

## Periodontology

## KEYWORDS:

Radiographically -Irregular periapical radiolucency,

## SURGICAL MANAGEMENT OF AN IATROGENIC ENDODONTIC COMPLICATION WITH GUIDED TISSUE REGENERATION – A CASE REPORT.



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**Dr. Jeyashree Jeyachandran\***

Post Graduate Resident.D.Y.Patil School Of Dentistry Periodontology And Oral Implantology Navi Mumbai Maharashtra India 400706.\*Corresponding Author

**Dr. Nancy Modi**

Proffesor D.y.patil Univercity Of Periodontology And Oral Implantology Navi Mumbai Maharashtra India 400706

**Prof. Dr.Devanand Shetty**

Proffesor & HOD .D.Y.Patil Dental College And Hospitals Periodontics Navi Mumbai Maharashtra India 400706

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## ABSTRACT

The purpose of this article is to present a clinical case of iatrogenic complication of an endodontically treated tooth. Complications in relation to endodontic treatment are a common occurrence in dentistry. These may occur at any stage of endodontic management. The aim of this case report was to evaluate the influence of GTR on the outcome of surgical endodontic treatment. The authors have performed root-end resection. The root canal obturation was done and the iatrogenically displaced extruded gutta-percha point and lesion was fully enucleated. Guided tissue regeneration was done with an alloplastic material. The 21-year-old female patient was followed up at 2 weeks, 3 and 6 months presenting as a functional and symptomless tooth. Radiographic findings showed a clear and progressive refilling of the cavity with bone. All these factors highlight a positive prognosis after periradicular surgery, which is now considered a valid treatment for the tooth to remain functional.

## BACKGROUND

Endodontic failure or procedural accidents are those unfortunate occurrences that happen during treatment, some owing to inattention to detail, others totally unpredictable -Torabinajed 1990.<sup>[1]</sup>An apicoectomy was well defined in 1884 by J. Farrar as “a bold act, which removes the entire cause of disease and which will lead to a permanent cure may not be the best in the end, but the most humane.” According to Black,<sup>[2]</sup> the root-resection technique (amputation of the root apex) originated as a treatment for “pyorrhea alveolaris” complicated by a dental abscess in the late years of the 19th century as a valid alternative to a dental extraction. In 1922, the first experimental study of root-resection was done by Bauler on cats in Germany. Today, after previous endodontic failure, non-surgical revision of the root in cases of periapical infection, granuloma, or cyst is considered by many as the primary mode of case management. The decision to perform surgery is often open to deliberation and debate. Apical surgery is often the last hope to save an endodontically treated tooth with a periapical lesion.<sup>[6]</sup> According to a satisfactory obturation of the root canal, the filling material and the endodontic instruments should be limited to the root canal without extending to periapical tissues or other neighboring structures. Causes of failure include incomplete obturation, root perforation, external root resorption, coexistent periodontal-periradicular lesions, grossly overfilled or overextended canals, canals left unfilled, developing apical cysts, adjacent pulpless teeth, inadvertently removed silver points, broken instruments, unfilled accessory canals, constant trauma, and nasal floor perforation.<sup>[3]</sup>

Depending on the organism's immune system, the connective tissue tends to absorb the foreign body or more frequently surround it with a fibrous capsule.<sup>[4]</sup> The principal modalities available to manage endodontic treatment failures are orthograde retreatment and apical surgery.<sup>[5]</sup> Root canal failure following gutta-percha overfilling can be managed by nonsurgical method or periradicular surgery or both. The aim of the endodontic surgery is to remove the periradicular pathosis and restore the health and function of tooth periodontium. This case report describes the surgical management of a case of an endodontic failure with over extended displaced obturation material.

