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Case Study

BUCCAL FAT PAD AS A PEDICLED AUTOGRAFT FOR ROOT COVERAGE: A CASE REPORT

JATIN CHAUHAN, RAJESH KUMAR THAKUR, BIPIN KUMAR YADAV, DIKSHA GUPTA*

Department of Periodontology, Faculty of Dental Sciences, Uttar Pradesh University of Medical Sciences, Saifai, Uttar Pradesh, India
***Corresponding author: Diksha Gupta; Email: dikshagupta1504@gmail.com**

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ABSTRACT

The buccal fat represents a unique and organized adipose tissue that maintains its volume and stability over long periods and serves as a well-vascularized, easily accessible local flap for reconstructive procedures such as the enhancement of root coverage in severe recession defects, thereby augmenting the dimensions of keratinized mucosa. Areas with Miller's Classes III and IV gingival recessions are not considered amenable to intervention utilizing surgical root coverage methodologies due to the poor prognosis with existing techniques. In this case report, a pedicled buccal fat pad was used as a subepithelial grafting technique for root coverage in a maxillary posterior tooth exhibiting a Class III gingival recession defect coupled with a deficiency of keratinized gingiva. At a 3-month follow-up, this approach demonstrated adequate root coverage, increased keratinized tissue, and improved patient comfort, as documented, with no notable complications.

Keywords: Root coverage, Buccal fat pad, Miller's Class III recession pedicled autograft.

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INTRODUCTION

Chronic periodontitis is caused by various hyper-responsive reactions and destructive immune responses provoked by microbial plaque around the gingival margin [1]. The underlying causes of this disease can be genetic, traumatic, developmental, or metabolic origin [2]. As the disease progresses, the loss of hard and soft tissues often results in the migration of the gum line away from the teeth, leading to gingival recession. Gingival recession represents a prevalent and unpleasant condition characterized by the displacement of the marginal gingival tissue apical to the cementoenamel junction with the uncovering of the root surface to the oral environment [3]. Gingival recession is represented as either localized or generalized and can affect one or multiple surfaces of the teeth. Root surface exposure due to the loss of periodontal attachment leads to various conditions, including dentine hypersensitivity, root caries, challenges in maintaining satisfactory oral hygiene, and aesthetic compromise. Undoubtedly, not every instance of gingival recession presents issues that necessitate interference. Nonetheless, it is crucial to detect and delineate those recession defects that would derive the most advantage from a root coverage procedure [4].

A multitude of surgical techniques have been depicted for the management of this condition, yielding varied results. The surgical interventions that have been used for the coverage of denuded root surfaces enclose free gingival grafts, laterally displaced flaps, coronally advanced flaps, subepithelial connective tissue grafts, guided tissue regeneration, as well as the pouch and tunnel technique [5]. Various adjunctive agents, including recombinant human growth factors, platelet-rich plasma, and platelet-rich fibrin, have been employed to expedite the healing process and further augment clinical outcomes. Furthermore, allogenic soft-tissue substitutes, such as acellular dermal matrix, alongside xenogenic soft-tissue substitutes, including NovaMatrix, have also been applied in clinical practice [6,7].

Another adjunctive and autologous agent, such as a pedicled buccal fat pad (PBFP), is a specially organized adipose tissue confined to the masticatory space between the buccinator muscle medially and the masseter muscle laterally. It is composed of a specialized fat that enhances intermuscular movement and is resistant to lipolysis. It consists of three lobes (anterior, middle, and posterior), and the posterior lobe has four projections (buccal, pterygoid, pterygopalatine, and temporal). Its volume is 10 cm^3, with a length of around 50–60 mm, a width of 50 mm, and a thickness of 6–7 mm. In addition, it was reported that donor site morbidity and patient discomfort were minimized. The BFP has a rich plexus of blood vessels forming an intrinsic microvascular network that ensures the survival of the flap after relocation with no need for anastomosis [8,9].

This case report emphasizes the use of PBFP as a subepithelial graft for root coverage in Class III gingival recession defect with bone dehiscence.

CASE REPORT

A 39-year-old systemically healthy male presented to the department of periodontology, complaining of mild sensitivity and discomfort in the upper left back tooth region for a few months (tooth 26, following the Fédération Dentaire Internationale tooth numbering system). Clinical examination showed Miller's Class III gingival recession and 8-mm gingival recession defect without keratinized gingiva on the distobuccal side of the maxillary first molar (Fig. 1). Following this, the patient received phase I intervention comprising instructions on pertinent dental hygiene practices, scaling, and root planing. After explaining the details regarding the surgical procedure, written informed consent was obtained from the patient before the inception of the procedure.

