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IATROGENIC AVULSION OF A TOOTH - AN ENDODONTIC MISHAP CAUSED BY RUBBER DAM CLAMP - A CASE REPORT

Dental Science

Dr. Sharmila Tapashetti* Asst. Professor Dept of Conservative Dentistry & Endodontics S.D.M. College of Dental Sciences Dharwad *Corresponding Author

Dr. Ambrapali S Lecturer Dept of Periodontics S.D.M. College of Dental Sciences Dharwad

Dr. Priyanka Mahale Lecturer Dept of Prosthodontics S.D.M. College of Dental Sciences Dharwad

Dr. Atul Sattur Professor Dept of Oral Medicine & Radiology S.D.M. College of Dental Sciences Dharwad

ABSTRACT

Root canal treatment of a tooth that has undergone a trauma and become non-vital is a common occurrence in any dental set up. During the root canal treatment, application of a rubber dam for proper isolation is also a well-established part of the procedure. However, in the present case, when the treatment was being done under rubber dam, the tooth in question spontaneously underwent avulsion. The occurrence of avulsion of a tooth on application of rubber dam is unheard of with no reference in the literature regarding the same.

Hence, in this article, we are discussing a case where such an incident happened. Though being baffled by the occurrence, we then completed the treatment as a case of avulsion according to the IADT guidelines. The tooth was replanted and splinted. The tooth now shows no increased mobility and is completely asymptomatic.

KEYWORDS

iatrogenic, avulsion, rubber dam clamp, replantation

Introduction

Endodontic treatment consists of sequence of procedures like access cavity preparation, biomechanical preparation and obturation, which are performed based on a sound scientific knowledge. However, if this chain of procedures is broken or not followed due to either poor application of the knowledge, inattention to detail, or overzealous instrumentation then they may pave the way for endodontic mishaps.[1]

The most commonly documented endodontic mishaps are treatment of wrong tooth, perforations, formation of ledges, breakage of instruments, overfilling, underfilling and accidents involved with the irrigants and local anaesthetics.[2] However, in the present case, we met with a very unusual mishap namely; the tooth being treated got avulsed following application of rubber dam.

Methodology

A 16 year old male patient reported to the Dept of Mutlispeciality Dentistry, S.D.M. College of Dental Sciences, Dharwad with a complaint of a fractured upper front tooth. He gave a history of trauma two days back. On examination, the maxillary right central incisor showed Ellis class II fracture and was grade I mobile. Cold test of the tooth showed a lingering response. However, as the patient gave no history of pain or discomfort with respect to that tooth, he was advised to return after a fortnight for a second vitality test.

When the patient returned after a fortnight and a second cold test was performed, the tooth did not show any improvement and still gave a lingering response. So endodontic treatment was begun for the affected tooth. Local anaesthesia was administered which was followed by access cavity preparation. After access cavity was prepared, rubber dam application was done and the treatment continued with determination of working length that was confirmed by an intraoral periapical radiograph.

However, during the treatment an unfortunate incident occurred. The tooth being treated underwent avulsion. This changed the course of the treatment plan. We informed the patient about the complication that had occurred and the necessary change in the treatment plan. With the patient and his parent's consent for the same, we decided to complete the endodontic treatment as early as possible followed by replantation and splinting of the tooth.

The endodontic treatment was completed extraorally taking care to maintain the hydration of the periodontal fibres on the root surface by rinsing the tooth with normal saline solution periodically. Care was taken not to touch the root surface. After the completion of endodontic treatment, the socket was inspected once again for any granulation tissue and gently irrigated with saline. The tooth was then replanted into the socket. The whole procedure was completed within 30 mins. The tooth was splinted to the adjacent teeth passively with a 23 guage orthodontic wire and composite resin to provide stability and support. The tooth was relieved from occlusion and the patient was recalled after 2 weeks for follow-up.

When the patient revisited, the follow up examination showed absence of any symptoms or mobility. The splint was removed and the patient was recalled for follow up every month, for the next 3 months, at 6 months and 1 year to check the stability of the tooth.

Discussion

Endodontic mishaps are the unfortunate occurrences or accidents that occur during an endodontic treatment either due to inattention to details or sometimes are completely unpredictable. The present case was one such incident where we came upon an unheard mishap i.e. the avulsion of a tooth during the treatment.

