

Management of traumatic dental injuries in a hemophiliac patient: A challenge! Case report with nine years follow-up

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ABSTRACT

Traumatic dental injuries (TDIs) are frequently associated with an injury pattern that requires accurate diagnosis for developing the appropriate treatment plan. When children with special healthcare needs, i.e., Hemophilia experience TDIs, managing the situation becomes a challenging task for pediatric dentists due to the requirement of a multidisciplinary approach in their care. This case report highlights the successful management of extrusive luxation injury of a young permanent tooth with an open apex in an eight-year-old male child with severe Hemophilia A. After a follow-up of nine years, the pulp showed significant healing with physiological closure of the apical foramen. The study further emphasizes that timely management of such injuries can lead to improved tooth prognosis.

Keywords: Dental luxation, Hemophilia A, tooth injuries, tooth replantation

Introduction

Dental trauma of permanent dentition occurs most commonly in children and young adults. The management of dental trauma due to immature teeth and pubertal facial growth for younger age groups may be different from adults.^[1] The extrusive luxation traumatic injury is caused by oblique forces, which is characterized by the partial or total separation of periodontal attachments. In extrusive luxation injury, loosening and axial displacement of the tooth are expected. This elongated tooth, also called “partial avulsion,” is compromised by the loss of vascular supply and pulp vitality. The patient complains of difficulty during mastication

due to impingement of teeth. Radiographically, there is an empty space visible around the apices of the extruded tooth.^[2-4] This type of dental injury occurs mainly before the completion of root formation.^[5] In traumatic dental injuries (TDIs), the root development stage, oral bacterial load, and severity of the injury are determinants of the final outcome of the treatment for luxation injuries.^[6]

Hemophilia A is a congenital bleeding disorder caused by a deficiency or complete absence of coagulation Factor VIII (F VIII). Hemophilia impacts parents, patients, and their families due to the chronic nature of the disorder which leads to progressive disability and premature mortality in the patient due to poor treatment facilities and high treatment costs.^[7] Hemophilic children require a collaboration between the physician (hematologist) and dentist which is essential for hemophilia management during dental treatment with or without the presence of trauma.^[8] Durham TM (1993) reported a case of traumatic oral-facial injury in a four-year-old child with severe

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Hemophilia A. In this case report, the child was diagnosed with a traumatic dissecting hematoma on the right side of the face. Due to the development of a Factor VIII inhibitor, the patient was suffering from continuous bleeding. Thus in this case report, according to the patient's age and development of Factor VIII inhibitor in the child, uncontrolled intra oral bleeding was successfully managed with the implementation of immune tolerance therapy under the supervision of a hematologist.^[9]

Jayaraman J (2023) reported the management of avulsed maxillary permanent central incisors (11, 21) in a seven-year-old girl with mild Hemophilia A (>5% Factor VIII). The child was on recombinant hemophilic Factor VIII therapy and was regularly seen by a hematologist. After a two-week follow-up, soft tissue healing was satisfactory and the teeth were stable.^[10] The management of dental traumatic injuries in children with hemophilia requires a multidisciplinary approach. The management of dental traumatic injuries poses a problem for pediatric dentists due to the underlying disease as it physiologically and psychologically affects both the parents and children.

This case report highlights the successful management of an extrusive luxation injury in a young permanent tooth with an open apex in an eight-year-old male child with severe Hemophilia A. The management of an open apex poses a serious challenge during root canal treatment as it significantly increases the risk of irrigating solution and sealer leaking into the surrounding periradicular tissues. The potential leakage in the periapical area can adversely affect the healing process.^[11] In the present case report, collaboration with a hematologist played a key role in the timely management of the treatment. Over a nine-year follow-up, the extruded tooth with an open apex revealed significant healing of the pulp with continued root growth.

Case Report

This case report has been written according to Preferred Reporting Items for Case Reports in Endodontics (PRICE) 2020 guidelines.^[12] An eight-year-old male patient with severe Hemophilia A (<1% Factor VIII) reported to the Department of Pediatric and Preventive Dentistry with a chief complaint of pain and a loose tooth in the upper front tooth region since one day. The patient gave a history of fall while playing in the school one day back and presented with profuse bleeding from the upper front tooth region with a swollen upper lip. The patient was immediately admitted to the Hematology Department for the management of an acute bleeding episode. To control the hemorrhage, replacement of Factor VIII concentrate was done, and the patient was referred to the Department of Pediatric and Preventive Dentistry for the management of dental trauma. The past medical history revealed that the patient had severe Hemophilia A (Factor VIII level less than 1%) and was on Factor VIII replacement therapy intermittently for the management of acute joint pain. The past dental history revealed bleeding episodes during the shedding of primary teeth which were managed with replacement therapy of Factor VIII concentrate.

