

Temporalis myofascial flap in reconstruction of maxillary defect: A case series

ABSTRACT

Ablative surgery of midface often leads to compromised aesthetics as well as function. Defects caused by ablative surgery need reconstruction that provides satisfactory results with minimal or no compromise in form and function. Various flaps can be used to reconstruct the maxillary defect. However, medium to large-sized defects can only be appropriately reconstructed using free or regional flaps. Moreover, as free flap reconstructions are tedious and require technique sensitive procedure whereas loco-regional flaps are versatile and more predictable. Temporalis myofascial flap (TMF) seems to be one of the best options among all other regional flaps as it has a reliable blood supply, adequate bulk and its anatomical location is close to primary defect.

Keywords: Maxillary defects, maxillectomy, midface defects, regional flap, temporalis myofascial flap

INTRODUCTION

Benign or malignant tumor of the maxillofacial region poses considerable risk as they lead to functional as well as cosmetic deficit, and sometimes leading to life-threatening complications.^[1] Removal of such lesion or tumor many times leads to functional morbidity like compromised mastication, deglutition and speech, and also leads to poor aesthetic outcome.^[2] Thus reconstruction of such composite defects after ablative surgery is more challenging.^[3] Midface region has more complex anatomy due to its relation with orbit, nasal cavity, maxillary sinus and oral cavity. Various loco-regional and free flaps have been reported in the literature but still an ideal reconstruction option for such defects is under research.

Temporalis myofascial flap (TMF) seems to be one of the best options among all other regional flaps as it has a reliable blood supply, adequate bulk and its anatomical location is near to maxillary defect.^[1] This article intends to provide a review of three cases of maxillary defect reconstruction using TMF with limited complications and to briefly through a light on surgical anatomy, surgical technique, and its importance.

CASE REPORTS

Case 1

A 42-year-old male reported to our outdoor department with complaints of nonhealing ulcerative lesion in right posterior maxillary alveolus region. Intraoral examination revealed a 2.5 cm × 3 cm endophytic ulcerative lesion present distal to the right maxillary second premolar tooth and extending up to the maxillary tuberosity area and medially on to the hard palate [Figure 1a]. Cervical lymph nodes were not

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palpable. The clinical findings were suggestive of malignant pathology. Contrast-enhanced computed tomographic (CECT) scan revealed an ill-defined lytic permeative lesion involving the posterior maxillary alveolus with associated enhancing soft tissue in right buccal space approximately 24 mm × 25 mm dimensions in anteroposterior, craniocaudal and transverse directions [Figure 1b]. The lesion was infiltrating into the posterolateral wall of the right maxillary sinus and its floor. No extension into the masticator and infratemporal region was detected. The right submandibular and upper jugular lymph nodes showed central necrosis suggestive of nodal metastasis. Incisional biopsy confirmed it as well-differentiated squamous cell carcinoma (SCC). The treatment included wide local excision with subtotal maxillectomy using modified Weber-Ferguson approach and ipsilateral supraomohyoid neck dissection. The temporalis myofascial flap was harvested through the temporal extension of incision and the flap was tunneled under the zygomatic arch through the infra-temporal space to reach the primary defect [Figure 2a-c]. The flap was approximated with the palatal mucosa and buccal mucosa with resorbable sutures [Figure 2d]. Skin closure was done with 4-0 prolene sutures in the facial region and 3-0 prolene in temporal region. Application of vacuum drain done in the temporal region and neck dissection region. The histopathological examination of the specimen revealed well-differentiated SCC with negative soft tissue and bone margins. Two of the 18 lymph nodes from level IIB showed metastatic deposits. No evidence of lymphovascular invasion, perineural invasion and extranodal extension reported. Postoperative course was satisfactory with normal facial nerve functions. The patient was sent for postoperative radiotherapy. Postradiation skin discoloration and oral mucositis was observed which resolved with symptomatic medications. The patient is under regular follow up for the past 6 months. No incidence of loco-regional recurrence and distant metastasis reported. The healing of

