

The Effects of Separating Inferior Alveolar Neurovascular Bundles on Osteogenesis of Tissue-Engineered Bone and Vascularization

Authors : Lin Feng, E. Lingling, Hongchen Liu

Abstract : In order to evaluate the effects of autologous blood vessels and nerves on vascularization. A dog model of tissue-engineered bone vascularization was established by constructing inferior alveolar neurovascular bundles through the mandibular canal. Sixteen 12-month-old healthy beagles were randomly divided into two groups (n=8). Group A retained inferior alveolar neurovascular bundles, and Group B retained inferior alveolar nerves. Bone marrow mesenchymal stem cells were injected into β -tricalcium phosphate to prepare internal tissue-engineered bone scaffold. A personalized titanium mesh was then prepared by rapid prototyping and fixed by external titanium scaffold. Two dogs in each group were sacrificed on the 30th, 45th, 60th, and 90th postoperative days respectively. The bone was visually examined, scanned by CT, and subjected to HE staining, immunohistochemical staining, vascular casting and PCR to detect the changes in osteogenesis and vascularization. The two groups had similar outcomes in regard to osteogenesis and vascularization ($P>0.05$) both showed remarkable regenerative capacities. The model of tissue-engineered bone vascularization is potentially applicable in clinical practice to allow satisfactory osteogenesis and vascularization.

Keywords : inferior alveolar neurovascular bundle, osteogenesis, tissue-engineered bone, vascularization

Conference Title : ICS 2015 : International Conference on Stomatology

Conference Location : London, United Kingdom

Conference Dates : February 16-17, 2015