A new biphasic osteoinductive calcium composite material with a negative Zeta potential for bone augmentation.

The aim of the present study was to analyze the osteogenic potential of a biphasic calcium composite material (BCC) with a negative surface charge for maxillary sinus floor augmentation. In a 61 year old patient, the BCC material was used in a bilateral sinus floor augmentation procedure. Six months postoperative, a bone sample was taken from the augmented regions before two titanium implants were inserted at each side. We analyzed bone neoformation by histology, bone density by computed tomography, and measured the activity of voltage-activated calcium currents of osteoblasts and surface charge effects. Control orthopantomograms were carried out five months after implant insertion. The BCC was biocompatible and replaced by new mineralized bone after being resorbed completely. The material demonstrated a negative surface charge (negative Zeta potential) which was found to be favorable for bone regeneration and osseointegration of dental implants.