

# **Osteoinductive Potential And Bone Healing Capacity Of Nanocrystalline Hydroxyapatite (nHA) Versus Biodentine Of Surgically Created Defects In Rabbits' Alveolar Process (An Animal Study)**

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## **Abstract**

**Background:** Bone defects resulting from trauma, tumor resection, infection, and congenital or acquired deformities remains an important clinical problem. Synthetic nano-crystalline hydroxyapatite, Nano bone, was successfully used in healing of bone defects without revealing negative side effects. Biodentine; a calcium-silicate based material was reported to have osteogenic and angiogenic properties.

**Objectives:** This study aims to investigate the initial osteoinductive potential of Nano Bone and Biodentine on surgically created defects in rabbits' alveolar process.

**Methods:** 30 adult male rabbits (1-1.5kg) were used in this study. Bilateral bone defects were created in the mandibles of all rabbits, one in each side; the right sides were experimental, and the lefts were kept empty as control. Animals were then divided into two groups (15 rabbits each); Group I (Biodentine): The right-side defects were loaded with Biodentine material. Group II (Nano Bone): Nano Bone was packed in the right-side defects. Five rabbits were euthanized from each group at; 3, 7 and 14 days postoperatively. Bone defects' specimens were prepared for histological examination by light microscope as well as quantitative analysis of gene expression of collagen1 alpha and Runx-2 by real time PCR.

**Results:** Biodentine had initiated osteogenesis; yet the newly formed bone was apparently of lesser quality than that formed with Nano Bone. Runx- 2 showed significant increase in Nano Bone compared to Biodentine at 1 week, while collagen1 alpha gene expression was significantly increased at all intervals.

**Conclusion:** Both Nano Bone and Biodentine had initiated osteogenesis. Nano bone showed better healing results when compared to Biodentine.

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