

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

Mona Fathy ,Heba Mohammad Hakam, Rehab Ali Abdel Moneim

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.

The Egyptian Journal of Histology 2020, September