

# Buccinator flap as a method for palatal fistula and VPI management

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## Abstract

**Background:** Secondary palatal fistula and velopharyngeal insufficiency (VPI) are two major complications of palatoplasty. Various methods have been introduced for surgical repair of these complications; however, most of them are associated with a high recurrence rate and morbidity. This study was designed to evaluate the use of the buccinator myomucosal flap in the reconstruction of palatal fistula and velopharyngeal insufficiency following primary palatoplasty.

**Materials and Methods:** This study was performed on 25 patients who had either secondary palatal fistula or velopharyngeal insufficiency. Their defects were repaired by buccinator myomucosal flaps (BMFs). Patients were followed for 8 weeks and follow-up visits were arranged at 1, 2, 4, and 8 weeks after discharge.

**Results:** All BMFs were harvested and transposed successfully. The length of the soft palate increased  $15.14 \pm 1.13$  mm postoperatively. One patient (4%) had flap dehiscence 6 days after the operation with no flap ischemia or necrosis. Another patient (4%) experienced recurrence of the palatal fistula with marginal necrosis of the BMF 6 weeks after the operation. Otherwise, no case of fistula recurrence, infection, flap ischemia or necrosis and donor-site morbidity was observed during follow-up sessions.

**Conclusion:** This study demonstrated that using BMFs could be a safe, effective and promising method of treatment for post palatoplasty fistula and VPI. However, further investigations on a larger sample size with longer follow-up are recommended for more accurate conclusion.

**Key Words:** Buccinator myomucosal flap, cleft palate, palatal fistula, velopharyngeal insufficiency

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## INTRODUCTION

Cleft palate is one of the most common congenital abnormalities of the orofacial region throughout

the world.<sup>[1,2]</sup> This condition can cause facial deformity, feeding problems, frequent middle ear infections, dental defects, speech abnormalities and emotional problems.<sup>[2]</sup> Early surgical repair of this congenital anomaly prevents the psychological and functional problems associated with the deformity.<sup>[3]</sup> Patients may develop various complications after primary palatoplasty including palatal fistula and velopharyngeal insufficiency (VPI) which are relatively common.<sup>[4,5]</sup> The incidence of post-palatoplasty palatal fistula has been reported to be as high as 45%.<sup>[6]</sup> Several factors including sex, age at operation, extent of cleft, associated

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congenital anomalies, use of pre-surgical orthopedics, perioperative antibiotics, surgical techniques, and surgeon factor may contribute to fistula occurrence.<sup>[7-11]</sup>

Palatal fistula may lead to various clinical problems such as nasal air escape, speech distortion, hearing loss, or fluid and food regurgitation,<sup>[7]</sup> while VPI may cause speech abnormalities.<sup>[12]</sup> Although various surgical methods have been applied to treat secondary palatal fistula, definitive repair of this complication is still difficult, and remains a challenge for surgeons.<sup>[13]</sup> Unfortunately, the recurrence rate of palatal fistula is currently as high as 37-50%.<sup>[14]</sup>

The buccinator myomucosal flap (BMF) has been introduced as a useful and versatile technique for correcting defects in any part of the oral cavity, with good results and modest morbidity.<sup>[15,16]</sup> It has been reported that BMF is associated with extremely low morbidity and optimal functional and cosmetic results. Therefore, it may play a major role in reconstructing moderate-size defects in the mouth<sup>[15]</sup> such as secondary palatal fistula. Similar to some other intraoral local flaps, BMF has several advantages including adequate amount of tissue, the ability to replace mucosa with mucosa, eliminating the need for external incision, reducing donor site morbidity, and optimal functional and cosmetic results.<sup>[17]</sup>

In light of the above, this study was designed to evaluate the efficacy and successfulness of using BMF in repair of post-palatoplasty palatal fistula or VPI.

## MATERIALS AND METHODS

### Study population and design

After approval of the study by the ethics committee of the Isfahan University of Medical Sciences and obtaining informed consent, this clinical trial was performed on patients who were referred to the outpatient cleft palate clinic for post-palatoplasty complications. This investigation was performed in the Al-zahra hospital, Isfahan, Iran, between March 2011 and May 2012.

A total of 25 patients aged between 2 to 18 years who were referred for surgical repair of secondary palatal fistula or VPI following palatoplasty were included in this study. Patients who had a history of previous surgical correction of palatoplasty complications, and those who did not follow postoperative visits were excluded from the study.

### Surgical procedure

All patients were subjected to repair of palatoplasty complications (secondary palatal fistula or VPI) under

general anesthesia with oral endotracheal intubation. Depending on the required amount of tissue, the outline of the flap was determined using a surgical marker or methylene blue.

