ISSN 2348-2125

Journal of Cleft Lip Palate and Craniofacial Anomalies

Official Publication of Indian Society of Cleft Lip Palate & Craniofacial Anomalies

Volume 3 / Issue 2 / July-December 2016

http://www.jclpca.org

Medknow

Wolters Kluwer

Original Article

Access this article online
Website: www.jclpca.org
DOI: 10.4103/2348-2125.187507
Quick Response Code:

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

Parit S. Ladani, Hermann F. Sailer

ABSTRACT

Purpose: To discuss the advantages of pedicle buccal fat pad flaps used to cover areas of exposed bone of the lateral hard palate. **Patients and Methods:** Fifty patients had buccal fat pad flaps used in cleft palate repair. Fat pad is filled into the lateral defect and sutured to palatal flap and gingiva without any tension over the midline suture of palatal flap. **Results:** No patients had any perioperative complication related to buccal fat pad or donor-site. 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. **Conclusion:** This technique allows safe, simple, durable, autologous, and vascularized coverage of the denuded bony hard palate.

Key words: Buccal fat pad, cleft palate, lateral defect

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 cause is the bones are denuded as a result of mucoperiosteal flaps transposition and the use of relaxing incisions and subsequent secondary healing and scaring.[2]

Swiss Cleft and Craniofacial Centre, BSES MG Hospital, Mumbai, Maharashtra, India

Address for correspondence:
Dr. Parit S. Ladani,
Swiss Cleft and Craniofacial Centre, BSES MG Hospital,
S. V. Road, Andheri West, Opp. Andheri Railway Station,
Mumbai - 400 058, Maharashtra, India.
E-mail: drparitladani@gmail.com

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

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

Cite this article as: Ladani PS, Sailer HF. Application of buccal fat pad for lining of lateral defect in cleft palate repair and review of literature. J Cleft Lip Palate Craniofac Anomal 2016;3:63-6.

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.

Table 1 : Type of cleft

Sex/type of cleft	Unilateral	Bilateral	Total
Male	26	8	34
Female	13	3	16
Total	39	11	50

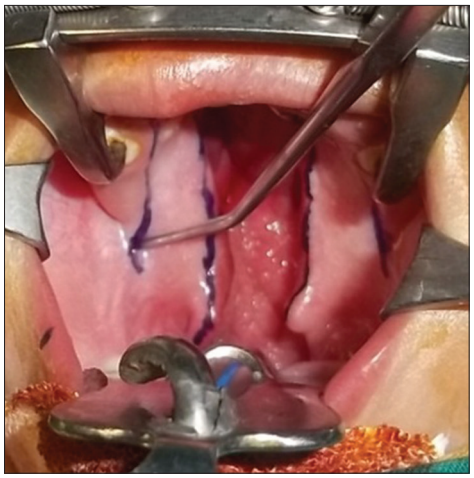

Figure 1: Preoperative photo: Incision marking and site for buccal fat pad harvest

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,[7-10] in which the bones are denuded as a result of mucoperiosteal flaps transposition

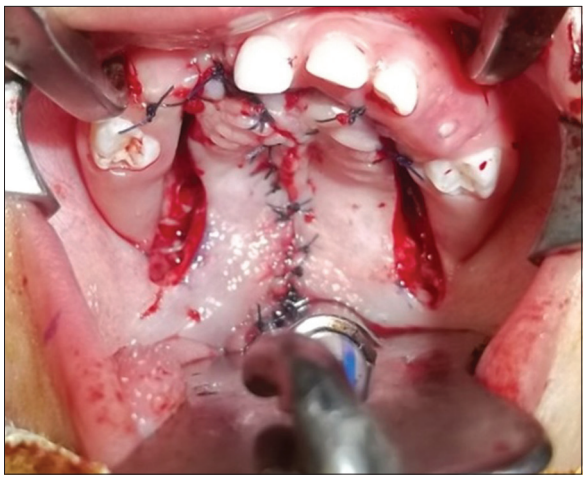

Figure 2: Lateral defect

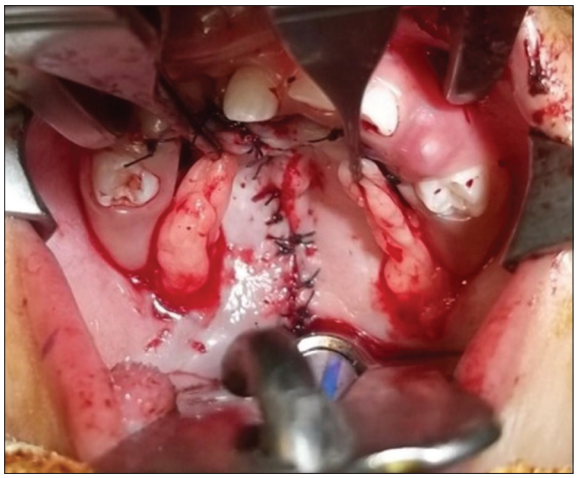

Figure 3: Buccal fat pad harvest

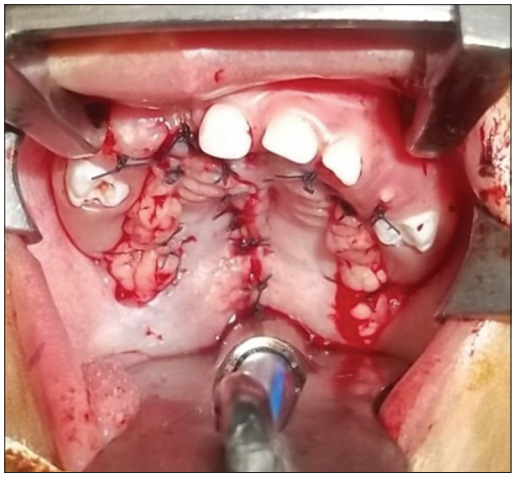

Figure 4: Buccal fat pad inset

Figure 5: Two years postoperative

and the use of relaxing incisions. As the result, the healing of the wounds occurs through granulation with subsequent, damaging effect of the postsurgical scars.[11-16]

