Journal of Craniomaxillofacial Research

Vol. 12, Issue. 4 Autumn 2025

Successful Autotransplantation of a Mandibular Third Molar: A Case Report

Vahid Azizi [1], Ali Chamani [1], Iman Shiezadeh [2*]

1. Department of Endodontics, Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.

2. Student Research Committee, Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.

ARTICLE INFO

Article Type:
Case Report

Received: 19 May 2025
Revised: 10 July 2025
Accepted: 5 September 2025

**Corresponding author:*
Iman Shiezadeh

Student Research Committee, Faculty of Dentistry, Mashhad University of Medical Sciences, Mashhad, Iran.

Tel: +98-21-84903747
Fax: +98-21-84903747
Email: shiezadehiman@gmail.com

ABSTRACT

Tooth autotransplantation serves as a viable treatment option for replacing non-restorable teeth, particularly in young patients. This case report details the successful autotransplantation of a mandibular third molar to replace a severely damaged right second mandibular molar in a 21-year-old female. Following atraumatic extraction and meticulous handling to minimize extraoral time, the donor tooth was transplanted into the recipient site with optimal endodontic treatment and stabilization through a semirigid splint. One-year post-operation, the transplanted tooth exhibited normal occlusion, physiological mobility, and no signs of complications such as root resorption or ankylosis. This case underscores the importance of careful patient selection, surgical precision, and post-operative care in achieving successful outcomes in tooth autotransplantation, reaffirming its role as a valuable treatment modality in contemporary dentistry.

Keywords: Tooth autotransplantation; Endodontic treatment; Endodontics.

Please cite this Article as:
Azizi V, Chamani A, Shiezadeh I. Successful Autotransplantation of a Mandibular Third Molar: A Case Report. J Craniomaxillofac Res 2025; 12(4): 292-298. DOI:

Introduction

Tooth autotransplantation involves the relocation of teeth within the same individual, offering a unique solution for dental issues such as dental agenesis, ectopic canines, and severely damaged permanent molars [1]. This procedure is particularly advantageous in young patients, where dental implants may lead to infraocclusion due to ongoing jaw growth. Autotransplantation not only preserves normal periodontal function and proprioception but also maintains alveolar bone volume, which is crucial for future dental health [2,3]. The success of tooth autotransplantation hinges on careful case selection and the meticulous execution of the procedure [4]. Factors such as the patient's oral hygiene, the presence of infection or inflammation, and the condition of the donor tooth significantly influence the prognosis [5]. Despite its benefits, autotransplantation is not without challenges. Root resorption and ankylosis are common complications that can affect long-term outcomes [5,6].

Autotransplanting in growing patients can provide benefits such as normal periodontal function, proprioception, and maintenance of alveolar bone volume. If the transplanted tooth fails, the bone and soft tissue are usually well-suited for future implants [7]. This method is effective and cost-efficient when properly indicated. A systematic review of autotransplantation outcomes reported a notable survival rate of 81%, with low incidences of ankylosis and inflammatory root resorption [8]. These findings underscore the procedure's viability when performed under optimal conditions. Autotransplantation is also recommended in cases where microsurgery is unsuitable, offering a less aggressive alternative to apical microsurgery [9]. Common donor teeth for autotransplantation include impacted maxillary canines and developing third molars. Third molars, in particular, are effective replacements for unrestorable or missing molars, providing a valuable treatment option [10]. The procedure relies heavily on the regeneration of the periodontal ligament (PDL) and pulp revascularization. However, damage to the PDL and pulp cells can lead to complications such as root resorption and ankylosis, resulting in unpredictable prognoses [9]. In this case report, we detail the successful autotransplantation of a mandibular third molar to replace a severely damaged second molar in a 21-year-old female. This case highlights the critical factors that contribute to the success of tooth autotransplantation and reaffirms its role as a valuable treatment modality in contemporary dentistry.

Case Presentation

A 21-year-old female patient presented with concerns regarding her lower right second molar, which was deemed unrestorable due to a severely damaged crown (Figure 1-A). Despite her good oral hygiene and an unremarkable medical history, clinical examination and radiographic analysis revealed a significant carious lesion in the second molar (Figure 1-B & C), making it hopeless. After discussing the tooth's condition and prognosis with the patient, extraction was recommended as the most appropriate course of action. Adjacent to this compromised tooth, the third molar was found to be in excellent condition—fully developed, fully erupted, and well-positioned within the dental arch. This made it an ideal candidate for autotransplantation (ATT). The patient was thoroughly informed about the procedure, including its potential benefits and risks, and she provided written informed consent to proceed with the treatment.

