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Achieving an excellent aesthetic outcome in postextraction dental implant placement in the anterior maxilla is a challenging procedure for clinicians. In fact, there is an increased risk for soft tissue recession at the facial aspect which may require supplementary connective tissue grafts to accomplish the final aesthetic result. The aim of this case report is to describe a regenerative technique using autologous plasma rich in growth factors fibrin plug for preservation of soft tissue architecture around an implant immediately placed into an extraction site in the anterior maxilla. Such a procedure allowed for guided bone regeneration without the need for vertical releasing incisions and primary healing, thus showing a pleasant gingival contour at the facial aspect after a single stage surgery. Integrating this technique into common practice could provide important benefits for the patients regarding aesthetics, without any risk of infection or transmission of diseases.

Key Words: immediate implant placement, extraction socket, aesthetics, soft tissue recession, plasma rich in growth factors (PRGF)

INTRODUCTION

The placement of dental implants into fresh extraction sockets was introduced in the late 1970s. Immediate postextraction implant placement offers both the patient and clinician a number of benefits and is, nowadays, a well-accepted protocol because of the preservation of esthetics, shorter total treatment time, maintenance of socket walls, reduced surgical time, and better actual implant placement.1

Nevertheless, after immediate single-tooth re-

placement with dental implants, the socket as well as the surrounding soft tissues may undergo extensive remodeling and resorption, particularly at the buccal side.2 The success of implant therapy in the anterior maxilla (ie, teeth 4–13) is not only based upon high survival rates but, especially, upon the esthetic aspect of the peri-implant soft tissue, which should be in harmony with the mucosa of the adjacent teeth.3 In order to avoid the regression of the bony architecture and the interproximal papil-laee, various hard and soft tissue augmentation procedures have been proposed, though they require considerable technical skillfulness, and their outcomes are sometimes unpredictable.4

In postextraction implant placement, achieving an optimal outcome in the esthetic region is a challenging procedure for clinicians. In fact, an
increased risk for soft tissue recession at the facial aspect has been frequently reported. Supplementary connective tissue grafting procedure thus may be required to accomplish the final esthetic result.

In 2004 Sclar described an alveolar ridge preservation procedure, known as “Bio-Col” technique, to preserve hard and soft tissue anatomy of the extraction socket after immediate implant insertion, and to reduce or eliminate the need for subsequent site-development procedures.

According to such procedure, (1) no vertical incision is performed; (2) anorganic bovine bone (Bio-Oss, Osteohealth, Shirley, NY) and an absorbable collagen-like material (CollaPlug, Zimmer Dental, Carlsbad, Calif) are used, respectively, to graft the mismatch between the implant surface and the surrounding socket walls, and to isolate and protect the grafted socket after implant placement; and (3) the scalloped soft tissue architecture is preserved by using interim provisional restorations.

Plasma rich in growth factors (PRGF) has been recently proposed as an aid for promoting hard and soft tissue regeneration in the field of oral surgery. The use of PRGF combined with immediate implant placement can be a valuable treatment option for the rehabilitation of fresh postextraction sockets.

The aim of this case report is to describe a modification of the technique proposed by Sclar, using PRGF technology for preservation of hard and soft tissue architecture around a postextraction implant immediately placed in the maxillary premolar region.

**CASE REPORT**

**Preparation technique for PRGF**

Ten milliliters of venous blood were extracted a few minutes before initiating the surgery. The blood was placed into sterile tubes, with 3.8% sodium citrate as anticoagulant, and centrifuged using a digital device (PRGF System, BTI Biotechnology Institute, Vitoria, Spain) at 480g for 8 minutes. The supernatant plasma was separated into 3 fractions, which differ for concentration of platelets and growth factors, by means of pipetting. Once the plasma fractions were obtained, we added 50 l of 10% calcium chloride for each milliliter of PRGF concentrate to enable the preparation of 3 different products with therapeutic potential from the same patient’s blood depending on the coagulation and activation degree of the samples: (a) a supernatant liquid formulation used to bioactivate surfaces; (b) a clot, that is the scaffold-like formulation composed of fibrillar and cellular components; and (c) a dense, whitish and hemostatic fibrin plug showing a rubbery consistency.

