



Research Article

**SURGICAL AND ESTHETIC MANAGEMENT OF APICAL PERIODONTITIS IN IMMATURE TEETH:
CASE REPORT**

Dr. Neelam Mittal¹, Dr. Tarun Kumar^{2*}, Dr. Vijay Parashar³ and Dr. Praveen Kumar⁴

¹Professor, Dean & Head, Faculty of Dental Sciences Banaras Hindu University, Varanasi, India

²Junior Resident, Faculty of Dental Sciences Banaras Hindu University, Varanasi, India

³Senior Resident, Faculty of Dental Sciences Banaras Hindu University, Varanasi, India

⁴Junior Resident, Faculty of Dental Sciences Banaras Hindu University, Varanasi, India

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ABSTRACT

Apical surgery is considered as a standard oral surgical procedure. It is often a last resort to surgically maintain a tooth with a periapical lesion that cannot be managed with conventional endodontic (re-)treatment. The main goal of apical surgery is to prevent bacterial leakage from the root-canal system into the periradicular tissues by placing a tight root-end filling following root-end resection. Clinicians are advised to perform apical surgery to benefit from magnification and illumination. In addition, the application of microsurgical techniques in apical surgery, i.e., gentle incision and flap elevation, production of a small osteotomy, and the use of sonic- or ultrasonic driven microtips, which result 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. The present paper describes current indications, techniques and outcome of apical surgery.

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INTRODUCTION

Apical surgery belongs to the field of endodontic surgery, which also includes incision and drainage, closure of perforations, and root or tooth resections.[1] The objective of apical surgery is to surgically maintain a tooth that primarily has an endodontic lesion that cannot be resolved by conventional endodontic (re-)treatment.[2]

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 non-surgical endodontics should be considered.[3]

The incision and flap design should be chosen according to clinical and radiographic parameters, including condition, biotype and width of gingival tissues, presence of a restoration margin, location and extent of the periapicallesion [4], and patient's esthetic demands. [5] A small osteotomy is produced to locate the root-end that is resected by about 3 mm. The resection plane should be perpendicular to the long axis of the tooth. At this stage, all pathological tissue should be removed and adequate hemorrhage control is established.[6]Root-end cavity preparation is performed with manual instruments.

The use of rotary instruments to prepare a root-end cavity is no longer recommended. [7] The retro-cavity should have a depth of 3 mm, follow the original path of the root canal, and also include accessory canals and isthmuses, if present. With regard to the root-end filling material, Biodentine appears to become the standard.[8] Although it is a comparatively expensive material and the clinician has to become familiar with its handling.

With regard to healing outcome, the classification of healing should be based on defined clinical and radiographic healing criteria. [9] Cases should be monitored at yearly intervals until a final diagnosis (success or failure) can be established. Generally, lower success rates have been reported for re-surgery cases, and for teeth with combined endodontic-periodontal lesions. [10] For both problems, the indication to perform apical surgery must be carefully weighed against extraction and implant/prosthetic rehabilitation.

Case Report

A 15 year old female patient was referred from private clinic, to the department of conservative and endodontics, IMS, BHU Varanasi. She has complained of mild to moderate intermittent pain in upper front region. Pain becomes intense during biting. Careful clinical examination revealed that, the patient had intraoral draining sinus in relation with 11 [fig.1].Pre op IOPA shows involved tooth was immature without apical closure with post placed inside the canal and periapical radiolucency

*Corresponding author: **Dr. Tarun Kumar**

Junior Resident, Faculty of Dental Sciences Banaras Hindu University, Varanasi, India

was evident [fig.2]. She gave history of root canal 5 years before in some private clinic. Since canal passage was obstructed due to fabricated post, retrograde approach with apical curettage and apical resection was planned followed by apical preparation and restoration with bioactive material. Aim should be achieved by root-end resection, root-end cavity preparation, and a bacteria-tight closure of the root-canal system with a retrograde filling. In addition, the periapical pathological tissue should be completely debrided by curettage in order to remove any extraradicular infection, foreign body material, or cystic granulation tissue.



Fig 1 Pre op Image



Fig 2 pre op IOPA



Fig 3 After flap elevation



Fig 4 Bony window preparation and apical resection



Fig 5 Root end preparation



Fig 6 Retrograde filling with biodentine

Management: Taking in consideration of immature apex associated with periapical periodontitis and involvement of apical radiolucency without much mobility associated with the tooth. Apicoectomy with apical curettage followed by retrograde filling with bioactive restorative material was planned. Whole treatment plan was divided into two stage, first stage deals about surgical part and second with aesthetic part.

On the day of the surgery, the patient was admitted to the clinic, the surgical procedures were described, the risks and benefits were explained, and a consent form was signed. The patient has been asked to complete one preoperative mouthrinse with 0.15% chlorhexidine.

