Case Report

Mandibular third molar autotransplantation in a 15-year-old patient: five-year radiographic and clinical follow-up case report

Wilman Rante Marampa[1*]
Mirsa Herdiani[1]
Syahril Samad[2]
Sylvia Agustin[3]

[1] Postgraduate Study Programme, Faculty of Medicine, Mulawarman University, Indonesia
[2]Department of Oral and Maxillofacial Surgery, Faculty of Medicine, Mulawarman University, Indonesia
[3]Department of Oral and Maxillofacial Radiology, Faculty of Medicine, Mulawarman University, Indonesia

* Correspondence:
wilmanrante@fk.unmul.ac.id

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ABSTRACT

Introduction: Tooth autotransplantation is a possible treatment option for the replacement of extracted permanent teeth damaged due to caries, trauma, and malformations. This method offers a quick and economical solution when a donor tooth is available to replace a non-restorable tooth. The purpose of this case report is to present a unique case of mandibular third molar autotransplantation performed in a 15-year-old patient, with five-year radiographic and clinical follow-up. **Case report**: A 15-year-old female patient presented with her parents to the emergency room at Abdul Wahab Sjahranie Regional Hospital, complaining of unbearable toothache following a previous dental filling. Intraoral examination revealed tooth 46 with a glass ionomer cement (GIC) restoration, a positive percussion test, and no history of swelling. An orthopantomogram (OPG) examination showed a radiolucent area at the apex of tooth 46. Impacted tooth 48 was observed with periodontal tissue in good condition and an incompletely formed root. Autotransplantation was performed using tooth 48 after the extraction of tooth 46. At the five-year follow-up appointment after treatment, tooth 48 remained stable and fully functional, with no complications such as mobility or infection. **Conclusion**: Tooth autotransplantation is an effective option for replacing missing teeth in young patients. Long-term success can be achieved with appropriate patient selection, atraumatic surgical technique, and careful postoperative care.

KEYWORDS

Mandible, immature teeth, third molars, autotransplantation, extraction

INTRODUCTION

Tooth autotransplantation (ATT) is a biological surgical technique in which a tooth is transferred from one site to another within the same individual. It is a viable treatment option for replacing missing or ectopically positioned teeth, particularly in children and adolescents who are still undergoing jaw development. This approach supports alveolar bone preservation, proprioception, and the potential for continued root growth, especially when immature teeth are used.[1]

The earliest documentation of third molar autotransplantation to replace first molars dates back to the 1950s.[2,3] Since then, ATT has been refined with evidence-based protocols and careful case selection. Unlike implants, which require full skeletal maturity and do not preserve periodontal ligament function, ATT allows for natural tooth adaptation and eruption guidance.[4,5] In pediatric cases, where implant placement is often contraindicated due to ongoing jaw growth, ATT presents a biologically favorable and cost-effective solution.

Several factors influence the decision-making process in choosing ATT over dental implants. These include the patient's age and skeletal development, the availability of a suitable donor tooth, the condition of the alveolar bone, and economic considerations. In young patients, ATT is particularly advantageous because it maintains proprioception, eliminates the need for prosthetic restorations, and can integrate harmoniously into the developing dentition.[6,7] However, its success is highly dependent on surgical technique and case selection, as risks such as root resorption and ankylosis may occur when the periodontal ligament is compromised.

Many studies in the literature report excellent success rates following tooth transplantation.[15] Rey Lescure et al. (2021) reported successful autotransplantation of two immature mandibular third molars in a 15-year-old patient, with no signs of root resorption, inflammation, or pain. The transplanted teeth exhibited normal periapical healing, physiological mobility, and continued root growth. After a two-year follow-up, radiographic examinations confirmed closure of the root apices with no periapical radiolucency or root resorption.[15] Rohof et al. (2018) reported long-term success rates of 97.4% after one year, 97.8% after five years, and 96.3% after ten years in cases involving autotransplanted teeth with incompletely formed roots, based on a systematic review and meta-analysis of multiple studies with follow-up periods of up to ten years. Complication rates were low, with ankylosis at 2.0%, root resorption at 2.9%, and pulp necrosis at 3.3%.[16] Success rates and long-term survival were found to be greater for autotransplanted teeth with open apices than for teeth that had undergone apex closure.[17]

