Regenerative Surgical Flap to Maintain Interdental Papilla around Dental Implant

Abstract

The modified surgical flap technique for placement of implant in the anterior maxilla has been described. The flap design has been used to achieve optimal soft-tissue contour for implant restoration. A modification in the surgical technique has been employed with the intention to preserve the interdental papilla, which is the key to the maintenance of hygiene and esthetics around anterior implants. This, in turn, prevents black triangles and improves soft-tissue contours. The modified surgical flap method maintains both functional and esthetic values.

Keywords: *Esthetics, gingiva, implant, preservation*

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Introduction

The current emphasis of any dental therapy is to effectively produce the right amalgamation of function with esthetics. To achieve an esthetically successful restoration, it is necessary to maintain the homeostatic balance between the hard and soft tissues of the oral cavity. One of the most challenging aspects of anterior implant surgery is the achievement of esthetic gingival architecture after implant placement.[1] This is majorly dependent on the gingival margins, contours, and size of the papillary gingiva. An ideal implant therapy should be aimed toward maintaining gingival marginal anatomy and preservation of the height of the papilla throughout the implant therapy. A lack of emphasis on this aspect may lead to papillary loss or gaps in gingival restoration junction which are also otherwise called "black triangles". Black triangles can impair the esthetic value of the restoration, and in some cases, may also cause phonetic aberrations.[2] Various techniques, surgical and nonsurgical, have been studied and suggested for overcoming such hurdles. A surgical approach that involves the papilla might contribute to a greater shrinkage and decrease in the height of interdental papilla, leading to black triangles. This has led to the development of a flap technique in which the papilla are spared instead of splitting it.[3] Probably, the first report of a conventional papilla preservation procedure was proposed by Kromer in 1956.[4] Papillae-sparing incisions described in this article are characterized by bilaterally retaining segments of papillae adjacent to an edentulous area when a flap is elevated. The following case report illustrates the technique of papilla-sparing incisions in the surgical flap for esthetic implant restoration, its advantages, and the final prognosis as determined postoperatively.

Case Report

A 22-year-old female patient reported to the Department of Prosthodontics with a chief complaint of missing tooth in the upper left front tooth region. The patient was more concerned about her esthetics. There was no relevant medical history. Previous dental history revealed that the patient underwent extraction of the maxillary left lateral incisor 1 year back. There was no mobility in the remaining natural teeth. Clinical examination with bone caliper revealed 8.5 mm width (mesiodistally) and 9 mm (labiopalatally) at an occlusal third of the alveolar bone in the maxillary left lateral incisor region [Figure 1a]. Radiographic examination showed that 17 mm of the bone height was present. Among the various treatment alternatives suggested to the patient was the conventional fixed partial denture taking support of the left central incisor and canine. Depending on

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the patient's expectation, cost consideration, and diagnostic information, the best treatment approach considered was implant placement in the maxillary left lateral incisor with a papilla-sparing technique to maintain hygiene and esthetics.

Papillae-sparing incision technique

The area of interest was anesthetized with the local anesthetic agent (Lignospan Special, 2% lidocaine with 1:80,000 epinephrine, septodont, France). A horizontal incision was made along the palatocrestal aspect of the ridge which was terminated 1 mm from the adjacent teeth. The incision was given palatally to transpose the keratinized tissue to buccal side. From the horizontal incision, two bilateral buccal vertical releasing incisions were given which extended obliquely at a diverging angle.[5] The mucosa was reflected and one root form implant (3.5mm diameter × 13mm length) was placed into the lateral incisor region of the maxillary alveolar bone [Figure 1b]. The implant achieved an insertion torque of 35Ncm. Preserved papillae contain supracrestal fibers that subsequently help in maintaining the papillary height. The vertical extent of the incision depends on the type of procedure to be accomplished. At the end of the procedure, the soft-tissue segments were sutured using vicryl (absorbable, polyglactin 910) suture. A postoperative radiograph was taken to confirm the position of the implant placement [Figure 2a]. Postoperative care instructions were given to the patient and medications were prescribed (amoxicillin 500 mg TDS, tinidazole 500 mg BD, and ibuprofen 200 mg TDS for 5 days). After a week from the surgery, the surgical site was evaluated for any infection and discharge and when it was found that the healing was appropriate, the sutures were removed. The implant was allowed to osseointegrate for 12 weeks [Figure 2]. Figure 3 demonstrates the complete implant protocol.