## CASE DESCRIPTION

A 22 year old female Patient reported to Department of Periodontology and Oral Implantology, D.Y. Patil school of dentistry, Nerul which was referred from department of conservative and endodontics department post 7 days of endodontic failure. Patient gave history of trauma on her face by a tennis ball a year ago and she noticed a pea-sized swelling in the upper front region of the jaw which was accompanied by pain after which it was treated endodontically. During the endodontic treatment procedure, a piece of customize mastercone broke at the apical end and extruded into the peri-radicular space. On oral examination - maxillary left central incisor fracture with slight discoloration was seen. The periodontal status was normal with probing depth < 3 mm. Tenderness on percussion was present on the tooth. (Fig:1) Radiographically -Irregular periapical radiolucency, Loss of lamina dura, widening of PDL Thinning of dentinal walls, apical resorption, horizontal bone loss and widening of pulp canal space. Wide open apex in central incisor seen. (Fig:2) CBCT showed a well-defined radio-opaque material measuring around 2mm extruded in periradicular space in left maxillary central incisor. As Orthograde approach was not possible, A surgical intervention was planned to remove the extruded obturation material in the periapical region ensuring complete disinfection

## TREATMENT

After clinical and radiographic diagnosis Re-endodontic treatment of 21 was done and apicoectomy was scheduled.

## PROCEDURE

Local anaesthesia was administered using a cartridge of 1.8 ml containing ( lignocaine 2% and adrenaline 1:80,000). Submarginal ochsenbein luebke flap design with two vertical incision connected by a scalloped sub marginal horizontal incision in the attached gingiva was given. (Fig 3) A labial full thickness mucoperiosteal trapezoidal flap was raised above the mucogingival junction<sup>[5]</sup> Already existing pathological cortical bone window was expanded and sufficient space was created & the granulation tissue at the surgically exposed site was removed by curettage with bone and curved periodontal curettes until healthy bone margins were encountered and the root tip was clearly visible. (fig 4) Apical root-

end resection was done with round diamond bur at high speed, with sterile water coolant, removing approximately 3 mm of the root apex.(fig 5) The root end cavity was then confirmed radiographically. Saline solution was used for irrigation during the entire surgical procedure and, at the end, the solution was aspirated and the root-end cavities dried with absorbent paper points. Retrograde obturation was completed placing layers of MTA with help of pluggers<sup>[17]</sup>

Periradicular bone defect was filled with filled with bone graft (Nova Bone) and covered with PerioCol membrane.(fig 6,7) The flaps were coronally positioned and sutured with Silk sutures. Plaque control was obtained by 0.2% chlorhexidine rinse, twice daily during the first two weeks. Patient was advised to mechanical cleaning of the operated area using an extra soft toothbrush by coronally directed "roll" technique. Sutures were removed two weeks after surgery. Clinical and radiological follow-up was performed at three and six months. Postoperative, periapical radiolucency was substantially reduced. Radiographical evaluation showed complete bone healing and tooth was asymptomatic, with healthy periodontal tissues and normal probing depths (fig 8). The patient was followed up at 2 weeks, 3 and 6 months presenting as a functional and symptomless tooth. Radiographic findings showed a clear and progressive refilling of the cavity with bone (Fig 9)

## DISCUSSION

The primary goal of dentistry should remain the preservation and/or regeneration of as many of the natural tooth components as possible, be it the tooth itself or its supporting structures. One of the highest achievements in combining endodontic and periodontal (surgical) procedures is to salvage a tooth on a long-term basis that has been defined as hopeless at the initiation of treatment<sup>[7]</sup>

Gutta-percha cones which had been extruded past the apices and subsequently examined under a scanning electron microscope, have demonstrated the presence of a "biofilm" on the cones<sup>[8]</sup> The consequences of overfilling of gutta-percha can result in infective periapical periodontitis caused by the transport of bacteria beyond the apex and an incomplete cleansing; foreign body reactions; and pain symptoms which are ascribable to irritative stimuli, even in the absence of radiological evidence<sup>[8]</sup>

Recent studies have shown that the treatment outcome of apical surgery has considerably improved, and the success rates have approached or exceeded 90% (von Arx, 2005a,b).[19]

This tendency of consistently high healing rates after apical surgery has been substantiated by several clinical studies published in the last 5 years (Lindeboom et al., 2005a,b; Tsesis et al., 2006; von Arx et al., 2007a,b,c; Kim et al., 2008; Saunders, 2008; Taschieri et al., 2008; Christiansen et al., 2009).[3]

Complete periapical wound healing after periapical surgery includes regeneration of alveolar bone, periodontal ligament, and cementum<sup>[9]</sup>

Pecora et al<sup>[11]</sup> evaluated the healing of periapical lesions of 10 mm and also showed clinical and radiographic evidence of complete bone regeneration when the membrane technique was used as a barrier.

