

FIRST UPPER PREMOLAR WITH 3 ROOTS PREPARED WITH SOLLA COLLORS LIME



<https://doi.org/10.56238/arev7n4-118>

Submitted on: 03/11/2025

Publication date: 04/11/2025

Rosana Maria Coelho Travassos¹, Samuel Nogueira Lima², Natália Cristina Abreu dos Santos³, Maria Regina Almeida de Menezes⁴, Josué Alves⁵, Priscila Prosini⁶, Ronaldo Carvalho Rsimundo⁷, Verônica Maria de Sá Rodrigues⁸, Mônica Maria de Albuquerque Pontes⁹, Pedro Henrique de Barros Falcão¹⁰, Maria Tereza Moura Cavalcanti¹¹ and Tereza Augusta Maciel¹²

ABSTRACT

The present clinical case report describes a rare case of maxillary first premolar with three separate roots prepared with Solla Collors file in a single session on tooth 14. Regarding the ethical terms, the patient signed the Informed Consent Form and the ethical principles described in the Declaration of Helsinki were respected. A 38-year-old male patient with no history of systemic diseases sought a private office. On clinical examination, tooth #14 did not respond after the vitality test, and on radiographic examination secondary caries and the presence of three roots were observed. The probable diagnosis was pulp necrosis. After anesthesia, the tooth was isolated and coronary access and irrigation with 2.5% sodium hypochlorite. After exploration of the root canal, electronic odontometry was performed with an apical locator, Irrot Apex. The root canals were prepared with Solla Collors #35.04 and the foraminal patency was performed with Solla Fille Purple Glidepath #16/02. The filling technique was performed with a single and calibrated FR-EL gutta-percha cone associated with Bio-C Selaler cement. The preparation of the root canals with Solla Collors file is completed.

¹Doctor
University of Pernambuco

²Doctor
Mário Jucá University Center – UMJ

³Master
Faculty: Fluminense Federal University

⁴Doctor
University of Pernambuco-Brazil

⁵Doctor
University of Pernambuco

⁶Doctor
University of Pernambuco

⁷Doctor
University of Pernambuco

⁸Doctor
University of Pernambuco

⁹Doctor
University of Pernambuco

¹⁰Doctor
Federal University of Pernambuco

¹¹Doctor
University of Pernambuco

¹²Doctor
University of Pernambuco

Keywords: Endodontics. Preparation of the canal. Rotating instruments. Root canal filling.

INTRODUCTION

The success of endodontic treatment is multifactorial, therefore related to the quality of cleaning and disinfection of the root canal system, sealing following three-dimensional precepts and adequate coronary reconstruction, in addition to knowledge of anatomy, which is fundamental for us to achieve this success. The upper first premolars of three roots are uncommon (0.5-1%) and are similar to the upper molars, and are referred to as "small molars" (Praveen et al., 2015). Even rarer is to observe three roots and three canals in maxillary second premolars, posing an even greater challenge. Even performing pulp therapy correctly, the non-instrumentation of any root canal can result in failure of endodontic treatment with consequent remaining infection (Karabucak et al., 2016).

Maxillary first premolars present significant challenges in pulp treatment due to their variable number of roots, complex root canal structure, diverse root orientation and longitudinal depression, and variable pulp cavity configurations. The variation in maxillary first premolars is significant, with most exhibiting two root canals, while the incidence of three root canals ranges from 0.5% to 7.5% (Kong et al. 2020). Determining the number of root canals and the location of root canal holes in the early stage of treatment is crucial to the success of root canal therapy.

The variation in the number of roots, canals, root direction, longitudinal depressions of the roots, the various shapes of the pulp cavity, and the problems in visualizing the apical limit by radiographs make the endodontic procedure of these teeth quite challenging. Endodontic success requires a thorough understanding of the anatomy of the root canal. The variation in the number of roots, canals, root direction, longitudinal depressions of the roots, the various shapes of the pulp cavity, and the problems in visualizing the apical limit by radiographs make the endodontic procedure of these teeth quite challenging. (Khan et al. 2024).

