

## **Peri-Implant Soft Tissue Augmentation Using Platelet Rich Fibrin (PRF) in Esthetic Zone: A Case Report**

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### **Abstract**

Management of peri-implant soft tissue is as important as preserving the peri-implant bone level. Many techniques, approaches and materials have been used to achieve healthy, keratinized, esthetic peri-implant soft tissue or correct/augment any deficiency in it. Platelets rich fibrin (PRF) is one of those materials that can be used to achieve soft tissue augmentation especially in esthetic zone.

**Keywords:** *Soft Tissue Augmentation; Platelet Rich Fibrin; Esthetic Zone*

### **Introduction**

Osseointegration is no longer considered the only parameter upon it we can judge the success of the implant therapy. Even precise ceramic duplication of the contour, shade, and translucency of natural dentition may still result in an aesthetic failure if the gingival profile, color, and texture are compromised. Therefore, functional and aesthetic success of implant treatment in the anterior esthetic zone depends not only on the quality of the restoration, but also on the final aspect of the contour and stability of the marginal gingiva and the proximal papillae in harmony with the adjacent teeth [1].

Peri-implant soft tissue management is an important and critical concept to preserve and reduce bone loss. The peri-implant gingiva has many criteria in common with the gingiva around natural teeth [2]. Around implants, a biological constant is formed comparable to the biological width, characterized by a thick epithelial layer of 2 mm and a suprabony connective tissue layer of 1 mm. Thinning or destruction of this tissue thickness leads automatically to peri-implant bone loss. This suggests that the existence of a minimum of peri-implant mucosa thickness is pivotal for the long-term stability of the bone level [3].

As a result of that, recent research focused on soft tissue augmentation of thin gingiva prior to or at the time of implant insertion or even as a treatment for peri-implantitis. Gingiva biotype plays an important role in determining the tissue levels around implant. A thin biotype is generally more susceptible to peri-implant recession, induced by the resorption of a thin labial cortical bone plate or other factors. Significant gains of soft tissue by augmenting the gingiva with a connective soft tissue graft harvested from the palate have been investigated. Soft tissues at augmented sites were thicker than on control sites and had a better pink esthetic score. However, this technically sensitive procedure did not lead to less peri-implant bone loss and requires secondary surgical site to be obtained [4].

Another successful technique for augmentation of soft tissue by using an acellular dermal matrix membrane has been investigated. Thickening with an allogenic membrane resulted in significantly reduced initial bone loss and enhanced soft tissue healing and thickness, but it is still a sensitive technique and costly for some patients [5,6].

Another trial to influence the peri-implant soft tissue is the use of platelet-rich fibrin (PRF). This second-generation platelet concentrate described by Choukroun, *et al.* is a fibrin matrix enriched with cytokines, circulating progenitor cells, and growth factors which can

be used as a resorbable membrane in surgery. Several studies show a constant release of growth factors such as PDGF (platelet-derived growth factor) or TGF-b (transforming growth factor) for at least 1 week up to 28 days and proved its accelerating effect on the healing process. The application of PRF has been tested in various disciplines of dentistry so far [7- 9].

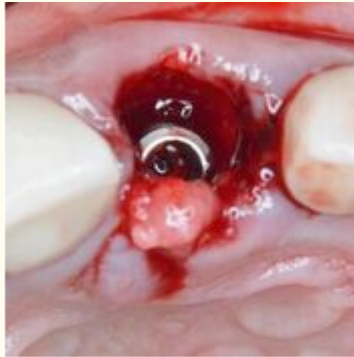
Few years ago, the use of PRF has developed extremely and has continued to demonstrate its efficiency and its potential applications in bone grafting and mucogingival procedures, including the prevention and correction of peri-implant gingival recession. It has been clinically proven that PRF enables the simple, effective, and predictable management of the gap between alveolar bone and implant. This, in turn, allows the prevention of secondary gingival recession by maintaining the future level of the biologic space [10]. However, no data of vertical soft tissue augmentation with PRF has yet been published.

Hence, the aim of this case report was to evaluate the clinical effect of using PRF through a minimally invasive approach (pouch flap approach) for peri-implant soft tissue augmentation in esthetic zone.

### Case Description

A 25-year-old female patient presented with remaining root of previously endodontically treated tooth (upper left central). She required an implant supported fixed restoration. Upon clinical and radiological examination, the case was ready to receive immediate implant placement after atraumatic extraction of the remaining root without flap “flapless technique” in order to preserve both hard and soft tissues (Figure 1). After implant placement, the peri-implant gaps were filled with PRF both labially and palatally (Figure 2-4).





Three month later, the patient presented at the clinic to complete the prosthetic steps. Upon clinical examination, there was noticeable deficiency in the labial contour (Figure 5), so soft tissue augmentation of the labial aspect was suggested. Using minimally invasive flap design “pouch design” and PRF, the labial aspect was augmented after placing the healing cap without suturing (Figure 6).





After 3 weeks of the augmentation, the tissue healing was excellent (Figure7), but we postponed the removal of the healing cap for more time “after 3 months”, to ensure the stability of the gained results, which have been gained as expected at that time, with a healthy, fully keratinized attached gingiva with improved biotype (Figure 8).



### Discussion

Soft tissue augmentation around dental implants in the anterior maxillae remains a controversial and unpredictable topic. Although success of implant therapy is similar in the anterior maxilla and other areas of the mouth, the majority of studies evaluating this therapy in the esthetic zone is lacking literature support, few in number, devoid of long-term follow-up and number of patients, and is subject to inclusion bias and thus should be addressed with caution [11].

As various growth factors are expressed during different phases of tissue healing, hence could serve as therapeutic agents to enhance both peri-implant soft and hard tissue regeneration. Platelet concentrates is one of these various growth factors and PRF is one of the recent innovation of various platelet concentrates [7,8].

PRF is a concentrated suspension of growth factors found in platelets. These concentrates contains high levels of growth factors including PDGF, TGF  $\beta$ 1,  $\beta$ 2, vascular endothelial growth factors (VEGF), platelet derived endothelial growth factors, Interleukin 1 and 2, basic fibroblast growth factor ( $\beta$ -FGF), platelet activating factor 4 (PAF-4) [12]. The cascade of reaction involves immediate binding of secreted growth factors to the transmembrane receptors present on the external surface of cell membranes in graft, flap or wound. This result in activation of an endogenous internal signal protein, which further initiate the expression of a normal gene sequence of cell such as matrix formation, cellular proliferation, osteoid production, and collagen synthesis [7,8,13] Synergistic role of these platelets derived factors in bone and soft tissue healing has been reported in literature [14,15].

Although PRF has been tested successfully in surgical procedures with reference to hard tissue augmentation (sinus lift, socket preservation) [16,17] and in the field of periodontal regeneration [18], publications of PRF usage in combination with soft tissue augmentation are rare and allow no real conclusion so far.

According to these data, PRF is a good suggestion or alternative for peri-implant soft tissue augmentation in the esthetic zone, as it is a simple procedure, a cost-effective source of growth factors and is easy to prepare. As the results showed, improvement in gingival thickness has been achieved. Furthermore, work with more patients is necessary, and the biologic qualities of PRF in soft tissue augmentation in esthetic zone must be better defined.

### Conclusion

Soft tissue augmentation with PRF using a minimally invasive pouch technique can be recommended to modify thin gingival biotypes. Future clinical studies with larger number of patients and longer period of maintenance will be necessary to evaluate whether augmentation with PRF is suitable for mucosa thickening on the long run.

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