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ORIGINAL ARTICLE

Role of Buccal Pad of Fat in Reconstruction of the Buccal Mucosa Defects

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Abstract Carcinoma buccal mucosa is the most common oral cavity cancer in India. Following excision of these lesions the defects can be reconstructed using various reconstructive techniques. Buccal pad of fat has been successfully used in the reconstruction of small palatal defects and in the closure of the oro antral fistula. This study aims at evaluating the role of buccal pad of fat in reconstruction of defects following excision of the small to medium premalignant lesions and T1–T2 malignant lesions of buccal mucosa. This study has 20 patients who presented between January 2013 and January 2015, with biopsy proven premalignant lesions and early malignant lesions in the buccal mucosa. The lesions were excised and reconstructed with buccal pad of fat. Patients were followed up for a period of 3 months, in this period were evaluated for flap epithelisation, postoperative complications like flap necrosis and infection and also the functional outcomes of the flap. In our study complete epithelisation of the flap was seen in all patients. Wound dehiscence was seen in three patients with larger defetcs(>5 cm). None of our patients had any post operative morbidity. This flap is therefore an excellent reconstruction technique for small to medium buccal mucosa defects as it is convenient, reliable, fast, has rich vascularity, easy accessibility, fewer complications and minimal or no donor site morbidity.

Keywords Buccal pad of fat · Buccal mucosa · Reconstruction · Carcinoma

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Introduction

Carcinoma buccal mucosa is the most common oral cavity cancer in India [1]. Compared to other sub sites of oral cavity like tongue, buccal mucosa malignancies are less aggressive. Though large number of patients present with locally advanced disease which requires major reconstruction, a subset of patients do present with pre malignant and early malignant lesions. Following excision of these lesions the defects can be reconstructed using various options like skin grafting, regional flap or free flaps [2]. Each of these techniques has its own advantage and disadvantages. Buccal pad of fat has been successfully used in the reconstruction of small palatal defects and in the closure of the oro antral fistula [3].

This study aims at evaluating the role of buccal pad of fat in reconstruction of defects following excision of the small to medium premalignant lesions and T1–T2 malignant lesions of buccal mucosa.

Materials and Methods

This is a observational study done in 20 patients (M:F ::1:4) who presented to the Department of Otorhinolaryngology and Head and Neck Surgery in our institute

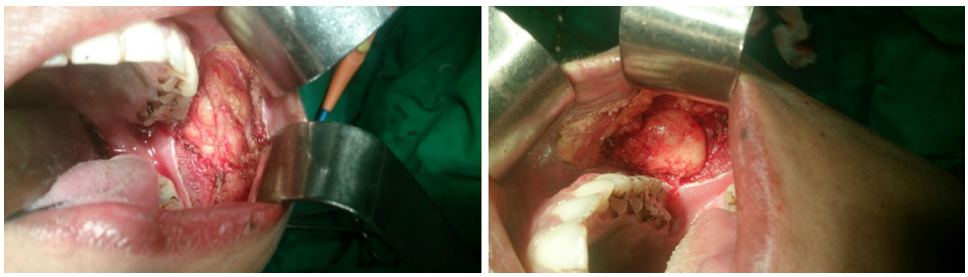

Fig. 1 Post excision defect and the buccal pad of fat in the superior aspect of the defect

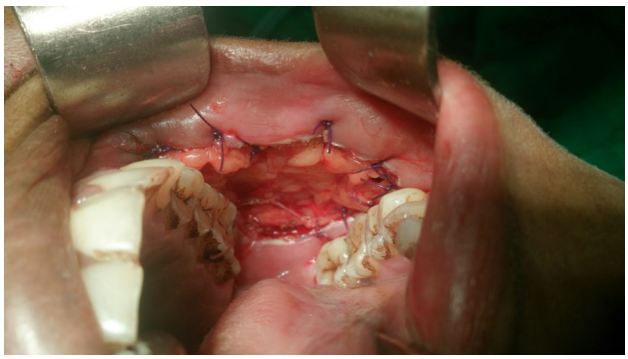

Fig. 2 Buccal pad of fat sutured to the mucosal edge of the defect

between January 2014 and August 2015. Age of the patients ranged from 35 to 67 years. Patients with premalignant lesions and T1–T2 malignant lesions in the buccal mucosa which was confirmed by biopsy were included in the study. Patients with extensive lesions which would lead to large surgical defect >6 cm were excluded from the study. And also patients treated with prior surgery or radiotherapy for the lesions in oral cavity were excluded from the study.

After institutional ethical committee clearance the study was started. Informed written consent was obtained from all the patients after explaining the procedure and the anticipated complications. After complete workup all the patients underwent wide excision of the lesion under general anesthesia.

Surgical Technique

After excision of the primary lesion Buccal pad of fat was identified and mobilized using blunt dissection from the superior aspect of defect taking care not to damage the thin capsule and its blood supply (Fig. 1). Once the pad was dissected free from its surrounding structures it was gently grasped with vascular forceps and spread over the defect again taking care of its capsule and the vascular plexus. Mechanical suction was avoided once the BPF is exposed. The buccal pad of fat was then sutured to the mucosal edges using 3-0 polyglactin (Vicryl) ensuring that it is not under excessive tension (Fig. 2). No complications were encountered intraoperatively.

