

# Autologous Dentin Grafts New Preparation Method: the Tooth Transformer. Clinical and Histological Analysis of 15 Consecutive Case

BERARDINI Marco(\*)<sup>1</sup>, MINETTI<sup>2</sup> Elio, TRISI<sup>1</sup> Paolo <sup>1</sup>Biomaterial Clinical and Histological Research Association, Pescara, Italy; <sup>2</sup>University of Bari "Aldo Moro", Italy

## BACKGROUND

Permanent teeth have been proposed as regenerative material since 1967, when Urist et al demonstrated the osteoinduction potential of autogenous demineralized dentin matrix. Bessho et al (1991) also demonstrated the presence of bone morphogenetic proteins (BMPs) in human dentin matrix. An innovative, completely automated medical device, called Tooth Transformer (Via Washington, 59 - Milan, Italy), now allows to obtain suitable tooth graft materials starting from the whole tooth of the patient. Decontamination, disinfection and demineralization processes are automated.

## CASE PRESENTATION

The present case series included 15 patients (7 male and 8 female); age ranged between 22 to 64 years old. All patients were in good health conditions and nonsmokers. In 11 cases the patient needed guided bone regeneration procedures and in other 4 cases maxillary sinus elevation. Extracted teeth were carefully cleaned, and any foreign materials were removed (including calculus, restorations and endodontic filling materials) before the insertion in the device. In all cases, the autologous tooth graft was covered by a resorbable porcine pericardium membrane (BEGO Implant System, Bremen, Germany). CBCT scans were performed before grafting procedures and after 4-6 months of healing. A total of 19 titanium dental implants were inserted after 4-6 months. Implant osteotomic sites were prepared using a trephine drill that allowed retrieving a bone sample for each osteotomy. The specimen were immediately fixed in 10% neutral buffered formalin and processed for histologic analysis. After 6 months of healing, the defects were completely filled by newly formed bone. All cases showed complete bone filling by clinical and radiographs observation. The presence of graft particles or grains in sub mucous connective tissues was not recorded. A D2-D3 bone density was detected. Dentin granules were surrounded by new bone formation. Newly formed trabecolae incorporated tooth graft particles and remodeling processes were observed.

## CONCLUSIONS

Results confirmed those presented by Kim YK et al (2014) that found favorable bony healing using tooth graft in GBR procedures. It has also been observed, by the present histological report, that dentin granules underwent remodeling phenomena just like the native bone. No inflammatory or infective reactions were detected testifying a high biocompatibility. Future controlled studies are needed to better evaluate the regenerative potential of tooth graft obtained by this innovative procedure.

## BIBLIOGRAPHY

- Yeomans JD, Urist MR. Bone induction by decalcified dentine implanted into oral, osseous and muscle tissues. Arch Oral Biol. 1967;12:999–1008
- Bono N, Tarsini P, Candiani G. Demineralized dentin and enamel matrices as suitable substrates for bone regeneration. J Appl Biomater Funct Mater. 2017;15(3)
- Bono N, Tarsini P, Candiani G. BMP-2 and type I collagen preservation in human deciduous teeth after demineralization. J Appl Biomater Funct Mater. 2018 Jul 26

Patient no.	Extraction	Tooth Class	Initial Radiological Defect (CBCT Data)	Defect	Radiological Defect (CBCT after 6 months)	Volume	% Trabecular Density
1	Extraction	14	Initial Defect 14 mm	Defect	Initial Defect 14 mm	14 mm	100%
2	Extraction	13	Initial Defect 13 mm	Defect	Initial Defect 13 mm	13 mm	100%
3	Extraction	12	Initial Defect 12 mm	Defect	Initial Defect 12 mm	12 mm	100%
4	Extraction	11	Initial Defect 11 mm	Defect	Initial Defect 11 mm	11 mm	100%
5	Extraction	10	Initial Defect 10 mm	Defect	Initial Defect 10 mm	10 mm	100%
6	Extraction	9	Initial Defect 9 mm	Defect	Initial Defect 9 mm	9 mm	100%
7	Extraction	8	Initial Defect 8 mm	Defect	Initial Defect 8 mm	8 mm	100%
8	Extraction	7	Initial Defect 7 mm	Defect	Initial Defect 7 mm	7 mm	100%
9	Extraction	6	Initial Defect 6 mm	Defect	Initial Defect 6 mm	6 mm	100%
10	Extraction	5	Initial Defect 5 mm	Defect	Initial Defect 5 mm	5 mm	100%
11	Extraction	4	Initial Defect 4 mm	Defect	Initial Defect 4 mm	4 mm	100%
12	Extraction	3	Initial Defect 3 mm	Defect	Initial Defect 3 mm	3 mm	100%
13	Extraction	2	Initial Defect 2 mm	Defect	Initial Defect 2 mm	2 mm	100%
14	Extraction	1	Initial Defect 1 mm	Defect	Initial Defect 1 mm	1 mm	100%
15	Extraction	0	Initial Defect 0 mm	Defect	Initial Defect 0 mm	0 mm	100%

