

**Original research, Clinical Sequela and Two-Year
Follow-up of Improperly Splinted Avulsed Primary
Central Incisors: A Case Report**

DOI: <https://doi.org/10.31920/2978-3402/2026/v2n1a4>

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Abstract

Introduction: Avulsion is a common traumatic dental injury (TDI) affecting the primary anterior dentition. To prevent further trauma to the permanent successor and avoid the risk of aspiration, the reimplantation of avulsed primary teeth is strictly contraindicated. This case report aimed to contribute to the emerging evidence on traumatic dental injuries (TDIs) in the primary dentition and their follow-up, and to highlight the clinical consequences of deviating from established pediatric dental trauma guidelines.

Case Report: A 4-year-old girl presented with pain in the anterior region and complications related to previously splinted teeth following an avulsion injury, including gingival inflammation, increased tooth mobility, and dental caries.

Treatment: The mobile teeth and the splint were removed, and the anterior carious teeth were restored. A two-year follow-up demonstrated normal age-appropriate development with no clinical symptoms.

Conclusions: Reimplantation of avulsed primary teeth carries significant risks for the permanent successors, including infection, bone loss, and aspiration. It is essential that dentists remain informed about current management guidelines to minimise treatment failures.

Keywords: *Traumatic dental injuries, Primary teeth, Pediatric dentistry, Avulsion, stabilisation, Root resorption*

Introduction

Avulsion, along with other luxation injuries, is a common occurrence in the primary anterior dentition following traumatic dental injuries (TDIs), whereas crown fractures are more frequently observed in the permanent dentition. This difference is attributed to the fact that primary teeth possess a more flexible bone structure, shorter roots, and a more vertical root orientation than those in the permanent dentition (Levin et al., 2020).

Reimplantation of avulsed primary teeth is contraindicated by the International Association of Dental Traumatology (IADT) due to the treatment burden at a young age, including splint placement and removal, and the need for root canal treatment. Furthermore, reimplantation may cause further damage to the developing permanent tooth or alter its eruption path, and there is also a risk of aspiration of a mobile tooth. Follow-up is essential to monitor the development and eruption of the permanent teeth (Day et al., 2020).

In contrast to the extensive literature on the reimplantation of avulsed permanent teeth, research on the reimplantation of avulsed primary teeth remains notably limited. In addition, there is limited evidence to support treatment options for emergencies in the primary dentition. Observation is generally considered the best strategy, provided there is no immediate risk of aspiration or occlusal interference. This conservative strategy may reduce further suffering for the child and their family and prevent additional damage to the permanent dentition (Andreasen JO et al., 2019).

It is important to discuss the expected sequelae of TDIs in primary teeth. Management depends on the clinicians' judgment, the child's maturity, their adherence to treatment and ability to cope with an emergency situation, the expected time of tooth exfoliation, the occlusion, access to resources and the financial situation, as well as the presence of multiple traumatic exposures to the same tooth that may further compromise the prognosis (Bourguignon et al., 2020).

What complicates the situation is that this trauma may be the reason for the child's first visit. Parents should be advised on managing acute symptoms of dental injuries, including the use of analgesics such as

ibuprofen or acetaminophen for pain relief. Developing a structured approach for diagnosing and treating trauma—incorporating history taking, radiographs, laboratory tests, and oral photographs as a permanent injury record—is strongly recommended (Day et al., 2020).

While there is no doubt that the IADT guidelines have contributed to improved care processes and patient outcomes for TDIs, the best available evidence remains insufficient or even contradictory for certain types of injuries. Furthermore, the level of evidence underpinning the treatment recommendations in the IADT guidelines is not graded, and the scientific rationale for recent changes is not clearly articulated (Philip et al., 2023).

The IADT guidelines are therefore grounded in a combination of available research evidence and expert panel consensus, due to the unique challenges inherent in conducting dental trauma research. While the IADT cannot guarantee favourable outcomes, adherence to the guidelines can maximise the chances of success (Levin et al., 2020).

