

Knowledge, attitudes, and practices on platelet-rich plasma among dental students – A survey

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ABSTRACT

Background: Platelet-rich plasma (PRP) is a part of the plasma fraction of autologous blood having concentration of platelet above baseline. The aim of the study is to assess the knowledge of dental undergraduate students regarding PRP. **Materials and Methods:** A questionnaire was given to 100 dental students comprising of questions to evaluate the knowledge about PRP. The questionnaire was administered through online survey planet link. **Results and conclusion:** The data was statistically analyzed and interpreted. Awareness may be created to dental students through seminars and workshops about the significance of platelet – rich plasma.

KEY WORDS: Platelet rich plasma, Survey planet, Wound healing

INTRODUCTION

Platelet-rich plasma (PRP) can be defined as a part of the plasma fraction of autologous blood having a concentration of platelet above baseline.^[1] Due to its ability to promote wound healing has attracted attention in several medical fields. Previously, platelets were only associated with hemostasis, but they are now known to initiate wound healing by secreting various growth factors and cytokines. By a process known as “activation,” numerous proteins are released by platelet alpha granules when they become activated, these proteins include platelet-derived growth factor (PDGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), insulin-like growth factor, epidermal growth factor, and interleukin-1.^[2,3]

PRP has been used in various surgical fields, including head and neck surgery, otolaryngology, cardiovascular surgery, and maxillofacial surgery. PRP is commonly used as a gel formulation, which is formed when PRP is mixed with thrombin and calcium chloride. PRP gel includes a high concentration of platelets and a native concentration of fibrinogen which is derived after autologous blood undergoes centrifugation.^[4,5] In recent

days, PRP has become a potent adjunct to promote healing in many dental procedures and oral surgery as well. The procedures include ablative surgical procedures, reconstruction of the mandible and surgical repair of cleft lip and palate, treatment of infrabony periodontal defects and periodontal plastic surgery, as well as procedures relating to the placement of osseointegrated implants. Handling of graft material becomes easier due to the adhesive nature of PRP; it ensures more predictable flap adaptation and hemostasis, and a more predictable seal that is the case with primary closure alone.^[6-14] The current study aims to assess the knowledge of dental undergraduate students with regard to various clinical applications of PRP.

MATERIALS AND METHODS

An online questionnaire of 10 questions was distributed to 100 dental students belonging to a private dental college. The questionnaire comprised open-ended structured questions to evaluate the knowledge about PRP. The questionnaire was administered through the survey planet app, and the results were analyzed.

RESULTS

From this study, we can see that 92% of students are aware that PRP is rich in growth factors and enzymes for rejuvenation and 8% of the students are not aware. 88% of the students were aware that PRP is extracted

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from patients own blood and 13% were not aware. 58% of the students were aware that PRP is used to treat alopecia, skin rejuvenation, as a filler and in treating ulcers and 42% were not aware. 45% of the students were PRP used in treating rotator cuff tears, ligament tear, osteoarthritis, and hamstring injuries in orthopedic medicine and 55% were not aware. Only 5% of the students were aware that PRP is used in improving pregnancy outcome in IVF by promoting endometrial growth. 25% of the students were aware that PRP can be used to treat in diabetic complications such as diabetic foot ulcer, diabetic retinopathy, and diabetic neuropathy. 89% of the students were aware that PRP is used in post-surgical wound healing in extractions and periodontal surgeries and regenerative periodontal therapies. 34% of the students have used PRP either for therapeutic, cosmetic or research purposes.

DISCUSSION

The basis of PRP treatment is the reversal of the red blood cell:platelet ratio by which red blood cells are reduced to 5% (because they play a smaller role in healing) and more importantly increasing the concentration of platelets which a powerful concoction of growth factors to 94%. A normal platelet count in a healthy individual is between 150,000 and 450,000 cells/ml of blood. Platelet concentrations of $<1000 \times 10^6/\text{ml}$ were not reliable for enhancing wound healing.^[1] It is reported that autologous PRP injections were first used in 1987 in open heart surgery.^[15] Over 20 years ago, PRP was used in the dental field for promoting accelerated wound healing in cancer patients following jaw reconstruction. PRP has been used by physicians to aid bone healing after spinal injury and soft tissue recovery following plastic surgery.^[16] The important protein of PRP which aids for hard and soft tissue healing has been identified as PDGF. It has been shown to stimulate chemotaxis, mitogenesis, and the replication of stem cells at the site of tissue injury. These sequences of events result in the formation of matrix bone and angiogenesis is also facilitated by stimulating the production of VEGF. This, in turn, may lead to accelerated soft tissue healing due to neovascularization. The production of fibronectin, a cell adhesion molecule used in cellular proliferation, is also stimulated and its migration during healing is also enhanced which, in turn, assists in promoting wound contraction and remodeling.^[17]

