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POST ENDODONTIC MANAGEMENT OF MANDIBULAR LATERAL INCISOR WITH TWO CANALS. A CASE REPORT

Dental Science

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ABSTRACT

Mandibular incisors with two canals are frequently seen in clinical practice. The minimal bulk and mesiodistal width of these teeth contraindicate the use of post and core particularly when they present with two canals. This case report describes a case of mandibular lateral incisor with two canals requiring endodontic therapy followed by post and core for its restoration. The criteria for post selection and the management of this case are discussed in detail.

KEYWORDS

INTRODUCTION

Post and core are indispensable part of endodontic therapy. When the remaining tooth structure necessitates increased retention it can be achieved either by increasing the post length, diameter or by utilising the resilience of dentin (1). Mandibular incisors have the narrowest mesiodistal dimensions among all teeth and often present with two canals. According to literature, mandibular incisors with two canals are contraindicated for post and core restorations due to inadequate root dentin thickness (2). However, this case report describes the successful use of post and core in a mandibular lateral incisor with two canals and its followup.

Case report

A 55-year-old female reported to our dental clinic with a chief complaint of fractured tooth #32. On examination, the tooth was grossly decayed with loss of coronal and middle thirds of the crown portion. About 2-3mm cervical one third alone was present (figure 1).

The tooth was tender on percussion and exhibited grade 1 mobility. Intra oral periapical radiographs were taken, which revealed periapical radiolucency and horizontal bone loss extending to the middle third of the root surface in relation to #32 (figure 2).

Endodontic treatment was initiated in #32 on the same day. Local anaesthetic (Lignox 2% A) was administered. Rubber dam was secured around the tooth with use of a dental floss and access opening was performed. The tooth exhibited 2 canals (labial and lingual). Patient was explained about the possible complications and prognosis of the tooth upon being restored.

It was a Vertucci's type II canal configuration and working length was determined as 12mm. Apical enlargement was done upto 30 size K file (Mani Inc) in both canals followed by step back preparation. Intra canal calcium hydroxide medicament was placed and access cavity was closed with temporary cement. Root planning and circumferential crown lengthening of about 1mm was performed in relation to #32 on the same day. The second appointment was scheduled after 1 week.

During the second visit, patient was asymptomatic. Canals were obturated (figure 3) by lateral compaction technique with 2% gutta percha (Dentsply-maillefer, Ballaigues) and zinc oxide eugenol sealer. Periodontal healing was reviewed.

During the third visit, patient continued to remain asymptomatic. Post space preparation was done in the labial canal for about 5mm with peaso size 1. An appropriate sized parallel threaded metal post (Nordin gold plated screw post, medium, size 1) was screwed into root canal dentin upto 5mm. The post was backed off by one fourth turn to ensure passivity. Metal primer (Prime & Bond NT, Dentsply-maillefer, Ballaigues) was applied to the post and core build up was done using composite resin (3M ESPE, USA). On the same visit, tooth preparation was performed for metal-ceramic crown in #32.

During the fourth visit, crown was cemented with resin cement (Maxcem Elite, Kerr,Orange,CA) (figure 4,5). Patient was reviewed at 3, 6 months and 1 year (figure 6). The tooth remained asymptomatic with complete periapical healing.

Discussion

Prevalence of two canals in mandibular incisors ranges between 3-15% (3,4). Verma et al, studied the incidence of two canals in permanent mandibular incisors in Indian Subpopulation and reported a higher prevalence rate of 30-33.5% in mandibular central incisors and 33.5-36.5% in mandibular lateral incisors (5). The same study also reported that mandibular incisors with two canals are more common in females (20.4%) compared to males (15.2%) (5). Root canal anatomy has the most significant influence over post selection and placement. In the presence of a single canal, mandibular incisors have the least recommended post space diameter of 0.7mm (6). Therefore, when mandibular incisors present with two canals placement of post becomes indeterminate.

Post systems can be rigid or non-rigid, parallel or tapered, active or passive, custom cast or prefabricated. A nonrigid post is selected when 2 to 3mm of cervical tooth structure is present to resist flexion. A rigid post is selected in case of limited ferrule or when less than 2mm cervical tooth structure is present. Rigid posts provide improved cervical stiffness to limit the movement of core and avert the disruption of cement seal (7). Therefore in this case, the first criteria was to select a rigid post.

Ideally it is recommended that the post length be equal to the length of the crown or two thirds the length of the root (7). But when a mandibular incisor presents with two canals, post length must be kept as minimal as possible because preparation to the recommended levels may compromise the quality of root canal dentin or even lead to strip perforation. So the second criteria was post length should be kept as minimal as possible i.e. less than the ideal recommendation. Neither a cast post nor a prefabricated cemented metal post can provide adequate retention when post length is compromised.

Adhesive posts are contraindicated for this case for the same above mentioned reasons. Firstly, presence of less than 3mm cervical tooth structure which necessitates the use of rigid metal posts to resist flexion. Secondly, adhesive post require post space preparations extending to half the length of the root(7). But mandibular incisors with two canals present with extremely slender circumferential dentin which tapers down apically. When post space preparations are made extending to half the length of the root it may lead to unacceptable loss of root canal dentin or even strip perforation.