His family history revealed that his two elder brothers were also suffering from Hemophilia A.

The clinical examination showed a swollen upper lip with a scab, laceration of upper labial mucosa, and poor oral hygiene [Figure 1a]. The child was diagnosed with extrusive luxation injury of tooth #11 (about 4 mm), subluxation of teeth #12, and #21, and open bite due to the impingement of extruded upper right central incisor tooth on lower central incisors [Figure 1b]. Radiographic examination revealed a widening of periodontal ligament space in the periapical area of the upper right central incisor tooth #11 with Cvek Stage II of root development^[13] and incomplete root development of all the maxillary incisors [Figure 1c]. After obtaining informed consent from the parents, under the systemic administration of Factor VIII concentrate, extruded upper right central incisor tooth #11 was re-positioned back into the socket. The tooth was stabilized with composite resin (Ivoclar Vivadent Te-Econom Plus Syringe Refill Universal Composite Resin - A2) and a stainless steel wire (26 Gauge) splint on maxillary central and lateral incisors, primary canines, and primary first molars [Figure 1d]. Local hemostasis was attained by topical application of crushed tranexamic acid tablet through a swab. The patient was prescribed oral antibiotics, Amoxicillin (20-40 mg per kg of body weight) and an analgesic, Paracetamol (10-15 mg per kg of body weight) three times a day for a duration of five days. Post-operatively, the patient was given comprehensive instructions which included avoiding mouth rinsing for 24 hours, adhering to a soft diet for seven days, and avoiding strenuous activities.

During one-week follow-up visit, the patient experienced another instance of trauma, resulting in dislodgement of the splint. Again, re-splinting was done after systematic administration of Factor VIII concentrate under supervision of the hematologist. In the present case report, managing the TDIs along with management of the systemic condition of the hemophilic patient was a real challenge. Thus, the management of hemorrhage was done in collaboration with the hematologist to avoid procedural and post-procedural hemorrhage. Both systemic and local hemostatic measures were taken and the patient was admitted to the Hemophilia Day Care Centre (HDCC) for continuous monitoring and for the administration of Factor VIII concentrate for seven days.

The splint was removed after two weeks according to the International Association of Dental Traumatology (IADT) guidelines for the management of extrusive luxation (2012).^[14] On the follow-up visit, soft tissues showed satisfactory healing [Figure 1e], and no periapical pathology was observed on radiographic examination. The patient was followed up at one month, three months, six months, 12 months, and two years after trauma for evaluation of healing. Radiographically, at six months follow-up, there was spontaneous closure of the apex of tooth #11 (Cvek Stage IV), obliteration of canal space of tooth #12, and continued root elongation of teeth #21 and #22 [Figure 1f]. After two-years of follow-up, there was complete obliteration of canals of

teeth #11 and #12 with physiologic closed apical foramen and completed root development (Cvek Stage V) [Figure 1g]. The pulp sensibility test was done at follow-up visits with an Electric Pulp Tester (EPT). At six-months follow-up visit, there was a positive response, and at two-year of follow-up, there was an increased sensory response threshold to EPT. At a nine-year recall [Figure 2a], all the maxillary central incisor teeth were asymptomatic with no significant change in color of teeth #11 and #12 [Figure 2b and 2c]. Both teeth #11 and #12 showed a delayed response to heat test as compared to contra-lateral teeth due to the obliteration of canals. Radio-graphically, there was complete obliteration of canals of teeth #11 and #12 with no signs of any periapical radiolucency [Figure 2d and 2e].