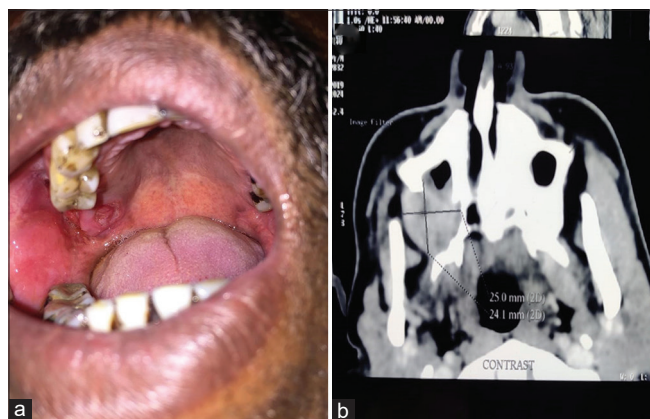


Figure 1: (a) Preoperative photo showing the primary lesion. (b) Axial section of contrast enhanced computed tomographic showing extension of the lesion

flap was uneventful and had maintained good camouflage with the surrounding mucosa [Figure 3].

Case 2

A 53-year-old female patient reported to the outdoor patient department (OPD) of the oral and maxillofacial unit with a nonhealing ulcer over left nasolabial fold extending into the left nostril [Figure 4]. The ulcer was not associated with any pain, but areas around ulcer were indurated. Cervical lymph nodes were not palpable. CECT showed the involvement of left maxillary sinus sparing the orbital floor. Preoperative incisional biopsy showed the lesion to be well-differentiated SCC.

Surgical procedure

Wide local excision of the lesion and medial maxillectomy with ipsilateral supra-omohyoid neck dissection was planned. To perform medial maxillectomy, Weber-Ferguson approach was considered as in the first case. The same surgical approach and procedure was followed except osteotomy of the zygomatic arch was considered in this case to increase the arc of rotation. The flap was pulled anteroinferiorly and transpositioned into the defect. Then, it was precisely sutured to adjacent tissues of skin and labial vestibule [Figure 5a]. Donor area also sutured in layers and for skin closure of



Figure 2: (a) Intraoperative photo of marking of incision. (b) Harvested temporalis myofascial flap. (c) Photo showing temporalis myofascial flap being tunneled at the site of defect. (d) temporalis myofascial flap being sutured to intraoral site of defect

