Case Report

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Obturation of A Mandibular 2nd Molar with the Help of Ultrasonic Irrigation to Clean the Lateral Canal

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ABSTRACT:

Apex of root is of great interest for endodontists mainly because of different stages involved in its development and the surrounding tissues. Mandibular molars normally consists of 2 roots, one mesial and one distal. About common occurrence, 2 canals are found in mesial root and 1 canal in the distal root. The patient was diagnosed with symptomatic irreversible pulpitis. After cleaning and shaping, the next step is obturation. Lateral canals are complex findings in the apical third of root which is characterized as a lateral canal deviating from the main canal. Normally, this lateral canal is not part of the standard root canal procedure due to the complexities, but sometimes obturation might be possible, which might affect the long-term prognosis of the tooth. Advanced skills are required to attempt and complete obturation of the lateral canal which might be a difficult task for the general practitioners.

Key words: Apical delta, Lateral canals, Root canal treatment.

How to cite this Article:
Abbasi H, Lal A, Jouhar R, Saib M. Obturation of A Mandibular 2nd Molar with the Help of Ultrasonic Irrigation to Clean the Lateral Canal. J Bahria Uni Med Dental Coll. 2021; 11(2):93-95 DOI: https://doi.org/10.51985/ZLCD4512

INTRODUCTION:

Pulpectomy or root canal treatment is one of the most frequently performed procedures on an outpatient department basis. The primary reason for it is mainly due to caries, pulpal pathologies, and trauma. A successful root canal treatment is intensively ground on filling the three-dimensional root canal morphology. Explicit numbers of root canal filling material and techniques have been developed with every clinician having his preferred way of attempting root canal treatment. Every clinician intends to completely fill the root canal system including any anatomical variation which is intermittently observed. Dentinal tubules, ramifications, lateral canals or deltas may dower to the endurance of periapical lesion in spite of completion of endodontic treatment. The complex anatomy of the root canals makes it difficult to remove the necrotic pulp from these spaces. In order to reach these areas, an appropriate solution and technique must be used.

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Received: 04-12-2020
Accepted: 05-03-2021

Lateral canals are an intricate part of the main root canal system which consists of blood vessels and nerves from the peripheral regions of the pulp system. About its morphology, it is mainly present in the apical third of the roots, sometimes it is not distinguishable from the root apex as it terminates close to it. Lateral canals are also associated with the peri-radicular disease due to inflamed pulp inside. Lateral canals are difficult to instrumentation and irrigation during the endodontic treatment, which may eventually promote microorganisms' growth if the infected pulp is to be left. General dentists usually don't attempt to obturate the lateral canals even if the finding can be appreciated radiographically, mainly being limited by their set of skills. However, such cases should be referred to the endodontists, who can manage such cases.

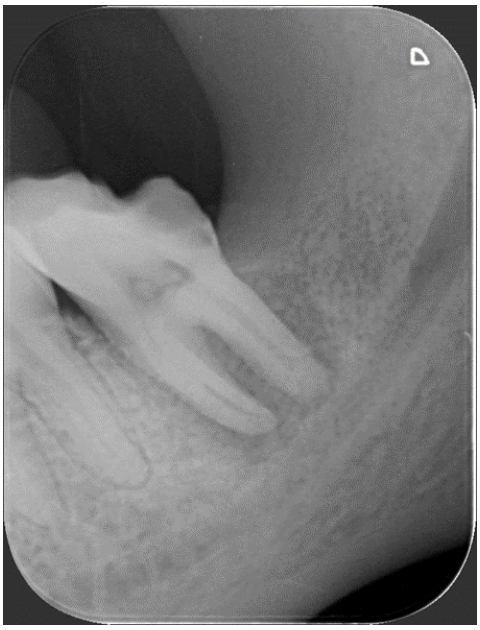
Complete removal of the infected and inflamed pulp is one of the main objectives whilst performing the root canal treatment. Lateral canals contain neurovascular bundles which mandate, if possible, the removal of the pulp to avoid further complications of the previously treated tooth such as re-endodontic treatment, which is considerably less successful as compared to first time endodontic treatment.

CASE REPORT:

A 40 years old patient presented to the Out-patient Department (OPD) of operative dentistry of Altamash Institute of Dental Medicine (Karachi, Pakistan). Earlier 1 week ago patient developed severe throbbing pain in her lower-left region of the jaw which was not being able to be located at one particular tooth. She stated that pain was radiating to the neck, jaws, and temporal areas on the affected side, pain was aggravated upon sleeping and at times disturbed her

