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Comprehensive interdiciplinary management of a largeperiapical lesion in the maxillary incisor - A case report

[1]Dr. Adarsh S, [2]Dr. Keerthi T, [3]Dr. Rajaram Naik, [4]Dr. Parimala Kumar

Corresponding Author: Dr. Adarsh S

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Abstract

Apical Surgery is considered as a standard oral surgical procedure which is considered to be a last resort to maintain a tooth with a non-healing periapical lesion.

The main goal of a periapical surgery is to prevent bacterial leakage from the root canal system into peri radicular tissues and vice versa by providing a hermetic seal at the root apex followed by root end resection.

A 41-year-old male patient reported to the department with a swelling on the palatal aspect of 11 &12. A conventional root canal therapy was performed followed by pericapical surgery and root end resection which was then sealed using bio dentine as a retrograde filling material followed by placement of bone graft.

Keywords: Periapical Surgery, Bio dentine, Apicectomy, Bone graft, Periapical granuloma

Introduction

Nonsurgical endodontic treatment has a high success rate in the treatment and prevention of apical Periodontitis when carried out according to standard and accepted clinical principles- which includes root canal treatment in order to successfully clean the diseased pulpal tissue, fill it with an obturating material and let the periapical tissue heal naturally. Most of these periapical lesions can be either radicular cysts, abscesses or granulomas. The definitive diagnosis can be arrived at after the his to pathological analysis of the periapical lesion. (1)

Apicectomy or root-end resection is the removal of the root tip and the periapical infected tissue of an tooth with periapical infection- when the inflammation and infection persists in the area around the root tip after or during root canal treatment.

It primarily enables elimination of the necrotic debris at the apical end, achieve apical seal with retrograde filling material and enable closure of the communication between the root canal and the surrounding periapical tissues. This case report explains the management of a periapical lesion by conventional root canal therapy followed by apicectomy and placement of bio dentine as retrograde filling material.

Case report

A 41 years old male patient was referred to department of conservative dentistry and endodontics with a chief complaint of swelling and pain on the palatal aspect of upper right central and lateral incisor (Tooth number 11 & 12) .On the eliciting the history, patient had met with a road traffic accident 9 years back .Other medical history were non-contributory .On clinical examination, there was a large swelling on the palatal aspect of 11 and 12 of size approximately 20 x 18mm (Figure 1) with Ellis class II fracture and a blackish dis coloration irt 11 was obvious. The electric pulp testing and cold test gave a negative response. The probing depth were at normal limits. On radio graphic examination, (Figure 2) a well-defined radiolucency was seen on the periapex of 11 & 12 suggestive of a periapical cyst with loss of coronal structed confined to dentin.

An Emergency access opening was performed irt both 11 & 12 under local anesthesia (2% lidocaine with 1: 100,000 epinephrine).

Working length was determined using apex locator (E-connect Pro, Eighteeth, Changzhou Sifary Medical Technology Co. Ltd.) and confirmed radio graphic ally (Figure 3) using a no.15 K file (Mani, Nakanishi Inc., Tokyo, Japan). The teeth are over instrumented using a no.10 K file led to the drainage of straw-coloured exudate from 11 & 12 and Initial biomechanical preparation was done till #30 K file and an open dressing was given. The patient was recalled after 2 days for evaluation and kept him under analgesics and antibiotic prophylaxis. On the second visit patient reported with reduced swelling and a biomechanical preparation was done. The apical enlargement was done using crown down technique. The biomechanical preparation was done using Protaper gold files till F3 with a constant irrigation (Dentsply Maillefer, Balliaigues, Switzer land) using saline and 2% chlorhexidine. The patient was then recalled and did not turn up for the treatment.

The patient turned up for the treatment after 9 months and then the patient was referred to Department of Periodontics for opinion regarding periapical surgery as there was persistent lesion noted at the periapex of 11 & 12. For the better treatment a cone beam computed Tomography was advised to analyse the palatal extensions of the lesion.

On revealing the CBCT report there was an ill-defined periapical rarefaction seen at the periapex of 11 and 12 (Figure 4). Following 2 days, obturation was completed in relation to 11 and 12 Gm BH 1 Co KG, Lange Nau, Switzerland) as the sealer followed by the placement of a temporary filling material, following which the periapical surgery was planned the next day (Figure 5 &6).

Periapical surgery

Treatment was recommended combining peri-radicular surgery with retrograde restoration. Prior to surgery, haematological investigations were carried out.

Surgical Intervention

After mouth preparation with povidineiodine rinse and swab, local anaesthesia (2% lidocaine with 1: 100,000 epinephrine) was administered.

A submarginal curved or semilunar incision using no. 15 size blade was given in the vestibule, and a full thickness flap was raised by approximating the location of the root apices (Figure 7). This surgical approach prevents over exposure of bone and enables localised exposure of the areaof interest.

Visualisation and osteotomy

Once the flap was reflected, a breach in the buccal bone was visualised. Using a round bur, under constant irrigation for cooling, enlargement of the bony defect was done through the buccal window to gain access to

the periapical lesion and root end of the tooth with the defect. Using cumine scaler, and Castroviejo scissors, the periapical lesion measuring 7mm*4mm was removed and was sent for histopathological investigation.

