CONCLUSION: At age 13, the most common anomaly was a missing tooth, most likely the 3rd molar (38%), though this is also the most commonly missing tooth in the general population. Other teeth, such as other molars and premolars, were also commonly missing. Molars were also observed to be impacted, ectopic, dysplastic, or ankylosic.

Prophylactic Use of Buccal Fat Flaps to Improve Oral Mucosal Healing Following Furlow Palatoplasty

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BACKGROUND: Furlow palatoplasty (FP) is increasingly used both for primary palatoplasty and secondary correction of VPI. While FP offers the advantage of lengthening the palate, the most tenuous component of the oral mucosal repair is anterior transposition of the oral mucosal z-plasty flap. When a secondary FP was done to correct VPI following primary FP, the senior author found oral mucosal separation in 53% of cases. To mitigate this problem, we prophylactically placed pedicled buccal fat pad flaps to provide an additional vascular layer to promote healing of the overlying oral mucosal z-plasty flap.

METHODS: A retrospective chart review identified patients who underwent pedicled buccal fat pad flaps with FP performed by the senior author (A.G.). Cleft palate diagnosis, Veau classification, primary and secondary palate repair surgeries, surgical technique and post-operative complications were extracted. The need for buccal fat flap augmentation was determined if the oral mucosal z-plasty flap showed duskiness during transposition or was under tension at the time of closure. Unilateral versus bilateral buccal fat flaps were chosen based on expected areas of tension in the final repair. On the buccal mucosa, a longitudinal incision just lateral to the most posterior aspect of the alveolar ridge was made, from which buccal fat was gently teased out. This was tunneled submucosally to the palatal repair site, where it was secured just posterior to the hard palate and anterior to the transposed levator veli palatine muscle. The oral side of the Furlow palatoplasty was then brought together over these pedicled buccal fat flaps.

RESULTS: We identified six patients who underwent FP with buccal fat flap augmentation. Two patients (33%) were primary FP while four patients (67%) were secondary FP. Three patients had unilateral cleft lip and palate, two had submucosal cleft palate and one had cleft palate only. The youngest patient was 11 months old, and the oldest was 7 years and 9 months. Half of the procedures used bilateral buccal fat pad flaps while the remainder were unilateral. All patients were seen at two weeks postoperatively and followed up regularly, with average follow-up time of 21 months (range 8–41 months). Post-operatively, one patient demonstrated a 1 cm area of mucosal dehiscence at the tip of the posterior triangular flap, which healed uneventfully. There were no other post-operative complications observed, including donor-site complications, complications relating to the buccal fat pad flap. No patient developed an oronasal fistula.

DISCUSSION: Our experience suggests that the buccal fat pad flap may minimize vascular compromise and dehiscence of the oral mucosal z-plasty following FP. This separation rate decreased from 8/15 (53%) patients in our prior series of secondary FP procedures to 1/4 (25%) patients undergoing secondary FP with buccal fat flaps. Cleft palate surgeons should consider adding this low-risk technique to their repertoire, as it provides an additional vascular layer beneath the most tenuous part of the oral mucosal closure in a FP, and may improve vascularity to the overlying oral mucosa so as to minimize dehiscence at this closure.

Square Root Palatoplasty: A New Modification of Double Opposing (Furlow) Palatoplasty

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INTRODUCTION: Double opposing palatoplasty has gained a wide popularity for primary palatoplasty in the US since its first description by Dr.Furlow in 1976. The advantages of Furlow palatoplasty are better repositioning of levator muscle (and formation of functional levator sling), palatal lengthening, tighter nasopharyngeal sphincter and decreased risk of longitudinal scar contracture. However,
the desired gain in length is created at the expense of shortening in the transverse axis and therefore, it is difficult to achieve tension-free closure with double opposing palatoplasty in wide clefts. Our aim in this study is to introduce a new modification of Furlow repair to overcome the disadvantages and compare its surgical outcomes with straight line repair.

**METHODS:** In this technique, an incision similar to square root shape is planned in the soft palate. Anteriorly based oral mucosal flap, which forms the transverse axis of the square root sign" is almost 90 degrees to the central limb along the cleft edges. This design allows better mobilization and vascularity of this flap, and prevents accidental tearing of the oral mucosal flap towards its base. Posteriorly based oral myomucosal flap, which forms the smaller "V" of the square root sign, can be easily transposed with this design. The levator veli palatini sling is reconstructed under the operating microscope and a spacer (acellular dermal matrix) is placed between mucosal layer and oral layer.

All patients undergoing primary palatoplasty by a single surgeon over 6 years were retrospectively reviewed. A total of 57 consecutive patients included in the study were divided into two groups: 30 in the modified furlow palatoplasty (MVP) group and 27 in the straight line repair group. Clinical characteristics (age at the time of surgery, sex, cleft type) and surgical outcomes (rate of fistula formation and speech outcomes) were compared between two groups. Speech outcomes are classified into 3 categories: normal speech, hypernasal and hyponasal speech.

**RESULTS:** Median age of repair at both groups was 8 months. Distribution of sex, cleft type and presence of associated syndromes were similar between the groups. Most common cleft type was Veau 3 (37% in straight line repair group, 40% in MVP group). Speech evaluation was available in 49 patients (85%). Hypernasality was more common in the straight line group than the MVP group (10/23 vs. 6/26, respectively; p=0.02) Fistula rates did not change significantly between two groups (18% in the MVP group vs 23% in the straight line repair group; p=0.67)

**CONCLUSION:** Modified Furlow double opposing z-plasty along with levator veli palatini retropositioning followed by a spacer of alloderm placed between the posterior nasal spine and the muscle reconstruction of the levator for primary palatal repairs demonstrated superior perceptual speech outcomes and same fistula rate with primary palatal repair.

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**Osteogenic Effects of Dipyridamole Versus rhBMP-2 Using 3D-Printed Bioceramic Scaffolds in a Growing Alveolar Cleft Model**

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**PURPOSE:** Alveolar clefts affect three out of four patients with cleft lip and palate (CL/P) resulting in maxillary arch instability, inability to support dentition, and facial asymmetry. Secondary bone grafting is the standard of care for alveolar clefts, but the procedure is associated with donor site morbidity and graft resorption. Although rhBMP-2 is under investigation for alveolar cleft repair, safety concerns remain regarding pathologic effects on the growing suture. This provides the impetus for investigating alternative osteogenic molecules. Dipyridamole (DIPY) is an adenosine receptor indirect agonist with known osteogenic potential. This study compared the regenerative capacity and side effects of DIPY to rhBMP-2 at alveolar cleft defects delivered via 3D-printed bio-ceramic (3DBC) scaffolds.

**METHODS:** 23 skeletally immature New Zealand White rabbits underwent unilateral, 3.5mm x 3.5mm alveolar resection adjacent to the growing suture. Five defects without intervention served as negative controls. Five defects were reconstructed with 3D scaffolds coated with the following agents: 1000μm DIPY (n=6), 10,000μm DIPY (n=7), and 0.2mg/mL rhBMP-2 (n=5). Animals were euthanized at t=8 weeks. Samples were scanned using microCT and new bone volume within scaffold was quantified using Amira 6.1 software (Visage Imaging GmbH, Berlin, Germany). Non-decalcified histology was performed and new bone within scaffold pores were evaluated for mechanical properties (i.e. reduced elastic modulus, hardness) and compared to internal controls of non-injured bone. Statistical analysis was performed using a generalized linear mixed model between groups and Wilcoxon rank sum test within samples.