

Comparative Outcomes of Secondary Speech Surgery Techniques for Velopharyngeal Insufficiency Following Cleft Palate Repair

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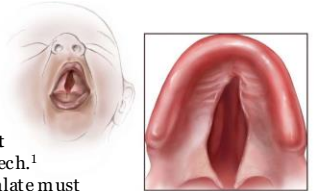
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Introduction

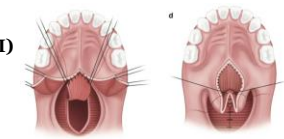
-**Cleft palate** is a common congenital craniofacial anomaly affecting approximately **1 in 1,563 live births**.¹

-**Cleft palate repair (CPR)** is typically performed within the **first 18 months of life** to improve speech.¹
-CPR closes the cleft, but the soft palate must also lift to meet the back and sides of the throat to seal off the nose. **VPI** results when this fails to happen causing **hypernasality** and **sleep apnea**.²

-**Velopharyngeal insufficiency (VPI)** can cause speech and psychosocial impairment post-palatoplasty.³
-Several surgical techniques to address VPI, but comparative outcome data among techniques remain limited, particularly **speech outcomes** and **revision rates**.



CDC. Cleft Lip/Cleft Palate. Birth Defects. Published January 8, 2026.



EntoKey. Velopharyngeal Insufficiency. Published April 26, 2020.

Objective

To compare outcomes by secondary speech surgery technique in pediatric patients with velopharyngeal insufficiency (VPI) after palatoplasty to treat cleft palate.

Methods

-**Retrospective cohort study** including pediatric patients at Corewell Health West and East.
-Included patients who underwent **secondary speech surgery for VPI diagnosed after cleft palate repair** between **2007 and 2022**.
-Patients underwent **pharyngeal flap**, **sphincter pharyngoplasty**, or **buccal flap palate-lengthening procedures** to treat VPI.
-**Hypernasality** was graded by speech-language pathologists (SLPs) as **none, mild, moderate, or severe**.
-**Outcomes of interest:** hypernasality severity, residual or recurrent VPI, revision surgery, sleep apnea
-Statistical analysis: Wilcoxon signed-rank tests with significance assigned to values with $p < 0.05$.

Figures

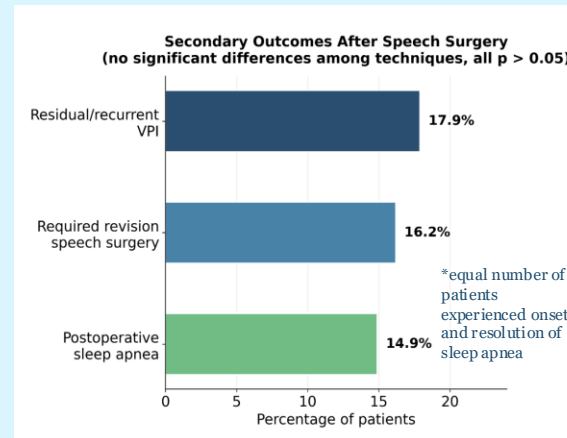


Figure 1. Secondary outcomes after speech surgery demonstrated no significant differences among the three analyzed techniques.

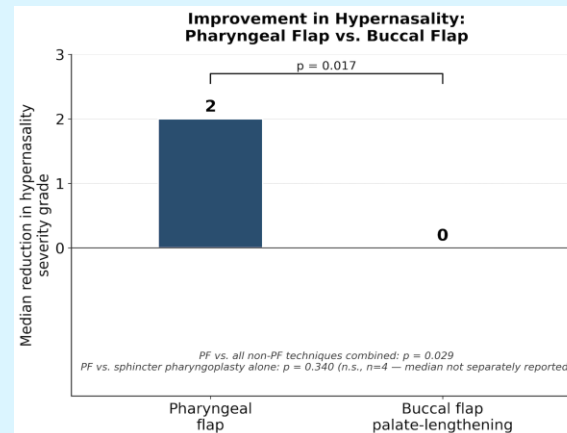


Figure 2. Pharyngeal flap demonstrated significantly better improvement in hypernasality vs. buccal flap palate-lengthening with a mean reduction of 2 vs. 0 severity grade levels.

Results

-**Sixty-eight patients** underwent speech surgery for VPI post-palatoplasty: pharyngeal flap (n=56), buccal-flap palate-lengthening (n=8), sphincter pharyngoplasty (n=4).
-Median age of formal VPI diagnosis **5.4 years** (IQR: 4.4-7.5) at median of **4.6 years** (IQR 3.4-6.6) after palatoplasty
-Speech surgery had significant **improvement in hypernasality severity** ($p < 0.001$) with **82.9% demonstrating improvement**, 14.6% unchanged, and 2.4% (n=1) worsening.
-**Pharyngeal flap** demonstrated **superiority in hypernasality reduction** compared to buccal flap palate-lengthening (mean reduction: 2 vs. 0 grades, $p = 0.017$) and all non-pharyngeal flap techniques combined ($p = 0.029$).
-**Residual or recurrent VPI in 17.9%** of patients and **16.2% required revision** speech surgery.
-**Postoperative sleep apnea** remained same at **14.9%** with equal number experiencing onset and resolution.
-No statistically significant difference in residual VPI, revision, sleep apnea among surgical techniques (all $p > 0.05$).

Conclusion

-Secondary speech surgery for VPI significantly improved hypernasality among patients with VPI post-palatoplasty.
-Pharyngeal flap demonstrated greater improvement of hypernasality compared to buccal flap palate-lengthening without increasing postoperative sleep apnea.
-Study demonstrates efficacy of secondary speech surgery in resolving VPI symptoms.
-Limitations: large pharyngeal flap sample size and smaller cohorts of other techniques may reduce ability to detect differences in less frequent outcomes.
-Larger multicenter studies with more balanced surgical cohort sizes are warranted to better compare techniques.

References

1. CDC. Cleft Lip/Cleft Palate. Birth Defects. Published January 8, 2026. <https://www.cdc.gov/birth-defects/about/cleft-lip-cleft-palate.html>
2. (2014) Kummer, A. Speech Evaluation for Patients with Cleft Palate. Clinics in Plastic Surgery; 41, 241-251.
3. EntoKey. Velopharyngeal Insufficiency. Published April 26, 2020.