by subtotal calvarial vault reconstruction, 7 (35%) by clamshell and 3 (15%) by posterior vault only.

Perioperative data were as follows. Mean operative time was 265 ± 50 minutes; mean estimated blood loss was 328 ± 206 ml; and mean length of stay was 3.8 ± 0.8 days. 85% of patients required intraoperative transfusions while 40% required postoperative transfusions. Mean pre- and postoperative CI values were 67.8 ± 3.7 and 73.7 ± 4.5, respectively.

Within the first 30 postoperative days there were no readmissions, medical or surgical complications, additional surgery, or mortality.

Preoperative CIs for subtotal (69.2), clamshell (67.2) and posterior vault (64.7) were equivalent (p = 0.15). Postoperative CIs for the three techniques were 75.8, 72.0 and 70.4, respectively (p = 0.08). There is a trend towards less improvement in CI with increasing age at surgery.

CONCLUSION: Open calvarial vault reconstruction is a safe method to correct sagittal craniosynostosis in older children. Despite the safety profile, our series suggest that earlier intervention is better. As children age, the calvarium becomes more rigid and the rate of brain expansion is less, both of which make it difficult to attain ideal aesthetic outcomes (eg, CI>75). In subgroup analysis, subtotal resulted in the best results, followed by clamshell and posterior technique.

Leveling the Maxillary Occlusal Plane without Orthodontic Appliances in Patients with Hemifacial Microsomia Using Unilateral Vertical Mandibular Distraction Osteogenesis

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PURPOSE: Internal distraction for mandibular lengthening using a vertical vector (vMDO) has been shown to be a stable procedure in the mixed dentition stage for patients with hemifacial microsomia (HFM). Orthodontic appliances have historically been employed to improve the occlusal plane and stability of the maxillary dentoalveolar unit after distraction, but these devices require considerations of cost and patient compliance. The purpose of this study was to evaluate the ability to align the maxillary occlusal plane using vMDO without orthodontic appliances in patients with HFM.

METHODS: This was a retrospective evaluation of consecutive patients over an 18-month period who underwent unilateral vMDO for the correction of vertical mandibular asymmetry secondary to HFM with Kabans-Pruzansky type II mandibular deformities. Patients were included if they had complete records and at least one year of clinical follow-up post-consolidation. Preoperative PA cephalograms were analyzed using known landmarks for vertical and horizontal reference lines to record ramus height, maxillary height, dentoalveolar height, chin point deviation, occlusal height, and occlusal plane cant. These values were compared to post-distraction measurements from PA cephalograms taken at a minimum of 3 months after consolidation.

RESULTS: Over an 18-month period, 5 patients met inclusion criteria; 3 subjects were female, median age was 12.6 years. Median distraction length was 21.3 mm. Median radiological follow-up was 6 months (range 4 to 38 months) post consolidation. There were no major complications during the study period. Ramus height on the distracted side was increased a median length of 12.0 mm (range 6.2 to 18.6 mm), corresponding to a median ramus height differential (non-distracted minus distracted side) improvement of 98%: median ramus height differential 15.0 mm (range 7.4 to 22.4 mm) preoperatively and 0.25 mm (range 0.2 to 13.1 mm) at follow-up. The chin point distance from vertical midline was improved by 29.1%: median chin point deviation of 7.35 mm (range 4 to 11.6 mm) pre-operatively and 5.55 mm (range 2.7 to 7.8 mm) post-operatively. The maxillary height differential (non-distracted minus distracted side) leveled by a median of 55%: median maxillary height differential 3 mm (range 1.8 to 4.2 mm) pre-operatively versus 1.35 mm (range 0.2 to 2.5 mm) at radiological follow-up. The maxillary occlusal height differential (non-distracted minus distracted side) was decreased by a median of 44.7%: median occlusal height differential of 3.8 mm (range 1 to 5.9 mm) preoperatively and 2.1 mm (0.3 to 2.8 mm) at radiological follow-up. The occlusal plane cant angle was decreased by a median of 84.6% toward neutral: median occlusal cant of 8.5 degrees (range 7.4 to 10.1 degrees) preoperatively and 1.3 degrees (0.8 to 2.8 degrees) at radiological follow-up.
CONCLUSION: Unilateral vertical mandibular distraction osteogenesis improves mandibular ramus height and chin point deviation, while also effectively leveling the maxillary occlusal height and cant angle for patients with HFM without the need for an intraoral orthodontic appliance. Future study will be aimed at assessing the long-term stability of these promising results.

Surgical Management through Skeletal Maturity in Craniofacial Microsomia

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PURPOSE: Due to the complex and diverse nature of craniofacial microsomia (CFM) and the variety of treatment options available, there is little consensus around an optimal management algorithm. This study examines treatment patterns for CFM over a 24-year period at a tertiary care center, with an emphasis on the controversial role of early mandibular distraction osteogenesis (MDO) as it relates to need for orthognathic surgery at skeletal maturity.

METHODS: A retrospective review of all CFM patients evaluated between January 1993 and March 2017 was conducted. A subset analysis was performed on subjects who had reached skeletal maturity to evaluate need for orthognathic surgery for correction of maxilla-mandibular asymmetries, specifically examining whether MDO had been previously performed. Demographic characteristics were assessed with descriptive statistics. Univariate analysis was conducted using chi-square and Fisher exact tests for categorical variables, and Mann-Whitney U test for continuous variables.

RESULTS: 179 patients were identified (55.9% male, mean follow-up age 11.3±5.6 years), with 148 having adequate data for analysis. 29.9% were Kaban-Pruzansky Grade I, 16.3% Grade IIa, 14.3% Grade IIb, and 17.0% Grade III. 122 subjects underwent a total of 543 procedures (mean 4±3 procedures per subject). The mean age at first intervention was 6.0±4.6 years, with ear reconstruction (30.1%) and mandibular distraction (20%) being the most frequent procedures. Higher Kaban-Pruzansky Grade was significantly associated with earlier age at first intervention (p=0.001). Other major interventions included costochondral rib grafting, fat grafting, cleft repair, and orthognathic surgery. 38 subjects (17 MDO, 21 non-MDO) who had reached skeletal maturity were included in the subset analysis. Cohorts were matched in Kaban-Pruzansky Grade (p=0.788). Need for orthognathic surgery did not differ significantly between the two cohorts (MDO=8; non-MDO =10; p=0.203).

CONCLUSION: Life-long management of CFM requires a multi-faceted treatment plan tailored to each patient’s evolving needs; careful sequencing and timing of operations is essential for optimal restoration of craniofacial form and function. CFM patients with more severe mandibular deformity are significantly younger at time of initial intervention. There appears to be similar orthognathic surgery rates at skeletal maturity between CFM subjects who underwent early-MDO and those who did not undergo early-MDO. Future studies and continuing experience can inform the best timing and technique of early-MDO for long-term retention of facial symmetry.

A Prospective Study of Forces in Craniofacial Distraction

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BACKGROUND: While much has been written about the variables “distance” and “rhythm” in craniofacial distraction osteogenesis (CMF DO), little is known about the forces involved. The purpose of this study is to study force magnitudes and force trends in CMF DO and associate these forces to operative outcomes.

METHODS: Seventeen patients undergoing distraction of the mandible or cranial vault with a semi-buried KLS-Martin (KLS-Martin, Tuttlingen, Germany) distractor, were included in this prospective study. Subjects’ distractors were activated each day by study personnel, using a digital