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INTRODUCTION: Congenital hydrocephalus, the most common cause of macrocephaly, is usually treated with ventriculoperitoneal (VP) shunting. Despite shunting, changes to the overlying cranial bones cause calvarial expansion and distortion. Reduction cranioplasty can be performed to approach proper cranial size, shape, and cephalocranial proportion. However, consistent results are difficult to achieve. Virtual surgical planning (VSP) with the creation of intraoperative templates allows for systematic control of both volume and morphology.

METHODS: Four patients presented with severe hydrocephalic macrocephaly (HM). All had undergone VP shunting to control ventriculomegaly as an infant. We performed 3D CT scans and utilized VSP to obtain a post-operative cranial size/shape using age-based anatomical norms. Cutting guides and intraoperative templates were generated, and reduction cranioplasty was performed using the clinical transfer tools. Perioperative variables such as OR time, blood loss, hospital stay, and volumetric analysis were recorded. Long-term variables such as bone healing and neurocognitive development were also observed.

RESULTS: All four patients recovered well after surgery. One patient had a small seroma of the scalp that resolved with aspiration and compression. All had stable reconstruction with normalized post-operative cranial morphology that followed preoperative plans. Postoperative volumes were consistent between cases.

CONCLUSION: Reduction cranioplasty can be performed on patients with HM. While the concept is straightforward, achieving proper cranial morphology while respecting brain volume can be difficult. Use of VSP allows for optimization of osteotomy design while translating this plan to the final result through cutting guides and reconfiguration templates. A final cranial size and shape can be predicted to a normative cohort, allowing for precision and reliability when actuating this plan.

Outcomes of Cranioplasty in the Adult Population: Analysis of a Statewide Population Database

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INTRODUCTION: Cranioplasty can be performed with autograft, allograft or a combination of both. The difference in outcomes based on the material utilized is a clinical question of utmost interest to the practicing craniofacial surgeon. This study examines a large cohort of adult cranioplasty surgery patients to evaluate such outcomes.

METHODS: The Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for California and Florida from 2006 to 2011 were used. Patients who had cranioplasty were identified via ICD-9 coding. Patients < 18 years of age were excluded. Type of surgery, age, number of diagnoses and procedures were used to assess for differences in outcomes. Univariate and multivariate analyses were performed.

RESULTS: 6,533 patients were identified. There were no statistically significant differences (p > 0.05) in mortality (3.7% vs 4.9%), implant removal (0.6% vs 0.4%), DVT (3.7% vs 2.7%), PE (1.1% vs 0.7%), and MI (0.6% vs 0.6%) between bone grafting versus implant. There were statistically (but not clinically) significant differences (P < 0.05) in SSI (1.5% vs 0.8%), sepsis (3.2% vs 2.0%), bleeding (2.7% vs 1.1%) and stroke (4.8% vs 6.5%).

Analysis of the cohort by age (18–39; 40–65; 66+) showed statistically significant differences in mortality (2.1% vs 3.9% vs 7.8%), MI (0% vs 0.6% vs 1.0%) and stroke (3.7% vs 5.8% vs 8.6%).

Number of diagnoses (1–10 vs 11+) and procedures (1–5 vs 6+) showed significant differences in mortality, implant removal, SSI, sepsis, MI and stroke among others with worse outcomes as each variable increased.
CONCLUSION: Analysis of two statewide databases appears to show no clinically significant differences in outcomes for patients undergoing cranioplasty based on the utilization of autograft versus allograft. Significant differences in outcomes are seen based on age, number of diagnoses and procedures, which are likely surrogate markers of the patients’ physiologic status and comorbidities.

Orthognathic Surgery Has a Significant Effect on Perceived Personality Traits and Emotions

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INTRODUCTION: The effects of orthognathic surgery go beyond objective cephalometric correction of facial and dental disproportion and malocclusion, respectively. Improved appearance after orthognathic surgery may lead to improved self-confidence, body and facial image, and social adjustment.1-3 In this study, we test the hypothesis that a compositely represented layperson, derived from crowdsourcing, will perceive a patient after orthognathic surgery more favorably than before surgery in regards to implicit personality traits and emotional expressions.

METHODS: We utilized MTurk (Amazon.com), a crowdsourcing tool, determine how preoperative and postoperative images of orthognathic surgery patients were perceived on a Likert scale on six personality traits and six emotional traits based on PA and lateral photos. Blinded MTurk respondents provided demographic information and were randomly assigned to one of two sets of 20 pictures (10 subjects before and after surgery). The perceived difference in personality traits and emotional expressions from preoperative to postoperative was calculated for each category and compared statistically.

RESULTS: Data on 20 orthognathic surgery patients were collected from 476 individuals. The majority of participants were female (52.6%), Caucasian (76.6%), 20–49 years old (84.2%), and earning income between $20,000–$99,999 (74.5%). A paired t-test analysis found that MTurk workers perceived the postoperative patients significantly more favorably than corresponding preoperative patients: more attractive (4.4±1.7 vs. 3.3±1.5, p<0.0001, respectively), intelligent (4.5±1.3 vs. 4.0±1.3, p<0.0001, respectively), friendly (4.4±1.5 vs. 3.8±1.4, p<0.0001, respectively), happy (3.5±2.4 vs. 2.8±2.3, p<0.0001, respectively), trustworthy (4.3±1.4 vs. 3.8±1.4, p<0.0001, respectively), and dominant (3.8±1.5 vs. 3.7±1.6, p<0.0001, respectively); also, less disgusted (2.7±2.4 vs. 3.1±2.4, p<0.0001, respectively), angry (2.9±2.4 vs. 3.3±2.4, p<0.0001, respectively), threatening (2.9±1.6 vs. 3.3±1.6, p<0.0001, respectively), afraid (2.5±2.3 vs. 2.8±2.3, p<0.0001, respectively), sad (3.0±2.4 vs. 3.3±2.4, p<0.0001, respectively), and surprised (2.6±2.3 vs. 2.7±2.3, p=0.0115, respectively). Raters with the highest annual income perceived a greater magnitude of dominance after surgery than those earning less (p=0.0002).

CONCLUSION: Lay people, identified through crowdsourcing, perceived positive changes in published orthognathic results related to personality traits and emotional expressions. Following surgery, patients are perceived to be significantly more dominant, more trustworthy, more friendly, more intelligent, more attractive, more happy, less threatening, less angry, less surprised, less sad, less afraid, and less disgusted. There may be differences in socio-economic and cultural perceptions after surgery, and this would be an interesting topic for further inquiry.

Reference Citations:
1. T L-T, Kiyak HA, Moore R. Long-term assessment of psychologic outcomes of orthognathic surgery. J oral ... 2003.
2. Hunt OT, Johnston CD, Hepper PG. The psychosocial impact of orthognathic surgery: a systematic review. Am J ... 2001.
3. Nardi P, Acocella A, Tedesco A, Rispoli A. Psychological aspects in orthognathic surgery. Body image and quality of life in postsurgical assessment. Body image and quality of life in postsurgical assessment. Minerva ... 2003.

Orthognathic Surgery and Adjunctive Rhinoplasty: An Algorithm for Treatment

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