



Perspective

Should we predict poor prognosis in autotransplantation of teeth with completed root formation?

ARTICLE INFO

Keywords

Oral surgery
Dental autotransplantation
Impacted teeth
Root formation
Apical diameter
Root canal treatment

ABSTRACT

Dental autotransplantation is a dental treatment whereupon a natural donor tooth from the same person replaces a missing tooth at the recipient site. This treatment modality has been ignored by many clinicians for decades. This paper discusses the “poor” prognosis of autotransplantation of teeth with complete root formation as described in a recent publication. It delivers a straightforward message indicating that success and failure are multifactorial.

Perspective

Dental autotransplantation (DAT) is a dental treatment where a natural donor tooth from the same individual replaces a missing one at the recipient site. DAT can be described as the “ignored chapter of dentistry”, even though literature confirms its therapeutic reliability with predictable success [1]. In many clinical scenarios, dental practitioners and implantologists plan implants and/or prosthodontic rehabilitations, and ignore DAT even where there is clear indication of DAT. Lack of sufficient knowledge and clinical experience specifically with this treatment modality may be a reason [1]. Given this gap in DAT knowledge and practice, a greater attention should be drawn to this forgotten chapter of dentistry.

Algubeal et al. have presented recently an interesting, very informative review on the subject [2]. This literature review included many important aspects regarding DAT treatment protocols, e.g., indications, contraindications, proposed guidelines and criteria for case selection, and factors affecting DAT survival and success [2]. But they described the prognosis of transplantation of a tooth with completed root formation as “poor”. We believe this is questionable. Hereby, we have issued the following question: Is autotransplantation of teeth with completed root formation associated with poor prognosis?

In fact, many factors can influence the outcome of DAT. These may include transplant status, trauma during dental extraction, recipient site preparation, vascularity, presence of infection, extra-alveolar time, fitting attempts, transplant preservation medium, fixation method, presence of occlusal trauma after DAT, and the need for endodontic treatment. In the past, we thought that completed root formation with small apical diameter would prevent pulp revascularization and healing after DAT, and root canal treatment (RCT) would be a must as near as possible. Later on, emerging evidence let us reconsider this [3–6]. The apical foramen size smaller than 1mm does not prevent successful revascularization and healing of pulp tissues [4]. No significant associations were found between DAT success and apex width or root development stage according to Ronchetti et al. [5]. Root canal treatment of the donor tooth, especially if performed extra-orally, can damage the periodontal ligament and negatively affect DAT success. So, we never

perform RCT extra-orally, and prefer not to perform it at all unless signs of pulp necrosis are shown. This is also in line with the results of Dhar et al. [6]. They stated that endodontic treatments of mature transplants were unnecessary as they were asymptomatic after 1 year of follow-up [6]. Moreover, Kokai et al. reported DAT of teeth with complete root formation with 5-year and 10-year survival rate of 96.4% and 89.5% respectively [7]. Kimura et al. reported successful DAT of mandibular third molar with complete root formation that was followed up for 29 years [8]. The transplant showed satisfactory functional outcomes without symptoms over the 29 years after DAT [8].

In conclusion, our experience and evidence-based practice indicate that transplantation of teeth with complete root formation can be a predictable treatment with many influencing factors, and is not necessarily associated with poor prognosis.

Ethical approval

Ethical approval is not needed for this manuscript.

Sources of funding

This paper received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author contributions

All authors have contributed substantially to the work.

Conceptualization, N.M.A. and Z.K.B.; Writing- original draft, N.M.A.; Writing-review and editing, Z.K.B.; Final approval, N.M.A. and Z.K.B.

Registration of research studies

1. Name of the registry: N/A
2. Unique Identifying number or registration ID: N/A
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

<https://doi.org/10.1016/j.amsu.2022.104501>

Received 17 August 2022; Accepted 21 August 2022

Available online 25 August 2022

2049-0801/© 2022 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Guarantor

Dr. Nuraldeen Maher Al-Khanati; nuraldeen.alkhanati@gmail.com.

Consent

N/A.

Declaration of competing interest

Each named author has no conflict of interest, financial or otherwise.

References

- [1] N.M. Al-Khanati, Z. Kara Beit, Is dental autotransplantation underestimated and underused by Syrian dentists? *J Educ Eval Health Prof* 18 (2021) 18, <https://doi.org/10.3352/jeehp.2021.18.18>.
- [2] Algubeal HM, Alanazi AF, Arafat AS, Fatani B, Al-Omar A. Autotransplantation of the lower posterior teeth: a comprehensive review. *Cureus* 14(8):e27875. doi: 10.7759/cureus.27875.
- [3] N.M. Al-Khanati, Z. Kara Beit, Reconsidering some standards in immediate autotransplantation of teeth: case report with 2-year follow-up, *Ann Med Surg (Lond)*. 75 (2022), 103470, <https://doi.org/10.1016/j.amsu.2022.103470>.
- [4] W.G. Laureys, C.A. Cuvelier, L.R. Dermaut, G.A. De Pauw, The critical apical diameter to obtain regeneration of the pulp tissue after tooth transplantation, replantation, or regenerative endodontic treatment, *J. Endod.* 39 (6) (2013) 759–763, <https://doi.org/10.1016/j.joen.2013.02.004>.
- [5] M.F. Ronchetti, S. Valdec, N. Pandis, M. Locher, H. van Waes, A retrospective analysis of factors influencing the success of autotransplanted posterior teeth, *Prog. Orthod.* 16 (2015) 42, <https://doi.org/10.1186/s40510-015-0112-y>.
- [6] S. Dhar, G. Singh, M. Mishra, A. Gaur, A prospective study on autotransplantation of mandibular third molars with complete root formation, *Craniomaxillofacial Trauma Reconstr.* (2022), <https://doi.org/10.1177/19433875211055600>.
- [7] S. Kokai, Z. Kanno, S. Koike, S. Uesugi, Y. Takahashi, T. Ono, K. Soma, Retrospective study of 100 autotransplanted teeth with complete root formation and subsequent orthodontic treatment, *Am. J. Orthod. Dentofacial Orthop.* 148 (6) (2015) 982–989, <https://doi.org/10.1016/j.ajodo.2015.06.018>.
- [8] H. Kimura, Y. Hamada, T. Eida, T. Kumano, K. Okamura, M. Yokota, Long-term outcome of autotransplantation of a complete root formed a mandibular third molar, *Case Rep Dent* 2021 (2021), 5512804, <https://doi.org/10.1155/2021/5512804>.

Nuraldeen Maher Al-Khanati*, Zafin Kara Beit

Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Damascus University, Damascus, Syria

* Corresponding author. Department of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Damascus University, P.O. Box 222, Damascus, Syria.
E-mail address: nuraldeen.alkhanati@gmail.com (N.M. Al-Khanati).