



## Endodontic treatment of a C-shaped mandibular second molar: case report

*Tratamento endodôntico de um segundo molar inferior em forma de C: relato de caso*

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### Abstract

**Objectives:** To report a clinical case of endodontic treatment of a C-shaped mandibular second molar. **Case report:** A patient came to the dental clinic of the Paulista University complaining of pain in tooth 47. The diagnosis was irreversible pulpitis in which biopulpectomy was recommended. Access was made, and after identifying the distal and mesiobuccal canals, the absence of the mesiolingual canal was observed and with the aid of a surgical operating microscope it was possible to confirm the presence of C-shaped canal. Rotary instrumentation with Profile type NiTi files was initiated making a stop up to file #40.04 in the distal canal and up to file #35.04 in the mesial canal. The filling technique performed was thermal compaction using McSpadden condenser #45. **Conclusion:** The case has been followed-up for nine months and the patient does not present painful symptomatology, thus indicating the clinical success of the case.

**Keywords:** C-shaped molar. Rotary instrumentation. Thermoplastic filling.

### Resumo

**Objetivos:** Relatar um caso clínico de tratamento endodôntico de segundo molar inferior em formato de "C". **Relato de caso:** Um paciente chegou à clínica odontológica da Universidade Paulista com queixa de dor no

dente 47. O diagnóstico foi pulpíte irreversível, sendo recomendada a biopulpectomia. O acesso foi realizado e, após identificação dos canais disto e méso-vestibular e verificação da ausência do canal méso-lingual, com auxílio de um microscópio cirúrgico foi possível confirmar a presença de um canal em forma de "C". Foi iniciada instrumentação rotatória com limas tipo NiTi Profile, com parada na lima #40.04 no canal distal e lima #35.04 no canal mesial. A técnica de obturação realizada foi a de compactação térmica utilizando condensador de McSpadden #45. **Conclusão:** O caso foi acompanhado durante nove meses, sendo que o paciente não apresentou sintomatologia dolorosa, confirmando, portanto, o sucesso clínico do tratamento.

**Palavras-chave:** Molar em forma de "C". Instrumentação rotatória. Obturação termoplástica.

## Introduction

Molar teeth are more difficult to perform endodontic treatment due to their anatomical variation (1). The mandibular second molar may have completely or partially fused roots. Amongst the anomalies that this group suffers, a molar with a single canal and a C-shaped molar may be mentioned (1).

The morphology of the C-shaped molar consists of the pulp chamber in the form of a groove or continuous line, joining the canals and forming a 180-degree arch. When sectioned horizontally, this groove has the shape of the letter C. Its anatomical complexity causes great difficulties during instrumentation and obturation of the root canals due to the absence of an anatomical standard with regard to the number of canals. A single C-shaped canal may be found from the pulp chamber up to the apical third or two, three or even four canals that are joined by the same isthmus (2-5).

The C-shaped molar is more commonly found in mandibular second molars for it is a tooth group that has more anatomical variations. The C-shaped molar is more commonly found in the Asiatic population (4). Radiographic diagnosis of a C-shaped molar is improbable and it is clinically recognized by the visual exam during endodontic access and confirmed by computed tomography or by observing the fused root in the conventional radiographic exam (1, 6).

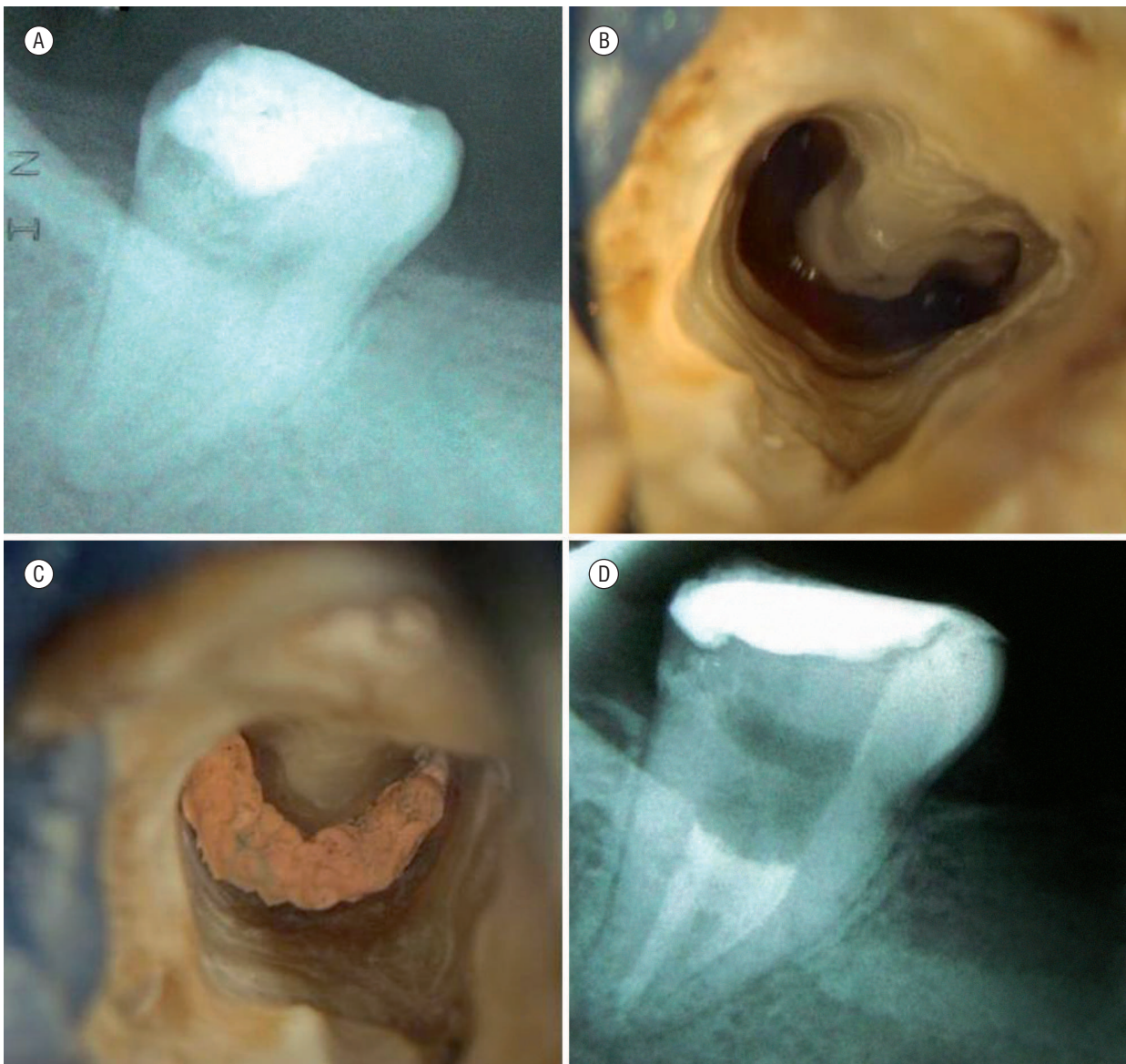
The C-shaped molar is an anatomical variation that deserves being pointed out due to its peculiar characteristics, which requires careful attention during endodontic treatment; otherwise it may lead to error or failure of endodontic therapy starting from the access to the pulp chamber until the location of the root canals, instrumentation and obturation.

