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Endodontic Retreatment of Mandibular First Molar Using Calcium Hydroxide Paste (NT CAL) and Bioceramic Sealer (NT BIOCERA FLO)

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Conflicts of Interest: Nil

Abstract

Endodontic treatment involves removing infected pulp tissue from the root canal system, shaping the canal space, and filling it with an inert substance to reduce the risk of reinfection.

Despite of increase in frequency, endodontic treatments has resulted in more failures and problems in management. Endodontic failure is becoming more common in dental clinics, leading in retreatments. This article discusses a clinical example where endodontic retreatment was necessary to prevent problems from leading to tooth extraction. Because the tooth in issue has a specific relevance with a physiological purpose, we resorted to its endodontic retreatment and covered it with a porcelain fused to metal crown.

Keywords: Calcium Hydroxide Paste, Endodontic retreatment, Porcelain fused, Obturation

Introduction

Endodontic failure can be caused by a variety of factors, including the presence of bacteria (both intra- and extra-canal), inadequate cleaning and obturation of the canal, overextension of root filling materials, improper coronal seal (leakage), untreated canals (both major and accessory), iatrogenic procedural errors (e.g., poor access cavity design), and instrumentation complications (e.g., ledges, perforations, etc.).

Endodontic retreatment is a process performed on a tooth that has previously been endodontically treated but now requires additional endodontic treatment to get a favourable outcome. Endodontic retreatment is preferred over dental extraction to maintain the tooth and minimise the functional and psychological impact of tooth loss. Nonsurgical endodontic retreatment aims to restore periodontal health by removing original filling

materials, disinfecting, and re-obturating the root canal system[1,2].

The justification for retreatment is that, regardless of the cause, all endodontic failures are ultimately due to leakage and/or bacterial contamination.

Endodontic retreatment can achieve a near-perfect success rate when all root canal contents are removed and a proper seal is applied.

Endodontic retreatment aims to remove irritants, such as bacteria, that may have remained in the canals after earlier treatment. Retreatments are recommended whenever possible as they involve the same steps as root canal therapy and align with biological principles.

This case report showcases the need for retreatment of mandibular first molar.

Case Report

A 45-year-old female patient arrived with pain in the lower left back tooth region for two months. The patient's demographics, including medical history, family history, and general examination, were normal or non-contributory.

On examination swelling and sinus tract was seen irt36 .Radiographic examination revealed root canal treatment performedirt 36. Also radiographic examination revealed extensive periapical lesion covering furcation area.

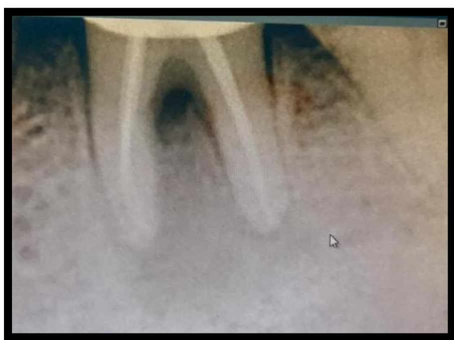

Figure 1: Pre-Operative Image

Lack of mechanical chemical preparation may have caused the treatment failure. In the first visit, after initial irrigation with 2.5% sodium hypochlorite (NaOCl) the gutta-percha was removed from all four canals using NT Gold Retreatment files and then again working length was established for all four canals using Coltene Canal Pro apex locator. The canals were finally cleaned and shaped with NT Rainbow S Rotary files up to size 30/04. Cleaning and shaping was done along with copious irrigation using saline and 2.5 % sodium hypochlorite. . Ultrasonic agitation of the irrigants was done with Endoactivator from Dentsply. The canals were dried with paper points, Calcium ydroxide (NT Cal)was used as an intra-canal medicament, and temporary restoration was done.

The patient was recalled after 10 days, the dressing was removed, the canals were irrigated and dried andclinical fit of the master cones were checked and verified with a peri apical radiograph at the calculated working length.

NT Biocera Flo Bioceramic Sealer was used along with gutta-percha as an obturating material. The sealer was injected directly into the canals according to manufacturersinstructions .The gutta-percha was cut at the orifice using a hot Plugger. All canals were obturated, and the pulp chamber was thoroughly cleansed of guttapercha and sealer. The patient came after 6 months for permanent restoration. The access cavity was restored with composite resin followed by crown placement.

