

## Case Report

# Management of an upper central incisor having periapical pathology with unusual presentation

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### ABSTRACT

The aim of this report is to discuss a case about a traumatized upper left central incisor presented with chronic periapical pathology with unusual presentation. In this case, the apical area of the tooth was exposed for a long period and the apex was open due to loss of affected tooth materials and its surrounding bone and soft tissue loss. The apical area was corrected with apical curettage and retrograde filling with Mineral Trioxide Aggregate (MTA) as well as soft tissue managed with pedicle flap design. The discolouration and mild shortening of the crown due to intrusive effect was managed by lamination of cosmetic restorative material. After 12 months follow up, the offending tooth was accepted both functionally and aesthetically.

### Introduction

Surgical endodontics is a reliable method for the treatment of teeth with periapical lesions that do not respond to conventional root canal treatment or when orthograde treatment is not feasible.<sup>1</sup> Also an immature or mature tooth with an open apex causes the problems of overfilling and poor apical seal. So an apical barrier is extremely needed. Retrograde filling is necessary to fill the apical canal space and to obtain a three dimensional seal between the periodontium and root canal system.

The objectives of surgical approach are to remove diseased tissue, debride the canal system as far as possible and to seal the cavity or defect to prevent or reduce the spread of microorganism in the periradicular tissues, thereby providing an environment conducive of regeneration of a normal periodontal apparatus.<sup>2</sup> An ideal retrograde filling material have some qualities like easy and moisture independent application, high sealing capacity, biocompatibility, radiologically confirmable seal and non-absorbable properties etc. MTA is more preferable because it is insensible to moisture, biocompatible and has the property of good seal. MTA provides superior seal when compared with Amalgam, IRM and Super EBA.<sup>3</sup> The marginal adaptation of MTA is better with or without finishing when compared to IRM and Super EBA.<sup>4</sup> As a root-end filling material, MTA showed evidence of healing of the surrounding tissues.<sup>5-7</sup>

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The ideal healing response after periradicular surgery is the re-establishment of an apical attachment apparatus and osseous repair.<sup>(8,9)</sup> However, histological examination of biopsy specimens reveals three types of tissue response;<sup>(10)</sup> healing with reformation of the periodontal ligament; healing with fibrous tissue (scar); and moderate-to-severe inflammation without scar tissue. The deposition of cementum on the cut root face is considered a desired healing response and a prerequisite for the reformation of a functional periodontal attachment.<sup>(8)</sup> Cementum deposition occurs from the circumference of the root end and proceeds centrally toward the resected root canal. The cementum provides a 'biological seal,' in addition to the 'physical seal' of the rootend filling, thereby creating a 'double seal'.<sup>(11)</sup> Different studies showed better sealing ability regarding MTA<sup>(12-17)</sup> while permitted cementoblast attachment and growth. The production of mineralized matrix gene and protein expression indicated that MTA could be considered cementoconductive.<sup>(18)</sup>

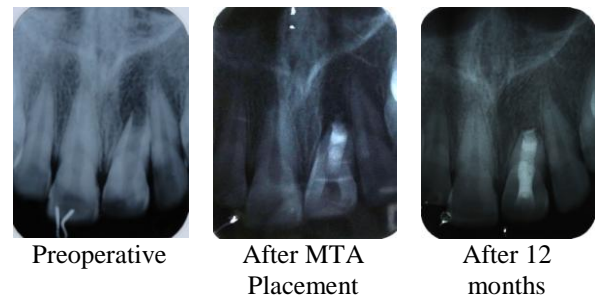
### Case report

A 22 year-old-male patient reported with chronic pus discharge from the apical area of upper left central incisor for 4 years. He also gave a history of sports trauma about 9 years back and the apical area of tooth begun to expose for last 2 years. On clinical examination, upper left central incisor was dark greyish in colour, slightly intruded and the apex of the tooth was with open apex. The apical area of the tooth was exposed with discharging pus but no significant mobility was found. Radiograph showed apical bone resorption as well as apical root resorption with wide pulpal space. The treatment plan of the symptomatic tooth was to manage the apical problem by surgical management, simultaneously with apical curettage and retrograde filling followed by management of the discoloured and intruded crown. After mouth preparation, local anaesthesia was administered at the surgical area. Then the inflamed and unhealthy gingival margin of exposed apical tooth area was removed to regain normal fresh margin with no. 15 BP blade. Then a pedicle flap was designed and the flap was reflected from the bone. The apical area was curetted and minimal

root resection was done to gain fresh dentinal surface while applying less stress to avoid fracture of apical root area.