In the post-operative period patients were put on broad spectrum antibiotics and ryles tube feeding for 5 days. During this period patients were encouraged to gently rinse the oral cavity with 2 % povidone iodine oral rinses. Flap was evaluated daily for the first 7 days and later every week for the next 4 weeks. After 10 days all patients were encouraged to do mouth opening exercises.

Results

The mean maximum dimension of the defect reconstructed in our study was 4.12 cm with the maximum dimension of the defects ranging from of 2–6 cm (Table 1).

Postoperative period was uneventful except in 3 patients, who developed partial wound dehiscence in the inferior aspect of the defects on the 3rd to 4th postoperative day which was seen in defects larger than 5 cm. This was treated conservatively and the flap completely epithelized by 2 months.

In other patients graft epithelization started by 1st week and completed by 4–6 weeks (Fig. 3).

We followed up all the patients for 3 months and found that in all the patients the graft had completely epithelized with minimal fibrosis.

At the end of 3 months none of our patients had any donor site morbidity or any complaints of difficulty in opening mouth or discomfort while chewing food.

Discussion

The buccal pad of fat as an anatomic element was first mentioned by Heister in 1732 and was described by Bichat in 1802. Therefore it is commonly referred to as boule de Bichat in French [3]. The buccal pad of fat had a limited clinical importance for many years and was usually considered a surgical nuisance as it was encountered in various surgeries in pterygomaxillary space or after injuries of the maxillofacial region [4].

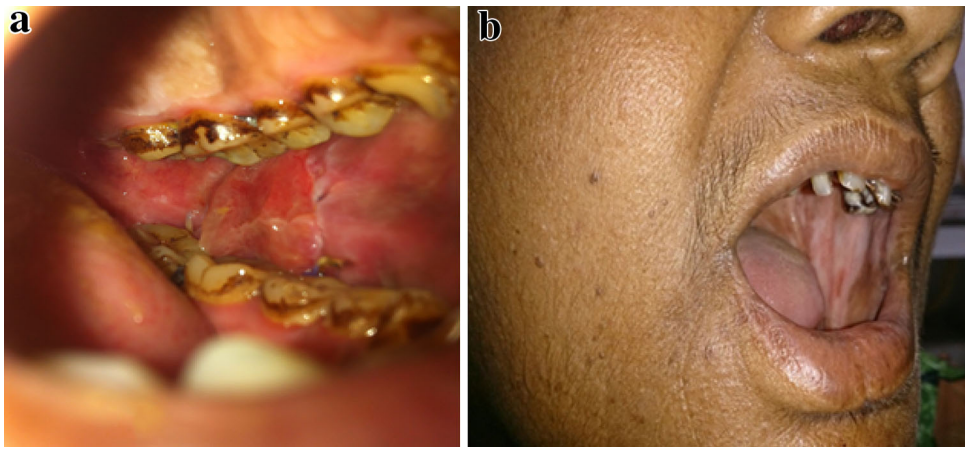

Fig. 3 Appearance of the buccal pad of fat reconstruction after **a** 2 weeks **b** 6 week post operative

Egyedi (1977) was the first to use this graft for closure of post surgical maxillary defects. It was Tideman (1986) who reported the concept of using BPF as pedicled graft and its complete epithelization without the use of skin graft [4].

Ho(1989) published article on reconstruction of palatal and cheek defects with this graft [4].

Anatomically buccal pad of fat is a simple lobulated mass consisting of a body and 4 extensions, buccal, pterygoid, pterygopalatine and temporal. The body and the buccal extension form 55–70 % of the total weight of the buccal pad of fat. The body is situated deep and along the posterior maxilla and upper fibers of buccinator covered by a thin capsule. The buccal extension lies superficially within the cheek forming the part of cheek contour. The other parts; pterygopalatine, pterygoid and temporal extension are situated in pterygopalatine fossa, pterygomandibular space and around the deep temporal fascia respectively. Each process has its own capsule and ligaments anchoring them to surrounding structures [3].

The parotid duct and the buccal branch of the facial nerve run superficially on the lateral surface of the buccal pad of fat. The facial vessels are in the same plane and mark the anterior extent of buccal pad of fat [3].

This graft receives axial pattern of blood supply from the transverse facial branch of superficial temporal artery, and also derives blood supply from the buccal and deep temporal branches of maxillary artery all forming random pattern of blood supply in mesenchyma of the buccal pad of fat. This rich blood supply explains the high take up rate and quick epithelisation of the graft [3].

Average volume of the fat is 9.6 ml which is seen to be mostly constant regardless to the overall body weight and fat distribution or even in a cachectic patient [5].

