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Background

Cleft palate frequently leads to **velopharyngeal insufficiency (VPI)**, resulting in **poor speech outcomes**.

Rapid palatal expansion (RPE) is an orthodontic intervention used to address **maxillary arch constriction** in patients with a history of cleft palate.

However, the impact of RPE on speech and its role as a precursor to VPI surgery remain underexplored.

This study investigates the **influence of RPE on speech outcomes** in cleft palate patients and its association with **the need for subsequent VPI surgery**.

Methods

- Retrospective cohort study of all patients who underwent palatoplasty from 2003-2023
- Non-syndromic** Veau-III patients **with unilateral cleft lip and palate (UCLP)** with **at least three years of follow up** were included.
- Our **primary outcome** was the **need for speech correcting surgery** to correct VPI following palatal expansion.
- VPI surgery rates were compared between the expansion cohort and patients with ULCP.
- Speech outcomes** including hypernasality and nasal air emission was compared within the expansion cohort
- Multivariate logistic regression** considered sex, age at palatoplasty, repair technique, fistula formation, surgeon experience and palate expansion

	Odds Ratio	95% CI	p-value
Male Sex	-0.515	[0.868-1.048]	0.327
Race/Ethnicity	<i>Reference</i>		
Asian			
White	1.063	[0.863-1.309]	0.565
Black/African American	0.899	[0.625-1.292]	0.564
Hispanic/Latinx	0.987	[0.842-1.158]	0.877
Other/Unreported	0.883	[0.736-1.060]	0.184
Age at Palatoplasty (months)	1.01	[1.001-1.022]	0.046*
Right Side	.959	[0.875-1.052]	0.382
Furlow Repair Technique	1.097	[0.991-1.215]	0.076
Palatal Expansion	1.123	[1.013-1.244]	0.029*
Fistula Repair	1.118	[0.952-1.313]	0.175
Surgeon Experience (years)	0.995	[0.984-1.006]	0.367

†Multivariate logistic regression assessing VPI surgery adjusting for sex, race age at palatoplasty, cleft palate laterality, cleft palate technique, rate of fistula repair , palatal expansion and surgeon experience



An analysis of hypernasality pre and post palatal expansion in patients who did not undergo VPI surgery
Green = Balanced, Yellow = Mild Hypernasality, Orange = Moderate Hypernasality and Red = Severe Hypernasality

Results

479 patients with unilateral cleft lip and palate were included in the study

165 patients underwent **palatal expansion**

Overall **VPI surgery rate** for Veau III patients was **13.7%**

Patients who underwent **palate expansion** were associated with **significantly increased VPI surgery rates** compared to patients who did not undergo palate expansion (**23.8% vs 9.2%, p= 0.009**).

By logistic regression, an **older age at palatoplasty** (Odds Ratio [OR] 1.010, p=0.046) and **palate expansion** (OR: 1.122, p=0.029) were **more likely to undergo VPI surgery**.

When comparing **speech assessments before and after palatal expansion** in patients who did not undergo VPI surgery, no differences were observed in **hypernasality** (p=0.113).

Conclusion

Veau III patients who undergo **palate expansion** are **more likely to have speech correction surgery** following their orthodontic intervention.

When counseling patients with Veau III clefts requiring palate expansion should be **advised of the increased likelihood** of the need for speech correcting surgery.