Discussion

Luxation is one of the most common types of TDI accounting for about 18–33% of injuries to permanent teeth.^[15] The

management of luxation injury in young permanent teeth is difficult and its management in hemophilic children becomes even more challenging. In hemophilic disorders, hemorrhage into joints/muscles, easy bruising, and prolonged and fatal hemorrhage after trauma or surgery are common.^[16] Even minor hemorrhage that occurs at the time of eruption and shedding of deciduous teeth may last for days or weeks.^[17] The dental management of Hemophilia A patients usually depends on the severity of the condition (mild, moderate, or severe) and the invasiveness of the planned dental procedure. At the time of major bleeding in Hemophilia patients, a dose of factor VIII 50U/Kg IS (factor VIII) every 8-12 hours for 7-14 days is required.^[18]

In the present case report, the patient was followed up both clinically and radiographically. At six months of follow-up, closure of the apex of tooth #11 and obliteration of the canal of tooth #12 were evident. Roots of teeth #21 and



Figure 1: Images of Extrusive Luxation wrt tooth # 11. (a). Extra oral view showing swollen upper lip (b). Frontal view showing extruded tooth #11 with open bite (c). Radiographic view showing widening of periodontal ligament space in the periapical area wrt tooth #11 with an open apex (d). Immediate post operative view after repositioning and splinting of tooth #11 (e). Frontal view at six months follow up (f). Radiograph at six months follow up showing closure of apical foramen of tooth #11 and obliteration of canals of tooth #12 (g). Radiograph at two years follow up showing closure of apical foramen with complete obliteration of canals of teeth #11 and #12



Figure 2: Follow up after nine years. (a). Extraoral view after nine years (b), (c). Frontal and maxillary occlusal view showing clinically asymptomatic tooth #11 with no change in colour (d), (e). Radiograph after nine years follow up, showing no periapical pathology wrt tooth #11, obliteration of canals of teeth #11, #12 with normal root development of teeth # 21, # 21

#22 were under development. In the present case report, healing of pulp may have been uneventful if another trauma had not happened. The expected outcome was continuous root growth with closure of apical foramen. However, due to repeated manipulation of the same region, the underlying process of root development was disturbed, and later on, pulp canal obliteration as a sequel of pulp healing was observed with time. Regardless, the patient was clinically asymptomatic and no signs of any periapical pathology were observed on follow-up visits even after nine years which is a good sign of pulpal healing and a favorable outcome.

After a traumatic injury in immature teeth, pulp repair may occur, with a return of sensibility within weeks to months.^[3] Continued root development and pulp canal obliteration (PCO) indicate re-establishment of the vascular supply of pulp. The obliteration of pulp canal is the second most common complication after healing of an extrusive luxation since this problem has been detected in 35% of the cases studied.^[19] Even after subluxation and luxation injuries, pulp tissue degeneration, pulpal calcification, and root resorption are among the most frequently reported complications. After these types of injuries in immature teeth, arrest of root development indicates (infected) pulp necrosis.^[1]

A similar case of extrusive luxation concomitant with subluxation injuries in upper anterior teeth was reported by Mokhtari S (2021) with a ten-year follow-up. The loss of vitality occurred in extruded tooth #21 and MTA apexification was done which was followed up for ten years. After 10 years of follow-up, no adverse sequelae or dental complications were found in this case.^[20]

The successful management after dental trauma requires an accurate diagnosis, treatment plan, and regularly scheduled follow-up appointments. The correct knowledge of patient's factor level, bleeding history, type of factor product used, and the number of required infusions per year plays an important role in the management of patients with bleeding disorders.^[21] Parents of a child with Hemophilia face challenges starting from the moment of diagnosis, adjusting family life and learning to manage treatment. The relationship between parents and health care providers is an important factor in providing special care to a child with Hemophilia.^[22] However, the impact of traumatic injuries in children with Hemophilia significantly affects the quality of life and success of treatment and their management which requires professional knowledge and experience, accuracy, and regular follow-up visits.

Conclusion

The management of luxation injuries in hemophilic patients requires timely management due to severity of the disease. The special considerations in management of Hemophilia are collaboration with the hematologist, need of factor infusion, and treatment duration. Hemophilic children require special

treatment protocol for trauma management to improve the quality of life.

Author's contribution

Dr. Mridula Goswami contributed to the concept of the study, designed the study, and planned the treatment. She provided an immense contribution to manuscript review and editing. Dr. Babita Jangra reviewed the literature performed all treatment procedures, and prepared the manuscript. Both authors have critically reviewed and approved the final draft and assume responsibility for the content and similarity index of the manuscript.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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