

Instrumentation of “C” Shaped Endodontic Area 47

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Summary

Following a clinical examination and basic radiography, extensive caries defect and specific “C” shaped canal were determined in a 19-year old female patient, admitted to the Department with severe pain in area 47. Instrumentation of the endodontic area was performed. The apical third was obturated with guttapercha point No. 120 and Diaket filler, and the remaining endodontic area was filled with thermoplastic guttapercha by ultrafill technique.

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CASE REPORT

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Introduction

The basic precondition for successful endodontic treatment is knowledge of the morphology of the endodontic area. Variations in the endodontic system have great clinical significance, since they are rather difficult to diagnose and create problems during endodontic treatment (1). The most frequent reason for failure is oversight of their existence, instrumentation and filling of extra canals or the specific shapes of the endodontic system (2). Morphological variations of the endodontic system can be found in the majority of permanent teeth. The mandibular second molar usually has two roots and three root canals (3), one located distally and two mesially, with the possibility of variations, both with regard to the number of roots and root canals. As a result of the merging of roots a C-shaped canal may develop, which usually occurs in the area of the mandibular second molar, but can also occur in the maxilla. This anomaly hinders endodontic treatment in all its phases, and very often ends with extraction

of the tooth. The aim of this study was to present endodontic treatment of a mandibular second molar with a C-shaped canal.

Case presentation

A female patient was admitted to the Department with pain in the area of the mandibular second molar. Clinical and radiographic examination showed diffuse caries which had destroyed a large part of the tooth crown. Following anaesthesia the caries dentine was completely removed, an endodontic cavity was formed and the bottom of the pulp chamber revealed with a unique entrance/ opening into the root endodontic area, in the shape of the letter “C” (Fig. 1). C-shaped root canal was confirmed on the basis of a radiological evaluation of the appearance of the endodontic area (Fig. 2). The cavity was rinsed with 2.5% sodium hypochlorite and the length of the root canal determined with an endometar (Endometar II Artronic, Croatia) and

X-ray with test guttapercha (Fig. 3). Instrumentation of the endodontic area was performed by "step-back" technique Kerr with expanders and thorough rinsing with 2.5% sodium hypochlorite. The dentine septa, shown in Fig. 2, were removed by instrumentation, after which a large, unique area with a wide open apical entrance/opening was obtained. After drying the root canals the apical opening was obturated with guttapercha point No. 120 and polyketone filler - Diakete, and the remaining endodontic area filled with Diakete and thermoplastic guttapercha by Ultrafil technique (Fig. 4). With this technique the thermoplastic guttapercha is previously warmed in a table heater up to 70°C, and injected under pressure into the canal (Figs. 5 and 6). The injection takes 60-70 seconds. The guttapercha is then compressed with a hot plugger (Fig. 7). Closing of the apical opening with guttapercha, prior to filling with thermoplastic guttapercha is known as the "SuccessFil" technique. Fig 8 shows the appearance of the cavity after removal of excess guttapercha and filler. The final treatment is shown in Fig. 9.

Discussion

C-shaped canal is one of the most difficult situations with which the dentist is confronted during endodontic treatment of teeth. It was first described by Keith (1908) (4), and later by Keith and Knowles (1913) (5), Pedersen (1949) (6), Tratman (1950) (7), and Cook and Cox (1979) (8). The C-shape develops as a result of partial or complete merging of roots, during which the endodontic area also merges to the extent to which the roots have coalesced (8,9-15). However, this process of merging does not always involve all the roots, resulting in the development of a shape resembling a large letter "C", but it can also resemble a small letter "c", which can be found in one or both canals (16). Five types of C-shaped canals can be classified, depending on the degree of merging (16).

- Type 1 - C-shape of the whole length of the endodontic area
- Type 2 - C-shape in the case of complete merging of the roots
- Type 3 - C-shape of the distal root canal
- Type 4 - C-shape of the mesial root canal
- Type 5 - C-shape of the mesial and distal canal in cases of partial merging of roots on the buccal and lingual surfaces.

During endodontic treatment of the mandibular second molar the possibility of anomaly should be considered, particularly as, according to Dalberg's theory, the mandibular second molar can be classified as a genetically labial tooth.

In this paper endodontic treatment of a mandibular second molar, type 1, C-shaped root canal is presented, which, according to investigations by Šutala et al (16) occurs in 12.5% of our population. During treatment of a C-shaped canal accurate diagnostics are necessary, both clinical and radiographic, because during trepanation it appears as though perforation of the floor/bottom of the pulp chamber occurs. Due to the complexity of the morphological area and bleeding comprehensive instrumentation is necessary. Melton et al (12) suggest step-back or ultrasonic technique for instrumentation. Because of the C-shape complete filling of the canal is difficult. The technique of cold lateral condensation, which is clinically satisfactory in the majority of cases, is not sufficient to ensure complete filling of the endodontic area, as cold guttapercha cannot fill all the unevenness. Therefore in this study we used thermoplastic guttapercha to fill the canal because of the better prospect of filling the endodontic area. Guttapercha thermoplastic ensures better homogeneity of the guttapercha. In order to prevent overfilling of the root canal, which frequently occurs with thermoplastic guttapercha, we previously obturated the apical with guttapercha point No. 120 and "Diaket" filler.