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Usage of Tongue Flap for Repair of Anterior Palatal Fistula: A Case Series of 12 Patients

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Abstract

Background: Anterior palatal fistula remains one of the most difficult complication encountered following cleft palate repair. It results in nasal regurgitation, hypernasality, poor speech intelligibility, and psychological distress. A variety of local and regional flaps have been described, but many are inadequate in the anterior region due to prior surgeries . The anterior based dorsal tongue flap provides a well-vascularized, robust, and reliable option for closure of these defects.

Methods: A case series report involving 12 patients aged between 7–25 years with anterior palatal fistula following cleft palate surgery . All patients underwent two-stage repair using an anterior based dorsal tongue flap. Demographics, fistula size, surgical technique, perioperative care, speech outcomes, and complications were evaluated over a mean follow-up of 12 months.

Results: Complete closure was achieved in 11 patients (91.7%). One case showed minor flap dehiscence that healed secondarily. All patients reported elimination of nasal regurgitation. Speech outcomes improved significantly, with an average 18% reduction in hypernasality scores and improved perceptual intelligibility in 10 patients. Donor site morbidity was minimal, with only transient pain and no long-term functional impairment. No patient developed tongue mobility restriction or complete flap necrosis.

Conclusion: The anterior based tongue flap remains a reliable, safe, and effective method for closure of large or recurrent anterior palatal fistulae. It ensures durable anatomical repair and functional improvement in speech and swallowing, with minimal donor site morbidity.

Keywords: Anterior palatal fistula, Cleft palate, Tongue flap, Palatal reconstruction, Plastic surgery

Introduction

Cleft palate repair is one of the most frequently performed reconstructive procedures in congenital orofacial surgery. Numerous local and regional soft tissue flaps and techniques have been explained for repair. Despite advances in surgical techniques, palatal fistula formation remains one of the common complication post surgery , with reported incidence ranging from 4% to 35%. The anterior hard palate region is particularly prone to fistula recurrence due to limited local tissue availability, tension during closure, and poor vascularity resulting from previous surgeries and presents a challenge for reconstruction compared to posterior soft palate fistulae.[1,2,]

Patients with anterior fistulae often experience persistent nasal regurgitation, hypernasality, and impaired speech intelligibility[3,4,], causing significant functional and psychosocial difficulties. Numerous closure techniques have been described, including local mucoperiosteal flaps, buccal mucosal flaps, and regional flaps coverage of large anterior defects often is adequate and associated with high chances of dehiscene. Hence necessitating coverage with , a vascularized flap.

The anteriorly based dorsal tongue flap, first described by Guerrero-Santos and Altamirano (1966), offers a well-vascularized, pliable, and reliable tissue option. Its proximity to the defect, robust blood supply, and ease of harvest make it an ideal choice for difficult anterior palatal fistulae.[5]

This study aims to evaluate the effectiveness and outcomes of the anteriorly based dorsal tongue flap for closure of large or recurrent anterior palatal fistulae in 12 patients managed at our tertiary care center..

Materials and Methods

Study Design

This prospective observational study was conducted at IRRH & DPS, Government Stanley Medical College, Chennai, between 2023 to 2025.

Patient Criteria

Inclusion criteria:

- Patients with large anterior hard palate fistula (≥ 0.7 cm in largest dimension) post cleft palate repair
- Failed previous local flap closure
- Good oral hygiene and tongue mobility

Exclusion criteria:

- Active infection or poor hygiene
- Posterior fistula or soft palate involvement
- Medically unfit for anesthesia
- Restricted tongue mobility or congenital malformations of tongue

Surgical Technique

Stage I: Flap Inset

Under general anesthesia, the fistula margins were freshned with a small extension along the oral mucosa and mucoperiosteal flap elevated medially for the nasal lining which was sutured with 4-0 Vicryl. Defect pattern mapped over lint pattern and traced over the mid dorsum of tongue anterior based 2 cm proximal to the tip . A dorsal tongue flap (1–1.2 cm thick, slightly larger than defect) was raised based on the anterior dorsal surface and transposed into the defect and sutured with the edge and gingiva with 3-0 Vicryl sutures along the anterior and lateral borders of the fistula. The flap was sutured without tension, and the donor site was primarily closed after ensuring hemostasis .

