

Background

- The primary goal of cleft palate (CP) repair is to **facilitate normal speech development**.
- The national rate of secondary speech surgery in CP patients remains high at 18.5%.
- One of our lead surgeons has developed a **modified straight-line repair (SLR) technique to mitigate velopharyngeal insufficiency (VPI) rates**. The technique involves:
 - 1) Release the nasal mucosa with the levator palatini off the hard palate
 - 2) Dissection into lateral avascular planes near the superior constrictor
- Purpose:**
 - 1) **Evaluate the ability of this modified SLR technique to mitigate secondary speech surgery in comparison to traditional SLR**
 - 2) Determine if single-layered closure at the hard-soft junction impacts fistula outcomes

Methods

- Retrospective review of patients with CP $\pm$ CL with Veau class III or IV who underwent a SLR at our institution from 1993-2023
- Excluded: Veau I and II CPs and diagnosed craniofacial syndrome
- Outcomes:
 - 1^o: **Secondary speech surgery rates**
 - 2^o: **Fistula rates, fistula location by Pittsburgh Fistula Classification System (PFCS), operative fistula rates**
- Chi-squared tests and multivariate logistic regressions evaluated 1^o and 2^o outcomes**
- Patients with >2 years follow-up were included in VPI analysis to allow for speech development

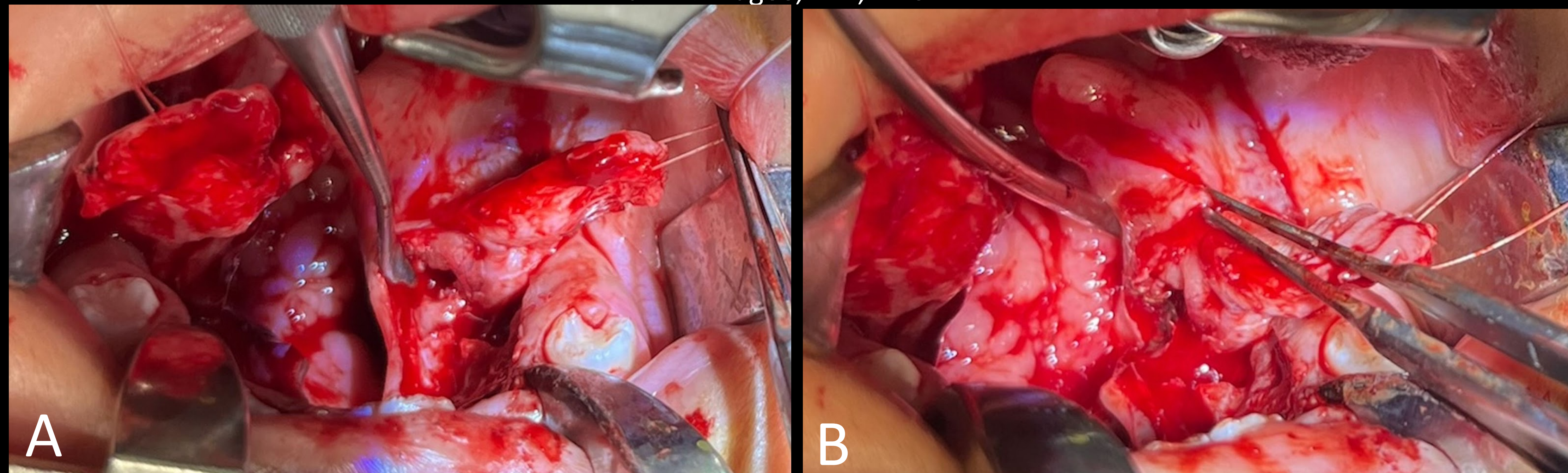


Figure 1: Intraoperative photos demonstrating before and after release of nasal mucosa with levator palatini off the hard palate (A) greater palatine artery flap islandized with periosteal elevator resting on nasal mucosa prior to cutback (B) nasal mucosa after being cut from posterior edge of the hard palate, with nasal mucosa of the soft palate held by forceps and suction in Eustachian tube

Fistula Locations of Modified vs Traditional SLR Cohorts

	Modified SLR (n=5)	Traditional SLR (n=28)	p-value
PFCS Fistula Classification			
II (soft palate)	0 (0%)	3 (10.7%)	0.104
III (hard-soft junction)	0 (0%)	4 (14.3%)	0.060
IV (hard palate)	1 (20.0%)	5 (17.9%)	0.138
V (1°-2° junction)	4 (80.0%)	16 (57.1%)	0.021*