On the day of the procedure, oral disinfection was achieved using a 0.2% chlorhexidine gluconate solution (Corsodyl, UK). After administering local anesthesia via an inferior alveolar nerve block injection with 1.8 ml of 2% lidocaine with 1:100,000 epinephrine (Daroupakhsh, Tehran, Iran), the second molar was extracted first, then the third molar (Figure 2-A & B). The third molar was outside the mouth for 12 minutes (minimizing extraoral time to preserve the PDL's cells vitality). During preparation, the tooth was kept moist with sterile gauze soaked in normal saline (figure 2-C). An access cavity on third molar was created using a high-speed diamond round bur No. 2 (Jota AG, Rüthi, Switzerland) with continuous water spray. It was refined using a diamond fissure bur No. 2 (Jota AG, Rüthi, Switzerland) to ensure optimal entry into the pulp chamber. Canal orifices were identified and initially scouted using a #10 K-file (MANI, Japan). Coronal preflaring was performed with an SX instrument (M3 Gold series, Düsseldorf, Germany) to facilitate further canal preparation. After that, the working length was determined by observing the exit of a size 10 K-file from the apex of the tooth and subtracting 1 millimeter from that length (Figure 2 -D). The M3 Gold file (M3 Gold series, Düsseldorf, Germany) was used, and instrumentation was performed up to a size 25 file with a 4% taper to the working length with a picking motion. Continuous irrigation with 2% NaOCl and normal saline was maintained during instrumentation to ensure thorough canal debridement. The obturation was performed using the single cone technique Gutta-percha 4% (META, Chugbuk, South Korea) and a bio ceramic

sealer (NeoSealer Flo Avalon Biomed, USA). The entire procedure, from extraction to transplantation, was efficiently completed in a total time of 12 minutes. The transplanted third molar was then positioned in the prepared recipient site without interfering with the occlusion of opposing teeth (Figure 3-C). The transplanted tooth was sutured using a 4-0 non-absorbable suture Ethilon by Ethicon (Johnson & Johnson company, USA). To stabilize the transplanted tooth (Figure 3: A & B), a semirigid splint made of Ortho FlexTech wire (USA) and translucent Gradia Composite (GC, Japan) was used to attach the tooth to the adjacent first molar and second premolar. This splint was maintained for two weeks before being removed. In the first week after the operation, the stitches were taken out. In the second week, the semirigid splint was removed. Additionally, the cusp reduction and taking them out of occlusion were also performed. After that, the tooth was restored with a translucent posterior composite (Filtek, 3M) using rubber dam isolation (Figure 4- B). The patient was scheduled for additional follow-up appointments at two weeks and one-year post-operation to monitor healing and integration. At the follow-ups (Figure 4), the transplanted third molar demonstrated stable positioning with no signs of inflammation or infection.

The patient experienced no discomfort, and the occlusion was normal. Radiographic evaluation indicated satisfactory bone healing around the transplanted tooth. Throughout the postoperative period, the patient encountered no complications. At the one-year follow-up (Figure 4-C & D), both clinical and radiographic assessments confirmed the success of the transplantation. The transplanted tooth exhibited normal occlusion, physiological mobility, and effective masticatory function. Periodontal probing revealed no pockets or signs of pathology, and the patient reported being symptom-free. Radiographs confirmed that the periodontal ligament was intact, the periradicular area remained healthy, and there was no evidence of root resorption or periapical lesions.

