2nd European Otolaryngology
ENT Surgery Conference
&
International Conference on
Craniofacial Surgery

Luca Barbera, J Otol Rhinol, 6:6
DOI: 10.4172/2324-8785-C1-005

SciTechnol

October 16-18, 2017 Rome, Italy

Platelet rich plasma and oral -Maxillofacial surgery. Power of synergy?

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Discussion: Platelet-rich plasma represents a new approach to provide a cocktail of biologically active molecules to the local milieu, which stimulate wound healing and tissue regeneration. The combination of platelet-rich plasma with biomaterials represents an emerging field of research that is gaining the attention of scientists. Such a combination may facilitate the preparation, handling, and administration of the conventional biomaterials but, more importantly, improve their final biologic and therapeutic properties. However, several aspects have to be clarified, such as what biomaterials can benefit the most from PRP and what is the best protocol for PRP both for production and application. Randomized controlled trials are needed to support the potential of this treatment approach and the advantages and disadvantages of PRP as an augmentation procedure to favour implant integration. Data reported in literature result sometimes in contrast, also because these studies often suggested the use of PRP both alone or in combination with autogenous bone, anorganic bone material and organic bone substitutes. The conflicting opinions reported in literature are certainly caused by a lack of agreement into study models and especially into an absence of one unique protocol universally approved and applied in order to obtain the platelet concentrate: the repeatability and predictability of results could only be achieved by strictly applying the standardized protocol. Once the degranulation process ends, platelets are no more the source of growth factor release. Macrophages, derived from circulating monocytes, intervene in their place. They are drawn back in large quantities into the graft, due to tissue hypoxia (pO_2 between 0.3 and 5 mm/Hg instead pO_2 between 35 and 40 mm/Hg in venous blood). Thanks to their fast replication, macrophages are remarkably efficient in growth factors production, being actively involved in the second stage of tissue regeneration. As the induced revascularization increases, a decrease in the oxygen pressures values is found and, consequently, with a significant reduction in macrophage action. Complete revascularization occurs on the 14th day, when bone matrix deposition by stem cells (endosteal osteoblasts) is fully detected. Up to now, the exact concentration able to optimize the aforesaid processes has not yet been detected; medical literature is only in agreement with the above-mentioned range. Higher platelet concentrations, in fact, are not able to sustain an increase in osteoblast and fibroblast proliferation. Even though it is widely stressed the necessity to continue this study on a larger cohort of patients, the Authors verified and documented the positive clinical-radiological examinations achieved by using the described protocol in all treated cases. Therefore, this paper tested, with a standardized methodology, the possibility to satisfactorily use PRP in the clinical practice with a great predictability about its success.

Conclusion: Theoretically, the potential of PRP is great. Despite completing an intensive and comprehensive literature research, there is a lack of evidence confirming any synergistic benefit of combining PRP to autograft or allograft. However, the addition of PRP to synthetic bone graft substitutes (BGS) appears to be beneficial in some instances, and could be recommended if the alternative is the synthetic BGS alone. The use of PRP alone without any additional components does not appear to benefit bone healing, and cannot be recommended. With proper use, aseptic application of autologous PRP appears to safely provide access to growth factors that may be useful for bone healing. Further studies are needed to establish whether PRP combined with a synthetic BGS has a bone healing capacity comparable to autograft.

Biography

Luca Barbera has completed his PhD at the age of 24 years from University Milan It. He performs his Pre and postgraduates fellows in Human Normal Anatomy dept (Univ. OF Milan Faculty of Medicine) Thoracic surgery Unit, Plastic Surgery Unit, Orthopedic surgery Unit, Oral Surgery Unit (Unniversity of Milan Faculty of Medicine) and, finally Maxillofacial Surgery unit (HSM Pordenone). He is Director of Luca Barbera srl Private Dental Clinic (Monza), Director of Odontostomatologic Unit H Habilita Zingonia (BG) and Sarnico (BS), Scientific Director of Multysystem Factory Dental Implant and Surgical Devices. He is attending in II Level Master in Digital Dentistry (University of Insubria It).

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