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Reinhard Gruber received his Dr. nat. techn. from the University of Natural Resources and Life Sciences in Vienna. After a post-doctoral appointment in Rheumatology, he joined the Department of Oral Surgery at the Medical University of Vienna in 1999. He was vice director of the curriculum dentistry and coordinator of the Doctoral Program "Bone and Joint Regeneration". As a visiting scientist, he was at the Bone Tissue Engineering Center at Carnegie Mellon University in Pittsburgh and at the University of Michigan's Dental School. From 2012 to 2015, Reinhard Gruber was head of the Laboratory of Oral Cell Biology at the School of Dental Medicine, University of Bern where he still holds an affiliation. In October 2014, he became Full Professor for Oral Biology at the Medical University of Vienna. He is Associate Editor of IJOMI and BMC Oral Health, and in four editorial boards including JDR, COIR, and Tissue Engineering. He is in the board of the Osteology Foundation and the German Society of Osteology. His laboratory uses fundamental cell biology, preclinical models and clinical trials for the development of causal therapeutic strategies in regenerative dentistry. One focus is on bone regeneration with respect to osseointegration of dental implants and graft consolidation.

Osseointegration and graft consolidation: the biological principles

Bone, a biomaterial with an inherent regenerative capacity being programmed to permanent remodeling, is not only a rigid and solid base for the stable anchoring of implants - it is the biological fundament of dental implantology. The early phase of osseointegration and augmentation requires bone regeneration. The later phase depends on bone remodeling and modeling. Consequently, the clinical success of dental implantology requires the coordinated action of bone-forming osteoblasts and bone-resorbing osteoclasts, and recently known, their coordination by the osteocytes. The lecture provides an insight into the molecular and cellular mechanisms of bone regeneration and remodeling in the context of dental implantology.