Discussion

The two primary parameters for determining the success of any restoration is function and esthetics. Although the functional aspect is of utmost importance, esthetic values of the restoration strongly influence the final output, and in turn, the patient's satisfaction. Often, we tend to ignore various factors that can influence the outcome of the treatment. The most crucial factor which can "make or break" the esthetic value is the interdental papillae. The gingival sculpting around an implant, if encroached, can result in nonmaintainable and unesthetic black spaces between the implant and the gingiva. These spaces are also known as "black triangles."[6]

Black triangles are a common cause of patient's misery who then tends to complain about hesitation while smiling due to the gaps. These can also lead to problems of phonetics or also cause food lodgment. Implant restorations, especially, show an increased predisposition to the incidence of black triangles around them. Various procedures have been used for manipulation of soft tissues to treat the black triangles.[7-10]

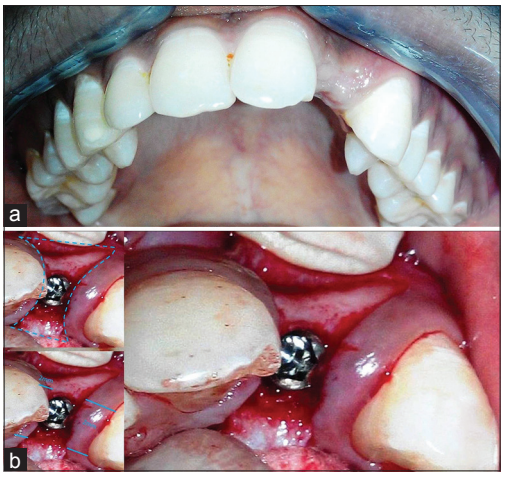

Figure 1: Preoperative (a); implant flap and osteotomy (b)

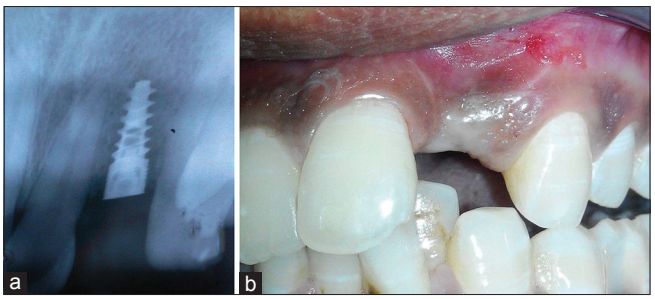

Figure 2: Postoperative radiograph (a); 1-week postoperative soft-tissue contour (b)

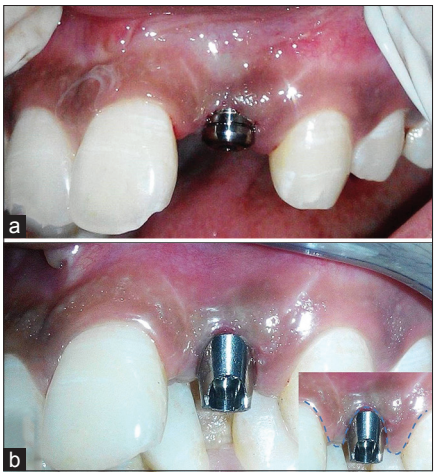

Figure 3: Gingival former (a); implant abutment with healthy papilla (b)

Prosthetic restorations have been used that are designed in a way that allows creeping of the soft tissues to eventually fill up the black triangles. Similar to this, other techniques like guided soft-tissue augmentation have also been suggested around implants.[11]

Surgical approaches for papillary reconstruction are technique sensitive and are often unpredictable. Hence,

other modifications which can be incorporated during implant placement surgery should be evaluated and implemented. In this case report, we have suggested a modification in the flap design for implant surgery, which is effective in reducing the severity of black triangles.

Conclusion

In the present case report, it has been shown that a modification in the flap technique during implant placement has resulted in the hygienic and esthetic outcomes. The flap design can be used in the anterior and posterior regions. Black triangles can be prevented or diminished using minor surgical modifications rather than major esthetic surgical procedures.

Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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