

Cutaneous sinus tracts: An Endodontic approach with case report

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ABSTRACT

Draining cutaneous sinus tracts in the area of face may be caused by chronic dental infections. Misdiagnosis of these cutaneous sinus tracts usually leads to destructive invasive treatment of the skin lesions that is not curative and often mutilating. Diagnosis of the cause may be challenging but is the key to successful therapy. Successful repair depends primarily on removal of etiological factors. This scientific paper aims to present a series of cases, where successful root canal treatment & closure of the tract achieved by conventional root canal therapy by relying on evidence based endodontics. Thus sparing the patient from surgical trauma.

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Introduction

A cutaneous sinus tract of dental origin with pulpal pathology is relatively uncommon and is misdiagnosed. Specific dental symptoms are usually absent in such cases, patients typically first visit a physician for evaluation and treatment. These sinus tracts most commonly are 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.[1] Egress of the irritants from infected root canals into periradicular tissues can initiate formation and perpetuation of periradicular lesions. Depending on the nature and quantity of these irritants, as well as duration of exposure of periradicular tissues, a variety of tissue changes can occur. Mild to moderate injuries of short duration cause reversible tissue damage and recovery of these tissues, whereas Persistent and/ or severe injuries usually result in irreversible changes in the pulp and development of periradicular lesions either in the form of granuloma, abscess or cysts. These infections will slowly tracts through the cancellous bone following the path of least resistance and perforates the cortical plate to present either intra, or extra-orally.[2] Once pus has entered the soft tissue, its direction of spread is limited by muscles and facial planes which tend to direct the pus towards certain defined areas where it accumulates. If the apices of the teeth are above the maxillary muscle attachments and below the mandibular muscle attachments the spread of infection may be extraoral.[3] Cutaneous lesion may develop over a long period of time and is often distant from the site of primary infection. Hence successful management of these odontogenic cutaneous sinus tracts of pulpal pathology depend on proper diagnosis.

In Diagnosing one should be able to differentiate them from other cutaneous nonodontogenic extraoral sinus tracts like that of sebaceous cysts, pyogenic granulomas, basal and squamous cell carcinomas, thyroglossal cysts etc. and from that of odontogenic sinus tracts without pulpal pathology like dentigerous cyst, keratocyst etc.[4,5]

Dental etiology can be confirmed by tracing the sinus tract to its origin with gutta-percha or similar radio opaque material, by radiographic examination and by pulp vitality testing. Panoramic radiographs can be useful in the initial screening for suspected dental pathology. Intraoral periapical radiographs, however, are more useful for specific diagnosis. Definitive treatment of the draining sinus tract requires elimination of the source of infection i.e. removal of degenerating and necrotic pulpal tissues followed by three dimensional obturation. This article aims to present a series of cases, where successful root canal treatment & closure of the tract was achieved by using conventional root canal therapy by proper bio and chemo mechanical preparation, intra canal medicaments and culture and sensitivity of intracanal microorganisms and appropriate antibiotics relying on evidence based endodontics. Thus sparing the patient from surgical trauma.

Case - 1

A 15-year-old healthy girl referred to the Department of conservative dentistry & Endodontics with a complaint of extra oral nodulous growth with intermittent pus discharge on her chin for the past 6 months. On extraoral examination, 1x1-cm nodule like lesion was noticed on her chin. On intra oral examination fractured incisal edge with mesial drift with mandibular right central incisor was noticed