Visualization of three channels in a maxillary premolar on preoperative radiographs can be difficult. Although preoperative radiography provides a two-dimensional image of a three-dimensional object, there are some guides that suggest the presence of a third canal. Whenever there is an abrupt narrowing or loss of radiolucent canal in the pulp cavity, a third canal should be suspected, either in the same root or in another independent root. In addition, whenever the mesiodistal width of the middle root area is equal to or greater than the mesiodistal width of the crown, the tooth likely has three roots and multiple canals and are common when an x-ray shows an instrument placed eccentrically on the roots.

(Sieraski et al. 1985). Therefore, the professional must know how to perform the correct coronary access, as it is an essential factor to locate all the canals and instrument them correctly. (Silva et al. 2023).

OBJECTIVE

The present study aimed to make clinicians aware of the knowledge of dental anatomy, as well as the possible variations and the importance of clinical examination and imaging in the diagnosis.

CASE REPORT

A 32-year-old female patient was referred to an endodontics specialist. Clinical examination showed no pain to vertical and horizontal percussion and also did not respond to the cold sensitivity test. Radiographic examination showed secondary caries, enlargement of the periodontal space. (Figure 1).

Figure 1 - Secondary caries and enlargement of the periodontal space



After anesthesia, the tooth was isolated and coronary access and irrigation with 2.5% sodium hypochlorite. After access, two embouchures were located: one vestibular and one palatine, as expected. After exploration of the root canal, electronic odontometry was performed with an apical locator, Irrot Apex.

The buccal and palatal root canals were prepared with Solla Collors #35.04 and the foraminal patency was performed with Solla Fille Purple Glidepath #16/0. 2, however, in the test radiography of the gutta-percha cones, the existence of the third canal was evident, starting from the same mouth as the vestibular, already located: it was the distovestibular canal. (Figure 2 A and 2 B).

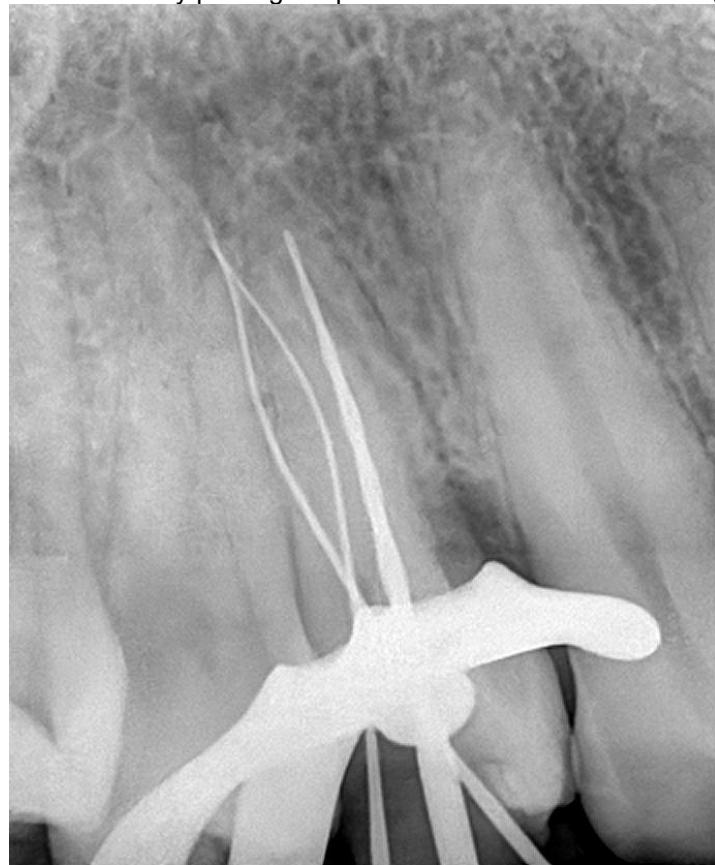
Figure 2 A – In the gutta-percha cone test, the existence of the third canal was evident.

