

BIOCERAMIC - Boon For Endodontic Lesion: A Case Report

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Abstract: Injury to anterior teeth is a common event. It requires a treatment approach that assures the complete biologic healing and functional restoration of the tooth or teeth involved. A cystic lesion, which is unable to heal nonsurgically, heals well with surgical intervention and use of BIOCERAMIC as retrograde filling has been reported in literature. Another material with largely improved handling properties that it can be used for crown and root dentin repair treatment, repair of perforations or resorptions, apexification, and root end fillings. This article presents a case report of surgical management of a large cystic lesion using Bioceramic as retrograde filling material which has not been reported in literature so far. Six months radiographic follow-up exhibited completely healed cystic lesion.

Keywords: Apical surgery, apicoectomy, Bioceramic, periapical lesion

I. INTRODUCTION

Traumatic injuries to the anterior teeth are one of the common unanticipated events that cause pain, disfigurement, and psychological problems. Cyst-like apical periodontitis could be the fate of untreated traumatically injured teeth. Treatment options like periapical surgery have been proposed to manage such cases.

Surgical endodontics is a reliable method for the treatment of teeth with periapical lesions that do not respond to conventional root canal treatment. Successful outcomes have been reported in over 80% of cases. This high success rate may be due to modern surgical techniques, magnifying devices, microsurgery instruments, ultrasonic retreats, and improved root end filling materials.

The cause of apical periodontitis emerges from a pulpal inflammation that exceeds to a necrotic pulp which gives opportunity for bacteria from the oral environment to enter the pulp chamber and the root canal. This colonization inside the tooth results in a leakage of bacterial products, toxins, and/or

bacteria's through the apical foramen causing an inflammatory reaction in the periapical tissue.

The reaction due to the microbial attacks and host response events, results in an apical granulation tissue, that is, periradicular bone resorption and degradation of the apical periodontal ligament. Some of the apical granulomas turn into cysts. The reported incidence of periapical cyst formation varies from 6 to 54%.

Review of literature supports bioceramic due to its higher biocompatibility and sealing ability promotes better healing of the tissues when placed in contact with the dental pulp or periradicular tissues over the available root end filling materials.

This case report demonstrates successful surgical management of a large periapical lesion using Bioceramic as a retrograde filling material with 6 months evident follow-up.

II. CASE REPORT

A healthy 24-year-old male patient was reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of broken, discolored tooth and swelling in the previously traumatized mandibular anterior region. The patient gave a history of fall and broken tooth 2 years ago. Medical history was noncontributory and clinical examination revealed a soft, fluctuant, and nontender swelling in the anterior region with fractured and discolored mandibular left lateral incisor [Figure 1b]. CBCT examination revealed well-defined radiolucency involving the coronally fractured and discolored mandibular left lateral incisor.

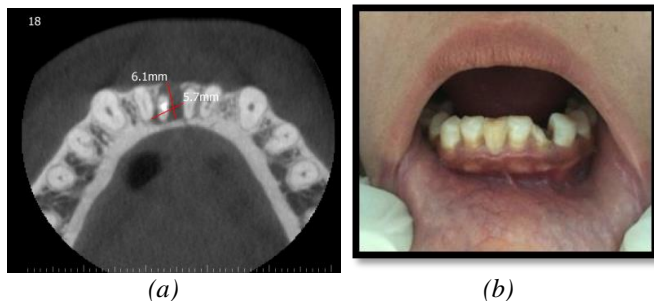


Figure 1: (a) Preoperative CBCT showing swelling and fractured central incisor. (b) Preoperative photograph

Both the teeth presented a negative response to pulp testing and endodontic treatment for both the incisors were scheduled. The endodontic treatment procedures were conducted under magnification (loops $\times 2.5$, Carl Zeiss, Germany). After teeth isolation the access cavities were prepared followed by shaping and cleaning and placement of intracanal medicament of calcium hydroxide (RC Cal, Prime Dental Products, India), which was renewed every 15 days for 1 month. Radiographic examination at 3 months proved no traits of healing and hence a periapical surgery was scheduled.

The teeth were then obturated using cold lateral condensation. Raising a double vertical trapezoidal flap, a periapical surgery was performed and periapical pathosis was enucleated. Mandibular right central and left lateral incisors were apically resected 3 mm from the apex and retrograde cavity was prepared using ultrasonic tip. Bioceramic was placed as retrograde restorative material of 3 mm thickness. The placement of the retrograde filling material was confirmed using a radiograph and the sutures were placed.

