Phoenix Children's Hospital, (6) Kelly Cordero, PhD, CCC-SLP, Phoenix Children's Hospital

Background/Purpose: Perceptual ratings of hypernasality have been consistently correlated with velopharyngeal gap size using nasopharyngoscopy and videofluoroscopy, which capture dynamic images and video of the velopharyngeal mechanism during connected speech tasks. Magnetic resonance imaging (MRI) is an emerging clinical imaging modality that provides detailed quantitative information of the velopharyngeal mechanism. Images are captured on MRI using sustained phonation. The correlation between perceptual ratings of hypernasality and gap size during sustained phonation has not been established using MRI. It is not yet known if a functional problem such as hypernasality severity level in conversation is adequately captured at an anatomical level using only sustained phonation.
Methods/Description: A single center retrospective cross-sectional study was performed to assess the relationship between perceptual ratings of VPI symptoms and gap size during sustained phonation on MRI. Hypernasality was rated on a 5-point ordinal scale: none, minimal, mild, moderate, severe. Patients were included if they completed both a perceptual speech evaluation and a velopharyngeal MRI with sustained phonation of /i/. Patients with any type of VPI etiology were included. Patients were excluded if they had VPI surgery performed between the speech evaluation and MRI, or if they had a pharyngeal flap in place at the time of evaluation.
Results: A total of 110 patients met the criteria for this study. Most patients (42%) presented with a Veau II or III cleft palate, followed by those with a normal appearing palate (21%). Approximately one quarter of patients (23%) had 22q11.2 deletion syndrome. Intra-rater reliability for hypernasality was k=0.65, indicating substantial agreement and percent agreement was 91%. Intra-rater reliability for measuring velopharyngeal gap size during sustained phonation on MRI was ICC=0.99, indicating almost perfect agreement. A Spearman's correlation was conducted to determine the relationship between severity of hypernasality and the size of the gap measured on MRI using sustained /i/. The results showed a strong, positive correlation between the severity of hypernasality and gap size, $r(110) = 0.61$, $p<0.0001$. There was a statistically significant difference in gap size during sustained /i/ across the hypernasality severity levels.
Conclusions: Hypernasality severity ratings made at the connected speech level strongly correlate with gap size measured during sustained phonation of /i/ on MRI. Gap size during sustained /i/ increases as hypernasality severity worsens. These findings suggest that sustained phonation captured on MRI can adequately characterize velopharyngeal function in the clinical evaluation of patients presenting for VPI management.

275. Pharyngeal Bulb Prosthesis: An Excellent Approach to Achieve a Successful Surgery to Correct VPI in Patients with Cleft Palate Presenting with Hypodynamic Velopharynx

(1) Maria Ines Pegoraro-Krook, PHD, FOB/HRAC University of São Paulo, (2) Homero Aferri, MD, FO/University of São Paulo

Background/Purpose: Clinical decision regarding the best approach for management of VPD is a complex and challenging and has important implications for the patient and healthcare system. Pharyngeal flap is the most common surgery to treat VPI, but its success depends on the lateral pharyngeal walls movement to achieve VP closure for speech. When surgical treatment is not considered as an option, prosthetic management of VPI is carried out by means of a pharyngeal bulb prosthesis, especially for those with VP mislearning due to hypodynamic velopharynx (HV) (gap size greater than 50% of the resting VP space and poor pharyngeal walls activity). HV usually combines insufficiency and mislearning requiring a combination of physical and behavioral treatment. Prognosis for surgery for patients presenting HV is poor and choosing a surgical procedure before correcting mislearning is challenging. Correcting only the structural problem, by a large flap, without behaviorally addressing the VP function does not resolve hypernasality. A bulb can be the alternative particularly when combined with speech therapy. The approach to behavioral modification of VP mislearning is made upon the assumption that patterns of VP function can be modified and feeble movement can be improved. VP closure must be an attainable goal for the VP mechanism to respond to speech therapy targeting VP mislearning. The bulb is used as a therapeutic tool to stimulate, guide and modify the movement of the pharyngeal walls. Once the mislearning is corrected (with the velopharynx responding adequately during sound production) and the pattern of VP function during speech involves maximum displacement of walls (with bulb reduction therapy), a surgical correction of VPI can be recommended with excellent prognosis. The purpose of this session is to provide methods, tips/tricks for obtaining a successful temporary bulb for patients with cleft palate presenting with HV. In addition, this session will focus on a bulb reduction program, associated with intensive speech therapy to prepare the patient for surgery.
Description: The presenters will: a) present/discuss the basic strategies/techniques for the bulb reduction program during a 2-week period, and provide some tips/tricks to elicit necessary cooperation from children, b) present/discuss strategies/techniques used in the speech therapy, c) describe how nasoendoscopy can be used to determine the bulb reductions. Lastly, videos of several cases will be presented detailing the entire process of the bulb reduction program in preparation for surgery; these will demonstrate the teamwork and collaboration required from both the prosthodontist and speech pathologist to optimize outcomes. Throughout the presentation, audience participation will be encouraged to generate a productive multidisciplinary discussion.

