

Improvement of Soft Tissue Aesthetic for Prosthetic Replacement of Anterior Tooth using Roll Flap Technique in Combination with Platelet Rich Fibrin (PRF): A Case Report

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Abstract

Introduction: Extraction of a tooth can lead to soft and hard tissue ridge deformity. This can present as a challenge to create a good emergence profile to bring about aesthetic result especially in maxillary anterior tooth prosthetic replacement. Various soft tissue ridge augmentation procedures are described with various

degree of success rate to overcome this problem, one of which is Abram’s roll flap technique.

Aim: To provide a better aesthesis in prosthetic rehabilitation of maxillary anterior tooth over a deformed ridge.

Materials and Methods: The treatment of seibert’s class I deformed ridge in maxillary anterior teeth region was carried out by soft tissue ridge augmentation using palatal

pedicle roll flap technique in combination with platelet rich fibrin to enhance the aesthetic outcome of fixed prosthesis.

Conclusion: This technique resulted in predictable good aesthetic outcome, uneventful healing and acceptable ridge augmentation.

Keywords: Soft tissue ridge augmentation, Anterior aesthetic, Roll flap technique, PRF.

Introduction

Prolonged edentulism leads to deficiency in volume of bone and soft tissue which in turn causes localized alveolar ridge defect. This type of ridge defect is undesirable especially in the area of high aesthetic demand such as maxillary anterior teeth region. Esthetically good and desirable prosthetic outcome depends on the harmony between soft tissue and prosthesis. Therefore surgical alteration of ridge defect is necessary to achieve desirable aesthetic outcome.¹ Seibert in 1983 classified the ridge with loss of bucco-lingual dimension and normal apico-coronal dimension as Class I alveolar ridge defect which is seen in the present case with one tooth extent.^{2,3}

The type of ridge defect influences the choice of surgical intervention to be performed for re-establishing the soft tissue profile of the edentulous alveolar ridge. The extent of defect being one tooth defect requires only soft tissue ridge augmentation for esthetic enhancement.⁴ Techniques such as onlay free gingival graft, interpositional (inlay) graft, combination onlay-inlay graft, connective tissue graft, pouch graft, roll and modified roll technique have been used in past for correction of ridge defect¹.

In 1980, Abrams introduced roll flap technique for correction of mild to moderate seibert's class I defect. A de-epithelized palatal flap was dissected to develop a pedicle towards the vestibular aspect. This connective tissue pedicle was rolled below the buccal flap in the area of deformity.⁵ In 1992, Scharf and Tarnow modified this

technique by using a trap door approach. In this, the epithelium covering the connective tissue palatal graft was preserved to cover the palatal bone.⁶ Further in 1999, Barone modified this technique with intra-sulcular incision forming a full thickness envelope on buccal aspect instead of two buccal releasing incision.⁷ Gasparini in 2004, proposed an L shaped incision on the palatal aspect and harvested a double fold connective tissue pedicle graft to augment severe bucco-lingual ridge defect.⁸

Platelet rich fibrin (PRF), a second generation platelet concentrate enhances the result of surgical procedures by wound sealing, promotion of wound healing and haemostasis.^{9,10}

In the present case report, we have corrected seibert's class I ridge defect in anterior tooth region by soft tissue augmentation using modified roll flap technique in conjunction with PRF to enhance the emergence profile of the prosthetic rehabilitation.

Material and Methods

A 17 year old systemically healthy female patient reported to the department of Periodontology, Manubhai patel dental college and hospital, Vadodara-Gujarat with the chief complain of missing upper anterior tooth due to trauma few years back.

The patient was explained about all possible prosthetic rehabilitation options including implant, fixed prosthesis and removable prosthesis. She opted for fixed partial denture as a replacement option for her missing teeth. On intra-oral examination seibert's class I ridge defect was noted [Figure 1]. So, before prosthetic replacement of maxillary right central incisor soft tissue ridge augmentation procedure using "roll flap technique" was carried out on a patient to give better aesthetic appearance while smiling.

Before commencement of surgical procedure, patient was made to rinse with 0.2% chlorhexidine mouthwash. The

surgical area was anesthetized by delivering local anesthesia. Trapezoidal flap design was marked [Figure 1(C)] and incised on the palatal aspect of the surgical area [Figure 2(A)]. On the palatal aspect partial thickness incision was made using no. 15 surgical blade at the crest of the alveolar ridge defect and full thickness sulcular incisions were made one tooth mesially and one tooth distally. Now, on the palatal aspect, two vertical incisions were made to raise a partial thickness palatal flap having mesio-distal dimension of the extent of the defect and apico-coral length equal to the height of the defect [Figure 2(A)].

At the base of the palatal flap, a horizontal full thickness incision was given on the connective tissue towards the bone. The connective tissue is then released from the underlying bone with the help of a periosteal elevator towards the buccal aspect [Figure 2(B)]. The connective tissue still remains attached with buccal flap hence; it is called as a pedicle connective tissue graft.

The reflection is then continued on the buccal aspect to make an envelope flap on the buccal side. Now the pedicle connective tissue is then rolled and tucked into the envelope flap on the buccal side [Figure(C)]. On the palatal side, the partial thickness palatal flap is then replaced to its original position [Figure 2(D)].

PRF was placed on the surgical site under the epithelium on buccal and palatal aspect [Figure 2(E, F, G)]. 4-0 vicryl sutures were taken on donor and recipient site to stabilize them [Figure 2(H, I)].

Post-operative surgical instructions were given. Patient was prescribed antibiotic (Amoxicillin Trihydrate 500mg) and analgesic (Paracetamol 375mg+ Aceclofenac sodium 125mg) for 5 days post-op. 0.2% Cholorhexidine mouthwash was given to facilitate oral hygiene. Patient was recalled after 3 days and 7 days for follow up and

after 10 days for suture removal. Healing was uneventful and satisfactory [Figure 3].

