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Original Research

Bilateral Mandibular Centrals with Rare Type IV Canals

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ABSTRACT

The aim of this study was to report the endodontic management of maxillary incisors having two canals with rare type IV vertucci canal configuration. Internal morphology of root canals is variable and often complex. Therefore, to achieve a technically satisfactory endodontic outcome, the clinician must have an adequate knowledge of the internal canal morphology and its variations to debride and obturate the root canal system thoroughly. This case report describes the successful endodontic treatment of both the mandibular central incisors having two-root canals in same individual.

KEYWORDS: Mandibular incisors, Canal configuration, Type IV canals, Vertucci classification, Vanal morphology, Two canals, Rare type

INTRODUCTION

Pulp space is a chamber of secrets. Pulp canal system is complex and canals may branch, divide and rejoin [1]. Lack of proper knowledge of root canal morphology or lack of skills to negotiate the canal leads to failure of the root canal treatment. The success of endodontic treatment closely depends on complete knowledge of the complexity and variety of internal/external dental anatomy to identify, clean, shape and obturate the whole root canals. Maxillary central incisor is generally considered as tooth with a single root and single root canal. However, the internal anatomy of the tooth can present a number of variations. Mandibular incisors show uncertainty in root canal morphology that none can claim that a mandibular incisor has only one canal.

- This uncertainty of root canal morphology was classified by Frank J Vertucci (1974) [2] (Fig. 1).
- Several investigators revealed the incidence of second canal in mandibular incisors [2] (Table 1).

CASE REPORT

A 40-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with pain in her lower front teeth region. There was a history of periodic aggravated pain on mastication. Clinical examination revealed the presence of severe attrition of both mandibular central incisors and tender to vertical percussion. Intraoral periapical radiograph revealed the widening of periodontal ligament space (Figure 2). Teeth showed a division of radiolucent canals in the root indicating the presence of second canal (Figure 2). It was diagnosed as apical periodontitis and was decided to perform endodontic therapy. Access preparation was done. During pulp extirpation, change in direction of the instrument in the canal suggested the possible presence of second canal in the incisors. No. 10 k files were placed in labial, and lingual canals of incisors and radiographs were taken by changing angulations which confirmed the presence of second canal (type IV) in both the mandibular central incisors, and working length

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Table 1: Percentage of canal system types in mandibular incisors

Investigators	Year	Type I (%)	Type II (%)	Type IV (%)
Rankine Wilson and Henry	1965	60.0	35.0	5.0
Madieriea and Hetem	1973	88.5	11.0	0.5
Dowson	1974	59.05	40.0	1.0
Vertucci	1985	92.5	5–2.5	

So, the literature reveals that the prevalence of type IV canal system in mandibular incisors is rare [2] (Table 1).

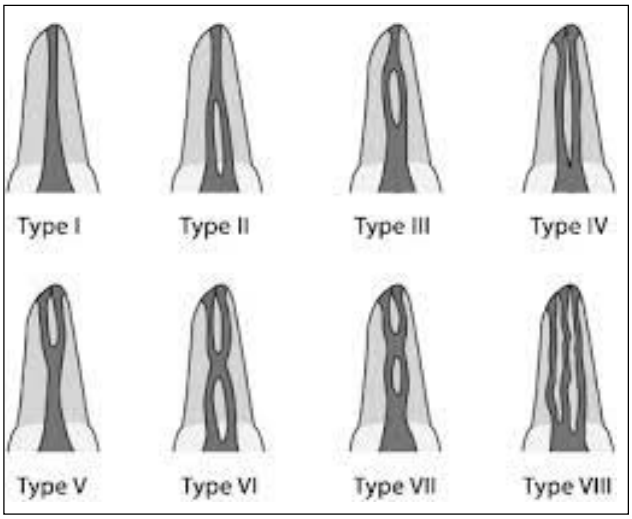

Figure 1: Vertucci classification

Figure 2: Division of radiolucent canals in the root indicating the presence of second canal

was determined (Figure 3). Root canals were prepared using 2% taper stainless steel hand files and copiously irrigated with 5.25% sodium hypochlorite and 17% EDTA. Canals were enlarged to master apical file size of 30. Calcium hydroxide intra-canal medicament was placed and temporary closed dressing was given. At the second appointment, the canals were dried and filled with 2% taper gutta-percha using lateral condensation technique with zinc oxide eugenol sealer (Figure 4). Access cavity was filled with temporary ZnOE. After a week, patient was recalled for permanent restoration and advised for extra coronal restoration. At review appointment after 3 months, there were no clinical and radiographic signs of periapical inflammation.

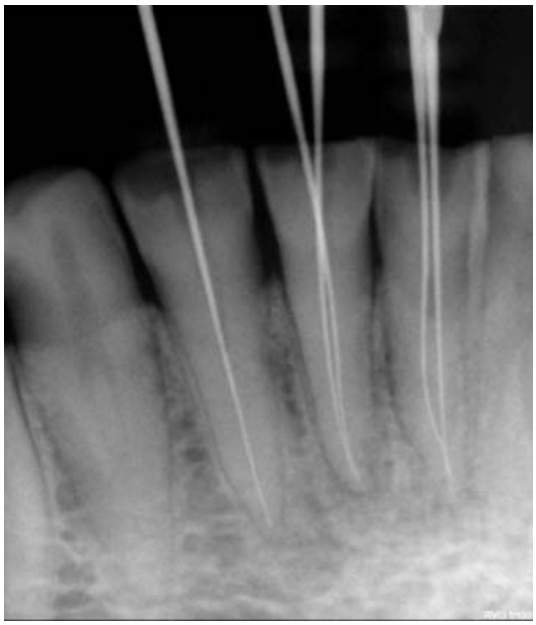

Figure 3: Presence of second canal (type IV) in both the mandibular central incisors

Figure 4: Obturation of two canals in mandibular centrals

DISCUSSION

The main objective of root canal treatment is thorough mechanical and chemical cleansing of the entire pulp space and complete obturation with an inert filling material. According to the endodontic literature, mandibular incisors with two canals are not unusual [3]. Such morphological variations are attributed to the disturbances in the normal development of her twig's epithelial root sheath and may adversely affect the outcome of endodontics [4]. In most cases in which two canals are present, however, they merge into a single canal short of the apex. The occurrence of two separate foramina in mandibular incisors with two canals (type IV) has been described in only a limited number of reports. A common reason for not locating a second canal in mandibular incisors is an inadequate access opening into the tooth which leaves a lingual shelf of dentine over the second (usually the lingual) canal [5]. Careful interpretation of the radiographic features is essential to ensure that additional root canals are not overlooked. This may necessitate imaging the tooth from a variety of angles so that the root canals may be distinguished in the resulting films [6]. Thus, careful interpretation of the radiographic feature taken from different angles should be done before starting endodontic treatment. One must be careful while access opening and initial buccolingual widening of mandibular incisors [7,8,9].

This report has described the root canal treatment of bilateral mandibular central incisors, each with two separate canals having their own foramina, in same patient. The morphological pattern of separate apical terminations for two canals in multiple mandibular incisors, as manifested in this case, is very rare [10,11].

CONCLUSION

Awareness about the common variations in canal morphology and number is essential in treating a tooth endodontically. The dentist must always be alert for extra elusive canals to prevent failures. Multiple angulated radiographs and careful examination of the floor of the pulp chamber by using advanced visualisation aids like microscopes and loupes has a great importance in the success of the endodontic treatment.

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