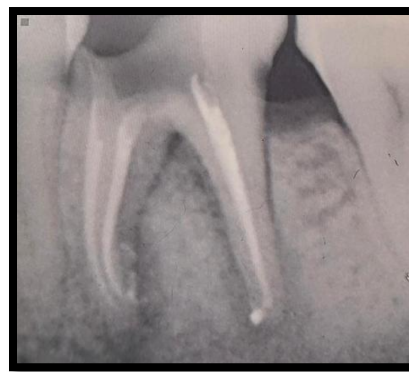

Figure 2: Months after Obturation

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Clinical and radiographic observations were performed at 2 month and 1 year intervals, and apical bone healing (bone neoformation) was found, in addition to the absence of clinical symptoms.

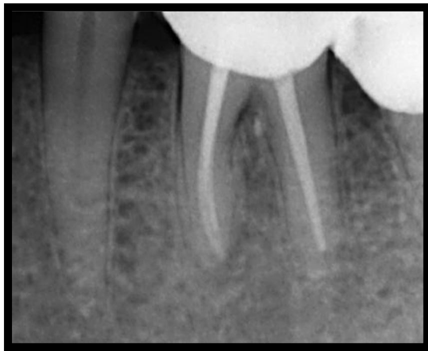

Figure 3: Year after Obturation

Discussion

There are three possible solutions for initial endodontic treatment failure. Endodontic retreatment is the most commonly recommended treatment. One alternative is to do an apicoectomy and retrograde sealing of the root canals. The least ideal option is extraction of the tooth. If the first two solutions are not feasible, the latter must be considered. For easy access to root canals, a non-surgical retreatment approach is preferred over surgery. A retreatment involves removing all root canal contents, cleaning and shaping the canals, and filling them with an inert material like guttapercha.

Studies indicate that 45% of endodontically treated teeth have chronic apical periodontitis[3]. This was shown to be owing to bacteria that had survived the endodontic procedure. Orthograde endodontic retreatment was effective in resolving this issue [4]. During the retreatment complete removal of the root filling materials eliminates bacteria and promotes periradicular healing.

There are myriad of techniques for the removal of guttapercha includes the use of retreatment rotary files, hand files, ultrasonic instruments, instruments with heat or chemical and chemical impregnated paper points are some of the commonly used techniques for the removal of Gutta-percha during a retreatment .

Here in this case we have used NT Gold Retreatment files is a specifically designed sequence of 3 files meant for removal of Gutta Percha (or other materials) from root canals. Specially designed for retreatment cases 2x times better Cyclic Fatigue Resistance than conventional Files Great Fracture Resistance Laser Taper and Size information on the shank.

Reinfection of the root canal system can occur if the coronary restoration is lost or infiltrated after endodontic treatment. This highlights the importance of using restorative materials that reduce or prevent microorganism penetration.

Endodontic instruments and irrigating fluid are used to clean root canals, followed by intracanal medicines for treatment. Calcium hydroxide is the most often utilised endodontic treatment due to its capacity to encourage tissue repair and have antibacterial effects [5].All of the biological effects of calcium hydroxide involve the ionic dissociation of calcium ions and hydroxyl ions. Calcium hydroxide's antibacterial activity is associated with the release of hydroxyl ions in an aqueous environment. Hydroxyl ions are highly reactive oxidant-free radicals that damage the bacterial cytoplasmic membrane, denaturate proteins, and destroy bacterial DNA.

Irrigating the root canal system is a critical step in root preparation. Hypochlorite is an effective irrigant due to its bactericidal action, toxin neutralisation, and ability to dissolve necrotic tissue [7].Periradicular tissue healing and repair is a complex regeneration process involving bone, periodontal ligament, and cementum[8] .Changes in lesion density, trabecular growth, and the formation of lamina dura are all radiographic signs of healing, particularly when they are associated with asymptomatic teeth and healthy soft tissues.

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Selecting an appropriate obturation technique and sealer is crucial for effective root end sealing and tissue repair. Here we have used bioceramic sealer (NT Biocera Flo) which has shown amzing results. As bioceramic-based sealers have outperformed other sealers in the era of adhesive dentistry due to their biocompatibility and the presence of calcium phosphate, which improves the setting properties of bioceramics and results in a chemical and crystalline structure similar to tooth and bone apatite components[9].

