



Managing Trauma to Permanent Anterior Teeth: A Case Report

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Introduction

Traumatic dental injuries (TDIs) are common in children and adolescents, due to their high levels of physical activity, lack of coordination, and proneness to accidents. When a TDI has pulpal effects, this can lead to future tooth necrosis and infection due to immature permanent teeth relying on pulp vitality for continued apexogenesis. When a TDI occurs, the effects on the tooth's long term prognosis can be minimal or extensive. Thus, treatment can range from non-surgical root canal treatment to no treatment at all.

Case Description

An 11-year-old male patient presents with his mom to the University of Minnesota School of Dentistry pre-doctoral pediatric clinic after a trauma.

Chief Complaint: "My son jumped on a ball and broke his front teeth"

History of Present Illness:

- Injury occurred indoors at school approximately 24 hours prior
- Patient did not lose consciousness
- Patient reports sharp pain initially but quickly went away
- Sensitive to touching of fractured areas
- Mom has fractured segments of teeth in bag of milk

Medical History: No significant medical history. Healthy patient.

Dental History: Initially after the trauma, patient presented to private general dentist whom he sees for regular dental care, but was immediately referred to the pediatric clinic at the University of Minnesota.

Clinical Exam

Extraoral Exam: Minor abrasion on upper lip midline. No swelling.

Intraoral Exam:

#8: Ellis class 2 fracture. Pulp visible just beneath exposed dentin at fracture line. No mobility. Normal in color.

#9: Ellis class 3 fracture with pinpoint pulp exposure <1mm. No mobility. Normal in color.

Radiographic Exam:

Periapical images of #8 and #9 taken few hours following injury at referring dentist (Fig. 1.).

Findings include:

- #8 and #9 MIFL crown fracture
- #9 widened PDL at apex
- Distal caries present on #9

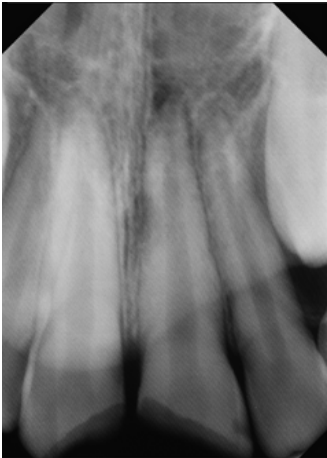


Fig. 1.

Treatment

1st Visit: Direct pulp cap with Dycal placed on #9 . Composite bandaid restoration with 3M Filtek flowable composite placed on #8 and #9 to temporarily protect exposed dentin until permanent restorations.

2nd Visit: One week after trauma Composite on #8 was missing, #9 had existing composite. Noted that #8 crown was slightly darker than crown of #9, and pulp space was clinically visible underneath exposed dentin (Fig. 2.). New periapical radiographs of #8 and #9 were taken. #8 had slight apical PDL widening (Fig. 3.) Periapical radiolucencies were present at the apex of #9 and #10 (Fig. 4.).

Performed endodontic diagnostic testing:

#8: Cold: NR Percussion: S+, Palpation: NS, Mobility: Normal, PD: <4mm

#9: Cold: NR, Percussion: NS, Palpation: NS, Mobility: Normal, PD: <4mm

Endodontic Assessment:

#8: Reversible pulpitis with symptomatic apical periodontitis

#9: Reversible pulpitis with symptomatic apical periodontitis

Consulted with graduate endodontics resident who determined necessity to refer to graduate endodontics clinic for further monitoring and evaluation.



Fig. 3.

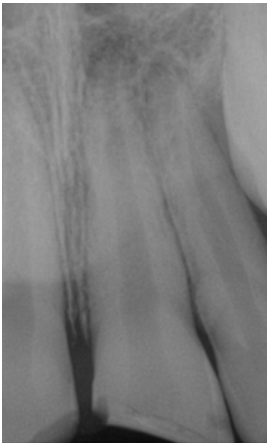


Fig. 4.

3rd Visit: 4 weeks after trauma. Patient was seen for a consult by resident in graduate endodontic clinic. Diagnostic testing performed again:

#8: Cold: NR Percussion: S+, Palpation: NS, Mobility: Normal, PD: <4mm

#9: Cold: NR, Percussion: S+, Palpation: S++, Mobility: Normal, PD: <4mm
CBCT limited FOV exposed and interpreted:

#8: Apical widening of PDL space, interrupted apical LD, ill-defined radiolucency approximately 3mm x 3mm at apex, open apex, radiolucency on root surface suggestive of external inflammatory resorption

#9: Apical widening of PDL space, interrupted apical LD, ill-defined radiolucency approximately 3mm x 3mm at apex, open apex

Assessment of #8,#9: **Necrotic Pulp and Symptomatic Apical Periodontitis**

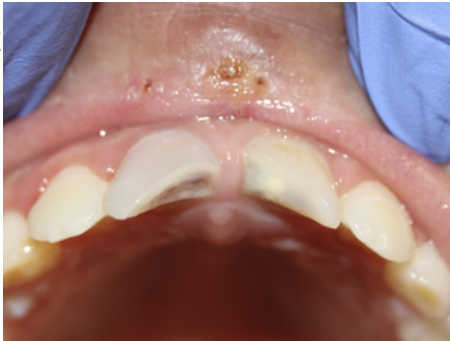


Fig. 2.

Per recommendation by endodontic resident, patient decided to proceed with Non-Surgical Root Canal Therapy of #8 and #9.

4th Visit: 5 weeks after trauma. Endodontic resident completed NSRCT on #8 and #9 using Vortex Blue file system (Fig. 5). GC Fuji triage salmon colored orifice barrier placed. Temporary restoration placed using Filtek A2 composite. Patient tolerated the procedure well.



Fig. 5.

5th Visit: 13 weeks after trauma. Patient had no symptoms or sensitivity associated with #8 and #9 following endodontic treatment. Both #8 and #9 had no mobility and no swelling associated. Used crown forms to restore #8 and #9 with Filtek Supreme Ultra composite (Fig. 6.). Patient was happy with the restorations.



Fig. 6.

Discussion

Traumatic dental injuries often occur to immature permanent anterior teeth; the effects on the pulp may initially appear to have preserved vitality. Even with the placement of liners and protective restorations, the pulp may become non-vital and/or require endodontic treatment following a TDI. This case report detailed the examination, diagnoses and treatment provided to the patient in order to attempt to preserve pulp vitality, restore function, and minimize the risk of future complications from the trauma.

References

1. American Academy of Pediatric Dentistry. Pulp therapy for primary and immature permanent teeth. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry; 2024:466-74.
2. Bourguignon C, Cohenca N, Lauridsen E, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations. Dent Traumatol 2020;36(4):314-330. <https://doi.org/10.1111/edt.12578>.