PLATELETS-RICH FIBRIN (PRF) IN THE TREATMENT OF MULTIPLE PERIAPICAL INJURIES: CASE REPORT

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ABSTRACT

Regenerative endodontic procedures associated with apical surgery may represent an alternative for the treatment of patients whose teeth have extensive or multiple apical lesions. Leukocyte platelet-rich fibrin (L-PRF) has advantages and may promote optimal bone healing. The present case report describes a regenerative endodontic therapy using PRF in three teeth bearing chronic apical periodontitis. The treatment performed was apicectomy, retropreparation and retrofilling with MTA Repair HP, and an approach using L-PRF. The follow-up was performed after the periapical radiography, concomitant computed tomography and clinical examination that showed no symptoms, as well as radiographic evaluations that have been corrected. Finally, images of the computed tomography of the periapical lesions and reestablishment of the buccal cortical bone. The successful results in this clinical case indicate a therapy which can be used as a complement, providing an alternative treatment strategy for complex clinical cases.

KEYWORDS: Endodontics, apical surgery, PRF, chronic periodontitis

1. INTRODUCTION

Endodontic therapy aims to prevent and control periradicular infection and it is a challenge the techniques and technologies previously available to endodontists for their effectiveness[1]. Persistent microorganisms are the most important risk factor for continuity of periapical disease after completed endodontic treatment[2,3]. The need for complementary surgical endodontic therapy increases as substrates arising from cervical and / or apical percolations put the remaining microbiota present in the canal system in contact with humoral fluids that favor its proliferation. In some cases, such surgery may be necessary in more than one tooth of the same patient, often due to the presence of prosthetic restorations with intraradicular pins. The presence of bone rarefaction (chronic apical periodontitis) in multiple affected teeth is detected in a control radiograph and offers the opportunity to use techniques and technologies that favor and accelerate post-surgical bone repair[4].

The use of materials such as heterogenous grafts and platelet-rich fibrin membranes can lead to and stimulate bone repair, where the simple combination of bone grafting materials with blood improves angiogenesis and new bone formation of bone grafts, predictability in the reconstitution of these tissues[5]. The objective of this Case Report was to describe a regenerative endodontic procedure using L-PRF associated with bovine graft in apical surgery in a patient who presented three teeth with chronic apical periodontitis resulting from endodontic failure.

2. CASE REPORT

A 52-year-old female patient reported to the University of Dentistry with chronic apical periodontitis in the maxillary central right incisor, maxillary lateral right incisor and maxillary right canine. The finding of periapical pathologies was obtained in routine periapical radiographs. The teeth involved were asymptomatic and treated endodontically for more than ten years, all of which had full metal crowns free of porcelain and intracanal pins. Endodontic retreatment was proposed, however the patient did not want to lose the crowns and asked for another solution. Paraendodontic surgery, with incision above the gingival sulcus to avoid retraction, was indicated after a favourable periodontal probe. The choice of the Ochsenbein-Luebke flap or shell flap provides good access and visualization and is easy to replace. The advantage is in preserving the marginal gingiva. In addition, it is an easy flap of incising, divulsing and suturing and the patient can maintain good hygiene. It also causes minimal bleeding. The patient did not have any health problems that would indicate the established therapeutics. On radiographic examination, the three teeth presented peri-

apical radiolucent images. Cone Beam Computed Tomography (CBCT) revealed radiolucent areas at the apexes of the right and left upper right lateral canines, as well as the right upper canine, all of which had a compromised vestibular cortex. Biochemical examinations were requested (complete hemogram and coagulogram and fasting glucose) and surgery was performed.

Surgical Techniques

First of all, the patient was anesthetized with 4% articaine with 1:100 000 epinephrine (Articaine, DFL). The incision was made in order to obtain a total mucoperiosteal flap. In this case a horizontal incision was made with small curvatures in the gingiva inserted 3 or 4 mm from the gingival sulcus and complemented with a vertical incision. A horizontal incision was made from the region of the upper left lateral incisor to the second upper right premolar. The vertical incision was performed in the distal of the second right upper premolar. After the incisions, the tissue was dived and the mucoperiosteal flap was obtained from the region to be operated. After the elevation of a mucoperiosteal flap, an osteotomy with chisels was performed with round burs under copious saline irrigation, with adjusting a surgical access to the pathological fenestrations in the teeth. Curettage of the pathological tissues present in the surgical sites of these three teeth was performed. Using a high-speed Zekrya surgical drill (Maillefer-Dentsply), apical resection of roots was made for approximately 3mm from the root apex of the three teeth.

All the pathological granulation tissue was debrided from the surgical site and excessive bleeding was controlled with cotton pellets. Properly curated and clean bone stores were carpeted with small sterile gauze pads. Root-end preparations extending 3 mm into the canal space along the long axis of the root were made with P1 ultrasonic retrotips (HELSE) with power 2, driven by a piezoelectric ultrasonic unit (EMS P100), and removed shutter material from these regions.

The root ends were irrigated and then dried with sterile absorbent paper cones (# 80) to place the backflow material. Finally, mineral trioxide aggregate (MTA Repair HP, Angelus) was placed as root end filling material whose appropriate placement was verified by an operating microscope under high magnification. The MTA was handled according to the manufacturer and then condensed millimetre by millimetre with MTA capacitors appropriate to the diameter of each cavity in the 3 teeth.

Patient's blood was collected with syringes coupled to vacuum tubes, a total of 8 ml of blood per tube. These six tubes were used to produce the L-PRF using a tabletop centrifuge (Intraspin, Intra-Lock). PRF was prepared by drawing the required amount of blood into a 10 ml test tube without anticoagulant and centrifuged immediately using a table top centrifuge for 12 minutes at 2,700 rpm to produce the PRF. After centrifugation, the final product comprised of acellular platelet poor plasma at the top of the tube. The middle layer consisted of PRF and red blood corpuscles were present at the bottom of the tube (Figure 1).

