

# Bipedicle mucoperiosteal flap repair of postpalatoplasty fistula: Can it reduce postoperative recurrence?

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## Abstract

*Palatal fistula following repair of cleft palate is a challenging problem and its repair is technically difficult. Many surgical techniques were described for management of postpalatoplasty fistula. Twenty eight patients with postpalatoplasty fistulas were repaired with Bipedicled mucoperiosteal flap with only 2 cases of recurrent fistulas (7.2%). Bipedicle mucoperiosteal flap utilizing the whole palatal mucoperiosteum is a reliable technique for repair of postpalatoplasty fistulas with a high success rate.*

## Introduction:

Palatal fistula is the commonest complication after cleft palate repair. The incidence of postpalatoplasty fistula varies greatly among different centers and surgeons. It was previously reported between 4-35%,<sup>1</sup> however, a recent incidence between 10-20% was reported.<sup>2</sup>

Palatal fistula has been associated with the severity and type of cleft palate, type and timing of repair, wound tension and the experience of the surgeon.<sup>3,4</sup>

The main symptoms of palatal fistula are nasal regurgitation and speech problems, mainly hypernasality.<sup>5</sup>

Many techniques have been used for treatment of palatal fistula as local flaps,<sup>4,6</sup> regional intraoral<sup>7,8</sup> and extraoral flaps,<sup>9</sup> free flaps<sup>10</sup> and prosthetic obturators.<sup>11</sup> However, the recurrence rate after repair of palatal fistula was reported to be between 33% and 37%.<sup>12</sup>

The aim of this study is to evaluate the technique of repair of postpalatoplasty fistula by total elevation of the palatal mucoperiosteum as a bipedicled flap based on both greater palatine arteries, and then closure in two layers (nasal and oral).

## Patients and methods:

Between November 2006 and January 2010, twenty eight patients underwent repair of postpalatoplasty fistula. Their age ranged

between (18 months- 10 years). 16 patients were males and 12 patients were females. The main presenting symptoms were regurgitation and nasal tone of voice. The fistulas were located in the hard palate in (10 cases), at the junctional area of the hard and soft palate in (12 cases) and multiple fistulas of the hard and soft palate in (6 cases).

Six patients had small fistulas (width 1-2mm), 12 patients had medium-sized fistulas (width 2-5mm) and 10 patients had large fistulas (width 5-15mm).

Eighteen patients had palatal fistulas following repair of unilateral cleft palate and 10 patients following repair of bilateral cleft palate. There were no previous attempts at repair of the palatal fistulas before.

## Operative technique:

The junction of the nasal and oral mucosa at the fistula is divided sharply followed by excision of the mucosa at the edge of the fistula. The palatal mucoperiosteum is elevated starting at the apex of the gingival sulcus of each tooth and then dissection proceeds medially with sharp edged elevators **Figures(1A,2A)**.

The palatal flap is reflected posteriorly, exposing the nasal aspect of the fistula, then complete separation of the nasal mucosa from the oral mucosa is done at the fistulous opening **Figure(2B)**. Dissection of the palatal mucoperiosteal flap continues till the greater

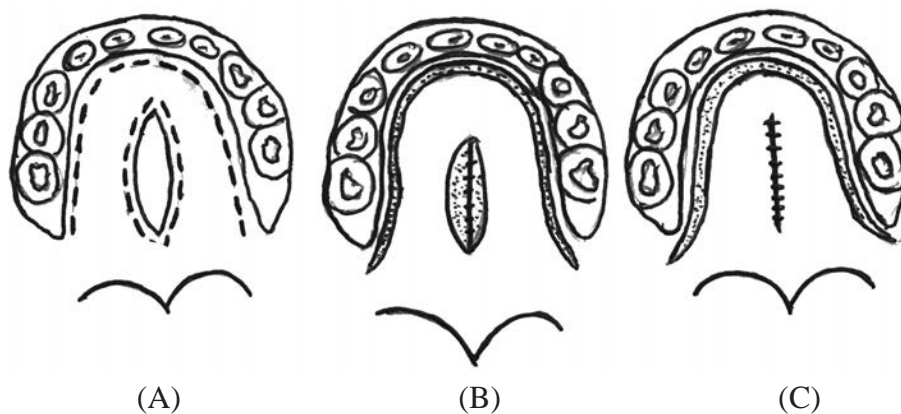
palatine arteries are exposed with proper dissection around them (Bipedicled flap).

The nasal mucosa is dissected bilaterally at the margin of the fistula and then closed with interrupted vicryl 5/0 **Figures(1B,2C)** sutures.

