

## Evaluation of Compressive Mechanical Properties of the Radial Bone Defect Treated with Selected Bone Graft Substitute Materials in Rabbit

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**Abstract :** Objective: To determine the effect of selected bone graft on the compression properties of radial bone in rabbit. Design-Experimental in vivo study. Animals: A total of 45 adult male New Zealand white rabbits. Procedures: The rabbits were anesthetized and a one-cm-full thickness piece of radial bone was removed using oscillating saw in the all rabbit. The rabbits were divided into 5 groups on the basis of the material used to fill the bone defect: group 1: the paste of bone cement calcium phosphate; group II: the paste of calcium phosphate mixture with type I collagen; group III: tricalcium phosphate mixed with hydroxyapatite (TCP & HP) with 5% porosity; group IV: the same scaffold as group III with 10% porosity; and group V: the same scaffold as group III and IV with 20% porosity, with 9 rabbits in each group. Subsequently subdivided into 3 subgroups of 3 rabbits each. Results: There was a significant increase in compression properties of radial bone in the group II and V in 2nd and 3rd months as compared with groups I, III and IV. The mean endurable crack-strength in group II and V were slightly higher than that of normal radius ( $P < 0.05$ ). Conclusion and clinical relevance: Application of calcium phosphate paste with type I collagen and scaffold of tricalcium phosphate with hydroxyapatite having 20% porosity indicated to have positive effect in integral formation of qualitative callus at the site of fracture and early re-organization of callus to regain mechanical strength too.

**Keywords :** calcium phosphate, tricalcium phosphate, hydroxyapatite, radial bone, compressive properties, porosity, type I collagen, rabbit

**Conference Title :** ICPSE 2014 : International Conference on Pharmaceutical Science and Engineering

**Conference Location :** Amsterdam, Netherlands

**Conference Dates :** August 07-08, 2014