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CASE STUDY

NON-SURGICAL HEALING OF A CUTANEOUS FACIAL SINUS TRACT OF DENTAL ORIGIN: A CASE REPORT

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ABSTRACT

Extra oral sinus of dental origin can occur when the purulent by-products of pulpal necrosis spread along the path of least resistance from the root apex of the tooth to the skin on the face. Patients that present with a cutaneous sinus have usually visited a general physician or dermatologist first, as the lesion can often mimic a dermatologic pathology. The presentation and symptoms may cause confusion, and at times leading to unnecessary surgical interventions. Hence, diagnosis of an extraoral draining sinus of odontogenic origin and referal to a dental surgeon is very important for treatment of this condition.

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INTRODUCTION

A cutaneous sinus tract of dental origin is relatively uncommon and may be misdiagnosed easily. As specific dental symptoms are usually absent in such cases, patients typically first visit a physician for evaluation and treatment. These sinus tracts are most commonly found on the chin or in the submandibular area. However, all chronic draining sinus tracts of the face or neck should signal the need for thorough dental evaluation (Johnson, 1999). Review of the literature reveals that these patients sometimes undergo multiple surgical excisions and biopsies before it is recognized that the origin of the sinus tract is the extension of pulpal disease into the periradicular area. Systemic antibiotic therapy can be tried an option, but it has limited action, which may result in only temporary cessation or diminution of the drainage. This may result in reoccurrence of the lesion after conclusion of the antibiotic therapy because the cause still persists (McWalter, 1988; Cioffi, 1986; Braun, 1981; Scott, 1980; Lewsin Epste, 1978). Recognition of a sinus tract is the first step in diagnosis (McWalter *et al*., 1988). Intra-oral periapical radiographs should be taken routinely, preferably with a gutta-percha core threaded into the sinus tract (McWalter *et al*., 1988).

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The radiopaque gutta-percha, helps to reveal the source of the infection. Any chronic suppurative lesion on the middle or lower portion of the face should be investigated for possible dental cause (McWalter *et al*., 1988). The presence of the sinus tract precludes swelling or pain, from pressure build-ups, since it provides continued drainage of the periradicular lesion (McWalter *et al*., 1988). Differential diagnosis of a cutaneous draining sinus tract may include suppurative apical periodontitis, osteomyelitis, congenital fistula, salivary gland fistula and infected cyst and deep mycotic infection. In addition, skin lesions such as pustules, furuncles, foreign-body lesions, squamous cell carcinoma and granulomatous disorders may all be similar superficially in appearance to a draining sinus tract of dental origin, but they are not true sinus tracts (Spear, 1983; Wood, 1991; Laskin, 1964). This paper presents a case of cutaneous sinus tract of dental origin that underwent complete resolution following orthograde non-surgical endodontic therapy alone.

Case History

A 23-year old healthy male was reported to the Department of Conservative dentistry and Endodontics, with a chief complaint of pain and mobility of the lower anterior teeth along with the presence of a boil just above the chin. The patient reported history of pain in the region approximately 2 months back that gradually increased along with increasing mobility.

The pain was spontaneous and lasted for 1-2 hours and relieved by analgesic medication. The patient recently noticed the presence of a boil near the chin that discharged pus like material. The patient also reported history of root canal therapy of the lower central incisors 1 year back.

Analgesic and anti-inflammatory medication was prescribed for the patient and the patient was recalled after one week. At the second visit one week later, the sinus tract was no longer draining and the patient was asymptomatic.