Active threaded posts are ones that screw into the root canal dentin. These posts occur in several styles including those that require tap, self-tapping, split shank and hybrid posts (8). A major concern pertaining to the use of threaded post has been the potential for vertical

root fracture during post placement. However, many studies support the use of threaded post unless it is completely 'bottomed out' (8). Therefore it is advised to unscrew one fourth of a turn to decrease the residual stresses in the root dentin during post placement (8). At shorter lengths, active posts have shown to produce less stresses than other styles of prefabricated posts (9). Therefore the main indication for use of active threaded posts is when root canal length is insufficient for retention of passive posts (8).

A threaded post was selected for this case because it of being rigid, most retentive and require minimal depth of embedment i.e. 3 to 4mm into the canal to provide retention (2). Although these posts produce high installation stresses, they can be made passive by unscrewing one fourth of a turn(7). Threaded posts have existed for a very long time, but their use was limited as they are known to produce high installation stresses. However, literature search revealed limited amount of case reports or clinical data available on the use of threaded posts and its installation stresses producing root fractures.

Conclusion

Threaded posts are the most retentive type of post requiring minimal post space preparation, thereby conserving tooth structure. This case report describes an ideal clinical situation utilising the resilience of dentin for post retention.

Disclosure

The authors confirm and declare that (1) this paper is their original work (2) the study was completely self-funded (3) this paper has not been published previously and is not currently considered for publication elsewhere (4) there is no conflict of interest regarding the publication of this paper.

Figures

Figure 1 – Pre operative radiograph

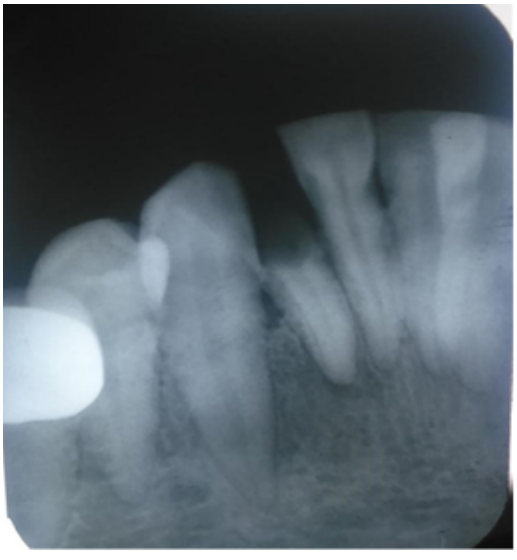


Figure 2 – Preoperative clinical picture.

Figure 3 – Mastercone radiograph

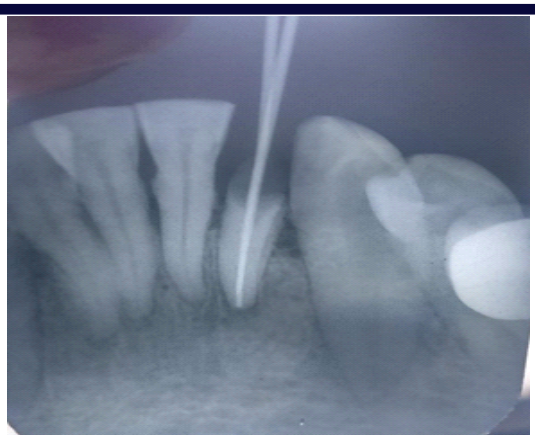


Figure 4 – post treatment radiograph showing threaded metal post and crown.

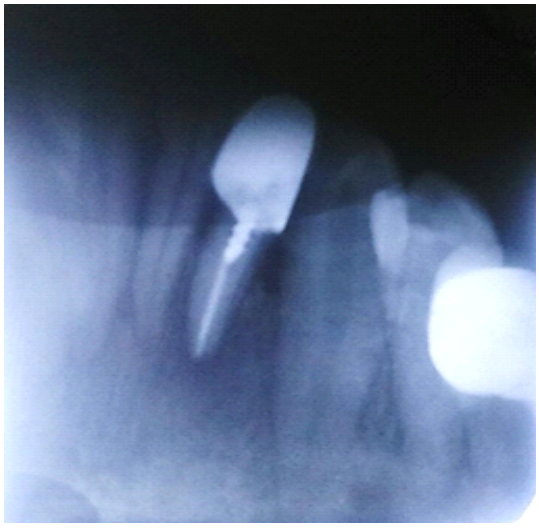


Figure 5 – Post treatment clinical picture

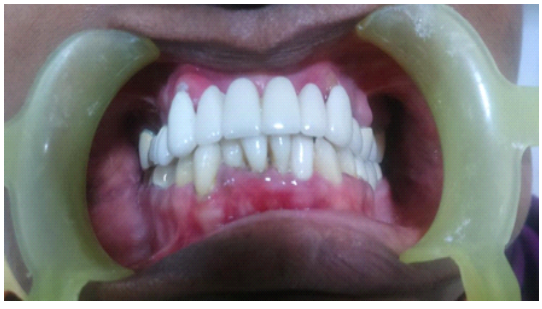
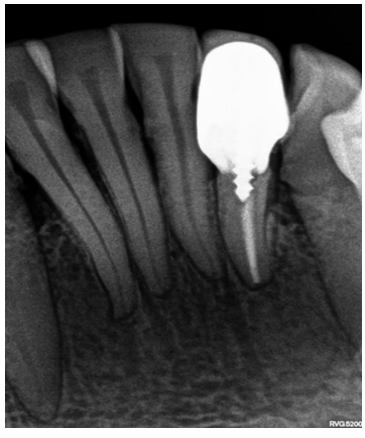


Figure 6 – 1yr follow-up radiograph showing complete periapical healing.



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