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APICECTOMY AND RETROGRADE FILLING AS SURGICAL MANAGEMENT OF AN EXTRA-ORAL MANDIBULAR CUTANEOUSLY PUS DRAINING SINUS TRACT : A CASE REPORT

Dental Science

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ABSTRACT

Apical surgery is a safe alternative when teeth are not responding to conventional endodontic treatment and re-treatment. The main goal of apical surgery is to prevent bacterial leakage from the root canal system into the periradicular tissues by placing a root-end filling following root-end resection. The aim of this paper is to present a case involving the surgical managemenet of a cutaneous sinus tract indicated due to failure in conventional endodontic treatment. A cutaneous sinus tract of dental origin is a canal that drains the infection from a dental source to the neck or face. A misdiagnosis could lead to an ineffective or inappropriate treatment.

KEYWORDS

Cutaneous, draining sinus, endodontic therapy, apicectomy, retrograde filling

INTRODUCTION

Traditional endodontic treatment aims to eliminate bacteria from root canal system and establish effective barriers against root recontamination.[1] To achieve success, cleaning, shaping and filling of the entire root canal system are considered essential steps in endodontic therapy. Failure factors in root canal conventional treatment are frequently related to presence of residual bacteria (persistent infection) or reinfection in a previously disinfected canal (secondary infection).[2] Endodontic treatment failures can be related to: extraradicular infections such as periapical actinomycosis[3]; to foreign body reactions that can be caused by endodontic material extrusion[4]; to endogenous cholesterol crystal accumulation in apical tissues;[5] and unresolved cystic lesion.[6]

A cutaneous sinus tract of dental origin is relatively uncommon and, therefore, may be misdiagnosed by some non dental health professionals. Specific dental symptoms may not be readily apparent, so patients may first visit a physician for evaluation and treatment. When sinus tracts form, they are most commonly found on the chin or submandibular area.[7] A review of several reported cases revealed that patients may undergo multiple biopsies and surgical excisions, radiotherapy, and multiple regimens of antibiotic therapy, all of which fail due to recurrence of the cutaneous sinus tract because the primary dental etiology was never correctly diagnosed or addressed.[8,9,10,11,12]

Periapical surgery comprehends a set of procedures recommended in periapical diseases treatment, when traditional endodontic therapy does not obtain favorable outcomes. Periapical surgery indications are: root canal obliteration impeding endodontic instrumentation access to apical region; endodontic material apical extrusion impeding radiolucent lesions repair and/or causing clinical symptoms; unsuccessful endodontic treatment and retreatment impossibility due to prothesis; root perforation impeding root canal hermetic sealing. The surgery goal is periapical lesion removal and the apical third sealing, allowing soft and hard tissue regeneration.[13,14]

The present case report discusses an extraoral sinus tract, which was cutaneous in nature, whose correct diagnosis led to its treatment by surgical endodontic therapy due to conventional endodontic treatment failure.

CASE REPORT

A 28 years old female patient reported to the Department of Conservative Dentistry and Endodontics, Himachal Dental College, Sundernagar, Himachal Pradesh, India, with the chief complaint of a swelling in the chin region with repeated episodes of bleeding from it. The medical history was non-contributory. Dental history revealed a history of trauma approximately 10 years ago. The patient gave a history of recurrence and repeated episodes of bleeding and pus discharge, for which she was treated by a general physician. The general physician performed incision and drainage twice, once at the age of 22 years and other at the age of 25 years. Since there was a recurrence of the lesion again and again, she was referred to our dental institute for our opinion.

Extraoral clinical examination revealed an erythematous symmetrical nodule approximately 1.5 cm in diameter slightly on the right side of the chin (Figure 1). The nodule was soft and palpation elicited a bloody and purulent discharge from it. Intraorally, tooth # 41 was discolored and was not tender on percussion No vestibular swelling was present. The tooth did not respond to heat (using temporary stoppings of gutta-percha) and electric pulp testing. The remaining mandibular anterior teeth were firm with no detectable mobility and did not reveal any periodontal defects on probing. They responded within normal limits after performing electric pulp testing and heat test.

Figure 1. Clinical examination revealed an erythematous symmetrical nodule approximately 1.5 cm in diameter slightly on the right side of the chin.

A periapical radiograph showed a diffuse 2 cm by 2 cm radiolucency surrounding tooth # 41 (Figure 2). Thus, a diagnosis of pulpal necrosis with chronic suppurative periradicular periodontitis with cutaneous drainage was made for teeth # 41. Initially, conventional endodontic therapy was carried out, but due to its failure to heal the draining sinus tract, an apical surgery (apicoectomy) was planned.

