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A 60-year-old female with pain on mastication for two months

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Article Info

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Presentation of Case

Dr. Sageer Ahmed (MS Resident): A 60 year's old female presented with the complaints of mild pain during mastication on the lower right posterior tooth for 2 months. She gave history of root canal treatment with crown placement on the same tooth 1 year ago. On clinical examination, crown was present on the lower right first molar tooth and there was tenderness on percussion. There was no sign of any swelling and discharge.

Dr. Mozammal Hossain (Associate Professor); Pre-operative radiograph (Figure 1-A) showed no traces of gutta-percha in the root canals and there was widening of periodontal ligament space surrounding the roots of lower right first molar tooth. Calcification of the root canals in the apical third was also seen.

Clinical procedure

Dr. Ahmed: The patient was sent to the Department of Prosthodontic for the removal of the crown. After administration of local anesthesia the tooth was isolated with rubber dam. The old restoration was removed with round bur and flushed with normal saline. The access cavity was modified with endo-z bur (Dentsply). Sharp endodontic explorer was used to identify the canal orifices. Three canals were identified; mesiobuccal, mesiolingual and distal canals. Various attempts were made to negotiate the canals with help of 10 K file but only coronal two-thirds were negotiated in all three canals. Coronal flaring of the all canals was done with help of orifice shaper (Sx, Dentsply). C+ file was used to negotiate the canals. A sharp bent was made in apical 2mm of C+ file and was coated with EDTA containing gel and inserted in mesiobuccalcanal with watch winding motion. When obstruction was felt, picking motion was used to feel catch in the canal. Once catch was felt, control radiograph was used to confirm the position of the file in the canal. After confirmation of correct position of file, the working length was confirmed 18mm for mesiobuccal, 19 mm for mesiolingual canal and 20mm for distal canal with help of Apex locator & radio-visiography (Figure 1-B). Glide path was created by 15 K File. The canal was prepared by using rotary system (Protaper Gold, Dentsply) up to F2 for mesio-buccal and mesio-lingual canal and F3 for distal canal. The patency of the canal was maintained by using 10K file. Canals were irrigated with 5.25% sodium hypochlorite & 17% liquid EDTA along with normal saline during canal preparation. Canals were dried with paper points and radiograph was taken to confirm cone fit (Figure 1-C). Obturation was done with protapergutta-percha and sealapex (Figure 1-D). The access preparation was sealed with composite restoration and referred to the Department of Prosthodontic for crown placement.

Provisional Diagnosis

Chronic apical periodontitis

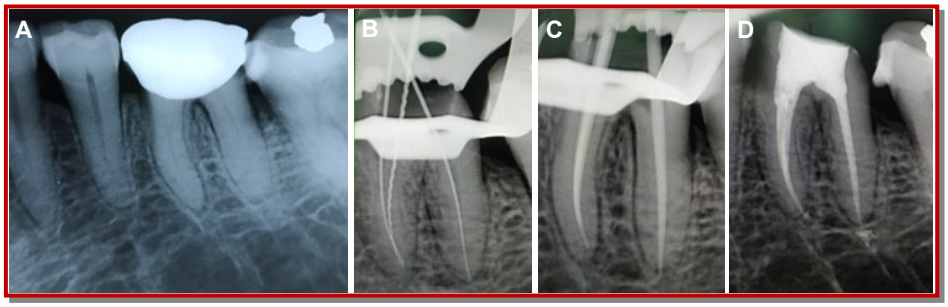

Figure 1. Pre-operative radiograph showed no traces of gutta-percha in the root canals and there was widening of periodontal ligament space (A); A diagnostic x-ray after inserting the files into the root canal that reached up to the apex (B); radiograph showed cone was fitted into the canal (C); The canals were obturated with gutta percha point and sealer (D)

Differential Diagnosis

Acute apical periodontitis

Followed by pulp necrosis acute apical periodontitis may develop.[1-4] There is severe, continuous pain and the tooth is highly tender to percussion.[5-7] Usually there are no radiographic features. In this case there was mild to moderate pain on mastication and radiographic features were present. So, it was excluded from the diagnosis.

Chronic alveolar abscess

A chronic alveolar abscess indicates a long-term and low-grade infection of the periapical tissue.[8-9] It is always associated with draining sinus tract.[10, 11] However, the present case did not have any sinus tract or history of swelling and discharge. So, it was excluded from the diagnosis.

Dr. Ahmed's Diagnosis

Previously treated lower right first molar tooth with chronic apical periodontitis

Discussion

Etiology of root canal failure

Dr. Ahmed; Although root canal treatment has an excellent success rate but it may failed due to several reasons such as procedural errors,[12-13] complex anatomic variations,[14-15] or the presence of extra-radicular biofilm.[16-17] Furthermore, root canal obstructions including calcification is considered as one of the most causes of failure.[18, 19] Calcification in the root canal system is also associated with various etiological factors include caries, trauma, drugs and aging.[20, 21] In the present case, either chronic irritation due to deep caries close to the pulp chamber or the use of the restoration in the pulp chamber without pulpectomy might be the possible cause for calcification.

Treatment options

Retreatment of the root canal can be possible by non -surgical retreatment method with or without apical surgery, intentional replantation and extraction.[22-26] In the present case, as the tooth was found restorable, non-surgical retreatment was performed. However, proper management of calcified canal depends upon correct access opening and identification of the root canal system. The relationship of the pulp space and distance from the occlusal surface to the pulp chamber should be measured from pre-operative radiograph. Coronal flaring of the canal orifices with rotary orifice shaper improves the advancement of the root canal instruments into canal system and proper disinfections. Accurate radiographic evaluation of bur orientation, use of sharp endodontic explorer and proper magnification are essential to recognize orifice of calcified canals.

Various techniques and materials have been used for the management of calcified canal in recent years. It includes the use of ultrasonics,[27, 28] chelating agent,[29, 30] magnified loupes,[31] optical fibers,[32, 33] and cone-beam computed tomography (CBCT).[34, 35] In the present case, chelating agent such as ethylenediaminetetraacetic acid (EDTA), sodium hypochlorite and C+ Files were used with radiovisiography. However previous studies have indicated that the use of EDTA vigorously might lead to formation of false canal. Therefore, dental operating microscope and ultrasonic are considered most useful tools nowadays. Ultrasonic tips provide conservative way to remove calcification in coronal portion of root canal and dental operating microscope provide higher depth and resolution of visibility inside the tooth. Digital radiography performed at different angles both initially and during treatment is used to assess the depth and orientation of pulp canal. CBCT has also been proved beneficial in identification and management of calcified canal due to its ability to view axial, sagittal and different sections of teeth. Guided endodontic is one of the latest methods used for management of calcified canal. However, high-tech armamentarium and 3D devices results in higher costing for the patient.

Follow-up

Patient was called for follow-up and evaluation at the interval of 3, 6 and 12 months.

Dr. Tania Parvin (MS Resident): Why C+ file was chosen in this case?

Dr. Ahmed: C+ files are stiffer than regular K-files with active end cutting tip. C+ file can engage dentin much better in calcified condition.[36] As there was calcification in this case, C+ file was chosen.

Dr. Tahmida Hoque (MS Resident): What are the causes of calcification of canals in root canal system?

Dr. Ahmed: There are many causes of root canal calcification. It include; aging, prolonged trauma, prolonged infection, non-vital teeth without endodontic treatment for many years, dental decay, dental restorations, gingival recession and idiopathic.[20, 21]

Final Diagnosis

Previously treated tooth with chronic apical periodontitis and calcified canal

Conflict of Interest

Authors declare no conflict of interest

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