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Guest Editorial

Periodontal regeneration: Are platelets the missing key?

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Despite conclusive evidence that some regeneration might be achieved,[1] complete regeneration has proven to be an enchanting, yet elusive, goal for many situations due in part to the complexity of the biological events, factors, and cells involved in periodontal regeneration.

For time immemorial the humankind has been fascinated by the regenerative powers of the body. Researchers have been participating worldwide in the quest to unjumble the complex mechanisms involved in repair and regeneration.

Searching for answers within

Healing or replacing injured tissues is the result of millennia of evolution that has allowed the refinement of increasingly sophisticated processes fundamental to cope with the onslaught of all the biological, physical and chemical challenges that dot our everyday life. Different sequential steps have been defined to outline such a complex process including hemostasis, inflammation, proliferation, and remodeling/maturation. Platelets are implicated in all these phases, from the early moments, where they are the most abundant cell type present, to the late steps.[2]

The Journey of Platelets- From Obscurity to Promise

The discovery of structures other than erythrocytes and leucocytes in blood by Donné in 1842 astounded his contemporaries. Julius Bizzozero was the first to name the new structures "le piastrine del sangue" – platelets.

From Matras using platelets as sealants to establish blood homeostasis during surgical procedures, to Knighton et al. describing protocols of autologous platelet-derived wound healing factors (PDWHF), the initial research was very promising. A new dimension was added by the pioneering work of Choukroun and colleagues[3] which led tointroduction of Platelet rich fibrin. Sacco's concentrated growth factors, Sohn's concept of sticky bone,[4]introduction of APRF (advanced PRF) and i-PRF[5] and Titanium prepared PRF, research has been making huge strides in improving our understanding of the potential of these wonder cells.

Clinical Applications

The literature reports numerous and diverse applications of PRF such as enhancing healing of the donor site post harvesting of free gingival graft, pulp revascularization and dentinogenesis of a necrotic tooth, alveolar socket preservation, accelerating healing of orofacial fractures, peri-implant bone regeneration, reconstruction of postsurgical osseous defects, promoting healing after ablative surgical treatment of oral mucosal lesions, treatment of TMJ articular cartilaginous defects, etc.

The use of PRF in the treatment of intrabony defects has shown significant clinical benefits on periodontal regeneration and healing. Yu-Chao et al.[5] showed that

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the use of PRF as the sole grafting material seems to be an effective modality of regenerative treatment for periodontal intrabony defects. The concept of "natural bone regeneration" was proposed by Simonpieri et al.[6] which includes regeneration of gingival tissue and bone volume through PRF membrane.

PRF can be used in sinus lift procedures, either as fragments mixed with different bone substitutes such as autogenous bone, graft, xenogeneic, allogeneic, and some artificial materials or as a sole filling material. Aroca et al.[7] demonstrated the increase in the width of keratinized gingiva with use of PRF membranes.

Conclusion

Our increasing understanding of the role of platelet in wound healing and tissue regeneration has resulted in diverse applications, both in modern medicine & Dentistry. Maxillofacial Surgery, Orthopedics, Dermatology, Regenerative Medicine, all specialties are exploring the use of the promising Platelet derivatives. In Periodontal Regeneration, the ongoing research has opened new avenues for application of these Platelet derivatives to help achieve predictable periodontal regeneration. It is time to embrace and further explore the potential of these multi-faceted cells in predictable regeneration.

Conflict of Interest

None.

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