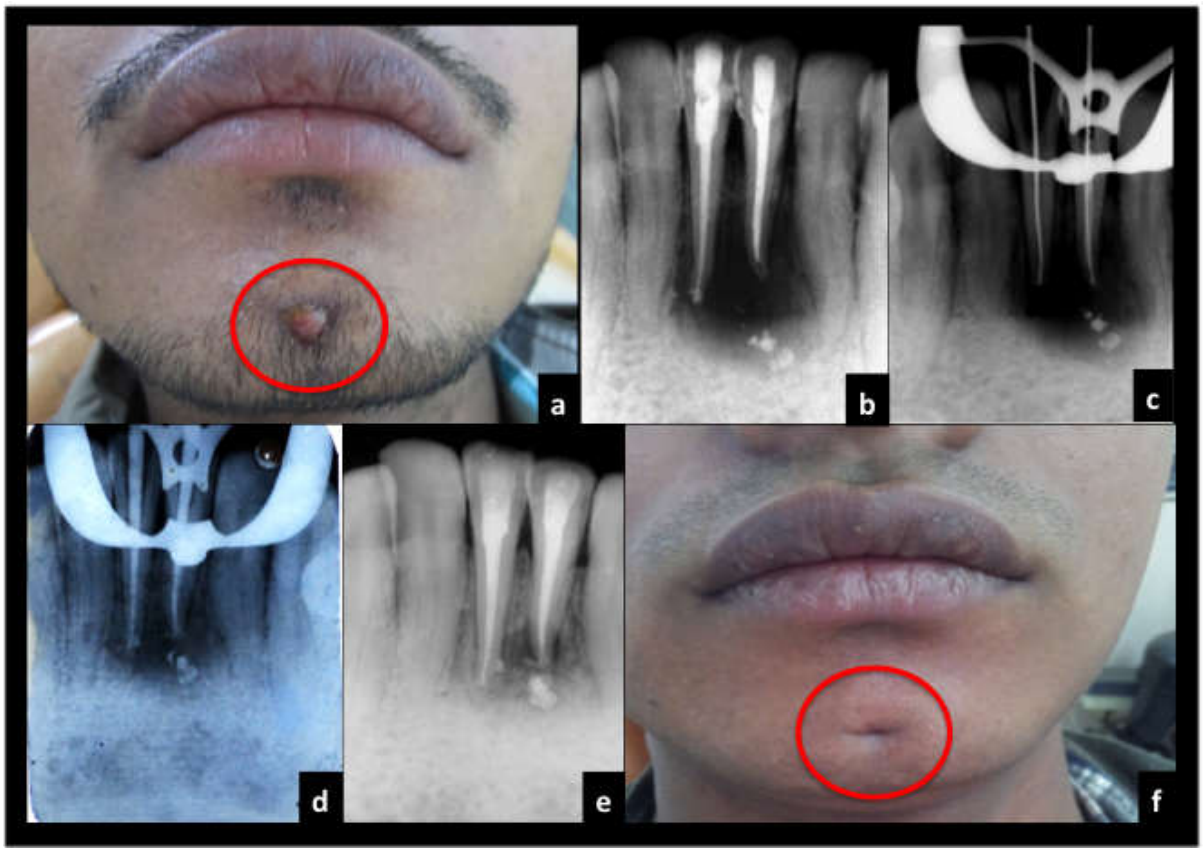

Figure 1 a. Extra oral draining sinus (red circle), b. Pre operative radiograph showing obturated teeth and a large periapical lesion, c. Working length determination, d. Master cone radiograph taken at 3 weeks, e. 8 week post obturation radiograph showing marked reduction in the size of the lesion and bone formation, f. Clinical picture of completely healed extra oral sinus (red circle)

Extraoral examination of the head and neck area presented no abnormalities, except for an area approximately 0.3 cm in diameter at the chin region of his face. (Figure 1a) On intraoral examination the lower central incisors exhibited grade 1 mobility and were tender on percussion. The surrounding teeth had normal response to all tests. Radiographically, large periapical radiolucency was seen with relation to the lower central incisors. (Figure 1b) The necrotic remnants of the pulp of the involved teeth, secondary infection as a result of a missed canal could have led to the periradicular abcess. Hence a diagnosis of Persistent periapical abcess with extra oral draining sinus was made and non-surgical endodontic retreatment was planned for the two involved central incisor teeth, #31 and #41.The teeth were isolated under rubber dam and standard access cavity was prepared for the 2 involved teeth. An attempt was made to locate a second canal, to rule out the chance of missed canal, but none was found in either tooth. The root fillings were removed by Protaper Universal Retreatment files (D1, D2, D3; Dentsply, Tulsa, OK) using RC Solve (Prime Dental Products Pvt. ltd, Mumbai, India) as a gutta-percha softener. The root canals were then cleaned and shaped thoroughly using Protaper Universal rotary files (Dentsply Maillefer, Ballaigues, Switzerland)), till F2 with copius irrigation using 5.25% sodium hypochlorite. Calcium hydroxide paste dressing (mixture of calcium hydroxide powder and normal saline) was placed in canals of both the teeth.

In this visit the canals were irrigated with 2.5ml of 0.2% Chlorhexidine gluconate, and a new calcium hydroxide paste was placed in the canals. The patient was recalled after 2 weeks. After 2 weeks the calcium hydroxide dressing was removed, the canals were irrigated with 5.25% sodium hypochlorite and saline, followed by a final rinse of 0.2% chlrohexidine gluconate. The canals were then dried with sterile paper points. As there was no discharge of blood or pus from the canals, the canals were obturated with gutta-percha and AH plus root canal sealer (Dentsply Detrey, Konstanz, Germany) using warm lateral condensation technique. (Figure 1c and d) Eight-month follow up X-ray revealed a completely healed periapical region and clinically evidence of healed sinus opening. (Figure 1e and f).

DISCUSSION

The cutaneous sinus tract of dental origin is uncommon but well documented condition in the medical, dental, and dermatological literature (Laskin, 1964). 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. Approximately 80% of the reported cases are associated with mandibular teeth and 20% with maxillary teeth (Mittal, 2004). Most commonly involved regions are the chin and submental (Cioffi *et al*., 1986).