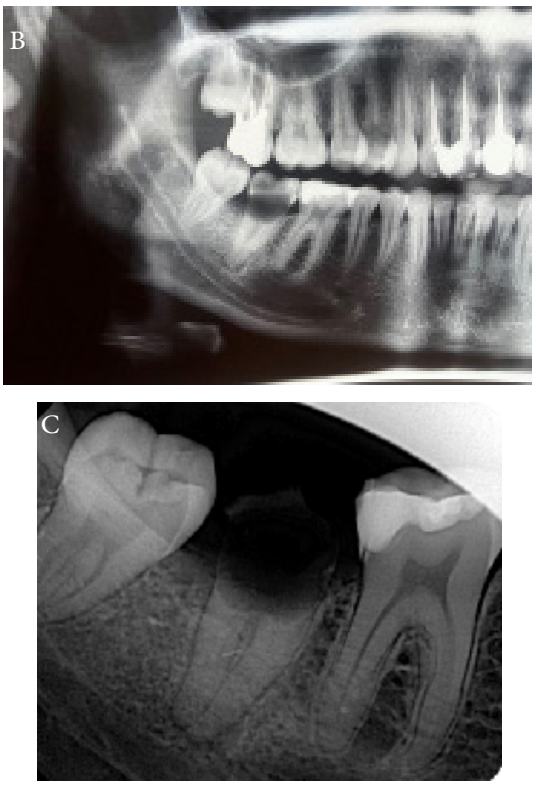
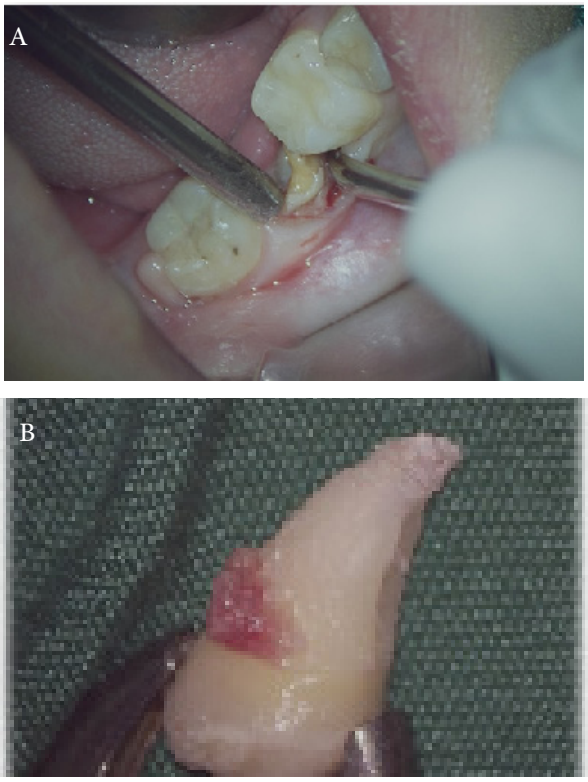


Figure 1. A) Panoramic radiograph of the patient, B) Periapical radiograph of the second and third molars, C) Clinical view of the teeth.



DOI:

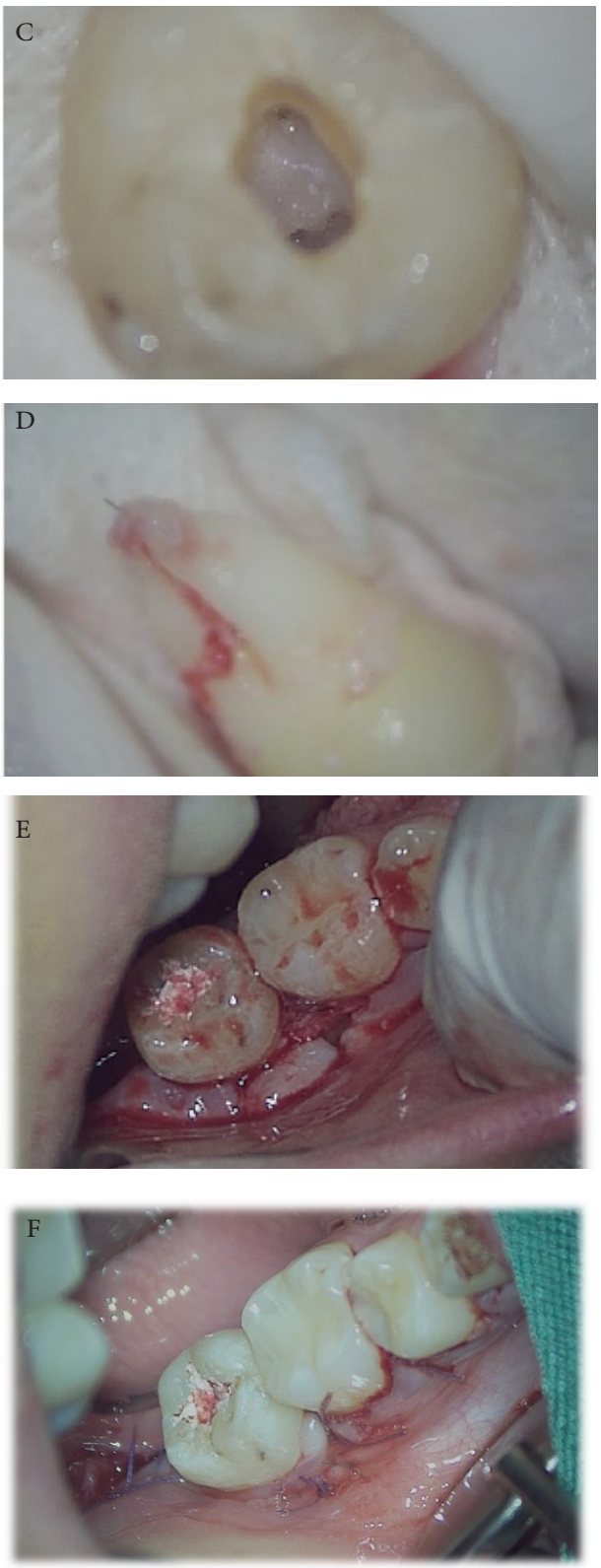


Figure 2. A) Atraumatic extraction of second molar, B)Third molar after extraction, C)pulp chamber view after preparation, D) determination of working length with a K-file that has passed through the apex, E & F) Autotrasplanting and suturing.

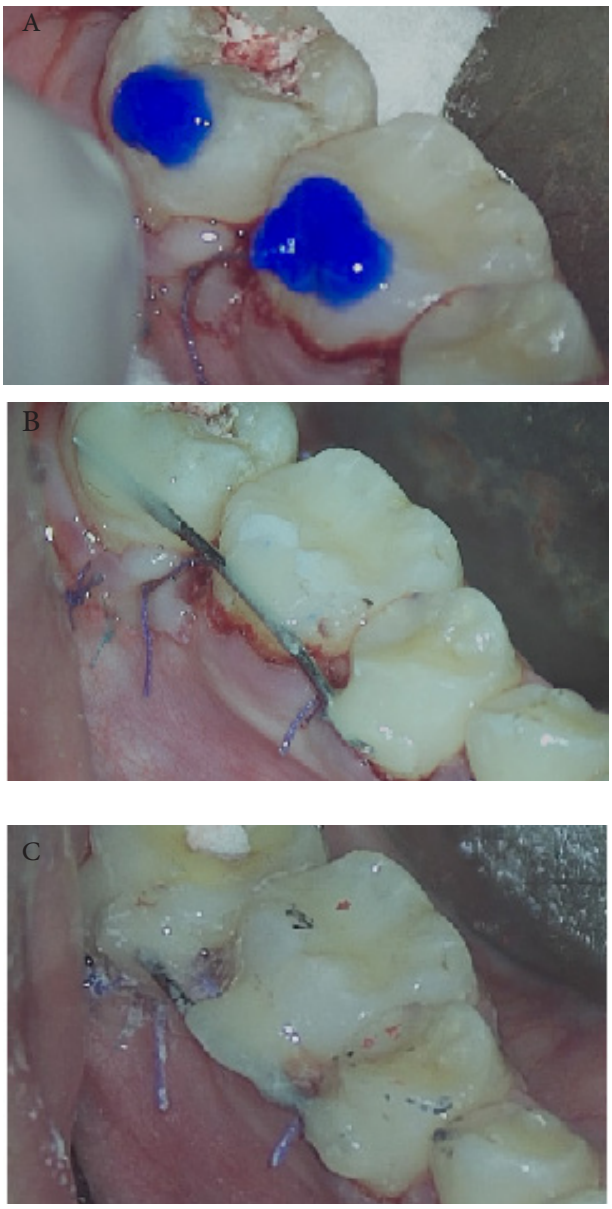
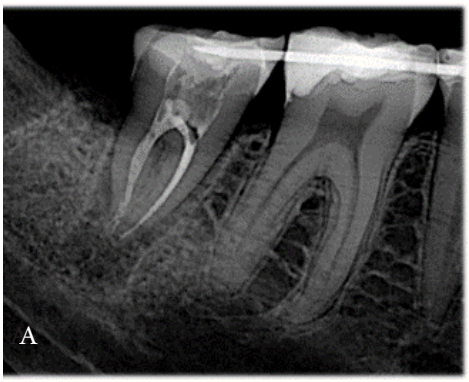


Figure 3. A & B) Applying a semirigid splint on the targeted tooth and C) occlusion adjustment after splinting.