276. Pharyngeal Obturator in Children with Cleft Lip and Palate During the Primary Dentition: Proposal for the Use of Resin Stops as an Additional Retention Method

(1) Vinicius Villas Boas Petroni, DDS, HRAC-University of São Paulo, (2) Maria Ines Pegoraro-Krook, PHD, FOB/HRAC-University of São Paulo, (3) Homero Aferri, MD, FOB/HRAC-University of São Paulo, (4) Monica Moraes Waldemarin Lopes, PhD, FOB/HRAC-University of São Paulo, (5) Estevam Bonfante, DDS, FOB/HRAC-University of São Paulo

Background/Purpose: The purpose of this study is to verify the effectiveness of the retention system obtained by resin stops on the buccal surface of deciduous teeth and to compare the best stop conformation for tensile and compressive forces applied to the prosthesis.
Methods/Description: The sample consisted of a single scanned plaster model obtained from the digitized collection of the Florida Project. This model represents a patient who underwent lip and palate surgery at ages 6 to 7. It was replicated 32 times and divided into four groups: R1) 8 replicas identical to the original; R2) 8 replicas with canine stops; R3) 8 replicas with molar stops; R4) 8 replicas with both molar and canine stops. These stops were created in a 3D mesh software, with their sizes corresponding to test models subjected to delineation through the roach technique, where each stop had a retention size of 0.5 mm. Subsequently, these models were printed using an SLA 3D printer based on the aforementioned groups. A total of 32 pharyngeal obturator prostheses were fabricated, with one for each

replica derived from the original printed model. Each prosthesis was utilized for both tensile and compression tests on a clinical trial machine. For statistical analysis, these replicas were divided into two groups: T – representing tensile forces, and C – representing compressive forces. Each group of tests involved subjecting 100% of the models to three measurements of T and C, aimed at demonstrating the effectiveness of obtaining valid results from the clinical trial machine. For the comparison of mean values within each group, ANOVA tests were applied.
Results: In traction tests, the force required to displace the prostheses in replicas R2, R3, and R4 was 10, 12, and 20 times greater than the replicas without stops. In compressive tests, replicas R4 and R2 required forces 30 times greater than the R1 replicas. These results demonstrate the effectiveness of stops in providing greater retention and consequent stability for pharyngeal obturator prostheses. Furthermore, the low retention levels in models without the addition of stops illustrate the significant difficulty in fabricating retentive prostheses without the use of secondary aids on the primary dentition. When analyzing traction forces, the arrangement of 4 pillars with stops makes the prostheses more retentive than the other groups of replicas. However, in the case of compressive analysis, stops in the canine region are more than sufficient to generate satisfactory retention. Nevertheless, in this case, the behavior of the prosthesis was subsequent release due to the lack of retention in the molars and stabilization during compression application.
Conclusions: From the obtained data, it can be observed that stops proved to be effective when applied, regardless of their configuration. However, for efficient clinical applicability, the placement of stops in four pillars, consisting of two anterior and two posterior ones, allows for a retention that can withstand both traction and compression forces, as observed in the oral cavity during activities such as tongue clicking and swallowing. This renders the device functional for speech rehabilitation and safe for daily use by children.

