

Surgical management of periapical lesion using bone graft: two case reports.

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ABSTRACT:

The local response of bone at the apex of the tooth that develops in response to pulpal necrosis or significant periodontal disease is known as periapical inflammatory lesion. Depending on the form of the lesion, the availability of progenitor cells, signaling molecules, and micro-environmental cues, the eventual outcome of wound healing after endodontic surgery could be repair or regeneration. Surgical treatment is generally undertaken in persistent periapical lesions that do not heal even after the completion of endodontic treatment, this was adopted in the following two case reports. The extensive periapical lesion with a large bony defect was managed with tissue curettage and a regenerative technique using bone graft. At the 6-month follow-up, both clinical and radiographic examinations confirmed excellent recovery in both the cases. To summarize, using a bone transplant during endodontic surgery to treat periapical lesions with bony defects is an effective treatment method for speeding up bone repair.

Keywords: Endodontic surgery; bone defect; periradicular lesion; periapical surgery.

INTRODUCTION

All clinical signs and symptoms must be resolved with complete periapical repair or regeneration for endodontic therapy to be successful. Conventional endodontic treatment is generally a successful procedure; however, in 10% to 15% of the cases- symptoms can persist or spontaneously recur. [1] Sometimes a well-executed endodontic treatment can fail due to microbial infection that is not eradicated throughout the endodontic therapy. A draining fistula, pain on mastication and the unintentional discovery of a radiolucent periapical lesion growing in size are all factors suggesting failure of the initial endodontic treatment. When traditional endodontic therapy and retreatment fails and periapical disease persists, surgical intervention to

combat the apical biofilm is recommended. [2] The diseased tissue is removed during periapical surgery and the periapical lesion heals.[3,4] In endodontic practice, periapical surgery represents about 3% to 10% among all the treatment procedures.[5] The prognosis of apical surgery depends on the size and position of the periapical bone defect.

All recent research has shown that using a regenerative approach towards periapical healing improves the outcome of bony lesions when compared to the same lesions without regenerative approach. [6, 7, 8] Many studies have indicated that using a bone graft can speed up the healing process.[9] Two case reports of persistent symptomatic periapical pathology associated with maxillary incisors which was endodontically and surgically treated with the use of bone graft is discussed.

CASE REPORTS

Case 1:

A 37-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at the Sree Balaji Dental College & Hospital, Pallikarani, Chennai with a chief complaint of discoloration, a dull, nagging pain and swelling in the upper front tooth region. On clinical testing, tooth number #11 was discovered to be discolored associated with a labial swelling (Fig -1A). Reviewing the dental record of the patient, root canal treatment was found to be completed in relation to #11, #12 about 2 years ago and retreatment of the same was done about 1 year back. He also gave a history of trauma about 9 years back. In addition, the region was painful to percussion and palpation, with normal probing depth and no mobility. The preoperative radiograph showed periapical radiolucency related to tooth #11, #12 (Fig 1B). Due to the persistence of the lesion, it was recommended that periapical surgery of the endodontically treated tooth would be the treatment of choice.

The procedure was explained to the patient and consent form was obtained for the same. On the day of surgery, he was asked to rinse the mouth with 0.2% chlorhexidine gluconate. Local anesthesia (2% lidocaine with 1:100,000 epinephrine) (Lignox 2% A, Indoco Remedies Ltd, Mumbai, India) was administered labially and palatally. Mucoperiosteal flap was raised with two vertical incisions (Fig-2A & 2B) and a crevicular release incision was made (Fig-2C) from the distal end of the maxillary right canine to that of the maxillary left canine. After the flap reflection, a perforated defect was observed with an absence of the labial cortical plate located above the maxillary right central and lateral incisor. Tissue curettage was done at the defect site using Lucas Bone Curette No.87 (15/723) (Waldent, New Delhi, India) (Fig-2D & 2E) and the defect was copiously irrigated with Betadine (Win-Medicare Pvt Ltd, New Delhi, India) and saline solution. Bone graft material (CopiOs Cancellous Particulate Xenografts, Zimmer Dental, USA) was placed into the bony defect using a plastic device. The flap was then repositioned and was sutured using 3-0 black silk suture material (Sutures India Pvt. Ltd, Karnataka, India) (Fig-2F). Analgesics, antibiotics and 0.2% chlorhexidine mouthwash was prescribed to the patient for a week. Sutures were removed one week later when the surgical site had healed satisfactorily. The patient was found to be asymptomatic at the 6 months' follow-up visits and periapical radiographs revealed considerable bone development in the periapical region (Fig- 3).

