

ENDODONTIC AND SURGICAL MANAGEMENT OF ODONTOGENIC CUTANEOUS SINUS AND MINERAL TRIOXIDE AGGREGATE OBTURATION IN A 8 YEAR OLD GIRL: A CASE REPORT

Case
Report

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ABSTRACT: Odontogenic cutaneous sinus tract is a rare but well-documented condition. It is usually misdiagnosed as a local skin lesion and maltreated by systemic antibiotics because the primary etiology is incorrectly determined. We came across a 8-year-old patient who presented with a cutaneous lesion of dental etiology below the lower border of the mandible with the frequent purulent discharge which was not responding to systemic antibiotics. The case history, diagnosis and management of this condition using both endodontics and surgery (shoe lace technique) are presented here alongwith the root canal obturation with MTA which provides a fluid tight seal of the root canal system thus improving the healing outcomes for the patient.

Keywords:

cutaneous extraoral sinus, mineral trioxide aggregate, shoe lace technique

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INTRODUCTION : A cutaneous sinus tract of odontogenic origin is a comparatively unusual condition.[1,2] A cutaneous sinus tract of odontogenic origin is a pathway through the alveolar bone which typically initiates at the apex of an infected tooth or of an infected portion of the dental alveolus and vacates infected material (pus) through the skin. The odontogenic cutaneous sinus tracts may present a diagnostic threat. An oral fistulous tract is a much more common discovery and is sometimes baffled with a cutaneous sinus tract. A fistulous tract is a pathway from the apical periodontal area of a tooth to the surface of the oral mucous membrane (but not through the skin), permitting the discharge of suppurative material. These chronically draining cutaneous sinus tracts are often incorrectly diagnosed and therefore,

treated inadequately.[1–9]. These lesions may present a diagnostic difficulty particularly for physicians, and therefore, the etiology of the skin lesion may be treated unsuccessfully for sometime before the correct diagnosis is confirmed. Usually the clinicians may not appreciate the possibility of an odontogenic infection as the source of a cutaneous swelling or of a draining sinus tract, and therefore, treatment regimens may involve therapies aimed at non-odontogenic diagnoses. Successful therapy requires an accurate diagnosis and the differential diagnosis is also of prime importance. The differential diagnoses includes granulomatous disorder, actinomycosis, deep mycotic infection, squamous cell carcinoma, suppurative apical periodontitis, osteomyelitis, congenital fistula, salivary gland fistula, pustule,

furuncle, infected cyst, myositis and foreign-body lesion. [1–9]

Odontogenic cutaneous sinus tracts have been well documented in the medical, dental and dermatological literature. The cutaneous sinus tract of odontogenic origin on the facial and cervical skin usually develops as a result of chronic apical periodontitis caused by pulpal necrosis.[2,7,8,10,11]

The apical infection may advance through the marrow space, then perforate the cortical bone. In soft tissue, the infection may spread through the path of least resistance between facial spaces and finally perforate a mucosal or cutaneous surface.[8,12] However, Chan et al. reported an extraoral cutaneous sinus tract caused by vertical root fracture.⁸ Calýskan et al. also reported a case of cutaneous sinus tract originated from a fractured crown caused by trauma.¹³ Cutaneous sinus tracts most commonly present on the chin and the cheek area.⁶ They are seldom found in the nasal region.[12,14,15]. These tracts usually appear as suppurative lesions of the chin or neck. The inner surface of sinus tracts may be partially lined with either granulomatous tissue or epithelium.^{13,16,17}.

The principle of managing such lesions is to remove the source of dental infection.[8,12] Conventional endodontic therapy and occasionally periapical surgery are effective in healing the sinus tract in a very short duration when the crown is restorable.[8,12,18,19] However, if the infection is severe or the tooth is not restorable, then extraction is the treatment of choice.⁹ The purpose of this report is to present a case of cutaneous sinus tract successfully managed with conventional root canal treatment and surgery.

A CASE REPORT:

An 8-year aged girl was referred to our department of Paedodontics and Preventive dentistry with a chief complaint of intermittent pus discharge on her right cheek close to the lower border of the mandible since last 1 year. On extraoral examination there was an 1 X .5 cm depressed erythematous mass covered with scab 1cm below the lower border of the mandible on the inferior aspect of the cheek. The lesion was draining and fixed to the underlying mandibular basilar region. On intraoral examination she had large caries in the mandibular right first molar tooth and left it untreated because she had no pain.