Stage II: Flap Division

At 3 weeks, under general anesthesia, the flap pedicle was divided and inset into the posterior palatal margins.

Postoperative Care

Patients were maintained on a Ryles tube feed 1 week and clear oral liquid diet for 2 week and soft diet post division thereafter. Chlorhexidine mouthwash was used for oral hygiene thrice daily . Patients were routinely followed up and speech therapy resumed at the end of 6 weeks of surgery.

Follow-Up

Patients were followed for a minimum of 12 months, assessing:

1. Fistula recurrence
2. Flap viability
3. Donor site morbidity
4. Speech improvement (hypernasality, articulation, intelligibility)
5. Patient satisfaction

Results:

Patient Demographics and Defect Characteristics

The study included 12 patients (8 males, 4 females) between the ages of 7 and 25 years (mean 14.8 years). All patients had undergone at least one prior palatal surgery with local flap cover . 3 patients had a history of failed local flap closure for the anterior fistula.

The size of the fistula ranged from 0.8 cm to 2.5 cm (mean 1.6 cm), located between the premaxilla and the incisive foramen region. The mucosal margins were often fibrotic and tethered indicating scarred local tissues from previous surgery.

Intraoperative Findings

The flap dimensions ranged from 2 × 3 cm to 3 × 4 cm, with a mean flap thickness of approximately 1 cm. The average operative time for flap elevation and inset (Stage I) was about 80 to 100 minutes and flap division (Stage II) took 30–40 minutes. All flaps demonstrated healthy vascularity intraoperatively, with no evidence of venous congestion or ischemia.

Postoperative Course and Complications

Mild postoperative pain and tongue edema were observed in all cases but subsided within 48 - 72hrs hours. One patient (8.3 %) developed minor flap dehiscence of 20% at the anterior margin on postoperative day 10, which healed secondarily with conservative management. One patient had experienced avulsion of primary incisor during division of the flap which was which was repaired intraoperatively . There were no cases of infection, hematoma, or total flap loss.

No patients exhibited airway compromise, dysphagia, or excessive salivation during the interstage period. The donor site healed uneventfully in all cases with minimal discomfort.

Speech and Functional Outcomes

At the 12-month follow-up, 11 out of 10 patients (91.7%) achieved complete closure without any recurrence. All patients reported improvement and resolution of nasal regurgitation during swallowing.Speech evaluation (performed jointly with a speech pathologist) demonstrated mean reduction in hypernasality of about 18 -20%, Improved speech comprehension in : 10 patients (83%)

Reduced nasal emission was observed in all cases , Resonance and articulation: improved in 75% of cases after 6 months of speech therapy

Donor Site Morbidity

None of the patients reported long-term difficulty in speech articulation, tongue movement, volume taste sensation or deglutition. No contracture, numbness, or scar hypertrophy was noted. Minor transient tongue tip numbness was noted in one case but resolved spontaneously within two weeks.

Aesthetic and Functional Satisfaction

Patient-reported satisfaction (on a 5-point Likert scale) averaged 4.7, reflecting high acceptance. Families also reported improved self-confidence and social participation post-repair.

Table 1. Demographics & outcomes	
Parameter	**Data (n=12)**
Age range	7–25 years (Mean: 14.8)
Gender	8 males, 4 females
Fistula size	0.8–2.5 cm (Mean: 1.6 cm)
Fistula recurrence	All post primary palatoplasty
Successful closure	11/12 (91.7%)
Partial dehiscence	1 (8.3%) – healed secondarily
Hypernasality reduction	Mean 18%
Improved speech intelligibility	10 patients (83%)
Nasal regurgitation resolved	12 (100%)
Donor site morbidity	Minimal, transient pain only
Tongue restriction	None
Follow-up duration	12 months

Case Examples

Case 1 : 16 year old male, with anterior fistula , covered with tongue flap, had tooth avulsion during flap division and inset which was repaired on table, post op at 3 months shows well settled flap and healed donor site.