Case 2:

A 35-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at the Sree Balaji Dental College, Chennai with a chief complaint of pain in the upper front tooth region. On clinical testing, tooth number #22 was found to be discoloured. Reviewing the dental record of the patient, root canal treatment was found to be initiated in relation to #21, #22 about a year ago. In addition, the region was painful to percussion and palpation, with normal probing depth and no mobility. The preoperative radiograph showed incomplete endodontic therapy in #21 and # 22 with periapical radiolucency related to #22 (Fig 4 A). The patient was recommended root canal treatment in # 21 and # 22 followed by periapical surgery of #22 .

The procedure was explained to the patient and consent form was obtained for the same. On the day of surgery, he was asked to rinse the mouth with 0.2% chlorhexidine gluconate. Local anesthesia (2% lidocaine with 1:100,000 epinephrine) (Lignox 2% A, Indoco Remedies Ltd, Mumbai, India) was administered labially and palatally. Mucoperiosteal flap was raised with two vertical incisions and a crevicular release incision was made from the distal end of the maxillary left canine to the mesial end of the maxillary left central incisor. After the flap reflection, a perforated defect was observed with an absence of the labial cortical plate located above the maxillary left lateral incisor. Tissue curettage was done at the defect site using Lucas Bone Curette No.87 (15/723) (Waldent, New Delhi, India) and the defect was copiously irrigated with Betadine (Win-Medicare Pvt Ltd, New Delhi, India) and saline solution. Later the root was sectioned 3 mm from the anatomical apex. The root-end cavity was performed by using ultrasonic tips (KiS, Spartan Obtura, Fenton, MI, USA) (Fig- 4B), dried with sterile paper points (Inline, BM Dentale, Turin, Italy) and filled with Mineral trioxide aggregate (Regular setting powder, Bosworth, Skokie, IL, USA). Bone graft material (CopiOs Cancellous Particulate Xenografts, Zimmer Dental, USA) was placed into the bony defect using a plastic device (Fig-5). The flap was then repositioned and was sutured using 3-0 black silk suture material (Sutures India Pvt. Ltd, Karnataka, India). Immediate post-operative periapical radiograph was taken (Fig- 6A). Analgesics, antibiotics and 0.2% chlorhexidine mouthwash was prescribed to the patient for a week. Sutures were removed one week later when the surgical site had healed satisfactorily. The patient was found to be asymptomatic at the 6 months' & 1 year follow-up visits and the periapical radiographs revealed considerable bone development in the periapical area (Fig- 6B).

DISUSSION

The initial line of treatment for periapical lesions of endodontic origin is conventional or non-surgical root canal treatment, which has a high success rate. Endodontic treatment failure in spite of meticulous cleaning, shaping and disinfection can be caused by persistent microbes in the root canal system and/or periradicular area.^[10] In such situations, endodontic surgery appears to offer more success.^[11] After a surgical procedure, healing takes place either by repair or regeneration.^[12] The use of an appropriate bone graft can result in tissue regeneration as well as functional rehabilitation.^[13] The efficiency with which the surgical site is closed, ensuring blood flow to the surgical site, spatial relation, and stability are all critical characteristics for effective healing following any surgical treatment.^[14]

The present two case reports describes the presentation of symptomatic periapical radiolucency with persistent swelling in relation to the endodontically treated teeth. According to a study, apical surgery should be the treatment of choice in cases of primary endodontic treatment failure or retreatment. [15] The periapical tissue will be able to heal in a more favourable environment as a result of this treatment. [16] Jansson L et al found that endodontic surgery had a survival rate of 68 % in molars and 77 % in single-rooted teeth over a 10-year period.[17]

Bone formation can be expedited after periapical surgery by inserting a bone transplant into the bony defect.[6] Various types of bone grafts are available including autografts, allografts, xenografts and alloplasts. The optimal bone graft replacement material should be physiologically inert, non-carcinogenic, and structurally stable. It should also be easily degradable, matching the rate of formation of the new bone. [18] Bone graft material was employed in the above two cases, without the use of a membrane barrier, since there was sufficient marginal bone. A study about tissue healing based on radiographic changes discovered that the size of the lesion and the time it took to heal had a direct relationship. A lesion smaller than 5 mm will recover in around 6.4 months, a lesion 6 to 10 mm will heal in about 7.25 months and lesions greater than 10 mm will heal in about 11 months.[19]

As a result, the current two clinical cases was considered a success because no discomfort was recorded at the six-month and 1 year recall visits, the soft tissues showed no changes, and the teeth was in proper function with significant bone formation in the follow up radiographs.