Autotransplantation of mature teeth is a highly technique-sensitive procedure and requires the maintenance of viable periodontal ligament (PDL) cells that can undergo periodontal tissue regeneration.[12] During extraction and handling of donor teeth, care must be taken to avoid compression and minimize injury to PDL, because iatrogenic damage to the bud will increase susceptibility to osteoclastic resorption activity.[18] The advantage of tooth transplantation is that it improves aesthetics and masticatory function; successful tooth transplantation can maintain the volume and morphology of the alveolar bone.[19,20,9]

Autotransplantation may be indicated in cases of dentoalveolar trauma, extensive caries involving the roots, tooth agenesis, iatrogenic complications, and patients who cannot afford implant treatment.[21] The success of autotransplantation depends on multiple factors, including the stage of root development, bone management, type of surgical protocol, splinting technique, use of antibiotic coverave, time of endodontic treatment, the tissue healing process after surgery due to rupture of the neurovascular and periodontal bundles.[12,18]

The most important criterion for successful transplantation is adequate alveolar bone support in all dimensions with sufficient keratinized tissue to stabilize the transplanted tooth.[22] Another important factor for successful autotransplantation is patient selection. The patient must be in good health and have excellent oral hygiene, must receive regular dental and oral care, and be able to follow post-operative instructions and attend follow-up apointments.[23] This procedure involves atraumatic extraction of the donor tooth, followed by the creation of a socket in the recipient site and repositioning of the tooth to a new position.[20]

The purpose of this case report is to present a unique case of mandibular third molar autotransplantation performed in a 15-year-old patient using a fully blind technique without preoperative 3D imaging or surgical template. This method relies on clinical estimation and careful intraoperative adaptation of the donor tooth to the recipient socket following extraction of a severely damaged first molar. The report highlights the postoperative outcome, focusing on periodontal healing, root development, and long-term stability of the transplanted tooth over five years of radiographic and clinical follow-up.

Case Report

In August 2019, a 15-year-old female patient presented with her parents to the emergency room at Abdul Wahab Sjahranie Regional Hospital complaining of an unbearable toothache. The patient had recently undergone a dental filling at a first-level health facility. Extraoral inspection revealed no facial asymmetry, swelling, or signs of extraoral infection. Temporomandibular joint (TMJ) movements were within normal limits, and no lymphadenopathy or other abnormalities were observed on palpation. Intraoral examination showed tooth 46 with glass ionomer cement (GIC) restoration, a positive percussion test, and no history of swelling.

The orthopantomogram (OPG) revealed a radiolucent area around the apex of tooth 46, consistent with chronic apical periodontitis. Tooth 48, the mandibular third molar, was impacted but exhibited favorable morphology, an open apex, and healthy surrounding periodontal tissue (Figure 2). The root was still developing and had not yet fully formed. Based on clinical and radiographic findings, the diagnosis was non-restorable tooth 46 with chronic apical periodontitis. The treatment plan involved the extraction of tooth 46 followed by immediate autotransplantation of tooth 48 into the extraction socket.

The patient and her parents were informed of the risks and benefits of the procedure and provided consent after receiving a detailed explanation. The prognosis was considered favorable due to the patient's young age, the presence of an open root apex on the donor tooth, and the absence of systemic conditions or comorbidities. The autotransplantation was performed under local anesthesia using a fully blind technique, without surgical guide or 3D imaging.

The clinical and radiographic outcomes during the postoperative follow-up period demonstrated good periodontal healing, continued root development of tooth 48, and functional integration into the dental arch. These findings support the success of blind autotransplantation as a viable and cost-effective alternative for young patients in resource-limited settings.

The autotransplantation procedure in patients began with the administration of local anesthesia via right inferior alveolar and right lingual nerve blocks. Tooth 46 was then extracted. Following the extraction, the septum of socket 46 was freed using a straight fissure bur and saline irrigation, followed by curettage and final saline irrigation. Tooth 48 was extracted by making an envelope incision, with only a small amount of buccal bone reduction and minimal luxation. Tooth 48 was then moved into socket 46 within eight minutes. Once adapted into the socket of tooth 46, it was fixed using 4/0 silk. Suturing of the tooth socket 48 was also carried out using 4/0 silk. Postoperative medication included Cefixime 500 mg every 12 hours and Dexamethasone 0.5 mg every 8 hours for five days.