Figure 4: NT CAL (Calcium Hydroxide)

Biocera Flo is bio compatible, off white to yellow in colour and miscible in water and injectable bio ceramic sealer. Comprises of Calcium Silicates, Calcium Aluminate, Calcium Hydroxide, Zirconium Oxide, Accelerators and thickening agents , which results in a chemical and crystalline structure comparable to tooth and bone apatite components.

Figure 5: Biocera Flo (Bioceramic sealer)

Sealer flow has a significant impact on the final outcome of the root canal filling. Acceptable flow within the working time is required for any endodontic sealer to reach and seal the apical foramen, irregular areas, and lateral canals[10]. According to ISO 6876/2012, the flow should be >17 mm .The Biocera Flo sealer used in our case report as per ISO 6876 method , the flow is 27 mm . Root canal sealers should be radiopaque enough to identify them from neighbouring anatomical features, making it easier to examine the quality of root fillings on radiographs[11].Zirconium oxide is used as a radio pacifier in root canal sealers because of its good biocompatibility, nondiscoloration, inert properties, nonleaching material, and ISO standard contrast media[10]. The radiopacity of the sealer used here is 7 mm Al (ISO limit min.>3 mm).

To eliminate bacteria that remained after chemo mechanical preparation, sealers should have a high pH. The sealer used has pH 10.8 after 1 hour and reaches upto 14. Having a high pH can improve osteogenicpotential, biocompatibility, and antimicrobial properties. Also because of high pH it does not shrink or resorb (which is crucial for a single-cone technique)Sets within approximately 3.2 hrs and solubilty is 1.7 % .According to ISO and ADA criteria, solubility should be less than 3%. Endodontic retreatment effectively prevents bacterial flow in the root canal system, allowing for tissue healing in the periradicular region without causing symptoms.

Conclusion

In this case, the lesion healed relatively completely during a 12-month period. Additionally, re-instrumentation (NT Gold Retreatment),intracanal calcium hydroxide medicine (NT Cal) and the ultimate power of bioceramic sealer (NT Biocera Flo) allowed for a conservative intervention with long-term success. Root canal therapy with bioceramic sealer was employed to treat a large periradicular lesion. Over the course of a

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year, the lesion in this example appeared to heal almost completely. Calcium hydroxide paste (NT CAL) and Bioceramic sealer (NT Biocera Flo) was found to be safe to use during complete cleaning and disinfection procedure.

References

1. Nair PN. “On the causes of persistent apical periodontitis: a review”. International Endodontic Journal 39 (2006): 249-281.
2. Ricucci D and Siqueira JF Jr. “Biofilms and apical periodontitis: study of prevalence and association with clinical and histopathologic findings”. Journal of Endodontics 36 (2010): 1277- 1288
3. Dugas NN., et al. “Periapical health and treatment quality assessment of root-filled teeth in two Canadian populations”. International Endodontic Journal 36 (2003): 181-192.
4. Friedman S. “Considerations and concepts of case selection in the management of post-treatment endododntic disease”. Endodontics Topics 1 (2002): 45-64
5. Song M1 et al. Analysis of the cause of failure in nonsurgical endodontic treatment by microscopic inspection during endodontic microsurgery. J Endod. 2011;37(11):1516-9.
6. Albuquerque MS et al. Sealing Capacity of Bulkfill Resin in Endodontically Treated Teeth. The Journal of Contemporary Dental Practice. 2019; 20(3): 311-17.
7. Abou-Ran M, Oglesby SW. The effects of temperature, concentration and tissue type on the solvent ability of sodium hypochlorite. J Endod. 1981; 7(8):376-7.
8. M Fernandes A Ida De Nonsurgical management of periapicallesionsJConserv Dent2010134240510.4103/0972-0707.73384 .
9. N Nagar N Kumar A Comparative Clinical E8 valuation Of A Bioceramic Root Canal Sealer With MTA Based Sealer, Resin Based Sealer And Zinc Oxide Based Sealer -An In Vivo StudyIOSR J Dent Med Sci201817581510.9790/0853-1705108185
10. Zhou H.-M., Shen Y., Zheng W., Li L., Zheng Y.-F., and Haapasalo M., Physical properties of 5 root canal sealers, Journal of Endodontics. (2013)
11. Al-Haddad A. and CheAb Aziz Z. A., Bioceramic-based root canal sealers: a review, International Journal of Biomaterials. (2016) 2016,

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