Results: A total of 2153 patients underwent IBR during the study period, of which 198 met case definition for SSI. Implant removal was required in 140 (70%) and positive culture data were identified from 105 (75%) clinical samples. There were 30 (29%) infections with Gram positive bacteria (GPB) and 75 (71%) with Gram negative bacteria (GNB). Of the GPB, Staphylococcus spp. and Streptococcus spp. were most common, whereas Pseudomonas spp. and Serratia spp. were most common among the GNB. In the GNB infections, obesity and autoimmune diseases were more prevalent (46.8% vs 17.8%; p=0.003, 75% vs 25%; p=0.032, respectively). Radiation therapy and adjuvant chemotherapy were more common in the GPB infections (86.7% vs 64.4%; p=0.027, 89.7% vs 63.3%; p=0.009, respectively). Compared to GPB, patients with GNB infections were more likely to present within 30 days after surgery (55% vs 15%; p=0.001). Erythema on exam was more commonly reported in those with GPB (76.1% vs 50%; p=0.047) whereas wound drainage (46.7% vs 18.2%; p=0.005) and necrosis (66.7% vs 23%; p=0.006) were more frequent in GNB infections. In GPB infections the median white blood cell count was 10.5 x 1000/mm$^3$ vs. 7 x 1000/mm$^3$ in the GNB group; p=0.004.

Conclusion: Patients with GNB infections after IBR presented earlier and were more likely to present with wound drainage and necrosis of the skin compared to GPB infections. In contrast, infections caused by GPB were more likely to present with breast erythema and higher white cell counts. These clinical characteristics should be considered when selecting empiric antimicrobial therapy in IBR infections.

Purpose: Craniosynostosis and cleft lip and palate are the two most common conditions treated by craniofacial surgeons. Because of the need for bony reconstruction and limited bone stock in pediatric patients, alternatives to autologous bone grafting to fill bony defects are required. β-tricalcium phosphate (β-TCP), the most common synthetic bone replacement product, is frequently used in craniofacial reconstruction. Although solid β-TCP can be absorbed over time, the slow degradation rate (1-3%/year) predisposes this product to exposure, infection, and fracture, limiting its use in the growing face where implants are required to grow and remodel with the patient. Our tissue engineering laboratory has successfully leveraged 3D printers to manufacture 3D-printed bioactive ceramic (3DPBC) scaffolds composed of β-TCP in an architecture which optimizes the needs of rigidity with efficient vascular ingrowth, osteogenesis, and degradation kinetics. The latter qualities are further optimized when the osteogenic agent dipyridamole (DIPY) is used. This long-term animal study of immature rabbits through the time of facial maturity reports on the new degradation kinetics profile achievable through this novel manufacturing and tissue engineering protocol.

Methods: Twenty-two one-month-old (immature) New Zealand White rabbits underwent creation of unilateral 10 mm calvarial defects with ipsilateral 3.5×3.5 mm alveolar defects. Each defect was repaired with 3DPBC scaffolds composed of 100% β-TCP and coated with 1,000 µM DIPY. Rabbits were sacrificed at 8 weeks (n=6), 6 months (n=8), and 18 months (n=8). Bone regeneration and scaffold degradation were calculated using micro-CT images and analyzed in Amira software. Cranial and maxillary suture patency and bone growth were qualitatively analyzed using histologic analysis.

Results: Results are reported as a percentage of volumetric space occupied by either scaffold or bone. When comparing time points 8 weeks, 6 months, and 18 month, scaffolds showed significantly decreased in vivo defect occupancy in calvaria (23.6±3.6%, 15.2±1.7%, and 5.1±3.4%; p < 0.001) and in alveoli (21.5±3.9%, 6.7±2.7%, and 0.1±0.2%; p < 0.001), with annual degradation rates 55.9% and 94.2%, respectively. Between 8 weeks and 18 months, significantly more bone regenerated in calvarial defects (25.8±6.3% vs. 55.7±10.3%, p < 0.001) and no difference was found in alveolar defects (28.4±6.8% vs. 32.4±8.0%, p = 0.33). Histology and mechanical testing revealed vascularized and organized bone without suture fusion.

Conclusion: The degradation kinetics of β-TCP can be altered through 3D printing and addition of an osteogenic agent. Our

Leveraging 3d Printing To Transform The Degradation Profile Of β-tricalcium Phosphatebone Replacement

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study demonstrates an acceleration of β-TCP degradation from 1-3% a year to 55-95% a year. Absorbed β-TCP is replaced by vascularized, organized bone, with histologic and mechanical properties similar to native bone and without damage noted to the growing suture. This additive manufacturing and tissue engineering protocol has implication to future reconstruction of the craniofacial skeleton, especially as a safe and efficacious method in pediatric bone tissue engineering.

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Administration Of Single-dose Antibiotics Does Not Decrease Oronasal Fistula Rates After Primary Palatoplasty

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Purpose: Oronasal fistula (ONF) is a known complication after primary palatoplasty (PP). Studies investigating the effect of perioperative antibiotics on fistula rates after PP have been limited by inadequate sample size or reliance on self-reporting through national databases. In this study, the authors evaluated a large number of consecutive patients undergoing PP by two experienced full-time pediatric plastic surgeons at a single institution to evaluate if perioperative antibiotics decrease postoperative fistula rates.

Methods: The authors examined their ongoing prospective database of patients who underwent PP between April 2009 and September 2019. Patients were classified into two groups. Group 1 had a single intraoperative dose of IV antibiotic, while Group 2 did not. Outcome measures included ONF formation, length of stay (LOS), and 30-day readmission rates. Multivariable Firth logistic regression was used to compare ONF formation, quantile regression to compare median LOS, and Chi-square test to compare readmission rate.

Results: In the 424 consecutive patients (Group 1 n=215; Group 2 n=209) evaluated, ONF rates for Group 1 and 2 were 4.19% and 0.48% respectively. After adjusting for confounding variables, the rate of ONF between the two groups was not statistically significant (Adjusted Odds Ratio: 4.9; 95% CI: 0.8, 29.1; P= 0.08). Further analysis demonstrated no differences in median LOS (p=0.89) and readmission within 30 days (p= 0.12) between the two cohorts.

Conclusion: Administration of a single-dose perioperative antibiotic did not affect fistula formation after PP. In addition, no significant effect was demonstrated on LOS and 30-day readmission rate.

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Mandibular Measurements At The 20-Week Anatomy Ultrasound As A Prenatal Predictor Of The Severity Of Pierre-Robin Sequence Associated Respiratory Distress

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Purpose: Pierre-Robin Sequence (PRS) is defined as micrognathia and glossoptosis leading to upper airway obstruction and possible respiratory distress. Prenatal diagnosis of PRS is key in preparing the delivery team for an airway emergency. Routine 20-week ultrasounds do not screen facial features, which would allow for the evaluation of maxilla-mandibular relationships and mandible size. This study aimed to evaluate 20-week ultrasounds of infants diagnosed with PRS to determine if specific facial measurements could predict PRS disease severity.

Methods: A retrospective review of patients with PRS born between December 2014 and March 2019 was performed. NICU and surgical data were collected. Respiratory and surgical interventions were recorded and scored for severity. Mid-sagittal profile images of the anatomy ultrasound were reviewed for each patient, and 3 parameters were measured to assess for micrognathia: facial-maxillary angle (FMA), facial nasomental angle (FNMA), and alveolar overjet. Mean alveolar overjet was 3.6mm (r: 2-7mm).