Influence of Autologus Adipose Derived Stem cells and PRP on regeneration of dehiscence-type defects in alveolar bone: A comparative histochemical and histomorphometric study in dogs

Lobna Abdelaziz,Alyaa Ragaie , Hala El- Menoufy, Laila Ahmed Rashed, Dina Sabry, Amal Hassan, Nagwa Roshdy, Hazem Atta

Abstract

Background and Objectives:
Autogenous bone grafts is considered to be the best choice for reconstructive surgery. Adipose Derived Stromal Cells (ASCs) represents a promising tool for new clinical concepts in supporting cellular therapy. The goal of our study was to investigate bone regeneration following application of autologous ASCs with or without Platelet-Rich Plasma (PRP) at dehiscence-type defects in alveolar bone in dogs.

Methods and Results:
Standardized buccal dehiscence defects (4Ǐ 3Ǐ3 mm) were surgically created in eighteen dogs, the defects were grafted with either ASCs -PRP, ASCs alone, or without grafting material. Three months later; a bone core was harvested from grafted and non grafted sites for histological, histochemical and histomorphometric assessment. There was no evidence of inflammation or adverse tissue reaction with either treatment. Defects grafted with ASCs-PRP showed a significantly higher result (pÒ 0.05), with a mean area % of spongy bone and compact bone of (64.96Ñ5.37 and 837.62Ñ24.95), compared to ASCs alone (47.65Ñ1.43 and 661.92Ñ12.65) and without grafting (33.55Ñ 1.74 and 290.85Ñ7.27) respectively. The area % of lamellated bone increased significantly reaching its highest level in group A followed by group B. Also a significant increase in area % of neutral mucopolysaccharides and calcified reactivity of Masson|s Trichrome stain in groups A and B compared to group C was obtained.

Conclusions:
Our results suggest that, the addition of PRP to ASCs enhances bone formation after 3 months and may be clinically effective in accelerating postsurgical healing in both periodontal and maxillofacial surgical applications.

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