Other cytokines released by PRP alpha granules are TGF- β 1 and TGF- β 2, both of which are involved in connective tissue repair and bone regeneration. The most important role of these cytokines includes the ability to be able to stimulate fibroblast chemotaxis and the production of collagen and fibronectin by cells while inhibiting collagen degradation by decreasing

proteases and increasing protease inhibitors.^[18] A recent review of literature states that the usage of PRP in the alveolar socket post tooth extractions has the potential to aid soft tissue healing, but there is insufficient evidence which supports the efficacy of PRP in improving bone regeneration. Similarly, the efficiency of PRP is controversial since the use of PRP in tooth extraction sites seems to influence the early phase of bone healing, thereby facilitating, and accelerating bone formation in the initial period after tooth extraction, its influence decreasing after a few days. Ambiguous results were not obtained for the effect of PRP on post-operative pain, and also conclusive considerations in terms of efficacy and efficiency could not be formulated.^[19] Another recent systematic review states that the efficacy of PRP in periodontal therapy has revealed its the capability of improving gingival recession but not clinical attachment level in cases of chronic periodontitis.^[20]

CONCLUSION

From the above survey, we can conclude that dental students have limited knowledge about the use of PRP. This shows the need for educational intervention to enhance the knowledge through interactive learning aids, seminars, workshops, and including the medical and dental significance of PRP as a part of the curriculum.

REFERENCES

1. Marx RE. Platelet-rich plasma (PRP): What is PRP and what is not PRP? *Implant Dent* 2001;10:225-8.
2. Marx RE. Platelet-rich plasma: Evidence to support its use. *J Oral Maxillofac Surg* 2004;62:489-96.
3. Eppley BL, Pietrzak WS, Blanton M. Platelet-rich plasma: A review of biology and applications in plastic surgery. *Plast Reconstr Surg* 2006;118:147e-59e.
4. Carlson NE, Roach RB Jr. Platelet-rich plasma: Clinical applications in dentistry. *J Am Dent Assoc* 2002;133:1383-6.
5. Kao RT, Murakami S, Beirne OR. The use of biologic mediators and tissue engineering in dentistry. *Periodontol* 2000 2009;50:127-53.
6. Marx RE, Carlson ER, Eichstaedt RM, Schimmele SR, Strauss JE, Georgeff KR, *et al.* Platelet-rich plasma: Growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998;85:638-46.
7. Fennis JP, Stoelinga PJ, Jansen JA. Mandibular reconstruction: A histological and histomorphometric study on the use of autogenous scaffolds, particulate corticocancellous bone grafts and platelet rich plasma in goats. *Int J Oral Maxillofac Surg* 2004; 33:48-55.
8. Del Corso M, Vervelle A, Simonpieri A, Jimbo R, Inchingolo F, Sammartino G, *et al.* Current knowledge and perspectives for the use of platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) in oral and maxillofacial surgery Part 1: Periodontal and dentoalveolar surgery. *Curr Pharm Biotechnol* 2012;13: 1207-30.
9. Plachokova AS, Nikolidakis D, Mulder J, Jansen JA, Creugers NH. Effect of platelet-rich plasma on bone regeneration in dentistry: A systematic review. *Clin Oral Implants Res* 2008;19:539-45.
10. Bae JH, Kim YK, Myung SK. Effects of platelet-rich plasma on sinus bone graft: Meta-analysis. *J Periodontol* 2011;82:660-7.

11. Holly D, Mracna J. The use of platelet rich plasma with guided tissue regeneration in defects caused by periodontal diseases. *Bratisl Lek Listy* 2009;110:669-71.
12. Choi BH, Im CJ, Huh JY, Suh JJ, Lee SH. Effect of platelet-rich plasma on bone regeneration in autogenous bone graft. *Int J Oral Maxillofac Surg* 2004;33:56-9.
13. Arora NS, Ramanayake T, Ren YF, Romanos GE. Platelet-rich plasma in sinus augmentation procedures: A systematic literature review: Part II. *Implant Dent* 2010;19:145-57.
14. Nikolidakis D, van den Dolder J, Wolke JG, Jansen JA. Effect of platelet-rich plasma on the early bone formation around ca-p-coated and non-coated oral implants in cortical bone. *Clin Oral Implants Res* 2008;19:207-13.
15. Ferrari M, Zia S, Valbonesi M, Henriquet F, Venere G, Spagnolo S, *et al.* A new technique for hemodilution, preparation of autologous platelet-rich plasma and intraoperative blood salvage in cardiac surgery. *Int J Artif Organs* 1987;10:47-50.
16. Storrs C. Is Platelet-Rich Plasma an Effective Healing Therapy? *Scientific American*; 2009.
17. Yang D, Chen J, Jing Z, Jin D. Platelet-derived growth factor (PDGF)-AA: A self-imposed cytokine in the proliferation of human fetal osteoblasts. *Cytokine* 2000;12:1271-4.
18. Cochran DL, Wozney JM. Biological mediators for periodontal regeneration. *Periodontol* 2000 1999;19:40-58.
19. Albanese A, Licata ME, Polizzi B, Campisi G. Platelet-rich plasma (PRP) in dental and oral surgery: From the wound healing to bone regeneration. *Immun Ageing* 2013;10:23.
20. Martínez-Zapata MJ, Martí-Carvajal A, Solà I, Bolibar I, Angel Expósito J, Rodríguez L, *et al.* Efficacy and safety of the use of autologous plasma rich in platelets for tissue regeneration: A systematic review. *Transfusion* 2009;49:44-56.

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