

The use Platelet Rich Fibrin in dental implants: A literature review

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Abstract

Background: Platelet rich fibrin (PRF) is a biomaterial derived from human blood, part of a platelet concentrate obtained through a centrifuge separating it. Its use is quite common in medicine and dentistry for recovery and healing in surgeries and for tissue regeneration. The aim of the present literature review was to evaluate the use of PRF in dentistry especially in the installation of dental implants.

Material and methods: Articles published between 1997 and 2018 were evaluated in Pubmed, Scielo and Lilacs databases. were evaluated 128 articles, of these 18 evaluated the use of PRF and were used in this systematic review.

Results: The main advantages and characteristics of PRF are: the acceleration of the cicatricial process of bones and gums in dental surgeries, especially in dental implants; high potential for tissue regeneration; PRF is capable of transforming adult stem cells into specific cells for the formation of bone and gingival tissues; ability to regenerate the tissue vascularization network. Some studies point to the use of PRF as a single fill material, others still show the use of PRF in combination with other bone graft materials. PRF can also be used as a membrane for guided bone regeneration, where the strong and elastic three-dimensional architecture acts as a saturable screen that will cover and stabilize the grafted material, protecting the material and the wound itself, allowing the gingival edges to approach and, consequently, favoring their re-epithelialization.

Conclusion: We conclude that the applications of PRF are numerous, but a knowledge of biomaterial, efficiency and limitations are necessary for its use in daily practice.

Introduction

Several clinical factors may influence the aesthetic success of implant-supported prostheses, especially where the aesthetic result is very important, the main risk region being the anterior maxilla. Among the factors that depend on the dental surgeon are the positioning of the implant, the manipulation of the soft tissue and the type of prosthesis to be used. There are also factors that depend on each individual that include quantity and quality bone and soft tissues [1].

The structure of soft tissue is highly dependent on the bone structure, which will establish the shape and anatomy of the region. The loss of bone structure is the most common cause of aesthetic failure, due to the gingival structure accompanying the bone condition [2].

This loss of structure occurs mainly in dental extractions or appearance of longitudinal fractures and fistulas mainly compromising the vestibular bone structure, causing a loss of well-defined structure [3].

The clinical and imaging evaluation of the condition of the bone structure after extraction shows a loss of alveolar volume shortly after. Therefore, the aesthetic search of implants installed in the anterior maxilla region can not be easily achieved. A reduction of up to 50% of the border width in the first six months after extraction is noted and may be even greater if the vestibular wall has some involvement [4].

To try to minimize this loss after extraction, several studies have been carried out, with new proposals to control or even prevent bone loss. Crest preservation would aim to minimize reabsorption of the

buccal wall and increase bone formation within the alveolus, although in the literature there is nothing to show complete preservation of the structure. In the studies, it is possible to observe that some structural preservation techniques have been able to reduce the vertical and horizontal loss of the alveolar bone crest after extraction. The importance of preserving the structure of the bone structure is directly linked to the search for aesthetic result, and healthy structures around the implant. Several studies have shown that the vestibular wall is formed by a very thin bone and a thicker palatal wall, which may explain the constant reabsorption of the vestibular wall [5-7].

The reabsorption of the buccal wall may lead to aesthetic failure, leading to poor appearance of soft tissues [8]. Upon extraction the buccal bone thickness of the anterior region of the maxilla as well as the adjacent soft tissues has a significant response impact. The presence of a thickness <2 mm of the vestibular bone wall of the anterior maxilla, may increase the risk of fenestration, dehiscence and soft tissue recession. As a consequence, a possible aesthetic damage. Studies have evaluated

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cadaver skulls and identified that the frequency of dehiscence, however, appeared to be unrelated to bone morphology [9].

Platelet rich fibrin (PRF) is a biomaterial derived from human blood, part of a platelet concentrate obtained through a centrifuge separating. Its use is quite common in medicine and dentistry for recovery and healing in surgeries and for tissue regeneration. PRF is a byproduct of obtaining Platelet Rich Plasma (PRP). Because of the haemostatic, adhesive and healing properties of fibrin plasma, its use has resulted in thoracic, cardiovascular, neurological, ophthalmic, reconstructive and dental surgeries [10].

The main advantages and characteristics of PRF are: the acceleration of the cicatricial process of bones and gums in dental surgeries, especially in dental implants; high potential for tissue regeneration; PRF is capable of transforming adult stem cells into specific cells for the formation of bone and gingival tissues; ability to regenerate the tissue vascularization network and the need to remove bone from another part of the body for bone grafting may be possible, making the procedure more comfortable for the patient [11,12].

