

Dental Trauma to Immature Permanent Teeth – Case Report

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Introduction:

-Traumatic dental injuries are common in children and young adults. The maxillary central incisors are the most frequently affected teeth accounting for as high as 69.4% of permanent tooth trauma and 68.9% of primary tooth trauma. The prognosis of the traumatic event can depend on a variety of factors. One major factor to consider in immature permanent teeth is the amount of root development at the time of injury.

Case Report:

-A 7-year-old Caucasian male patient presented to the Pediatric Dentistry Clinic at the University of Nevada, Las Vegas (UNLV) on May 10th, 2021, for an emergency appointment.



-Chief Complaint: "Front tooth was hanging out". According to the mother, the patient fell at school on April 15th, 2021. Child was taken to a local hospital where he was instructed to seek prompt evaluation and care by his primary dentist. At the dental office tooth #8 was repositioned and splinted.

-Clinical findings:

Tooth #8:

- Gingival abscess
- Erythematous facial gingiva
- Periapical radiolucency observed on a periapical radiograph
- Immature permanent tooth with minimal root development
- Class II mobility

Tooth #9:

- Class II mobility

Summary of Subsequent Appointments:

Appointment 2: 5/13/21

-Splint was replaced with a new flexible splint.
-Tooth #8 – Isovac used due to lack of stabilization for rubber dam due to trauma, endodontic access made, canal irrigated with dilute Sodium Hypochlorite, hemostasis achieved, canal medicated with Calcium Hydroxide for apexogenesis, and access was temporized.



-Recommendations: soft diet, reinforce daily oral hygiene, avoid "high risk" activities that could retraumatize teeth.

Appointment 3: 6/10/21

-Tooth #8 – Isovac used due to lack of stabilization for rubber dam due to trauma, canal was irrigated with dilute Sodium Hypochlorite, hemostasis achieved, new Calcium Hydroxide was placed in the canal.



Appointment 4: 6/15/21

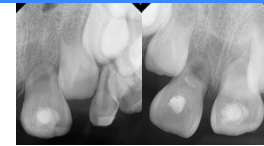
-Tooth #9:

- periapical radiolucency was noted.
- split dam used, endodontic access made, canal irrigated with dilute Sodium Hypochlorite, hemostasis achieved, canal medicated with Calcium Hydroxide for apexogenesis, and access was temporized.



Appointment 5: 6/23/21

-Tooth #8 – split dam used, canal irrigated with dilute Sodium Hypochlorite, hemostasis achieved, new Calcium Hydroxide was placed in the canal.

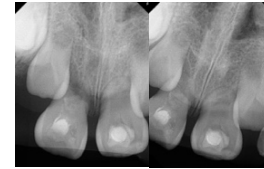


Appointment 6: 7/21/21

-No abscess was present

-Teeth #8 and #9:

- unfavorable crown to root ratio of 1:0.5
- split dam used, canal irrigated with dilute Sodium Hypochlorite, hemostasis achieved, new Calcium Hydroxide was placed in the canal.
- Treatment plan for next appointment: apexification using MTA plug.



Appointment 7: 8/6/21

-Comprehensive exam and follow up for teeth #8 and #9.

-Teeth #8 and #9 – no clinical signs of infection but root development has not progressed since the traumatic incident.

-It was recommended to re-evaluate teeth #8 and #9 in 6 months but no treatment was done.



Appointment 8: 2/10/22

-Comprehensive exam and follow up for teeth #8 and #9

-Teeth #8 and #9 – no clinical signs of infection but root development has not progressed since the traumatic incident

-Treatment plan for teeth #8 and #9 were determined and it was recommended to perform apexification with MTA plug as soon as possible.



Patient did not return for another 6 months for proposed treatment of apexification with MTA plug for both teeth #8 and #9

Appointment 9: 10/14/22

-Comprehensive exam and follow up for teeth #8 and #9.

-Chronic apical abscess due to tooth #9 as confirmed by a gutta percha tracing the sinus tract present near tooth #10.