277. Pilot Testing the Cellie Coping Kit for Craniofacial Conditions with Families with School-Age Children

(1) Janine Rosenberg, PhD, University of Illinois Hospital and Health Science System, (2) Marissa Koven March, PhD, University of Illinois Hospital, (3) Susan Tran, PhD, DePaul University, (4) Meghan Marsac, PhD, University of Kentucky College of Medicine

Introduction: To better support the psychosocial needs of craniofacial patients and families, we developed and pilot-tested the Cellie Coping Kit for Craniofacial Conditions (Craniofacial Coping Kit) by systematically adapting an existing kit designed for youth with cancer. This is a low-cost, evidence-based coping tool in a family-focused format using coping cards, caregiver booklet, and stuffed toy (Cellie). The study aimed to explore kit feasibility, acceptability, and relevance for English-speaking families and children with craniofacial conditions.
Methods: Adaptation was guided by integrating heuristic and ecological validity frameworks. Primary adaptations included: developing craniofacial-specific content in collaboration with clinic families and experts (e.g., surgeon, speech language pathologist, psychologist), meeting adult literacy needs, using inclusive caregiving and non-gendered language, and increasing cultural sensitivity for Hispanic/Latinx families through language and content changes. Children with craniofacial conditions ages 6 to 12 years old, with sufficient English verbal comprehension skills, and their English-speaking caregivers were recruited via clinic visits, phone, and email. Five families completed intervention baseline and four completed two follow ups within a 4-week remotely delivered intervention. Families completed pre-measures (i.e., demographics, Psychosocial Assessment Tool-Craniofacial Version), participated in visits supporting independent kit use, and completed a post satisfaction questionnaire. Study feasibility and acceptability aims were explored through examining researcher implementation fidelity forms, and quantitative and qualitative review of verbal and written participant reports. Study received IRB approval.
Results: Study used a mixed-methods approach including descriptive statistics and thematic analysis. Regarding feasibility, all visits were delivered remotely (54% video calls, 46% phone calls), over 95% of intervention components were delivered, and families used kits at least 2 to 5 times with plans to continue use. Qualitative feasibility themes highlighted usability, approaches to kit use, barriers to use, and suggested changes. Families reported overall, content, and design related acceptability and relevance (i.e., 100% recommended kit, reported useful tips, and liked the pictures), which were further exemplified through themes of acceptability, relevance, and what families learned.
Conclusion: Preliminary family feedback revealed the Craniofacial Coping Kit was a feasible, acceptable, relevant, and remotely deliverable psychosocial intervention tool. Findings will inform future kit and intervention design modifications, and guide future evaluation and clinical care.

278. Play It by Ear: Effect of Palatoplasty Technique on Otologic Outcomes in Children with Cleft Palate

(1) Paul Hung, BS, UT Health McGovern Medical School, (2) Zi Yang Jiang, MD, UT Health McGovern Medical School, (3) Chioma Obinero, MD, UT Health McGovern Medical School, (4) Jose Barrera, BS, UT Health McGovern Medical School, (5) Zhen Huang, MD, MBA, UT Health McGovern Medical School, (6) Matthew Greives, MD, MS, FACS, UT Health McGovern Medical School

Background/Purpose: Otitis media with effusion (OME) and subsequent hearing loss is a common finding in children after cleft palate (CP) repair. Displacement of palatal musculature in children with CP is a known causal factor for eustachian tube dysfunction and subsequent OME. Persistent OME in children with CP may necessitate multiple ear tube re-insertions after CP repair or a switch to long-term ear tubes (T-tubes). Although some studies have associated the Furlow palatoplasty technique with better otologic outcomes, no consensus has been reached on the most effective technique for improved hearing. Our aim is to provide further evidence to characterize the effects of palatal closure technique on short and long-term otologic outcomes in children with CP.
Methods/Description: A retrospective review of patients who underwent primary palatoplasty from 2007 to 2017 was performed. Inclusion required continuous follow-up with our interdisciplinary team. Patients who had sensorineural hearing loss, ossicular chain abnormalities, and other ear malformations were excluded. Patient demographics, Veau classification, medical history, surgical details, and follow-up audiograms were collected. The primary outcome was time to placement of long-term ventilation tubes (T-tubes). Secondary outcomes were number of ear tube placements post-palatoplasty, eardrum perforation, as well as 3-year and 6-year audiogram results. Hearing outcomes were characterized using pure-tone audiometry (PTA) values, with normal hearing threshold defined as a PTA $\leq$ 20 decibels. Multivariate linear and logistic regression was performed to determine the effect of operative technique and various patient factors on our outcomes.
Results: There were 84 patients who met inclusion criteria. Of these patients, 45 (54%) were female. Most patients had two-flap