**Description of the technique**

The patient was a 30-year-old woman with non-contributory medical history. She was referred to the specialist surgeon (S.T.) by her restorative dentist. She presented with vague clinical symptoms exacerbated by mastication on tooth number 4 (Figure 1a). The preoperative radiograph evidenced a periodontal radiolucency at the distal aspect of the root, and a distobuccal oblong
osseous defect was detected clinically using a periodontal probe (Figure 2a).

One hour before surgery the patient started prophylaxis with 2 g of amoxicillin and clavulanic acid (Augmentin, Roche, Milan, Italy). Local anesthesia was induced with articaine chlorohydrate 4% and adrenaline 1:100 000 (Alfacaina N, Weimer Pharma, Rastat, Germany).

An exploratory full-thickness mucosal flap with no vertical incisions was raised. Once the presence of a vertical root fracture was confirmed, the tooth was carefully luxated and removed with the use of small elevators as atraumatically as possible in order to minimize the mechanical trauma to the socket bony walls.

A titanium implant (BTI Biotechnology Institute) of 4.5 mm diameter and 11.5 mm length was soaked with PRGF liquid and immediately placed in the extraction site achieving primary stability.

An alveolar site-preservation was then carried out.

A 1:1 mixture of PRGF clot and anorganic bovine bone as grafting material (Bio-Oss Spongiosa 0.25–1.0 mm small granules, Geistlich Biomaterials, Wolhusen, Switzerland) was used to fill the mismatch between the implant surface and the socket walls, which was 2.5 mm at the buccal aspect.

Then, the dense autologous fibrin plug was stretched above the fixture head and secured to the surrounding attached gingiva with an absorbable/monocryl 4-/0 suture (Ethicon Inc, Johnson & Johnson, Piscataway, NJ) (Figure 3a through c).

Anchorage sutures included 2 interrupted sutures on the papillae and 1 crossed suture with a figure 8 incorporating the PRGF fibrin plug in the center of the alveolus. The crossing of such suture was able to ensure the PRGF graft stabilization and adaptation to the underlying tissues, maintaining its position during the period of initial healing (Figure 3b and c).

The fibrin plug acted like a barrier membrane, providing protection and isolation to the grafted socket and allowing a safe and predictable secondary healing (Figure 3d and e).

Finally, a composite ovate pontic bonded to the adjacent teeth was placed to both stabilize and optimize the soft tissue architecture (Figure 4).

A standardized periapical X ray was taken at the end of the surgery.

After the surgical phase, a standard pharmacologic protocol was prescribed: nimesulide, 100 mg twice daily for pain control if needed, and 0.2% chlorhexidine digluconate mouthwash (Curasept, Curaden Healthcare srl, Milan, Italy), twice daily for 1 week for plaque control. A soft diet was recommended, avoiding contact of the surgically involved zone with food for a few days if possible.

After 4 months of healing, a surgical reentry procedure was performed. A full-thickness flap was elevated to access the marginal portion of the implant site. The cover screw was replaced with a
healing cap and, subsequently, with a permanent abutment. The implant was loaded with a final cemented restoration. The radiograph obtained at 1 year of follow-up (Figure 2b) showed a minimal vertical crest reduction.

The Figure 1b shows the final restoration 1 year after delivery. Soft tissues display a natural appearance, and a fair amount of keratinized tissue is present at the facial aspect. No complications were recorded during such time.