In order to harvest this random buccinator myomucosal flap, the orifice of the Stensen duct in the cheek was identified, and this duct was considered as the superior border of BMF. The mandibular molar teeth were considered as the inferior border of the flap. The pterygomandibular raphe and the oral commissure were considered as the posterior and anterior margins respectively.

The length to breadth ratio of the flap was about 1:2 (approximately 1 × 2 inches). Making incisions on the marked out lines, BMFs were raised from the donor site, and immediately transferred to the recipient site to repair the defect. The flaps were sutured to the recipient site using monocril 5-0 thread.

In the cases of VPI and patients who needed lengthening of the palate, double BMFs harvested from the both cheeks were used to repair defects.

The donor site was also closed primarily by 5-0 monocril sutures.

After 3 days of routine postoperative care, patients were discharged on the 4<sup>th</sup> day postoperatively.

At the time of discharge, patients were commenced on a 5-day course of oral antibiotics including metronidazole and cephalexin. The antibiotic dosage and pharmaceutical form were determined according to the patient's age. In addition, they were asked to rinse their mouth with chlorhexidine gluconate mouthwash for 60 sec thrice a day. Moreover, patients were advised to eat soft foods, and not to use a spoon and fork for 3 weeks to avoid any trauma to the surgical site.

Patients were seen postoperatively on follow-up appointments at 1, 2, 4, and 8 weeks after discharge [Figures 1-5].

On follow-up visits, patients were examined to evaluate the success of palatal fistula closure and palatal lengthening. Besides, flaps were assessed regarding any complication such as clinical signs of ischemia and necrosis.

Data were analyzed by SPSS 16.5 using descriptive statistics.

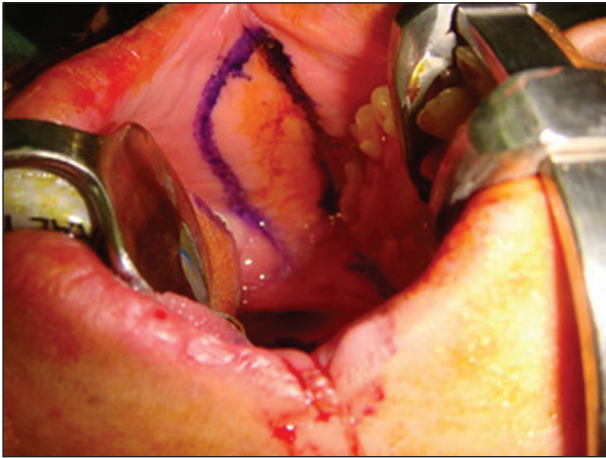


Figure 1: Flap marking



Figure 2: Palatal fistula

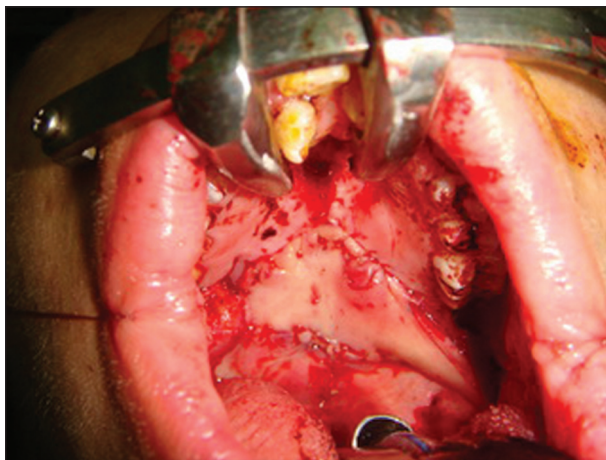


Figure 3: Flap inset

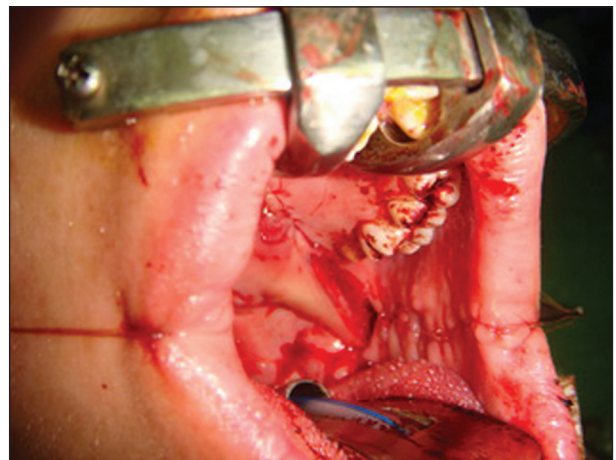


Figure 4: Donor site closure



Figure 5: Postoperative result

## RESULTS

This study consisted of 15 (60%) male and 10 (40%) female subjects. The mean age of patients was  $8.74 \pm 3.37$  years (ranging from 5 to 18 years). All patients had undergone primary palatoplasty before the first year of life.

