



USE OF POSTERIORLY BASED TONGUE FLAP IN RECONSTRUCTION OF INTRAORAL MAXILLARY SOFT TISSUE DEFECTS FOLLOWING EXCISION OF MAXILLARY BENIGN SOFT TISSUE TUMORS

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ABSTRACT

Aim of the study: The current study aimed to evaluate the efficacy of posterior-based tongue flap for reconstruction and restoring function and esthetics of intraoral posterior maxillary soft tissue defects following surgical excision of large maxillary benign soft tissue granulomas.

Patients and methods: This study was carried out on 10 female patients aged from 37 to 55 years (men age: 46) who had been planned for treatment with posterior-based tongue flap procedure for reconstruction of intraoral maxillary soft tissue defects following surgical excision of large maxillary benign soft tissue tumors and/or granulomas. The first sessions were carried out under general anesthesia and aimed to surgical excision of the tumor and reconstruction the soft tissue defects with posterior-based tongue flap. In the second session, the pedicle was divided under local anesthesia. Between the first and second sessions, the period of time needed was 15 to 21 days. The proximal part of the pedicle was returned to the donor site in the second session. Postoperative clinical follow up and recall was scheduled at 1, 3, 6, 9, and 12 months postoperatively.

Results: All the flaps survived but one flap had temporary venous congestion after flap division. No recurrence was noted. Good aesthetic and functional results were achieved. No post-operative wound dehiscence and wound infection were recorded. The soft tissue contour at the recipient sites was clinically satisfactory.

Conclusion: Despite the disadvantages of being an interpolation flap which requires a second session and good patient cooperation, posterior-based tongue flap is a choice for reconstruction of intraoral posterior maxillary soft tissue defects following surgical excision of large maxillary benign soft tissue tumors or granulomas with its highly vascular structure, good mobility, localization, texture match, and low donor area morbidity.

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INTRODUCTION

The reconstruction of intraoral defects can be challenging due to the different characteristics of the region, importance of preserving the anatomy and function, and shortage of available donor areas.^{1,2} The location and size of the defect guides the reconstructive surgeon through the treatment plan. Intraoral tissue defects are generally the result of oncologic resections, traumas, and congenital abnormalities.² These defects are usually composite tissue defects, which have 2 or more deficient tissue components. Several methods, such as primary closure, mucosal or skin grafts, local and regional flaps, and free tissue transfers, have been proposed for the reconstruction of intraoral defects.¹

Similar to all other reconstructive surgical procedures, intraoral reconstruction has the main principle of replacement with similar tissue by using the simplest technique available. For contour, texture and color match, local tissues seem to have the best match for tissue defects.² Local flap options in the intraoral region are relatively limited. Among these local tissues, tongue flaps have been found useful in intraoral defect reconstruction.^{3,4} Tongue has the advantages of its central location and high vascular structure. Tongue flaps are mostly used as interpolation flaps; therefore, a second operation and patient's compatibility with the method are needed.⁵⁻⁸

MATERIALS AND METHODS

This study was carried out on 10 female patients aged from 37 to 55 years (men age: 46) who had been planned for treatment with posterior-based tongue flap procedure for reconstruction of intraoral posterior maxillary soft tissue defects following surgical excision of large maxillary benign soft tissue granulomas. All patients in the current study had slowly growing benign large maxillary peripheral giant cell granuloma or pyogenic granuloma involving posterior maxillary soft

tissues. The diagnosis of the lesion was confirmed clinically and by histopathological examinations bases on incisional biopsies of the lesions.

Under general anesthesia the benign large pyogenic granuloma in all patients were excised surgically then the maxillary soft tissues defects were reconstructed by posterior-based tongue flaps which were elevated from the dorsal face (figures 1-9). Based on the location of the maxillary soft tissue defects, the incision design on the tongue differs.⁹ In maxillary alveolar process defect extending posteriorly to the hard palate mucosa, the incision in the midline of the tongue tip was considered for the beginning of flap elevation. If the defect was limited to the hard palate, the incision began one centimeter away from the tongue midline because of the need for less length. Based on the width of the defect, up to 1/3 of the tongue width could be included in the flap design. Full- thickness" incision of the tongue from the anterior to the posterior direction creates posteriorly based lateral tongue flap. In such cases, the flap should not extend posteriorly to the circumvalate papilla. Great caution was exercised so that the flap pedicle would not become thin when the incision extended posteriorly. When there was a need for more width, the elevated flap could be incised from below in longitudinal direction. It converted the thick, narrow flap to a thin wide one. The flap was sutured to the recipient palatal mucosa.

The donor sites of the flaps and the recipient sites were closed primarily by interrupted sutures in the first session. Therefore, in all patients, the first sessions were carried out under general anesthesia. In the second session, the pedicle was divided under local anesthesia. Between the first and second sessions, the period of time needed was 15 to 21 days. The proximal part of the pedicle was returned to the donor site in the second session. Postoperative clinical follow up and recall was scheduled at 1, 3, 6, 9, and 12 months postoperatively.