Root end Resection

A straight fissure carbide bur was bevelled perpendicular to the long axis of each root and used to cut the 3 mm of the apex(figure 8 & 9) . The retrograde cavity was prepared and was then filled with retrograde filling material. The material of choice for retrograde filling was bio dentine. It was placed into the prepared apex using hand plugger to assure dense filling and minimal voids.

Xenograft (Osseo graft) was packed into the bony defect to induce bone formation once the retrograde filling material dried (figure 10).

The surgical site was irrigated with saline for complete debridement of Hemostatic agent, retrograde filling material, and debris, which may hinder the process of healing. Finally, single interrupted vicarly sutures were given (figure 11).

Patient was prescribed with the analgesics and antibiotics for five days. He was recalled after five days to see for the surgical site maintenance and to check on the patients wellbeing.

After 14 days the suture was removed and the surgical area had healed with no signs of scarring (figure 12).

Following complete procedure, patient was recalled after a month for assessing the immediate clinical and radiological signs of healing. On third month of recall the IOPAR showed satisfactory healing (figure 13).

Discussion

Endodontic surgery entails the excision of damaged periapical tissue in order to create the perfect conditions for tissue health, regeneration, and the formation of new tooth structural support. When performed for the first time, endo dontic surgery has a success rate of between 78 and 91%

(2) but is less successful in retreatment situations where there is a periapical lesion. (3) From a purely patho logical stand point, when a periapical lesion presents as a radio lucent lesion on a radiograph, the clinicians are not aware of the histology condition of the lesion at the time of treatment. 10% of all periapical lesions also need surgery in addition to endodontic treatment.

Additionally surgical endodontics is the best option for treating failed re-treatment instances caused by apical transportation or procedural errors, particularly if they have post restorations. Furthermore, non-surgical endodontic therapy cannot guarantee 100% success due to the complexity of the canal structure. (4)

A non-hermetic apical seal will allow the bacteria and their toxins to be a main cause of these periapical lesions. In such a condition the effect of the leaking is eliminated by curetting the damaged periapical tissues. A 3-mm root-end amputation eliminates all lateral canals and apical ramifications, reducing the likelihood of reinfection and failure.

Bio dentine which is a calcium silicate-based cement has recently gained popularity due to its resemblance to MTA in the recent years. It is specifically designed as dentin replacement material to be used for endodontic repair like root perforations, resorptive lesions, apex i ficationretrograde filling and pulp capping in restorative dentistry.

Due to the faster setting and the bioavailability, bio dentine was selected as the material for retrograde filling. Studies show that resecting the apical 3 mm and preparing the 3 mm root-end during periapical surgery reduces 98% of the apical ramifications and 93% of the lateral canals. (5)(6)

GBR technique was applied in this case for adequate hard tissue healing using xenograft (Osseo graft). It has type I collagen retained in its native form after the demineralization process with favourable osteo inductive potential.

The patient was re-evaluated on 7th day, 14th day, end of 1 month and end of 3 months. Following 14 days, there was absence of symptoms and the normal function of the tooth was restored. As the combination of clinical and radiographic healing criteria is accepted today to determine the outcome of apical surgery as given by Zuolo et al, 2000- patient has been kept under observation for the following one year in order to determine the radiographic changes.

Conclusion

Endodontic surgery performed with bone graft after resecting the root end followed by placement of bio dentine as a retrograde filling material proved to be a successful alternative in the resolution of persistent periapical infection.

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Legend Figures

Figure 1

Figure 2

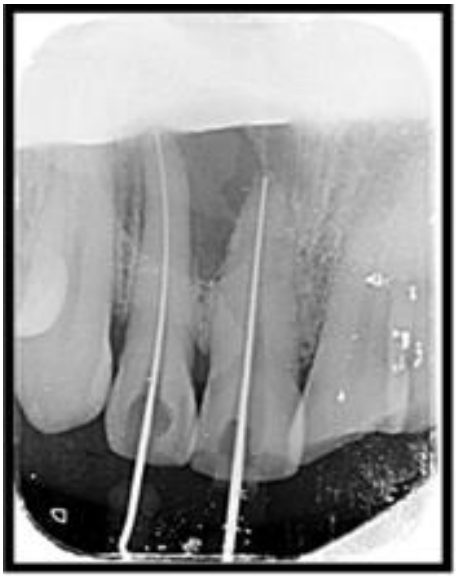

Figure 3

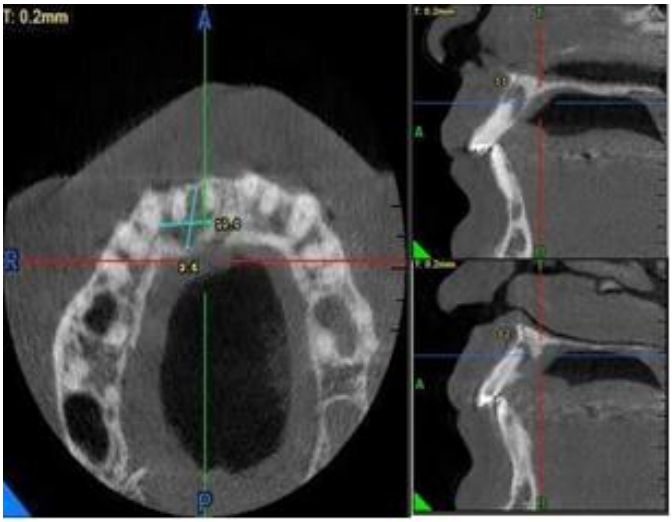

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13