Indications and Surgical Procedures for Bone Regeneration with Three-Dimensional Printing Individualized Titanium Mesh

Keller Pierre

Cabinet de chirurgie orale et implantologie, Strasbourg-Kehl

Faculté de chirurgie dentaire de Strasbourg, Université Louis Pasteur, France

Abstract:

Bone regenerations after tooth extractions are a real challenge. The reconstructed bone volume must allow for the placement of implants according to a prosthetic design. The dental world is undergoing a major transformation with the integration of digital technologies. The digital workflow is also becoming crucial in pre-implant bone reconstructions. With digital wax-ups, implant planning enables visualization of the volume to be grafted based on the prosthetic design. It is possible to model a titanium mesh, perfectly adapted to the defect shape, in order to create an appropriate peri-implant environment. This cage is filled with autogenous particulate bone to benefit from its reproducibility and reduce healing times. The graft shape is defined by the modeled cage, with its body composed of pure autogenous bone particles to optimize regeneration and reduce resorption. After only 4 months, implant placement is associated with a slight vestibular guided bone regeneration (GBR). This two-stage reconstruction helps reduce the initial graft volume. Excessive augmentation could be a significant risk factor for grid exposure. The reconstruction is planned without accounting for resorption, and it is supplemented with a mini GBR to ensure peri-implant bone volume. Finally, gingival management is crucial in implant treatment. During implant uncovering, soft tissues are shaped in the anterior sector and deepened in the posterior sector.