

## CUTANEOUS DENTAL SINUS OF SUBMENTAL REGION: AN EIGHT YEARS FOLLOW-UP

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### *Abstract*

*A 22-year-old female patient had a history of a 7-month recurrent pus discharge from her chin. She had been previously treated by physicians, dermatologist, and surgeons. The sinus kept re-occurring and she was referred to dental hospital for opinion.*

*The patient had cutaneous opening of size 5mm × 6mm with purulent discharge in submental region. Patient had undergone three surgical excisions and multiple antibiotic regimens. Patient had a history of trauma due to fall six years back. A 30 number standard gutta-percha was used to trace the sinus tract and dental origin was confirmed radiographically. The tract led to in-between the root canal apices of both mandibular incisors. Treatment included non-surgical endodontic treatment with both mandibular central incisors and antibiotic coverage following bacterial culture of discharge. The pus culture showed *Streptococcus anginosus* which was found to be sensitive to penicillin. Patient was kept on 1-week course of oral amoxicillin-clavulanate along with root canal therapy.*

*The cutaneous sinus healed following root canal treatment and antibiotic coverage. On an 8-year follow-up skin of sub-mental region appeared normal and peri-apical healing with both mandibular central incisors was evident radiographically. Cutaneous lesions on face may be of dental origin. A cross referral between dentists, physicians, surgeons, and dermatologists should be considered in such cases.*

**Keywords:** abscesses, chlorhexidine, large peri-apical lesion, dermatitis, diagnosis, oral wound healing

### **Introduction**

Cutaneous tracts of odontogenic origin continue to represent a diagnostic dilemma. Patients affected by these conditions search treatment from the medical doctor or a physician as an alternative to a dentist and frequently go through several surgical excisions, radiotherapy, biopsies,

as well as antibiotic sessions with ultimate recurrence of the cutaneous sinus tract, because the odontogenic involvement is often misdiagnosed [1,2].

Misdiagnosis typically leads to an invasive intervention of draining cutaneous lesions, which is not only non-remedial but also often destructive. Moreover, epidermal biopsy might generate scarring [3]. The commonest reason behind a cutaneous sinus tract is a long standing periradicular lesion. This kind of abscesses come

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up from bacterial infection, tenderness, or perhaps trauma. The inflammatory development commences in a diseased pulp and progresses into adjacent periodontal area, as well as bone [4,5]. The first pathological appearance will be apical periodontitis. The inflammatory and immunological disorder encourages bone marrow resorption, causing the development of the abscess, the suppurative osteitis. Subsequently, factors like path of least resistance, gravity, virulence of microorganisms, host resistance and anatomic arrangement of neighboring musculature and fasciae, lead to a cutaneous sinus tract formation [5,6]. Non-surgical endodontic treatment is the preferred treatment in such cases [4,5].

The aim of this report is to present a case of a facial lesion which was previously misdiagnosed as a non-healing entity and was surgically excised three times by a general surgeon and was rightly diagnosed in a dental office to be an odontogenic sinus tract. The report also highlights long term success of these odontogenic cutaneous sinus tracts using a non-surgical endodontic therapy. A follow-up of eight years revealed a successful outcome in the presented case.

### Case Report

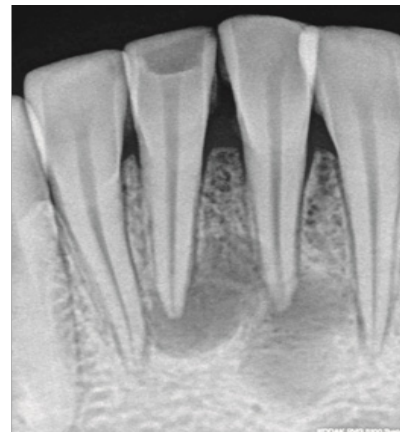
A 22-year-old female patient was consulted in a dental hospital, referred from the department of general surgery for an opinion. Her chief complaint was pus discharge from an opening located on the lower chin area over the past 7 months. The patient had undergone three surgical excisions and multiple broad antibiotic therapies. Medical history was non-contributory. Patient had a history of trauma due to an accidental fall six years before. Clinical examination revealed mild pain and food lodgment in the lower left central incisor. Extra oral examination revealed a cutaneous opening of 5 x 6 mm size, with a purulent discharge in the sub-mental region (Figure 1).



**Figure 1.** Preoperative photograph revealing a cutaneous opening of 5 x 6 mm size with a purulent discharge in the sub-mental region.

Intra-orally both mandibular central incisors (#31 and #41) had moderate calculus deposition and no deep pockets were present. The teeth were non-tender on percussion and had mild pain on palpation with labial mucosa adjoining to the related teeth. Pulp testing (Cold test and EPT) elicited non-responsiveness from the suspected teeth (#31 and #41) and a normal response with #32 and #42.

