

**Efficacy of nano-hydroxyapatite prepared by an aqueous solution combustion technique in healing bone defects of goat (Published in Journal of Veterinary Science (2008), 9(2), 183-191**

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**Synopsis** - The present study was undertaken to evaluate porous hydroxyapatite (HAp), the powder of which was prepared by novel aqueous solution combustion technique, as a bone substitute in healing bone defects *in vivo*, as assessed by radiologic and histopathologic methods, oxytetracycline labeling, and angiogenic features in Bengal goat. Bone defects were created in the diaphysis of the radius and either not filled (group I) or filled with a HAp strut (group II). The radiologic study in group II showed the presence of unabsorbed implants which acted as a scaffold for new bone growth across the defect, and the quality of healing of the bone defect was almost indistinguishable from the control group, in which the defect was more or less similar, although the newly formed bony tissue was more organized when HAp was used. Histologic methods showed complete normal ossification with development of Haversian canals and well-defined osteoblasts at the periphery in group II, whereas the control group had moderate fibro-collagenization and an adequate amount of marrow material, fat cells, and blood vessels. An oxytetracycline labeling study showed moderate activity of new bone formation with crossing-over of new bone trabeculae along with the presence of resorption cavities in group II, whereas in the control group, the process of new bone formation was active from both ends and the defect site appeared as a homogenous non-fluorescent area. Angiograms of the animals in the control group showed uniform angiogenesis in the defect site with establishment of trans-transplant angiogenesis, whereas in group II there was complete trans-transplant shunting of blood vessel communication. Porous HAp ceramic prepared by an aqueous combustion technique promoted bone formation over the defect, confirming their biologic osteoconductive property.

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