Temporary prosthesis was given for 6 months [Figure 4] followed by final prosthesis construction [Figure 5]. When we compared pre-operative [Figure 6(D)] and post-operative [Figure 6(E)] soft tissue profile of ridge augmentation, we have achieved satisfactorily result throughout the year [Figure 6 (A,B,C)].

Discussion

Isolated alveolar ridge defect, seen after extraction presents as a challenge for anterior tooth rehabilitation as it compromises the functional and aesthetics of the normal oral tissue. The optimum aesthetics are compromised as the tooth to gingival relationship gets disturbed and emergence profile gets affected. This kind of defects can be corrected by two approaches: 1. Bone grafts or guided bone regeneration (Buser et al, 1996)¹¹, or 2. Soft tissue management (Abrams, 1980)⁵. When fixed partial denture is chosen for rehabilitation, acceptable aesthetic outcomes can be brought about by soft tissue correction only.¹¹

Abrams in 1980 proposed roll pedicle graft technique in which palatal pedicle flap was de-epithelized and rolled under buccal mucosa to increase the bucco-palatal dimension of edentulous ridge which led to exposure of palatal bone. The risk of graft necrosis, the need for second surgical site and pain during healing by secondary intention were inadvertent with this approach⁵. Later in 1992, Scharf and Tarnow proposed a modification to it. It involved horizontal incision closed to the alveolar ridge crest and two parallel vertical incisions on the palatal site for removal of connective tissue by trap-door approach. This led to complete closure of palatal donor site, thus reducing the chances of graft necrosis and pain. This also allows the healing by primary intention. Considering these advantages of the modification, we have decided to use this technique.⁶

We have placed PRF at surgical as well as on donor site before closure as PRF contains growth factors and accelerates tissue healing due to effective new vascularization, enhance wound closure with swift tissue remodeling and bone formation.^{9,10}

Over and above the treatment planning must include the estimation of healing period and amount of graft contraction to get a predictable prognosis. It is found that 40% of subepithelial connective tissue graft contracts in first 6 weeks. Hence, the recipient tissue should be augmented upto atleast 120-150% (Perenack et al).¹² Also, the healing period of 6-8 months is required before construction of final prosthesis (Wiskott et al).¹³ So, we followed this guideline for final prosthesis construction.

Man et al in 2013 successfully managed peri-implant soft tissue deficiency with stable result using this technique.¹⁴

A similar case series was reported by Kulkarni et al in 2017 for peri-implant soft tissue augmentation and achieved the satisfactory result.¹⁵ Treatment of mild to moderate sibert's class I ridge defect was carried out using trap-door technique (a modification of Abram's roll flap technique) by Saquib et al in 2019 which resulted in acceptable ridge augmentation, uneventful healing and good aesthetic outcome.¹

Dhruva et al in 2013 corrected seiber't class II alveolar ridge deformity in maxillary anterior smile zone using a roll flap techniqur prior to fixed prosthesis correction. It resulted in vastly improved restorative emergence profile with minimal change in height of labial gingival margin and interdental papilla.¹⁶ A case series was reported by Reddy et al in 2015 where predictable aesthetic outcome was achieved for anterior maxillary seibet's class III ridge defects using long palatal roll pedicle graft with demineralized freeze dried bone allograft plus PRF combination. Aesthetic outcome of fixed prosthetic denture was achieved with a good emergence profile.¹⁷

Conclusion

When fixed partial denture is preferred choice for prosthetic rehabilitation, soft tissue augmentation procedure gives predictable result to restore the lost volume of the alveolar ridge even in the cases of severe defects. This can achieve an excellent aesthetic result.

Soft tissue augmentation procedure often improves the quality and quantity of mucogingival tissue giving the ideal aesthetic result.

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Legends Figures

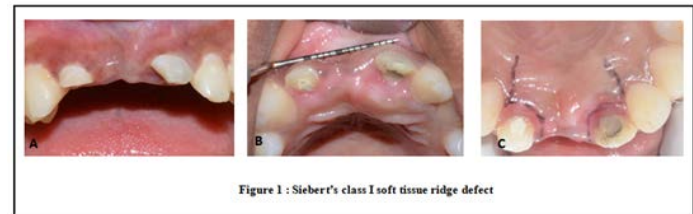


Figure 1 : Siebert's class I soft tissue ridge defect

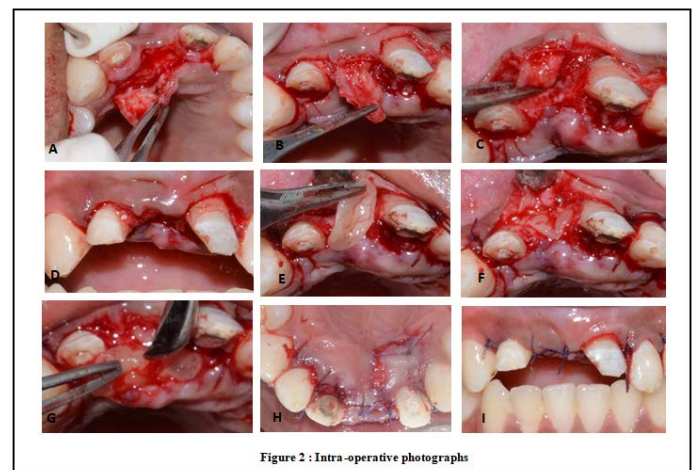


Figure 2 : Intra-operative photographs



Figure 3 : 15 days follow up



Figure 4 : Provisional Prosthesis



Figure 5 : Final Prosthesis