Andreason and Rud<sup>[9]</sup> proposed that if the size of the osseous defect is too large, osseous regeneration of the wound will not occur and the defect will heal by fibrous connective tissue repair. The present study confirms that GTR may be beneficial for the treatment of large periapical lesion. Bone grafts can be used to achieve favorable healing and regeneration of the periapical defect area after degranulation<sup>[15]</sup>

Alloplast (Nova Bone) is a bioactive glass composed primarily of silica, calcium, sodium and phosphorous. It is an amorphous, crystalline and completely absorbable material. Its principle mode of action is by osteostimulation which stimulates and accelerates

new bone formation in an osseous defect. In addition the osteoconductive effect leads to new bone formation at the defect margin which penetrates to center of the graft. Adjunctive benefits include antimicrobial, anti-inflammatory and hemostatic effect. These are a result of alkaline nature of cations released by the graft which ensures rapid healing<sup>[16]</sup>

An ideal barrier material has to meet the following essential design criteria: it should be biocompatible, act as a barrier to exclude undesirable cell types from entering the secluded space adjacent to the root surface, allow tissue integration into the material without penetrating all the way through in order to prevent rapid epithelial down-growth on the outer surface of the material, provide stability to the overlying flap, capable of creating and maintaining a space adjacent to the root surface and comes in configurations that are easy to trim and to place<sup>[13]</sup>

Although non absorbable membranes have been used successfully in animal experiments and in clinical studies, they persist after healing and must be removed in a second operation<sup>[14]</sup> Bioabsorbable barrier materials for GTR have been introduced in order to avoid a second surgery for membrane removal and based on the results of the current study could be beneficial for endodontic surgery.



Fig 1: Pre operative picture

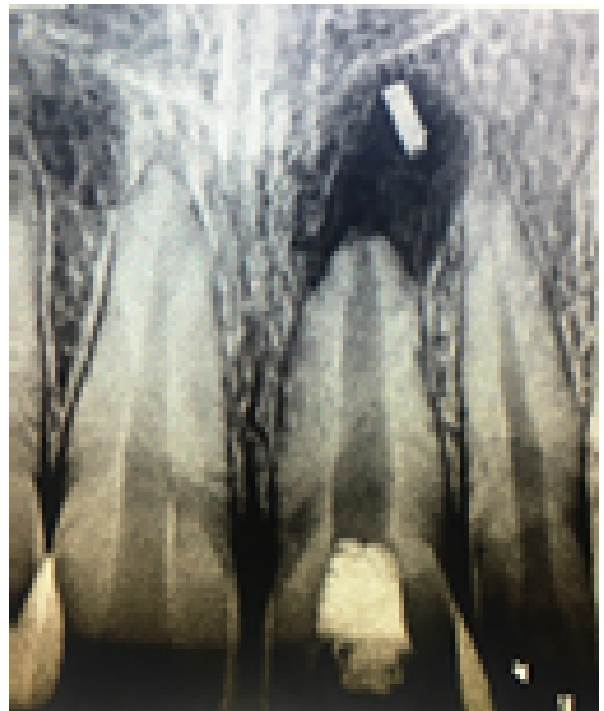


Fig :2 pre operative radiograph showing master cone broken at the apical end.



**Fig 3:**Partial loss of labial cortical plate, large periapical defect were observed due to abscess.



**Fig:4** Crown Root Ratio



**Fig 5:**root end filling



**Fig 6:**Biocompatible material – at surgical site



**Fig 7 :** Membrane placement



**FIG 8-**immediate Post op radiograph

#### CONCLUSION

The primary goal of dentistry should remain the preservation and/or regeneration of as many of the natural tooth components as possible, be it the tooth itself or its supporting structures. To make this possible, as in this case report the use appropriate surgical technique like apicoectomy, GTR ,retrograde filling materials like MTA with ideal characteristics was used to stimulate the healing of affected tissues. One of the highest achievements in combining endodontic and periodontal (surgical) procedures is to salvage a tooth on a long-term basis that has been defined as hopeless at the initiation of treatment. The use of the membrane technique in guided tissue regeneration and guided bone regeneration has become a standard of care in periodontology and implant dentistry. Recent case report has demonstrated that this technique can also be successfully applied in endodontic surgery for successful regeneration.

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#### Conflicts of interest

There are no conflicts of interest.



**Patient consent**

Obtained.

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