The Intra-oral periapical radiograph (IOPA) revealed a well circumscribed periapical radiolucency in relation with #31 and #41 (Figure 2). A no. 30 standard gutta-percha cone was used to trace the sinus tract from the cutaneous opening (Figure 3). It was confirmed radio-graphically that the lesion was of dental origin. The tract led to in between root canal apices of both mandibular central incisors. Hence, a diagnosis of pulpal necrosis with chronic peri-radicular periodontitis and extra oral cutaneous discharge was made and possibility of differential diagnosis of systemic or medical etiology like actinomycoses, osteomyelitis, or any other diseases, was ruled out.



**Figure 2.** The Intra-oral periapical radiograph (IOPA) revealing a well circumscribed periradicular radiolucency associated with both mandibular central incisors.



**Figure 3.** Intra-oral periapical radiograph (IOPA) revealing a no. 30 standard gutta-percha cone tracing the sinus tract from the cutaneous opening and confirming dental origin.

Under the application of a rubber dam, access openings were prepared using a dental operating microscope (Global Surgical Corporation St. Louis MO, USA) 8x, with an endo-access bur (DentsplyMaillefer, USA) in both mandibular central incisors. Following this, patency was confirmed using a no.10 K-files (Kerr USA), and the working length was determined and recorded by using an apex locator Root ZX mini (J. Morita MFG. Corporation, Kyoto, Japan). The root canals were prepared by Rotary files, Protaper universal system (DentsplyMaillefer, USA) along with a root canal conditioner Glyde (DentsplyMaillefer, USA) using crown down technique to the size F3. The root canals were abundantly irrigated with 5.2% sodium hypochlorite and 17% EDTA solution with a manual agitation during the entire procedure. Following this, final rinse was done with 2% Chlorhexidine solution (V-concept, Vishal Dentocare, India). Calcium Hydroxide paste (Dento Sur Cal, Satendra Polyfrobs, Nashik (MS) India) was placed within the root canals and access cavity was sealed with Cavit-G (3M ESPE, USA). Patient was reappointed after two weeks. On 2-week follow-up appointment the drainage persisted from the cutaneous site. Again, following the removal of old intra-canal medicament, calcium hydroxide paste was again placed and cavity was sealed. Discharge from sinus was collected and sent for microbial analysis. The culture from cutaneous discharge showed a growth of *Streptococcus anginosus* which was sensitive to penicillin. Patient was prescribed with a 1-week course of oral medication of amoxicillin-clavulanate. On a 4-week follow-up visit, the

teeth were clinically asymptomatic and the cutaneous sinus tract had significantly healed. Root canals were cleaned again with normal saline and rinsed with 2% chlorhexidine and dried by using paper points. During root canal filling, master cones were placed to test their aptness to the canals and a radiograph was taken.

Root canals of teeth #31 and #41 were filled with chosen master gutta-percha cones F-3 (Protaper, Dentsply Maillefer) and sealer (AH-Plus, Dentsply, Maillefer, USA) (Figure 4). The coronal gutta-percha below the pulp chamber were removed using a heated plugger and vertical compaction was performed. Temporization with Cavit-G was done. The patient was recalled after one week for final restorations. Permanent restorations using composites (Tetric N-Ceram, IvoclarVivadent AG, NY, USA ) were made in the following visit. At the six month and one year recall follow-ups (Figure 5) respectively, the patient was comfortable and the sinus tract had healed significantly with a minimal scar formation.

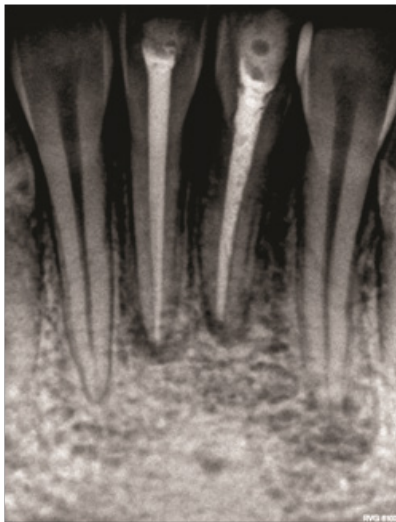
Patient on a follow-up visit after five years had again complaint of pain in relation with mandibular left lateral incisor (#42). IOPA revealed peri-apical radiolucency with #42 (Figure 6). Pulp testing (cold and electric) elicited non-responsiveness from the concerned tooth, Hence, root canal treatment was performed with #42 which had two canals (Figure 7) .Follow-up after eight years revealed healthy bone in periapical area and complete healing of cutaneous lesion (Figure 8 and Figure 9).



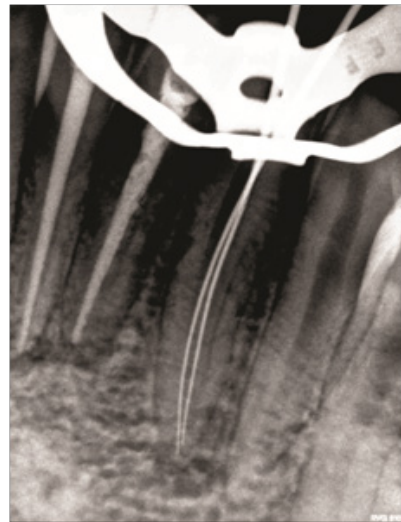
**Figure 4.** Immediate post-obturation radiograph.