After giving local anesthesia (Lignox 2%; Indoco Remedies Ltd., Mumbai). Most commonly used mucoperiosteal flaps for apical access in the anterior part of the maxilla are the trapezoidal flap and the triangular flap with an obvious mesial and distal releasing incision. Surgical blade no.15 is used for trapezoidal flap with two vertical releasing incisions which are almost parallel to long axis of the root. Extension of flap design ends upto one 3rd of the adjacent normal teeth in mesial as well as distal direction. Periosteal elevator was used to elevate the soft thin flap atraumatically. Care should be taken to avoid tearing and laceration of flap, which may lead to undue delay in postoperative healing. [Fig.3]

After elevating the flap and visualizing the cortical bone, immediately a continuous soft tissue structure was noted between the bony cavity and the buccal flap. After dissection, the buccal bone showed a hollow space. Designing the flap is a key aspect of periapical surgery: It should ensure adequate exposure of the surgical field and allow the surgeon to work quickly and comfortably. Furthermore, there should be no tension capable of complicating the work of the dental professional or of causing patient discomfort, and soft-tissue damage due to retractor compression is to be avoided. A good flap design with delicate manipulation of the soft tissue is

necessary for successful periapical surgery. Osteotomy was performed successfully with a straight fissure carbide bur with the opportunity to enlarge the bony defect to a buccal window (1cm) and gaining access to the granulation area [fig.4]. A straight fissure carbide bur was directed perpendicular to the long axis of each root and used with full rotating power to cut the distal 3 mm of the apex. This cut is completed in order to decrease dentin tubules peripheral microfiltration. This cut exposed the guttapercha material and removed any excess guttapercha protruding from the apical foramen. Saline irrigation was used to clean the cavity, removing debris of gutta-percha, dentin, and cementum (30s). Sterile gauzes in long strips were gently placed inside the empty cavity to obtain hemostasis, to clean the environment. The strips were removed after 2 min. The apices of the roots were visualized and then carefully resected at 0° or 180° to the long axis of root with a straight fissure bur on a hand-piece.[fig.5] After retrograde preparation, the canals were restored with bioactive material; biodentine.[fig.6] Any excess of biodentine was removed with a microbrush. Bone trimmer was used to remove any blunt bony borders or sharp spicules from the window access which enhances the rate of post-operative healing rate. The operative area was closed carefully by 3-0 mersilk, intermittent suture [fig.7] and a final IOPA was taken.[fig.8] Patient was then discharged after giving postoperative instructions.



Fig 7 Immediate post-op image after suturing



Fig 8 Immediate post-op IOPA



Fig 9 Post op image showing healing after 1 week



Fig 10 Post op IOPA showing healing after 3months



Fig 11 Post op showing after crown preparation



Fig 12 Post op after final cementation

Patient as instructed, reported for reevaluation after 1 week, and found to be completely asymptomatic with nice texture, colour, and consistency of gingival area.[fig.9] As discussed above rct and crown fabrication was performed by a private practitioner when she was at age of 8years. Due course of time, passive eruption of tooth makes unprepared enamel visible above gingival margin, which found to be aesthetically unpleasing by patient, so planned to go for new crown. Preparation was done carefully over the existing crown [fig.11] and new finish line was prepared above and subgingival. Impression was taken and send to laboratory after shade matching, which was later restored and cemented with luting cement.[fig.12]

Discussion

The evaluation of a case referred for apical surgery must always include a careful weighing of the advantages and disadvantages of surgical and non-surgical intervention, i.e., the possibility of a conventional root-canal (re-)treatment should be considered as a therapeutic option[2].

After the failure of the conventional root canal treatment (RCT), non-surgical retreatment is the preferred option in most cases. Several factors, such as a complex root canal system or

previous procedural accidents, may impede the success of non-surgical retreatment.[10] In these cases, periradicular surgery and apicoectomy would be the treatment of choice to preserve the tooth.

Numerous materials have been recommended for root-end obturation, and many studies have attempted to identify an ideal material; however, an ideal material has not been found yet. [12]The most commonly used materials are mineral trioxide aggregate (MTA) and IRM. Recent studies show that bioactive materials such as biodentin achieved the most favorable healing response, both radiographically and histologically,[13] however these results were not statistically different from MTA.An ideal material should be non-absorbable, non-corrosive, non-cytotoxic, not affected by moisture, dimensionally stable, biocompatible, antibacterial, radiopaque, cost-effective, easily manipulated, adhesive to dentinal walls, create a tight seal, and induce cementogenesis.[14]

The follow-up examinations of this case were after 2 weeks, 3 months. The examinations noted an absence of symptoms, such as pain, swelling, trismus and the normal function of the tooth was preserved. No sensory loss was reported by the patient. The X-ray after 3 months showed a reduction of the cavity and decrease in the radiolucency in apical region. [fig.9][fig.10]

The patient is happy and satisfied to have her tooth functional. Also, the X-ray evaluation reported clear and slow bone deposition in the cavity after apicoectomy. These criteria highlight the success of the treatment after 3 months.

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