Application of buccal fat pad for lining of lateral defect in cleft palate repair and review of literature

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INTRODUCTION

Clefting of the palate is one of the most common deformities in the craniofacial skeleton, with the birth prevalence of clefts is somewhere between 27,000 and 33,000 clefts/year in India.\(^1\) Most of these children are referred to a surgeon for definitive repair; however, palatal fistulas and transverse growth restriction remain a significant problem for clinicians regardless of the center and type of repair. One of the suggested causes is the bones are denuded as a result of mucoperiosteal flaps transposition and the use of relaxing incisions and subsequent secondary healing and scarring.\(^2\)

Only in the last quarter of this century has the buccal fat pad been used as a grafting source. In 1977, Egyedi\(^3\) reported the use of the buccal fat pad as a pedicled graft in closing oronasal fistula. Neder,\(^4\) in 1983, was the first to describe the use of the buccal fat pad as a free graft for intraoral defects. In separate articles Tideman et al.\(^5\) and Loh and Loh\(^6\) advanced the graft’s utility when they reported that the presence of a split-thickness graft is not necessary for the survival of pedicled unlined fat pad grafts or for re-epithelialization. Although the use of buccal fat grafts to aid in definitive closure of oral antral and oral nasal communication defects has been well-documented, we describe a technique of cleft palate repair using pedicled buccal fat pad flaps as an added tissue layer.

We describe the use of the buccal fat pad flap in cleft palate repair coupled with pedicled buccal fat pad flaps to cover areas of exposed bone of the hard palate. We believe this technique may decrease scar contraction and subsequent transverse maxillary growth restriction induced by the lateral hard palatal tissue defect. Technically, minimal time, skill, and dissection are needed to harvest this robust flap, and we think cleft surgeons will find this useful for challenging cleft palate and palatal fistula repairs.

PATIENTS AND METHODS

Fifty patients had buccal fat pad flaps used for cleft palate repairs performed by one surgeon at a single...
institution. All patients are between the age of 1 and 5 years. Of fifty patients, 34 are male and 16 female. Eleven patients were having bilateral cleft palate and 39 patients were having unilateral cleft palate [Table 1]. In all patients, palate was repaired with Bardach’s two flap palatoplasty with intervelor veloplasty [Figure 1] in which the incision is made along the cleft margin and the alveolar margin. These are joined anteriorly to free the mucoperiosteal flaps. These flaps are based on the greater palatine vessels. The soft palate is repaired in a straight line. The levator palate muscle dissection and reconstruction of the muscle sling is performed as in intervelar veloplasty. Alveolar incision is extended behind tuberosity to access buccal fat pad. Cleft palate closer is done with the use of 4–0 vicryl suture with few intermittent suture passing through both oral and nasal later to reduce the dead space between both layers [Figure 2].

The buccal fat pad is a readily accessible mass. The superior limit of the fat pad lies along the height of the maxillary vestibule above the maxillary second molar and directly opposite Stenson’s duct. The fat pad then travels laterally below the parotid duct to enter the cheek. Interiorly it is limited by the mandibular retromolar region. The main part of the buccal fat pad is located between the buccinator muscle medially and the anterior margin of the masseter muscle and the mandibular ramus and zygomatic arch laterally. The fat can be easily exposed through a horizontal incision just lateral to the maxillary tuberosity. Curved Iris scissor is used for blunt dissection through the superior constrictor and buccinators junction, the buccal fat pad will herniate into the oral cavity [Figure 3]. The body and buccal extension can be gently pedicled into the region lateral alveolar defect. Fat pad is filled into the defect and sutured to palatal flap and gingiva without any tension over the midline suture of palatal flap [Figure 4]. All patients were discharged on 2nd postoperative day.

RESULTS

Fifty patients underwent primary palate repair with the use of Bardach’s two-flap palatoplasty with intervelor veloplasty technique and lining of lateral alveolar defect with buccal fat pad. Harvest and inset took 10 min/flap. No patients had complications related to buccal fat pad or donor-site, like bleeding, difficulty in harvesting, quantity of fat to cover the defect perioperatively. All patients were seen 2, 4, 12 weeks and 2 years postoperatively [Figure 5]. In all cleft palate patients, the recipient areas fully epithelialized within 2 weeks or less. No patients had developed infection, loss of graft, palatal fistulas, or cheek depression [Table 2].