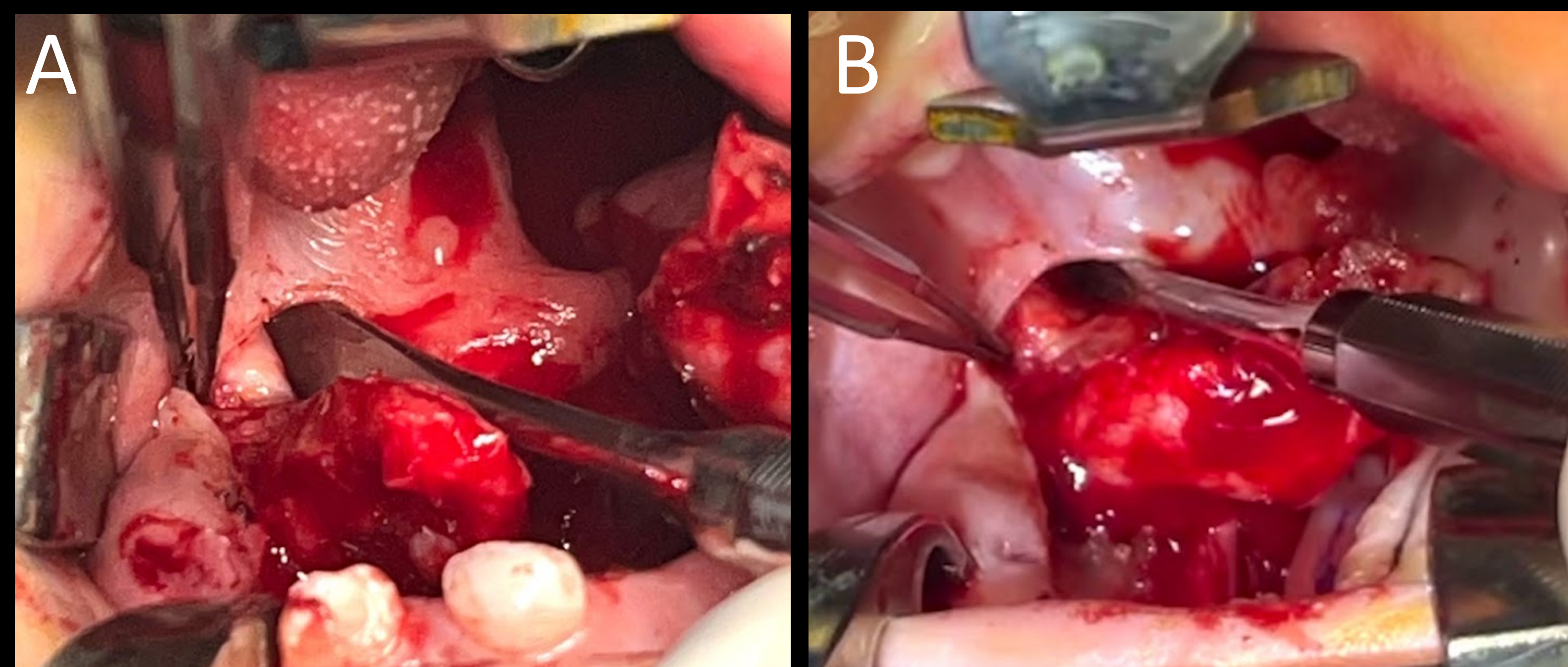


Figure 2: The space of Ernst (A) the periosteal elevator sits at the entrance of the avascular plane just medial to the pterygoid hamulus and posterior to the tensor veli palatini tendon (B) the periosteal elevator has bluntly dissected into this plane demonstrating the space and medial mobility that can be generated for the soft palate.

Results

- 343 patients underwent SLR (160 modified SLR, 183 traditional SLR)
- Median age at palatoplasty = 1.0 years old
- Average follow-up from palatoplasty = 6.4 $\pm$ 5.3 years
- 280 patients were included in VPI analysis (118 modified SLR, 162 traditional SLR)
- Modified SLR cohort had a lower rate of secondary speech surgery compared to the traditional SLR cohort (0.8% vs 16.0%, p=0.003).**
- Modified SLR cohort had fewer fistulas** compared to the traditional SLR cohort (3.1% vs 15.3%, p=0.001).
- There were fewer fistulas at the junction 1^o and 2^o palate (type V) in the modified SLR compared to traditional SLR cohort (p=0.021)
- Modified SLR cohort had lower rate of fistula repair** compared to the traditional SLR cohort (2.5% vs 8.7%, p=0.022).

Conclusion

- The modified SLR resulted in a **95% reduction in secondary speech surgery rates and an 80% reduction in fistulas** compared to traditional SLR at six years.
- Modified SLR maneuvers facilitate posterior and medial positioning of the soft palate without muscular dissection which:
 - 1) **Lengthens the velum improving speech outcomes**
 - 2) **Decreases tension on the repair improving fistula outcomes**
- Future studies should evaluate long-term VPI rates.