

Buccal Flap Use in Primary Palatoplasty Does not Decrease Velopharyngeal Insufficiency

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Background

- Cleft palate repair techniques differ in the extent of mucoperiosteal dissection and muscular transposition. The implications of technique on velopharyngeal function and subsequent speech outcomes are incompletely understood.
- Previous literature relating palatoplasty to speech outcomes often focuses on only 1-2 techniques by a singular surgeon, very early or limited speech outcomes, and do not evaluate the buccal myomucosal palatoplasty technique.¹⁻⁵
- A 2023 systematic review of 54 studies found speech surgery requirements in 19% of patients after straight-line palatoplasty, 7% for buccal palatoplasty, and 6% for Z-plasty.¹
- Study Aim: To evaluate the relationship between palatoplasty technique and speech outcomes, specifically whether the use of a buccal flap at the time of primary palatoplasty affects the rate of velopharyngeal insufficiency (VPI).

Methods

- Study Type:** retrospective cohort
- Inclusion Criteria:** 161 patients who underwent palatoplasty at Helen DeVos Children's Hospital or Ian Jackson Craniofacial & Cleft Clinic 1/2018-1/2025
- Exclusion Criteria:** submucous cleft palate
- Data Collection:**
 - Patient demographics
 - Cleft information: lip involvement, severity (incomplete vs. complete), and laterality
 - Palatoplasty information: age, technique, operating time, surgeon
 - Speech outcomes: VPI, speech therapy requirement/recommendation, speech surgery requirement/recommendation
- Statistical Analysis:** associations evaluated via Chi-square, logistic regression, ANOVA, and Tukey-adjusted pairwise comparisons

Results

- Patients were primarily male (57.8%), non-Hispanic (87.0%), and White (64.6%). 16.8% of patients were syndromic.
- 65.8% had a cleft lip in addition to cleft palate. 59.6% of cleft palates were complete, 36.0% incomplete, and 4.3% unknown severity.

