

# Successful Endodontic Treatment Of Mandibular Canine With Vertucci Type III Configuration: A Case Report

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## ABSTRACT

In order for root canal treatment to be successful, the clinician must have a comprehensive understanding of tooth anatomy and the many variations that might occur. Additionally, the physician must be able to diagnose and treat each individual case appropriately. In most cases, mandibular canines have a single root and a single root canal. However, there are instances in which they have two canals with either one or two foramina, or even less often, two roots. The endodontic treatment of a mandibular canine that had a Vertucci type III canal structure is described in depth in this case report.

**Keywords:** Mandibular canine, Two canals, Vertucci type III configuration

## I. Introduction

Canines are named the cornerstone of the dental arch due to their position, lengthy root, and robust crown. It is strategically vital to preserve this tooth because it plays a substantial role in occlusal guiding during eccentric motions and because the long, solid root is used for prosthetic support. The majority of mandibular canines have a single root and a single root canal, however around 15% of these teeth may have two roots or two canals. 1 Vertucci has described a variety of root canal designs for permanent teeth in humans, from one to three different canals. 2 Two canals were found in 4-12% of cases in single-rooted mandibular canines with Vertucci type II (2-1) or Vertucci type III (1-2-1) arrangement, according to reports. This case study is about the endodontic treatment of a mandibular canine tooth with one root and a Vertucci type III canal.

## II. Case Report

A patient, 42-year-old woman, came to the Department of Conservative Dentistry and Endodontics to express her discomfort in the area of her bottom left tooth. Consuming hot or cold liquids made the agony worse. Her account of nighttime agony for the previous two days was similarly detailed.

The clinical examination revealed extensive caries on the mesial surface of the left canine of the mandible. On the back, three years ago, there was a restoration that looked like real teeth. The patient reported discomfort that persisted for about thirty minutes during the cold test. The tooth's radiographs showed pulpal involvement from caries. Fig. 1 shows that the tooth had a single canal that came out of the pulp chamber, split in half, and then

rejoined at the root's apex. The patient requires non-surgical endodontic therapy, followed by permanent restoration, after a clinical diagnosis of symptomatic irreversible pulpitis was confirmed.

The patient was given local anesthetic with a mixture of 2% lignocaine and 1:1,000,000 epinephrine. We used endo access #1 and the endo-Z bur (Dentsply, Maillefer) to prepare the access. After initial exploration, one canal was identified; further exploration revealed a second canal on the lingual side. Root canal lubricant RC prep was first used in conjunction with numbers 8 and 10 k files (Dentsply, Maillefer) to navigate the canals. An apex finder (Root ZX; Morita, Tokyo, Japan) was used to determine the working length, which was then validated with a radiograph (Fig. 2). The HyFlex CM orifice opener was used to widen the canal openings. The following irrigation solutions were used: normal saline with 3% sodium hypochlorite (Parcan, Septodont), 17% EDTA (Md cleanser, Meta Biomed) in between, and 2% chlorhexidine (Anabond Asep RC) as the last irrigant after shaping and cleaning up to a 25/4% rotary file. Following the selection of master cones, the canals were dried using paper points (Fig. 3). We used AH Plus sealer (Dentsply, Maillefer) to occlude a single cone (Fig. 4). Then, we sealed the access cavity with resin-modified glass ionomer. Finally, we bonded composite repair.

### III. Discussion

The majority of mandibular canines that have been studied only have one root and one canal. The number of documented instances of morphological abnormalities of teeth, however, has increased due to developments in radiological imaging and magnification. Sikri and Kumar<sup>3</sup> found anatomical heterogeneity in the root canal system in a prior investigation on permanent human mandibular canines. Straight canals (53.84-60.71%), curved canals (46-39%), apical foramen positioned centrally (34.61-47.14%), and apical foramen located laterally (65.31-42.85%) were among the canal patterns discovered by the researchers. Type IV (4-10%) and Type V (2%), as well as Vertucci's Types II (4-12%), III (4-6%), and IV (2%), were also identified. As a result, pay close attention to the diagnostic radiographs; you need to look for signs of root canal multiplication, such as an abrupt break in the canal's continuity or a radiolucent groove on the root's side.<sup>4</sup> Finding additional canals is much easier with the use of angled radiographs or a CBCT examination. This means that in order to find more canals, one has to adjust the preparation of the access cavity appropriately.

Technical issues arise during instrumentation of mandibular canines with variances. Problems such as obstruction, ledge development, instrument separation, and lateral perforation are likely to occur when using large-size files for instrumentation. For this reason, it is essential to irrigate the area thoroughly with a sodium hypochlorite and 17% EDTA solution before to biomechanical preparation.

To preserve the tooth structure and make the straight-line access and instrumentation of both canals straightforward and predictable, access preparation was done from the mesial aspect in this instance since there was a carious lesion on that side.

One possible cause of canal obstruction is the migration of pulp tissue or organic waste from one canal to the next. Careful exploration of the canals with smaller-sized hand tools prior to adding bigger ones or rotary devices is required to prevent procedural mistakes.

Due to the instrument's sharp or right angle penetration of the linked section at the canal confluence, special care must be taken while using a rotary instrument in this arrangement to prevent instrument separation.<sup>5</sup> Hyflex CM files with a 4% taper were therefore used for the purpose of expansion in this particular instance. To avoid the difficulty of obturation caused by apical hourglass preparation, Schilder<sup>6</sup> proposed an alternate method of preparing such canals. According to Castellucci<sup>7</sup>, the straight canal should be cleaned and shaped up to the apex first, and then the curved canal up to the point of merger. Prior to the merger point, obturate the main canal. Then, obturate the second canal.

#### IV. Conclusion

Clinicians may encounter difficulties as a result of mandibular canines that may have differences. By carefully evaluating preoperative radiographs and taking the required precautions during treatment operations, it is possible to avoid unfavorable results and treatments that are not performed correctly.

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**Below given is radiographic Sequence of Endodontic Treatment in a Mandibular Canine with Vertucci Type III Canal Configuration**