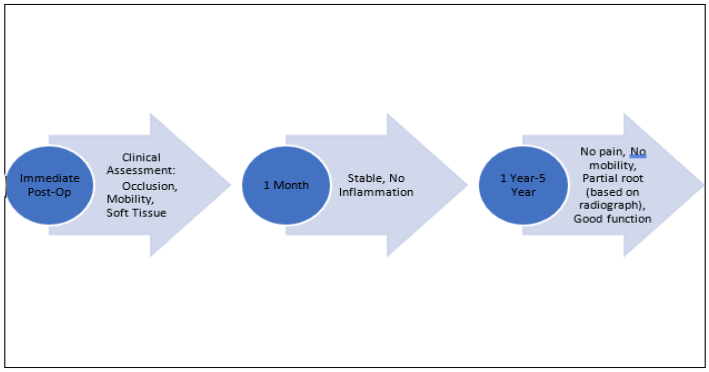

Figure 1. Timeline of clinical interventions and radiographic evaluations following the autotransplantation of tooth 48 into the socket of previously extracted tooth 46. The flowchart summarizes postoperative assessments at key time points over a 5-year follow-up period, including clinical stability, radiographic outcomes, and patient-reported comfort.

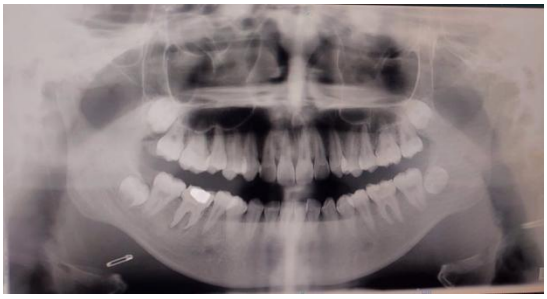

Figure 2. OPG - Initial Condition of the Patient

Figure 3. OPG - Post-Extraction of Tooth 46 for Recipient Site Preparation

Figure 4. OPG – Post-Transplantation of Tooth 48 to the Recipient Site

At the one-year-follow-up appointment after the autotransplantation of tooth 48 into the socket of tooth 46, an evaluation was conducted to monitor the development and health of the transplanted tooth. Radiographic examination was performed to assess the integration of tooth 48 into the socket of tooth 46, as well as the development of the root and surrounding periodontal tissue. Additionally, masticatory function, pain, and stiffness in the area was evaluated. When the initial follow-up results showed good integration and the absence of problems such as root resorption or infection, the patient's autotransplantation procedure could be considered successful. The patient was advised to maintain routine oral care including regular check-ups and proper dental hygiene.

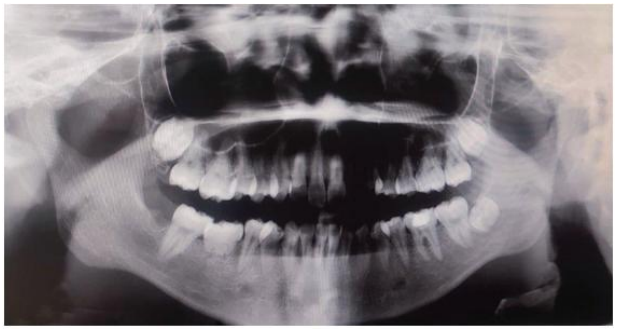

Figure 5. OPG - One Year Post-Transplantation of Tooth 48 to the Recipient Site

At the five-year post autotransplantation follow-up appointment, a comprehensive clinical and radiological evaluation was performed to assess the long-term success of the procedure. Clinical parameters evaluated included tooth mobility using Miller's Index, percussion testing, cold vitality test, and periodontal

probing to assess attachment loss and soft tissue health. Radiographic examination confirmed continued presence of partial root formation, absence of external or internal resorption and no evidence of ankylosis. Tooth 48 remained stable, functional, and asymptomatic, with the patient reporting satisfaction with masticatory function and overall oral health. (Figure 6, 7, 8)

Figure 6. Clinical Photograph of Occlusal View of tooth 48 in the Recipient Site (Five-Year Post-Autotransplantation Follow-up)