Figure 2. A periapical radiograph showed a diffuse 2 cm by 2 cm radiolucency surrounding tooth # 41.

Firstly, treatment consisted of a cutaneous drainage with nonsurgical endodontic treatment. Treatment was explained to the patient and an informed consent was signed. An endodontic therapy was initiated where isolation was achieved using rubber dam and saliva ejector placed in position. Access opening was done and working length was determined with the help of apex locator (Apex ID, Sybron Endo). A glide path was prepared till no. 15 K files (Dentsply Maillefer, Switzerland). The canal was cleaned and shaped. Normal saline was used for irrigation which resulted in the irrigant squirting out of the extra oral lesion, which confirmed that the lesion was a sinus tract with an odontogenic origin from the mandibular central incisor. As the saline was coming out through the extraoral lesion, chlorhexidine was preferred as an irrigant during the instrumentation procedure and not sodium hypochlorite, due to the risk of the apical extrusion of the irrigant. After an enlargement upto size 30 K-file, the canal was irrigated with saline followed by chlorhexidine as a final irrigant. Chlorhexidine was left in the canal for 10 min to ensure complete disinfection. The canal was dried and the obturation was done with gutta-percha points (Dentsply Maillefer, Switzerland) using AH plus (Dentsply Maillefer, Switzerland) sealer following cold lateral compaction technique. The opening access was restored with a composite resin. Since, the cutaneous lesion didn't heal even after a month using conservative approach, an apical surgery was planned where anesthesia was administered using 2% lidocaine with epinephrine 1:80000. After raising the mucoperiosteal flap, the cortical bone over the root end was removed and the root end was located. The periapical pathological tissue (measuring nearly 1.5 x 1.5 cm) was curetted out (Figure 3) to enhance access and visibility of the surgical field (Figure 4).

Figure 3. The periapical pathological tissue (measuring nearly 1.5 x 1.5 cm) curetted out.

Figure 4. Enhanced access and visibility of the surgical field after the excision of the periapical lesion and root resected with retrograde filling (MTA, Dentsply), in place.

Apical curettage was performed using lucas curette size #85 and #86 (Hu-Friedy, Rio de Janeiro, Brazil). Then 3 mm of root from the root tip was resected to remove the apical delta using a plain fissure bur in a low-speed handpiece. Following apical resection, any residual pathological tissue, in particular on the lingual aspect of the root, was removed. After the careful check of the resection plane, a retrocavity with a depth of 3mm was prepared into the root-end using a small round bur or an inverted cone bur in an angled micro-handpiece. The retrograde cavity was filled using mineral trioxide aggregate (MTA, Dentsply), which was prepared following the manufacturer's instructions (Figure 4). The flap was repositioned and slight compression with gauze was done to bring the periosteal tissue in contact with the bone. Suturing was made with silk thread 4-0 (Ethicon Johnson, Sao Paulo, Brazil) (Figure 5). An immediate post operative radiograph was taken to confirm the retrograde filling in place (Figure 6). Extraorally, the sinus tract lining was removed surgically (Figure 7) and extraoral embedded sutures (catgut) were placed followed by silk (3-0) sutures (Figure 8). Postoperative antibiotics and analgesics were prescribed to the patient. For oral hygiene, 0.2% chlorhexidine solution was prescribed twice a day. Patient was recalled after one week for suture removal and follow up.

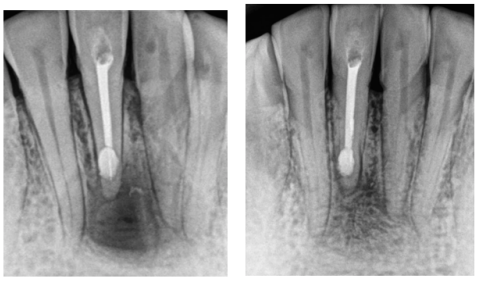
Figure 5. After suturing with silk thread 4-0.

Figure 6. An immediate post operative radiograph to confirm the retrograde filling in place.

Figure 7. Extraoral, surgical removal of the the sinus tract lining.

Figure 8. Extraoral, silk (3-0) sutures placed after the surgical removal of sinus tract lining.

Post operative follow up radiographs were taken after three months and six months. In this case, the reduction in the size of radiolucency was evident radiographically in three months and marked reduction was seen 6 months afterwards; a radiopaque area can be seen where the lesion used to be, suggesting the formation of new healthy bone (Figure 9). The patient was found to be completely asymptomatic, with no recurrence of the previous swelling hence proving the success of the surgery due to healing and lack of fistula.



A B

Figure 9. Evident reduction in the size of radiolucency radiographically in three months (A) and marked reduction seen radiographically 6 months (B) afterwards, a radiopaque area can be seen where the lesion used to be, suggesting the formation of new healthy bone.