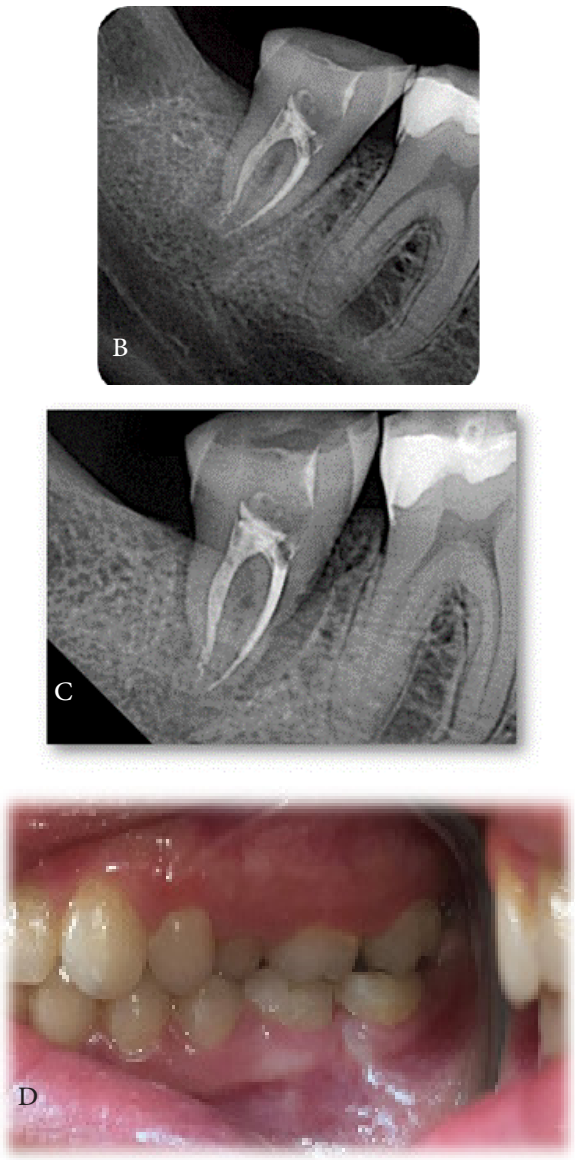


Figure 4. A) 2 weeks follow-up B) two-month follow-up C & D) 12-month follow-up and clinical view.

Discussion

The autotransplantation of teeth, particularly in the mandibular region, presents a unique and effective approach for replacing non-restorable teeth, especially in young patients where growth and development considerations preclude the use of dental implants [11]. The success of tooth autotransplantation hinges on several factors, including patient selection, the condition of the donor tooth, and the recipient site. A critical factor in the success of autotransplantation is the preservation of the periodontal ligament (PDL) on the donor tooth [12]. The viability of the PDL is paramount, as it plays a crucial role in the healing and integration of the transplanted tooth. In our case, the atraumatic extraction of both the donor and recipient teeth was meticulously performed to preserve the PDL, aligning with recommendations that emphasize minimizing trauma to enhance periodontal healing [5,13]. The success of autotransplantation is significantly influenced by anatomical variability between donor and recipient sites. Root morphology, including the number of roots, root curvature, and apical development stage, directly impacts the feasibility and prognosis of the procedure [14]. In our case, the mandibular third molar's favorable root morphology and complete development facilitated successful transplantation. However, anatomical discrepancies can lead to complications such as inadequate fit, increased extraoral time, and subsequent PDL damage, ultimately affecting long-term outcomes.

Timing is another pivotal factor. The donor tooth was kept outside the oral cavity for less than eight minutes, a critical measure that significantly enhances the prognosis by reducing the risk of PDL cell damage and necrosis. This swift handling is consistent with best practices that advocate for minimizing extraoral time to preserve the vitality of the PDL [5]. To reduce damage to PDL cells, the donor tooth should not remain outside the alveolar socket for more than 15 minutes [9]. As it was also considered in our procedure (12 minutes).