Thus, increased reporting of TDIs can strengthen the existing body of evidence and support the development of robust guidelines with higher levels of recommendation. Reporting this case was intended to contribute to the emerging evidence on TDIs in primary dentition and their follow-up protocols. This case underscores the clinical consequences of deviating from established pediatric dental trauma guidelines, emphasising the importance of addressing post-trauma outcomes from both clinical and patient perspectives.

Case Report

A four-year-old girl presented with spontaneous dull pain in the anterior maxillary region. The history revealed that, at the age of three, she had suffered from avulsion of both maxillary primary incisors. Another dentist had reimplanted both teeth, stabilised them with a wire-composite splint, and the splint had remained in place since that time (Figure 1). The mother reported that the previous dentist had failed to provide instructions at any stage of treatment regarding when or why the splint needed to be removed.

Clinical examination revealed gingival inflammation beneath the splint, grade 3 mobility (Kim et al., 2023) in both reimplanted central incisors, and active labial caries in the adjacent non-traumatised teeth, namely the right lateral incisor and the left canine (Figure 2). Although periapical or occlusal radiographs are the recommended imaging

modalities for the evaluation of avulsed primary teeth (Day et al., 2020), the mother had already obtained a panoramic radiograph (Figure 3) prior to presentation to assess potential trauma-related complications. Therefore, additional periapical radiographs were avoided to minimise unnecessary radiation exposure that would not have altered either the diagnosis or the treatment decision, which was extraction of the central incisors with grade 3 mobility (American Academy of Pediatric Dentistry, 2025b).

Although physiological root resorption is expected in primary teeth at age four to five years, it is not expected to cause clinical grade 3 mobility. Furthermore, physiological resorption is generally driven by the permanent successor's approximation, whereas the panoramic radiograph (Figure 3) shows spacing between the successor and the resorbed root, which is particularly evident in the right incisor.

Treatment

Written informed consent for treatment and for the publication of anonymised clinical and radiographic images was obtained from the parent.” The mobile central incisors were removed together with the splint to avoid the risk of aspiration (Day et al., 2020) (Figure 4), and the other anterior carious teeth were restored with glass ionomer restorations. The parent was advised to manage the child's diet carefully to prevent additional soft tissue trauma, maintain oral hygiene using a soft toothbrush, and cleanse the oral cavity twice daily with topically applied 0.2% chlorhexidine (American Academy of Pediatric Dentistry, 2025a). Two years later, another panoramic radiograph (Figure 5) showed normal age-appropriate development (Figures 6 and 7), favourable outcomes including healed gingiva, no clinical symptoms of pain or infection, and no radiographic signs of stunted eruption or bone rarefaction in the traumatised area (Day et al., 2020).



Figure 1: Original case presentation with reimplanted avulsed primary central incisors and gingival inflammation around a one-year-old splint



Figure 2: Gingival inflammation below the splint “white arrows”, and cavities in the adjacent non-traumatized teeth “black arrows”

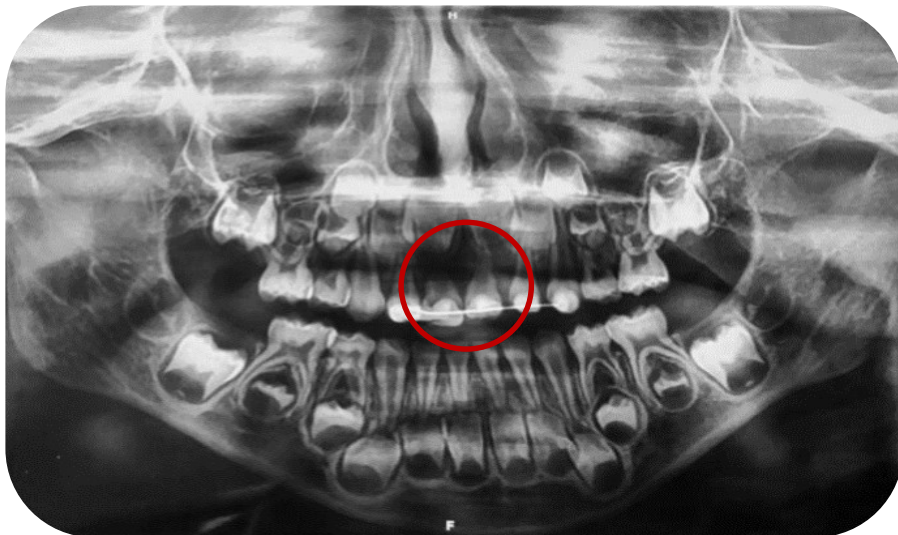


Figure 3: Panoramic radiograph showing pathologic root resorption of the splinted primary central incisors