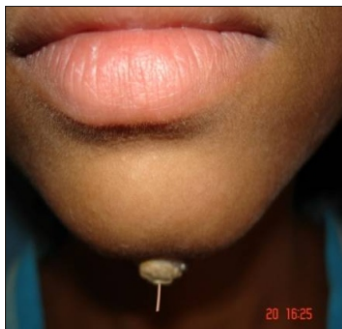


Figure - 1a. Extra oral sinus tract with gutta purcha

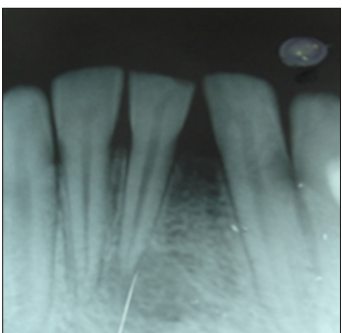


Figure - 1b. IOPA revealed periapical radiolucency in relation to right mandibular central incisor

and there was missing mandibular left central incisor (Figure 1b). On taking dental history patient revealed that she met with trauma 5 years ago, and 2 years back subsequently she underwent extraction with mandibular left central incisor as she developed swelling. Again after 6 months nodule recurred in chin region. She stated that the lesion had been discharging pus intermittently for more than 6 months. Pulp vitality test showed negative response with 41. Periapical radiograph of mandibular right central incisor revealed periapical radiolucency. Gutta purcha was used to trace and confirmed that the tract led to the apex of the right central incisor (Figure 1a, 1b). The clinical diagnosis established as chronic apical periodontitis leading to extra oral sinus tract.

Under the complete aseptic field, after rubberdam application, access opening done and samples collected for both aerobic and anerobic culture, to correctly identify the pathogens and institute effective antibiotic treatment. Biomechanical preparation done with hand K-files under irrigation with 3% sodium hypochloride solution and EDTA. $\text{Ca}(\text{OH})_2$ with glycerine was given as Intra canal medicament. By using 2% Chlorhexidine as the last irrigant, the root canal was obturated with gutta-percha points and Calcium Hydroxide based Seal apex root canal sealer by cold lateral condensation technique. After 30 days, patient showed healed sinus tract (Figure 1c). At the 3-month, 6 months, 1 year recall visit (Figure 1d), there is no evidence of the previous problem nor periapical lesion from radiographs was observed.

Case-2

A 22 year old male patient reported to the Dept. of conservative dentistry & endodontics, with the history of draining cutaneous



Figure - 1c. 30 days Post treatment photograph showing healed sinus tract

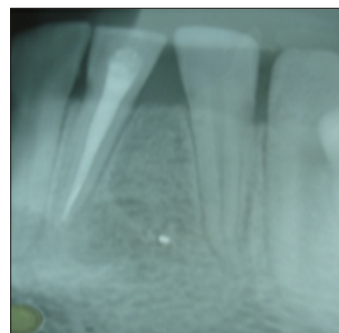


Figure - 1d. Post treatment IOPA

lesion on his left cheek associated with pus discharge for the past 4 days. Past dental history revealed patient had pain in left lower back region 15 days back and subsequently no pain for the past 1 week, but he developed swelling and then draining sinus. Extra oral clinical examination showed cutaneous lesion on left cheek at the inferior border of mandible, 4mm in diameter approximately. The opening of the lesion was crusted with minimal swelling. Palpation elicited a purulent discharge and fixation of the lesion to underlying bone. Intraorally there was no swelling. Tooth #37 was carious. There was no detectable mobility of tooth # 37 and periodontal probing depths were within normal range. The periapical radiograph showed carious tooth # 37 with periapical radiolucency and impacted 38. Tooth 37 was unresponsive to thermal and electric pulp vitality tests, whereas rest of the adjacent teeth responded normally. Path of sinus tract was confirmed by passing gutta purcha through the sinus, which was leading to 37 (Figure 2a, 2b).

A diagnosis of chronic periapical periodontitis with cutaneous sinus associated with tooth # 37 was made. Treatment consisted of culture and sensitivity and nonsurgical endodontic therapy in the similar way as mentioned above. Systemic antibiotics were advised according to the sensitivity report. The lesion healed within 15 days of this treatment (Figure 2c). Six months recall periapical radiograph showed signs of healing of periapical lesion (Figure 2d).

