World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 5.088

APICOECTOMY OF MANDIBULAR FIRST MOLAR- A CASE REPORT

Himanshu Thukral*[1], Amit Sharma[2], Kaynat Nizami[3], Shubhra Aggarwal[4], Dhruv Gupta[5] and Aditya Bansal[6]

[1]Consultant Oral and Maxillofacial Surgeon, New Delhi.
[2]BDS, Sharma Dental Clinic, New Delhi.
[3]BDS New Delhi.
[4]Bds, Ceo Dantam Dental Clinic New Delhi.
[5]Endodontist Vasundhra, Ghaziabad Up.
[6]Mds Oral and Maxillofacial Surgeon, Mp.

***Corresponding Author: Himanshu Thukral**
Consultant Oral and Maxillofacial Surgeon, New Delhi.

Article Received on 30/01/2019 **Article Revised on 20/02/2019** **Article Accepted on 10/03/2019**

ABSTRACT

This paper reports a case of a recurrent periapical cyst treated with enucleation of the lesion, apicoectomy, and root end obturation on a lower right first molar. In the case of conventional root canal treatment failure, non-surgical retreatment is the preferred option in most of the cases. Several factors such as a complex root canal system or previous procedural accidents may impede the success of non-surgical retreatment. The authors have performed root-end resection and preparation under local anesthesia on a lower right first molar; The root canal filling is placed within the new cavity to close the path of communication between the infected root canal system and periradicular structures with an intermediate restorative material. The lesion was fully enucleated and sent for histopathology.

INTRODUCTION

An apicoectomy was well defined in 1884 by J. Farrar as "a bold act, which removes the entire cause [of disease] and which will lead to a permanent cure may not be the best in the end, but the most humane." According to Black,[1] the root-resection technique (amputation of the root apex) originated as a treatment for "pyorrhea alveolaris" complicated by a dental abscess in the late years of the 19th century as a valid alternative to adental extraction. It seems that the first treatment properly described was performed on a 14-year-old boy in 1846, gaining access to the root with a trephine and a bur mounted on the dental engine to drill away the area of inflamed/infected tissue.[2] After this, within a few years, a more radical method of complete excision of the root apex was performed and mastered. The pioneers in the apicoectomy technique started operating without any form of anesthesia and simply applied 95% phenol on the gingiva, then scraping away the inflamed tissue (dental abscess) until the alveolar bone covering the root end was exposed to the action of trephine and the straight bur.[1,2] The first application of cocaine as a local anesthetic changed the reliability of this technique completely and of all other dental procedures. In 1907, procaine and novocaine were developed as a more stable substitute by A. Eihorn. Dr. T.P. Hinman of Atlanta (Georgia, USA), after examining the apicoectomy method, stated in a famous paper that "apicoectomy is rarely successful". This statement convinced the editor of *Dental Items Journal* to send letters of inquiry for opinions on this issue to several professors of wide reputation.[2] Apparently, this controversy incited the clinicians to apply a new approach and to master a different perspective for the apicoectomy technique in which the ideal results were: (1) covering of the resected surface of the root by a new layer of cementum; (2) covering of the neoformed cementum by the periodontal membrane; and (3) space formerly occupied by the resected root should be filled by bone. In 1922, the first experimental study of root-resection was done by Bauler on cats in Germany. Bauler performed this procedure on six maxillary canines, and then after apicoectomy, histologic sections were obtained proving the growth of the periodontal membrane.[2] Several other studies in the subsequent 30 years were conducted on animals and humans. Some of these studies described the possibility of filling the resected root with wax, lead or gold.[3] Today, after previous endodontic failure, non-surgical revision of the root in cases of periapical infection, granuloma, or cyst is considered by many as the primary mode of case management. The decision to perform surgery is often open to deliberation and debate.[1] Apical surgery is often the last hope to save an endodontically treated tooth with a periapical lesion. The introduction of new materials for apical obturation in the early nineties improved the success rates of apical surgery to 80-

90%.[4] As reported in the literature, the historical pathway to current surgical endodontic procedures and their applications has been tortuous and complex, heavily influenced by the European school. Many newer techniques, defined as "revolutionary", which are practiced today are simply a re-interpretation of surgical concepts that were lost in the archives of time.[5] The advent of evidence-based endodontics has supported newer procedures with science and the usage of novel materials, modern techniques, and research outcomes.[5]

CASE REPORT

A 21-year-old male reported with a chief complaint of pus discharge from the lower right posterior region. On oral examination, a sinus was seen on the buccal-attached gingival with mandibular left first molar. The tooth was tender on percussion and palpation. The patient had a history of spontaneous throbbing pain due to caries with the tooth, for which he underwent initial endodontic treatment 1 year back in a private clinic. Symptoms of the pus discharge started 1 month after the initial endodontic treatment.