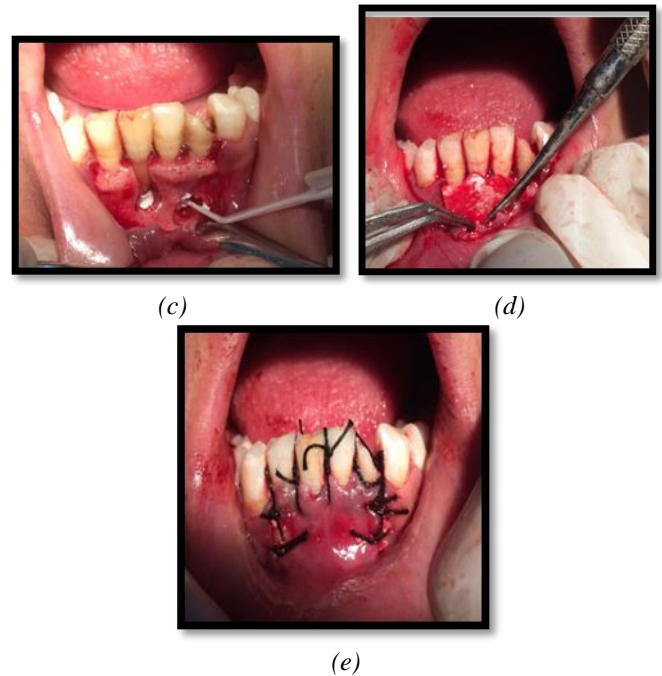
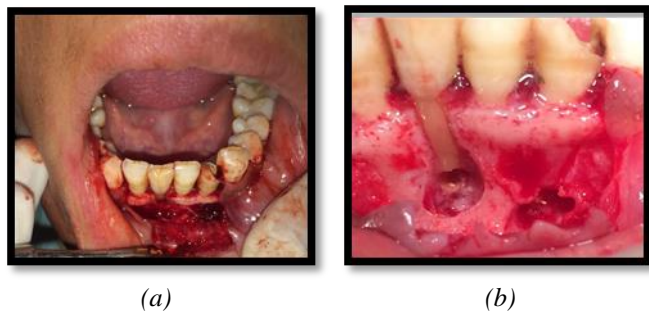


Figure 2: (a) Flap raised (b) window preparation of mandibular 31,31,41 (c) bioceramic placed as retrograde cavity (d) bonegraft and membrane placed (e) sutures placed

The patient was recalled after a week for suture removal. The patient was kept under symptomatic and radiographic observation for the purpose of postoperative evaluation of healing of the periapical intervention in intervals of 1, 3, 6 months. Periodic radiographic evaluation of the area of intervention showed progressive healing and 6 months follow-up X-ray showed complete bone formation and tooth was asymptomatic. The patient refused for an orthodontic treatment for correcting his misaligned teeth so the tooth was restored by an esthetic composite class IV restoration.

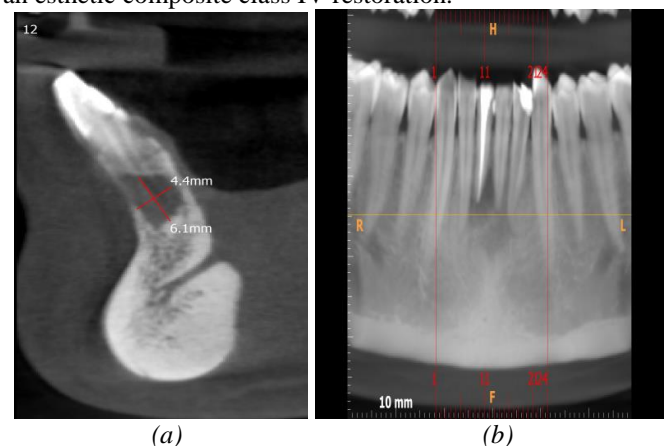


Figure 3: (a-d) Follow up X-rays at the interval of 3, 6 months showing progressive healing

III. DISCUSSION

The goal of a periradicular surgery is to gain access to the affected area, evaluate the root circumference and root canal anatomy, and place a biocompatible seal in the form of root end filling that stimulates the regeneration of periapical tissues. The principal modality available to manage failure of

conventional orthograde endodontic treatment for a large nonhealing periapical lesion is apical surgery with the success rate being 86-92%. Large cyst-like periapical lesions can drastically change the treatment to more complex procedures with nonsurgical approach being one of the options for managing such cases. However, it requires multiple visits for intracanal medicament placement before permanent filling of the root canal space. This may not be suitable for time constrained patients.

Various cements have been used as root end filling materials. The choice of a root end filling material could be governed by handling properties, biocompatibility, apical seal, and long-term clinical success. MTA has been investigated and used as a root end filling material since its introduction. Despite its good physical and biological properties and it being hydrophilic in nature; its use has always remained a challenge because of its technique sensitivity, prolonged setting time, and high cost. The search for an alternative material was with the aim to reduce cost and increase the feasibility for both professionals and patients.

Kokate and Pawar conducted a study that compared the microleakage of glass ionomer cement, MTA, and Biodentine, Bioceramic™ when used as a retrograde filling material and concluded that Bioceramic exhibited the least microleakage when compared to other materials used.

Research suggests that the high pH and released calcium ions are required for a material to stimulate mineralization in the process of hard tissue healing. Sulthan carried out a study to evaluate the pH and calcium ion release of MTA and Bioceramic when used as root end fillings. He concluded that Bioceramic presented alkaline pH and ability to release calcium ions similar to that of MTA. In another study by Han and Okiji that compared the uptake of calcium and silicon released from MTA and Bioceramic used as endodontic materials into root canal dentine concluded that the elemental uptake into dentine was more prominent for Bioceramic than for MTA.

Since the introduction of Bioceramic to be a material of choice as a retrograde filling material, so far there is very less literature other than manufacturers scientific file on its clinical use as a retrograde filling material, so it was proposed in this case to use Bioceramic as a retrograde filling material and clinically observe for at least a period of 6 months to authentically exhibit the results those can be relied upon.

IV. CONCLUSION

This case report has shown that routine endodontic therapy followed by surgical intervention with a placement of biocompatible retrograde filling material like Bioceramic for management of endodontic periapical lesions of chronicity would positively affect the treatment outcome

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