**DISCUSSION**

The preservation or recreation of natural alveolar ridge anatomy by guided bone regeneration (GBR) procedures is considered a reliable means for treating dehiscences and defects created during implant placement as well as a prerequisite for achieving a satisfactory esthetic outcome in implant therapy.6

In a controlled clinical trial by Zitzmann et al,10 implants were placed both in sites requiring simultaneous GBR to correct fenestrations/dehiscences and in sites not necessitating bone augmentation procedures in the same sample of patients. The survival rate of implants in the 2 groups was similar after 5 years (92% and 97%, respectively).

In a very recent systematic review, Chiapasco and Zaniboni11 evaluated the effectiveness of GBR procedures, after at least 12 months of follow-up, for correction of peri-implant dehiscence and fenestration defects. They reported that GBR is strictly recommended when the peri-implant defect is larger than 2 mm in the vertical dimension. Even though the value of GBR in improving the survival rate of implants in the presence of dehiscence-type defects is still questionable, guided tissue regeneration associated with implant placement may play a relevant role in obtaining an adequate esthetic result. As a matter of fact, Chiapasco and Zaniboni11 also concluded that esthetic complications may occur when an exposed implant surface is left uncovered, such as: (1) soft tissue recession at the buccal aspect with consequent exposure of implant threads; (2) “gray areas” on the mucosa covering the dehiscence, especially in patients with a thin periodontal biotype; and (3) a flattened aspect of the alveolar ridge in the buccal side.

Nevertheless, when implants are placed in fresh postextraction sockets, a site-preservation procedure implies vertical releasing incisions for achieving a primary closure after membrane application and, as a consequence, the loss of keratinized gingiva.

For this reason, grafting of the fresh postextraction socket followed by an “early” or “immediate-delayed” implant insertion (after a soft tissue healing period from 4 to 8 weeks) seems to be more predictable under an esthetic point of view than an “immediate” approach because it avoids subsequent site-development procedures.5,12

On the other hand, the more the implant insertion is postponed after extraction, the greater the bone reduction.2 In such a perspective, the authors propose an immediate postextraction implant technique by using PRGF and xenograft as grafting material, which allows for GBR without the need for flap elevation and primary closure, thus preserving the surrounding soft tissue contour and volume.

GBR with a barrier membrane has become a well-accepted method for treating peri-implant bone defects; nevertheless, membrane exposure and its potential colonization by bacteria have been sometimes reported resulting in inflammation and/or reduced bone fill.13 In this case the PRGF fibrin plug used as a barrier allowed isolation of the grafted socket as well as a safe secondary healing, avoiding any side effect arising from potential absorbable or nonabsorbable membrane exposure.

The use of platelet-derived growth factors in medicine is well documented: several in vitro studies, animal experiments, and clinical trials showed that platelet concentrates, such as PRGF, PRP, and PRF, may effectively trigger regeneration of soft tissues, as well as reduce inflammation and pain.14

The present technique showed a good preservation of gingival architecture at the facial aspect and a pleasant esthetic outcome after a single stage surgery. However, in some circumstances, a supplementary connective tissue graft may be useful to accomplish the final esthetic result.

The main difference between such procedure and the one previously reported by Sclar6 is that the autologous fibrin plug used in this case report, being embedded with growth factors, promotes a faster gingival epithelization than collagen materials. As a consequence, a faster secondary healing, a safer postoperative recovery after implant insertion,
and a better soft tissue management can be achieved.

The present technique is safe and more cost effective with respect to standard GBR procedures. No negative effect on soft tissues was encountered using PRGF. The epithelization was optimal and regeneration of mature bone occurred in good quantity and quality.

**CONCLUSION**

Integrating the present technique into common practice could provide important benefits for patients in terms of esthetics without any risk of infection or transmission of diseases. Of course, further studies with a higher level of evidence will be necessary to monitor soft tissue changes on a long-term basis and confirm the promising results of the present report.

**ABBREVIATIONS**

GBR: guided bone regeneration  
PRGF: plasma rich in growth factors

**REFERENCES**


