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**Case Report**

# ENDO-PERIO LESION ASSOCIATED WITH A CALCULUS LIKE DEPOSIT AT THE ROOT APEX OF A MAXILLARY CENTRAL INCISOR-A CASE REPORT

**Bhavana.V*, P.V.Durga Rao, Chaitanya Popuri and Nimeshika Ramachandruni**

Mallareddy Dental College for Women, Suraram, Hyderabad, Telangana

**A R T I C L E I N F O**

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**A B S T R A C T**

This case report describes about a calculus like deposit seen at the root apex of a maxillary right central incisor having apical periodontitis. A 22 year old male patient came for the treatment of his discolored upper right central incisor with sinus tract and pus drainage. Root canal treatment did not solve the problem, as there was persistence of sinus tract even after the treatment. Hence periradicular surgery was planned and dark-brown, calculus-like deposit was noted at the root apex of the tooth during the surgery, which was carefully removed, followed by root-end resection and root-end filling. Asix months follow upperiapical radiograph showed decrease in the periapical radiolucency and the patient is asymptomatic with complete healing of the labial mucosa of the tooth.



## INTRODUCTION

The inter-relationships among tooth structures influence each of them not only during health and function but also during disease. Colonization of bacteria in the root canal system is the main etiological factor for development and maintenance of apical periodontitis.[1] Hence elimination of microorganisms from the root canal system is a crucial step in resolution of apical periodontics, but due to the complexities in the root canal system such as isthmuses, ramifications, dentinal tubules and irregularities of the root canal walls, complete elimination of endodontic infection cannot be achieved always resulting in periapical and periodontal inflammation and therefore resulting in the treatment failures.[2]

Certain microorganisms survive outside the root canal and maintain the inflammatory disease in periapical tissues. This canhappen either by microbes adhering to the apical root surface, forming biofilm-like structuresor by their existing within the inflamed periapical tissues, usually as cohesive colonies, becoming independent of the root canal infection.[3,4] Some bacteria like Actinomyces species and Propionibacteriumpropionicum, have been reported to survive outside the root canal and strive in the maintenance of inflammation of periapical tissues.[5]

**Corresponding author:* **Bhavana.V**
Mallareddy Dental College for Women, Suraram, Hyderabad, Telangana

Supragingival and subgingival dental calculus occurrence has been noted in majority of the population across the world and endodontic failures due to presence of bacteria on the root surface of the teeth have also been reported in many studies.[6] However occurrence of calculus-like deposit on the external surface of the root tips of the teeth with apical periodontitis are very rare.

This case report is about the presence of calculus-like deposit on the external surface of the root tip of the tooth with apical periodontitis, having persistant sinus tract and periapical lesion post endodontic treatment.

### *Case History*

A 22 year old male patient came for the treatment of right maxillary central incisor because of discoloration of the tooth, since 3 years and sinus tract with pus discharge at the labial mucosa. He had a history of trauma during his childhood, around 12 years back, but he paid no attention to it. Clinical examination revealed sinus tract opening with pus discharge above the overlying mucosa of the maxillary central incisor and a pocket depth of 5mm is seen, the mobility was within the normal limits and no fracture line was found on the tooth surface and it was non- tender to percussion. A preoperative periapical radiograph revealed large periradicular radiolucency extending from the distal aspect of the right central incisor to the mesial radicular aspect of the left central incisor and bizarre and irregular radiopaque shadow on the mesial periradicular area of the tooth was noted [Figure 1]. Based on the above examinations, the diagnosis was suppurative apical periodontitis right maxillary central

incisor. First nonsurgical endodontic treatment of the central incisor wasdecided after discussion with the patient.

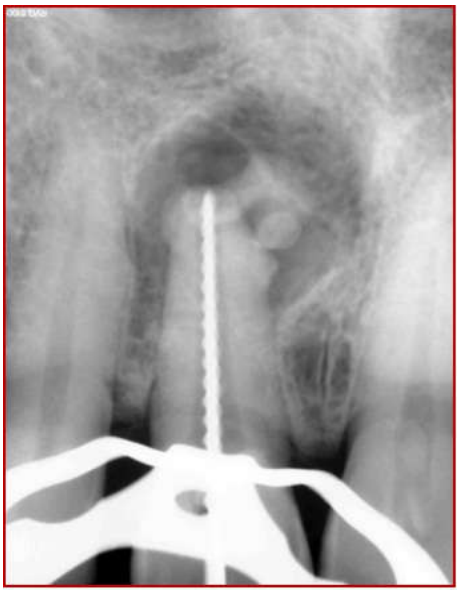
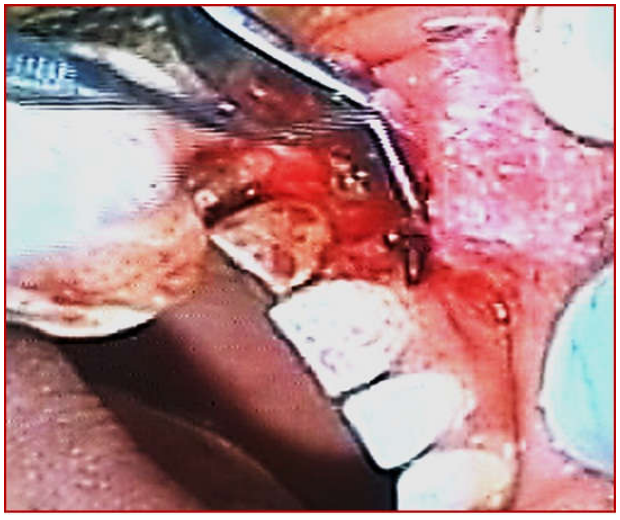


**Figure 1** Preoperative radiograph showing large periapical radiolucency with bizarre and irregular radiopaque shadow.

Access cavity preparation was done and working length was determined, the root canal was instrumented and copiously irrigated with 2% Chlorhexidine solution. The canal was then dressed with pure calcium hydroxide powder mixed with saline. After 14 days, the sinus tract with pus discharge still persisted. The patient was informed about the questionable prognosis and possible necessity of periradicular surgery. The root canal was filled by a lateral compaction technique with gutta-percha and AH Plus sealer (Dentsply DeTrey, Konstanz, Germany). Periradicular surgery was performed 2 weeksafter root canal filling of the maxillary central incisor.