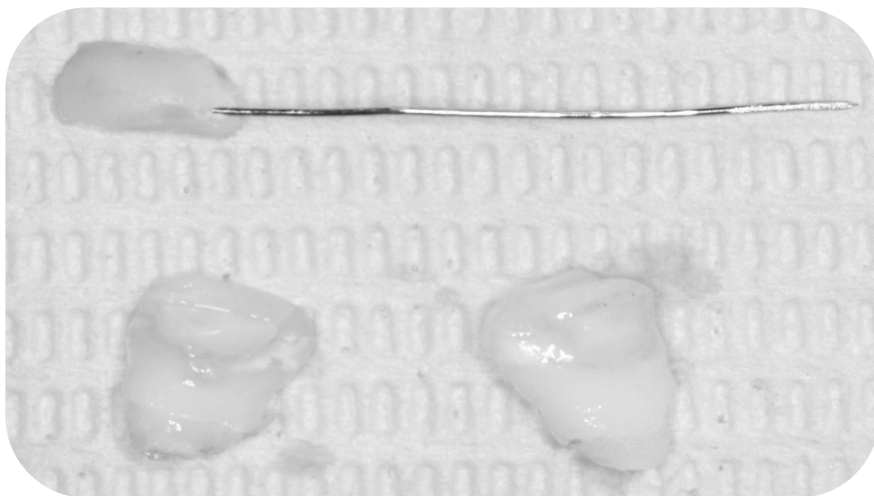


Figure 4: Removal of the wire and composite splint, extraction of both resorbed mobile anterior primary central incisors

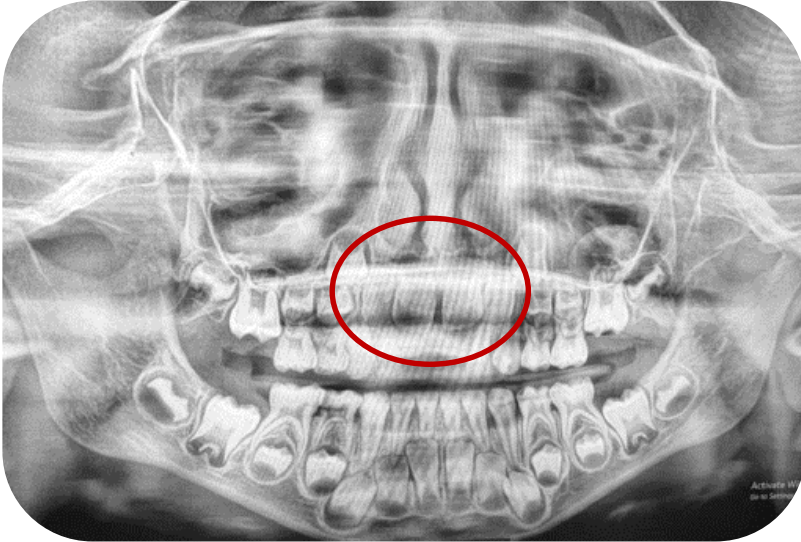


Figure 5: Panoramic radiograph two years later, showing normal development

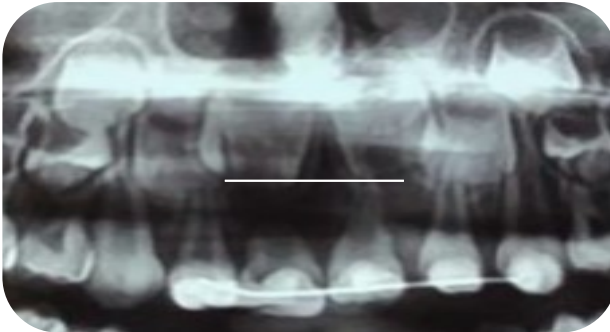


Figure 6: The level of the permanent central incisors is still above that of the laterals “white line” on the initial presentation

