

Case Report

A novel route for placing free flap pedicle from a palatal defect

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ABSTRACT

One of the better options available to repair a large palatal defect is by employing a free flap. Almost all the times such free flaps are plumbed to facial vessels. The greatest challenge in such cases is the placement of the pedicle from palatal shelf to recipient vessels because there is no direct route available. As majority of large palatal fistulae are encountered in operated cleft palates there is a possibility of routing the pedicle through a cleft in the maxillary arch or via pyriform aperture. When such a possibility doesn't exist the pedicle is routed behind the maxillary arch. We describe a novel technique of pedicle placement through a maxillary antrostomy, in this case report, where a large palatal fistula in a 16 year old boy was repaired employing a free radial artery forearm flap. The direct route provided by maxillary antrostomy is considered the most expeditious of all possibilities mentioned above.

KEY WORDS

Free radial artery forearm flap; large palatal fistula; maxillary antrostomy; palatal fistula repair

INTRODUCTION

Occurrence of a large palatal fistula following a cleft palate repair presents a vexing problem for the cleft surgeon. Employing a free flap for repair may be one of the options in such cases. The concept of bringing in well-vascularised tissue from a distant site that can be tailored to the size of defect, to allow single stage and tension free repair is an attractive proposition. Such repairs by free flaps are no longer anecdotal, with many published cases.^[1-9] The most critical consideration in such free flap repairs is the path taken by the vascular pedicle to

reach the facial vessels for anastomosis. Here, we present a new route for pedicle placement to achieve this goal.

CASE REPORT

A 16-year-old boy presented with a long standing palatal fistula of 13 years duration. He was operated earlier for cleft palate at a district hospital, near his village. The repair broke down in the postoperative period leaving a large anterior defect. The parents looking for help, however, reached our department after a long gap. Examination revealed a 3 cm × 5 cm fistula in the anterior hard palate with intact dental arch [Figure 1]. Intra nasal examination also revealed a small bony defect at the junction of the floor and the medial wall of the left maxillary antrum, most likely a result of breakdown of the earlier repair.

He was planned for repair by a free radial artery forearm flap (RAFF). The recipient site was prepared by raising local

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10.4103/0970-0358.138965

muco-periosteal turnover flaps to form nasal lining. A small 1 cm diameter defect of the nasal lining, just behind the left lateral incisor, couldn't be closed for lack of adequate tissue. The resultant palatal defect was of 5 cm diameter [Figure 2]. A left RAFF of appropriate dimensions was raised with the cephalic vein [Figure 3]. After making a left upper gingivobuccal sulcus incision, a large antrostomy (11-12 mm) was made in left maxilla, above the premolars without exposing the teeth apices, to accommodate the two pedicles [Figure 4]. The flap was tacked to palatal shelf on the right margin, and the pedicle was passed through the gap in the nasal lining, the inferomedial defect of the left maxillary sinus and the antrostomy. It reached the facial vessels through a subcutaneous tunnel in the cheek. Facial artery and vein were used for vascular anastomosis with radial artery and cephalic vein. Following anastomosis, the flap inset was completed. The patient had an uneventful recovery, and at 10 months follow-up, the flap has settled well and the fistula remains closed [Figure 5].

DISCUSSION

An astonishing variety of free flaps have been used to repair large palatal defects. They include, RAFF,^[1,3,9] dorsalis pedis flap,^[2] scapular flap,^[4] lateral arm flap,^[5] anterolateral thigh flap^[6] and even a vastus lateralis flap^[7] or a femur flap!^[8] The critical considerations are providing a thin, nonspace occupying, pliable flap in the oral cavity, which is also preferably lined on the nasal aspect. The commonality of requirement of all free flaps to the palate is the comfortable routing of the pedicle to

facial vessels for anastomosis. In the presence of a cleft in the maxillary arch, the pedicle is easily placed through the defect^[1-7] to follow a subcutaneous tunnel dissected in the cheek. However, with an intact alveolar arch the routing requires more ingenuity for pedicle placement. Schwabegger *et al.* described in great detail the posterior approach behind the region of maxillary tuberosity where the alveolar arch ends.^[4] The lateral parapharyngeal space is accessed through a vertical incision and a tunnel created by blunt dissection to reach the vessels below the angle of the mandible.^[4] The authors noted the need for prolonged sedation and use of oral bite block to ensure that the patients did not "bite" the pedicle in the early postoperative period which happened in one of their patients.^[4] They also noted the potential of contracture of the intraoral scar that would restrict mouth opening in the late postoperative period.^[4] Subsequently, Ninkovic *et al.*,^[2] Ozkan *et al.*,^[6] and Krimmel *et al.*^[5] used the same posterior approach with dorsalis pedis flaps, anterolateral thigh flap and a prelaminated lateral arm flap, respectively.