Surgical procedure

The patient underwent a comprehensive preliminary preparation that included the application of a 0.12% chlorhexidine mouthwash. Subsequently, an infiltration of 1:100,000 lignocaine combined with adrenaline was administered. Local anesthesia was successfully induced, and a precise incision was executed. A crevicular incision was given extending from the distal aspect of the first premolar to the distal aspect of the first molar followed by the meticulous elevation of a full-thickness mucoperiosteal flap (Fig. 2). The flap was elevated beyond the mucogingival junction to reveal the zygomatic buttress and to access the attachment of the buccinator muscle. Thereafter, a minor horizontal incision was given beneath the elevated flap to expose the buccal fat pad (BFP). Buccal fat was harvested through blunt dissection utilizing sinus forceps, maneuvering through the buccinator and the surrounding loose fascia. It was subsequently manipulated and spread onto the root surface of the maxillary first molar (Fig. 3).

Fig. 1: Pre-operative clinical picture: Showing gingival recession and loss of keratinized tissue irt distobuccal root of 26

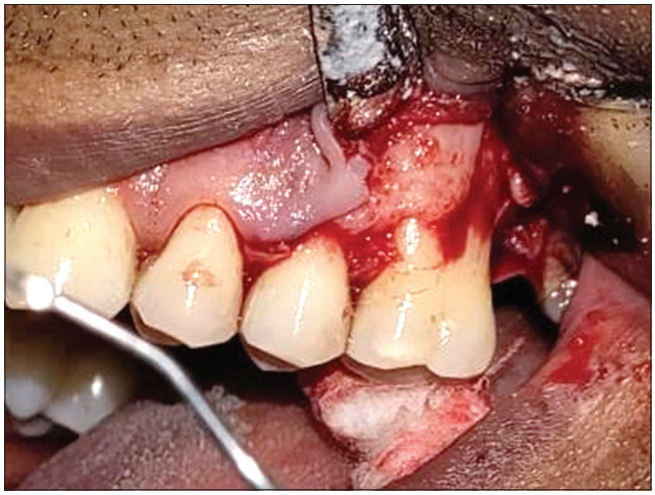

Fig. 2: Crevicular incision given and full-thickness mucoperiosteal flap was elevated

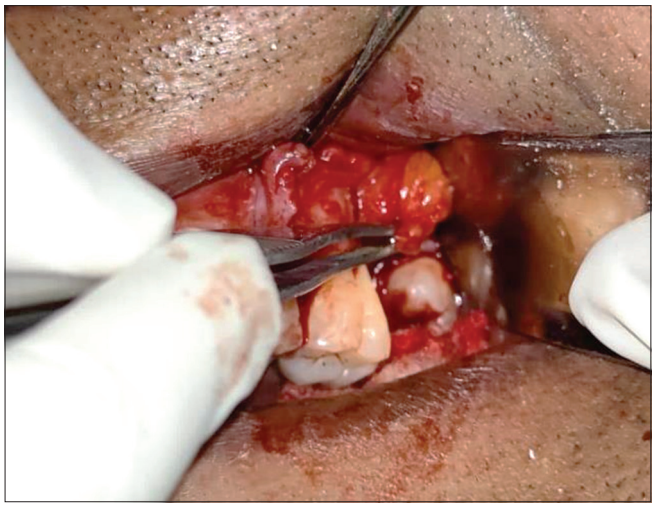

Fig. 3: Buccal fat harvested through blunt dissection

The vascularized buccal fat was secured to the buccal and distal surface of the maxillary first molar and sutured to the mucosal edges with absorbable 4–0 polyglycolic acid sutures. After the stabilization of buccal fat, it is then covered by a rotational, lateral pedicle flap from the adjacent premolar region, and sutured without tension by non-absorbable 4-0 braided silk sutures (Fig. 4). The surgical site was then covered with periodontal dressing (Coe-Pak™) after placing tin foil (Fig. 5).

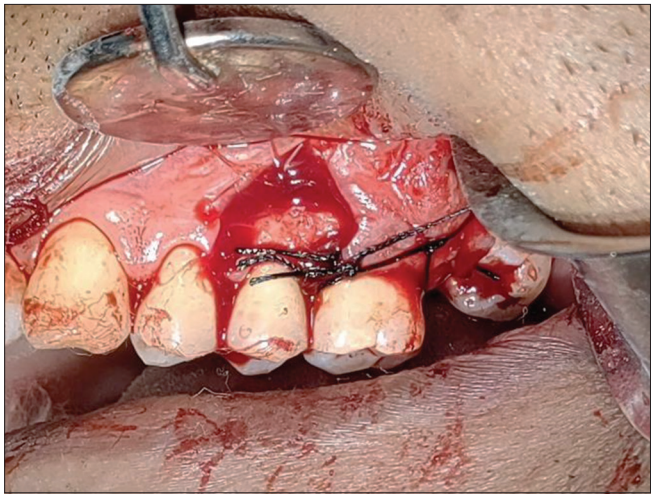

Fig. 4: Buccal fat was stabilized with sutures, and covered by a rotational, lateral pedicle flap