Discussion

The cutaneous sinus tract of dental origin is an uncommon but well documented condition in the medical literature, dental literature, and



Figure - 2a. Extra oral sinus tract with gutta purcha



Figure - 2c. 30 days Post treatment photograph showing healed sinus tract

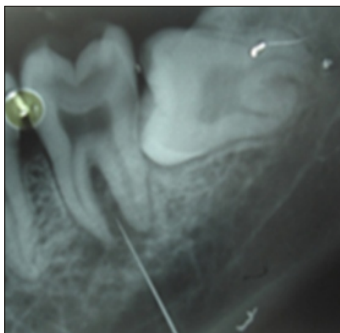


Figure - 2b. IOPA revealed periapical radiolucency in relation to left mandibular second molar

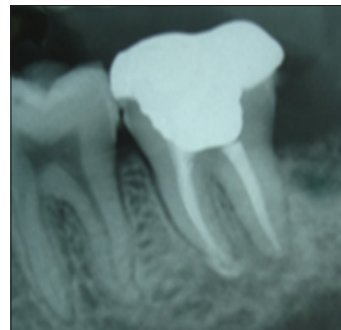


Figure - 2d. Post treatment IOPA

dermatological literature.[3] 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. Winstock in 1959 described cutaneous lesions with dental infections.[6] Kaban in 1980 elaborated the path of spread of chronic dental infections.[7] Approximately 80% of the reported cases are associated with mandibular teeth and 20% with maxillary teeth.[8] Most commonly involved areas are the chin and submental region . The other uncommon locations are cheek, canine space, nasolabial fold, nostrils and inner canthus of eye.[9]

The characteristic lesion is erythematous, smooth, symmetrical nodule, 1-20 mm in diameter. 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.[8]

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 central infection zone consists of microorganisms & neutrophils, 2nd contamination zone contains zone of roundcell infiltrate. Irritation zone contains osteoclasts & macrophages and outer stimulation zone contains fibroblasts and forming collagen & bone. Because of 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 number 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.[2]

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. Involved teeth respond negatively to pulp vitality tests. Periapical radiograph taken by a gutta percha point inserted in the sinus is helpful in tracking the origin of the lesion. 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.Anerobic microorganisms like peptococcus, peptostreptococcus, Veillonella parvula, lactobacilli, Eubacterium, Bacteroids, Fusobacterium and Aerobic microorganisms like Staphylococcus,Streptococcus,E.Coli, Candida albicans,Klebsiella were identified. Most of the pathogens were sensitive to Cephalixin, then tetracyclines and resistant to pencillins and least sensitivity noticed with erythromycin, Amoxycillin and even to metronidazole,which is one of the commonly prescribed antibiotic for anerobic infections. Along with biomechanical preparation, even chemomechanical preparation done with 3% NaOCl and 17% EDTA and 2% Chlorhexidine as Hess in 1925 said 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. Ca(OH)₂ with Glycerine were choosen as intra canal medicament as glycerine has hygroscopic property and it is very useful as a moistening substance and is non toxic. Final irrigation was done with 2% Chlorhexidine as the dentin medicated with it proven to acquire antimicrobial substantivity upto 12 weeks . Obturation has been done by using medicated (calcium hydroxide based) Seal apex as the sealer. By following each step according to scientific rationale and evidence based data,we tried to achieve complete sterilization of root canals.

Conclusion

It may be concluded that the correct diagnosis is the key to treat cutaneous sinus tracts. Successful management of odontogenic extra oral sinus tracts with pulpal pathology depends on proper diagnosis, and removal of etiological factors by proper bio and chemo mechanical preparation and three dimentional obturation. In such cases surgical management should not be the first armamentarium at our disposal. Instead application of basic

principles of root canal treatment should be used judiciously to create a conducive environment while effectively eliminating the pathogens and giving the body's immune, healing and repair mechanism a chance to achieve the desired result and thus sparing the patient from surgical ,physical and psychological trauma.

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