Appointment 10: 10/21/22

-Tooth #8 – rubber dam isolation used, canal irrigated with dilute Sodium Hypochlorite, hemostasis could not be achieved so Calcium Hydroxide was placed again, and access was temporized

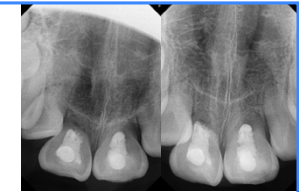
-Tooth #9 – rubber dam isolation achieved, canal irrigated with dilute Sodium Hypochlorite, hemostasis achieved, Calcium Hydroxide placed in the canal until sinus tract heals.



Appointment 11: 11/9/22

-Teeth #8 and #9

- rubber dam isolation used, irrigated with dilute Sodium Hypochlorite, hemostasis achieved, MTA plugs placed, canals obturated, and final restorations completed.
- Crown to Root ratio of 1:0.5 (did not improve)
- Class I mobility (improved)
- Immature roots did not develop any further since traumatic incident



Discussion and Results:

Based on the initial presentation of the traumatized immature teeth with underdeveloped roots, it was determined that these teeth have a guarded prognosis, and the goal was to keep these teeth until the patient is old enough for a more permanent solution, such as implants.

The initial diagnosis of the type of trauma could not be determined because of inadequate communication between the parents of the patient, the hospital and dental provider that initially saw the patient, and the UNLV dental clinic. Luxation and extrusion are the two possible working diagnoses.

Initial attempts were made for apexogenesis with Calcium Hydroxide to thicken the walls of the root of tooth #8 and eventually tooth #9, as well as decreasing the inflammation that can cause root resorption.

Many follow-ups were done with subsequent cleaning and re-insection of fresh Calcium Hydroxide into the canals. However, after 1-year post-trauma, there was a period of 6 months where the teeth were not assessed or treated with fresh Calcium Hydroxide in the canals. This led to another 6-month period after a recall exam where the patient did not return for the recommended apexification treatment using MTA plug.

When the patient returned almost 15 months after the previous intracanal medicament of Calcium Hydroxide treatment, there was a sinus tract from tooth #9, which is a sign of infection and failed treatment. Furthermore, hemostasis could not be achieved for tooth #8; thus, both teeth were treated with Calcium Hydroxide as an intracanal medicament once again until the inflammation was controlled.

MTA plug was finally placed to achieve apexification and a final restoration was placed. Both teeth were determined to have class I mobility and Crown to Root ratios of 1:0.5. The roots did not continue to develop even though mobility improved slightly. Even though the apexogenesis treatment was not successful, both teeth are still functioning for the patient to this date with very short roots.

Conclusion:

-Patient compliance and continuous communication between the pediatric dentist and patient's family is essential. Correct diagnosis, management, and frequent follow-ups can help with long-term prognosis. In this case report, at the time of injury, teeth #8 and #9 were at the early stages of root development, and during the management of the case there was lack of compliance for timely follow-ups, and lack of recommended necessary follow-up treatment. Consequently, this led to a relatively poor outcome. However, teeth #8 and #9 continue to function well with a crown to root ratio of 1:0.5 and Class I mobility. Hopefully they continue to serve their function and to prevent any alveolar bone loss until a more permanent solution is available, such as implants.

References:

- Bourguignon, C., Cohenca, N., Lauridsen, E., Flores, M. T., O'Connell, A. C., Day, P. F., ... & Levin, L. (2020). International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. *Dental Traumatology*, 36(4), 314-330.
- de Paula Barros, J. N., de Araújo, T. A. A., Soares, T. R. C., Lenzi, M. M., de Andrade Rizzo, P., Fidalgo, T. K. D. S., & Maia, L. C. (2019). Profiles of trauma in primary and permanent teeth of children and adolescents. *Journal of clinical pediatric dentistry*, 43(1), 5-10.
- 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*, 36(4), 309-313.