Autotransplantation offers several advantages over traditional prosthetic replacements. It maintains alveolar bone height and volume, a benefit particularly important in young patients whose jaws are still developing. This biological approach supports the natural growth of the jaw and avoids the infraocclusion issues associated with implants in growing individuals [13]. Moreover, the procedure allows for the retention of proprioception and natural tooth aesthetics, which are often compromised with artificial replacements. Despite its benefits, autotransplantation is not without challenges. Potential complications include root resorption and ankylosis, which can undermine long-term success. The careful selection of donor teeth with favorable root morphology and the preservation of the PDL are strategies to mitigate these risks. In our case, the use of a semirigid splint for stabilization post-transplantation helped ensure proper healing and integration, as supported by evidence that appropriate splinting can enhance periodontal regeneration [5]. Additionally, occlusal reduction was performed to shield the transplanted tooth from occlusal trauma and unwanted forces, ensuring the protection and healing of the surrounding periradicular tissues [15]. The one-year follow-up in our case demonstrated desirable outcomes, with the transplanted tooth showing normal occlusion, physiological mobility, and effective masti-

catory function. These results are consistent with findings from long-term studies indicating high survival rates for autotransplanted teeth, particularly when the procedure is performed under optimal conditions [13]. Chamberlin and Georig's criteria for successful tooth transplantation include stable tooth placement without inflammation, comfortable chewing, no tooth mobility, no radiographic pathology, normal lamina dura on X-rays, root growth visible on X-rays, and normal gum depth, contour, and color [2]. The presence of healthy periodontal ligament cells on the donor tooth's root surface is crucial for the healing of an autotransplanted tooth. Damage to the root cement during surgery can lead to inflammation-induced root resorption or ankylosis. Additionally, prolonged extraoral time for the donor tooth negatively impacts the viability of these cells, increasing the risk of unfavorable root resorption [2,16].

Several authors have identified risk factors for the autotransplantation of donor teeth with complete root formation. These factors include age, using molars as donor teeth, probing pocket depth of 4 mm or more, a history of root canal treatment, multi-rooted teeth, fixation with sutures, carious donor teeth, and inadequate buccal bone coverage of the transplanted teeth [2,17,18]. Dental autotransplantation (DAT) is a procedure utilized for teeth that cannot be restored, but it presents specific challenges compared to intentional replantation (IR) due to the anatomical differences between the donor tooth and the recipient site [19]. If the socket is too small, it can create excessive pressure on the donor tooth, negatively impacting the periodontal ligament (PDL) cells, while a socket that is too large may compromise the stability of the transplanted tooth. It is crucial to ensure that the recipient alveolus is approximately 10% larger than the donor tooth, which often necessitates adjustments during the surgery [9].

Effective post-operative care, including the use of flexible splints for a duration of less than six weeks, is important for facilitating healing and reducing the risk of ankylosis [9]. Recent innovations, such as the application of triple antibiotics [20] and materials like Bio-oss [21] and leukocyte- and platelet-rich fibrin (L-PRF) [22], have enhanced healing outcomes and addressed issues related to PDL recovery. Recently, scholars have been working on incorporating digital processes into tooth autotransplantation, which is a topic of discussion and could be compared in future research to further validate its effectiveness. This case report has several limitations that should be acknowledged. First, as a single case study, the generalizability of our findings is limited, and larger case series or controlled studies are needed to validate these outcomes. Second, the heterogeneity inherent in case reports makes it difficult to establish standardized protocols applicable to all clinical scenarios. Third, our follow-up period of one year, while showing promising results, represents a relatively short-term assessment. Long-term follow-up studies extending 5-10 years post-transplantation are essential to fully evaluate the procedure's success and identify potential late complications such as progressive root resorption or ankylosis.

Clinical Relevance for Practitioners

For general practitioners and endodontists, several key clinical recommendations emerge from this case. First, careful case selection is paramount—ideal candidates include young patients with healthy donor teeth and adequate recipient sites. Second, minimizing extraoral time (≤ 15 minutes) is critical for PDL preservation.

Conclusion

In summary, the successful autotransplantation of a mandibular third molar in this case highlights the importance of meticulous surgical technique and post-operative care. The procedure remains a valuable option for tooth replacement, offering both functional and aesthetic benefits, especially in young patients.

Conflict of Interest

There is no conflict of interest to declare.

References

[1] Ajay SV, Vishnani R. From Concept to Clinical Practice: A Review of Autotransplantation Techniques and Their Impact on Dentistry. Cureus. 2024; 16:e66904.

[2] Dhar S, Singh G, Mishra M, Gaur A. A Prospective Study on Autotransplantation of Mandibular Third Molars With Complete Root Formation. Craniomaxillofac Trauma Reconstr. 2022; 15:340-9.