Figure 7. Clinical Photograph of Buccal View During Centric Occlusion of Tooth 48 in the Recipient Site (Five-Year Post-Autotransplantation Follow-up)

Figure 8. OPG: Five-Year Post-Autotransplantation Follow-up

DISCUSSION

Tooth autotransplantation (ATT) remains a valuable treatment option, especially in pediatric and adolescent patients with missing or non-restorable teeth. In this reported case, a mandibular third molar (tooth 48) was transplanted into the site of a severely damaged and non-restorable first molar (tooth 46) in a 15-year-old patient. This case is unique because the procedure was performed without the aid of preoperative CBCT, a surgical template, or a 3D donor tooth replica, relying solely on clinical and two-dimensional panoramic (OPG) imaging—

making it a "partially blind" approach. Despite these limitations, the 5-year follow-up showed satisfactory clinical function and periodontal stability, highlighting the feasibility of a simplified ATT protocol under constrained resources.[6,16]

This treatment choice was driven by multiple considerations. First, dental implant placement was contraindicated due to the patient's ongoing craniofacial growth. Second, a prosthetic bridge would compromise adjacent teeth and alveolar bone. ATT provides a biologically superior and cost-effective alternative that preserves the periodontal ligament (PDL), maintains proprioception, and allows for natural adaptation during growth. Studies have shown that immature donor teeth, particularly third molars with open apices, have a higher success rate due to their potential for continued root development and pulp revascularization.[16,25]

At the 5-year follow-up, the transplanted tooth remained functional and asymptomatic. Radiographic findings revealed a short root formation, likely associated with disruption or partial loss of Hertwig's epithelial root sheath (HERS), a key regulator of root elongation and PDL differentiation.[29] The vitality of the tooth appeared to be maintained through the PDL, and no signs of ankylosis, infection, or root resorption were observed. These findings support that even in cases where full root development is not achieved, long-term stability and function are still possible—a conclusion also supported in prior literature.[9,29]

From the patient's perspective, improved masticatory efficiency and satisfaction with aesthetics and function were reported. These subjective outcomes align with previous studies emphasizing patient-reported success in ATT procedures.[18] Additionally, compared to implant placement or prosthodontic solutions, ATT in adolescents supports long-term periodontal health and future orthodontic possibilities.

While high success rates (>80%) have been documented in autotransplantation of immature teeth,[6,24] success is contingent upon several critical factors: atraumatic donor tooth extraction to preserve the PDL, minimal extraoral time (ideally <15 minutes), and recipient socket adaptation. Preservation of viable PDL cells is essential, as these are sensitive to dehydration, pH shifts, and mechanical trauma.[13,24] In this case, careful handling of the donor tooth and rapid surgical execution contributed to favorable PDL healing and periodontal integration.

It is important to note that while advanced imaging modalities such as CBCT significantly improve the precision of donor-recipient matching, this particular case clearly demonstrates that successful outcomes can still be achieved using traditional 2D imaging and skilled clinical estimation. This is especially true when surgical teams are experienced and rigorously adhere to evidence-based principles. However, the absence of 3D imaging and intraoperative photographs limits the ability to fully evaluate precise details such as the socket-donor adaptation, root trajectory, and surrounding bone.

This case reinforces that ATT is not only a cost-effective and biologically favorable option but also adaptable to low-resource settings. Future improvements should include digital planning, 3D-printed surgical guides, and CBCT imaging to increase precision. Nonetheless, this report contributes to the body of evidence that ATT, even under "blind" conditions, remains viable and successful, particularly in growing patients with suitable donor teeth.

Future research should focus on developing standardized protocols for case selection and evaluating long-term patient satisfaction to further validate the effectiveness of this treatment approach.

A major limitation in this case was the absence of preoperative and postoperative CBCT imaging, which limited comprehensive assessment of root structure and alveolar integration.

CONCLUSION

Dental autotransplantation is an effective option for replacing missing teeth in young patients. Long-term success can be achieved with appropriate patient selection, atraumatic surgical technique, and careful postoperative care. The implication of this research is that autotransplantation should be considered a viable alternative to implants or prosthetic solutions, particularly in young patients with ongoing jaw development. This study reinforces the need for comprehensive case selection, meticulous surgical execution, and postoperative monitoring to ensure favorable outcomes.