**Figure 1: Photograph of clinical procedure**



**Figure 2: Radiograph (before & after)**

The root end was prepared biomechanically thorough and thorough up to get a fresh dentin surface at canal wall. After preparation of apical area for the purpose of retrograde filling, Mineral Trioxide Aggregate (ProRoot MTA, Dentsply) was placed at apical 3-4 mm and a radiograph was taken. After radiological evaluation, the soft tissue of wound area was closed with suturing and a moist cotton pillet was in the canal orifice and the access was sealed with interim restoration (Cavit, GC, Japan). Antibiotics and analgesics were advised along with tetracycline mouth wash during immediate post-operative period. After 7 days, the suture was removed and prepared root canal coronal to the MTA placement was filled with gutta percha by vertical compaction technique followed by composite resin restoration at the same day. Regular follow-up was done from the time of operating procedure as 1 month, 3 months and every 6 months. After 3 months

follow up, there was no significant sign and symptoms clinically. Radiograph showed formation of new bone at periapical area and the lesion size was reduced. So, the discoloration of that tooth was managed by lamination of the crown with a cosmetic restoration (Giomer, Sofu, Japan). After 12 months follow up, the offending tooth was accepted both functionally and aesthetically.

### Discussion

In this case, MTA was chosen as a retrograde filling material than other due to its ideal properties. Easy and moisture independent application, superior seal, biocompatibility and ability to increase the vulnerable root strength was the considerable factors. Also, at longer duration, new cementum was found on the surface of the material.<sup>(19)</sup> In a two year follow-up study with MTA as root-end filling material resulted in a high success rate.<sup>(20)</sup>

The periapical pathology regarding this case was chronic abscess in nature where buccal cortical bone was lost. But the most common type of periapical radiolucency is granuloma (73%) than cystic (15%) or abscess (12%) type of lesion.<sup>(21-22)</sup> It is a well-accepted fact that a granuloma heals after endodontic therapy. However, there has been a long-standing debate among dentists as to whether periapical cysts heal after endodontic therapy. It is the prevailing opinion that pocket cysts heal after endodontic therapy<sup>(23)</sup>, but true periapical cysts may not heal after nonsurgical endodontic therapy.<sup>(21-22)</sup> Only a subsequent surgical intervention will result in healing of such a lesion.

Endodontic microsurgical techniques with the aided of operative microscope are more beneficial for better outcome for nowadays.<sup>(24)</sup> The advantages of microsurgery include easier identification of root apices, smaller osteotomies and shallower resection angles that conserve cortical bone and root length. In addition, a resected root surface under high magnification and illumination readily reveals anatomical details such as isthmuses, canal fins, micro fractures, and lateral canals. Combined with the microscope, the ultrasonic instrument permits conservative, coaxial root-end preparations and

precise root-end fillings that satisfy the requirements for mechanical and biological principles of endodontic surgery.

Anatomical study of the root apex showed that at least 3 mm of the root-end must be removed to reduce 98% of the apical ramifications and 93% of the lateral canals<sup>(25)</sup>; in this case, minimal removal up to a level of fresh root dentinal surface because short root length by previously loss of tooth apex pathologically. The soft tissue was managed by flap surgery in a pedicle flap design but free gingival graft or periosteal pedicle flap may also be designed in different consideration. Also, bone cell formation initiating material or bone grafting along with surgery may causes beneficial sometimes. Er:YAG laser was superior in comparison with CO<sub>2</sub>, Nd:YAG, and Ho:YAG.<sup>(26)</sup> it showed root surfaces devoid of charring. Clinically it's use improved healing and diminished post-operative discomfort.<sup>(27)</sup> The use of laser for apicectomy procedure has some merits, but it takes more time to perform when compared to more conventional methods.

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