The tooth subjected to endodontic retreatment after which the clinical symptoms remained unresolved. A diagnostic periapical radiograph of the tooth revealed radiolcency, external root resorption in the mesial root, and one separated instruments in the mesial root [Figure 1].

Figure 1: Pre-operative radiograph with broken file on mesial root.

The initial treatment plan proposed was orthograde retreatment. Need for surgical intervention, if necessary, was explained to the patient and consent was obtained. After the removal of gutta-percha, the broken files in mesial canals were bypassed with a #10 K file (Mani, Japan) using watch winding motion followed by thorough cleaning and shaping. The canals were then obturated with mineral trioxide aggregate (MTA) (Angelus, Soluções em Odontologia, Londrina, PR, Brazil). Moist cotton was placed in the pulp chamber and the patient was recalled after 7 days.

On recall, the patient was asymptomatic, there was no pus discharge, and the sinus had resolved.

However, a surgical intervention was necessary to remove the extruded obturation material in the periapical region to ensure complete disinfection. A full-thickness mucoperiosteal flap was raised from 44 to 47. On flap reflection, bone loss was seen on the buccal aspect of the tooth between the mesial and distal roots near the furcation area of 46 [Figure 2].

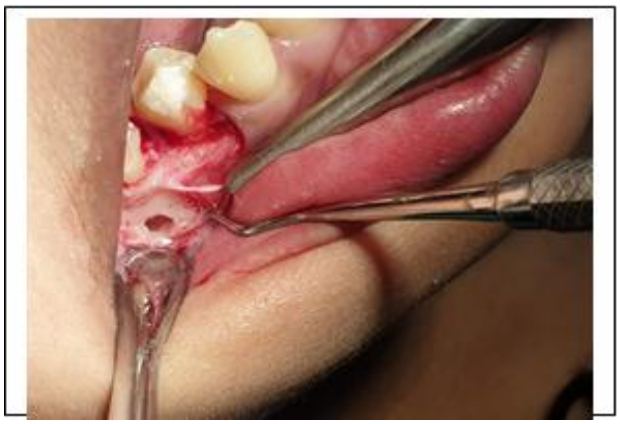

Figure 2: Surgical exposure of the affected area site.

The osseous cavity was enlarged with a surgical round bur to obtain access to the root apices and extruded obturation material. Once access was gained, approximately, 3 mm of the mesial and distal root ends was resected and the bony cavity curetted to remove the extrusions and granulation tissue. Complete removal of the extrusions was confirmed radiographically before the placement of interrupted sutures [Figure 3].

Figure 3: Suture Placed.

Sutures were removed after 7 days, and a postendodontic restoration with a full coverage crown. The patient was recalled periodically and 1 year follow-up demonstrated complete healing both clinically and radiographically.

DISCUSSION

One of the iatrogenic complications is overfilling of the root canal, which has a negative effect on the prognosis

of endodontically treated teeth.[5] Failure of conventional orthograde treatment may be due to failure to remove the infection completely or due to re‑infection. Orthograde retreatment should be the treatment of choice in failed cases.

In spite of this, there may be persisting clinical symptoms or nonhealing lesions that dictate the need for more definitive and advance treatment, i.e., periradicular surgery.[3] Periapical extrusion in a lower molar needs surgical intervention as orthograde re‑treatment may not be able to completely eliminate any foreign bodies. Intentional replantation and root resection, though present as other treatment alternatives, are not commonly used due to their nonconservative nature and short‑term prognosis. Although difficult, retrograde approach is a more suitable method for the management of such complications due to its proven long‑term clinical success. However, it requires a greater level of clinical competence.[7]

Gutta‑percha is the most commonly used material for obturation of the root canal space. Gutta-percha is biologically inert and resilient. Pure gutta‑percha can be considered absolutely biocompatible because no effect has been reported on the frequency of chromosomal aberrations in *in vitro* studies.

