

Autotransplantation of a mature mandibular third molar as alternative to dental implant placement: Case report

ABSTRACT

Dental autotransplantation is defined as the movement of one tooth from one position to another, within the same patient. Autotransplantation has predictable results; in fact, many studies describe a success rate of over 90%. This article describes a case report concerning the surgical management of this surgical technique. An 18-year-old patient comes for the treatment of her left first mandibular molar (3.6) involved in decay process. An accurate radiological analysis (periapical X-ray and orthopantomographic evaluation) showed an immature left mandibular third molar (3.8), suitable as donor tooth. The mandibular first molar was extracted in an atraumatic way. The intra-alveolar septum was modified with a piezoelectric device. The tooth was slightly depressed in the socket and remained in infra-occlusion. It was stabilized by sutures and a metallic splint. Then, the autotransplanted molar was fixed with a double splinting for 4 weeks. In conclusion, the autotransplantation was followed by endodontic treatment. After 36 months of follow-up, wisdom tooth showed an improvement in clinical features in agreement with radiological examination. The success of this case can be attributed to the atraumatic surgical technique and the immature stage of the transplanted element.

Keywords: Autotransplantation, ankylosis, oral surgery, traumatology

INTRODUCTION

Autotransplantation is a treatment option that allows replacing a compromised tooth with another one not essential in masticatory function, usually a third molar. Unlike implant, tooth transplantation provides for periodontal ligament formation, so the maintenance of this cell is the key to the success and the predictability of this technique. The absence of these cells, in fact, can lead to an ankylosis or root resorption process.^[1]

CASE REPORT

An 18-year-old patient comes at her first clinical examination. Root fragments were found in 3.6 tooth area. Element 3.8 was found in a good state of periodontal health.

Orthopantomography confirmed the unfavorable prognosis of 3.6 and the compatibility between the element 3.8 and the receiving bed.

To decrease the intraoral bacterial load, a week before the surgery, the patient underwent an oral hygiene

session and 3 days before antiseptic therapy was prescribed. Furthermore, prophylaxis with 2 g of amoxicillin + clavulanic acid was administered 1 h before the surgery. After inferior alveolar nerve block and local anesthesia with mepivacaine 2% + VC, a luxation and extraction of the roots were followed by a delicate curettage to remove the periapical granulation tissue without affecting the periodontal ligament fibers.

At the end of the first surgical phase, an intrasulcular incision was made at the element 38 to interrupt the circular fibers of

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the ligament; then, luxation and extraction were performed, avoiding touching the radicular surface to prevent damaging the periodontal ligament cells. Element 38 was immersed in a sterile saline solution, to preserve the vitality of the cells of the periodontal ligament. Due to the incompatibility between receiving alveolus and donor element, alveoplasty was performed through the use of piezoelectric instruments. In this way it was possible to reduce the inter-radicular septum and widening the receiving bed. A slight enameloplasty was performed on the mesial and distal aspects of the element 38's crown to allow it to be hosted in the new alveolus.

Once the receiving bed was made compatible and the element was laid down, single mesial and distal stitches were given to the element 38 with resorbable 4/0 suture. Once the hemostasis was under control, the operative field was dried and a semi-rigid, vestibular, and lingual double splinting was carried out.

To prevent the element from being subjected to excessive trauma, a selective grinding was performed on its occlusal aspect, until a condition of minimum subocclusion was reached. A periapical postoperative control X-ray was performed at the end of the surgery.

Antibiotic and antiseptic therapy was prescribed after the surgery.

RESULTS

Six months later, on radiographic examination, the tooth showed a radial contour similar to any other tooth; the periodontal line

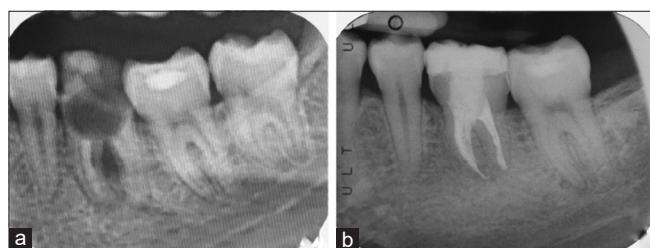


Figure 1: Periapical intraoral radiography before the surgery (a) and after 36 months of follow-up (b)

Table 1: Different follow up times

	1 week	2 weeks	1 month	3 months	6 months	12 months	18 months	24 months	36 months
Mobility (miller)	2°	1°	-	-	-	-	-	-	-
Vitality test	Negative	Negative	Endodontically treated	/	/	/	/	/	/
Splinting	On-site	On-site	Removed	-	-	-	-	-	-
Ankilosys	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Periodontal probing	NR	NR	NR	3 mm<	3 mm<	3 mm<	3 mm<	3 mm<	3 mm<

NR: Not required

spacing and the bundle bone were well represented. To restore an adequate functionality to the transplanted element and to correct esthetics, the reimplanted element 38 was restored with an indirect composite onlay restoration.