FIGURE 1. Pretreatment Photograph Demonstrating

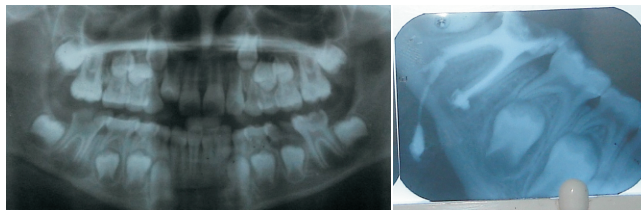
Large Caries In The Mandibular Right First Molar Along With Sinus Tract On The Right Cheek



On palpation, a thumb-tip-sized nodal swelling around the fistula was found. The tooth was not tender on percussion or painful on biting and didn't respond to electrical pulp testing. No sign of mobility or periodontal pocket were present in relation to 46.

Radiographic examination revealed periapical radiolucent lesion associated with the roots of mandibular right first molar. The diagnosis was established as pulp necrosis with chronic apical periodontitis with cutaneous sinus tract. Root canal treatment of the involved tooth and management of the extraoral sinus tract was planned using shoe lace technique.

FIGURE 2. Preoperative Opg And Iopar With Metapex Placed After Access Opening And Bmp



During the first visit, standard access cavity was prepared and the root canals were cleaned and shaped using k flex files and copiously irrigated with 2.5% sodium hypochlorite and 17% EDTA. Working length was established (17mm in all the canals) and biomechanical preparation was performed with hand instrumentation using step back techniques till #60 in DB and DL canals and #45 in ML and MB canals. Metapex was used as intracanal medicament and access cavity was sealed temporarily with GIC. Medication was left for three weeks. Metapex was removed, canals irrigated with copious amounts of saline, dried with paper points and one step apexification and obturation was done with MTA. DL, ML and MB canals were filled with MTA till orifice whereas DB canal was filled till 7 mm. 10mm space left was utilized for prefabricated post. Radiographically MTA seal was checked and a wet

cotton pellet was kept inside the tooth and the tooth was sealed with IRM for 72 hours. After 72 hours the tooth was opened, cotton pellet removed, post space was dried and prefabricated post selected. Post was cemented with luting GIC and core buildup was done with composite and finally stainless steel crown was given.

Management of the extraoral sinus tract was planned using 'Shoe lace technique'. Under local anesthesia mucoperiosteal flap was raised, flap was reflected upto line of mandible. Extraoral sinus tract dissected out upto intraoral region and intra-extraoral tract curettage done. Shoe lace technique involved managing the sinus by soaking the gauge piece in Povidone iodine and inserting it extraorally to disrupt the epithelium of sinus tract to make a patency for pus drainage. The flap was repositioned and sutured back and extraoral sutures were also given. Antibiotics and analgesics were prescribed. After 1 week both intraoral and extraoral sutures were removed and soframycin ointment was advised for extraoral application. Patient reported asymptomatic after 1 month follow-up. No extraoral sinus was present. Sinus tract healed satisfactorily.

FIGURE 3. Photograph Showing The Removal Of The Epithelium And Maintaining The Patency Using Shoelace Technique.



Figure 4: Photograph And Iopar Showing Stainless Steel Crown Cemented Inrelation To 46 After Obturation With Mta And Cementation Of Prefabricated Post In Distobuccal Canal



Figure 5: Extraoral Photograph Showing Healing After 1 Month



DISCUSSION : The cutaneous sinus tracts of odontogenic origin in the face and neck region are rare and present a diagnostic challenge to clinician as they may present a wide variety of diseases.[7,8,13]. Patients with such lesion generally go to plastic surgeon and dermatologist rather than dentists for treatment and may undergo unnecessary multiple biopsies, surgical excision or antibiotic regimens, however recurrence of the sinus tracts becomes unavoidable, because the primary dental aetiology is never correctly diagnosed or addressed.[7,8] The opening of the intraoral or extraoral sinus tract depends on the path of the inflammatory process in relationship to the muscle attachments. If the teeth infections emanate superior to the maxillary muscle attachments or inferior to the mandibular muscle attachments, the infection may move through the cutaneous barrier and drain through an extra-oral sinus tract.5 Intra-oral fistulation is the far more common finding compared to extra-oral sinus tract. The most common sites of extra-oral sinus tract of odontogenic origin are the jaws and chin with the angle of the jaw being the most common site.[1-9] Winstock described cutaneous lesions with dental infections.[20] Kaban elaborated the path of spread of chronic dental infections.[21] Approximately 80% of the reported cases are associated with mandibular teeth and 20% with maxillary teeth.1 Sassone et al conducted a microbiologic evaluation of primary endodontic infections in teeth with and without sinus tract.[22] They discovered the greatest prevalence of such bacteria as *Fusobacterium nucleatum* sp. *vincentii*, *Porphyromonas gingivalis*, *Veillonella parvula*, *Enterococcus faecalis*, *Campylobacter gracellis*, and *Neisseria mucosa*. The total bacterial counts were identical between lesions with and without sinus tracts. Although *E faecalis*, *Streptococcus anginosus*, *Capnocytophaga sputigena* and *Capnocytophaga gingivalis* had significantly higher counts in the lesions without sinus tracts. Higher levels of *P gingivalis* and *F nucleatum* sp. *nucleatum* were noted in cases with sinus tract. Misdiagnosis and delay

