LT4AH ORAL COMMUNICATION CLINICAL INNOVATIONS

Multi-center study on post-extraction socket preservation using autologous tooth graft

Elio Minetti[1]; Marco Berardini[2]
[1]*University of Bari "Aldo Moro", Milano, Italy;* [2]*Private Practice, Pescara, Italy*

Background: Autologous tooth graft has been proposed more than 50 years ago by studies that supposed the osteoinduction potential of demineralized dentin matrix. To this end, Kawai and Urist (1989) demonstrated the presence of bone morphogenetic proteins in bovine dentin matrix. Bessho et al (1991) showed the presence of bone morphogenetic proteins (BMPs) in human dentin. The technique to transform autologous teeth in suitable grafting material still represents the fundamental step of the whole procedure.
Aim/Hypothesis: The aim of the study was to evaluate clinical and histological outcomes of extracted teeth used as autologous graft in socket preservation procedures. To this purpose, the Tooth Transformer shredding and decontamination device has been used.
Materials and Methods: Ninety-eight patients (29 men and 69 women) with an average age 53.7 years, needing one or more tooth extractions, were treated between 2016 and 2019 in private dental centers in Italy, Czech Republic, and Singapore. After tooth extraction, all patients received a socket preservation procedure using autologous tooth graft. An innovative, completely automated medical device, called Tooth Transformer (Milan, Italy) was used to obtain suitable tooth graft materials starting from the whole tooth of the patient. Decontamination, disinfection and demineralization processes are automated by this device. Endodontic or restorative materials were mechanically removed before the extracted tooth was placed inside the device. One-hundred six titanium implants (Biomet 3i, USA) were inserted after a healing period of 4 months. Bone samples were harvested, using a trephine bur during implant drilling procedures, in 13 sites (randomly selected) for the histological analysis.
Results: All defects were classified by analyzing the existing bone walls: 43% had three walls, 42% had four walls, 12% had one wall and 3% had two walls. The vertical average defect was 9.16 mm, buccal/palatal 7.0 mm, and mesio-distal 10.3 mm. A total of 119 post extractive sockets were treated using autologous tooth graft material and 106 implants were inserted after 4 months. No surgical complications occurred during the first 4 months. The implant success rate was 98.94% (one implant failed). The histological analysis of samples revealed that all the dentin granules were almost surrounded by newly formed bone without any inflammatory reaction around the particles. The histomorphometric measurements showed that Bone Volume (BV%) was 41.47 ± 11.51, the Residual Graft (Graft%) was 16.60 ± 7.09 and the Vital Bone (VB%) was 21.89 ± 9.72.
Conclusions and Clinical Implications: The efficacy and safety of autogenous partially demineralized dentin matrix prepared chairside, for bone regeneration, were recently demonstrated in some human studies and confirmed by the present paper. The bone volumes were adequate to support the implant insertion after 4 months. This innovative device allowed for process and use, as bone graft, any patient's tooth in a very short time. Future controlled trials with long follow-up are needed in order to confirm these results.