Abstract

Purpose: To present a case report outlining the decision process of treatment planning for restorable permanent teeth with immature root development. A patient was identified with trauma to her permanent central incisors which had incomplete root development.

Methods: Anesthetic was applied via local infiltration. Access was performed on the permanent left maxillary central incisor. The necrotic pulpal tissue was removed with a broach, and the canal was irrigated with 20 cc of 3% sodium hypochlorite. Length was determined and calcium hydroxide was placed in the coronal third of the root. Two weeks later after resolution of symptoms calcium hydroxide was removed, and apical bleeding was stimulated. After a blood clot formed a collagen plug was placed in the coronal third and covered with mineral trioxide aggregate. The tooth was restored at a subsequent visit. A decision tree was formulated to assist clinical treatment recommendations.

Results: Two week follow up shows resolution of symptoms and swelling. At two months post treatment the patient continued to be asymptomatic, and there was no evidence of apical pathosis or swelling. At four months the patient presented with similar circumstances of the adjacent permanent central incisor, and treatment was initiated in a similar fashion.

Conclusions: Pulpal and periradicular management due to caries insult or trauma of immature permanent teeth places clinicians in a position where it is important to have sound judgment on treatment decisions. Pediatric dentists should be familiar with the treatment and management of teeth with immature apices.







Introduction

It is estimated that the prevalence of dental injuries is 4-59%.¹ Athletics accounts for approximately 10-39% of injuries, and children aging from seven years of age to eleven years of age are more susceptible to athletic injury.²⁻⁶ Traumatic dental injuries can be a stressful time for the patient, parent, and dental provider. Correct diagnosis of the type of injury can help influence treatment to prevent undesired outcomes and influence treatment such that teeth with immature apices can be maintained in the oral cavity.

Methods

An alert normally developed 8 y 6 mo female in no apparent distress presented for evaluation. A history, diagnostic testing, and radiographic examination were performed. Tooth #8 was Vital Pulp Therapy (MTA Direct Pulp Cap) diagnosed as reversible pulpitis with normal apical tissues, and tooth #9 was diagnosed as necrotic with chronic apical abscess. Anesthetic was applied using local infiltration. Dentin on tooth #8 was covered with Fuji II LC. Tooth #9 was isolated with a rubber dam and the necrotic tissue was removed with a broach. The canal was irrigated with 20 cc 3% sodium hypochlorite, and a tooth length was determined with a radiograph. A collagen plug was placed in the coronal third followed by calcium hydroxide. Two weeks later after resolution of symptoms, anesthetic was applied; the canal was accessed under rubber dam isolation, and irrigated with 20 cc 3% sodium hypochlorite to remove calcium hydroxide and chemically clean the canal. Bleeding was stimulated with a size #70 file and a clot was allowed to form in the coronal third of the canal. A collagen plug was placed in the coronal third and covered with mineral trioxide aggregate. A wet cotton pellet was placed and the access opening was covered with Fuji II LC. The teeth were restored at a subsequent visit with composite resin. The patient presented five months later with the chief complaint of pain. The patient had fractured the composite resin restoration on #8 and had developed a chronic apical abscess interproximally between tooth #8 and #9. Tooth #8 had lost responsiveness to vitality testing and a test cavity was performed to determine a diagnosis of necrotic with chronic apical abscess. Regeneration was initiated on tooth #8 in the same

methodology as described above.

Results

Initial Visit









09/06/2013



09/16/2013 CaOH Placment



09/30/2013 2 Weeks



*Cases that require a post for coronal restorations are not good candidates for Regeneration.

Conclusions

This case provides evidence of the importance of diagnosis and treatment planning in relation to dental trauma with teeth with immature root development. Pediatric dentists should be familiar with management of trauma to teeth with immature apices as injuries may occur at an age where an Endodontist may not be willing to complete a case due to behavior management. Pediatric dentists should be aware of the advantages and disadvantages of each treatment option when providing a recommendation for teeth with immature apices. The ability to provide the correct treatment can lead to root lengthening, root thickening, and maintenance or return of sensation.



11/25/2013 2 Months

01/28/2014 4 Months

02/03/2014 4 Months





References

I. Glendor U, Andreasen JO. Classification, epidemiology and etiology. In: Andreasen JO, Andreasen FM, Andersson L, eds. *Traumatic Injuries to* the Teeth. 4th ed. Oxford:Blackwell Munksgaard; 2007:217-54.

2. Newsome P, Tran D, Cooke M. The role of the mouthguard in the prevention of sports-related dental injuries: A review. J Paediatr Dent. 2001;11(6):396-404. 3. Rodd HD, Chesham DJ. Sports-related oral injury and mouthguard use among Sheffield school children. *Community Dent Health*. 1997;14(1):25-30.

4. Tesini DA, Soporowski NJ. Epidemiology of orofacial sports-related injuries. *Dent Clin North Am*. 2000;44(1):1-18.

5. American Dental Association Council on Access, Prevention, and Interprofessional Relations and Council on Scientific Affairs. Using mouthguards to reduce the incidence and severity of sports-related oral injuries. J Am Dent Assoc. 2006;137(12):1712-20. 6. American Academy of Pediatric Dentistry. Oral Health Policy on Prevention of Sports-related Orofacial Injuries. Pediatr Dent 2012;34(special issue):67-70.