## Case report

The patient R.S, a 26-year-old woman, sought the Dental Clinic of the School of Dentistry of Paulista University, complaining of pain in tooth 47. During clinical exam, an extensive caries lesion was found in the occlusal face. Percussion and pulp vitality tests were performed whose results were negative and positive, respectively. In the radiographic exam (Figure 1A) it was observed that the caries had already affected the pulp chamber. Diagnosis was irreversible pulpitis and recommended treatment was biopulpectomy. After local anesthesia and rubber dam isolation, endodontic access was performed with a spherical diamond bur and after identifying the distal and mesiobuccal canals, the absence of the mesiolingual canal was observed. With the aid of a surgical operating microscope (DF Vasconcelos, São Paulo, SP, Brazil), it was possible to confirm the presence of a C-shaped canal (Figure 1B).

After access was performed, catheterism with the K files #15 and #20 (Dentsply/Maillefer, Ballaigues, Switzerland) began in the temporary working length with abundant irrigation with 2.5% sodium hypochlorite. Afterwards, cervical preparation was performed with Largo burs #1 and #2 (Dentsply/Maillefer) in both the canals and in the isthmus region. Rotary instrumentation with Profile type NiTi files (Dentsply/Maillefer) began making the stop up to file #40.04 in the distal canal and up to file #35.04 in the mesial canal.

Next, the smear layer was removed with 17% EDTA and the canals were dried and obturated. Sealer 26 cement (Dentsply/Maillefer) was used and the filling technique was thermal compaction using McSpadden condenser #45 (Dentsply/Maillefer) (Figures 1C and 1D). The tooth was temporarily restored and the



**Figure 1** - A) Radiographic exam of the C-shaped mandibular second molar; B) C-shaped canal after access; C) C-shaped canal after filling by thermal compaction technique; D) Radiographic exam after obturation

patient was referred to rehabilitation treatment. The case has been followed-up for 12 months, with no painful symptomatology.

## Discussion

In 2002, Al-Fouzan (2) reported the importance of recognizing the C-shaped molar to correctly clean, model, and obturate the canals. Initial radiographic diagnosis may show the presence of fused roots or two separated roots, but it is not always possible to

verify the presence of a C-shaped molar in a radiograph. In the present case, diagnosis was only concluded with the visual exam of the pulp chamber during endodontic access for in the initial radiographic exam, the pulp chamber showed no alteration.

There is consensus among the authors that the surgical operating microscope has revolutionized Endodontics and has brought innumerable advantages as well as providing greater illumination and magnification of the operating field since in this specialty the procedures are performed in darkness and depend on the tactile sensitivity of the operator.

Magnification is needed to help several clinical procedures. The use of this appliance in this case was important to provide detail of the pulp chamber floor and the entrance of the root canals, allowing greater precision of endodontic treatment during all the stages of treatment (3).

In this case, the Largo burs were used for cervical preparation because they present higher resistance to fracture, larger cutting surface and less displacement as well as being directed against the canal walls, improving finishing and increasing the diameter of preparation. Therefore, it was possible to clean the isthmus region safely and efficiently. Debridement of the root canals was performed with the Profile type NiTi files due to the tooth having two canals in a single foramen, reducing risk of fracture of the instrument for the Profile type files allow greater removal of the excised dentin as a result of the instrumentation due to its U-shape, as well as greater possibility of the hypochlorite flowing in the apical direction, reducing the chances of impaction of dentin during instrumentation (4). These files have the capacity of being maintained centralized inside the root canal during biomechanical preparation. The posterior portion of the radial guide is lowered, reducing the contact area between the instrument and the root canal walls (4).

Thermo-plastic filling is ideal for C-shaped molars for the anatomy of the tooth would make the correct lateral condensation difficult, leaving empty spaces inside the canals, causing recontamination of the root canals. Therefore, with gutta-percha completely melted along the canals, the isthmus region may be completely filled (1, 5, 7).

## Conclusion

It may be concluded that with the aid of a surgical operating microscope it was possible to perform treatment of a tooth with a different anatomy in a rapid and efficient way, reducing the risk of iatrogenies as well as working time.

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