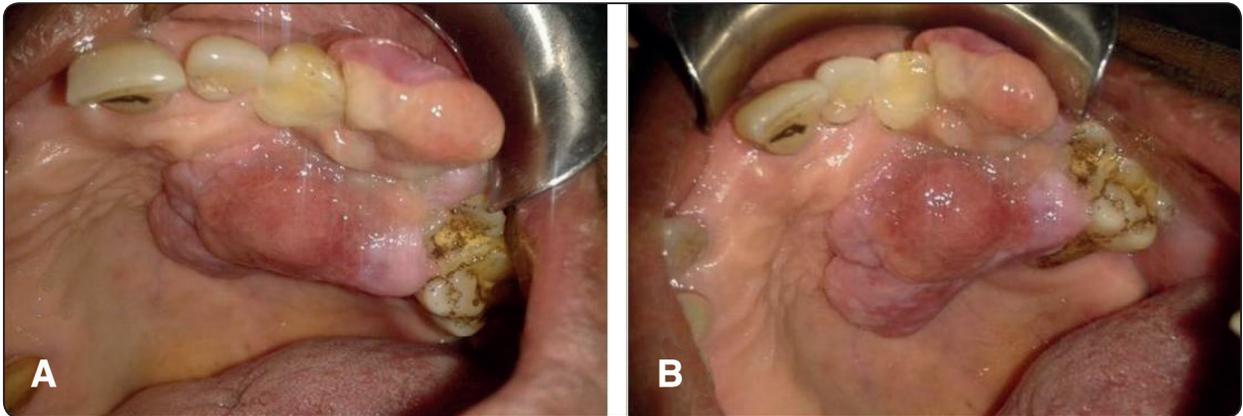


Fig. (1A and B): Preoperative view of benign maxillary soft tissue tumor as confirmed by incisional biopsy

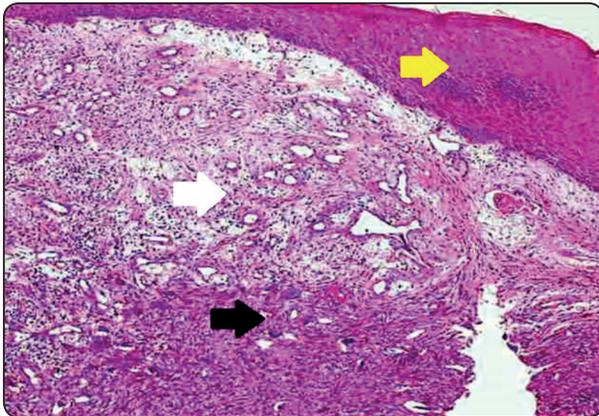


Fig. (2): Incisional biopsy report for the maxillary soft tissue tumor showed peripheral giant cell granuloma with granulation tissue containing giant cells (black arrow) separated from the covering surface epithelium (yellow arrow) by giant cell free zone (white arrow)

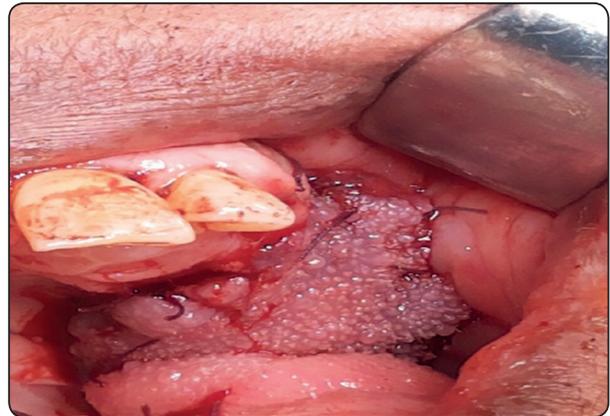


Fig. (3): Intra-operative posterior-based tongue flap adapted to the soft tissue defect following excision of benign maxillary soft tissue tumor



Fig. (4): Pathological tissue of the excised benign maxillary soft tissue tumor.



Fig. (5): One week postoperative appearance of posterior-based tongue flap in situ



Fig. (6): Six weeks postoperative after separation of the tongue flap from its base



Fig. (7): Eight weeks postoperative photograph showed complete healing of the graft



Fig. (8): A: Re-shaping of the tongue flap after 8 weeks. B: application of periodontal pack



Fig. (9 A and B): Postoperative photo showing normal healing of the tongue with no restriction of movement or speech

RESULTS

The follow-up period was 12 months. All the flaps survived (100%) but one flap had temporary venous congestion after flap division. In present study group, we had bleeding in one patient (10%), which was controlled with local hemostatic measures.

No recurrence was noted all the patients. Good aesthetic and functional results were achieved in all patients. The severity of pain and postoperative swelling was moderate in all patients. No postoperative wound dehiscence, sloughing and wound infection were recorded in any patients.