CONCLUSION

Based on the literature and the two clinical cases presented, it can be concluded that endodontic therapy in combination with periapical surgery has a very good prognosis with the appropriate use of bone formation promoting materials.

CONFLICT OF INTEREST: Nil

SOURCE OF FUNDING: Nil

ETHICAL CLEARANCE: Not required for a case report manuscript. However written informed was obtained from both the patients to publish the outcome of the treatment results.

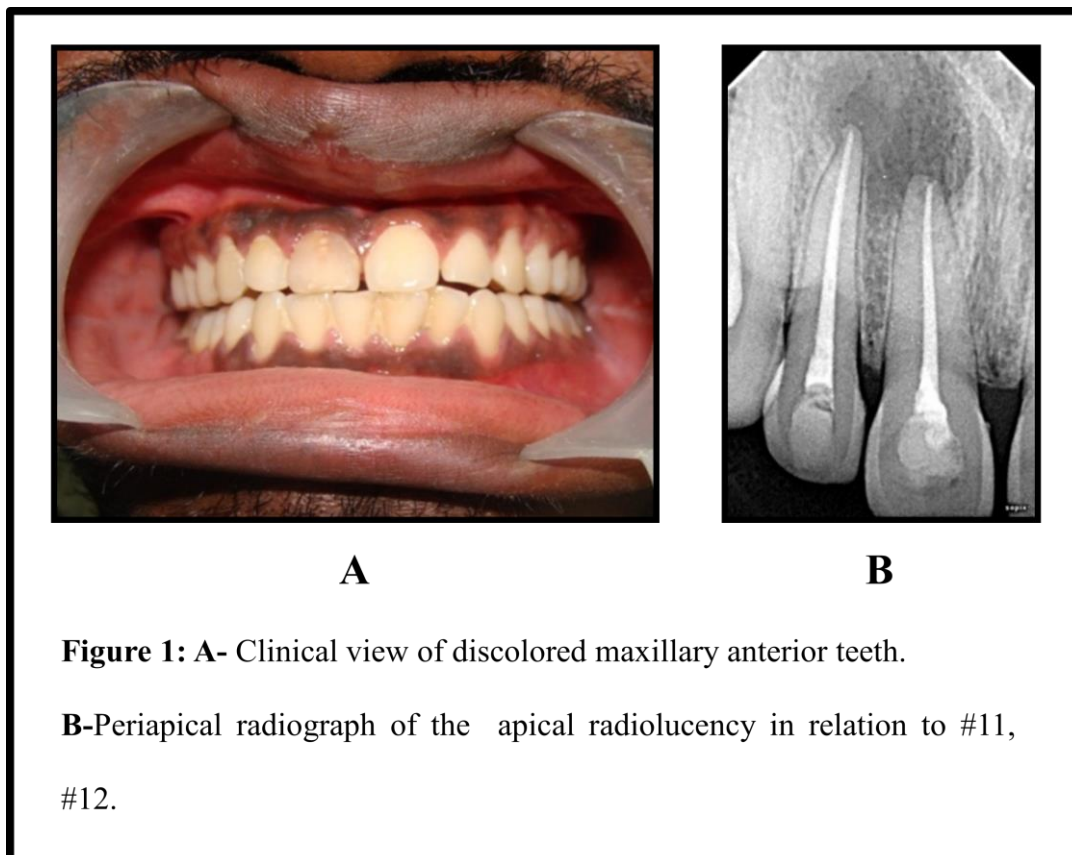
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FIGURES
CASE- 1