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.[17] 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.[18,19] 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.[20]

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.[21,22] 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.[23]

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.[24] 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 cm^2, whereas the area we are covering on average is 5 cm^2. Even in studies in which surgeons have purposefully excised the entire buccal fat pad, results achieved

Table 2 : Perioperative and postoperative complication

Complication	Perioperatively				Post operativel			
	Bleeding	Difficulty in harvesting	Quantity of graft	Time to inset flap	Infection	Loss of graft	Palatal fistula	Hollowness in cheek
Unilateral	No	No	No	8 min	No	No	No	No
Bilateral	No	No	No	10 min	No	No	No	No

were noted to be "subtle."[25] 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 scaring 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.

Financial support and sponsorship

Cleft Children International, Switzerland.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Mossey P, Little J. Addressing the challenges of cleft lip and palate research in India. Indian J Plast Surg 2009;42 Suppl:S9-18.
2. Rohrich RJ, Gosman AA. An update on the timing of hard palate closure: A critical long-term analysis. Plast Reconstr Surg 2004;113:350-2.
3. Egyedi P. Utilization of the buccal fat pad for closure of oro-antral and/or oro-nasal communications. J Maxillofac Surg 1977;5:241-4.
4. Neder A. Use of buccal fat pad for grafts. Oral Surg Oral Med Oral Pathol 1983;55:349-50.
5. Tideman H, Bosanquet A, Scott J. Use of the buccal fat pad as a pedicled graft. J Oral Maxillofac Surg 1986;44:435-40.
6. Loh FC, Loh HS. Use of the buccal fat pad for correction of intraoral defects: Report of cases. J Oral Maxillofac Surg 1991;49:413-6.
7. Von Langenbeck B. The uranoplasty by use of palatal mucoperiosteal flap. Langenbecks Arch Klin Chir 1861;2:205-87.
8. Veau V. Division Palatine. Paris: Masson et Cie; 1931.
9. Peet E. The Oxford technique of cleft palate repair. Plast Reconstr Surg 1961;28:282-94.
10. Wardill WE. The technique of operation for cleft palate. Br J Surg 1937;25:117.
11. Herfert O. Fundamental investigations into the problems related to cleft palate surgery. Br J Plast Surg 1958;11:97.
12. Kremenak CR, Huffman WC, Olin WH. Growth of maxillae in dogs after palatal surgery. I. Cleft Palate J 1967;4:6-17.
13. Mazaheri M, Harding RL, Nanda S. The effect of surgery on maxillary growth and cleft width. Plast Reconstr Surg 1967;40:22-30.
14. Ross RB. Treatment variables affecting facial growth in complete unilateral cleft lip and palate. Part 6: Techniques of palate repair. Cleft Palate J 1987;24:64-77.
15. Wada T, Kremenak CR, Miyazaki T. Midfacial growth effects of surgical trauma to the area of the vomer in beagles. J Osaka Univ Dent Sch 1980;20:241-76.
16. Kobus KF. Cleft palate repair with the use of osmotic expanders: A preliminary report. J Plast Reconstr Aesthet Surg 2007;60:414-21.
17. Levi B, Kasten SJ, Buchman SR. Utilization of the buccal fat pad flap for congenital cleft palate repair. Plast Reconstr Surg 2009;123:1018-21.
18. Ramirez OM. Buccal fat pad pedicle flap for midface augmentation. Ann Plast Surg 1999;43:109-18.
19. Matarasso A. Buccal fat pad excision: Aesthetic improvement of the midface. Ann Plast Surg 1991;26:413-8.
20. Zhang M, Zhang X, Zheng C. Application of buccal fat pads in pack palate relaxing incisions on maxillary growth: A clinical study. Int J Clin Exp Med 2015;8:2689-92.
21. Stuzin JM, Wagstrom L, Kawamoto HK, Baker TJ, Wolfe SA. The anatomy and clinical applications of the buccal fat pad. Plast Reconstr Surg 1990;85:29-37.
22. Ortiz-Monasterio F, Caronni EP, Brown L. Discussion of craniosynostosis. Craniofac Surg 1985;1:307-14.
23. Hudson JW, Anderson JG, Russell RM Jr., Anderson N, Chambers K. Use of pedicled fat pad graft as an adjunct in the reconstruction of palatal cleft defects. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1995;80:24-7
24. Zhang HM, Yan YP, Qi KM, Wang JQ, Liu ZF. Anatomical structure of the buccal fat pad and its clinical adaptations. Plast Reconstr Surg 2002;109:2509-18.
25. Dubin B, Jackson IT, Halim A, Triplett WW, Ferreira M. Anatomy of the buccal fat pad and its clinical significance. Plast Reconstr Surg 1989;83:257-64.