In all cases postoperative aesthetics of the donor tongue site were found to be satisfactory. Tongue aesthetics was assessed based on the symmetry on either side of the suture line after complete healing. There was no interference with speech as a consequence of use of the tongue as a donor site. Oral hygiene and mastication were unimpaired. No patient complained of sensory or gustatory disability following this procedure. The soft tissue contour at the recipient sites was clinically satisfactory for both the patients and the author. Six patients out of ten constructed partial denture on the recipient sites with no complain. Partial dentures were constructed on the recipient sites without any complain and were functionally and esthetically accepted.

DISCUSSION

Reconstruction of the intraoral region defects which involve the lips, mouth floor, alveolar region, cheeks, soft and hard palate, and tongue can be challenging for reconstructive surgeons. Ablative surgery for cancer treatment, trauma, and congenital abnormalities are primary reasons for patients to seek repair. Several methods of reconstruction including primary closure, mucosa or skin grafts, local flaps, regional flaps, and free flaps have been used.¹ The anatomy, location, and the size of the defect should be kept in mind when considering the

treatment plan to determine the best reconstructive method.³

Since the intraoral structures have specific functions such as tasting, eating, chewing, swallowing, and speaking, tissue defects in the oral region should be replaced with tissues, which have the best anatomical, histological, and functional similarity.^{10,11} The use of the tongue flap has been described in oral and maxillofacial reconstruction such as closure of palatal fistulas, mouth floor and alveolar region defects, hypopharyngeal and retromolar defects, cheek defects, and lip defects.¹⁰ This shows that even though tongue flap procedures are said to be inconvenient because of having the tongue attached to the defect while awaiting the second procedure, this technique has stood the test of time.

Eiselsberg was the first to use the tongue in reconstruction of oral cavity.¹² Lexer reported the first posteriorly based pedicled tongue flap for coverage of a retromolar defect occurring after oncological surgery.¹³ Closure of palatal fistulas after primary cleft palate repair is the most common indication for the use of tongue flaps. Baba et al¹⁴ conducted a study on closure of anterior palatal fistula using tongue flap and from their clinical experiences concluded that the tongue flap is an excellent and versatile option for closure of large palatal fistulas with high success rate and least morbidity.

The tongue is one of the most versatile organs for obtaining tissue for transfer within the oral cavity of pharynx. Its abundant blood supply permits the use of posteriorly based flaps, anteriorly based flaps, central island flaps, and dorsal flaps to transfer tissue. Tongue flaps are based on one or more branches of the ipsilateral lingual artery, sometimes including branches of the contralateral lingual vessel.¹⁵ This blood supply with its extensive anastomotic network with branches from the contralateral side permits ipsilateral lingual artery destruction

without compromising viability. The tongue flap is easy and reproducible. It can be recommended in mediopalatal defects after cancer palatal surgery. Its esthetical and functional results are excellent. It is an alternative to palatal obturator, which are not well tolerated in the long run.¹⁵ In study of Guerrero-Santos and Altamirano¹⁶ show 70 percent and in study of Pigott et al¹⁷ show 85 percent success rate. Guerrero- Santos and Altamirano¹⁶ suggested fixing the tip of the tongue to the upper lip to reduce the mobility of the tongue, thus reducing the traction on the attachment of the flap.¹⁸

Following precautions has to be taken while raising a tongue flap, length of the flap should be sufficient enough to avoid tension in the flap, principal gustatory papillae should be avoided from the flap, tip of the tongue should be preserved as much as possible and flap should have adequate thickness and should contain mucosa and sub adjacent muscle. Tongue flaps are not commonly used due to the fear of alteration in speech, articulation problems, Postoperative edema that can compromise the airway and need for second surgeries to divide and de-bulk the flap. Complications of the procedure include hematoma formation that can compress the pedicle leading to necrosis of the flap, dehiscence and temporary loss of tongue sensation and alteration in taste perception.¹⁹

However, although many surgeons have been reluctant to use the tongue flap technique because of the possible problems related to the prolonged tongue fixation to the recipient site, there may be limited options available to the patients.²⁰ the current study showed the tongue is an excellent donor site alternative for oral soft tissue reconstruction especially posterior-based tongue flap for closure of posterior palatal and maxillary soft tissue defects following surgical excision of large maxillary benign tumor or granuloma because of its highly vascular structure, proximity to all intraoral structures, and texture match.

CONCLUSION

The posteriorly based tongue flap is an excellent and versatile option for closure of large intraoral maxillary soft tissue defects following surgical excision of large maxillary benign tumor or granuloma with high success rate and least morbidity. The excellent vascular structure, mobility, and versatility of the tongue facilitate its use in reconstruction of intraoral maxillary soft tissue defects and should also be kept in mind for other intraoral soft tissue defects.

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