Case report

ENDODONTIC MANAGEMENT OF HYPERCEMENTOSIS IN CONJUNCTION WITH MIDDLE MESIAL CANAL - A CLINICAL CHALLENGE

ABSTRACT

Hypercementosis is characterized by an excessive deposit of dental cementum. While it is considered a benign pathology, it can sometimes be associated with a chronic pulpal or periapical infection. Furthermore, its management is complex, because establishing an accurate apical limit for a root canal procedure is not always possible. When a periapical lesion is present, a conservative, non-surgical approach to remove the inflammatory tissue from the periapical lesion can be considered as a treatment option. This case report illustrates the management of a tooth with hypercementosis accompanied by a middle mesial canal affecting a left mandibular first molar.

Keywords: endodontics, hypercementosis, mandibular molar, mid-mesial canal, root canal treatment

1. INTRODUCTION

Hypercementosis, also known as cemental hyperplasia, is a non-neoplastic deposition of excessive cementum, which merges with the radicular cementum and can extend to either one tooth, a group of teeth or an entire tooth.[1] Broadly, hypercementosis is an idiopathic condition, but some conditions that may be linked to hypercementosis include:[2]

- intensive masticatory effort
- supra-eruption of tooth due to loss of opposing antagonist
- chronic periapical infections
- impacted teeth
- periodontal disease
- trauma from occlusion
- systemic diseases like Paget's disease, toxic goiter, acromegaly, gigantism

Hypercementosis is normally seen to be asymptomatic and is mostly encountered as an incidental finding during radiographic examination. It may be related to other pathologies, such as apical periodontitis.Radiographically, hypercementosis is seen as a thickening of the cementum layer, adjacent to the normal radicular cementum and is contained within the limits of the periodontal ligament and the lamina dura.[3]

Clinically, a mandibular molar may have many anatomical variations, like the presence of additional roots in the distolingual or mesiobuccal aspect, C-shaped canal anatomy, and

three canals in mesial or distal roots including a middle mesial canal (MMC) or middle distal canal (MDC), etc.[4]

Clinical studies have investigated the incidence of middle mesial canals in mandibular molars. Before the introduction of cone beam computed tomography (CBCT), the incidence of MM canal ranged between 1 and 15%,[5] whereas a recent study[6] has reported a much higher incidence of 46.2% in mandibular first and second molars. Matherne et al. suggested the use of CBCT imaging in identifying root canal systems.[7]For root canal treatment to be successful, it is necessary to locate all root canals and debride them thoroughly for which knowledge of the morphology of this middle canal in mandibular molars is important.
Thus, this case report illustrates the management of the endodontic challenge faced when a middle mesial canal is present concomitantly with hypercementosis in a mandibular first molar.

2. CASE REPORT

A 37-year-old female patient was referred to the Department of Conservative Dentistry and Endodontics with the chief complaint of spontaneous pain in the lower right posterior tooth. History revealed intermittent and spontaneous pain for the past 1 month. The patient's medical history was non-contributory. Clinical examination of the left mandibular first molar revealed the presence of an old dislodged amalgam restoration. The tooth 36 was tender on percussion and showed increased response to cold and heat stimulus in comparison to adjacent and contra-lateral teeth. Periodontal probing around the tooth and mobility were within normal physiological limits.

Periapical radiograph showed the previous restoration encroaching the distal pulp horn with a diffused periapical radiolucency wrt the distal root of 36. As an incidental finding, at the level of the apical third, a thickening of the mesial root was observed due to the symmetrical and excessive deposition of a radiopaque material, with the PDL space and lamina dura still distinguishable. A similar, though reduced thickening was seen wrt the distal root. The clinical and radiological findings were consistent with a diagnosis of symptomatic apical periodontitis with hypercementosis.

When a CBCT scan was taken to confirm the finding and extent of hypercementosis, a large radiopaque zone was seen surrounding the mesial root of 36, with an intact periodontal space lining. Additionally, in axial sections, a third canal was seen in between the 2 mesial canals, suggestive of a middle mesial canal. From clinical and radiographic examination, a diagnosis of pulp necrosis with hypercementosis was made and routine nonsurgical endodontic treatment was initiated.

