

Assessment of bone augmentation using silica calcium phosphate nano-composite (SCPC) versus hydroxyapatite in open sinus lift Surgeries (A Scanning Electron Microscope, Cone Beam Computerized Tomography and histological study)

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Abstract

Objectives:Maxillary sinus pneumatization and extraction of posterior maxillary teeth are among the most common factors attributing to the diminished alveolar process. Implants placed in posterior region of maxilla showed the highest failure rates due to poor bone density in addition to insufficient remaining bone volume needed for implant primary stability.**Materials and methods:**Ten patients were selected from out patient clinic with partially or fully edentulous maxilla missing premolars or molars with residual alveolar bone height less than 6 mm, both groups received open sinus lift surgery with different grafting material group 1 (control group) received hydroxyapatite (HA)in a disc form, group 2(Study group) received silica calcium phosphate nano-composite (SCPC) in a disc form. Clinical evaluation, Cone Beam Computerized Tomography (CBCT) (Pre-operative, 0 & 4 months post-operatively),Scanning Electron Microscopy (SEM) (4 months post-operatively) and histological study (4 months post-operatively)were performed for both groups as follow-up following either stages of surgery.**Results:**all patients had uneventful wound healing, and none experienced excessive post surgical edema.Following surgical stage II (implant placement) all patients exhibited proper dental implant osseointegration,and all were properly restored by fixed prosthodontics. For radio graphical results the bone height and bone width showed statistically significant increase in both groups; The histopathological results of both groups revealed new bone formation in the histological sections attained from the core bone biopsies over 4 months post operatively. While the analysis of the SEM images revealed that in the control group (HA), the new bone exhibited an irregular and porous appearance In the study group (SCPC), the bone appeared as a continuous plate with nearly homogenous surface.**Conclusion:**within the limitations of the present study, the present data support the fact that both HA and SCPC can be used, successfully, in sinus augmentation procedures. Moreover, the suggested technique in combination with grafts in the form of discs, and using piezoelectric surgical units are simpler and safer approaches to lateral sinus lift augmentation procedures.

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