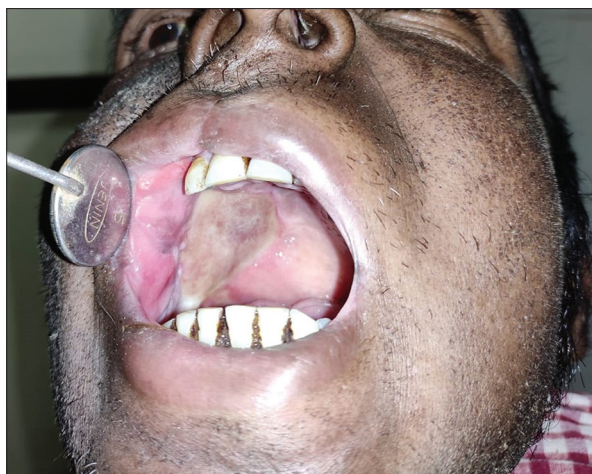


Figure 3: Postoperative result of 3 months' follow-up



Figure 4: Preoperative photo of extraoral lesion

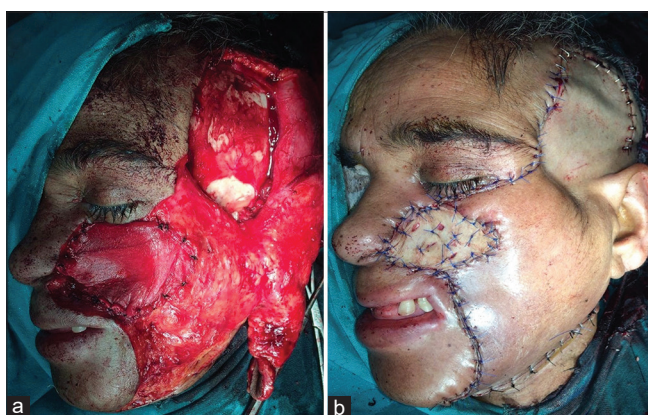


Figure 5: (a) Intraoperative photo showing temporalis myofascial flap being sutured at the site of defect. (b) Closure of extraoral incision with split thickness skin graft at site of defect

temporal region, staplers were used. Since skin defect was also created during wide local excision of the lesion, a split-thickness skin graft was harvested from the left thigh and sutured above TMF and to the adjacent skin with help of 4-0 prolene sutures [Figure 5b]. The histopathological examination of the specimen revealed well-differentiated SCC with negative soft tissue and bone margins.

The patient was on antibiotics and analgesics for 7 days' postoperatively and was discharged on the 8th day with signs of mild facial nerve weakness. Postoperative radiotherapy was advised after 6 weeks after the completion of epithelialization of TMF. Postoperative 4 months' follow-up showed satisfactory healing with no sign of recurrence [Figure 6].

Case 3

A 59-year-old male reported to OPD of our maxillofacial unit with a complaint of nonhealing ulcer in the oral cavity. Clinical examination revealed a ulceroproliferative lesion of approximately 3.5 cm × 2.5 cm in size located at the region



Figure 6: Postoperative 3 months follow-up

of right upper buccal vestibule extending from left upper third molar posteriorly to the second premolar anteriorly and laterally on to buccal mucosa (T2N0M0) [Figure 7]. Preoperative incisional biopsy revealed the lesion to be well-differentiated SCC.

Surgical procedure

Wide local excision and left partial maxillectomy with ipsilateral supraomohyoid neck dissection was planned. Similar surgical procedure was followed as above mentioned cases using a modified Weber-Ferguson approach with separate temporal incision. Harvested TMF was tunneled under the zygomatic arch through the infra-temporal space to reach the primary defect and was meticulously sutured with adjacent mucosa of the oral cavity with help of resorbable sutures [Figure 8a and b]. Skin closure was achieved with 4-0 nylon at face and skin staplers at the temporal region. The histopathological examination of the resected specimen revealed well-differentiated SCC with negative soft tissue and bone margins.

Radiotherapy was advised after 4 weeks. Postoperative follow-up of 2 months showed satisfactory healing with no sign of recurrence and little or no functional and aesthetic morbidity [Figure 9].

DISCUSSION

Facial esthetics and contour are governed by various facial bones. Maxilla, being a part of midface plays a key role in facial aesthetics, orofacial functions, and in preserving the continuity with the nasal cavity, the palate, and the orbit.^[4] These are the points need to be considered in patients having tumors of the maxilla and while reconstructing maxilla.

