

Autogenous dental transplantation of the third molar: case report

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Abstract: Autogenous dental transplantation, or autotransplantation, is a technique that gained recognition in the 18th century and involves the transfer of a tooth from one socket to another in the same individual. This practice can be performed with embedded, impacted, or erupted teeth to replace lost or non-restorable teeth, offering a biological alternative that preserves natural teeth. The process of autotransplantation involves steps such as radiographic evaluation, atraumatic extraction, root inspection, extraoral management, and transfer of the tooth to the recipient socket, all carefully followed to ensure clinical success. Currently, dental transplantation is a well-accepted option due to its lower cost, shorter treatment duration, and preservation of tissue and periodontal ligament. However, the lack of knowledge among professionals limits its indication as a rehabilitative alternative. The article presents a literature review followed by a clinical case report of an autogenous dental transplant surgery performed in a Primary Health Care Unit in the municipality of Graça, Ceará, Brazil. A 16-year-old teenager presented with extensive coronary destruction of element 37 due to decay, diagnosed as pulp necrosis. After radiographic evaluation and determining the viability of tooth 38 as a donor, atraumatic extractions of elements 37 and 38 were performed, followed by the autotransplantation of tooth 38 into the socket of tooth 37. The procedure was carried out without scraping or curettage of the recipient bed and without the use of pre-surgical antibiotic therapy. The patient was evaluated after 15 days, 45 days, and 6 months, showing a satisfactory evolution with a response within normal standards for pulp and periodontal health. This work highlights the importance of autotransplantation as an option for dental rehabilitation, especially in contexts where access to endodontic and prosthetic treatments is limited and emphasizes the need for greater dissemination and training for oral health professionals.

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1. Introduction

Dental autotransplantation is defined as the transplantation of a tooth from one socket to another in the same individual, which can be obtained from impacted, impacted, or erupted teeth to replace a recently extracted tooth, early loss, or congenital agenesis. For example, a viable but non-functional third molar due to poor positioning can be moved to replace an unrestorable first molar, thus offering a biological alternative to the patient, choosing to retain the maximum number of natural teeth. Dental autotransplantation has been performed for hundreds of years, but it was only in the 18th century that the procedure was established when John Hunter reported success in a dental transplant in a London gentleman in 1772. However, it was only in 1950 that the first records appeared in the literature with transplants of premolars with incomplete roots [1].

In 1953, Fong reported the success of autotransplantation of third molars, and soon after, other authors validated the success of the procedure [2]. Autogenous dental transplantation involves a series of processes, including radiographic evaluation, atraumatic exodontia, root inspection, extraoral handling, and transferring the tooth to the recipient

socket. All these processes are carefully and meticulously followed to ensure the transplant progresses to clinical success. The literature review conducted describes the risks of each technique in each executed process [3].

Currently, dental transplantation is a well-accepted option due to lower costs, shorter treatment duration, preservation of periodontal tissue and ligament, a high rate of alveolar bone regeneration, and improved aesthetics. However, due to a lack of professional knowledge, it remains a less suggested rehabilitative alternative [4]. This work aims to present a literature review followed by a clinical case report of an autogenous dental transplantation surgery as a rehabilitative alternative to a dental element that would undergo extraction in a Family Health Strategy setting in the municipality of Graça, in the state of Ceará.

2. Case Report

A 16-year-old normosystemic female patient presented to the dental service of a Primary Health Care Unit (PHCU) linked to the Family Health Team (FHT) in the municipality of Graça, located in Ceará, Brazil. She complained of dental pain during the consultation. Upon intraoral clinical examination, extensive coronal destruction of tooth 37 related to caries was observed. After vitality tests (thermal cold and heat tests) yielded negative results, while vertical and horizontal percussion test results were positive, a diagnosis of pulp necrosis was reached. Extraoral examination findings were within normal standards. As an initial rehabilitative alternative, endodontic treatment of tooth 37 followed by prosthodontic treatment was proposed. However, the municipality lacked the necessary services for this profile, and financially, according to the guardian, accessing private services was not an option. Therefore, autogenous transplantation surgery of tooth 38 was proposed.