The objective of the present literature review was to evaluate the use of PRF in dentistry especially in the installation of dental implants.

Material and methods

Articles published between 1997 and 2018 were evaluated in Pubmed, Scielo and Lilacs databases. The keywords searched were: platelet rich fibrin in oral surgery, platelet rich fibrin in implantology, platelet rich fibrin in dentistry, platelet rich fibrin in aesthetic zone in oral implants, were evaluated 128 articles, of these 18 evaluated the use of PRF and were used in this systematic review.

Discussion

The PRF has wide applicability, from Dentistry to Medicine, with excellent results in the short term, all studies show the safety in its use for maxillofacial application. Essentially it is contacted that the PRF is more effective than the other surgical additives, because its method of manufacture is simpler, effective and with low cost of preparation. PRF is a byproduct obtained from platelet-rich plasma and was developed to enhance and accelerate the repair of autologous platelet-rich bone and soft tissues and growth factors that present an ideal immune and platelet concentrate for osteoconduction and enhance response of the patient's own cells. The clinical applications of PRF in dentistry are quite varied, as in maxillary sinus elevation in combination with bone grafts; stabilization of graft materials; preservation of the alveolus after extraction or avulsion; in the coverage of roots with recession; in the treatment of bone defects; in the treatment of endodontic and periodontal lesions; in the treatment of furcation defects; in the improvement of the healing of palatal wounds after free gingival graft [3-5,8,9].

In dentistry, especially in implantology, the use of this biomaterial has as main objective the increase of the surrounding bone tissue for implant placement, since the lack of adequate thickness, as well as the proximity of the maxillary sinuses in the maxilla, and the inferior alveolar nerve in the mandible are the most frequent problems that professionals in this area face [1,2,11]. This has led to surgical bone augmentation procedures, such as breast lift and guided bone regeneration, which work in conjunction with the implant system in order to generate sufficient bone that supports implant placement. New therapeutic forms can be developed with the addition of PRF to graft materials [13,14].

One of the major differences between PRP and PRF fibrin glues is attributable from the gelation mode. Fibrin and CPRP adhesives use a bovine thrombin and calcium chloride association to initiate the last phase of coagulation and polymerization of sudden fibrin [10].

Some studies point to the use of PRF as a single fill material, others still show the use of PRF in combination with other bone graft materials. PRF can also be used as a membrane for guided bone regeneration, where the strong and elastic three-dimensional architecture acts as a suturable screen that will cover and stabilize the grafted material, protecting the material and the wound itself, allowing the gingival edges to approach and, consequently, favoring their re-epithelialization. Thus, the acceleration of the healing process makes the surgical site less sensitive to aggression, reducing postoperative sensitivity and acting in favor of aesthetics [12].

The plasma used in this process is the patient's own, that is, reapplication at the graft site does not present a risk of infections and rejections. This is called an autologous graft. There are different shapes and materials used in bone grafting. However the choice of the best method is made by the dentist with the patient taking into account the particularities of each case. The method is simple: a blood sample is taken from the patient at the time of surgery. The blood-containing tube is placed in a centrifuge at specially controlled rotations, temperature and time. The result is the separation of blood, basically from two by-products, including PRF, which also contains large amounts of cytokines, platelets, and leukocytes. The application of PRF alone or in association with different biomaterials demonstrated the additional effect in treatment of infra-bony periodontal defects, furcation lesions, maxillary sinus floor elevation, extraction alveoli [13,14].

Platelet rich fibrin came to aggregate tissue regeneration, making healing more effective and qualified, both bone and tissue. The fact of using it to regenerate tissues can repair many damages caused by peri-implant recessions, in the maxillary sinus lift helps in rapid healing by accelerating the bone integration of the implants [15-18].

PRF membranes can be used in all patients (and may even be recommended in patients who use anticoagulants or smokers), they promote the healing of soft tissues, reducing the risk of necrosis of the flaps after surgery. This is a point in common with all fibrin-based products, particularly fibrin glues that stimulate angiogenesis and reduce the risk of necrosis. Potential applications are numerous, but a knowledge of biomaterial, efficiency and limitations are required for its use in daily practice.

Conclusions

The use of PRF in daily clinical practice shows promising results, however, research that accompanies the patient over the years is necessary for the understanding of which substances or substances are effectively beneficial to patients

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