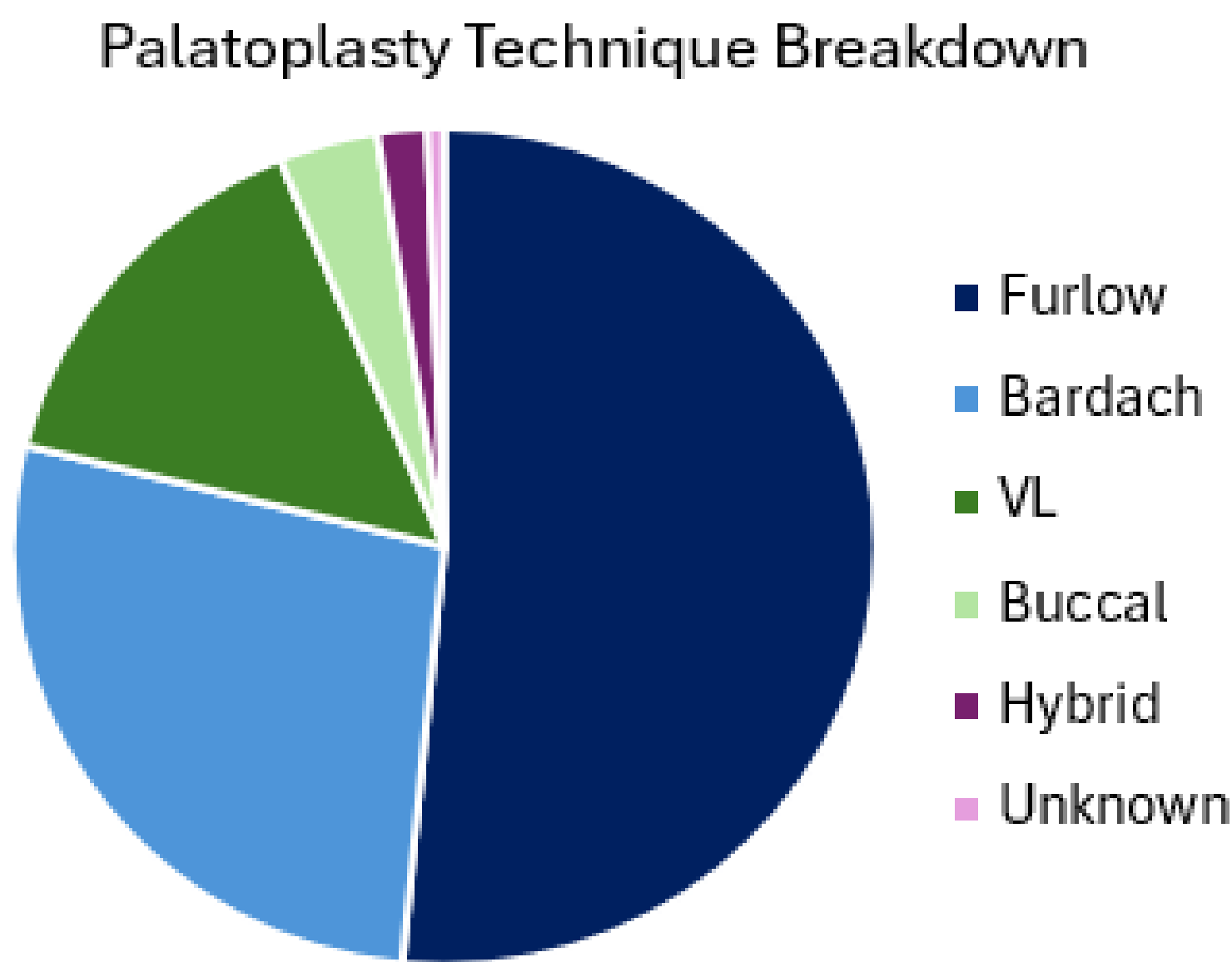


Figure 1. Palatoplasty techniques undergone by cohort. VL = Von Langenbeck