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Data Availability Statement: We encourage all authors of articles published in PJD journals to share their research data. In this section, please provide details regarding where data supporting reported results can be found, including links to publicly archived datasets analyzed or generated during the study. Where no new data were created, or where data are unavailable due to privacy or ethical restrictions, a statement is still required.
Conflicts of Interest: The authors declare no conflict of interest.

REFERENCES

1. Al-Khanati NM, Albassal A, Kara Beit Z. Unusual Indications of Teeth Transplantation: A Literature Review. Cureus. 2022;14(9):1–8. https://doi.org/10.7759/cureus.29030
2. Martin K, Nathwani S, Bunyan R. Autotransplantation of teeth: An evidence-based approach. Br Dent J. 2018;224(11):861–4. https://doi.org/10.1038/sj.bdj.2018.432
3. Monteiro J, Barber S, Jawad Z, Duggal M, Houghton N. Tooth Autotransplantation Part 1: uses, indications and factors affecting success. Orthod Updat. 2019;12(2):63–9. https://doi.org/10.12968/ortu.2019.12.2.63
4. Dharmani U, Jadhav GR, Dharmani CKK, Devi TP. Mineral trioxide aggregate pulpotomy in autotransplanted immature mandibular third molar with a 4-year follow-up. J Conserv Dent. 2016;19(3):293–5. https://doi.org/10.4103/0972-0707.181951
5. Sicilia-Pasos J, Kewalramani N, Peña-Cardelles J, Salgado-Peralvo A, Madrigal-Martínez-Pereda C, López-Carpintero Á. Autotransplantation of teeth with incomplete root formation: systematic review and meta-analysis. Clin Oral Investig [Internet]. 2022;26(5):3795–3805. https://doi.org/10.1007/s00784 022-04435-8
6. Plotino G, Abella Sans F, Duggal MS, Grande NM, Krastl G, Nagendrababu V, et al. European Society of Endodontology position statement: Surgical extrusion, intentional replantation and tooth autotransplantation: European Society of Endodontology developed by: Int Endod J. 2021;54(5):655–9. https://doi.org/10.1111/iej.13456
7. Barendregt D, Louropoulou A, Linssen M, et al. An evaluation of 1654 premolars transplanted in the posterior region. Dent Traumatol. 2021;37(6):711-719. https://doi.org/10.1111/edt.12849
8. Pecci Lloret MP, Martínez EP, Rodríguez Lozano FJ, Pecci Lloret MR, Gironés JG, Riccitiello F, et al. Influencing factors in autotransplantation of teeth with open apex: A review of the literature. Appl Sci. 2021;11(9). https://doi.org/10.3390/app11094037
9. Akhlef Y, Schwartz O, Andreasen JO, Jensen SS. Autotransplantation of teeth to the anterior maxilla: A systematic review of survival and success, aesthetic presentation and patient-reported outcome. Dent Traumatol. 2018;34(1):20–7. https://doi.org/10.1111/edt.12379
10. Ong DCV, Dance GM. Posterior tooth autotransplantation: a case series. *Aust Dent J.* 2021;66:85–95. https://doi.org/10.1111/adj.12757
11. Kulkarni MU, Desai N. Autotransplantation of a mandibular third molar, using a customized reservoir. J Conserv Dent. 2020;23(2):206–10. https://doi.org/10.4103/JCD.JCD_246_20
12. Tsukiboshi M, Tsukiboshi C, Levin L. A step-by step guide for autotransplantation of teeth. Dent Traumatol. 2023;39(S1):70–80. https://doi.org/10.1111/edt.12819
13. Ashurko I, Vlasova I, Yaremchuk P, Bystrova O. Autotransplantation of teeth as an alternative to dental implantation. BMJ Case Rep. 2020;13(6):6–10. https://doi.org/10.1136/bcr-2020-234889
14. Rey Lescure M, Valente N, Chatelain S, Cinquini C, Barone A. Autotransplantation of two immature third molars with the use of L-PRF. *Case Rep Dent.* 2021;2021:6672711. https://doi.org/10.1155/2021/6672711.
15. Rohof ECM, Kerdijk W, Jansma J, Livas C, Ren Y. Autotransplantation of teeth with incomplete root formation: a systematic review and meta-analysis. *Clin Oral Investig.* 2018;22(4):1613-1624. https://doi.org/10.1007/s00784-018-2408-z.
16. Atala-Acevedo C, Abarca J, Martínez-Zapata MJ, Díaz J, Olate S, Zaror C. Success Rate of Autotransplantation of Teeth With an Open Apex: Systematic Review and Meta-Analysis. J Oral Maxillofac Surg. 2017;75(1):35–50. https://doi.org/10.1016/j.joms.2016.09.010