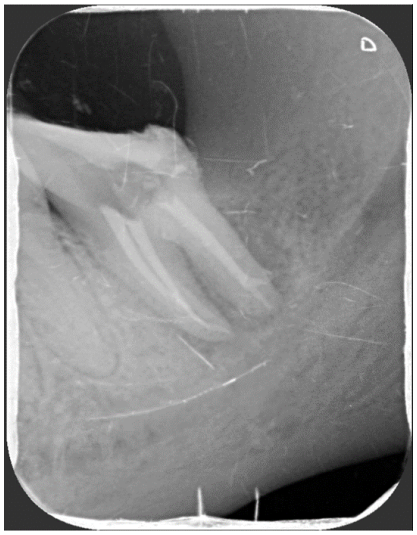
sleep as well. Before visiting the OPD, the patient did not report taking any sort of painkiller to relieve her pain. Regarding the medical history of the patient, no remarkable thing was to be noted other than a less frequent complaint of gastric reflux for which she took proton pump inhibitor. About dental history, the patient previously had a tooth extracted which required administration of local anesthesia, and the outcome post-operatively was unremarkable. Upon clinical examination of the oral cavity, poor oral hygiene was generally seen with several missing teeth. A carious lesion was seen in the lower left 2nd molar which was tender to percussion with no mobility. Moving towards the radiographical examination, a deep carious lesion was seen invading the pulp chamber of the tooth occlusally along with periodontal ligament widening. Furthermore, an extensive circular radiolucent image with defined limits; was observed associated with the distal root of the tooth with the visible lateral canal on the apical third of the distal root shown in (figure 1)**.** Patient was counseled regarding the diagnosis, and the treatment plan of root canal treatment was explained. After taking consent from the patient, the treatment was started.

Figure 1 : Radiolucency at apical third of the distal root



Considering the pain with which the patient initially presented, inferior alveolar block anesthesia (Lidocaine 2% with epinephrine 1:100,000) was administered in order to create a pain-free environment for the patient. Initial access opening was done under rubber dam isolation of the 2nd left mandibular molar, with subsequent pulpectomy. It was followed by cleaning and shaping with crown-down instrumentation technique using universal Pro-taper system in the first appointment along with frequent use of ultrasonic irrigation containing 2.5% sodium hypochlorite in order to thoroughly clean the root canal system targeting the lateral canal in the apical third of the distal root. Canals were dried and medicated with calcium hydroxide and the patient was called after 15 days. On the second appointment, the patient was asked about any post-op pain which she might have suffered during these 15 days, to which the patient did not complain about. No other remarkable finding was found when the patient came back for the second appointment. Now, obturation was performed on the previously treated tooth. Gutta-percha cones were inserted up to the working length of each canal with zinc oxide eugenol as a sealer which was confirmed previously on the periapical radiographs. Using the lateral condensation method, obturation was performed and the tooth was restored in the 2nd visit. A final periapical radiograph was performed on the same treated tooth for evaluation of any voids. It was noted that root filling revealed a lateral canal that was also obturated along with the main root canal system following ultrasonic irrigation. (figure 2)

Figure 2: Using leteral condensation obturatin was performed



DISCUSSION:

Obturation of the lateral canal is a rare finding while performing the root canal treatment of the patients. Normally, the lateral canals are difficult to obturate mainly due to complex morphology and occurrence along with skills limitations. Practicing and experienced endodontists are well aware of the fact of identifying lateral canals when they encounter it as finding and obturating lateral canals are considered to be a positive prognostic factor for that particular tooth. Furthermore, a variety of techniques has been stated in the literature for performing lateral canal obturation which includes Lateral condensation, Continuous wave of condensation, warm vertical condensation, carrier-based thermoplasticized gutta percha, and warm lateral condensation.

In our case, the lateral canal was found to be obturated in the mandibular 2nd molar. After removing the vital pulp of the tooth, the patient was pain-free with no further complications. Proper isolation of the tooth under treatment is among the standard care steps to ensure sterile and optimum treatment for the patient.

Locating lateral canals along with obturating it is a difficult task considering the intricate morphology of it. Removal of all the infected pulp of the canal is one of the primary targets of standard root canal treatment. Remnants of infected and inflamed pulp, in this case, lateral canal in the distal root at the apical third, can be a detrimental factor which might in future necessitate performing re-endodontic treatment of the same tooth, but the success rate is considerably low of doing endodontic treatment of previously treated tooth.

Most of the time, gutta-percha cones when condensed does not follow into these lateral canals nor does the sealer material, primarily due to the tricky morphology of it. Moreover, currently sealing this part of the root is now considered to be a good prognostic factor. In contrast to using gutta percha, studies do report greater efficiency of using resilon using thermomechanical compaction technique for obturating the lateral canals. Although this might be due to limited skills and technique used.

Literature states that lateral canals are part of complex minor root morphologies that have been associated with pulpal diseases, canal reinfection, post-treatment disease, and primary root canal infection. Normally the endodontic files cannot penetrate such lateral canals due to their deviated morphologies, but during condensation, there are chances of gutta percha or sealer to follow into it which might provide the needed seal to successfully complete the root canal treatment.

CONCLUSION:

Lateral canals are commonly found in the human teeth but locating and obturating it is a big challenge mainly due to its complex morphology. It is considered to be a positive prognosis for the teeth being treated if these lateral canals are thoroughly cleaned using ultrasonic irrigations and also sealed along with the main root canal system. The practicing dentist should routinely keep an eye on the radiographs to appreciate and effectively manage such findings.

Authors Contribution:
Hira Abbasi: Conception and design of the study, Collection of data and assembly and article writing.
Abhishek Lal: Literature review, drafted the manuscript and compilation of results.
Rizwan Jouhar: Final approval of the manuscript.
Muhammad Saqib: Critical review of the manuscript

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