[3] Ong DV, Goh P, Dance G. Anterior tooth autotransplantation: a case series. Aust Dent J. 2023; 68:202-15.

[4] Maqbool M, Asif J, Noorani T. Success of a tooth auto-transplant despite delayed endodontic treatment due to COVID-19 pandemic lock-down: a case report. Brazilian Dental Science. 2022; 25:e3239.

[5] Algubeal HM, Alanazi AF, Arafat AS, Fatani B, Al-Omar A. Autotransplantation of the Lower Posterior Teeth: A Comprehensive Review. Cureus. 2022; 14:e27875.

[6] Saccomanno S, Valeri C, Di Giandomenico D, Fani E, Marzo G, Quinzi V. What is the impact of autotransplantation on the long-term stability and patient satisfaction of impacted canines? A Systematic Review. Saudi Dent J. 2024; 36:1268-77.

[7] Ong DV, Dance GM. Posterior tooth autotransplantation: a case series. Aust Dent J. 2021; 66:85-95.

[8] Machado LA, do Nascimento RR, Ferreira DM, Mattos CT, Vilella OV. Long-term prognosis of tooth autotransplantation: a systematic review and meta-analysis. Int J Oral Maxillofac Surg. 2016; 45:610-7.

[9] Wang Y, Hofmann M, Ruf S, Zhang J, Huang Q. Intentional replantation and dental autotransplantation of mandibular posterior teeth: Two case reports. Medicine (Baltimore). 2023; 102:e35822.

[10] Asgary S. Autotransplantation of a Third Molar to Replace an Adjacent Unrestorable Tooth: A Case Report. Cureus. 2023; 15:e48133.

[11] Park J, Tai K, Hayashi D. Tooth Autotransplantation as a Treatment Option: A Review. The Journal of clinical pediatric dentistry. 2010; 35:129-35.

[12] Hadji A, Bader G. Assessment of an original dental autotransplantation technique: A retrospective study and proposal of a method. J Clin Exp Dent. 2024; 16:e1193-e200.

[13] Nimčenko T, Omerca G, Varinauskas V, Bramanti E, Signorino F, Cicciù M. Tooth auto-transplantation as an alternative treatment option: A literature review. Dent Res J (Isfahan). 2013; 10:1-6.

[14] Puleio F, Lizio AS, Coppini V, Lo Giudice R, Lo Giudice G. CBCT-based assessment of vapor lock effects on endodontic disinfection. Applied Sciences. 2023; 13:9542.

[15] Zakershahrak M, Moshari A, Vatanpour M, Khalilak Z, Jalali Ara A. Autogenous Transplantation for Replacing a Hopeless Tooth. Iran Endod J. 2017; 12:124-7.

[16] Lee SJ, Kim E. Minimizing the extra-oral time in autogeneous tooth transplantation: use of computer-aided rapid prototyping (CARP) as a duplicate model tooth. Restor Dent Endod. 2012; 37:136-41.

[17] Sugai T, Yoshizawa M, Kobayashi T, Ono K, Takagi R, Kitamura N, et al. Clinical study on prognostic factors for autotransplantation of teeth with complete root formation. Int J Oral Maxillofac Surg. 2010; 39:1193-203.

[18] Sugai T, Yoshizawa M, Kobayashi T, Ono K, Takagi R, Kitamura N, et al. Clinical study on prognostic factors for autotransplantation of teeth with complete root formation. International journal of oral and maxillofacial surgery. 2010; 39:1193-203.

[19] Ji H, Ren L, Han J, Wang Q, Xu C, Fan Y, et al. Tooth autotransplantation gives teeth a second chance at life: A case series. Heliyon. 2023; 9:e15336.

[20] Asgary S, Parhizkar A. Management of External Inflammatory Root Resorption following Tooth Autotransplantation Using a Modified Combination of Triple Antibiotics. Case Rep Dent. 2022; 2022:5178339.

[21] Yao L, Liu J, Cao Z, Sheng L. Study of the intentional replantation procedure used to treat a tooth with a palatogingival groove: A case report. J Clin Exp Dent. 2022; 14:e205-e10.

[22] Rey Lescure M, Valente NA, Chatelain S, Cinquini C, Barone A. Autotransplantation of Two Immature Third Molars with the Use of L-PRF. Case Rep Dent. 2021; 2021:6672711.