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RESEARCH ARTICLE

A CASE REPORT ON MANAGEMENT OF CALCIFIED CANAL NON-SURGICALLY

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ABSTRACT

Traumatic injuries to dental tissues may lead to several clinical complications, one of them is the pulp canal obliteration, which presents itself as hard tissue deposition along the pulp chamber and root canal walls. It may partially or completely obliterate the pulp canal space causing a great challenge in treating the tooth. This article is showing a case of management of calcified tooth non-surgically.

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INTRODUCTION

It is a normal physiologic process that hard tissue deposits along the root canal walls but after dental trauma the rate of deposition may seem to be uncontrolled, resulting in Pulp Canal Obliteration (Selden, 1989). The aim of the root canal treatment is complete bio-mechanical preparation and obturation of the root canal system. Sometimes, because of root canal calcifications complete cleaning and shaping of the root canals cannot be done in an effective manner thereby leading to the failure of root canal treatment. This article is showing the management of a case of a maxillary left central incisor with calcified root canal.

Case Report: A 18 year old male patient reported with a chief complaint of yellowish discolouration of maxillary left central incisor. Patient gave a history of trauma 5 years back and since then this tooth started discolouring. On clinical examination, left maxillary central incisor did not exhibit any morphological changes other than yellowish discolouration. Tooth was also tender on percussion. On pulp vitality testing it was found non-responsive. The tooth did not respond to both thermal and electric (Parkell Electronics, Farmingdale, USA) pulp testing.

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Preoperative radiograph revealed the presence of a single root with no visible root canal space in left maxillary central incisor compared other teeth (Figure 1.) Periodontal ligament space widening around the apical region was observed. Hence a provisional diagnosis of pulpal necrosis with apical periodontitis was made. Access cavity preparation was performed with access cavity preparation set (Dentsply-Maillefer). Initially no root canal orifice was found. Access was deepended by the munce discovery bur (Curtecy, CJM engineering) #1 and #2 for locating the canal orifice. Ultrasonic tips (BUC 1) were used to locate canal orifice. Then finally we found the access to the canal. The canal was negotiated using #6 and #8 K-file (Mani Inc, Japan). Working length was determined using electronic apex locator and confirmed radiographically (Figure 2) and then bio-mechanical preparation was done with K-File system (Mani Inc. , Japan). 5.2% sodium hypochlorite and 17% EDTA were used for irrigation. Tooth was obturated by using lateral condensation technique with AH Plus sealer (Dentsply) (Figure3,4).

DISCUSSION

Root canal calcification has also been referred to as calcific metamorphosis, dystrophic calcification, and calcific degeneration. It is commonly seen after traumatic dental injuries and is recognized clinically as early as 3 months after injury, but in most cases, it is not detected for about 1 year (Amir, 2001).

Figure 1. Radiograph showing no visible canal space in maxillary left central incisor

Figure 2. Working length determination

Figure 3. Master cone radiograph

Figure 4. Post Obturation radiograph

The mechanism of calcific degeneration is not yet clear. To explain this phenomenon many hypotheses have been published. Torneck proposed that the hard tissue deposition is either a result of pre-existing odontoblasts stimulation or a result of the loss of their regulatory mechanism containing a maze of small irregular spaces and cul-de-sacs, which extend from the pulp chamber to the apical foramen (Torneck, 1990). Tooth with calcification pose a great diagnostic challenge. Mostly the tooth appears yellowish and is found accidently when patient comes with aesthetic problems. There is a progressive decrease in the response to thermal and electrical pulp testing as the pulp calcification increases. It is generally accepted that sensibility tests are unreliable in the presence of pulp obliteration (McCabe, 2012).The attempt to locate calcified canals may result in significantly increased chair side time. It may be difficult to locate and negotiate the calcified canal even with improved magnification technologies. Excessive tooth structure may be removed and the tooth may be at risk of perforation while locating and negotiating the canals. The canal may be very tiny or difficult to find or negotiate but it is present. Unfortunately, these spaces have adequate room to allow passage of millions of microorganisms. Canals become less calcified as they approach the root apex.

Despite severe coronal calcifications, the clinician must assume that all canals exist and must be shaped, cleaned, and obturated to the canal terminus. An access cavity of normal size and shape is made in the crown to a depth equal to that of the pulp chamber floor in a non-calcified tooth. It is essential to remember that the pulp chamber is always located in the centre of the tooth at the level of the cementoenamel junction (CEJ), which is the most consistent repeatable landmark for locating the pulp chamber (Walton, 2002). Dyes such as methylene blue may assist in locating the canal system under the microscope. Sodium hypochlorite may also be used to assist with the identification of a calcified canal being enhanced using the “bubble” or “champagne” test. Placing 5% sodium hypochlorite into the pulp chamber over a calcified canal containing remnants of pulp tissue will result in a stream of bubbles emerging from the oxygenation of the tissue.

This can be seen under the microscope and be used to identify the canal orifice (Johnson, 2009). In very deep access preparations, it is wise to take radiographic images at multiple angles to check whether the instrument is correctly placed or not. DG‐16 explorer is a very useful instrument in the location of canal orifice. Ultrasonic endodontic instruments can also help to open up a calcified root canal. When the tip vibrates at a very high rate, it creates miniature sound waves that break up the calcification. Calcification occurs in a coronal to apical direction; therefore, once the initial canal has been captured, an instrument tends to progress more easily as it advances towards the canal terminus. Always start with a smaller sized K-file and progress to larger sizes without skipping sizes. Firstly a glide path should be prepared with #6 and #8 K-file and then larger sizes can be used in small strokes with watch-binding motion. Use of Chelating agents during preparations have been advocated frequently as adjuncts for root canal preparation, especially in narrow and calcified root canals. Ethylenediaminetetraacetic acid (EDTA) acts on calcified tissue by substituting the calcium ions of sclerosed dentin. Liquid EDTA solution should be introduced into the pulp chamber. Though the actual degree to which chelating agent facilitate negotiation and preparation of calcified and narrow root canals is still unknown, their use can help in negotiation and lubrication of canal. Root‐end resection and filling should be considered when a canal cannot be located. Endodontic surgery is an option in the treatment of calcified canals as it offers a direct approach to the root apex (Carrotte, 2005).

Conclusion

Though negotiating and managing calcified canals can be challenging, they can be managed if a proper protocol is followed. Operator's skill, patience, and a proper armamentarium are the requisites to overcome the difficulties posed by these unforgiving canals for their successful treatment.

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