had undergone LA or NAM, with follow-up imaging between ages of 7–9 were included. Patients were further categorized based on gingivoperiostioplasty (GPP) status. Patients with phase one orthodontic therapy were excluded. Cephalogram analysis used Dolphin software (©Dolphin imaging and management solutions). Measures taken: U1-NA(mm) and U1-SN, U1-FN, U1-NA, SNA, SNB, ANB (°) and were compared to Bolton normative measurements.

RESULTS: Inclusion criteria yielded 50 children who received NAM (22 patients with GPP) and 18 children who received lip adhesion (2 patients with GPP). U1-SN angle was 73.6° for NAM and 88.4° for lip adhesion (p<0.0033). U1-FH angle was 83° for NAM and 96.3° for lip adhesion (p<0.0057). U1-NA angle was -2.1° for NAM and 10° for lip adhesion (p<0.025). U1-NA distance was not significantly different between treatment groups. Differences in angles ANB, SNB and SNA were non-significant. Overjet (mm) was -7.07 and-1.65 for NAM and LA, respectively (p<0.028). Proportion of patients with overjet was 10 and 35.3%, respectively and for underjet 78 and 47.1%, respectively (P<0.002). Combining NAM and lip adhesion patients: U1-SN angle, U1-FH angle, U1-NA angle were 82.3, 91.1 and 7.6° respectively for unilateral cleft
patients and 69.4, 78.8 and -9.4° respectively for bilateral cleft patients (p<0.05). ANB was 0.79 and 3.53 degrees for unilateral and bilateral clefts, respectively (p<0.0156). No other significant differences were identified. None of the parameters above showed any significant correlation with patient age at time of scan nor the use of GPP (p>0.05).

CONCLUSION: LA and NAM cause deviation from normal in U1-SN, U1-FH, U1-NA and overjet with NAM having a greater effect. Bilateral clefts treated with NAM or LA deviated more in these parameters than unilateral clefts. Age at cephalometry and history of GPP had no significant affect. This may have significant implications for the phase I orthodontic options, time in treatment and potential dental morbidity due to traumatic occlusion and functional occlusal shifting.

Current Trends in Surgical Airway Management of Patients with Robin Sequence

Presenter: Justin Buro, BS

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BACKGROUND AND PURPOSE: Robin sequence (RS) is the clinical triad of micrognathia, glossoptosis, and airway obstruction. Mortality rates range as high as 65%, though improved nutritional support and airway management may reduce this rate. In severe cases, surgical intervention may be indicated to relieve airway obstruction. Though the efficacy of certain surgical interventions (e.g. tracheostomy, tongue-lip adhesion – TLA, mandibular distraction osteogenesis – MDO) in improving patient outcomes is well established, algorithms dictating decision making and peri-operative protocols are poorly defined. To aid in establishment of distinct protocols among surgeons treating RS, we designed a survey to elucidate current practice trends.

METHODS/DESCRIPTION: A 22-question survey was designed on SurveyMonkey (www.surveymonkey.com) and sent via e-mail to members of the American Cleft Palate-Craniofacial Association and International Society of Craniofacial Surgeons. Questions were related to surgeon experience in treating RS, and peri-operative protocols. Responses were collected for 8 weeks.

RESULTS: A total of 151 responses were collected. Most respondents were surgeons practicing in North America (82.8%), in a university hospital setting (81.5%), and had completed a fellowship in pediatric plastic surgery or craniofacial surgery (76.2%). Pre-operative protocols varied widely. While 78.8% of respondents performed direct laryngoscopy, only 49.7% routinely obtained pre-operative polysomnography. Minimum apnea hypopnea index (AHI) for surgical intervention ranged from <10 (21.4%) to >30 (6.8%). 74.2% reported MDO as their most common primary surgical modality, with 12.6% primarily utilizing TLA. Similarly, only 45.7% perform TLA. Surgeon experience influenced operative selection, with 80% of those in practice 0–5 years primarily utilizing MDO, compared to 56% in practice >15 years.

Among those performing MDO, there were variations in osteotomy selection (inverted L ramus–39.3%, angle–37.8%), distraction vector (horizontal–64.0%, oblique–22.1%), type of device (internal–80.0%, external–23.1%), and use of virtual surgical planning (yes/sometimes–50.0%, no–50.0%), 25.2% did not incorporate a latency phase. Daily activation length mostly ranged from 1.0mm (45.1%) to 2.0mm (32.3%), with most choosing an endpoint of class 3 occlusion (56.0%) or “as far as possible” (28.4%). There was no consensus on consolidation phase (4–6 weeks–20.0%, 6–8 weeks–31.3%, 8–10 weeks–19.1%, >10 weeks–25.2%). Most respondents (90.3%) reported low rates (0–24% of patients) of required secondary intervention for apnea after distraction.

CONCLUSION: Surgical airway management in patients with RS varied widely. Clear trends were not identified in preoperative evaluation, type of surgical intervention, intraoperative or postoperative protocols, though MDO was utilized more than other modalities, particularly among younger surgeons. Further studies and collaborative efforts will help guide standards of care in the airway management of these patients.

Evolution of Airway Obstruction in Infants with Robin Sequence (RS): Non-Surgical Vs. Surgical Treatment

Presenter: Rafael Galli, MD