The possible functions of this buccal pad of fat are preventing negative pressure in newborns while suckling, separating the masticator muscles from one another and from the adjacent bone, enhancing the intermuscular motion, which is why this specialized type of fat is termed syssacosis and also protection of the neurovascular bundles [3].

It has been seen that this buccal pad of fat has been put to many uses from closure of oroantral communication to reconstruction of maxillectomy defects, closure of mucosal defects in palate, retromolar trigone, buccal mucosa following excision of malignancy or excision of fibrous bands in oral submucus fibrosis, in reconstruction of cleft palates, and in Temperomandibular Joint surgeries [3].

The critical factor in success is the size. Studies showed that in a maxillary defect of more than $4 \times 4 \times 3$ cm, partial dehiscence is likely to result due to impaired vascularity of the stretched ends. But a buccal or retromandibular defect of $7 \times 5 \times 2$ cm can be successfully reconstructed as the flap is place over the rich vascular bed of the muscles in the recipient area [4]. In our study the maximum dimensions of the defect reconstructed was 6×5 cm. Another important factor for graft success is preserving the capsule and vascularity while mobilizing the buccal pad of fat.

Healing with complete epithelisation was seen in all our patients. It has been seen that once transferred buccal pad of fat epithelizes in a week. Complete epithelialization is seen by 6 weeks and by this time the graft is completely epithelised with minimal fibrosis.

Histological study done showed that superficial fat layer is replaced by granulation tissue by end of 2nd week and finally covered by stratified squamous epithelium migrating from the margins of the defect. Although the epithelium was formed by parakeratotic stratified squamous epithelium with flattened rete ridges. The subepithelial stroma consists of sparsely cellular, dense fibrous connective tissue with no lamina propria or submucosa and also no fat cells for at least a depth of 6–8 mm. [6].

Most common complication documented in literature is partial necrosis of the flap (7.9 %) followed by excessive scarring (5.4 %) [4]. None of our patients had any of these complications.

Table 1 .

Sl no	Diagnosis	Dimension of the post surgical defect (cm)	Complication
1	Squamous cell carcinoma of buccal mucosa T2N0M0	4 × 3	No
2	Squamous cell carcinoma of buccal mucosa T1N0M0	4 × 4	No
3	Squamous cell carcinoma of buccal mucosa T2N0M0	4 × 3	No
4	Squamous cell carcinoma of buccal mucosa T2N0M0	4 × 4	No
5	Squamous cell carcinoma of buccal mucosa T1N0M0	3 × 3	No
6	Squamous cell carcinoma of buccal mucosa T2N0M0	3 × 4	No
7	Squamous cell carcinoma of buccal mucosa T2N0M0	5 × 5	No
8	Squamous cell carcinoma of buccal mucosa T2N0M0	5 × 5	No
9	Squamous cell carcinoma of buccal mucosa T2N0M0	5 × 5	No
10	Squamous cell carcinoma of buccal mucosa T2N0M0	5 × 4	No
11	Squamous cell carcinoma of buccal mucosa T1N0M0	4 × 3.5	No
12	Squamous cell carcinoma of buccal mucosa T2N0M0	4 × 4	No
13	Squamous cell carcinoma of buccal mucosa T1N0M0	3 × 2	No
14	Squamous cell carcinoma of buccal mucosa T1N0M0	2 × 2	No
15	Squamous cell carcinoma of buccal mucosa T2N0M0	5 × 6	No
16	Leukoplakia	3 × 5	No
17	Erythroplakia	5 × 5.5	Partial wound dehiscence
18	Leukoplakia	6 × 5.5	Partial wound dehiscence
19	Leukoplakia	5 × 5	Partial wound dehiscence
20	Erythroplakia	5 × 5	No

One major disadvantage of this flap is that it cannot be used in previously irradiated patient and this flap can be used only once in a patient [4].

It has been seen that when buccal pad of fat was used to reconstruct retromolar trigone defects, limitation in mouth opening was one of the complication [3].

In our patients good functional outcome was seen, as the patients did not complain of difficulty in opening mouth or discomfort while chewing food post operatively.

Conclusion

This flap is therefore an excellent reconstruction technique for small to medium buccal mucosa defects as it is convenient, reliable, fast, has rich vascularity, easy accessibility, fewer complications and minimal or no donor site morbidity.

In our study we have seen that in addition to the advantages listed above buccal pad of fat is usually not involved in the early carcinoma of the buccal mucosa, so it is a safe reconstructive technique in early malignancies of buccal mucosa.

Compliance with Ethical Standards

Conflict of interest Dr. Sagayaraj A., Dr. Divya Jyothi N., Dr. S.M Azeem Mohiyuddin, Dr. Ravindra P. Deo, Dr. B. Vageesh Padiyar declare that they have no conflict of interest.

Ethical Approval This study does not involve any animals. In this study procedure or intervention performed for the purpose of the study on human participants was done after obtaining an informed written consent from all subjects to be included for this study. This study was done in accordance with the ethical standards of the institutional ethical committee. The ethical clearance was obtained from institutional ethical committee of our institute. Vide No: DMC/KLR/IEC-CER/96/2015-16.

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