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Case Report

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MANAGEMENT OF CURVED CANAL IN MAXILLARY THIRD MOLAR: A CASE REPORT.

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ABSTRACT

Curved or dilacerated root canals specially in the posterior region are a major challenge for clinicians during endodontic treatment. Procedural errors might take place when conventional instruments and techniques are used in such canals. Advent of newer file systems and improvement in metallurgy of the presently available NITI file systems along with novel tactile control activation technique has made the treatment of such curved canals less cumbersome. Thus, this case report discusses various aspects of root canal treatment while treating a dilacerated tooth.

KEYWORDS: curved canals, dilaceration, tactile control activation.

INTRODUCTION

Adequate removal of bacteria and their by-products by chemo mechanical disinfection and establishing a three-dimensional seal are the key elements for a successful root canal treatment and these steps become all the more challenging in case of curved root canals.[1]

Usually, straight root canal canals are rather an exception than a normality as most teeth show some form of root or canal curvatures along their length.[2] For more severe curvatures the term "dilaceration" was coined by Tomes, in 1848 which refers to a sharp bend or an acute curve in the root or crown of formed tooth or a deviation or bend in the linear relationship of a crown of a tooth to its root.[3] Whenever encountered, a practitioner has to overcome a number of diagnostic, management, and prognostic challenges to manage such dilacerations.[4] Both the permanent and deciduous dentitions have shown dilacerations with more prevalence in posterior region especially maxillary teeth. Careful and thorough examination of periapical radiographs is the most appropriate way to diagnose the presence of root dilacerations.[5]

Such curvatures often increase the susceptibility of procedural errors during root canal preparation like perforations, instrument separation, transportation, ledges, asymmetrical dentine removal, or alterations of the internal anatomy. Though these errors don't cause treatment failures directly, but they do jeopardize the proficiency of the practitioners to eradicate intracanal infection. thus, affecting the prognosis of the treatment.[1]

This case report is an attempt to discuss a clinical approach to diagnosis and management of maxillary third molar with severely curved distobuccal and mesiobuccal roots.

CASE REPORT

A 40-year-old male patient reported with a history of spontaneous pain in the left maxillary posterior region for a month. On clinical examination, proximal composite restoration on the mesial aspect of 28 could be seen and the tooth was tender on percussion. Medical history was non-contributory. Radiographic examination revealed mesial composite restoration placed encroaching the pulp chamber of the involved teeth. The mesiobuccal(MB) and disbuccual(DB) root canal of 28 exhibited a sharp curvature(dilaceration) (Fig:1 a, b showing schnieders angle).starting from the middle third of the root. [Fig-1c]. Electric pulp testing elicited a delayed response in comparison to the control tooth. Thus, with the clinical and radiographic findings, a diagnosis of symptomatic apical periodontitis was made in relation to 28.

A single visit root canal treatment was planned. With informed consent, local anesthesia was administered using 2% lignocaine and 1:100000 adrenaline and endodontic therapy was initiated under rubber dam isolation. Endo access bur was used for initial cavity preparation. After a drop was felt on entering the pulp horn of the palatal canal, further modification of the cavity was done by using Endo Z bur to locate mesiobuccal (MB) and distobuccal canal (DB).

Thereafter, the access cavity was modified ultrasonically with Start X tips (Dentsply, sirona) to extend more distobuccally. A number of #8 and #10 C-Pilot files (VDW, Dentsply) were precurved for further exploration and for checking the patency of root canals. The MB and DB root canals showed extreme abrupt curvature with a short radius of curvature causing slight resistance of # 10 C-Pilot file to reach the apical third for initial patency. Patency was achieved in all the three canals and the apical third of the curved MB and DB canal were prepared using short amplitude filing. Frequent irrigation of the root canal and recapitulation was done multiple times to prevent blockage of the curved canal by accumulated hard tissue debris.

Working length determination was done initially apex locator (Canal Pro Compact, Coltene Whaledent Altstätten/Switzerland) and later confirmed by an IOPA radiograph. Coronal preflaring was done using rotary Hyflex EDM orifice shaper (25/12%) (Coltene Whaledent Altstätten/Switzerland). All the three root canals were prepared using a combination of Hyflex CM and EDM rotary files in a Tactile Control Activation technique(TCA). TCA utilises file activation only after maximum engagement of the flutes is reached and tactile feedback of the anatomy is felt. Recapitulation with no. 10 C-Pilot file and intermittent irrigation was performed using sodium hypochlorite (Canal Pro 5.25%, Coltene) after each instrumentation. The MB and DB canals were prepared to apical size 20/5% (Hyflex EDM, Coltène/Whaledent,) while the palatal was finished with 25/8% (Hyflex EDM One 25/~, Coltène/Whaledent,). Final irrigation was done with 17% EDTA and activated with Ultra X(Eighteenth, Orikam) for one minute followed by final rinse with saline. The canal was dried with absorbent paper points and obturation of the root canals was performed with matched tapered fitted gutta-percha cones and gutta flow bioseal sealer (Coltène/Whaledent, Altstätten/Switzerland) (Fig: 2) and the access cavity was restored with nanohybrid composite restoration.