DISCUSSION

Cleft surgeons are constantly challenged by transverse width restriction of the maxillary arch and palatal fistulas after cleft surgery. Following cleft palate repair factors that might lead to hypoplasia and deformity of the maxilla include extensive dissection of the tissues and the healing of wounds by secondary intention. This is especially so after Bardach’s two-flap palatoplasty, Von Langenbeck, Veau, Peet and Wardill methods, in which the bones are denuded as a result of mucoperiosteal flaps transposition.

![Figure 1: Preoperative photo: Incision marking and site for buccal fat pad harvest](image1)

![Figure 2: Lateral defect](image2)

<table>
<thead>
<tr>
<th>Sex/type of cleft</th>
<th>Unilateral</th>
<th>Bilateral</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>26</td>
<td>8</td>
<td>34</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>11</td>
<td>50</td>
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Table 1 : Type of cleft
Large, unlined, denuded palatal shelves serve as a key nidus of scar contraction as the palatal tissues attempt to fill the dead space. We posit that an added layer of vascularized tissue (the buccal fat pad flap) functions to fill and line this open denuded space, increases vascularity to this area, and may thwart or even prevent significant wound contracture. Most reports show that the buccal fat pad is a well-vascularized, easily accessible local flap that has long-term follow-up for intraoral reconstruction. Zhang et al. used buccal fat pads to fill the cleft palate relaxing incision as an experimental intervention, and used traditional iodoform gauze as a comparison reference. The results showed obvious differences in the maxillary growth of the two groups, with that of the experimental group being considerably improved compared with that of the control group, which was associated with a large scar area that formed after cleft palate surgery. The experimental group had a decreased area of palate scar tissue and, therefore, a reduced effect of the postoperative scar on maxillary growth.

The fat pad consists of the main body with buccal, pterygoid, superficial, and deep temporal extensions. These extensions closely approximate other key structures, including the parotid duct and zygomatic and buccal branches of the facial nerve. The buccal fat effectively separates the surface of the masticatory muscles because of its extension medial to the ramus beneath the zygomatic arch and into the cheek. This specialized type of fat, known as syssarcosis, separates the muscle by providing a gliding surface. The vascular supply of the fat pad is an important consideration for its viability as a pedicled graft. Branches of the facial artery travel within the fat pad superiorly forming anastomosis to supply the buccal fat pad. Blood supply to the fat pad is also derived superficially from buccal and deep temporal branches of the internal maxillary artery. A branch of the superficial temporal artery, the middle temporal artery, supplies the superficial and temporal extensions of the fat pad.

We prefer the buccal fat pad flap as it takes less time and requires less donor-site dissection. With regard to donor-site morbidity, no change in the hollowness of the child’s cheeks was seen in this study. Anatomically, the buccal fat pad flap is composed of three independent lobes. Our technique uses only a small amount of one lobe, making aesthetic alteration unlikely. The full buccal fat pad flap can cover an area of 10 cm², whereas the area we are covering on average is 5 cm². Even in studies in which surgeons have purposefully excised the entire buccal fat pad, results achieved...
were noted to be “subtle.” Thus, we believe that this flap has significant potential to function as an added vascularized tissue layer in cleft palate repair. We believe cleft surgeons should add this innovative technique to their armamentarium for wide cleft palate cases in which coverage of areas of denuded hard palatal bone, is of paramount importance.

Advantage of using buccal fat pad for palate repair are:

- The buccal fat pad graft provides vascular coverage to both soft tissue layers and denuded bone thereby promoting rapid soft tissue healing and lack of scarring effect
- The graft serves as a bed for secondary granulation thereby reducing dehiscence in the soft tissue layer
- The fat pad physically aids in closure by obliterating dead space at the alveolar defect; and
- The fat pad creates a soft tissue hydrophobic middle layer that acts as a barrier by virtue of the physiologic composition of adipose tissue.

### CONCLUSION

This report describes a technique for primary cleft palate repair using the buccal fat pad flap in conjunction with the Bardach’s two-flap palatoplasty. This technique allows durable, autologous, and vascularized coverage of the denuded bony hard palate. However, long-term study is required to see the impact of this technique on maxillary growth. The buccal fat pad flap is simple and safe and has been used successfully in other intraoral reconstructions. We believe cleft surgeons should add this technique to their armamentarium for wide cleft palate cases in which coverage of denuded hard palate is of paramount importance.

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### Conflicts of interest

There are no conflicts of interest.

### REFERENCES