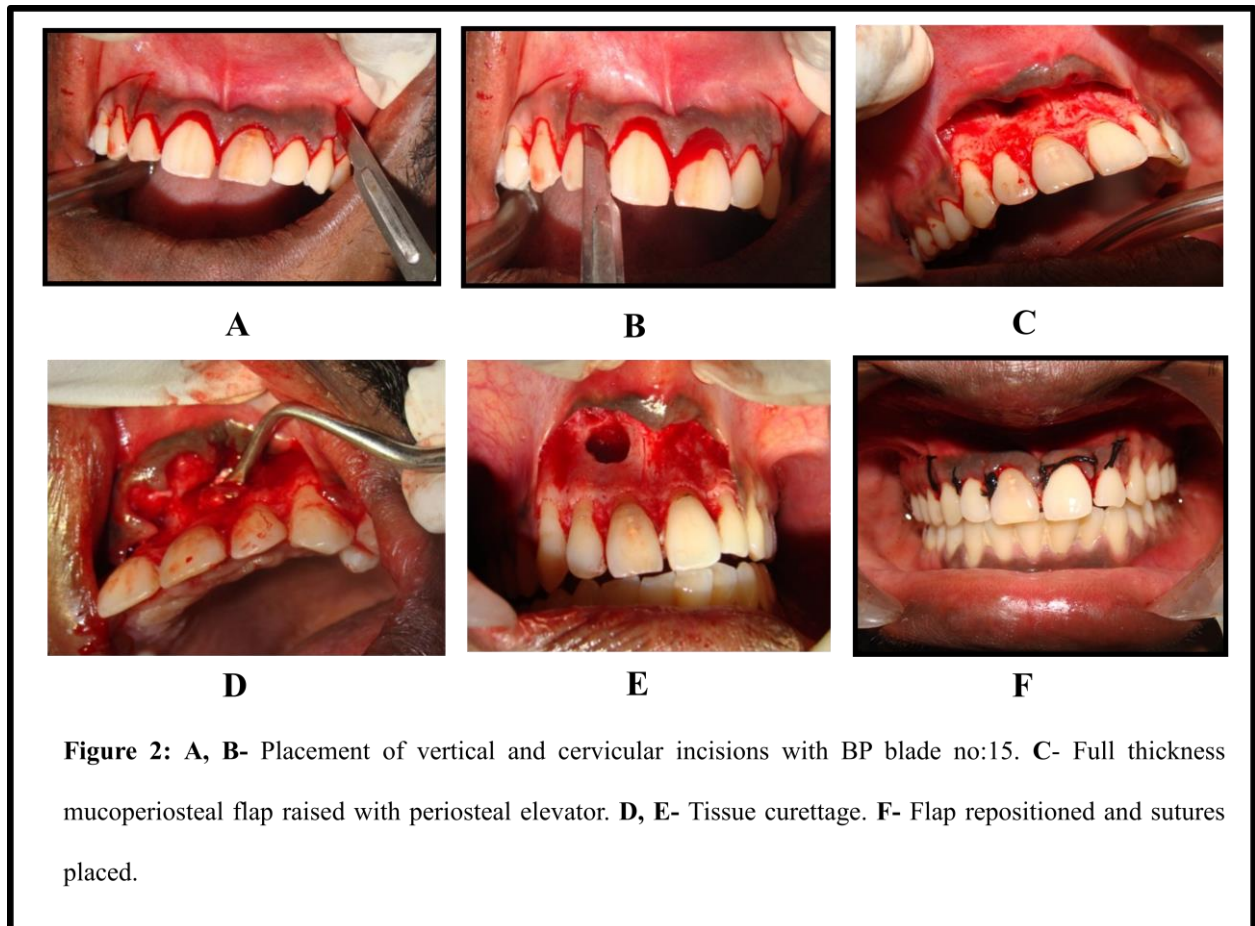
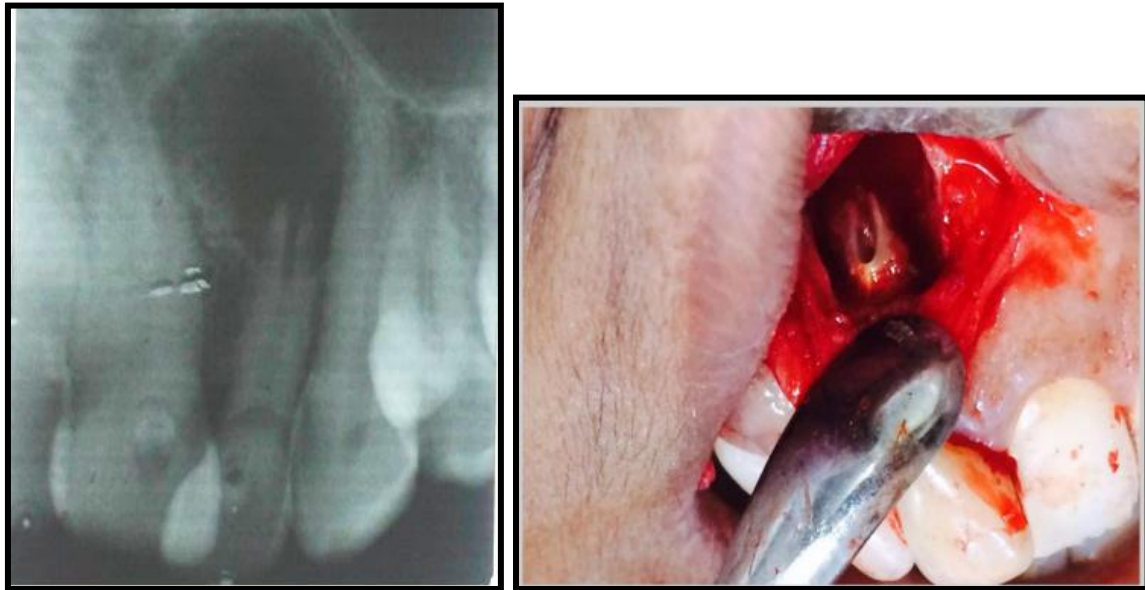
**CASE 2**

