

ORIGINAL RESEARCH

The relationship between cleft palate repair technique and audiological outcomes: A retrospective cohort study

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Abstract

Objective: Otitis media with effusion is common in children with cleft palates. This study aimed to investigate the link between palatal closure techniques and audiological outcomes.

Methods: In this retrospective-prospective cohort study, we examined the relationship between palate repair techniques and hearing outcomes in children with cleft palates. From 2017 to 2022, 190 ears of 95 cleft patients were studied at the Cleft Lip and Palate Department of Shiraz University of Medical Sciences. Variables assessed included the surgical technique, cleft severity, auditory brainstem response (ABR) threshold, and tympanometry configuration.

Results: The mean ABR improved from a prepalatoplasty value of 39.51(11.62) decibels (dB) to a postpalatoplasty mean of 26.61(11.60) dB (Cohen's d : 1.12 [95% CI: 0.90–1.34]). Initially, 87.9% of the studied ears exhibited abnormal tympanometry, but this significantly decreased to 47% postsurgery (risk ratio: 4.43 [95% CI: 1.20–16.43]). When compared with Sommerlad intravelar veloplasty, the Nadjmi modified Furlow palatoplasty was associated with a notably lower mean ABR (β : -6.58 [95% CI: -10.43 to -2.73], p -value = .001) and a reduced frequency of abnormal tympanometry (odds ratio [OR]: -1.10 ; 95% CI: -1.85 to -0.36 , p -value = .004). Factors like prepalatoplasty ABR, cleft palate severity, gender, and syndromic did not confound these findings.

Conclusions: Although the Nadjmi modified Furlow palatoplasty showed better results, our findings indicate a significant improvement in ABR and tympanometry outcomes for both techniques. Future randomized controlled trials are suggested to confirm the influence of palatal closure techniques on audiological outcomes.

Level of Evidence: 3b.

KEYWORDS

cleft palate, cleft severity, hearing loss, modified Furlow, palatoplasty, palatoplasty, Sommerlad intravelar veloplasty

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outcomes of hard palate cleft repairs. Although no study directly compared Sommerlad intravelar veloplasty with Nadjmi's modified Furlow palatoplasty concerning audiological outcomes, D'Andrea et al.³¹ proposed that early Sommerlad intravelar veloplasty, as opposed to Veau-Wardill-Kilner palatoplasty, might reduce persistent OME, thereby decreasing the need for ventilation tubes. Our results support the theory that the choice of palatoplasty technique significantly affects postoperative hearing thresholds. Both methods lowered mean ABR thresholds postsurgery (p -value for both $<.001$), but GLM analysis revealed that the Nadjmi modified Furlow approach led to a markedly superior ABR outcome compared with Sommerlad intravelar veloplasty.

Some studies have explored the relationship between cleft width and otologic outcomes in patients with cleft palate. For instance, a study by Martin et al.³² suggested that patients with wider cleft palates may be more susceptible to severe eustachian tube dysfunction and otologic complications. Additionally, Wu et al.³³ indicated that wider preoperative cleft palates, which correlate with Veau classification, are associated with increased complications and poorer outcomes following cleft palate repair. However, to the best of our knowledge, there is no direct comparison in the existing literature that definitively evaluates whether cleft width or Veau classification has a greater impact on otologic outcomes.

Given the uneven distribution of patients across cleft severity grades, we undertook a subgroup analysis focused on postpalatoplasty ABR. Grade 4 cleft severity was excluded from this due to insufficient sample size. As summarized in Table 3, for Grades 2 and 3 Veau cleft severity, the Nadjmi Furlow technique corresponded with a reduced mean postpalatoplasty ABR compared with the Sommerlad intravelar veloplasty.

The Audiology Clinical Practice Guideline for Cleft Palate Patients indicates that palatoplasty surgery can positively impact audiological evaluations provided there is a minimum 3-month gap postsurgery.²⁹ Consequently, our study ensured a minimum 3-month interval between palatoplasty and audiological testing.

Like any retrospective cohort study, ours has limitations. The follow-up duration may be considered short, age-related hearing improvement was not factored in, and there was an uneven distribution of participants across the cleft severity spectrum. Nonetheless, our findings robustly support all the proposed hypotheses, suggesting they are not merely the result of statistical anomalies. We acknowledge that including patients with prior ventilation tubes in future studies, conducted through randomized, blinded clinical trials, could provide a broader and more comprehensive assessment of the outcomes of palatoplasty in a diverse patient population, with a specific focus on audiological aspects.

5 | CONCLUSION

In sum, our research suggests that the Nadjmi modified Furlow palatoplasty, in comparison to Sommerlad intravelar veloplasty, might offer improved audiological outcomes as gauged by ABR and

tympanometry. Thus, in alignment with existing research, early intervention, continued follow-up, and judicious selection of the most effective surgical approach are advocated to enhance not just dental and orthodontic results but also hearing and speech outcomes. Such strategies can play a pivotal role in the holistic social development of children diagnosed with orofacial clefts.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Dr. Sara S Nabavizadeh, upon reasonable request.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all individual participants included in the study.

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