Following a sulcular incision, a full-thickness flap was raised and the buccal fenestrated lesion was exposed. The marginal bone surrounding was intact, and there was no communication between the sulcus and periapical lesion. After removing the granulomatous tissue, a dense, dark-brown, calculus-like deposit was noted, and the deposit was firmly attached to the root surface of the maxillary right central incisors [Figure 2,3].



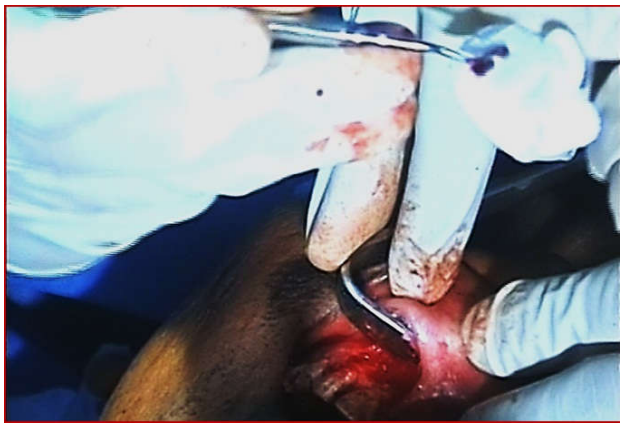


**Figure 2 and 3** Dark-brown calculus-like deposit found during the surgery.

The calculus-like deposit was removed and the root surface was planed. Root-end resection and root-end filling were performed and the surgical area was sutured. Two weeks after surgery, the sinus tract was not found, and the maxillary right central incisor was asymptomatic. At the six months recall, the periapical radiograph demonstrated a reduction in the size of the radiolucent shadow around the central incisor and there was no obvious apical resorption of the root was seen [Figure 4]. On clinical examination, the patient was asymptomatic, with complete healing of labial mucosa without a sinus tract or an abscess and probing depth of the central incisor was < 3 mm.

**Figure 4** Six months follow up radiograph, showing reduced size of the radiolucency.

## DISCUSSION

One of the possible etiological factors for root canal failure may be extra radicular infection, and also the persistence of bacteria in the root canal system.[4] Many scanning electronmicroscopic studies of apices of teeth with necrotic pulps with periapical lesions have shown the presence of bacterial plaque on the external root surface, in lacunae of the cementum or in areas of resorption.[7] Refractory apical periodontitis may be related to the presence of these extra radicular bacterial biofilms. Solid substratum of intimately associated microorganisms, in an exopolymer matrix form

biofilms, which are unaffected by environmental factors, such as host defense mechanisms, antiseptics, antibiotics or endodontic disinfection procedures, hence causing dental caries, dental plaque and periodontal diseases.[8,9] Mineralization of dental biofilms, composed primarily of calcium phosphate mineral salts deposited between and within remnants of formerly viable microorganisms results in the formation of calculus.[6]

There are very rare case reports describing endodontic failure caused by calculus deposition at the surface of the root apex. In this case report calculus like deposit was found at the apical surface of the root during the endodontic surgery, which was carefully removed during the surgery, as this extra radicular infection was thought to be the main etiologic factor for persistence of the sinus tract with pus discharge even after the orthograde root canal treatment. A similar case was reported by Cheng-Mei Yang et al 2010,[5] in which refractory apical periodontitis associated with a calculus-like deposit was found at the root apex of maxillary central and lateral incisors, that healed after removal of the calculus like deposit through endodontic surgery, which is in correlation with the present study. Some microorganisms such as, Streptococcus mutans, Actinomyces and Candida albicans, were observed to be associated with mineralizationin various states of intra or extracellular calcification. Aging or colonized bio-environment along with the presence of calcium phosphate is essential for bacterial mineralization. Moreover, microbial composition of the plaque, interactions among microorganisms and the complicated environment are the reasons behind formation of dental calculus.[10]In this case report, formation of calculus-like deposits at the root apex may be due to the extraradicular biofilm together with periradicular tissue fluid or continuing ingress of oral fluids via the sinus tract, which maintained the periapical inflammation, constituted an attachment base for further extraradicular biofilm formation and caused failure of the root canal treatment. Complete elimination of the calcified deposit with the aid of microscopy and radiography during endodontic surgery, along with good follow up is essential for a better prognosis in such cases.

## CONCLUSION

In this case report, calculus-like deposit was found on the root apical surface of maxillary right central incisor. This may be due to the continuing ingress of oral fluids via the sinus tract, allowed the formation and the maintenance of this deposit. The calculus-like material possibly constituted an attachment base for an extraradicular biofilm. This biofilm maintained the periapical inflammation, and prevented periapical healing, despite adequate orthograde root canal treatment. During the endodontic surgery, the clinician should carefully examine and remove mineralized deposits on the surface of the root apex, for better periapical healing.

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