Comparison of osteoblast and fibroblast regeneration using allograft combined with platelet rich plasma and allograft combined with mineralized plasmatic matrix on Lepus nigricollis femur

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Introduction

After an extraction, a bone defect forms in the tooth socket. While the healing process takes place, the alveolar ridge dimension eventually tends to undergo reduction process and it may challenge the treatment plan in particularly a dental implant placement. It has been suggested that alveolar ridge preservation might counteract this natural consequence of tooth extraction. A variety of regenerative surgical procedures for soft and hard tissue regeneration are available currently to maximize the function of alveolar ridge. Bone grafting using allograft with additional regenerative materials such as Platelet Rich Plasma (PRP) and Mineralized Plasmatic Matrix (MPM) has demonstrated a high degree of benefits. However, most of the evidences of these materials properties were derived from case reports and clinical results only. The significant statistical differences of them are still lack of laboratory findings. A successful result can be achieved by understanding the benefits of surgical regenerative procedure of alveolar ridge preservation.

Objectives

The study objective aims to count the increase number of osteoblast and fibroblast in 7 and 14 days after allograft surgical application with additional PRP and MPM, and to evaluate the significant differences of the regenerative capacity and efficacy between those materials.

Methods

Two circular drill-holes were created in the femurs of twelve Lepus nigricollis rabbits. Each hole being treated with allograft combined with PRP and allograft combined with MPM. Six rabbits were sacrificed 7 days postoperatively and assessed by histology and micro-CT. The six others were evaluated after 14 days. The results were analyzed by using the paired Student t-test.

Results

A significant increase in number of osteoblast and fibroblast 14 days postoperatively was showed in both groups. However, there were no significant statistical differences of osteoblast and fibroblast expressions between allograft combined with PRP and allograft combined with MPM groups 7 and 14 days postoperatively.

Conclusion

A significant regenerative result was demonstrated following an application of allograft combined
with PRP and MPM 7 and 14 days after the surgical procedure in the rabbit femur along with the increase in number of osteoblast and fibroblast.