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Effect of Demineralized Bone Matrix on Resorption of Autogenous Cortical Bone Graft in Rats

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Abstract: The purpose of this study was to evaluate the effect of demineralized bone matrix (DBM) on autogenous cortical bone resorption in rats. Fifty-six male Wistar rats were used and divided into the baseline group (n = 8), the experimental group (n = 24) and the control group (n = 24). The experimental and contol groups were subdivided into three groups. Each subgroup was followed-up for 2, 4, and 12 weeks respectively. Initially, overnight fasting urine and blood samples were collected from the baseline group to obtain biochemical parameters in healthy rats. In the experimental group, bone defects 3 mm in diameter and 2 mm in depth were created in the right femur. Autogenous cortical bone graft 3 mm in diameter and 2 mm in depth was harvested with a standard trephine bur from the right femur 5 mm from the defect site. Bovine derived DBM gel was applied locally on the bone defect. Following this procedure, the graft was placed in the bone defect and stabilized by perifemoral wiring. In the control group, the same procedures were applied but the bone graft was placed without DBM. Serum calcium, phosphate, PTH and 25 dihydroxyvitamin D levels and urine pyridinoline, deoxypyridinoline, calcium and creatinine levels were measured during the study. Urinary deoxypyridinoline and pyridinoline levels, which are the markers of bone resorption were significantly lower in the experimental group than in the control group at 2, 4, and 12 weeks. Significant reduction in the number of osteoclasts and resorptive lacunae revealed the pronounced suppression of the graft resorption in the experimental group. The results of this study revealed that DBM is effective in decreasing the resorption of autogenous cortical bone graft.

Key Words: Demineralized bone matrix, autogenous graft, bone resorption

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