The main indication of operation was secondary palatal fistula for 21 (84%) patients and VPI for 4 (16%) patients. The average time for the operation was  $2.84 \pm 0.68$  h.

All BMFs were harvested and transposed successfully.

The length of the soft palate increased  $15.14 \pm 1.13$  mm postoperatively (ranging from 12.40 to 16.80 mm).

One patient (4%) had flap dehiscence 6 days after the operation; however, there was no sign of flap ischemia or necrosis. Therefore, re-operation was performed, and the buccinator flap was fixed to the site again. This patient did not develop further complications until the end of the study.

Another patient (4%) experienced recurrence of the palatal fistula with marginal necrosis of the BMF 6 weeks after the operation which was repaired successfully by local flap. Fortunately, these 2 patients achieved complete healing.



Otherwise, no case of fistula recurrence, infection, ischemia or necrosis was observed during follow-up sessions.

None of the patients developed postoperative donor-site morbidity.

## DISCUSSION

The history of cleft palate repair can be traced back by many centuries. Various palatoplasty techniques have been used to correct palatal deformities, and to prevent significant complications associated with cleft palate.<sup>[4]</sup> However, post-palatoplasty palatal fistula and VPI compromise these goals, and lead to a challenging management problem for the cleft palate treatment team.<sup>[4,18,19]</sup>

Although several factors may lead to secondary cleft fistulization, tension at the site of repair caused by shortage of the local tissue is the most important contributing factor.<sup>[13]</sup>

Using intraoral local flaps harvested from the internal side of the cheek has been reported to be a useful method for reconstruction of the intraoral defects. These flaps provide adequate amount of tissue required for correction of the defect and reduce the need for external incisions. In addition, using intraoral flaps instead of external flaps has been reported to be associated with fewer donor-site problems.<sup>[17]</sup>

Therefore, a good amount of recent literature recommended use of intraoral local flaps harvested from the internal cheek area for repair of intraoral defects.<sup>[20-23]</sup>

BMF is one such type of intraoral flap that has been commonly used to reconstruct various intraoral defects such as oral cavity defects after oncologic resection.<sup>[17,24]</sup>

In this study we used BMFs to repair two major post-palatoplasty complications including secondary palatal fistula and VPI. After a 2-month follow-up, we only observed one case of early flap dehiscence, and one case of fistula recurrence with marginal necrosis of the flap which were managed successfully, and healed completely. None of the patients had complete flap necrosis.

A previous study by Bianchi *et al.*, investigated application of BMFs in reconstruction of intraoral defects, and concluded that buccinator musculomucosal flaps are a good option for reconstruction of moderately sized oral cavity defects. They employed 3 different

techniques to use BMF, and reported a complication rate of 7% (1 case of complete loss of the flap and 2 cases of marginal necrosis) which is very similar to our findings.

Multiple other methods have been described for fistula repair; however, they have relatively high recurrence rates. The study of Cohen *et al.*, reported a disappointing recurrence rate of 37% regardless of the method of fistula repair.<sup>[10]</sup>

Using the von Langenbeck method predominantly, Muzaffar *et al.*, reported recurrence of secondary palatal fistula in 33% of subjects.<sup>[18]</sup>

On the other hand, Emory and coworkers used local flaps to manage secondary palatal fistula, and reported successful closure of fistula in 91% of patients.<sup>[25]</sup>

Comparing with these methods, we observed significantly lower recurrence rate of fistula (4%); however, longer follow-up is required to make a more definitive comparison.

Nerve damage, mouth opening difficulties and trismus are among the most important donor-site morbidities in surgical procedures performed on the oral cavity, especially in the cheek area.<sup>[15]</sup> Fortunately, no significant donor-site morbidity was found in our study. The previous investigation performed by Ferrari and colleagues similarly reported that donor-site morbidity associated with buccinator flaps is extremely low when care is taken.<sup>[15]</sup>

Compared with surgical repair of defects of the oral cavity with free flaps which require competence in microsurgery and lengthy surgical and hospitalization periods, and may lead to donor-site morbidity with esthetically unsatisfactory results,<sup>[17]</sup> use of BMFs seems to be a more applicable, safe and effective method.

BMF has a reliable and consistent anatomy. It is an easily harvested flap that provides similarly textured sensate tissue for surgical repair of the oral cavity defects without morbidity. In addition, its donor site can be closed primarily with excellent cosmesis and function.<sup>[26-28]</sup>

In summary, our findings demonstrated that using BMFs could be a safe, effective and promising method of treatment for post-palatoplasty fistula and VPI. However, further investigations on a larger sample size with longer follow-up are recommended for more accurate conclusions.

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