



# Alveolar Bone Preservation After Pediatric Dental Trauma: A Case Report



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## Introduction

Complicated crown and root fractures of permanent anterior teeth in pediatric patients present significant clinical challenges, particularly during periods of active craniofacial growth. Management in growing children must prioritize timely intervention, preservation of alveolar bone, coordinated multidisciplinary care, and maintenance of esthetics to support optimal functional outcomes and psychosocial well-being. Evidence supports that intentional retention of permanent incisor roots can aid in preserving alveolar bone and improving long-term outcomes in young patients (Rodd et al., 2002). Additionally, individualized, staged management approaches such as decoronation, pulp therapy, and interim prosthetic rehabilitation are critical to stabilize traumatized teeth and maintain ridge integrity until definitive treatment becomes feasible (Fidel et al., 2011). These strategies highlight the importance of comprehensive care that addresses both functional needs and psychosocial impact throughout the child's development.

## Case Report

This report details the management of a 9-year-old male who presented with acute dentoalveolar trauma to the maxillary anterior segment. Clinical and radiographic evaluation confirmed complicated crown-root fractures of the permanent maxillary central incisors (#8 and #9). Given the patient's stage of craniofacial development and the poor prognosis of the coronal fragments, an urgent multidisciplinary protocol was established to prioritize alveolar ridge preservation.

Acute intervention involved the removal of the mobile coronal fragment of tooth #8 to mitigate aspiration risk, while the radicular segment was intentionally retained to maintain the alveolar housing. Tooth #9 underwent pulp protection and stabilization. To address functional and psychosocial needs, a fixed pediatric partial denture was fabricated as an interim rehabilitative measure. This staged approach maintains the vertical and horizontal dimensions of the bone until skeletal maturity, at which time definitive implant or fixed prosthodontic therapy will be initiated. Success to date has been predicted on prompt, coordinated specialty care and rigorous patient compliance.

## Clinical and Radiographic Examination

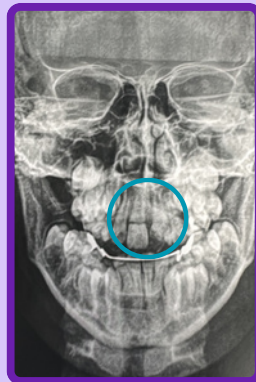


Fig 1. CT Maxillofacial

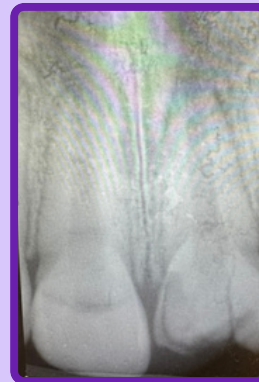


Fig 2. Periapical Radiograph



Fig 3. Biodentine and GI Placement Tooth #9



Fig 4. Extraction Coronal Fragment Tooth #8



Fig 5. Decoronation and RCT by Endodontist



Fig 6. Favorable healing



Fig 7. Fixed Kiddie Partial Fabrication

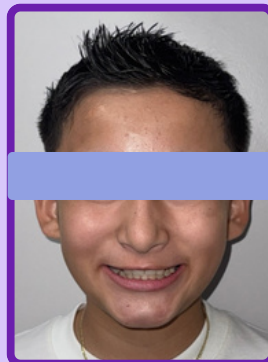


Fig 8. Patient Satisfaction



Fig 9. Fixed Kiddie Partial

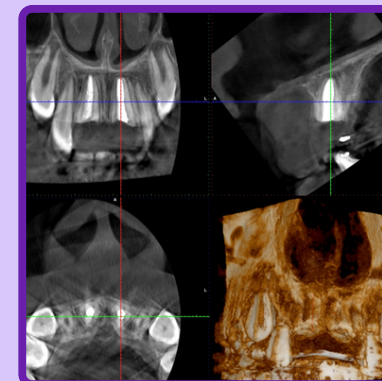


Fig 10. Recall ConeBeam CT

## Management

**Initial Management and Diagnosis:** Initial intervention focused on stabilizing the traumatized dentoalveolar segment, preserving the alveolar bone, and mitigating aspiration risks. Following debridement and visualization (Figures 1–2), tooth #8 was diagnosed with a complicated crown-root fracture, and tooth #9 with a comminuted "mosaic-like" fracture; both presented with pulpal exposure.

**Immediate Intervention:** The mobile coronal fragment of #8 was removed to eliminate the risk of aspiration. The remaining root was retained to maintain the alveolar housing, sealed with Biodentine, and stabilized with a figure-8 suture. Tooth #9 underwent pulp capping with Biodentine and was restored with glass ionomer cement (Figures 3–4).

**Multidisciplinary Care and Rehabilitation:** The patient was referred for urgent pediatric and endodontic evaluation. To preserve the vertical and horizontal dimensions of the alveolar ridge, decoronation of teeth #8 and #9 was performed in conjunction with root canal therapy. Functional and esthetic rehabilitation was subsequently achieved with a fixed pediatric partial denture (Figures 5–7).

**Follow-Up and Long-Term Strategy:** Longitudinal monitoring (Figures 8–10) includes periodic clinical examinations and CBCT imaging to assess periapical healing, alveolar bone development, and appliance integrity. This protocol will continue until the patient reaches skeletal maturity, at which point a referral to prosthodontics has been established for definitive rehabilitation. Early multidisciplinary intervention and bone-preservation strategies were paramount in achieving the current high level of patient and parent satisfaction.

## Conclusion

This case illustrates the critical role of prompt, multidisciplinary management in pediatric dentoalveolar trauma. By prioritizing alveolar bone preservation and immediate esthetic rehabilitation, clinicians can effectively mitigate ridge atrophy and support the patient's psychosocial development during active growth. The successful short-term outcome highlights the synergy between timely intervention and patient adherence. Longitudinal monitoring remains paramount to ensure a seamless transition to definitive prosthodontic rehabilitation once skeletal maturity is achieved, ensuring lasting functional and esthetic stability.

## Acknowledgement

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## References

Rodd, H. D., Davidson, L. E., Livesey, S., & Cooke, M. E. (2002). Survival of intentionally retained permanent incisor roots following crown root fractures in children. *Dental traumatology : official publication of International Association for Dental Traumatology*, 18(2), 92–97. <https://doi.org/10.1034/j.1600-9657.2002.180209.x>  
Fidel, S. R., Fidel-Junior, R. A., Sassone, L. M., Murad, C. F., & Fidel, R. A. (2011). Clinical management of a complicated crown-root fracture: a case report. *Brazilian dental journal*, 22(3), 258–262. <https://doi.org/10.1590/s0103-64402011000300014>