DISCUSSION

The detection, exploration and negotiation of curved root canals becomes a tedious and often daunting task for the operator and the inability to follow the root canal curvature may result in various procedural errors.[6]

About 84% of human teeth have clinically noticeable root canal curvatures.[7] A deviation of the apical part of the root by 20° or more is termed as dilaceration which may be as much as 90^0. Dilacerations might be due to some form of trauma during the period of tooth formation, where the position of the calcified portion of the tooth is changed and the remainder of the tooth is formed at an angle.[4]

Conventional endodontic instruments have the tendency to straighten in the root canal, causing over preparation of the outer curvature in their apical portion and the inner curve of the root canal in the coronal parts of the curved roots.[8] Thus, maintaining original canal anatomy becomes difficult and there is an increased chance of file separation. Recently, newer file systems with innovative metallurgy have been designed especially for use in curved canals HyFlex EDM files (Coltene/Whaledent) used for the management of the above case are manufactured via an electro discharge machining (EDM) process making them more resistant to cyclic and torsional fatigue and thereby increasing their resistance to fracture.[9] Also the combination of the property of superelasticity and fracture toughness reduces the number of files required for cleaning and shaping has been reduced without compromising the original root canal anatomy.[10]

Keeping in mind the severity of the dilacerated root canal there was a need to minimize file engagement and torsional loading during instrumentation. Hence the novel instrumentation technique of Tactile Controlled Activation (TCA) was adopted for this case. Proposed by Antonis Chaniotis, it is a single stroke activation of a stationary engine-driven file only after it becomes fully engaged inside a patent canal and tactile feedback of the underlying anatomy is gained. By inserting non- rotating files with smaller diameters around curvatures and withdrawing with rotation, the severity of the curvature can be easily determined whilst avoiding excessive stress (McSpadden, 2007). Thus, TCA technique takes advantage of this strategy to avoid stress in highly curved canal systems.[1]

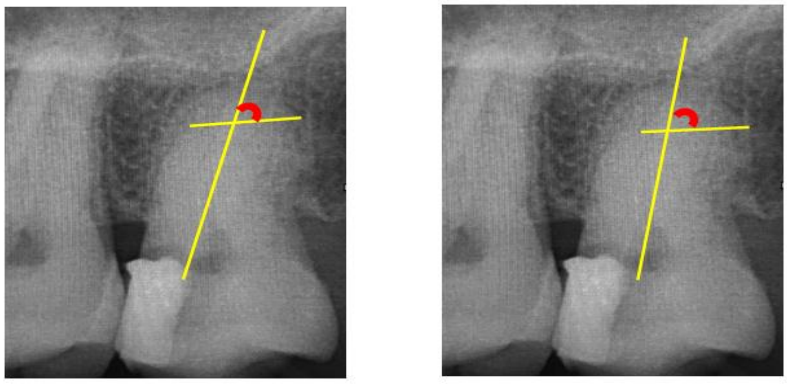

Figure 1 a, b: Preoperative radiograph showing schnieders angle in the DB &MB canals.

Figure 1c: Preoperative radiograph.

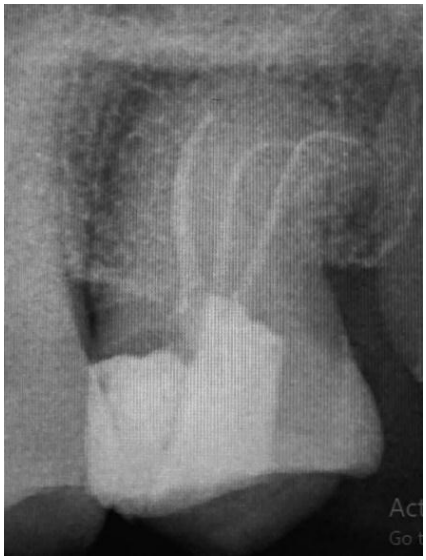

Figure 2: Postoperative radiograph.

CONCLUSION

Severe root canal curvature may pose considerable difficulties in their cleaning and shaping. Conventionally angulated radiographs, straight line access, orifice flaring martensitic niti(rotary CM & EDM), and novel techniques like tactile controlled activation use of flexible K reamers/ files in watch winding motion for patency, predictable glide path along with frequent irrigation and recapitulation are prerequisites for minimizing iatrogenic errors during shaping and dilacerated and curved canals.

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