DISCUSSION

The cutaneous sinus tract of dental origin is an uncommon but well-documented condition in the medical, dental and dermatological literature.[15] However, these lesions continue to be a diagnostic dilemma. The evaluation of a cutaneous sinus tract must begin with a thorough patient history and awareness that any cutaneous lesion of the face and neck could be of dental origin. Cutaneous sinus tracts typically present as fixed, nontender, erythematous, nodulocystic lesions on the skin of the lower face. The patient is usually unable to recall an acute or painful onset and the lesion is seldom accompanied by symptoms in the oral cavity.[2]Once, the infection from the offending tooth has perforated the periosteum, the tooth may become asymptomatic. The majority of dental sinus tracts develop intraorally. When an extraoral dental sinus tract occurs, it most often develops in close proximity to the offending tooth.[16] Because of radicular pathology, infection may spread through the marrow space, perforate the cortical bone, spread in the soft tissue between the fascial spaces, and finally perforate a mucosal or cutaneous surface.[17,18] The major factors influencing the spread of oral cutaneous sinus tracts are bacterial virulence, body resistance of the patient, and position of the apical foramen of the affected tooth relative to muscle attachments.[19] In the present case, examinations were performed by several physicians and repeatedly misdiagnosed, putting the patient through needless rounds of antibiotic therapy. These patients are usually healthy. The sinus tract prevents swelling or pain from pressure build-up because it provides drainage of the odontogenic primary site.[4]Thus, the draining sinus tract maintains a localized condition and prevents systemic involvement.

Endodontic surgery is a surgical procedure which consists of excision of pathological periapical tissue from root surface (including apical accessory canals), and, lastly, canal or canals sealing against pathologic agents, thus reaching the goal of creating the best conditions to the tissue health, regeneration and creation of new tooth structural support. Among the most adopted surgical methods to solve difficulties, accidents and complications of conventional endodontic treatment, are: curettage with apical planing, apicoectomy, apicoectomy with retrofilling, apicoectomy with retroinstrumentation and canal retrofilling and filling simultaneous to surgery.[20]

Apicoectomy is the standard surgical procedure, thanks to several factors such as lesion location and the need to fully eliminate it, as well as the presence of cores or posts. This procedure allows minimal apical resection and enables the placement of material for retrograde sealing, which allows better waterproofing of the canal.[21] Apical surgery has 75-90% success rate and is evaluated through clinical exploration and radiographic controls after nearly half a year.[22] Yu et al[23] presented cases where the healing process can last 10 years or more after treatment. However, the present case shows healing of the affected zone within 6 months, which was confirmed radiographically.

The choice of MTA for apical sealing after surgery completion is convenient due to the physico-chemical and biological characteristics of the material. MTA showed the best performance in terms of waterproofing, biocompatibility, and stimulation of the development of new bone trabeculae, in addition to excellent marginal sealing and low cytotoxicity.[24] In the present case, the MTA used for retrograde filling proved to be effective in terms of stimulation of new healthy bone and the cement adjacent to the affected area.

Leonardi et al.[25] stated that several factors can influence apicoectomy success, such as: the root region where the apicoectomy is done; the drill type employed or laser execution, as well as the cut angle. It is important to obtain the cut surface as regular as it can. The apical cut must involve anatomical variations such as the presence of isthmuses and accessory canals, because they act as a reservoir for bacteria and necrotic pulp tissue, which can lead to treatment failure. The apical cut performed at 3 mm leads to the reduction of the lateral canal in 93%, without the need of largest resections, such as 4 mm. To pathological tissue removal, lucas curettes size #85 and #86 were employed. Periapical curettage aims to remove pathological tissue in a lesion at the apical level of a tooth or foreign bodies at periapical region.This must be followed by apical planing. This is necessary, because the cement covering the root apical portion is reabsorbed due to periapical lesion.[26]

After six months there was absence of fistula and there was periapical bone repair, that confirms a successful procedure. Also, the long-term prognosis depends on the quality of the performed surgery, the recontouring of the remaining tooth structure as well as the status of periodontal care. Good post- operative oral hygiene is important, especially in the area of root resection.[27] The quality of the root canal treatment and the final restoration should be considered too.

CONCLUSION

Correct diagnosis is the key to treat draining sinus tracts. Successful management of odontogenic extraoral sinus tracts with pulpal pathology depends on removal of the etiological factors by proper bio and chemomechanical preparation and three-dimensional obturation. Surgical management proves to be an adjunct for speedy management of such cases. Root canal treatment and endodontic surgery should be used judiciously for effectively eliminating the pathogens thus providing healing and repair mechanisms a chance to achieve the desired results.

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