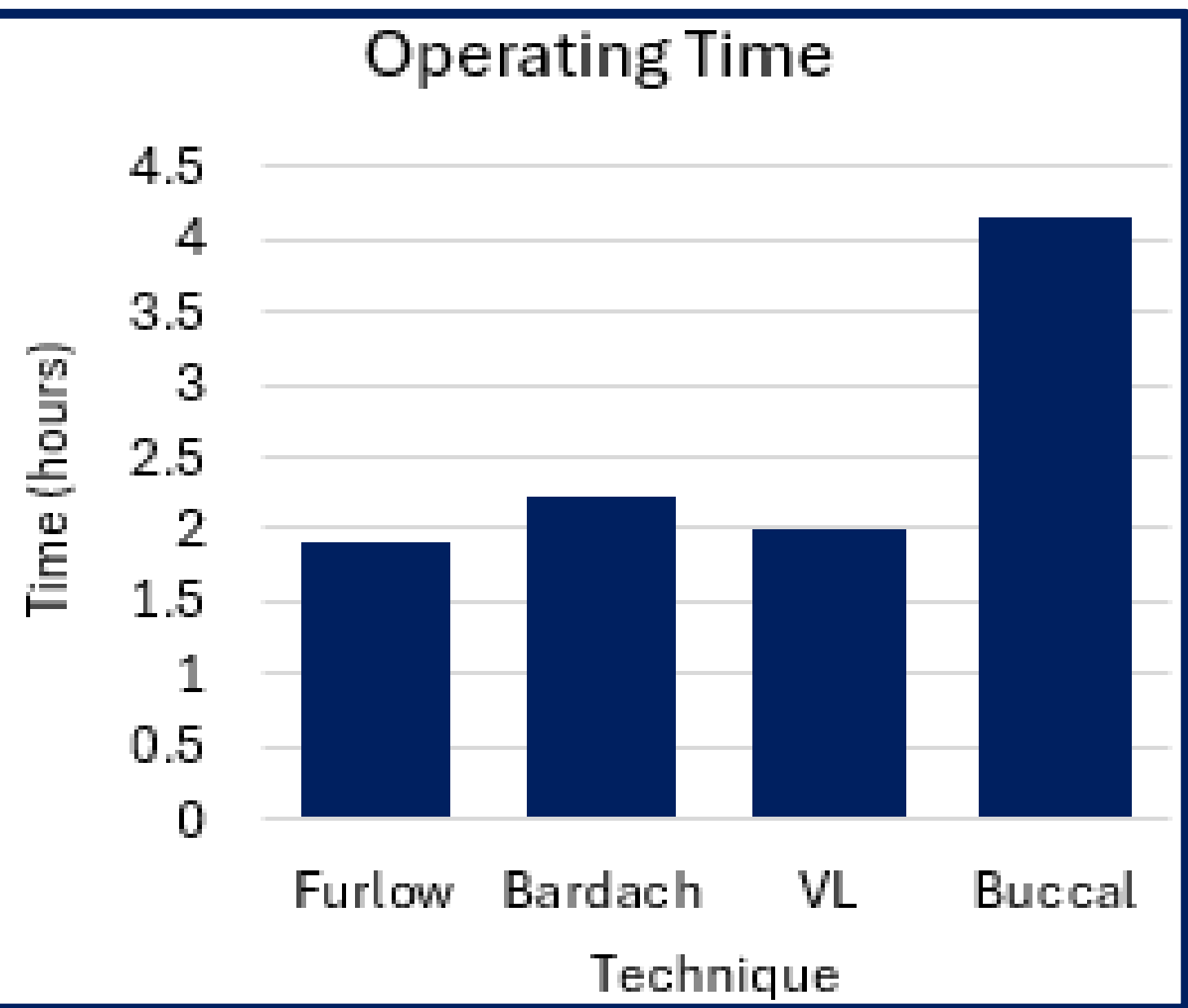


Figure 2. Median operating time according to palatoplasty technique. VL = Von Langenbeck

