Introduction

Platelet rich plasma (PRP) is a latest approach to tissue regeneration: it is widely used in many fields like medical, including head and neck surgery, otolaryngology, cardiovascular surgery and maxillofacial surgery. It is very effective for use in regenerative endodontic therapies and is a valuable adjunct to promote healing in many procedures in dental and oral surgery[1]. There are two major concepts in regenerative endodontics: tissue regeneration and tissue engineering[2]. Tissue engineering procedure utilizes specific stem cells, scaffolds and growth factors to regenerate pulp-dentin complex[3]. Tissue regeneration procedure involves disinfection by irrigation solution, placement of triple antibiotic paste into the root canal thus eliminating micro organisms from it, and revascularization of the pulp-dentin complex; promoting proliferation of the newly formed matrix and maintaining root development[4].

PRP derives from the centrifugation of the patient’s own blood and it contains growth factors that are highly effective in promoting cell proliferation and differentiation[5]. The major effects of PRP are derived from Platelet derived growth factor (PDGF), which has been identified as an important protein for hard and soft tissue healing. PDGF has been shown to stimulate chemotaxis, mitogenesis and the replication of stem cells at the site of a wound. This results in the formation of matrix bone and angiogenesis by stimulating increased levels of vascular endothelial growth factor (VEGF). This in turn may lead to accelerate soft tissue healing due to neo-vascularization. PDGF also stimulates the production of fibronectin, a cell adhesion molecule used in cellular proliferation and migration during healing, including osteoconduction and promoting wound contraction and remodeling[6]. Other cytokines released by PRP are transforming growth factors (TGF-β1 and TGF-β2), both of which are involved in connective tissue repair and bone regeneration. Their most important role appears to be to stimulate fibroblast chemotaxis and production of collagen and fibronectin by cells while inhibiting collagen degradation by decreasing proteases and increasing protease inhibitors. In vitro and in vivo studies have also shown that TGF increases the proliferation of mesenchymal stem cells and osteoblasts, leading to bone regeneration[7].

For the preparation of PRP, blood sample from the patient is drawn into a citrated tube. The sample tube is then spun in a standard centrifuge for 10 minutes at 2400 rpm to produce PPP (Platelet Poor Plasma). The PPP is taken up into a syringe with a long cannula and an additional air-intake cannula. A second centrifugation (15 minutes at 3600 rpm) is performed to concentrate the platelets. The second supernatant is also taken up by a long cannula and an air-intake cannula. For each 8 mL of blood, the volume of supernatant is about 0.6–0.7 mL; this is the PRP, to be used for the surgical procedure. At the time of the application, the PRP is combined with an equal volume of a sterile saline solution containing 10% calcium chloride and 100 U/mL of sterile bovine thrombin; the result should be a sticky gel that will be relatively easy to apply to the surgical defects[8].

The use of PRP in the treatment of immature tooth with periapical lesion has been found to be highly successful in several case reports. In such cases PRP acts as a scaffold as well as source of growth factor, whereby there will be apexogenesis of tooth. PRP has also revealed better results in periodontal therapy as well as improve soft tissue healing and positively influence bone regen-
eration in the alveolar socket after tooth extractions. Promising results have also been obtained in implant surgery, using PRP on its own as a coating material. The combination of necrotic bone curettage and PRP application seem to be encouraging for the treatment of refractory BRONJ (bisphosphonate-related osteonecrosis of the jaw), as it has demonstrated successful outcomes with minimal invasivity\(^9\). Since it is free from potential risks to patients, not difficult to obtain and use, PRP can be employed as a valid adjunct to many procedures in oral and dental surgery. Further research studies in the use of PRP can strengthen the concept of “Biological solutions to Biological problems”

**References**