The uncommon locations are cheek, canine space, nasolabial fold, nostrils and inner canthus of eye (Cioffi *et al*., 1986). The characteristic lesion is erythematous, smooth, symmetrical nodule, 1-20 mm in diameter (Mittal, 2004). There is periodic drainage and crusting in some cases and the lesion is depressed below the normal skin surface. A cord - like tract can be felt attached to the underlying bone (Mittal, 2004). Histopathologically the lesion is a chronic abscess and tract is characterized as fragments of granulation tissue focally lined by stratified squamous epithelium. The pattern of breakdown and repair of periradicular lesions was demonstrated by Fish in 1939.He described 4 reactive zones to the bacteria, which are zone of infection, contamination, irritation and zone of stimulation. The egress of microorganisms into periradicular region causes tissue destruction in the central zone of infection. As the toxicity of irritants is reduced in central infection zone, the numbers of reparative cells increase in periphery. Removal of irritants, proper debridement and obturation permits reparative zone move inward. The healing of periradicular tissues after root canal treatment is often associated with formation and organization of a fibrin clot, granulation tissue formation, maturation, subsidence of inflammation and finally restoration of normal architecture of periodontal ligament. Hence treatment must be focused on elimination of the source of the infection (John, 2002). Successful treatment depends on accurate diagnosis, definitive treatment i.e. removal of etiological factors and drugs.

Tentative diagnosis is based on history and clinical examination, which is further augmented by investigations comprising of intra oral periapical radiographs and pulp vitality tests. Once the diagnosis is made, treatment must be focused on elimination of the source of the infection, for which treatment protocol included culture and sensitivity. Thorough disinfection of the root canal system is essential for the success of root canal therapy, which requires the use of an intra-canal medicament. *Enterococcus faecalis* is the most frequently found species in persistent/secondary intracanal infection associated endodontic treatment failure. 2% chlorhexidine gel alone was most effective against *E. faecalis* when compared to other medicaments tested (Mittal, 2004). Therefore, in the case presented here, at the second visit, NaOCL and chlorhexidine gluconate, both were used as the intracanal irrigants.

Along with biomechanical preparation, even chemomechanical preparation is done with 5.25 % NaOCl, 17% EDTA and 2% Chlorhexidine, as Hess has suggested that mechanical instrumentation alone does not result in bacteria free root canal system. Suggested clinical protocol by Zehnder (2006) consists of irrigation with NaOCl to dissolve the organic components and irrigation with EDTA to eliminate the smear layer and irrigation with Chlorhexidine to increase the antimicrobial spectrum of activity to impart substantivity. Clegg *et al* (2006) investigated action of 3 concentrations of NaOCl (6%, 3%, 1%), 2% Chlorhexidine & Biopure MTAD and Dunavant *et al* (2006) investigated the effect of 6% NaOCl, 3% NaOCl, smear clear, 2% Chlorhexidine, REDTA, Biopure MTAD against biofilm and showed that 6% and 3% NaOCl had maximum effect and could disrupt and eliminate the biofilm. Hence, copious irrigation with NaOCL was performed dring cleaning and shaping of the canals in the case presented. Ca(OH) with was choosen as intra canal medicament owing to its antibacterial efficacy. A study concluded that chemo-mechanical preparation with 2.5% NaOCl as an irrigant significantly reduced the number of bacteria in the canal but failed to render the canal free of cultivable bacteria in more than one-half of the cases and a 7-day intracanal dressing with Ca(OH)(2) paste further significantly increased the number of culture-negative cases (Siqueira *et al*., 2007). Final irrigation was done with 2% chlorhexidine as the dentin medicated with it acquires antimicrobial substantivity. Therefore, in the presented case a Ca (OH) dressing was placed immediately after cleaning and shaping and changed a week later. A cutaneous sinus tract is a localized entity and is not an indication for antibiotics. The antibiotic therapy is actually unsuccessful and may be misleading in that the drainage may stop temporarily. Systemic antibiotic administration is not recommended in patients with a cutaneous odontogenic sinus tract who have a competent immune system, no signs and symptoms of systemic involvement, and no systemic condition requiring prophylactic antibiotic cover. In fact, the sinus tract prevents swelling and pain caused by pressure build-up by providing drainage of the primary odontogenic site (Mittal *et al*., 2004). By following each step according to scientific rationale and evidence-based data, we tried to achieve complete disinfection of root canals.

From the above-presented case report, the key concluding points could be:

- Dermatologists and other medical practitioners should be aware that dental extraoral sinus tracts can be confused with skin lesions.
- A dental aetiology, as part of a differential diagnosis, should be kept in mind with oro-facial skin lesions.
- If an extraoral sinus tract is of endodontic origin, then elimination of infection through effective endodontic treatment will lead to resolution of the sinus tract.
- Early correct diagnosis can prevent unnecessary and ineffective antibiotic therapy and/or surgical intervention.

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