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Case Report

### Tooth Transformer®: A New Method to Prepare Autologous Tooth Grafts – Histologic and Histomorphometric Analyses of 11 Consecutive Clinical Cases

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Abstract

**Introduction:** Human dentin matrix could be successfully used for bone grafting procedures. It was well accepted that dentin grafts can induce osteoblast proliferation. An innovative preparation method, using the dedicated automated device Tooth Transformer®, which can transform autologous teeth in suitable grafting material, has been recently introduced. The aim of the present article is to analyze the histologic outcomes in 11 consecutive human cases, in which autologous tooth graft materials, starting from the whole tooth of the patient, were used for bone regeneration. **Results:** The bone defects were completely filled by newly formed bone after 6 months of healing. Histologic analysis revealed no inflammatory or infective reactions against the tooth graft. Tooth granules were surrounded by newly formed bone. Some tooth granules were incorporated in the bony trabeculae, and they appeared partially resorbed. This fact confirmed that tooth grafts underwent remodeling processes just like the native bone. **Discussion:** Results from the present histologic case series analysis revealed that tooth graft appeared well integrated in the regenerative tissue without any inflammatory or infective reaction. The tooth of the patient may be used as an autologous regenerative material, avoiding any foreign graft material.

**Keywords:** Bone regeneration, dentin graft, osteoinduction, tooth

INTRODUCTION

The tooth grafting procedure has been introduced by Yeoman and Urist more than 50 years ago, when they discovered the osteoinduction potential of demineralized dentin matrix.<sup>1,2</sup> More recently, Brasheo *et al.* demonstrated the presence of bone morphogenetic protein (BMP) in human dentin matrix. In particular, bone formation and osteoblasts' presence were observed in rat muscle after demineralized human dentin matrix graft.<sup>3</sup>

It was clear that both bone and dentin matrices contained fundamental growth factors (GFs) for bone regeneration. It represents an efficient source of BMPs, bioactive GFs, such as transforming growth factor-β (TGF-β), which are well known to be involved in the bone-healing process.<sup>4</sup> Some authors have theorized that the demineralization process allows better bone augmentation than nondemineralized dentin.<sup>5</sup>

Moreover, the chemical composition of bone and dentin was almost the same with the presence of an inorganic portion made of hydroxyapatite and an organic one, mainly composed by collagen Type I and other secondary proteins.

Heterologous or alloplastic grafting materials, on the other hand, have been used for bone augmentation procedures for more than 35 years, but they work as mechanical scaffold for host cells and do not offer any osteoinduction stimulus.<sup>6-8</sup> The efficacy and safety of autogenous partially demineralized dentin matrix prepared onsite, for clinical application in bone regeneration procedures related to implant dentistry, including

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