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RESEARCH ARTICLE

MAXILLARY CENTRAL INCISOR WITH TWO ROOTS: A CASE REPORT

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ABSTRACT

To achieve goals of endodontic therapy the clinician must have thorough knowledge about internal and external dental anatomy of the tooth and its variations in presentation. The internal anatomy of the maxillary central incisor is well known and usually presents with one root and one radicular canal system. This case report describes an endodontic treatment of a maxillary central incisor with two roots and two canal systems, demonstrated by radiography. Failure to recognize unusual root canal anatomy may lead to unsuccessful endodontic treatment.

INTRODUCTION

One of the most important objectives of root canal treatment is the debridement of bacterial colonies and necrotic debris from root canal space. However the failure of endodontic treatment is attributed to many reasons such as diagnostic errors, persistence of infection, error in cleaning and shaping of root canal, instrument separation, poor restorations and undetected extra canals. Therefore thorough knowledge of internal and external anatomy of teeth is necessary for adequate endodontic treatment (Thakur A *et al* 2016). Anterior teeth may have aberrant variations in number of roots and root canals. However there is 0.6% incidence of extra canal in maxillary central incisors. (Cleghorn B M *et al* 2008) This case report describes the clinical significance and endodontic treatment of maxillary central incisor with two root canals.

CASE REPORT: A 35 year old female patient came to the Department Of Conservative Dentistry and Endodontics of Maharaja Ganga Singh Dental College and Research Center, Sri Ganganagar, Rajasthan, with chief complaint of intermittent dull pain in relation to upper front teeth since 2 months. Patient reports of endodontic treatment done elsewhere in relation to the maxillary left central incisor and composite restoration in relation to maxillary right central incisor 6 months before. The teeth were tender on percussion.

Radiographic examination revealed periapical changes and inadequate obturation in relation to maxillary left central incisor (21) and periodontal space widening, inadequate restoration in relation to maxillary right central incisor (11). The tooth 11 did not respond to electric pulp testing. Based on the clinical and radiographic findings the diagnosis of pulpal necrosis was made and patient advised to undergo root canal treatment for the maxillary right central incisor and Re-treatment for the maxillary left central incisor. Radiograph showed a faint radiolucent line in addition to the main root in relation to 11, hence and additional root suspected. After explaining the treatment plan and obtaining consent from the patient, root canal treatment as initiated. First for maxillary right central incisor (11) the old defective restoration and remaining infected dentin was removed and access opened to the main canal, under rubber dam. The access was then modified extending the cavity preparation distopalatally and an additional canal located. The canals were negotiated and working length estimated using ISO 2% No 15 K files and IOPA radiograph taken. Chemomechanical preparation was done in step down technique using hand K files, upto sizes 60 K file under continuous irrigation with 2.5% sodium hypochlorite solution, 17% ethylene diamine tetra acetic acid and saline. Calcium hydroxide placed as intracanal medicament and access sealed. For the maxillary left central incisor (21) the old restorative material and obturation material



Figure 1. Pre operative IOPA. Radiograph



Figure 2. Canal orifice location schematic diagram



Figure 3. Working Length



Figure 4. Master Cone IOPA radiograph

were removed using H files and canals were irrigated with saline and 2.5% sodium hypochlorite solution and saline, the tooth was then prepared by step back technique using ISO 2% hand K files upto master cone of size 60 and radiograph taken. Followed by intra canal Calcium Hydroxide intracanal dressing. Patient recalled after three weeks. Master cone radiograph were taken after both the teeth were cleaned and shaped. The root canals were dried with paper points and obturated with standardized gutta percha cones with lateral condensation technique using resino seal sealer. Followed by post obturation restoration with Composite and radiograph.

DISCUSSION

The case reported here is an unusual case of a maxillary central incisor with two roots and root canals located buccally and disto palatally. Most endodontic and anatomy texts describe the human maxillary central incisors with single root and single canal. There were few case reports describing an additional canal in maxillary central incisors and most of them present morphological alterations, such as macrodontia, fused and geminated tooth. Such morphologic variations are attributed to the disturbances in the normal development of

Hertwig's epithelial root sheath and may adversely affect the outcome of endodontic therapy. (Thompson B H *et al* 1985, Anathanarayan K *et al* 2012). Even though the maxillary central incisors are considered to be the least complicated tooth for endodontic treatment, clinicians need to be aware of unexpected root canal morphology when performing root canal therapy. As Hess in 1925 first reported maxillary central incisors presenting single root and root canal in 100% cases, followed by studies conducted by De Deus and Vertucci also reported similar findings. And has been the same in majority of cases. However case reports of maxillary incisors with two roots and root canals were reported by Reid *et al* 1993, Genovese *et al* 2003, Lin W C *et al* 2006, Kasshara *et al* 1990, Kottoor J *et al* 2012, Marcelo S C *et al* 2013 (Marcelo Santos Coelho *et al* 2013). Mangani *et al* 1994 has reported a case of maxillary central incisor presenting with dens invaginatus and four root canal. Root canal configuration Vertucci type IV (2-2) and type V (2-1) are the most common accessory anatomical variation reported in single and double rooted maxillary anterior teeth (Ahmed *et al* 2015). Vertucci and De Grood, Cunningham reported that a considerable number of failures could be assigned to anatomical variations, such as the

presence of unusually root canals. (Vertucci 1984) (De Grood *et al* 1997) Thorough knowledge including pre and intra operative awareness of landmarks associated with normal morphology as well as aberrant anatomy of root and root canal, internal and external tooth morphology is essential prerequisite for successful root canal therapy as then there will be less chances of missed root or canals during treatment. (Vertucci *et al* 2005, Cantatore *et al* 2006). Diagnostic methods such as accurate preoperative radiographs, straight and multiple angulated techniques, examination of pulp chamber floor with endodontic explorer, troughing grooves with ultrasonic tips, staining the chamber with des, champagne bubble test and visualization bleeding points to use of endodontic microscopes may be useful in providing clues to the number of roots and addition canals that exist and morphological variations in pulpal anatomy must be considered before treatment onset.. (Klein *et al.*, 1997) (Arora *et al.*, 2105)

Conclusion

There are no limits for morphological variations of teeth according to literature and the most routine case might deviate from usual. Hence clinicians must be careful to nail it. Diagnostic methods are the third eye that can reveal the variations. The entire volume of the root canal space should be thoroughly cleaned and filled which includes additional canals inability to do so leaves a source of persistent infection, narrowing clinical success.

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