Figure 3: Six months follow-up radiograph showing periapical healing



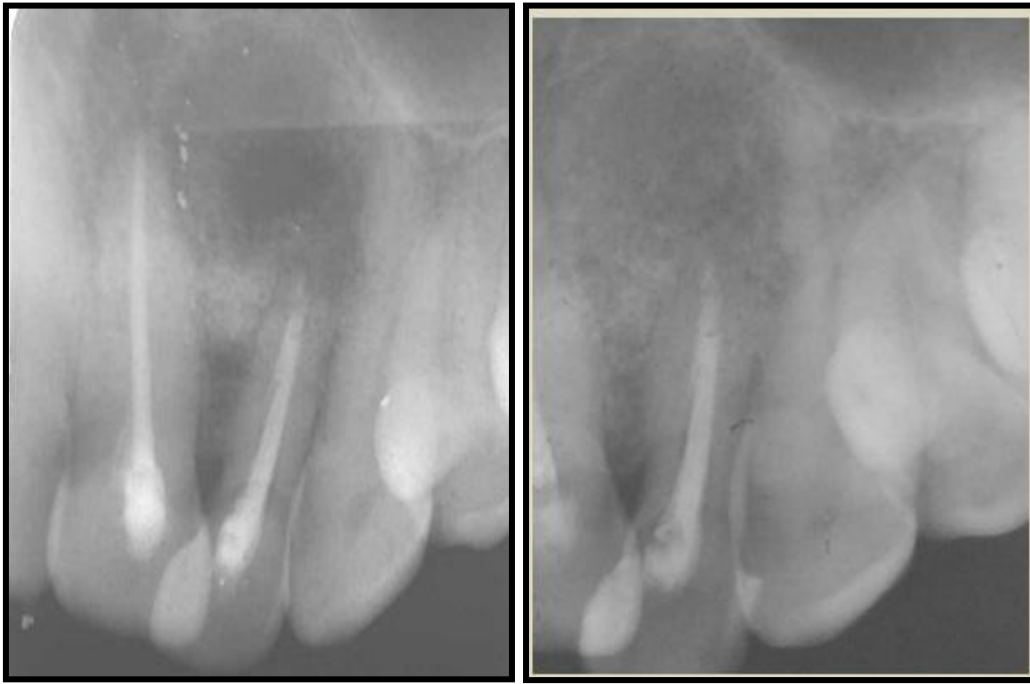
A

B

Figure 4 - (A) Pre-operative radiograph revealing presence of periapical pathology in 21 and 22 (B) Retro grade root end preparation in 22



Figure 5 - Placement of Bone graft material



A

B

**Figure 6 - (A) Immediate post operative periapical radiograph of 21 and 22;
(B) Follow up radiograph after 6 months**