Figure 2 B - Third canal, starting from the same embouchure as the vestibular



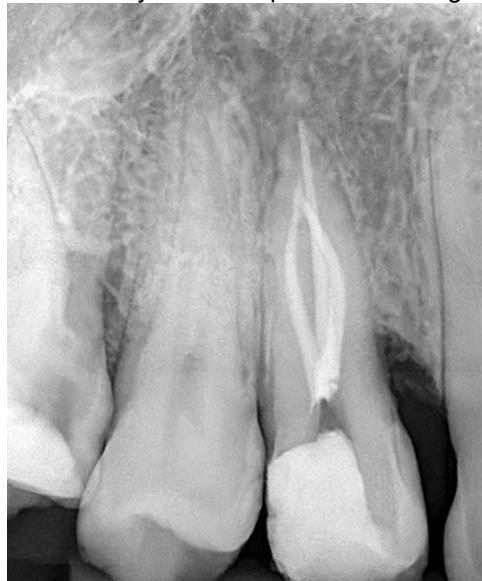
It was possible to access this channel by inserting the Solla file well angled towards it. After locating the third canal, radiographic odontometry was performed to confirm the actual working length and to make sure the location of the distobuccal canal. (Figure 3).

Figure 3 – Radiographic odontometry proving the presence of the third root canal (disto-vestibular canal).



The disto-vestibular canal was also prepared with Solla Collors #35.04. The filling of the root canal system was performed by the single cone technique (calibrated FR-EL) associated with BIO-C Sealer cement. (Figure 4). The pulp chamber was sealed with Flow resin and the patient was referred to the index finger.

Figure 4 - Filling of the root canal system was performed using the single cone technique



DISCUSSION

The correct identification and knowledge of the steps to be followed in the face of anatomical variations, it is important that cases that deviate from the standard are published. The present report reveals a first premolar with 3 roots and 3 root canals that belong to infrequent anatomical variations, and a different look is required from the dentist at the time of case resolution, as its level of difficulty increases. In this way, the report to the scientific community is important to serve as a basis for consultation. Future research involving controlled studies would provide a more comprehensive understanding of treatment approaches for complex endodontic cases.

The premolars, for the most part, have two roots with 2 channels, however, in some rare cases three roots with three channels can be found, being called "mini molars" which ends up being a great challenge in endodontic treatment. According to the literature, the incidence of maxillary second premolars with three root canals appears to be distributed among specific regions of the world: with the majority being in South America, followed by the Middle East and southern China (Low, 2001; Kurstaci et al., 2007, Almeida Gomes, 2009).

In the present case, the X-ray with was not sufficient to suggest a distinct anatomy in the maxillary first premolar with three separate roots. The use of cone beam computed tomography (CBCT) can be used as an auxiliary resource in endodontics, being favorable to treatment compared to periapical radiography because it allows the evaluation of hard tissues of the maxillofacial region and three-dimensional structures in complex cases, in addition to the possibility of section-by-section visualization, allowing an accurate evaluation and better treatment planning by the professional (Machado et al., 2021). Previous training and adequate knowledge of dental anatomy favored the success of the endodontic treatment of the maxillary first premolar with three canals and three separate roots. In this case, during the clinical and radiographic adaptation of the main gutta-percha cones, the presence of the third root canal was determined, and its preparation was performed in the same session.

A complementary angled radiographic socket allows the dissociation of the canals and, consequently, their radiographic visualization, in cases where the roots are fused, if the three roots are separated, the radiographic image is similar to that of a maxillary first molar. Because of this anatomical similarity, maxillary premolars are often referred to as minimolars (Mathew et al. 2015). It is important to observe the floor of the pulp chamber

during opening, as it may show traces of the existing types of root canals. If there is only one canal, it is in the center of the pulp chamber and is relatively easy to find. If a hole is found far from the center, there is a greater chance that there will be another on the opposite side. The farther away the entrances to the canals, the greater the chance that they are separated by their entire length (Martins, 2011).

An analysis of the dental anatomy on the initial radiograph, as well as special attention to the characteristics of the external anatomy, represent essential requirements to ensure the correct identification of extranumerary canals, although root canal anomalies of the maxillary first premolars have a low prevalence, they must be detected by careful evaluation to avoid possible endodontic failures (Casadei et al., 2020).

