Healing Of Periapical Lesion In Maxillary Anterior Region With Mineral Trioxide Aggregate Using Retrograde Technique After Apicoectomy - A Case Report.

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Abstract: Apical surgery is considered often a last resort to treat a tooth with a periapical lesion that cannot be managed with conventional endodontic treatment or retreatment. The goal of apical surgery is to prevent bacterial leakage from the root-canal system into the peri radicular tissues by placing a tight root-end filling following root-end resection. In addition, its objective is to promote tissue regeneration by removal of the periapical pathologic tissue and by exclusion of any irritants within the physical confines of the affected root. The application of microsurgical techniques in apical surgery, i.e., incision and flap elevation, production of a small osteotomy, and the use of sonic- or ultrasonic driven microtips, results in less trauma to the patient and faster postsurgical healing. A major step in apical surgery is to identify possible leakage areas at the cut root face and subsequently to ensure adequate root-end filling. Only a tight and persistent apical obturation will allow periapical healing with good long-term prognosis. Mineral Trioxide Aggregate (MTA) has since long been successfully used by dentists in the management of teeth.

Keywords: Mineral Trioxide Aggregate, Root canal Treatment, Apicoectomy, Apical surgery.

1. Introduction

Periapical pathology could be the fate of untreated or unsatisfactorily treated traumatically injured teeth. Surgical endodontics is a reliable method for the treatment of teeth with periapical lesions which do not respond to conventional root canal treatment.³ Apical surgery belongs to the field of endodontic surgery, which also includes incision and drainage, closure of perforations, and root or tooth resections. The goal of a periapical surgery is to gain access to the affected area, evaluate the root circumference and root canal anatomy, and place a biocompatible seal in the form of root end filling that stimulates the regeneration of periapical hard and soft tissues. Its success rate varies from 86 – 92% while failure rate is 4.7%.²³ The prognosis depends on several factors such as: different surgical procedures and materials, clinical and radiographic evaluation, systemic conditions, local factors such as involved teeth and their anatomy, previous treatment and its quality.⁴⁻⁵⁻⁶ It is therefore of clinical relevance to perform a thorough clinical and radiographic examination of the tooth before apical surgery (including adjacent and opposing teeth), in order to decide whether surgical or nonsurgical endodontics should be considered. According to the updated guidelines by the European Society of Endodontology, indications for apical surgery comprise (1) radiological findings of apical periodontitis and/or symptoms associated with an obstructed canal (the obstruction proved not to be removable, displacement did not seem feasible or the risk of damage was too great), (2) extruded material with clinical or radiological findings of apical periodontitis and/or symptoms continuing over a prolonged period, (3) persisting or emerging disease following root-canal treatment when root canal retreatment is inappropriate, and (4) perforation of the root or the floor of the pulp chamber and where it is impossible to treat from within the pulp cavity.⁷ Various studies have shown that MTA is an excellent material for use in apexification, as a root end filling material for immature permanent teeth, as a pulp capping and pulpotomy agent and for repair of perforations. Besides these uses, Mineral trioxide aggregate (MTA) has also emerged as a reliable bioactive material with extended applications in endodontics that include the obturation of the root canal space.⁸⁻¹⁰ The present paper describes the successful
outcome of apical surgery performed in maxillary right central incisor followed by retrograde filling by MTA.

2. Case Report

A thirty-seven-year-old male patient reported to the Department of Conservative Dentistry & Endodontics, Guru Nanak Institute of Dental Sciences & Research, Kolkata with the chief complaint of tender on percussion in front region of upper jaw for 15 days. The patient gave history of trauma to the upper front teeth 6-7 years back. The medical history was non-contributory.

Clinical examination revealed missing tooth no. 11, 21 and endodontically treated 22. The tooth No. 12 was tender on percussion, showed negative response to vitality test and was non-carious with no visible fracture line in the crown. The periodontal health of the patient was satisfactory and free from traumatic occlusion.

The treatment plan included gross debridement and disinfection and obturation of root canal followed by apicoectomy and subsequent sealing of the root end with MTA.

In the first appointment, access opening was done in relation to 11 and the canal was cleaned and shaped. Copious irrigation was performed for complete cleaning of the canal. After thorough cleaning and drying, the canal was obturated with gutta percha.