Informed consent was obtained from the patient prior to starting treatment. After administration of local anesthesia and rubber dam isolation, the previous restoration was removed and an adequate endodontic access cavity was made. Inspection of the pulp chamber floor showed orifices corresponding to mesiobuccal, mesiolingual, and distal

canals. On careful examination of the groove between the mesiobuccal and mesiolingual canal orifices with endodontic explorer, an additional canal orifice was identified and the canal subsequently negotiated with D-finder files [Mani Inc, Japan]. This canal was identified as the middle mesial canal.

The canals were explored and negotiated with no. 6, 8 and 10 K files. The working length was determined using an electronic apex locator and confirmed radiographically. Subsequently, canals were shaped using rotary NiTi files [ProTaper, Dentsply Maillefer] with crown down technique and irrigated with 3% sodium hypochlorite and 17% EDTA solution. Canals were subsequently filled with calcium hydroxide as an intra-canal medicament until the next appointment for a week. In the follow up visit, when the patient was found asymptomatic, gutta-percha master cones [ProTaper, Dentsply Maillefer] were selected and obturation was carried out with gutta percha cones and AH plus sealer [Dentsply Sirona]. The access cavity was further permanently restored with composite resin after a week from obturation and patient was referred to undergo full coverage restoration.

3. DISCUSSION

Hypercementosis may not be associated with any known cause or may be seen as a result of a wide range of conditions that can be local or systemic in nature.[8] If the underlying cause is systemic, a generalised distribution of hypercementosis may be seen with symmetrical enlargements of the entire root structure. Local factors leading to this condition may be a chronic periapical infection, loss of antagonist teeth, trauma from occlusion, among others.

Hypercementosis may be mistaken for any radiopaque structure seen in the root vicinity, like a bony dense island, or mature cemento-osseous dysplasia, or a small cementoblastoma.[9] A cementoblastoma presents a diagnostic challenge for the clinician due to its close similarity with hypercementosis. However, hypercementosis can be differentiated by the presence of an intact periodontal membrane space around the involved root.[10]

Periapical pathologies have a known propensity for causing hypercementosis of a single involved root with a bulbous or nodular enlargement, such in the case of this patient, where hypercementosis was associated with a previous restoration that was causing chronic pulp irritation. In spite of the fact that abnormal amounts of cementum are present, the affected roots are separated from periapical bone by both normal appearing periodontal ligament space and intact lamina dura, except Paget's hypercementosis which is complete absence of periodontal membrane and lamina dura.[3,11]

A large number of cases have been recorded in dental literature about the unusual anatomy of the root canals of mandibular molars. A thorough knowledge of root canal morphology and its variations aids the clinician in detecting any additional canals. These canals in a mandibular first molar can only be found by careful examination of the pulpal floor, selective troughing, and improved visualisation with a dental operating microscope. According to a study by Azim et al., the MM canal was discovered in 46.2% of cases, of which 39.6% were discovered following standardised troughing and 6.6% following conventional access

preparation.[7] Additionally, they noted that the younger patient age group had a noticeably higher incidence of an MM canal.

In this case, the presence of an additional mesial canal was found incidentally in axial sections during CBCT examination. After access opening and initial negotiation of the mesio-buccal and mesio-lingual canals, the middle mesial canal was instrumented with D-finder files. These are pathfinding files and are said to prevent excessive filing or binding in calcified or curved canals. After completion of cleaning and shaping, multiple radiographs at different angulations can be taken to help in visualisation of the canal anatomy. In this case, the middle mesial canal was seen to merge with the mesio-lingual canal at the middle third.
It is challenging to determine a correlation between the external anatomy of the apical third and the main foramen's diameter or the number of apical foramina in teeth with hypercementosis; these morphological traits may account for the challenges in radiographically estimating the working length.[14] In this instance, however, the working length and master cone length may be calculated based on the faint visualisation of the root's usual lamina dura.

