

The Three-dimensional Bone Reconstruction Using the Tunnel Technique: First Results of a Retrospective Study of 5 Years of functional Loading

In the last 15 years bone grafting became more and more a routine procedure performed with different techniques; autogenous bone was mostly used. The bone resorption in the vertical dimension was the typical problem described in the literature. Aim of this study is to present a five years follow up after functional loading of 3-D regenerated sites using the tunnel technique.

Between 2002 and 2004 the tunnel technique procedure for 3-D bone grafting was performed in 32 patients. 13 patients were augmented in the upper jaw while the other 19 cases were performed in the mandible. In 31 cases bone was harvested from the retromolar area. No crestal incisions were done. Only one vertical mesial muco-periosteal incision was necessary to access the residual ridge through a tunneling preparation. 16 weeks after 21 Biomet 3i and 44 Dentsply Friadent XiVE implants were inserted. In 10 cases a biopsy of the grafted bone was taken. The digital radiographical evaluation started after the cementation of the definitive restorations for the following 5 years. Thus the distance from the top of the implant shoulder to the beginning of the crestal bone surrounding the implant was measured mesially and distally and evaluated statistically. No dehiscences or signs of inflammations were registered after the interventions. No bone resorption occurred while placing the implants.

The bone biopsies taken with the trephine bur showed a clinically well vascularized and regenerated bone. The histological findings showed clearly a high presence of new bone formation, osteoid and bone marrow. The survival rate of the implants was 100%. All the prosthetic temporary and definitive procedures passed without signs of inflammation. Plaque was present on 35% of the implants. Bleeding on probing was detectable at 2 implants (3%).

The statistical findings showed a mean bone loss resorption after 5 years of 0,43 (SD 0,05) mm mesially and 0,63 (SD 0,4) mm distally.

The major advantage of the "tunnel technique" flap design is the avoidance of the crestal incision in order to preserve the blood supply and the integrity of the tissue. This surgical technique combined with the "biological approach" of bone grafting (scaffold concept) may accelerate the bone regeneration process maintaining the grafted bone volume and its integrity around the implants.