

Case Report

Management of a maxillary right lateral incisor with calcified canal by conventional endodontic treatment

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Calcified root canal causes so many problems during endodontic treatment due to difficulty in canal orifice location, negotiation, preparation as well as consideration of operating time. Most serious problem may arise during any phase of root canal treatment procedure even taking a lot of precaution. In this case, traumatized calcified maxillary lateral incisor tooth of 21 years old was managed by conventional endodontic treatment. Radiographic assessments, knowledge of internal canal anatomy and time factors are very important to manage this type of problem. In addition, newer canal orifice locating devices, canal shaping and cleaning instruments and materials accelerate the operating procedure.

Keywords: Calcified root canal, Maxillary lateral incisor, Endodontic treatment.

INTRODUCTION

Over the years life, clinically and radiographically, the pulp chamber and canal system remains patent and accessible, but if irritant impact the tooth slowly over the period, both the pulp chamber and the canal system undergo calcific changes that may impede access opening during root canal procedure.¹This type of pulpal response due to trauma which is commonly found in young adult in the anterior region of the mouth, usually defined as calcific metamorphosis.²

A preoperative radiograph often appears to reveal total or nearly total calcification of the pulp chamber and radicular canal spaces. Unfortunately, these spaces have adequate room to allow passage of millions of microorganisms. Despite several coronal calcifications, the clinician must assume that all canals exist and must be shaped, cleaned and burred to the canal terminus.

But fortunately, in modern dentistry, only a small percentage of cases that radiographically exhibit fine or unidentifiable canals or calcified blockage prove to be unmanageable using non-surgical root canal techniques.

Teeth with severe calcification may present problems with locating and negotiating root canals. To locate the calcified orifice, the clinician should mentally visualize first and project the normal spatial relationship of the pulp space on a radiograph of the calcified tooth. The knowledge of the normal pulp chamber location, root

canal anatomy and long axis of the roots as well as accurate radiographic assessment is very much important to find out and to negotiate the canal. A high contrast radiograph with multiple views may be helpful to the clinician. Comparatively it is very much difficult for posterior tooth where multiple equipment and multiple assessments is essential. After the initial access opening, the bur should be left in place and radiograph should be taken at different angulation. Also, there are some rules which are particularly useful in locating calcified canal orifices³ such as law of centrality, law of concentricity, law

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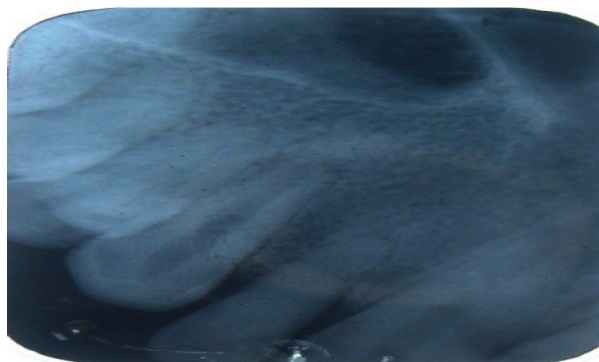


Figure 1. Pre-operative Radiograph

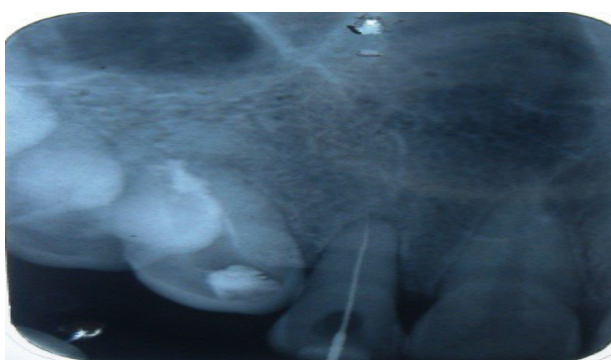


Figure 2. Per-operative Radiograph



Figure 3. Post-operative Radiograph

of cemento-enamel junction, law of symmetry, law of colour change and law of orifice location. Some additional methods are helpful to locate the orifice of canal such as magnification, loupes or operating microscope. After the procedure for location and penetration, the canal may be negotiated with finer instruments followed by copious irrigation with sodium hypochlorite and chelating agents.

CASE REPORT

21 years old female patient was referred to the department of Conservative Dentistry and Endodontics at

Bangabandhu Sheikh Mujib Medical University with the presenting complaint of discolouration of upper right lateral incisor as well as the feature of discharging pus from sulcus of adjacent canine tooth. On clinical examination, the canine was non-vital whereas, the adjacent lateral incisor showed delayed response. On radiographic examination, both teeth showed radiolucency with separated apical root fragment and additionally complete root canal obliteration with calcification. So, the endodontic treatment was necessary for both the teeth with regular follow up.

After proper isolation, an attempt was done to prepare an endodontic access at upper right lateral incisor with the

no.4 round bur from palatal approach. At the normal anatomical orifice level, no sign of orifice was found. Then a no.2 round bur was used to drill at slow speed into the centre of the imaginary anatomical orifice of the

root canal. An endodontic explorer was used to locate the anatomical orifice after removal of chamber content by proper irrigation and canal orifice was re-established with the help of chelating agent. A 10 No K -file (Dentsply) was placed into the orifice with the help of chelating agent and an attempt to negotiate the canal but an attempt to negotiation of the canal could not be done rather than catch the orifice. So, a smaller no.8 file size was placed from coronal to mid-root area with very gentle stem-winding movement. Then the direction of the canal was confirmed by an additional radiograph. Near the apical third area, the no.8 file was replaced with no.6 files because of narrowness and more resistance of that area. After coronal flaring with Sx and S1 of hand protaper files (Dentsply), the whole canal was negotiated upto 19 mm length with no.10 K file. Then the working length was determined at 18 mm length (full length of coronal fragment) based on another radiograph. After determination of the working length, the canal was prepared upto no.40 H-file. Each instrument was slowly advanced during preparation and was cleaned on withdrawal and inspected before re-inserting the canal. After preparation of the canal, the canal was irrigated thoroughly with sodium hypochlorite and calcium hydroxide was used as an intracanal medication. After one week, the canal was thoroughly cleaned and dry followed by obturation with gutta-percha point with lateral condensation technique.

DISCUSSION

Procedural errors can arise from overzealous inappropriate attempts to locate the canals. Root wall or furcation perforations can occur even with most careful search. In severe cases regarding perforation, the communication with periodontal tissues must be repaired immediately. Retrograde surgical procedures become

conservative compared with perforation or root fracture.⁴ To avoid any type of complication in a calcified chamber or canal, all precaution should be taken as well as application of knowledge of the tooth morphology. Though in this case, almost every procedure was done with conventional method, modifications can be done to find and prepare the calcified canals with a variety of explorers, radiograph taken at different levels of bur penetration, magnification, operating microscope, ultrasonic instruments, various types of C files or path file and power assisted rotary instruments.

During preparation, gentle pressure should be applied with instruments. Forcing a no.8 file too vigorously may lead to ledge formation or blockage. Frequent inspection of apical curvature of the files is performed to identify any defect. Any file that shows evidence of fatigue or irregularity of the spiral flutes should be replaced. Junction of the middle to apical portion of the canal is another considering factor where highly variable anatomical structure such as rapid narrowing, canal deviations and canal junctions can be found. In excessive calcification the file can be modified by clipping to make different size. To get better action of chelating agents, the authors recommended liquid EDTA solution be introduced into pulp chamber.⁵

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