4. CONCLUSION

The use of CBCT technology has been advocated for many procedures in endodontics, although there exists considerable debate as to whether or not it should be used as a standard and routine imaging modality. However, usage of CBCT for visualisation of hypercementosis in this case proved to be useful for detecting the additional mesial canal. Long term success of endodontic therapy can be ensured by understanding the clinical implications of hypercementosis, and the complex anatomy associated with middle mesial canals.

Definitions, Acronyms, Abbreviations

CBCT- Cone Beam Computed Tomography

MM- Middle Mesial

CONSENT

All authors declare that 'written informed consent was obtained from the patient for publication of this case report and accompanying images.

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Fig 1-Pre-operative IOPA radiograph

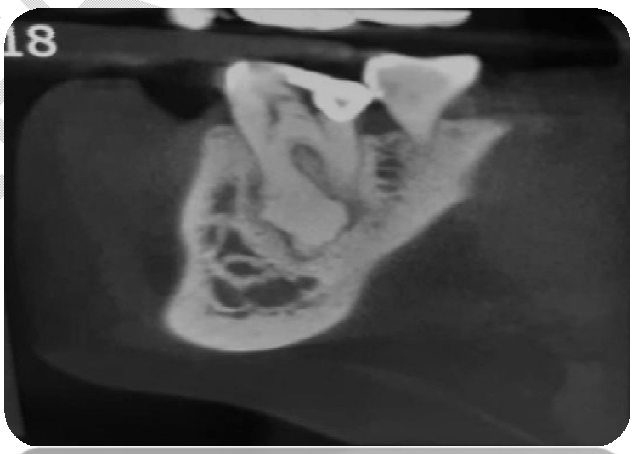
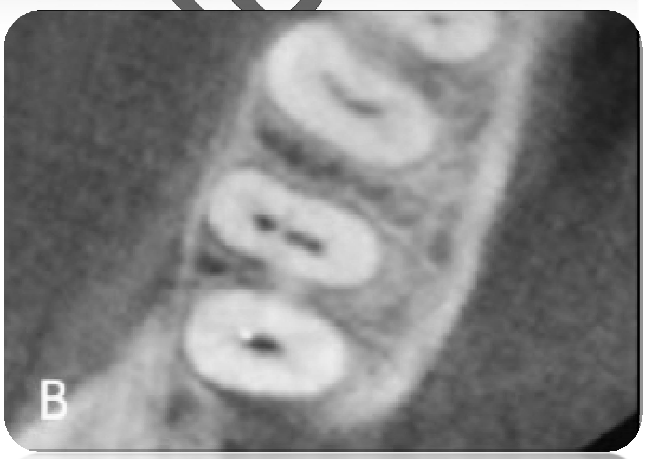


Fig 2-CBCT Imaging of 36



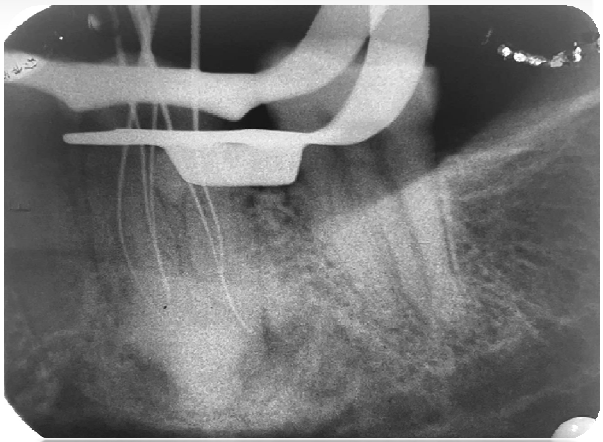


Fig 3-CBCT scan report 1

Fig 4-CBCT scan report 2

Fig -5-Clinical photograph showing orifice of middle mesial canal

Fig -6- Post-endodontic restoration IOPA radiograph

Fig -7-IOPA radiograph after crown placement