in accurate treatment protocol may often be encountered.[7,8,12] Therefore, when diagnosing and treating sinus tracts of unknown aetiology in the head and neck region, dermatologist or plastic surgeon should always consult dental surgeon to rule out a dental cause even though there is no dental complaint. This is because the cutaneous sinus tract caused by chronic infection is often painless and may develop over a long period of time without alarming the patient.[7,8,13] Patients rarely relate the symptoms to dental infection.[2] Therefore, early and proper diagnosis is essential. An accurate diagnosis should include medical history of the patient, inspection and palpation of the lesion, pulp vitality test and intraoral radiographs.[7,11,13] Digital palpation of the involved area frequently discloses a cord of tissue connecting the painless skin lesion to the involved maxilla or mandible. During palpation, an effort should be made to 'milk' the sinus tract; production of a purulent discharge confirms the presence of a tract.[23] Frequently, both the nodule and perilesional skin are slightly retracted below the level of the surrounding skin surface.[14] In addition, the insertion of a probe or gutta-percha through the fistula to take radiographs is an effective method for determining the diseased tooth.¹³ As suggested in literature, nonsurgical endodontic therapy is the treatment of choice of such lesions and should be attempted first.⁶ In the present case, endodontic therapy was carried out along with the surgical treatment of the sinus tract with minimal scar formation as an outcome. The use of intracanal medicaments is essential to eliminate bacteria that remain after mechanical debridement.[21] Here calcium hydroxide in metapex was used as an intracanal medicament due to its beneficial effects.[14,24,25] Metapex is a silicone oil-based calcium hydroxide paste containing 38% iodoform. Calcium hydroxide is a strong alkaline substance with a pH of [12.5]. In an aqueous solution calcium hydroxide splits into calcium and hydroxyl ions. The benefits of calcium hydroxide treatment are stimulation of bone repair and bactericidal effects due to its high alkalinity. Use of calcium hydroxide paste was advocated for rapid and successful treatment of sinus tract associated with necrotic teeth.[14] The superior antimicrobial effects of metapex may be due to the combination with iodoform and to the viscous and oily vehicle which may lengthen the action of the medicament. Gomes et al displayed that oily

vehicles increase the antimicrobial effects of calcium hydroxide against *E. faecalis* and other bacteria.^{26,30} The strong bactericidal properties of iodoform paste have been demonstrated in earlier studies.[27] Iodine is bactericidal as well as fungicidal.[28,30] The antimicrobial action of calcium hydroxide with iodoform against *C. albicans* might be due to the action of the calcium ions in the regulation of *C. albicans* morphogenesis. The antimicrobial effect of calcium hydroxide, due to the liberation of hydroxyl ions, might be intensified due to the inhibition of *C. albicans* growth by calcium ions.[29,30]

After 21 days obturation was done with MTA. MTA exhibits unique physiochemical properties that can provide exceptional outcomes when used for complete or partial canal obturation. Recent research on immature tooth models that were obturated with MTA and tested for fracture strength by using an Instron (Norwood, MA) testing machine indicated that at 1-year, MTA showed higher fracture resistance than untreated controls.^{31,32,33} These researchers postulated that MTA might prevent the destruction of collagen by inducing the expression of a tissue inhibitor of metalloproteinase-2 in the dentin matrix. It seems that teeth obturated with MTA may not only increase their fracture resistance with time, but bacteria may be effectively entombed and neutralized in severely infected teeth. Hence, treatment must be focused on elimination of the source of the infection which has been rectified by root canal treatment and by making a patent pathway for the pus to drain. Multiple methods have been generated to drain the pus, which extend from periapically perforating the root of tooth during root canal treatment thus draining the pus through orthograde approach, to creating an extraoral pathway for providing rapid relief to the patient in case of big sinuses. Shoe lace technique is one such method, where the sinus is managed extraorally by inserting a gauge piece soaked in povidone iodine to make a path for pus drainage.[34,35]

CONCLUSION : It may be concluded that the correct diagnosis is crucial to treat odontogenic sinus tracts. Successful management of odontogenic extraoral sinus tracts depends on proper diagnosis and removal of etiology by proper endodontic treatment. In such cases surgical management proves as an adjunct for prompt and speedy management of the lesion.

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