Since the late 1800 s, TMF serves as a useful option for maxillofacial reconstruction. TMF consist of temporalis muscle with the overlying temporalis fascia and it has rotational radius 8 cm³ to gain access to midface defect. Temporalis muscle is strong enough to bear the rotation of 180 degrees for reconstruction of intraoral defect. Muscle length of 12–16 cm is reported in the literature with more length seen in males.^[5] TMF serves as an axial flap with anterior, posterior deep temporal arteries which are branches of internal maxillary artery and middle temporal artery which is a branch of superficial temporal artery as a pedicle.^[6] TMF comes under Mathes and Nahai type III classification of vascular patterns of flap since it has two major vascular supplies.^[7] Despite being a major vascular source middle temporal artery often gets compromised during harvesting TMF but it has limited or no effect on the survival of flap. Critical steps during harvesting flap, is to find out correct dissection plane. The surgeon must be able to recognize superficial temporal fascia and carry out dissection deep to this plane to protect the frontal branches of the facial nerve, that is located superficial to it.^[8] Sometimes, osteotomy of the zygomatic arch is necessary to allow sufficient flap transposition, in such cases careful subperiosteal dissection is preferred to preserve facial nerve.^[8] Despite having strong vascular supply to withstand rotation of muscle, trauma during harvesting flap often cause nerve injury that results in atrophy and reduction of muscle bulk. This atrophy is beneficial, as it decreases the nasal obstruction caused by muscle bulk and also leads to cicatricial change in muscle fibers that produce a rigid and hardened flap reconstruction.^[9] Another important aspect in the success of TMF is epithelialization that starts from the periphery and often takes 8–12 weeks but little longer in case of a patient undergoing radiotherapy.^[9]

TMF mainly indicated for reconstruction of oral defects,^[1,10] cranial base reconstruction,^[11] facial reanimation surgery,^[12]



Figure 7: Preoperative primary lesion with its extension

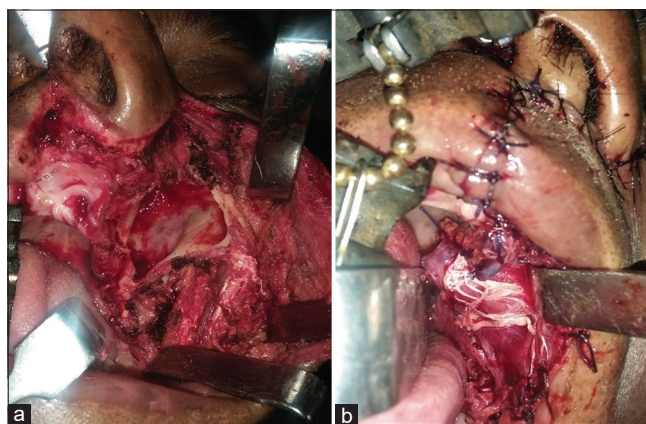


Figure 8: (a) Intraoperative photo showing defect created after maxillectomy. (b) Intraoral placement of temporalis myofascial flap with suture in its place



Figure 9: Postoperative intraoral result of 2 months follow-up

obliteration of defects of orbit,^[13] and midface reconstruction^[14] as in our case. The previous history of trauma, surgery, radiotherapy to the temporoparietal area, or aesthetic consideration of patients being bald with a risk of scar visibility

postoperatively are few of the contraindication of TMF for reconstruction.^[7] Sometimes, TMF can be used as a composite flap that incorporates calvarium^[15] or coronoid process when there is need for bony augmentation also. The bone obtained is a standard bone with adequate thickness to be used in orbit, maxillary wall, palate reconstruction. TMF considered to be acceptable means of maxillary reconstruction after oncological resection because of its excellent viability that allows early postoperative radiotherapy.^[8] The main advantage of TMF is that it provides immediate reconstruction of the defect. It circumvents the need of distant flap with subsequent complex microvascular anastomosis, or future need of prosthetic rehabilitation and it also offers a shorter duration of surgery and cost-effective options when compared to the other mode of reconstruction.^[9]

TMF show relatively low donor site morbidity as reported in our article. Despite minimal complications, few complications are outlined such as necrosis of flap which is rare, temporal hollowing which can be concealed by hair, damage to the facial nerve which are mostly transient, hematoma and reduction in mouth opening which are self-resolving in nature and get resolved within few weeks.^[1]

CONCLUSION

Despite the era of free flaps, TMF is a versatile option for the reconstruction of maxillary defect owing to its high predictability, reliable vascular pedicle, and proximity to defects of the orofacial region. Satisfactory cosmetic and functional results, low donor site morbidity, relative ease of harvesting make TMF as a flap of choice for reconstruction of maxillary defect avoiding more complex reconstructive options.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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