

Surgical Management of a Non-vital Immature Permanent Maxillary Incisors with a Large Peri-Apical Lesion

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Abstract: Large endodontic lesions do not resolve solely by root canal therapy. Additionally, surgical intervention is required to eliminate the lesion completely and relieve the patient's symptoms. Dental trauma is the leading cause of loss of tooth vitality in children. It often leads to the presence of immature open root apices, which should be dealt with at an early stage to prevent periapical infections. Surgical removal of a large periapical granuloma was done, followed by, retrograde apical filling with mineral trioxide aggregate, for an immature maxillary central incisor in an apexification procedure.

Keywords: Dental Trauma, Mineral Trioxide Aggregate, Occlusal Radiographs, Retrograde Filling, Root resection, Surgical Endodontics

Introduction: Dental trauma results in pulpal necrosis that later evolves into an endodontic infection which maybe immediate or delayed.¹ This may further perpetuate into acute or chronic apical periodontitis depending on bacterial and host-related factors.² Delay in treatment in children may lead to various pulpal responses such as internal resorption, dystrophic calcification, and pulpitis which may evolve into partial or total pulpal necrosis.³ This may lead to a guarded prognosis of the tooth involved which maybe eventually lost. Nonsurgical endodontic treatment may not suffice for the treatment of such a lesion. Surgical intervention is often required along with nonsurgical treatment which has a success rate of 40 %-90%.¹

Apical seal in non-vital immature teeth can be achieved by using Mineral trioxide aggregate. MTA has the ability to induce cementum-like hard tissue when used adjacent to

the periradicular tissues. MTA is a promising material as a result of its superior sealing property, its ability to set in the presence of blood, and its biocompatibility.

The present case report describes one such case of dental trauma leading to an endodontic lesion where the treatment was delayed for 8 years. A combination of non-surgical treatment along with surgical intervention was planned with regular follow-ups.

Case Report: A 15-year-old female patient was referred to the department of Pedodontics and Preventive Dentistry, Santosh dental college & hospital, with a chief complaint of pain in the upper front tooth region from five days. The pain was severe, throbbing, continuous in nature, radiated to the frontal and temporal lobe, and was aggravated by hot foods or liquids. History of presenting illness suggested that the patient had suffered trauma to tooth 21 at the age of 8 years, due to a fall, while playing. No treatment was done for the tooth at that time. The patient had no significant medical history.

On clinical examination, tooth 21 was discolored with Ellie's class 2 fracture (Fig.1). It was non-vital and percussion positive. A periapical radiograph was taken, and a large periapical lesion was seen involving the apical region of tooth 21, extending to the mesial root surface of tooth 22, with the absence of lamina dura of the involved teeth. Additionally, a true occlusal radiograph (Fig. 2) was taken to assess the size and extent of the lesion. The lesion was found to be approximately 15 x 20 mm in its greatest dimension with well-defined borders, it was located at the apices of teeth 21, and 22, present in the anterior half of the palatal bone not crossing the midline.



Figure 1- Pre-operative View



Figure 2 - Occlusal X-ray Showing the Lesion

Based on the above clinical and radiographic findings, the lesion was diagnosed as a secondarily infected, chronic periapical granuloma. An apicoectomy was planned with the expectation of resolving the lesion of this large size, which may not be possible with nonsurgical endodontics alone. The patients' parents were informed about the procedure and written consent was obtained. A complete blood profile was also advised prior to the surgery. Under local anesthesia, a crevicular incision was made using a #15 scalpel blade involving teeth 13, 12, 11, 21, 22, 23, 24, 25 and a full-thickness flap was raised with help of a 9 Molt periosteal elevator (P9X, HuFreidy). The soft tissue lesion was palpated, and a bony window was created (Fig.3) at the region on 21, 22 using a surgical round bur (SS White Dental) to allow access. Following this, granulation tissue was removed using curettes (Hu Freidy) and the lesion was removed completely. A portion of the granulation tissue was stored in a 10% buffered formalin solution, for histopathological examination. The apical portion of 4mm of teeth 21, 22 was resected followed by root canal treatment of 21 and 22 (Fig.4). A retrograde filling was done to seal the apical portion of the tooth using MTA (Angelus MTA Fillapex Smartmix Syringe) (Fig. 5). The site of surgery was irrigated copiously with saline, and flap was replaced with silk sutures (Ethicon Mersilk #3-0 Black Braided Suture). Post-operative instructions were given, and medications were prescribed for the patient (650 mg of Augmentin three times a day, 400 mg of Metronidazole three times a day, and a combination of aceclofenac 100 mg and serratiopeptidase 15 mg twice a day for 5 days post-surgery). The patient was recalled after one week for the suture removal, a regular follow-up was done, and the results were promising. The patient's tooth 21 was restored with a porcelain fused to a metal crown (Fig.6) after three months of follow-up.



Figure 3 - Creation of Bony Window

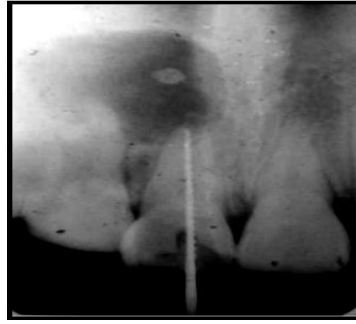


Figure 4 - Root Canal Therapy #21, 22



Figure 5 - Obturation with MTA #21, 22



Figure 6 - Post Operative View with PFM Crown

Discussion: Dental trauma may result in pulpal necrosis leading to the development of a granulomatous lesion and eventually a cyst depending on pulpal response and time-lapse. Periapical lesions are mostly classified as radicular cysts, dental granulomas, or abscesses.⁵ The incidence of cysts ranges from 6% to 55%, granulomas 9.3% to 87.1%, and abscesses 28.7% to 70.07%.⁶ The lesion, in this case, was diagnosed as an acute exacerbation of a chronic periapical granuloma in relation to teeth 21, and 22 after confirmation with histopathological examination.

A combination of IOPA and occlusal radiograph has been used to locate the lesion and measure its dimension. Compared to the advanced recent radiographic techniques such as CBCT and MRI these are more economical and easily available.

The success rate of endodontic microsurgery and non-surgical retreatment is 92% and 80 % respectively hence we planned an apicectomy for the present case.⁷ The main objective of surgical endodontics is complete removal of necrotic cells, tissue debris, and bacteria in the periapical lesions. A proper case selection can ensure effective debridement rapidly. Healing of periapical wound is much faster after endodontic surgery than with non-surgical endodontic therapy.

MTA was used as a root-end filling material for teeth 21, 22. According to a study MTA produced cementum formation in 23% of the specimens after 2–5 weeks of periapical surgery and more than 80% of root-end-filled cavities with MTA showed deposition of cementum 10–18 weeks after surgery.¹

A follow-up was done at one, three- and six-months intervals. Proper wound healing was observed, and teeth were asymptomatic.

Conclusion: Surgical endodontics is a very effective and reliable method in the treatment of large periapical lesions. Patient awareness and motivation toward dental treatment are of prime importance for a successful endodontic treatment outcome.

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