Figure 2 - Case example 1

Case 2: 19 year old female, with anterior fistula , covered with tongue flap, had t post op at 6 months shows well settled flap and healed donor site.

Figure 3 : Case example 2

Case 3: 25 year old male, with anterior fistula , covered with tongue flap, had partial dehiscence of flap , post op at 1 month shows partial dehiscence of flap along anterior margin which healed conservatively by end of 3 months.

Figure 4 : Case example 3

Discussion

The persistence of a palatal fistula remains a major reconstructive challenge even in modern cleft surgery. The anterior fistula poses unique difficulties due to limited mucoperiosteal mobility, proximity to bone, and the effects of prior surgeries. The goal of fistula closure should aim to restore normal speech, swallowing, and prevent regurgitation with a proper anatomical repair.

Comparison with Existing Literature

In this series, the high success and favourable results parallels that of those from major studies in the literature. Guerrero-Santos et. Al (1966), in their original description of the tongue flap, reported complete healing in the majority of cases [6]. Parwaz et al. (2009) achieved a 97.5% success rate in 41 patients using the dorsal tongue flap, emphasizing its reliability even in scarred tissues [7]. Amin et al. (2017) reported 96% success, noting minimal morbidity and early return to function [8].
Our results reaffirm that the tongue flap remains a gold-standard option for recurrent or large anterior fistulae even in today's setting.[9]

Functional Outcomes and Speech Improvement

One of the primary advantages of the tongue flap is its ability to restore functional separation and barrier between the nasal and oral cavities, which directly improves speech resonance and intelligibility. In this study, an 20% mean reduction in hypernasality was achieved—comparable to reports by Agrawal (2019) and Mehendale et al. (2000) [10,11].

After closure, the improvement in velopharyngeal function is attributed not only to mechanical sealing of the defect but also to reduced nasal air escape and improved intraoral pressure during phonation which in turn adresses the goal for cleft palate repairs. Early postoperative speech therapy plays a vital role in maximizing functional gains.

Donor Site Considerations

The dorsal tongue surface provides an ideal donor area because of its rich vascularity from the dorsal lingual arteries, rapid mucosal healing, and minimal postoperative scarring. In this series, no donor site morbidity was noted beyond mild transient pain. Similar observations were made by Fadeyibi et al. (2012), who concluded that the tongue flap has negligible long-term functional impairment [9].

Advantages Over Other Techniques

Compared to local mucoperiosteal flaps, the tongue flap provides greater mobility, better vascularity, and thicker tissue coverage. Unlike buccal mucosal flaps, it avoids

intraoral contracture or donor site tethering. Furthermore, its proximity allows tension-free transposition, reducing recurrence.

Furlow's double opposing Z-plasty (1986) [3] and two-stage vomerine flaps are excellent for posterior defects but inadequate for large anterior defects. Hence, for recurrent or wide anterior fistulae, the tongue flap remains the most predictable and reproducible choice.

Limitations of the Study

This study is limited by its small sample size (n=10) and and a average follow of 1 year duration . A larger multicentric cohort and longer follow-up would better quantify long-term speech outcomes.

Clinical Implications

Our findings reinforce that the tongue flap should be considered early in recurrent or large anterior fistula cases rather than as a salvage option. Early intervention prevents repeated failed surgeries, scarring, and psychological trauma. The simplicity, reproducibility, and reliability of this technique make it suitable even in resource-limited settings.

Conclusion

The anteriorly based dorsal tongue flap is a dependable and versatile technique for closure of large or recurrent anterior palatal fistulae. It provides durable anatomical and functional restoration with minimal complications and good speech outcomes.

Key Advantages:

1) Reliable vascularity
2) Ample tissue for anterior defects
3) Minimal donor site morbidity
4) Improved speech and swallowing

Conflict of Interest

The authors declare no conflicts of interest.

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