

## Original Research Article

# Closure of anterior palatal fistula using tongue flap: our experience

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### ABSTRACT

**Background:** Palatal fistula is one of the most common complications following cleft palate repair. It occurs mostly due to tip necrosis of palatal flaps. Small palatal fistulas are usually closed by transposition of adjacent tissues, however these local tissues are not sufficient for the closure of bigger fistulas. The tongue flap serves as a reliable and most easily obtainable local flap for closure of large sized palatal fistulas.

**Methods:** This is a prospective study conducted from Aug 2006 to July 2015 in the department of Plastic & Reconstructive Surgery, SKIMS, Srinagar, Jammu Kashmir, India. A total of 25 patients with large anterior palatal fistula were treated using anteriorly based tongue flap. Patients were selected on the basis of size of fistula (> 1x1 cm), scarred local palatal tissue or history of fistula recurrence after previous attempts of closure using local palatal tissues.

**Results:** In present study 25 patients of palatal fistula were treated using tongue flap. Eighty percent patients were in the age group of 3 to 5 years. Male-to-female ratio was 2:3. The largest dimension of treated fistula was 4x3 cm. There was partial dehiscence of flap suture line in two patients while remnant fistula was observed in three patients. None of our patients had flap necrosis.

**Conclusions:** Tongue flap is an excellent and versatile option for closure of large palatal fistulas with high success rate and least morbidity.

**Keywords:** Cleft palate, Palatal fistula, Tongue flap

### INTRODUCTION

Incidence of palatal fistula in secondary palate varies from 8.9 to 34%.<sup>1</sup> Breakdown of palatal repair is one of the major causes of fistula formation, which is in turn related to tension in the repair line, necrosis, greater palatine artery injury or mechanical trauma.

Small palatal fistulas are usually closed by transposition of adjacent tissues, however closure of large fistulas is extremely difficult and challenging.<sup>2-7</sup> The excellent vascularity and good amount of tissue availability make tongue flap one of the most appropriate options for the closure of large palatal fistulas.<sup>8</sup> Tongue flap is a versatile

flap which can be anteriorly or posteriorly based with axial or random pattern of blood supply and can be harvested from ventral, dorsal or lateral portions of tongue.<sup>9-12</sup> Use of tongue flap for closure of palatal fistula was first described by Guerrero-santos et al.<sup>13</sup> We present our experience of using tongue flap for closure of anterior palatal fistulas over past nine years.

### METHODS

This was a prospective study conducted from Aug 2006 to July 2015 in the department of Plastic & Reconstructive Surgery, SKIMS, Srinagar, Jammu Kashmir, India during which 25 patients with large

anterior palatal fistula were treated using anteriorly based tongue flap. These included 10 male and 15 female patients, with mean age of four years (ranging from 2 to 18 years). Patients were selected on the basis of size of fistula (> 1x1 cm), scarred local palatal tissue or history of fistula recurrence after previous attempts of closure using local palatal tissues.

### Operative procedure

All patients were operated under general anaesthesia. After scrubbing and draping, fistula (Figure 1) was infiltrated with 2% lidocaine with 1:200,000 adrenaline. Circumscribed incision was given around the fistula and turn-over flaps were raised and closed in midline. In cases where turn-over flaps didn't suffice for complete lining of fistula, turn-over flaps were raised from inferior turbinate or nasal septum. Anteriorly based tongue flap was marked so that its base was just at the level of anterior edge of fistula in normal resting position of tongue.



**Figure 1: Wide anterior palatal fistula.**

Length and width of tongue flap was determined by using a template as a guide. The depth of flap was about 5 to 8 mm thick, which included thin muscular layer, for the protection of sub-mucosal plexus, which is the major source of blood supply to the flap. The flap was then rotated forward and sutured to raw edges of palatal defect anteriorly and laterally using 4-0 vicryl (Figure 2). Donor site was also closed using interrupted 4-0 vicryl sutures.



**Figure 2: Anteriorly based tongue flap insitu.**

Patients were given liquid diet on first post-operative day and soft diet was started from second post-operative day for three weeks, after which the patients were taken for detachment and final inset given (Figure 3).



**Figure 3: Flap detached and final inset given.**

### Follow up

After detachment of tongue flap the patients were followed weekly during first month and monthly thereafter for one year, during which patients were observed for fistula closure, flap viability, residual tongue aesthetics and function.

## RESULTS

### Sex and age groups

Out of 25 patients operated, 10 patients were males (40%) and 15 patients were females (60%). Age of the patients varied from 2 to 18 years, with most patients falling in the age group of 3 to 5 years (20 patients), accounting for 80% of study participants. The mean age of the studied patients was four years.

### Location of the fistula

We used The Pittsburgh Fistula Classification System to describe the location of the fistula as follows: Type I-bifid uvula; Type II-soft palate; Type III- junction of the soft and hard palate; Type IV-hard palate; Type V-junction of the primary and secondary palates; Type VI-lingual alveolar; and Type VII-labial alveolar.<sup>14</sup>

In present study, most of the fistulas were seen at the junction of the primary and secondary palate. Out of 25 patients, 20 patients (80%) had fistula at the junction of primary and secondary palate (type V), 5 patients (20%) had fistula in hard palate (type IV).