The greatest difficulties found in endodontics are usually due to variations in the anatomy of the canals, but even in single canals it is important to have a broad knowledge of the possible variations to be found. The dental element that has a greater number of canals than its dental group represents an additional challenge, starting with the differentiated opening, access to all canals, location, cleaning, and even the modeling of the canal system. (Soares, Leonardo, 2003).

CONCLUSION

The preparation of the root canals with Solla Collors file is completed.

REFERENCES

1. Almeida-Gomes, F., de Sousa, B. C., de Souza, F. D., dos Santos, R. A., & Maniglia-Ferreira, C. (2009). Unusual anatomy of maxillary second premolars. *European Journal of Dentistry*, 3(2), 145–149.
2. Casadei, B. A., Lara-Mendes, S., Barbosa, C., Araújo, C. V., de Freitas, C. A., Machado, V. C., & Santa-Rosa, C. C. (2020). Access to original canal trajectory after deviation and perforation with guided endodontic assistance. *Australian Endodontic Journal*, 46(1), 101–106. <https://doi.org/10.1111/aej.12388>
3. Karabucak, B., Bunes, A., Chehoud, C., Kohli, M. R., & Setzer, F. (2016). Prevalence of apical periodontitis in endodontically treated premolars and molars with untreated canal: A cone-beam computed tomography study. *Journal of Endodontics*, 42(4), 538–541. <https://doi.org/10.1016/j.joen.2015.12.020>
4. Khan, D., Ahmed, A., & Sabana Haq, S. (2024). Endodontic treatment of upper first premolar with 3 canals - Case report. *Journal of Rawalpindi Medical College*, 28(2), 352–355.
5. Kong, Q., Liang, L., Wang, G., & Shiqi, Q. (2020). Cone beam CT study of root and root canal morphology of maxillary premolars. *Prevention and Treatment of Oral Diseases*, 28(4), 246–251.
6. Kustarci, A., Kürşat Er, & Akpinar, K. E. (2007). Root canal treatment of maxillary second premolar with three roots and three canals: Clinical cases. *Brazilian Journal of Oral Sciences*, 6(22), 1411–1414.
7. Low, D. (2001). Unusual maxillary second premolar morphology: A case report. *Quintessence International*, 32(8), 626–628.
8. Machado, B. S., Saguchi, A. H., Yamamoto, A. T. A., & Diniz, M. B. (2021). Uso de tomografia computadorizada no diagnóstico e planejamento endodôntico de pré-molar superior com dupla curvatura radicular. *Research, Society and Development*, 10(12), e111101220355. <https://doi.org/10.33448/rsd-v10i12.20355>
9. Martins, J. N. R. (2011). Primeiro pré-molar superior com três canais: Diagnóstico e tratamento – Quatro casos clínicos. *Revista Portuguesa de Estomatologia, Medicina Dentária e Cirurgia Maxilofacial*, 52(1), 43–51. [https://doi.org/10.1016/S1646-2890\(11\)70031-7](https://doi.org/10.1016/S1646-2890(11)70031-7)
10. Mathew, J., Devadathan, A., Syriac, G., & Shamini, S. (2015). Root canal treatment of a maxillary first premolar with three roots. *Journal of Pharmacy and Bioallied Sciences*, 7(Suppl. 2), S746–S748. <https://doi.org/10.4103/0975-7406.163567>
11. Praveen, R., Thakur, S., Kirthiga, M., Shankar, S., Nair, V. S., & Manghani, P. (2015). The ridiculous' premolars: Case reports of a maxillary and mandibular premolar with three canals. *Journal of Natural Science, Biology, and Medicine*, 6(2), 442–445. <https://doi.org/10.4103/0976-9668.160033>

12. Sieraski, S. M., Taylor, G. T., & Kohn, R. A. (1989). Identification and endodontic management of three-canalled maxillary premolars. *Journal of Endodontics*, 15(1), 29–32. [https://doi.org/10.1016/S0099-2399\(89\)80091-7](https://doi.org/10.1016/S0099-2399(89)80091-7)
13. Silva, L. B. G. da, Sousa, W. V. de, & Oliveira, J. R. B. de. (2023). Endodontic treatment of upper premolar with three root conducts – Case report. *Research, Society and Development*, 12(11), e15121143780. <https://doi.org/10.33448/rsd-v12i11.43780>