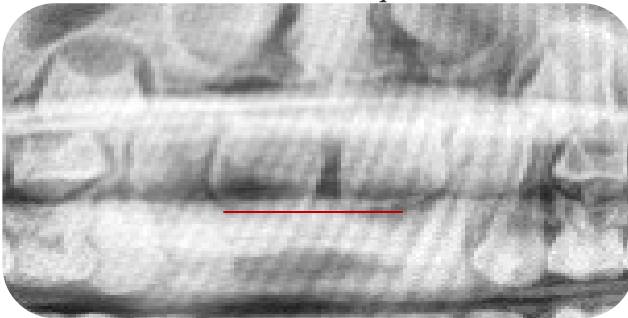


Figure 7: The level of the permanent central incisors exceeds that of the laterals, “red line,” indicating ongoing eruption two years later

Discussion

Reimplantation of avulsed primary teeth continues to be reported in the literature, despite being contraindicated by the IADT guidelines (Akitomo et al., 2025). Concerns about potential disruptions to speech, mastication, or tongue posture, coupled with the psychological impact on the growing child, may prompt this practice (De Carvalho Rocha & Cardoso, 2008).

However, when weighing the risks of aspiration of a mobile tooth, infection of the pulp or socket of the reimplanted tooth, the need for additional cooperation from the child, potential deviation or impaction of the permanent successor, and the possibility of enamel hypoplasia against the functional and aesthetic benefits of maintaining a primary anterior tooth, the recommended course of action is to discard avulsed primary teeth (Al-Khayatt & Davidson, 2005).

Conversely, some authors contend that most of the aforementioned problems lack robust clinical evidence and remain largely anecdotal. They argue that there is no conclusive proof that these complications result from replantation itself rather than from the initial traumatic injury. Furthermore, the clinical relevance of extraoral dry time, the developmental stage of the permanent successor, the child's age, and the child's ability to cooperate with a potentially painful treatment are all called into question (Holan, 2013).

The widespread recommendation against replantation of avulsed primary incisors appears to be based primarily on opinion and assumption rather than robust scientific evidence. The available literature is limited and consists largely of a few case reports. The fear of being accused of causing damage to permanent teeth may partly explain the high level of consensus among dentists and their adherence to current recommendations. Furthermore, a primary contributor to dentists' reluctance to perform replantation is the absence of both clear, well-defined clinical guidelines and long-term research demonstrating high success rates (Holan, 2013).

Authors reported a 5-year follow-up of a replanted primary tooth managed in emergency care. The tooth later became ankylosed, and the authors recommended replanting primary teeth and monitoring them until pathologic root resorption leading to mobility or ankylosis causing deflection of the permanent successor occurs before intervening surgically (Akitomo et al., 2025).

Other authors deliberately replanted a primary tooth in a two-year-old child, followed by splinting, and observed favorable outcomes until pathological resorption occurred later, necessitating endodontic treatment. They claimed that unfavorable outcomes would not occur if the extraoral dry time did not exceed 30 minutes and the tooth was stored in milk. The tooth was maintained in situ until eruption of the permanent incisor. (De Carvalho Rocha & Cardoso, 2008).

In this case report, three aspects deviate from current clinical evidence: reimplanting avulsed primary teeth, splinting them, and maintaining the splint for 1 year. For the primary dentition, current protocols limit splinting to a maximum of four weeks, followed by a mandatory clinical review for reevaluation. (Levin et al., 2020).

This may have occurred due to outdated knowledge, gaps in practitioner training, or parental expectations. The subsequent proposed treatment aimed to limit further damage to bone and soft tissue. It also protected the child from a potential emergency related to aspiration of mobile teeth or splint components. This treatment is in line with the latest IADT guidelines (Day et al., 2020).

This report is limited by the fact that the initial replantation occurred in an urgent care clinic; detailed documentation regarding the dental trauma and the condition of the avulsed primary incisor was therefore missing, and the extraoral dry time could not be retrieved during the history-taking session.

Recommendations

Reviewing the existing body of evidence before making clinical decisions regarding TDIs in primary teeth and reporting the clinical findings to further strengthen the developing evidence base on this topic. (Philip et al., 2023).

