

SERUM BIOCHEMICAL CHANGES OF BONE REMODELING FOLLOWING RESIDRONATE-BIOGLASS SCAFFOLDS FOR THE RECONSTRUCTION OF EXPERIMENTALLY INDUCED MANDIBULAR DEFECTS IN DOG MODEL

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Abstract

Background: Bone tissue engineering has gained significant attention to restoring bone defects by using biodegradable scaffolds. Purpose: This study aimed to evaluate serum biochemical changes of bone remodeling following the use of hybrid scaffolds to reconstruct experimentally induced critical-sized mandibular defects in dogs. Methods: Hybrid scaffolds of chitosan:polyvinyl alcohol named, (CH) alone (no BG) and with bio-glass (BG) graft combined without/with anti-osteoporotic drug (Risedronate M) to form non-medicated and medicated (NM and M) forms were used. A critical size mandibular defect was created into the right mandible of twenty skeletally mature mongrel dogs. These dogs were divided into four equal groups: the 1st group; control (CH) (NM), the 2nd group; CH(M), the 3rd group; CH.BG (NM) and the last group, CH.BG (M). Clinical, radiographic, serum biochemical evaluation (alkaline phosphatase, calcium, phosphorus, calcitonin and osteocalcin) was evaluated at week interval till 12 weeks. Results: A non-significant decrease was found in the activity of osteocalcin in serum for (CH.BG) (M) group when compared to control group CH (NM). There is a highly noteworthy increase in serum calcium, alkaline phosphatase, calcitonin, and phosphorus levels in the (CH.BG) (M) group when compared to the control group CH (NM). Conclusion: Serum biochemical markers of bone healing provided a clinically useful tool to monitor early changes associated with bone healing before radiographic signs of bone healing become obvious. The addition of BG with risedronate drug M improved the degree of bone healing as presented.

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