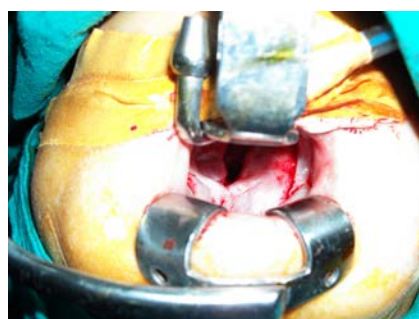
Closure of the oral mucosa at the fistulous opening is done with interrupted vicryl 4/0. Then three interrupted vicryl 4/0 sutures are done between the edge of the palatal mucoperiosteal flap and the remaining gingival mucosa laterally to prevent the flap from falling (hanging palate) **Figures(1C,2D)**.

In cases of combined fistulas of the hard and soft palate, the lateral incisions of the mucoperiosteal flap are extended bilaterally on the lateral borders of the soft palate, then incision at the edge of the fistula of the soft palate is made to separate nasal from oral mucosa, undermining of the soft palate to create two layers, then closure of the fistula as before in two layers (nasal and oral) separately.

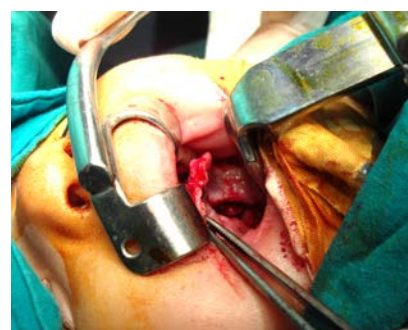
In the postoperative period, mothers are instructed to avoid suckling of young babies, and patients are on soft diet for 10 days.



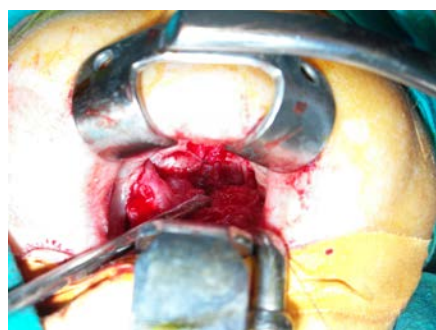
*Figure (1): Line diagram showing the technique of bipedicled flap reconstruction of palatal fistula. A) Incision at the edge of the fistula and incision of the palatal mucoperiosteum at the apex of the gingival sulcus of the teeth, B) Closure of the nasal mucosa at the fistulous opening, C) Closure of the oral mucosa at the site of the fistula.*



(A)



(B)



(C)



(D)

*Figure (2): Operative technique of palatal fistula repair using the bipedicled flap reconstruction. A) Incision at the edge of the fistula to separate nasal from oral mucosa. Another incision of palatal mucoperiosteum at the apex of gingival sulcus of the teeth, B) The palatal mucoperiosteal flap is reflected posteriorly to expose the nasal side of the fistula, C) Suturing of the nasal mucosa at the edge of the fistula in a separate layer, D) Suture of the oral mucosa at the site of the fistula.*

**Results:**

Twenty eight patients with postpalatoplasty fistula were managed by this technique of bipediced flap reconstruction. All patients were followed weekly till 1 month postoperative. Parents were interviewed about whether there had been nasal leaks of fluids

or semisolids and the palatal suture lines were inspected closely for fistulous openings. The postoperative follow-up duration ranged from 3-9 months. There were no postoperative complications except for 2 cases with recurrent palatal fistula **Table(1)**.

*Table (1): Complications following repair of postpalatoplasty fistula using bipediced flap technique.*

Complication	Number	%
Hemorrhage	0	0
Respiratory obstruction	0	0
Infection	0	0
Hanging palate	0	0
Flap necrosis	0	0
Recurrent fistula	2	7.2

**Case presentation:**

Case (1): Male patient, 3 years old with palatal fistula at the junction of the hard and soft palate. Repair was done with palatal mucoperiosteal bipediced flap reconstruction **Figure(3)**.

Case (2): Male patient, 4 years old with large palatal fistula (15mm width) taking most

of the hard palate and the junctional area of the hard and soft palate. Repair was done with palatal mucoperiosteal bipediced flap reconstruction **Figure(4)**.

Case (3): Female patient, 18 months old with double fistulas involving the hard and soft palate. Repair was done with palatal bipedice flap reconstruction **Figure(5)**.