17. Tan BL, Tong HJ, Narashimhan S, Banihani A, Nazzal H, Duggal MS. Tooth autotransplantation: An umbrella review. Dent Traumatol. 2023;39(S1):2–29. https://doi.org/10.1111/edt.12836
18. Algubeal HM, Alanazi AF, Arafat AS, Fatani B, Al-Omar A. Autotransplantation of the lower posterior teeth: A comprehensive review. *Cureus.* 2022;14:e27875. doi:10.7759/cureus.27875. https://doi.org/10.7759/cureus.27875.
19. Ajay SV, Vishnani R. From concept to clinical practice: A review of autotransplantation techniques and their impact on dentistry. *Cureus.* 2024;16:e66904. https://doi.org/10.7759/cureus.66904.
20. Esteve-Pardo G, Lozano-Montoya A, Esteve-Colomina L. Dental autotransplantation or immediate single implant for the replacement of a hopeless molar: A comparative case series study. *Int J Periodontics Restorative Dent.* 2024;0(0):1-27. https://doi.org/10.11607/prd.5078.
21. Noenko I, Kostura K, Khodakov O. Clinical aspects of tooth autotransplantation and post-endodontic restoration of autotransplanted tooth: case-based literature review. *Ukrainian Dent J.* 2022;1(1):27-36. https://doi.org/10.56569/udj.1.1.2022.27-36.
22. Najafi E, Jafarzadeh H, Dastpak M. Autotransplantation of a mandibular third molar: A case report. J Dent Mater Tech. 2017;6(3):142–6. Available from: https://jdmt.mums.ac.ir/article_8941_57bb089dbbb942964976d38289d01250.pdf
23. Kakde K, K R. Tooth Autotransplantation as an Alternative Biological Treatment: A Literature Review. Cureus. 2022;14(10). https://doi.org/10.7759/cureus.30491
24. Raabe C, Bornstein MM, Ducommun J, Sendi P, von Arx T, Janner SFM. A retrospective analysis of autotransplanted teeth including an evaluation of a novel surgical technique. Clin Oral Investig. 2021;25(6):3513–25. https://doi.org/10.1007/s00784-020-03673-y
25. Plotino G, Abella Sans F, Duggal MS, Grande NM, Krastl G, Nagendrababu V, et al. Present status and future directions: Surgical extrusion, intentional replantation and tooth autotransplantation. Int Endod J. 2022;55(S3):827–42. https://doi.org/10.1111/iej.13723
26. Plotino G, Abella Sans F, Duggal MS, Grande NM, Krastl G, Nagendrababu V, et al. Clinical procedures and outcome of surgical extrusion, intentional replantation and tooth autotransplantation – a narrative review. Int Endod J. 2020;53(12):1636 52. https://doi.org/10.1111/iej.13396
27. Luca B, Michele M, Federico B. Long term survival of mature autotransplanted teeth: a retrospective single center analysis. Build Environ [Internet]. 2020;107386. https://doi.org/10.1016/j.buildenv.2020.107386
28. Guo Y, Guo W, Chen J, Chen G, Tian W, Bai D**.** Are Hertwig's epithelial root sheath cells necessary for periodontal formation by dental follicle cells? *Arch Oral Biol.* 2018;94:1–9. https://doi.org/10.1016/j.archoralbio.2018.0.
29. Da Silva Almeida T, Roldi A, Finck N, Beltrame L, Intra J, Lima T**.** Pulp survival and periodontal healing of autotransplanted teeth: a retrospective study. *Res Soc Dev.* 2022;11(17). https://doi.org/10.33448/rsd-v11i17.39196.