Dental avulsion is the complete displacement of a tooth from its socket in alveolar bone. The most common cause of avulsion of a tooth is a trauma usually a blunt force strong enough to sever the periodontal fibres. [3] Avulsion of a tooth accounts for 0.5 to 3% of all dental injuries and poses a true dental emergency for not only aesthetic reasons and the pain involved with it, but also because any avulsion in a young individual can affect the facial growth. [4,5,6,7] However in the present case, the avulsion occurred during the treatment on application of rubber dam.

The patient here had presented with a fracture involving the enamel and dentin without involving the pulp. The tooth also showed slight tenderness, but no dislocation or significant increase in the mobility. Hence, it was diagnosed to be a case of concussion along with an Ellis Class II fracture.[8] Based on this diagnosis, only palliative treatment was given.

Following a traumatic dental injury, generally the pulp and the periodontal fibres are injured. The pulp goes into shock causing a transient lack of response to vitality tests and the periodontal fibres may be frayed or severed from the root surface. [8] However, these tissues have an ability to repair themselves and return to health. The pulp generally takes 2 weeks to recover from its state of shock. On the other hand by 2 weeks, principal periodontal fibres will have undergone advanced repair and approximately 2/3 of mechanical

strength of periodontal ligament will be restored.[9] Thus it usually takes about 2 weeks to gain definite knowledge about the healing process. Hence, the tooth was kept under observation for two weeks before initiating the treatment.

On the recall visit, the pulp did not show any signs of improvement when the vitality test was performed. Hence, endodontic treatment was initiated under local anaesthesia. The access cavity preparation was done followed by rubber dam application.

The untoward avulsion that occurred following this was an enigma. After going through all the steps taken with a fine toothed comb, the aetiology of the avulsion was deduced to be due to the clamp applied onto the tooth for rubber dam application.

In case of luxation injuries of the tooth, the periodontal fibres are injured. Therefore, in luxation injuries with increased mobility of the tooth, splinting is advised for two weeks. This allows the periodontal tissues to heal better. Nevertheless, in the present case, as there was no significant increase in the mobility, we diagnosed it as concussion and did not splint the teeth on the initial visit. This could have led to incomplete healing of the periodontal ligament making them susceptible to any further traumatic forces. Therefore, when the rubber dam clamp was applied onto the tooth, forces of traction were probably created which could have led to the breakdown of the already injured periodontal fibres leading to avulsion of the tooth.

The treatment of the avulsed tooth was done according to the IADT guidelines. As the endodontic treatment had already been started, we completed the endodontic treatment extraorally as early as possible. Care was taken during the whole procedure to maintain the hydration of the root surface and the tooth was held only by the crown to avoid disturbing the periodontal fibres. The hydrated periodontal ligament cells maintain their viability and heal better by formation of regenerated periodontal cells without much destructive inflammation. This reduces the incidence of replacement resorption or ankylosis of the tooth.[10,11]

Replantation of the tooth was completed within 30 mins. This increases the chances of the pdl cells being viable and hence improves the prognosis of the replantation.[6,7,9,10] The tooth was passively splinted with a 23 guage orthodontic wire. The teeth were kept out of occlusion and a soft diet was advised. Antibiotics and anti inflammatory drugs were prescribed for the patient and recalled after 2 weeks for removal of splint.

The reduction of mobility and absence of any symptoms on the follow up visits indicate good healing. The tooth shows promises of healing with formation of periodontal fibres without ankylosis.

However, avulsion of the tooth could have probably been avoided either by splinting on the first visit or by the use of wedgets during the application of rubber dam instead of clamps.[12]

Conclusion

Endodontic mishaps are more or less unforeseen incidents occurring during the endodontic treatments. Nevertheless, we learn from our mistakes. Therefore, from the present case, we can take home the message that, in case of dental traumatic injuries splinting of the teeth needs to be carried out preferably on the first visit irrespective of the status of mobility. This can probably help in mending the periodontal fibres and making the tooth more stable. In such cases, we also need to take care during application of rubber dam and use wedgets for securing the rubber dam instead of clamps.

Figures

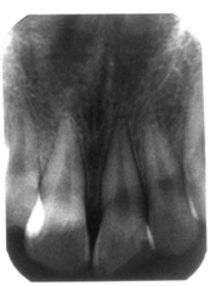

Fig 1 - Diagnostic radiograph

Fig 2 - Clinical photograph after avulsion of tooth

Fig 3 - Radiograph after replantation & splinting

Fig 4 - 15 days follow up radiograph

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