

LONG TERM EVALUATION OF SILICA-CALCIUM PHOSPHATE COMPOSITE (SCPC) BONE GRAFT IN HUMAN SOCKET AUGMENTATION AND SINUS LIFTING

Ryan Estes¹, Mohanad Alsabagh¹, Larry Cunningham², Robert Horwitz³, Robee Baily⁴, Heather Gentry⁵, Ahmed El-Ghannam⁶, Shaimaa AbuelSadat⁷, Doaa Khattab⁸, Ham Benuzzi⁹, and Michele Tucci⁹

¹Department of Periodontology, University of Kentucky, USA, ²Oral and maxillofacial surgery Department, School of Dental Medicine University of Pittsburgh, Pittsburgh, Pennsylvania, ³Oral Surgery, Periodontology and Implant Dentistry, The NYU College of Dentistry, New York, NY, 10010 USA, ⁴Orthodontist Clinic, Concord, NC 28027, ⁵Gentry Dental, Charlotte NC, ⁶Biomaterials and Tissue engineering Laboratory, Department of Mechanical Engineering and Engineering Science, UNC Charlotte, NC 28233, ⁷Department of Oral Radiology and ⁸Department of Periodontology, Oral Medicine and Diagnosis Faculty of Dentistry, Ain Shams University, ⁹University of Mississippi Medical Center, Jackson State University, Jackson, MS 39216.USA

Corresponding author: Ahmed El-Ghannam <arelgha@shfabone.com>

ABSTRACT

INTRODUCTION. There is a need for a new graft design that takes into consideration all measures related to the elements of the chemical composition that promote osteoblast differentiation, bone formation and vascularization. The aim of the present study is to evaluate clinically, radiographically and histologically the effect of SCPC granules on new bone formation and implant placement following socket grafting and open sinus augmentation.

EXPERIMENTAL. A total of 154 extraction socket cases were grafted with SCPC including diabetic and healthy patients and 22 patients underwent open sinus lift procedures using SCPC granules to elevate the floor of the sinus prior to dental implant placement in a staged approach. Five months postoperative a biopsy was retrieved during implant placement for histology analyses. Radiographic changes in bone width and height was carried out by cone beam CT.

RESULTS AND DISCUSSION. For all cases new bone formation facilitated successful implant placement. Histologic analysis showed new mature bone formation through the entire cross section of the grafted sockets as supported by the presence of osteocytes, haversian system, blood vessels, mineralized collagen type I and the synthesis of Osteopontin. Quantitatively, histomorphometry showed $41.3 \pm 12\%$ new bone, $20.1 \pm 14\%$ granulation tissue and $5.3 \pm 4\%$ residual SCPC granules in the SCPC grafted sockets.

CONCLUSIONS. Clinical, radiographic and histology analyses confirmed bone regeneration and graft material resorption in extraction sockets grafted as well as sinus augmentation with SCPC resorbable bioactive granules. Long term (2 years) follow up showed the stability of the dental implants in the newly formed bone in both sinus and socket augmentation.

Keywords: Bone graft resorption, Shefabone® SCPC granules, dental implant, socket preservation, sinus lifting

INTRODUCTION

Alveolar ridge resorption following teeth extraction leads to a 50% loss in bone width over a year period which corresponds to 5 -7 mm mainly from the buccal rather than palatal\lingual aspects. Moreover,