Cone beam computed tomography of maxillomandibular dentoalveolar arches revealed presence of a well-defined radiolucent central bony SOL, involving the periapical region of endodontically treated 12 with an approximated radiological dimension of 13.9mm X 9.7mm X 16.1mm, the periphery of the lesion is sclerotic with complete destruction of internal bony trabeculae and buccolingual cortical plate distortion. Destruction of lateral cortical wall of nasopalatine canal is also noted.

Fig-2- CBCT scan

The patient was recalled after 7 days for re-evaluation and complete blood investigation. In the next appointment, apicoectomy was performed in relation to 12. After administration of local anesthesia, a full thickness trapezoidal mucoperiosteal flap was raised extending from distal aspect of 13 to mesial aspect of 22 using Bard Parker (B.P) blade size #15 (BD, Sao Paulo, Brazil) and periosteal elevator (SS White, Lakewood New Jersey). Apical curettage was performed for the removal of granulation tissue. Surgical site was irrigated using normal saline. Following the raising of a flap, surgical osteotomy was done to get access to the root end. Horizontal surgical excision of 3.0 mm of the apex was done using a Lindeman Surgical Bur (Brasseler USA) and the root end was exposed. Ultrasonic tips (BEST TIPS 1 and 2 [Brasseler USA]) were used to make a 3.0-mm deep retro preparation. Hemostasis was obtained in the osseous crypt, and then the retro preparation was disinfected and dried. The retrograde filling was done with MTA (Angelus, Londrina, PR Brazil). The flap was then repositioned and approximated with moderated digital pressure and moist gauze and then sutured. Post-operatively antibiotics and analgesics were prescribed to the patient along with 0.12% chlorhexidine mouth rinse for maintenance of oral hygiene. The patient was recalled after 7 days for removal of sutures and treatment evaluation. Radiographic examination on the recall visit, revealed continued healing of the periapical lesion. On one year follow up, radiographic examination revealed peri radicular bone formation.
3. Discussion

Apicoectomy is a surgical procedure which involves the excision of pathological periapical tissue from root surface (including apical accessory canals) and sealing the canals against pathological agents thereby aiding in tissue regeneration and creation of new structural support to the tooth. It is the principal modality available to manage failure of conventional orthograde endodontic treatment of a large non-healing periapical lesion. The reported success rate for periapical surgery varies between 44% and 90%. Harty et al. (1970) found that the success rate of 1016 cases of apicoectomy was 90%. Oginni and Olusile concluded that the success rate of apicoectomy of anterior teeth was 71.9%. Peterson and Gutmann reported a success rate of 64%. 11-15

The reason for this great variation may be the lack of agreement on a definition of success and failure of surgery, the difference in the expertise of those who perform the operations, and the decision to operate or not to operate on teeth with unfavorable prognosis. Better case selection can be achieved through obtaining quality information presurgically using digital imaging, which helps establish a more accurate prognosis. Recent advancements in high-resolution, 3-D digital imaging using limited Cone Beam radiography techniques have helped improve surgical case selection through better visualization of the operating field and the determination of the exact location of the associated pathology prior to the actual surgical procedure. This information improves case selection prior to the surgery, which in turn, helps improve case outcome. The advent of ultrasonic devices with surgical preparation tips that allow conservative bony access cavities while still allowing for deep retro preparation depths (following root resection) have further advanced the apicoectomy procedure. 16-19

Various cements have been used as root end filling materials. The choice of a root end filling material could be governed by handling properties, biocompatibility, apical seal, and long term clinical success. MTA has been investigated and used as a root end filling material since its introduction. Despite its good physical and biological properties and its being hydrophilic in nature; its use has always remained a challenge because of its technique sensitivity, prolonged setting time, and high cost. The search for an alternative material was with the aim to reduce cost and increase the feasibility for both professionals and patients.

In this case, we performed apicoectomy in maxillary left central incisor followed by MTA filling. In accordance with the results of the aforementioned studies, we obtained good results along with patient satisfaction. Post operatively, the tooth remained asymptomatic.

4. Conclusion

Based on the contemporary understanding of endodontic concepts for success and failure, assessment and subsequent treatment of apicoectomy procedures have greatly improved. Advances in apicoectomy armamentaria and materials (including bioceramic retrofilling materials and clinical techniques for their efficient use) have enabled endodontists to treat challenging cases with much greater efficiency. While successful outcomes are still predominantly a function of proper case section and triage, using the novel retrofilling technique, as described in this article, can make this previously
challenging aspect of surgical endodontics much easier for clinicians

5. References