(A)



(B)

*Figure (3): Male patient with palatal fistula at the junction of the hard and soft palate. A) Preoperative view, B) Postoperative view, after bipediced mucoperiosteal flap reconstruction.*

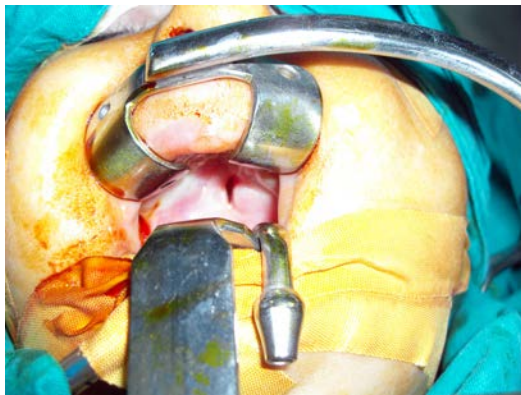


(A)

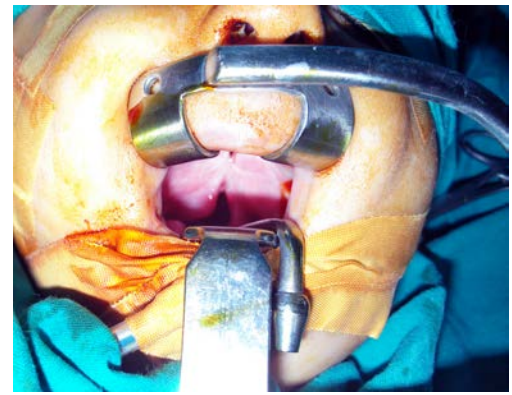


(B)

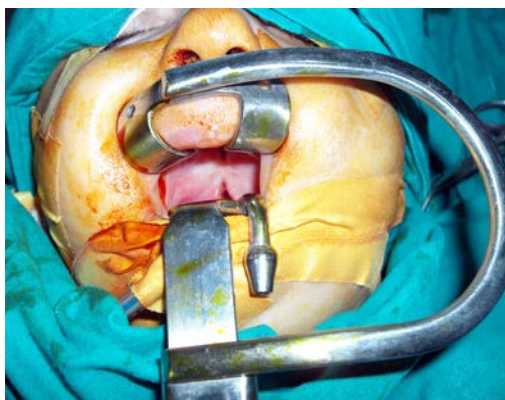
*Figure (4): Male patient with large palatal fistula (width= 15mm) involving most of the hard palate and the junctional area of the hard and soft palate. A) Preoperative view, B) Postoperative view after bipediced mucoperiosteal flap reconstruction.*



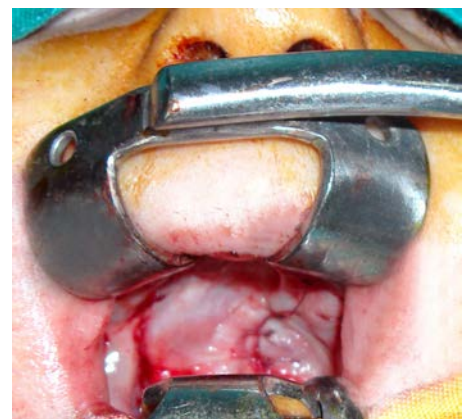
(A)



(B)



(C)



(D)

*Figure (5): Female patient with double fistula of the hard and soft palate. A) Preoperative view showing the hard palatal fistula, B) Preoperative view showing the soft palatal fistula, C) Preoperative view showing both hard and soft palatal fistulas, D) Postoperative view after repair with bipediced flap technique.*

## Discussion:

Palatal fistula is the most common complication following cleft palate repair, and it results from poor wound healing, tension, or absent multilayer repair.

The treatment of palatal fistulas has proved challenging, conventional methods of surgical closure have reported success in only 35% of cases.

Enrina et al,<sup>13</sup> reconstructed postpalatoplasty fistula in 64 patients with local flap and two-flap palatoplasty as the common techniques used, and they reported an overall success rate of 90.5% of cases.

Arlen and Christian,<sup>14</sup> managed 60 patients with palatal fistulas by total elevation of the palatal mucoperiosteum, and reported success rate in 90% of cases.

Tiwari and Sujata,<sup>15</sup> used orbicularis oris musculomucosal flap for repair of anterior palatal fistula with 92% success rate.

Abdel-Aziz et al,<sup>16</sup> used superior lip myomucosal flap for reconstruction of anterior palatal fistula with 91% success rate.

Assunção,<sup>17</sup> used tongue flap to close postpalatoplasty fistulas in 12 cases, with flap survival in all cases but with partial recurrence of the fistula in one case.

Many authors used free flaps for repair of postpalatoplasty fistulas, Chen et al,<sup>10</sup> used free forearm flap for closure of difficult oronasal fistulas, Ninkovic et al,<sup>18</sup> used the dorsalis pedis-first dorsal metatarsal artery flap for closure of palatal fistulas. However, free flap reconstruction of postpalatoplasty fistula is time consuming procedure and it has a higher donor site morbidity than other techniques.

