

Reconstruction of bone defects using bio-active glass materials. Egyptian Dental Journal, 48 (4): 2259-2268, October, 2002.

Abstract:

Unmodified porous bioactive glass is one of the synthetic graft materials newly introduced in medical practice. It has the ability to bond to bone tissues and enhance bone growth by its osteoconductive property. Recently, modified calcium phosphate bioactive glass was introduced; it is formed by precipitation of a calcium phosphate layer on its surface. It has greater osteoblastic activity than the unmodified bioactive glass. **Aim:** The aim of this study was to evaluate and compare the osteogenic potential of unmodified and modified bioactive glass during healing following creation of a bone defect versus normal healing. **Method:** Twenty-four white rabbits, weighting 3-4 kg each were categorized into two equal groups, Group I and Group II in which modified and unmodified bioactive glass particles were packed in bone defects created on the right side respectively while the other side acted as control with surgical debridement only. The bone defects were evaluated macroscopically, as well as on dental films using direct digital radiographic examination using Digora system; and by histopathologic examination using H.&E. stain. **Results:** It was found that there was a statistically significant increase in the mean percent change in density measurement in the engrafted sides (modified and unmodified bioactive materials) when compared to control-ungrafted defects throughout the follow-up period (4 and 6 weeks). The increase in density inside grafted defects was the result of new bone formation. Also, there was found an increase of mean percent change in density inside defects filled with modified bio-active glass than those in defects filled with unmodified bio-active glass particles. However, the difference was not statistically significant. The histological results indicated great osteoblastic activity around modified bioactive glass particle surfaces in comparison to unmodified bioactive glass particle surfaces as well as controls. **Conclusion:** both bio-active glass and modified bio-active glass can be used to advantage to fill large bone cavities to enhance and speed up the healing process following bone surgery.