Radiographic examination (Figure 1A) revealed that the carious lesion extended to the pulp chamber, with preserved alveolar bone showing no signs of inflammatory bone resorption. Anatomical aspects of the donor root, presence or absence of carious lesions, alveolar bone receptor bed, local infection in the receptor bed, vestibulo-lingual and mesio-distal dimensions of the receptor bed and donor element were evaluated. No treatment was performed on the root surface of the donor tooth. The extractions of teeth 37 and 38 were performed with minimal trauma (Figure 1B and 1C). No curettage of the alveolar walls was performed. After autogenous transplantation (Figure 1D), the transplanted tooth was semi-rigidly fixed with sutures (Figure 1E). Pre-surgical antibiotic therapy or any other pre-surgical anti-inflammatory medication was not required. The sutures were removed after 15 days. The patient was evaluated after 45 days and 6 months, showing a satisfactory response in terms of pulp and periodontal health.

3. Discussion

Autotransplantation is a rehabilitative treatment aimed at replacing an unrestorable or lost tooth with limited indications. It involves the surgical relocation of a viable, malpositioned, or impacted donor tooth into a receptor socket [5]. However, literature suggests that dental autotransplantation is a less suggested rehabilitative alternative, despite clinical signs indicating its suitability, due to professionals' lack of knowledge regarding the procedure and its benefits to the patient [4]. Current literature indicates that dental transplantation is a well-accepted option due to lower cost, shorter treatment duration, improved aesthetics, higher preservation of periodontal tissue, and potential for alveolar bone regeneration [6].

Autogenous dental transplantation was suggested for the patient due to the impossibility of endodontic treatment, aligning with the idea of Tan et al. (2023) seeking a biological treatment approach, especially when other rehabilitative treatments, albeit more expensive, are contraindicated for growing patients [2]. Autotransplantation is considered a viable alternative, promoting a more aesthetic, simple, economical, and biological approach to treatment, aiming to retain as many natural teeth as possible in the arch.

The success rate of dental transplantation depends on various factors such as root development stage, patient age, receptor socket condition, local inflammation, surgical technique, immobilization type, antibiotic therapy, and endodontic treatment.



Figure 1: Pre, intra, and postoperative moments of autogenous dental transplantation of tooth 38. A. Periapical radiograph showing extensive carious lesion of tooth 37 extending to the pulp chamber floor. B. Beginning of atraumatic extraction of teeth 37 and 38. C. Tooth 37 after extraction, showing extensive coronal destruction. D. Transplantation of tooth 38 into the socket of tooth 37. E. Semi-rigid fixation of the transplanted tooth using suture thread with a "X" shaped stitch.

Pre-procedural radiographs provide crucial anatomical information, accurate diagnosis, and identification of signs of infection in the receptor socket, aiding in treatment planning. Primary factors influencing the prognosis of autotransplanted teeth include short extraoral time, appropriate storage in saliva or physiological solution, minimally invasive exodontia technique, optimal distance between the transplanted tooth and the receptor socket (0.5-1.0 mm), and quality of endodontic treatment. Advantages of dental transplantation include orthodontic movement, preservation of alveolar bone and gingival tissues, and potential preservation of periodontal ligament vitality. Disadvantages include the need for a compatible donor tooth, demanding surgical techniques to minimize risks of surgical trauma and irreversible ligament damage [6].

Revascularization of the donor tooth is possible and is related to root development. Some professionals suggest performing endodontic treatment after autotransplantation, but this procedure was deemed unnecessary for teeth with open apices, as they have competent access to blood supply and stem cells for pulp restoration post-transplantation [7]. Studies indicate a high survival rate for transplanted teeth with complete roots and potential revascularization in such cases. However, for teeth with complete roots, post-transplant endodontic treatment is often recommended to reduce infection risks and improve success rates compared to teeth treated endodontically intraorally before transplantation [5, 8].

The patient's age and incomplete root formation in the donor tooth indicate a high chance of survival for the autotransplanted tooth, as younger patients exhibit greater potential for periodontal cell regeneration compared to older patients. Additionally, teeth

with open apices have competent access to blood supply and stem cells for revascularization [5]. Criteria for successful autotransplantation include normal gingival contour and color post-fixation, normal periodontal pocket depth, absence of inflammation or pathology on radiographs, normal lamina dura presence, and satisfactory masticatory function without discomfort [6].

4. Conclusion

In conclusion, the clinical case report and literature review demonstrate that dental autotransplantation is a viable option for patients requiring rehabilitative treatment when conventional alternatives are limited. The procedure offers a cost-effective, natural, and time-efficient solution, especially when other rehabilitative treatments are not feasible, showcasing its viability even within a primary public health service setting.

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