Fig. 5: Periodontal dressing given after placing tinfoil

Fig. 6: Post-operative view after suture removal

Post-operative care

The patient was prescribed non-steroidal anti-inflammatory drugs and a course of antibiotics for 5 days. The patient was also advised to use mouth rinse containing chlorhexidine (0.12%) instead of brushing their teeth for 2 weeks at the surgical site. The patient was scheduled for weekly follow-up appointments for 1 month after surgery. Sutures were removed 10 days postoperatively (Fig. 6). No dehiscence, infection, or necrosis was observed. After suture removal, the color of the BFP changed to reddish pink. At each visit, instructions on maintaining

Fig. 7: Post-operative after 3 months (Buccal view) depicting satisfactory healing, and favorable results

Fig. 8: Post-operative after 3 months (occlusal view). The distobuccal root of the left maxillary first molar shows optimum root coverage

dental hygiene were provided and monitored. The treatment process went well and the patient was satisfied. Subsequently, monthly routine follow-up recalls were made. After 3 months, progressive adaptation and morphological resemblance were observed, resulting in an adequate amount of root coverage concerning the distobuccal root of the maxillary first molar (Figs. 7 and 8).

DISCUSSION

Reconstruction of the gingiva has become an integral part of periodontal practice. Countless approaches have been employed for root coverage. Wound healing plays a significant role in determining root-coverage predictability, so graft vascularization and surgical technique must be considered [10]. Heister initially delineated the BFP in 1732, positing that it constitutes a glandular entity [11]. The authentic lipid composition of this biological tissue was proposed by Bichat in the year 1802 [12]. BFP represents a meticulously organized form of tissue. Its adipose component is classified as a unique type of fat, which facilitates intermuscular motion. Unlike subcutaneous adipose tissue, it is not subject to lipid metabolism; instead, it operates with a distinct pattern of lipolysis, preserving its volume and structural integrity over extended durations. The BFP comprises an encapsulated central body (corpus) accompanied by four extensions: buccal, pterygoid, superficial, and deep temporal. The corpus is situated along the anterior boundary of the masseter muscle and is positioned adjacent to the periosteum of the posterior wall of the maxilla. Collectively, the corpus and the buccal extension constitute 50% of the BFP and are regarded as the most clinically relevant segments [13].

The vascularization is supplied by branches originating from the superficial temporal artery, the infraorbital artery, the transverse facial artery, and the internal maxillary artery. In addition, it encompasses lymphatic vessels and myelinated nerve fibers. The venous drainage comprises tributaries of the pterygoid venous plexus [14]. Histological evidence of wound healing in 2–3 weeks was presented by Samman *et al.* the stratified squamous epithelium covers the largely acellular fibrous tissue that replaces the fat cells [15].

Agarwal *et al.* used PBFP in Miller's Class IV recession in the maxillary first molar. They found that the clinical attachment gain was found to be 4 mm depicting partial root coverage [16]. Similarly, Deepa and Kumar conducted a study to evaluate the usefulness of pedicled BFP (PBFP) for treating Classes II and III gingival recession. They concluded that pedicled buccal fat is an effective treatment option for managing Class II and Class III gingival recession in the maxillary posterior region [17].

Adeyemo *et al.* examined various uses of the PBFP in oral reconstruction, such as closing surgical defects after tumor removal, repairing defects following the excision of leukoplakia and submucous fibrosis, addressing primary and secondary palatal clefts, covering bone grafts in the maxilla and mandible, and lining the sinus surface of the maxillary sinus bone graft during sinus lift procedures for maxillary enhancement. They determined that the BFP can be quickly mobilized, has a magnificent blood supply, and causes minimal donor site putrescence, making it an optimal flap choice. The primary benefits of the BFP include its ease of extraction and versatility, straightforward nature, low complication rates, and quickness of the surgical procedure [18].

The disadvantages of using the PBFP in root coverage seem to be related to the limited extensibility of the pedicled flap, to maintain its vascularity. It might not work well for teeth that are more anterior, such as the central and lateral incisors, and it could not be applied as a pedicled flap to the lower jaw [9].

CONCLUSION

PBFP is easy to handle, mobilize, secure, and suture. The procedure for Miller's Class III deformities can be completed with a single horizontal incision beneath the same flap while elevated beyond the mucogingival junction. It offers excellent color and texture matching and tends to re-epithelize. In addition, it might be viewed as a unique application for root coverage of Miller's Class III defects, which could escalate the upper posterior teeth's keratinized tissue.

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AUTHORS' CONTRIBUTIONS

Conceptualization of the case report, patient management, and manuscript drafting was done by Dr. Rajesh Kumar Thakur, Dr. Jatin Chauhan, and Dr. Diksha Gupta. Literature review and manuscript editing were done by Dr. Bipin Kumar Yadav, Dr. Jatin Chauhan, and Dr. Diksha Gupta. Critical revision of the manuscript, supervision, and final endorsement of the version to be published was done by Dr. Rajesh Kumar Thakur and Dr. Bipin Kumar Yadav.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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