### Size of the fistulas

The smallest size of the operated fistula was 12x10 mm and the largest fistula encountered was 4x3cms in size; the mean size was 15.4x12.6 mm.

### ***Size of the tongue flap***

In present study, we used tongue flaps whose size ranged from 15x13 mm to 5x4cms.

### ***Number of previously operated patients***

In our study, out of 25 patients operated, 5 patients (20%) were operated previously for closure of fistula using local palatal tissue.

### ***Flap viability***

All the 25 operated patients had viable flap at the end of one year of follow-up, however three flaps (12%) required resuturing, and who also had satisfactory results at the end of one year of follow-up.

### ***Fistula closure***

In three patients (12%), the fistula recurred and secondary closure was achieved by local advancement of in-situ tongue flap tissue.

### ***Residual tongue function and esthetics***

In all cases postoperative aesthetics of the donor tongue site were found to be satisfactory. Tongue aesthetics was assessed based on the symmetry on either side of the suture line after complete healing. There was no interference with speech as a consequence of use of the tongue as a donor site. Oral hygiene and mastication were unimpaired. No patient complained of sensory or gustatory disability following this procedure.

### ***Complications***

In present study group, we had bleeding in two patients (8%), which were controlled with local hemostatic measures. Dehiscence was seen in two patients (8%), sloughing in one patient (4%) and overall three patients required resuturing of the flap, among these one of our operated patients had total detachment of the flap on first post-operative day due to unconsolable crying. Recurrence of fistula was seen in three (12%) patients. None of our patients had flap necrosis.

## **DISCUSSION**

One of the main goals of cleft palate repair is separation of the oral and nasal cavities. However fistula can recur in the secondary palate in significant percentage of patients ranging from 8.9 to 34%.<sup>1</sup> The severity of the original defect also increases the probability of fistula formation.

Musgrave and Bremner reported a 4.6% incidence in case of incomplete cleft palate, in 7.7% of complete unilateral clefts, and in 12.5% of complete bilateral clefts.<sup>15</sup> The palatal defect leads to discomfort and disability in speech,

mastication and swallowing.<sup>16</sup> Many surgical attempts have been tried in the past for the closure of such defects. In present study we used dorsal tongue flap for closure of anterior palatal fistula. Jackson in his study did closure of secondary palatal fistulas in 68 patients with intraoral tissue and bone grafting. He used tongue flaps for closure of wider fistulas. In his study, he used the Veau flap and the buccal flap but found that the tongue flap was excellent for wider defects.<sup>17</sup>

Gordon and Brown provided a brief review of flap techniques for closure of defects of the palate including the Fickling–Inkwell technique, double-layer island flap, double-layer hinged flap, and tongue flap; the authors advised that the local flaps be chosen for smaller defects (enough to be covered with a rotated flap) when adjacent healthy tissue is available. However, a larger defect may require reinforcement with tongue flaps.<sup>18</sup>

Piggot et al recommended the two layer closure of cleft palate fistula. In accordance with these principles, in our present study we closed anterior palatal fistula in two layers using local turn-over for providing nasal lining and anteriorly based tongue flap to provide oral lining for closure of palatal fistula.<sup>19</sup>

Guerrero-Santos et al and Piggot et al have stressed the importance of correct alignment of base of the flap; design of the flap and provision of adequate tongue mobility with a pedicle of reasonable length. Accordingly, the design of the tongue flap in our study was anteriorly based in midline of tongue dorsum in most of the cases.<sup>13,19</sup> The length was taken such that it could cover the anterior-posterior dimensions of the fistula with at least 1cm extra, to allow for the turn-over section to cover and to give freedom of some tongue movement. The depth of our flap included few layers of underlying muscle, to provide protection to the sub mucosal plexus.

Busić et al used anteriorly based dorsal tongue flaps in 19 cleft patients for closing large palatal defects. The procedure was successful in 17 patients. One patient had partial marginal necrosis after division of the pedicle, another had complete necrosis after division of the pedicle, and another had complete necrosis of the distal part of the flap; the authors concluded that the anteriorly based dorsal tongue flap is a safe and effective method for closure of relatively large palatal defects. The parameters for success include sufficient length of the flap (5 to 6 cm), a flap width somewhat larger than the defect, and a flap thickness of about 0.5 cm.<sup>20</sup>

Assunção presented his experience with thin (3-mm) tongue flaps used to close large anterior palatal fistulas. This technique was used successfully in 12 patients with fistula following surgery for cleft palate.

One forked flap and one mushroom-shaped flap that were used to close irregularly shaped fistulas were described. All flaps survived and there was a partial recurrence in

only one patient. The results of this series confirm that the thin tongue flap is a safe and reliable technique for the closure of large palatal fistula even when tailored to fit irregularly shaped defects.<sup>21</sup>

## CONCLUSION

The tongue flap is an excellent and versatile option for closure of large palatal fistulas with high success rate and least morbidity.

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