Information on how to manage severe and unexpected avulsive injuries should be made readily available to guardians and teachers. The “Save a Tooth” poster—available in multiple languages—and the “ToothSOS” mobile application, which offers emergency dental injury instructions, are both accessible resources on the IADT website. (Fouad et al., 2020).

Conclusions

Reimplantation of avulsed primary teeth carries additional risks to the permanent successors, including infection, progressive bone loss, increased tooth mobility, and aspiration in young children. Therefore, current guidelines still advise against the replantation of avulsed primary teeth. This case demonstrates that managing paediatric dental injuries must adhere to current evidence-based clinical standards.

Conflict of Interest: None declared

References

- Akitomo, T., Hamaguchi, S., Mitsuhashi, C., & Nomura, R. (2025). Long-Term Follow-Up of a Patient with Ankylosis of a Primary Incisor Caused by Trauma: A Case Report. *Reports*, 8(1), 27.
- Al-Khayatt, A. S., & Davidson, L. E. (2005). Complications following replantation of a primary incisor: A cautionary tale. *British Dental Journal* 2005, 198(11), 687-688.
- American Academy of Pediatric Dentistry. (2025a). Periodontal Conditions in Pediatric Dental Patients. *The Reference Manual of Pediatric Dentistry*, 527-544.
- American Academy of Pediatric Dentistry. (2025b). Prescribing Dental Radiographs for Infants, Children, Adolescents, and Individuals with Special Health Care Needs. *The Reference Manual of Pediatric Dentistry*, 332-336.
- Andreasen JO, Andreasen FM, & Andersson L. (2019). *Textbook and Color Atlas of Traumatic Injuries to the Teeth*.
- Bourguignon, C., Cohenca, N., Lauridsen, E., Flores, M. T., O'Connell, A. C., Day, P. F., Tsilingaridis, G., Abbott, P. V., Fouad, A. F., Hicks, L., Andreasen, J. O., Cehreli, Z. C., Harlamb, S., Kahler, B., Oginni, A., Semper, M., & Levin, L. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. *Dental Traumatology: Official Publication of International Association for Dental Traumatology*, 36(4), 314-330.
- Day, P. F., Flores, M. T., O'Connell, A. C., Abbott, P. V., Tsilingaridis, G., Fouad, A. F., Cohenca, N., Lauridsen, E., Bourguignon, C., Hicks, L., Andreasen, J. O., Cehreli, Z. C., Harlamb, S., Kahler, B.,

- Oginni, A., Semper, M., & Levin, L. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dental Traumatology*, 36(4), 343-359.
- De Carvalho Rocha, M. J., & Cardoso, M. (2008). Reimplantation of primary tooth--case report. *Dental Traumatology: Official Publication of International Association for Dental Traumatology*, 24(4).
- Fouad, A. F., Abbott, P. V., Tsilingaridis, G., Cohenca, N., Lauridsen, E., Bourguignon, C., O'Connell, A., Flores, M. T., Day, P. F., Hicks, L., Andreassen, J. O., Cehreli, Z. C., Harlamb, S., Kahler, B., Oginni, A., Semper, M., & Levin, L. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth. *Dental Traumatology: Official Publication of International Association for Dental Traumatology*, 36(4), 331-342.
- Holan, G. (2013). Replantation of avulsed primary incisors: A critical review of a controversial treatment. *Dental Traumatology*, 29(3), 178-184.
- Kim, G. Y., Kim, S., Chang, J. S., & Pyo, S. W. (2023). Advancements in Methods of Classification and Measurement Used to Assess Tooth Mobility: A Narrative Review. *Journal of Clinical Medicine*, 13(1), 142.
- Levin, L., Day, P. F., Hicks, L., O'Connell, A., Fouad, A. F., Bourguignon, C., & Abbott, P. V. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: General introduction. *Dental Traumatology: Official Publication of International Association for Dental Traumatology*, 36(4), 309-313.
- Philip, N., Nazzal, H., & Duggal, M. S. (2023). Critical appraisal of the 2020 IADT Guidelines: A personal commentary. *Dental Traumatology: Official Publication of International Association for Dental Traumatology*, 39(5), 509-516.