

Advantages and limitations of Platelet-rich plasma use in oral implantology-narrative review



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Introduction

Oral rehabilitation with implants in conditions with poor bone availability limits the treatment prognosis. The platelet-rich plasma (PRP) is one of the available technical possibilities for bone and soft tissue regenerations.

Objectives

This narrative review aim to describe the advantages and limitations of using PRP in bone and soft tissues regeneration, when applied in oral implantology field.

Methods

Research conducted in *PubMed/Science Direct* of publications from 1992 to 2015 years with the keywords: "Platelet-rich plasma", "Bone regeneration", "Dental Implants", "Periodontal Regeneration", "Growth Factor", "Regenerative implantology". To 85 articles were applied the inclusion criteria: review, clinical cases, and human or animal clinical trials publications, it was selected 42 publications.

RESULTS

The PRP is a product of the laboratory processing of autologous blood (Figure 1A), collected in the preoperative period, rich in growth factors originating in the α -platelet granules

(Whitman *et al.*, 1997; Marx & Garg, 1999; Anitua, 1999; Marx *et al.*, 1998)

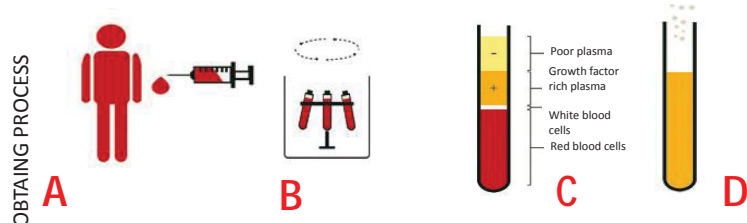


Figure 1 – Laboratory stages (A, B, C, D) to obtain the PRP.

The result of this centrifugation (Figure 1B) is a high concentration of platelets. There are many methods of obtaining PRP, each with specific features as the ability to concentrate the platelets and the release of certain growth factors process. Activation of platelet α -granules is made by calcium chloride, after obtaining PRP by centrifugation. To the PRP has greater efficiency, the optimum concentration of platelets should be around 1.000.000 μ L in 5-6mL.

(Anitua & Andia Ortiz, 2001)

Applications and Advantages

Animal and human studies (Table 1; Figure 2) have demonstrated that PRP enhances and accelerates soft tissue repair and bone regeneration;

(Garcia *et al.*, 2010)

Periodontal treatment: Treatment of infra osseous defects;

(Bharadwaj *et al.*, 2011)

Socket preservation for implant placement (Soft tissue);

(Alissa *et al.*, 2010; Albanese *et al.*, 2013)

Implant Placement: the placement of PRP on the implant surface increases bone quality around the implant;

(Anitua e Andia Ortiz, 2001)

Adjuvant in bone regeneration/treatment of peri-implantar lesions

(Harnack *et al.*, 2009; Rodrigues *et al.*, 2011)

Reducing postoperative bleeding and morbidity

(Anitua *et al.*, 2004; Albanese *et al.*, 2013)

Conclusions

The PRP promotes a faster bone and gingival regeneration; it is an autogenous product, so it does not promotes transmission of diseases and it does not show an immunological reaction.

Authors	Year	Nº patients	Treatment	Follow-up (weeks)	Results	PRP effect
Anitua <i>et al.</i>	2006	295	Implantology	8	Best implant prognosis	Strong
Anand <i>et al.</i>	2012	11	Implantology	12-24-36-48	Best quality of bone around the implant	Strong
Gentile <i>et al.</i>	2010	15	Mandibular reconstructive surgery	2-4-12-24	Patient satisfaction and lower morbidity	Strong
Daif	2012	24	Bone regeneration in mandibular fracture	1-12-24	The PRP application in fracture zone can increase the bone regeneration	Strong
Khairy <i>et al.</i>	2012	15	Sinus lift	12-24	Associated with bone substitute > Bone density	Strong
Poeschl <i>et al.</i>	2012	14	Sinus lift	28	Increase bone formation	Strong

Table 1 – Review RCT studies in tissue regeneration surgery and implants (adapted from Albanese *et al.*, 2013).

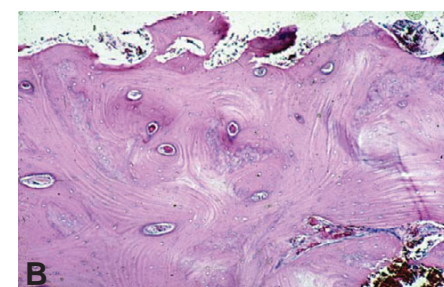
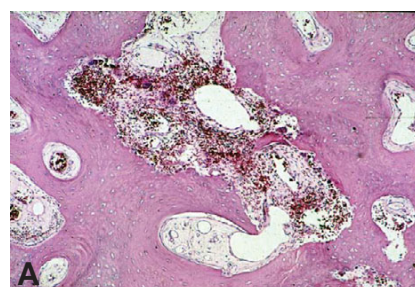


Figure 2 – A. Human bone graft histology at 4 months without platelet-rich plasma (59% trabecular bone density); B. Human bone graft histology at 4 months with platelet-rich plasma enhancement (80% trabecular bone density) (adapted from Marx, 2004).

Limitations

The isolated use of PRP has no statistically significant association in bone regeneration, only when used in combination with bone substitute;

(Albanese *et al.*, 2013)

According to Alissa *et al.* (2010), there were insufficient data to support the use of PRP to promote bone healing or to enhance the quality of life of patients following tooth extraction;

(Alissa *et al.*, 2010)

The parallel use of antiplatelet medications could theoretically limit efficacy;

(Anitua *et al.*, 2004; Albanese *et al.*, 2013)

Clinical implications

The use of PRP in bone and soft tissue regeneration in post-socket alveoli or peri-implant defects constitutes a viable treatment option in oral rehabilitation with dental implants.

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Key-words
 Platelet-rich plasma
 Bone regeneration
 Dental Implants
 Periodontal Regeneration
 Growth Factor
 Regenerative implantology

