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The Impact of Natural Calcium Carbonate and Ubiquinone on Bone Mineral Density in Rabbits

ABSTRACT

This study investigates the effect of Ubiquinone and/or calcium carbonate (CaCO_3) on bone mineral density (BMD) in rabbits at the healing site in mandibular bone postoperatively. Sixty healthy white male New Zealand rabbits (almost the same age [5-6 months], weight [2.0 ± 0.25 kg] and circumstance) were used in this study. The heavy-duty dental engine drilled a mandibular groove of 2mm diameter and 6mm length in all animals. Post-surgery, the rabbits were randomly divided into six groups (10 each) according to the treatment. According to the evaluation period, each group was further subdivided into two subgroups (5 rabbits each); 15 and 30 days. The groups included; control group (the groove was not filled by anything) and treated groups which included five groups as follows: group I (in which the groove was filled with Ubiquinone), group II (groove was filled with CaCO_3), group III (groove was filled with CaCO_3 : Ubiquinone as a ratio [1:1]), group IV (groove was filled with CaCO_3 : Ubiquinone as a ratio [1:2]) and group V (groove was filled with CaCO_3 : Ubiquinone as a ratio [2:1]). The BMD was measured using Densitometry after 15 and 30 days. Statistical analysis showed significant differences at $p \leq 0.05$ in bone mineral density (BMD) between the control group (92 ± 0.15) and all other treated groups except group III (125 ± 3.54) and group IV (126 ± 5.13) showed no significant differences at follow-up times at 15 days. Also, in the present study, we found there is a significant difference in bone mineral density among the control group (109 ± 1.25), group I (144 ± 3.45), group II (153 ± 6.24) and group V (182 ± 12.56) groups respectively. ANOVA test showed no significant difference in group III (160 ± 8.94) and group IV (165 ± 9.11) at follow-up times at 30 days. Adding the Ubiquinone and/or CaCO_3 showed a significant increase in BMD manifested by bone healing like space-filling, newly formed bone trabeculae and a high number of lacunas compared with the control group. It can be concluded that, the Addition of Ubiquinone and/or CaCO_3 to the mandibular fracture has a favourable effect on BMD and enhance bone healing in rabbits.