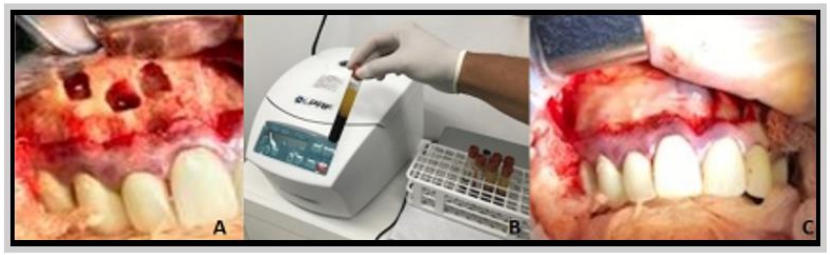

Figure 1. A) Surgical sites in the maxillary central right incisor, maxillary lateral right incisor and maxillary right canine. B) Intraspin Centrifuge and PRF with test tube with three components for post-centrifugation. C) Membrane PRF covering like bone stores.

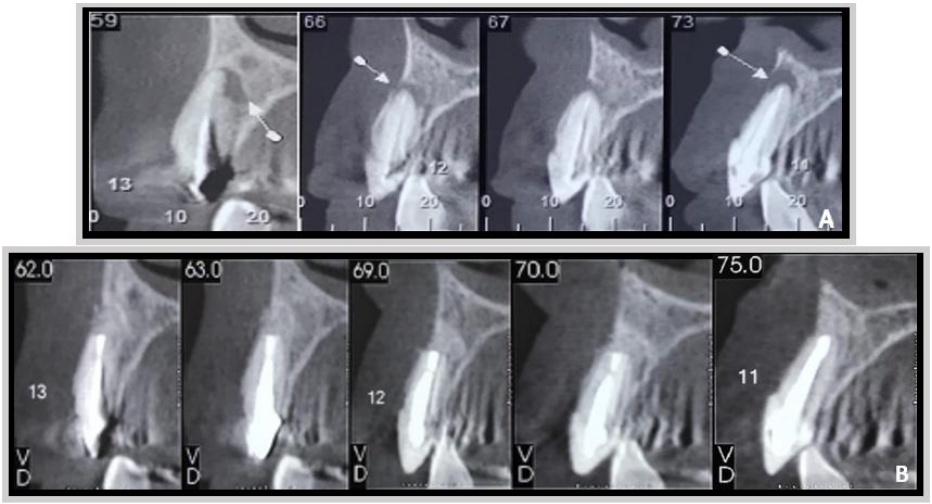

Figure 2. A) Preoperative CBCT showing periradicular bone rarefaction of maxillary central incisor (11), maxillary lateral incisor (12) and maxillary canine (13) right lesions. B) CBCT after twelve months of paraendodontic surgery, observe areas of bone repair in treated teeth

The graft used was Bio-Oss (Geistlich) lyophilized bovine bone, which was hydrated with acellular autogenous plasma obtained from the patient's blood centrifugation and properly accommodated in the three bone stores. Then, one of the membranes produced from PRF was properly accommodated over the bone stores. Afterwards, the flap was placed on the membrane.

In order to close the surgical site, 5-0 monofilament

Nylon (Ethicon) sutures were used, beginning with the union of the horizontal incision with the vertical and continuous suture.

The patient was instructed regarding the postoperative care, the sutures were removed after seven days of surgical treatment and the healing progress was checked and found to be satisfactory. The patient reported for follow-up at twelve months. The patient remained completely asymptomatic during the first twelve months post-surgery. Radiographic and control CBCT images showed repair of the periapical lesion and reestablishment of the cortical buccal bone (Figure 2).

3. DISCUSSION

The clinical situation of the cases of endodontic success in fixed denture teeth is complex, in the treatment of chronic apical periodontitis, due to some factors such as the presence of pins in the roots of these teeth and prosthetic rehabilitations.

The removal of these crowns and pins as well as the risk of perforations or root fissures also bring an additional cost to the patient. The viability of the surgical approach should be considered. The present case report describes an approach with regenerative endodontic therapy using PRF in anterior teeth in the jaw with asymptomatic apical periodontitis. Despite the benefits obtained in classic periradicular repairs after paraendodontic surgeries, the addition of PRF seems to have contributed to the regenerative process of this case. PRF contains almost all platelets and more than 50% of leukocytes from the initial blood collection, providing a strong fibrin structure and a specific distribution of 3 parts of platelets and leukocytes[6]. In addition, the beta-facilitating membranes carriers of the slow release of growth factors, such as transformation of beta growth factor; AB-platelet-derived growth factor; vascular endothelial growth factor and thrombospondin-1; release growth factors during least 7 days[7]. The formation of an angiographic study and the antibacterial properties described for PRF play, undoubtedly, a key role in the healing of soft and hard tissue[8,9,10].

On the other hand, it is important to consider that centrifuge characteristics and centrifugation protocols have a significant impact on the cells, growth factors, and fibrin architecture of PRF and thus on the regenerative potential. In this case, the PRF protocol used the only system (IntraSpin) approved by the Food and Drug Administration[11] the same used in the case reported here. Our results[11,12,13] were in agreement with the reports described by[12,13], emphasizing the importance of repair of apical surgeries.

4. CONCLUSION

Successful results have shown that this surgical protocol is a viable alternative therapy for similar clinical cases. However, future randomized controlled trials are needed to confirm the promising effects of PRF on regenerative endodontic procedures associated with apical surgery.

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