In this study, twenty eight patients with postpalatoplasty fistulas with a fistula width ranging between (2-15mm), were managed with bipediced (based on both greater palatine arteries) mucoperiosteal flap reconstruction utilizing all the palatal mucoperiosteum as a flap and then closure of the nasal and oral mucosa at the site of the fistula separately. Success of fistula closure occurred in 26 cases (92.8%) with only 2 cases of recurrent palatal fistula (7.2%).

To conclude, postpalatoplasty fistula can be repaired successfully using the total palatal mucoperiosteum as a bipediced flap. The flap

has rich blood supply and even this flap can be extended anteriorly into two-flap palatoplasty for management of small anterior fistula.

Regional intraoral flaps as buccal and superior lip myomucosal flaps and tongue flap can be reserved for huge fistulas (width >15mm), large anterior fistulas and multiply recurrent fistulas.

## References:

- 1- Cohen SR, Kalinowski J, La Rossa D, et al: Cleft palate fistulas: A multivariate statistical analysis of prevalence, etiology, and surgical management. *Plast Reconstr Surg* 1991; 87: 1041-1047.
- 2- Sadove AM, Eppley BL: Cleft lip and palate. In: Pediatric Surgery. Grosfeld JL, O'Neill JA, Coran AG, et al. (Editors); Philadelphia: Mosby Elsevier (Publisher); 6<sup>th</sup> edn. 2006; p. 803-812.
- 3- Rohrich RJ, Gosman AA: An update on the timing of hard palate closure: A critical long-term analysis. *Plast Reconstr Surg* 2004; 113: 350-352.
- 4- Emory RE, Clay RP, Bite U, et al. Fistula formation and repair after palatal closure: An institutional perspective. *Plast Reconstr Surgery* 1997; 99: 1535-1538.
- 5- Inman DS, Thomas P, Hodgkinson CA, et al: Oronasal fistula development and velopharyngeal insufficiency following primary cleft palate surgery: An audit of 148 children born between 1985 and 1997. *Br J Plast Surg* 2005; 58 (8): 1051-1054.
- 6- Muzaffar AR, Bvrđ HS, Rohrich RJ, et al: Incidence of cleft palate fistula. An institutional experience with two-stage palatal repair. *Plast Reconstr Surg* 2001; 108: 1515.
- 7- Jackson IT: Closure of secondary palatal fistula with intra-oral tissue and bone grafting. *Br J Plast Surg* 1972; 25: 93.
- 8- Thaller SR: Staged repair of secondary cleft palate deformities. *J Craniofac Surg* 1995; 6: 375.
- 9- Demas PN, Sotereanos GC: Transmaxillary temporalis transfer for reconstruction of a large palatal defect: Report of a case. *J Oral Maxillofac Surg* 1989; 47: 197.

- 10-Chen HC, Ganos DL, Coessens BC, et al: Free forearm flap for closure of difficult oronasal fistulas in cleft palate patients. *Plast Reconstr Surg* 1992; 90: 757.
- 11-Berkman MD: Early non-surgical closure of post-operative palatal-fistula. *Plast Reconstr Surg* 1978; 62: 537.
- 12-Dufresne CR: Oronasal fistula and nasolabial fistulas. In: Multidisciplinary management of cleft lip and palate. Bardach J, Morris HL (Editors); Philadelphia: WB Saunders (Publishers): 1<sup>st</sup> edn.1990; p. 425-436.
- 13-Enrina D, Lun JL, Claudia YM, et al: Cleft oronasal fistula: A review of treatment results and a surgical management algorithm proposal. *Chang Gung Med J* 2007; 30(6).
- 14-Arlen DD, Christian AA: Surgical technique for the correction of postpalatoplasty fistula of the hard palate. *Plast Reconstr Surg* 2005; 883-887.
- 15-Tiwari VK, Sujata S: Orbicularis oris musculomucosal flap for anterior palatal fistula. *Indian J Plast Surg* 2006; 39: 148-151.
- 16-Abdel-Aziz M, Abdel-Nasser W, Elhosny H, et al: Closure of anterior post-palatoplasty fistula using superior lip myomucosal flap. *International Journal of Pediatric Otolaryngology* 2008; 72: 571-574.
- 17-Assunçao AG: The design of tongue flaps for the closure of palatal fistula. *Plast Reconstr Surg* 1993; 91: 806-810.
- 18-Ninkovic M, Hubli EH, Schwabegger, et al: Free flap closure of recurrent palatal fistula in the cleft lip and palate patient. *J Craniofac Surg* 1997; 8 (6): 491-495.