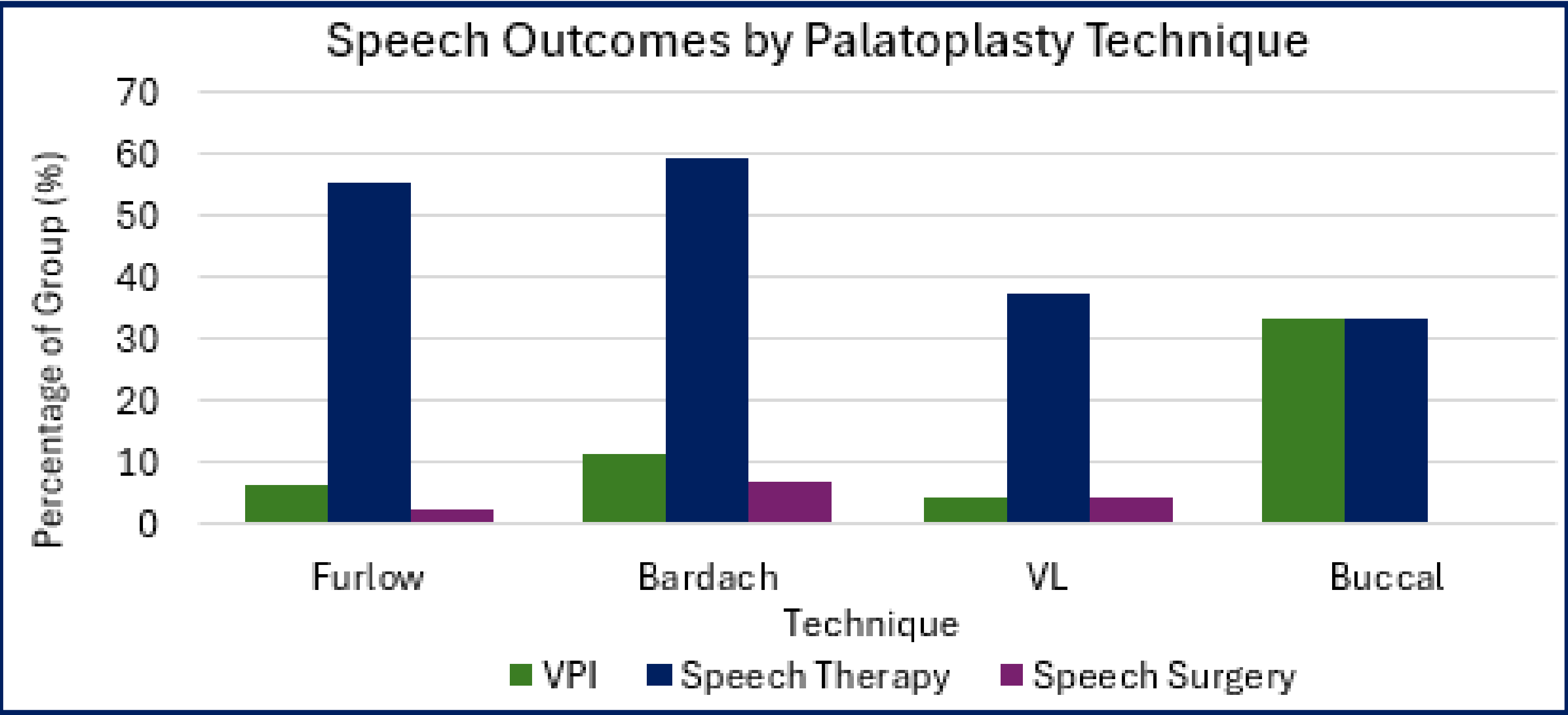


Figure 3. Incidence of examined speech outcomes according to palatoplasty technique. VL = Von Langenbeck

Table 1. Differences in speech outcomes and operating time according to palatoplasty technique

Outcome Variable	Relevant Value	P-value*
VPI, n (%)	13 (8.1%)	0.086
Speech Therapy, n (%)	87 (54.0%)	0.251
Speech Surgery, n (%)	6 (3.7%)	0.621
Operative Time, median [IQR]	2.1 [1.6, 2.5]	<0.001
Buccal-Bardach, mean difference [95% CI]	1.9 [1.1, 2.8]	<0.001
Furlow-Bardach, mean difference [95% CI]	-0.3 [-0.6, 0.1]	0.210
Furlow-Buccal, mean difference [95% CI]	-0.1 [-0.6, 0.4]	<0.001
VL-Bardach, mean difference [95% CI]	-2.2 [-3.0, -1.4]	0.929
VL-Buccal, mean difference [95% CI]	-2.1 [-2.9, -1.2]	<0.001
VL-Furlow, mean difference [95% CI]	0.2 [-0.3, 0.6]	0.801

Note: IQR = interquartile range, CI = 95% confidence interval, VL = Von Langenbeck. * = P-values are for comparisons between groups. Bolded values are significant.

Results

- Age at palatoplasty, median [IQR]: 11.4 months [9.2, 13.0]
- Follow-up time, median [IQR]: 2.22 years [1.0, 4.2]

Conclusion

- Diagnosis of VPI and speech surgery were relatively uncommon in this patient cohort. Speech therapy was frequently required or recommended by surgeons.
- The palatoplasty techniques evaluated are equivalent with respect to adverse speech outcomes, even after adjustment for age at palatoplasty, validating equity in procedure choice based on a patient's anatomical needs and surgeon preference.
- Buccal flap palatoplasties required the longest operating time at over 4 hours, which was significantly longer than that of Bardach and Furlow procedures, but did not exhibit a measurable advantage in speech outcomes. This factor should be considered preoperatively particularly for high-risk patients.
- Limitations:**
 - The cohort size was limited particularly for buccal palatoplasties, which reduces statistical power. With a trend towards greater speech therapy requirements in patients undergoing Furlow and Bardach palatoplasties, measurement of a significant difference may not have been possible.
 - While surgeon data was collected, analyses could not be adjusted by this factor due to one surgeon performing all buccal procedures.
- Future Work:** Increase the cohort size with additional technique analyses as available

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