Bone formation using autologous biomaterials combined with synthetic bone substitutes: Practical tools for successful implantation

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Replacing missing bone or adding mass to existing bone is often essential to the success of a dental implant. An implant needs a critical mass of bone surrounding it in order to bind to it and deliver sufficient strength and stability. If in the location where the implants are intended there is low mass of bone (width or height) a bone graft must be applied in order to maintain this critical bone mass. A large variety of graft materials have been used for maxillary and mandibular atrophy. Autologous biomaterials enriched with progenitor/stem cells and growth factors can be produced from components of bone marrow, peripheral blood, adipose tissue, cancellous bone, and represent a very interesting research field for dental bone regeneration and suppose a good perspective of the future in the clinical dentistry. The adjunctive clinical benefit of the autologous biomaterials preparation can be explained on the basis of tissue engineering, i.e., tissue engineering generally combines three key elements for regeneration: 1) scaffolds or matrices, 2) signaling molecules or growth factors, and 3) cells. Stem cells need a scaffolds that facility their integration, differentiation, matrix synthesis and promote multiple specific interactions between cells. Synthetic or artificially designed substitutes has numerous interconnecting pathways similar to cancellous bone and facilitates bone formation by providing an exceptional osteoconductive scaffolding which results from the retention of the natural porous architecture and trabeculation of human cancellous bone. Synthetic scaffolds show resorbable characters during bone regeneration, and can be completely substituted for the bone tissue after stimulation of bone formation. The use of autologous biomaterials combined with synthetic scaffolds is a recent and promising innovation in dental bone regeneration. Our experience with autologous biomaterials combined with artificially designed scaffolds for augmentation of the extremely atrophic maxilla and mandible is presented. The techniques are based on stimulation of natural events continuously present in living bone, that is, the process of bone remodeling and offering both osteoinduction and osteoconductive features.

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Implant failures from a restorative point of view

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Any restorative clinician who is treating and maintaining implant restorations will encounter patients who may have implants that can be failing without one even knowing. The idea is to diagnosis this early enough to determine treatment to save the implant and restoration. This lecture is designed to help a restorative dentist understand diagnosing, treating and preventing implant failures. The first part of the lecture will focus on diagnosis. Early diagnosis is the key to prevent any future or further implant failures. It is important for a clinician to know the early symptoms to be able to diagnosis progressive failure. The second part of the lecture will focus on treating implant failures. Whether it is a total loss of both the implant and restoration; or diagnosing early enough to try and solve both implant and restoration- we will discuss various treatment modalities. The final part of the lecture will discuss about prevention of implant failures.

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