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The short-term effects of various xenografts on bone healing in rats cranial defects

EXPERIMENTAL STUDIES

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ABSTRACT

Although autogenous bone grafts are considered the gold standard in bone regeneration, their resorption and the donor site morbidity led the research to identify in allografts, xenografts and synthetics a viable alternative method. Currently, more investigations are being carried out to find the ideal material to support the bone repair or regeneration in bone defects and, thanks to their physico-chemical properties similar to those of the human bone, xenografts from animal origin show great osteoconductive characteristics and can be used as scaffolds for the ingrowth of osteoblasts, with minimal risks of contamination from infectious diseases. In the present investigation, the Authors aimed to assess the short-term effects of OsteoBiol® *Gen-Os*® (Tecnoss®, Giaveno, Italy) in particular form and OsteoBiol® *Gel 40* (Tecnoss®) in gel xenografts on bone healing in experimentally created parietal bone defects in rats. Twelve Wistar albino rats were used. The rats were randomly divided into two groups, and the defects (n=24) were treated with an application of OsteoBiol® *Gen-Os*® (Group 1) and OsteoBiol® *Gel 40* (Group 2), and symmetrical defects left empty as controls. After the application of the grafts, the periosteum and soft tissues were repositioned and sutured. After 40 days, the rats were sacrificed for the histological evaluation. In Group 1, lamellar bone and faddly bone marrow tissue were present and new bone formation was detected in the defect area. The graft particles were present in almost all the defects, encapsulated with a fibrous tissue layer. The inflammation rate was minimal. In Group 2, new bone formation was found at the defect border, with presence of connective tissue. More resorption of the gel graft existed, and inflammation was observed. In the Control group, Minimal bone building was detected at the defect border. Around the newly formed bone trabeculae, there were osteoblastic arrangements. Moreover, a minimal inflammation and chronic inflammatory cells in the inflamed area were found.

CONCLUSIONS

The results showed that there was more bone building in the test groups when compared to the controls ($p<0.05$). Besides, no difference was seen between the two test groups ($p>0.05$). A significant difference was also found among the three groups regarding the inflammation scores ($p<0.05$). Therefore, the Authors concluded that *"within the limits of the short-term study, it can be concluded that the bio-materials used in the present study are both osteoconductive, and a greater bone building was observed in the Gel 40 group. However, further detailed studies are needed to prove their effects on bone regeneration and clinical suitability"*.

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