The tooth did not show pathological features at 12, 18, 24, and 36 months of follow-up [Table 1, Figure 1 and 2].

DISCUSSION

A long-term review of cases with follow-up from 17 to 41 years found a success rate of 90% autografts, similar to implantprosthetic restorations.^[2]

A dental element with a completed germinative process of the apical foramen has an inferior success rate. The incomplete radicular formation is an advantage because of its regenerative and inductive potential.^[3]

According to Tsukiboshi, transplantation should be performed when an element is at its maximum radicular length but still represents the potential for pulpal regeneration (radiographic apex > 1 mm).^[4] In a young patient, it is advised to perform the intentional reimplantation without proceeding with previous endodontic treatment of the element because the percentages of revascularization are high. Only if, during the recalls, the onset of clinical-pathological signs is highlighted, then it is correct to proceed with the root canal therapy, as happened in this case.

On the contrary, even with a negative response to the thermal test, it is necessary to observe the rule of “wait and see,” that is to keep the transplanted element monitored with periodic recalls, since revascularization may have occurred but not a re-innervation.^[5]

The negative thermal test, in fact, is not a discriminant sign which indicates the need of canal treatment. The ideally tool to evaluate if the revascularization occurred is the laser Doppler flowmetry.^[6]

In the case of an adult patient, with a radiographically formed apex, it is advisable to perform intraoral root canal treatment

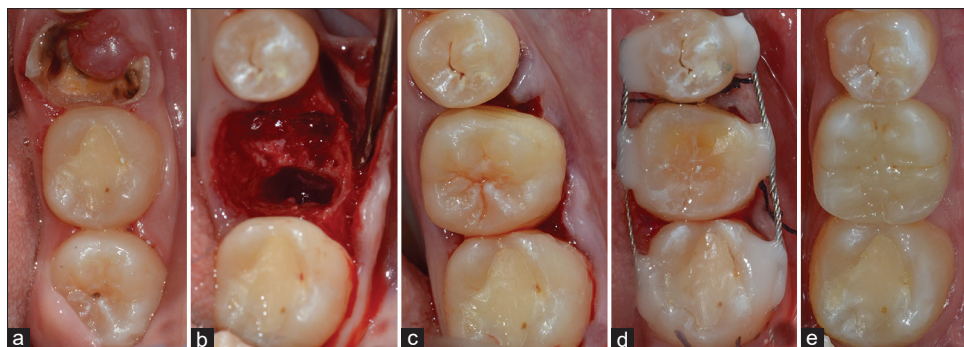


Figure 2: In order: (a) occlusal view showing carious on 36, (b) 36 postextraction socket, (c) occlusal view of autotransplanted wisdom tooth (3.8), (d) occlusal view showing double splinting of first molar (3.6), and (e) Occlusal view of autotransplanted wisdom tooth (3.8) at 36 months of follow-up

before surgery to reduce the extraoral stay time. In fact, it is advisable to keep the dental element no longer than 15 min out of the socket to avoid a compromise of periodontal cells. During this period, the element must be immersed in sterile saline solution. To reduce the extraoral permanence time, it is possible to realize a stereolithographic model of the dental element to transplant, based on a cone-beam computed tomographic data. In this way, it is possible to have a previsualization of the adaptation interferences and perform the donor tooth extraction after the alveoloplasty.

It is essential that the dental elements are extracted AVOIDING the osteotomy PROCEDURE and that the housing of the receiving bed occurs without compressive forces to REVENT damaging the periodontal ligament cells.^[7]

The biological advantages of this technique guarantee the maintenance of a well-represented periodontal tissue, the proprioceptive capacity of the element, and the regeneration of the surrounding bone tissue, thanks to the stimulation of the ligament cells.^[8]

CONCLUSION

The success of this treatment can be attributed to an atraumatic surgical technique, to a semi-rigid splinting, and to a favorable anatomy of the donor element. Not less important is the speed of execution.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has

given his consent for images and other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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