Figure 1: A 16-year-old boy with a large anterior palatal defect

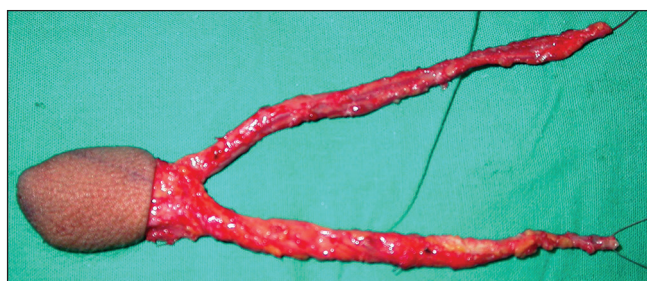


Figure 3: Radial artery forearm flap with additional cephalic vein pedicle

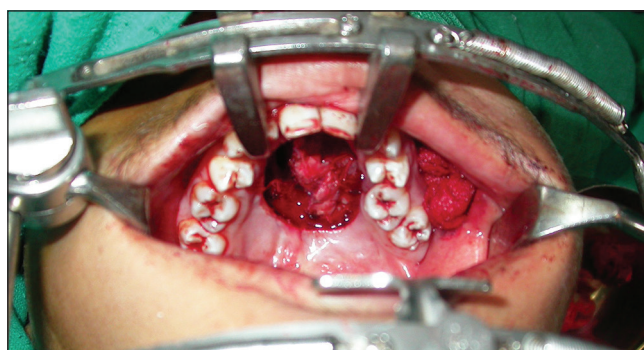


Figure 2: Showing nasal lining has been reconstructed with "in turned" muco-periosteal hinge flaps. A small gap in lining is visible just behind the left incisors

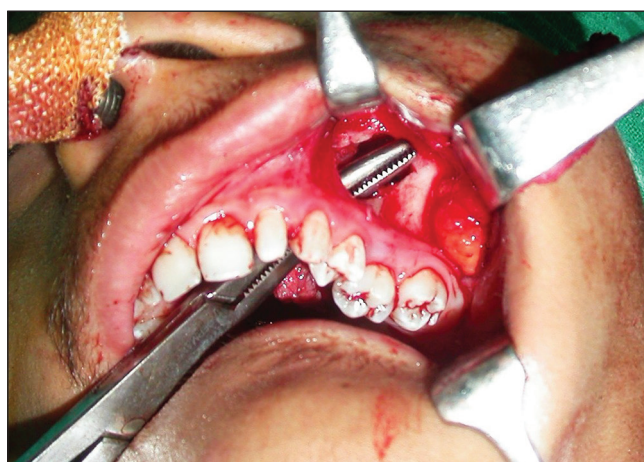


Figure 4: Showing a large antrostomy, above the premolars, communicating with the gap in reconstructed nasal lining and the infero-medial defect in the maxillary antrum

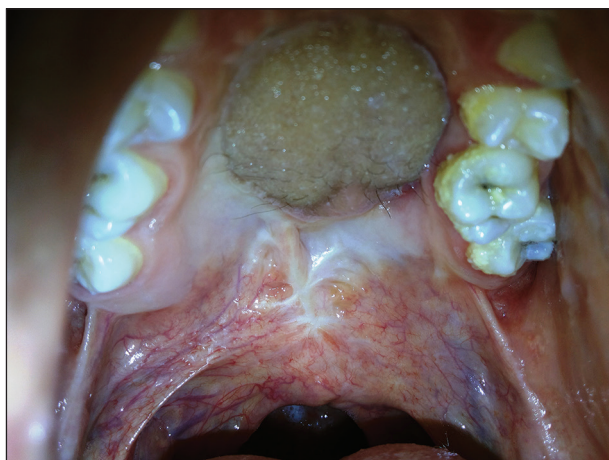


Figure 5: Showing a well-settled flap at 10 months follow-up

Marshall *et al.* employing RAFF flaps for large palatal defects described another innovative route by burring the pyriform rim to enlarge and deepen it for placing the pedicle.^[3] An intermediate incision in the nasolabial fold or alar crease was utilised for easing the passage of the pedicle. The obvious disadvantages of this approach are potential for damage to the apices of the teeth and the need of an incision on the face. Colletti *et al.* modified this approach for edentulous alveolar arch by burring in the molar region to create a direct passage.^[9]

A fully dentulous maxilla, without a cleft in the arch, made us innovate yet another route. We created a maxillary antrostomy to route the pedicle of RAFF. Large anterior palatal defects communicate with the antrum when the inferomedial wall of the sinus is also involved [Figure 1] and the decision to make an antrostomy seemed very obvious and easy with direct and shortest possible route, and, without any external facial scars or complicated dissection in the parapharyngeal space, as is required in tunnelling behind the maxillary arch. A wide antrostomy can be effected to protect against postoperative swelling [Figure 4]. The apices of teeth are protected and there is no fear of the patient 'biting off' the pedicle. It only requires a small gap to be left in the reconstructed nasal lining which gets occupied by the pedicle, effectively sealing the rent. In large palatal fistulas, it is difficult to completely reconstruct the nasal lining, as in our patient, and the pedicle passing through the gap sealed the lining and also worked to keep the RAFF closely adhered to it. It is expected that the pedicle, lying on the antral floor, will eventually epithelialise.

Though, transmaxillary transfer of temporalis based flap for repair of palatal defects was described in 1989, it has

not found wide acceptance.^[10] In their review, Cordeiro and Wolfe report two cases of complete, distal flap loss when inseting this flap through the fenestration in the posterior wall of sinus with intact maxillary sinus.^[11] They surmised the cause to be the constriction of the temporalis muscle pedicle through the bony fenestration. Such flaps have, however, found wide usage for maxillary reconstructions in post oncologic resection setting. We have described here a transmaxillary route by an anterolateral antrostomy as an alternate path for safe passage of the vascular pedicle of a free flap. This technique of pedicle placement is a useful variation for such complicated, large palatal defects involving a defect in the floor of adjacent antrum and requires only one, adequate, nonconstricting fenestration to be made in the anterolateral wall of the maxillary sinus.

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How to cite this article: Ahuja RB, Chatterjee P, Shrivastava P. A novel route for placing free flap pedicle from a palatal defect. *Indian J Plast Surg* 2014;47:249-51.

Source of Support: Nil, **Conflict of Interest:** None declared.