Management of Severe Intrusive Injury in Immature Incisor with Revascularization: Case Report

Ariel Snell, DMD, MPH, Jonathan Bacon, DDS, Crystal McIntosh DDS, and Paula Nesbitt, DDS
College of Dentistry, Howard University

Background

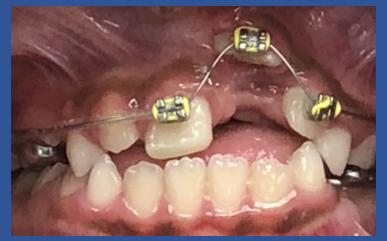
An intrusion occurs when a tooth is pushed axially into the tooth socket; thereby crushing the periodontal ligament and damaging the cementum, alveolar bone, and vasculature. Intrusions account for approximately 2% of traumatic dentoalveolar injuries in permanent teeth and most frequently result in pulp necrosis.[1,2] Intrusive injuries are classified based on the degree of clinical displacement as mild (<3mm), moderate (3-7mm) and severe (>7mm).[3] Any tooth intruded greater than 7mm is likely not to undergo spontaneous extrusion and must be repositioned orthodontically or surgically as stated in the IADT Guideline.[4] The prognosis for healing and tooth retainment decreases with increasing intrusion severity.[2] There are two major techniques for managing a non-vital immature permanent tooth with an open apex—apexification and revascularization.

Case Summary

Appointment #1
- 7 yo AA female patient suffered severe intrusion and buccal displacement of tooth #9.
- Completed LOE and PA #9.
- Signs and Symptoms: 10 mm intrusion, un-complicated enamel dentin fracture, non-mobile, not painful, and necrotic pulp.

Appointment #2
- Completed a Periodontal Consult, Orthodontic Consult and CBCT.
- Completed Gingivectomy and orthodontic button placement with nitrous oxide inhalation sedation.

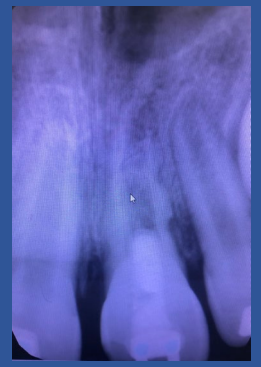
Appointment #3
- Patient sustained a second traumatic Incident.
- Obtained a PA #8 and #9. Radiograph shows external root resorption at apex of #9 and uncomplicated fracture of tooth #8 and #9
- Composite Band-Aid placed for tooth #8.
- Placement of ortho bands on #3 and #14. Brackets placed on #8, and 10 and 0.018x0.025 stainless steel main arch wire. Tooth #9 bracket engaged to main arch wire with ligature tie



Orthodontic Extrusion
- The patient attended biweekly orthodontic visits for 5 months.
- Orthodontists used light continuous forces to extrude the tooth before revascularization.

Appointment #4
- First Revascularization Appointment—the technique was obtained from the AAE guidelines and treatment performed with oral sedation.
- Administered anesthesia, accessed the tooth, removed necrotic tissue remnants from the pulp chamber, irrigated with 20ml NaOCl, obtained working length, irrigated with 20ml of EDTA ,dried with paper points, placed CaOH into canal and sealed orifice with cavit and glass ionomer.

Appointment #5
- Second revascularization appointment occurred 4 weeks after first revascularization appointment.
- Anesthetized with Mepivacaine to avoid vasoconstriction.
- Irrigated with EDTA.
- Induced bleeding.
- Placed MTA with composite seal.



Conclusion

- Revascularization achieved the primary goal of preserving alveolar bone, maintaining dental function, preserving esthetics and maintaining an adequate periodontium in case an implant or prosthesis is needed in the future.
- At 1 year follow-up, the PA shows cessation of the resorptive process, distinct lamina dura and discontinuation of signs and symptoms.
- Revascularization effective even with 5-month delay between initial injury and endodontic therapy.

- Maintain oral hygiene with 3 month recalls throughout orthodontic treatment, restore with full coverage restoration after debonding and follow-up with yearly radiographic and clinical exam

References

1. Andreasen JO, Bakland LK, Matras RC, Andreasen FM. Traumatic intrusion of permanent teeth. part 1. an epidemiological study of 216 intruded permanent teeth. Dent Traumatol. 2006;22(2):83-89. Accessed Nov 17, 2021. doi: 10.1111/j.1600-9657.2006.00421.x..
2. Humphrey JM, Kenny DJ, Barrett EJ. Clinical outcomes for permanent incisor luxations in a pediatric population. I. intrusions. Dental Traumatology. 2003;19(5):266-273.
3. Council on Clinical Affairs. Guideline on management of acute dental trauma. AAPD Reference Manual. 2010;32(6):202-212.
4. Diangelis AJ, Andreasen JO, Ebeleseder KA, et al. International association of dental traumatology guidelines for the management of traumatic dental injuries: 1. fractures and luxations of permanent teeth. Dent Traumatol. 2012;28(1):2-12