Gutta‑percha consists of 20% gutta‑percha, and the main component is ZnO (60–70%), which is necessary to make it radiopaque. Commercially available gutta‑percha points can be cytotoxic due to the substances added to the base material, particularly Zn, as this might leak into the surrounding soft tissues.[8] Cytotoxicity has been reported with both commonly used cements and gutta‑percha when subjected to scanning electron microscope analysis. This cytotoxicity can induce periradicular inflammation or necrosis of the periodontal ligament, and for this reason, overfilling should be avoided as much as possible because it can lead to failure of short‑term treatment or a long‑negative prognosis.[5]

Endodontic surgery, once thought to be the treatment of the last resort, has advanced in the recent years and increases the clinicians' ability to achieve more predictable clinical outcome with a success rate exceeding 90%. Age, gender, tooth type, root‑end filling material, and the magnification system had no significant effect on the proportion of success.[9,10] Littner *et al.* studied the relationship between the apices of mandibular molars and the mandibular canal and found that most frequently, the upper border of the mandibular canal was located 3.5–5.4 mm below the root apices of both the first and second molars.[11] In this case, distance from the inferior alveolar canal was approximately 8 mm, which is a safe margin for successful apicoectomy procedure.

External inflammatory root resorption involves a pH drop of 3–4.5, following pulpal necrosis, with an increase in the osteoclastic/odontoclastic activity. MTA is a tricalcium silicate‑based material that attains an immediate pH of 12 by the release of calcium ions which lasts for months. Because of its high pH and the ability to stimulate cementoblasts/odontoblasts, it can be used in the cases of root resorption.[12]

MTA has also been successfully used by eminent clinicians and researchers to obturate the entire canal due to its favorable physicochemical and biological properties such as superior sealing, good marginal adaptation, minimal microleakage, high biocompatibility, and bioinductive and antimicrobial properties.[13] In this case, the clinical symptoms had disappeared after orthograde MTA obturation. However, a surgical intervention was necessary due to the extruded obturation material.

CONCLUSION

The most ideal management of iatrogenic errors would be its prevention. Mandibular molars present a challenge for endodontic surgery due to its proximity to inferior alveolar nerve and difficulty in accessibility. However, in cases of previous endodontic retreatment failure and when extruded obturation material is present in periapical tissues, endodontic surgery is likely to enhance the prognosis of the tooth.

REFERENCES

1. Hepworth MJ, Friedman S. Treatment outcome of surgical and non‑surgical management of endodontic failures. J Can Dent Assoc, 1997; 63: 364‑71.
2. Ektefaie MR, David HT, Poh CF. Surgical resolution of chronic tissue irritation caused by extruded endodontic filling material. J Can Dent Assoc, 2005; 71: 487‑90.
3. Pasha S, Madhu KS, Nagaraja S. Treatment outcome of surgical management in endodontic retreatment failure. Pak Oral Dent J, 2013; 33: 554‑7.
4. Stavrianos C, Eliades A, Kokkas A. An interesting unusual case report of madly endodontic treatments. Res J Med S, 2010; 4: 98‑101.
5. Yadav RK, Chand S, Verma P, Chandra A, Tikku AP, Wadhwani KK. Clinical negligence or endodontic mishaps: A surgeons dilemma. Natl J Maxillofac Surg, 2012; 3: 87‑90.
6. Pai AV, Shrikrishna SB, Shah N. Surgical management of overfilled gutta‑percha and root capping with mineral trioxide aggregate in a young patient. Indian J Multidiscip Dent, 2014; 4: 148‑51.
7. Gurtu A, Singhal A, Singhal P, Mohan S. Retrieval of separated instrument in mandibular molar by surgical approach‑a case report. J Dent Sci Oral Rehabil, 2011; 2: 32‑3.

8. Mallineni SK, Nuvvula S, Matinlinna JP, Yiu CK, King NM. Biocompatibility of various dental materials in contemporary dentistry: A narrative insight. J Investig Clin Dent, 2013; 4: 9‑19.
9. Tsesis I, Rosen E, Taschieri S, Telishevsky Strauss Y, Ceresoli V, Del Fa bbro M. Outcomes of surgical endodontic treatment performed by a modern technique: An updated meta‑analysis of the literature. J Endod, 2013; 39: 332‑9.
10. von Arx T. Apical surgery: A review of current techniques and outcome. Saudi Dent J, 2011; 23: 9‑15.
11. Littner MM, Kaffe I, Tamse A, Dicapua P. Relationship between the apices of the lower molars and mandibular canal – A radiographic study. Oral Surg Oral Med Oral Pathol, 1986; 62: 595‑602.
12. Aggarwal V, Singla M. Management of inflammatory root resorption using MTA obturation – A four year follow up. Br Dent J, 2010; 208: 287‑9.
13. Wahengbam B, Wahengbam P, Tikku AP. A simplified technique of orthograde MTA obturation on the elected canals of posterior teeth: Two case reports. J Conserv Dent, 2014; 17: 80‑4.