A Case Report

Mandibular Anteriors Teeth Presenting Type III Vertucci Canal System

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Abstract

Mandibular anterior teeth often thought to have only single root canal in correspondence to the singular root morphology. In contrast many times two canal system exists in mandibular anterior teeth including premolars also. One should always be care full in finding the other canal in mandibular anterior teeth as missing one leads to the failure of the endodontic treatment. As mandibular incisors, are smaller in dimensions, two canals in a small space makes it challenging and technique sensitive to treat.

Keywords: Two Canal system, Bifurcated Root Canals, Type II Vertucci canal, single rooted teeth.

INTRODUCTION

Root canal morphology of mandibular teeth especially anterior teeth often presents bizarre variations in their root canal system. For this the morphology of root canals were classified by Vertucci.

Vertucci classified the system into four types in 1974[1,2].

Type I: Single canal system from pulp chamber to the apex.

Type II: Two separate root canals, separate orifice, join to form one canal reaching the apex.

Type III: Single root canal leaving the pulp chamber, divides into two midway, merges to form common exit.

Type IV: Two distinct root canals with separate entrances and exits.

Knowing the variations and common features of a root canal system pushes the clinician skills towards a successful treatment outcome[2]. Newer techniques, with use of modern improved loupes and microscopes also helps in identifying the hidden orifices, followed by proper cleaning and shaping of a canal[3]. CBCT and newer radiological software also help in diagnosing any aberrant change in root canal morphology[4].

This case report presented here is of mandibular lateral incisor and canine having the dual canal anatomy with common exit i.e Type III of Vertucci's classification.

CASE REPORT

A 45-year-old male came with the chief complaints of pain and sensitivity to hot and cold in the lower front region for approximately 6 months.

On intra-oral examination, it was found that all lower anterior teeth were severely attrited. Lower left lateral incisor -32& 33, were symptomatic and tender on percussion. Radio graphically there was small peri apical pathology evident as a small radiolucency apical to lateral incisor. There were no other signs of bone were seen interdentally. Extra oral examination revealed no swelling or any sinus related to the diseased tooth.

Non-surgical endodontic treatment was planned with proper bio-mechanical preparation in observance of adequate healing of peri-apical pathology. The patient was anesthetized with 1.8 ml of lignocaine and access cavity prepared for 32& 33, widened bucco-lingually and extended with in the cingulum, which revealed the presence of two canal orifices, extending in bucco-lingual direction. Working length of the canals were confirmed radiographically with size 15. K files.

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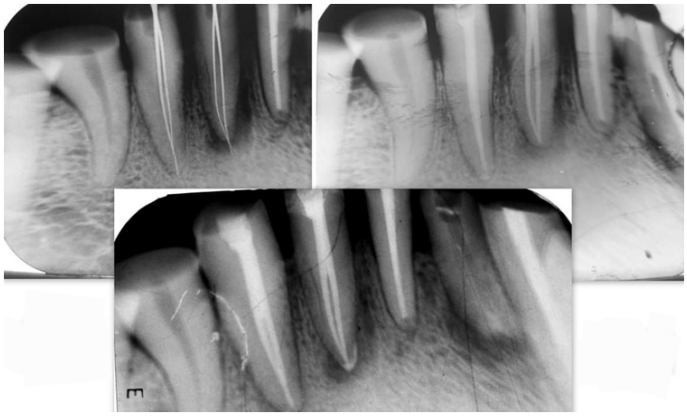

DISCUSSION

The root canal system of any tooth presents a lot of variations in their morphology, knowledge of which saves the clinician from making mistakes and treatment failures. Many studies claim that the canal anatomy of permanent teeth varies according to race and ethnicity[5]. In single-rooted teeth especially mandibular teeth, specifically mandibular incisors may present two canals in place of one. This extra canal often poses challenges in cleaning and shaping and chances of missing a canal are high because of the smaller dimensions of the tooth resulting in inaccurate access cavity preparation. In a study, it was found that approx. 42% of endodontic re-treatments are because of a missed canal[6]. Another finding by Green is the presence of an isthmus in approx. 22% of mandibular incisors which is a narrow ribbon-shaped communication containing pulp tissue between the two root canals[2].

Pre-treatment radiographs are helpful in identifying any extra canals. Any aberrant change in root morphology or overlapping of root shadows gives an indication of using Clark's Rule for taking peri-apical radiographs[4]. The exploration of root canal orifices is always essential to know for the presence of any extra canal opening. For this magnifying loupes or Microscopes are quite helpful. As mandibular incisors are much smaller in dimensions than any other tooth workable access cavity preparation is difficult to prepare, increasing the chances of missing any extra canal if present[7].The buccal canal is always easier to locate if there are two canals present because the lingual one is often shielded under the lingual shelf, and the angulation of the tooth facilitates the negotiation of buccal canal than the lingual one[8]. It's obvious that if a clinician misses negotiating an extra canal, it will lead to incomplete debridement, insufficient shaping, leading to incomplete irrigation and instrumentation concluding in the failure of the endodontic treatment.

Some authors based on the previous studies suggest that expecting a single canal in mandibular incisors must be considered as an exception rather than a common finding. It's been suggested that a dentist should always look for any extra canal when treating mandibular incisors and any isthmus present, and proceed accordingly. This will minimize the errors and increases the prognosis of the tooth.

CONCLUSION

In our clinical experience we have found that a Type III Vertucci variation of root canal morphology is found more often in mandibular anterior teeth, and these teeth should always be considered of having any extra canal. The knowledge of complete root canal system and advanced armamentarium helps the experienced and skilled clinician to overcome the challenges presented by the variations in the root canal configuration[9]. This case we presented, concludes a favourable outcome with proper diagnosis of the configuration of the canals. From the pre-operative radiographs up to the final sealing of the canals the two canals system requires thorough knowledge and skills for a successful endodontic treatment.

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