Case Report

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Use of Autologous Dentin as a Filling Material After a Lower Third Molar Surgery: A Clinical Case and Literature Review

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ABSTRACT

This clinical case presents a 26-year-old male who, after several episodes of pericoronitis, underwent surgical extraction of the lower right third molar. The socket was filled with autologous dentin from the freshly extracted lower third molar. This material was prepared using the Tooth Transformer® device (Imbiodent, Zaragoza, Spain). The objective was to enhance bone regeneration in the socket and prevent the development of a periodontal pocket distal to the second molar. This technique may also be used for alveolar preservation and bone regeneration in implant dentistry.

Keywords: *lower third molar, autologous dentin, tooth transformer..*

Introduction

The impaction of lower third molars can cause bone lysis in the distal alveolar area of the second molar. Also, the surgical procedure for its extraction itself may lead to periodontal complications such as bone loss in the distal area of the second molar, the formation of periodontal pockets, and even affection of the adjacent second molar [1,2].

Many authors recommend the use of regenerative techniques as a complementary treatment to avoid these complications. These authors demonstrated that the use of bone substitutes with resorbable membranes is an effective method for post-extraction healing of defects compared to extraction without grafting, resulting in greater bone height [3].

Although autologous bone is the material of choice for bone regeneration, it has disadvantages such as limited availability and morbidity associated with the donor site. As a result, dentin has been explored in recent years as a potential regenerative biomaterial. Dentin possesses ideal physical and chemical properties, such as density, roughness, homogeneity, and a calcium-phosphate composition similar to that of human bone [4]. Its compositions consist of 70% inorganic content, which provides osteoconductive properties. The organic content represents 20%, of which 18% is a type I collagen network, and the remaining 2% consists of non-collagenous proteins involved in bone calcification and growth factors that provide osteoinductive properties. The remaining 10% consists of fluids [4,5]. The disadvantages of this material are the absence of osteogenic capacity, and its availability depends on the condition of the extracted teeth. [6].

New technologies are being developed to obtain autologous dentin, such as the Tooth Transformer®, which produces an easy-to-use and cost-effective autologous graft from the extracted tooth. It promotes bone regeneration, osteoinduction, and osteoconduction, thanks to the morphogenetic proteins and growth factors present in dentin. This device sterilizes, demineralizes, and fragments the tooth into granules of appropriate size (400–800 µm). The tooth fragments are placed in a tooth grinder equipped with special blades that grind the tooth. The container is made of a thermoplastic material, while the blades are made of surgical stainless steel. Different liquids are applied to allow the demineralization of the particles, disinfection, and rinsing of the final product. A basket is used to collect the granules at the end of the procedure. The material obtained with the Tooth Transformer® allows the alveolar preservation technique. When used combined to implant placement, a waiting period of 4 months is required [7].

A valid consent was obtained from the patient to publish this clinical report.

Clinical Case

A 26-year-old male patient, with no relevant medical history, visited the University clinic at the Faculty of Dentistry of the Complutense University of Madrid. The extraction of the lower right third molar was recommended due to repeated episodes of pericoronitis. A panoramic radiograph and CBCT were performed as complementary tests.

Due to the probing depths in the distal site of the lower right second molar (6 mm distobuccal, 5 mm distomedial, and 5 mm distolingual), we decided to perform a regenerative technique as a preventive treatment with autologous dentin.The patient was given an informed consent form explaining the surgical technique, the possible complications, and the recommendation of use of autologous dentin.

Local anesthesia was administered using 4% Articaine with Epinephrine 1:200,000 (Ultracain, Normon Laboratories, Spain). A linear festooned incision was made at full thickness, with mucoperiosteal detachment and slight osteotomy in the mesial, buccal, and distal areas. Then, we began the luxation using a straight elevator and proceeded to complete the extraction. For the preparation of the autologous dentin, we used the Tooth Transformer® machine (Imbiodent, Zaragoza, Spain).

Once the soft tissues were cleaned, we used a fissure bur to divide the tooth into fragments of about 4-5 mm, which were then dried with air. The fragments were placed in the grinder (Figure 1) and inserted into the machine. The disposable component kit, consisting of a tray and a cartridge of liquids that would clean and disinfect the tooth, was opened. The tray and liquid cartridge, with the perforable side facing up, were inserted, perforated with a punch, and the lid was closed. After about 5 minutes, the grinding process finished, and we opened the machine to check the granule size of what had been the tooth. As the granules were the correct size (between 0.40 and 0.80 mm), we continued with the disinfection and cleaning process by pressing the front button. The disinfection process took between 20 and 30 minutes, after which we collected the graft material from the tray, which was ready to be placed into the socket with minimal compaction to allow for blood vessel growth (Figure 2).

We performed a radiographic follow-up of the graft material two months after the extraction of tooth 4.8. In the radiograph (Figure 3), the socket appeared fully filled. We also measured the probing depth in the distobuccal, distomedial, and distolingual areas of tooth 4.7, observing a reduction in depth to 2 mm.

Figure 1: Dental fragments in the grinder

Figure 2: Graft material and placement of the graft material

Figure 3: Radiograph of the 4.8 socket two months after extraction

Discussion

The structure of teeth closely resembles bone, both physically and biochemically, and can be efficiently used as graft material due to its osteoinductive and osteoconductive properties. Autogenous tooth bone grafts find their primary application in sinus and ridge augmentations and for socket preservation before implant placement [5].

After the procedure described, our patient had no complications, and the probing depth was reduced. A similar outcome was achieved in Mazzucchi et al.'s study [8], in which no complications were observed, and probing depth improved at the 6-month follow-up. Kim [9] published promising results of the technique in 2010. A single-case report in 2015 showed positive results in alveolar preservation of an upper third molar using autologous dentin [10]. Also, systematic reviews by Gual-Vaqués et al. [6] and Ramanauskaite et al. [11] highlighted the formation of new bone with this material.

The use of autologous dentin minimizes the periodontal defect that remains distal to the second molar after the surgical extraction of the lower third molar [12,13]. This technique is being applied in the field of Implant dentistry, where bone availability is often limited, such as in the maxillary sinus area [14]. It is also being used for alveolar preservation, maintaining the vertical and horizontal dimensions of the post-extraction socket [15].

Conclusion

Autologous dentin is an excellent material for alveolar preservation since it is sourced directly from the patient. However, unlike autologous bone, it is more easily available and does not involve morbidity at the donor site.

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Conflict of interest

There is no conflict of interest

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