

Mechanism of Bone Reconstruction in Diabetic Patients Grafted with SCPC Bioactive Ceramic

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Oral rehabilitation of diabetic patients is challenged by impaired bone formation in extraction sockets and reduction in alveolar ridge height. We used silica-calcium phosphate (SCPC) granules to enhance bone regeneration in extraction sockets in type 2 diabetic patients. Thirty male patients were divided into 3 groups: (A, n=10) diabetic patients grafted with SCPC granules, (B, n=10) diabetic patients without graft and (C, n = 10) non diabetic patients grafted with SCPC. SCPC was well tolerated in all patients as indicated by normal color and texture of the covering mucosa and absences of infection, allergic reaction, or ulceration. Direct digital radiography system showed a significant increase in bone density from 2-6 months postoperatively in SCPC grafted groups compared to control ungrafted one. Statistical analysis showed comparable bone density in sockets grafted with SCPC in groups A and C indicating the strong stimulatory effect of SCPC on new bone formation in diabetic patients. Cell culture studies demonstrated the cell mediated mineralization of extracellular matrix produced by bone marrow stem cells on SCPC surface. The capacity of SCPC to correct the abnormal bone and mineral metabolism in diabetic patient is attributed to the stimulatory effect of SCPC on stem cell differentiation.