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.

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.

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 (Witthaut et al., 1997; Marx & Garg, 1999; Armita, 1999; Marx et al., 1998).

Aplications and Advantages

Animal and human studies (Table 1; Figure 2) have demonstrated that PRP enhances and accelerates soft tissue repair and bone regeneration; (Sarti et al., 2010)

Periodontal treatment: Treatment of infra osseous defects;

Socket preservation for implant placement (Soft tissue);

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

Adjuvant in bone regeneration/treatment of peri-implantar lesions;

Reducing postoperative bleeding and morbidity

(Anitua & Ardiña Ortiz, 2001)

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/mL in 5-6mL.

The use of PRP in bone and soft tissues regeneration, when applied in oral implantology.

RESULTS

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Nº patients</th>
<th>Treatment</th>
<th>Follow-up (weeks)</th>
<th>Results</th>
<th>PRP effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anitua et al.</td>
<td>2006</td>
<td>255</td>
<td>Implantology</td>
<td>9</td>
<td>Best implant prognosis</td>
<td>Strong</td>
</tr>
<tr>
<td>Arand et al.</td>
<td>2012</td>
<td>11</td>
<td>Implantology</td>
<td>12-24-36-48</td>
<td>Best quality of bone around the implant</td>
<td>Strong</td>
</tr>
<tr>
<td>Sarlitti et al.</td>
<td>2010</td>
<td>15</td>
<td>Maxillofacial reconstructive surgery</td>
<td>2-4-12-24</td>
<td>Patient satisfaction and lower morbidity</td>
<td>Strong</td>
</tr>
<tr>
<td>Dall et al.</td>
<td>2012</td>
<td>24</td>
<td>Bone regeneration in mandibular fracture</td>
<td>1-12-24</td>
<td>The PRP application in fracture zone can increase the bone regeneration</td>
<td>Strong</td>
</tr>
<tr>
<td>Khairy et al.</td>
<td>2012</td>
<td>15</td>
<td>Sinus lift</td>
<td>10-24</td>
<td>Associated with bone substitute + Bone density</td>
<td>Strong</td>
</tr>
<tr>
<td>Peacock et al.</td>
<td>2012</td>
<td>14</td>
<td>Sinus lift</td>
<td>28</td>
<td>Increase bone formation</td>
<td>Strong</td>
</tr>
</tbody>
</table>

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

Clinical implications

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

Limitations

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

(Albinse 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 antiplattelet medications could theoretically limit efficacy;

(Alissa et al., 2010)

Conclusions

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.

Key-words

Platelet-rich plasma, Bone regeneration, Dental Implants, Periodontal Regeneration, Growth Factors, Regenerative implantology

Bibliography


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