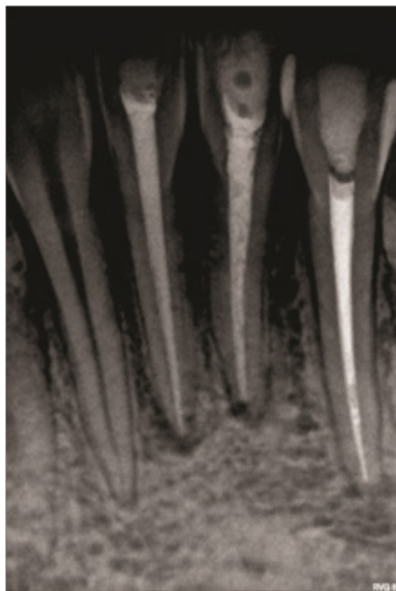
**Figure 5.** Follow-up photograph after one year.



**Figure 6.** Radiograph revealing periapical radiolucency with mandibular left lateral incisor.



**Figure 7.** Working length determination of mandibular left lateral incisor with two canals.



**Figure 8.** Follow-up radiograph after eight years showing healthy bone formation.



**Figure 9.** Follow-up photograph after eight years showing complete healing of cutaneous lesion.

### Discussion

It is well known that patients with cutaneous dental sinus usually present to their physician due to the unpleasant appearance and persistence of the lesion [4]. However, as there is generally no pain present to help define the etiology of origin of the tract, the diagnosis becomes increasingly difficult. It is imperative that a thorough intraoral, extra oral, and radiographic examination be conducted to determine the source of the infection. Without appropriate management, chronic dental infections can have acute exacerbations resulting in distressing and sometimes disastrous effects on the patient.

Several published reports of cutaneous dental sinus have shown treatment which included frequent excisions and biopsies, along with the administration of long term broad spectrum antibiotics [5,6]. These treatments only resulted in initial reduction of the sinus tract and drainage of the lesion which subsequently reappeared and persisted, since the source of the infection was misdiagnosed owing to the limited dental knowledge of the treating physician [5]. Similarly, in the presented case, the patient reported to the physician first and had undergone long term antibiotic regimens. Following reoccurrence, patient was referred to a surgeon and underwent surgical excisions thrice, but the

lesion eventually persisted as the underlying dental cause was misdiagnosed.

Identifying the precise features of the lesion facilitates timely treatment, reduces patient distress and esthetic tribulations, and drastically minimizes the possibility of advanced complications [5,6]. The differential diagnosis of endodontic cutaneous sinus tract may be pustule, actinomycosis, osteomyelitis, malignancies, dermatological infections, granuloma, chronic tuberculosis, and gumma of tertiary syphilis [4].

Pustule is commonly found as suppurative draining defect and is characterized by its local and short course. Actinomycosis has multiple fine yellow granules with discharging drainage and does not settle even after treatment of the principal source [7].

The patient with cutaneous endodontic tract may present with the history or complaint of dental problems. There may also be complaints of discharge from the extra-oral site with persistence of the draining lesion. Patient may have a history of trauma to the tooth.

The exact diagnosis of the cutaneous tract of odontogenic origin must be suspected by the coarse appearance of the lesion. The cases classically present as erythematous, painless tracts of maximum 20 mm in size and intermittent drainage [5]. The most distinguishing characteristic of the lesion is its depression or dimpling beneath the skin and may be a result of the healing course. When a cutaneous opening is patent, a gutta-percha point may be inserted into the sinus opening and confirmed through a radiograph if it travels to the tooth. In this case a 30-no. standard gutta-percha point was used to track the sinus tract from the cutaneous opening and radiograph was taken which confirmed endodontic origin [5,7].

The apical succession of a periodontal lesion may progress and involve the apical area. The pulp might get necrotized as a consequence of the pathology invading through lateral canals or the apical area. This may also be the contributing factor in cutaneous dental sinus tracts. In the case presented, intra-orally both #31 & #41 had moderate calculus deposition and no deep pockets were present. Hence, although the patient had poor oral hygiene, the cutaneous sinus tract was primarily of endodontic origin [4].

Non-surgical endodontic management is the preferred treatment, if the tooth is restorable. Hence, non-surgical endodontic treatment with both mandibular central incisors was planned. Pre-operative radiograph revealed large periapical radiolucency with the suspected teeth and therefore calcium hydroxide was chosen as a root canal medicament following root canal preparation. Calcium hydroxide is a material of choice as intra canal medicament because of its high alkalinity and bactericidal properties [8]. The time duration that calcium hydroxide is used in the canal can affect its effectiveness, it is recommended that the optimum time should be 2 weeks. The effect is better when calcium hydroxide is in close contact with the

periapical area. The sinus tract healed after 4 weeks of calcium hydroxide placement [8].

Chlorhexidine (CHX) has been extensively used in endodontic therapy in form of irrigant or intra-canal medicament, as it has a broad range of bacteriocidal activity, substantivity (residual antimicrobial activity), inferior cytotoxicity, at the same time validating effectual clinical presentation, lubricating properties, rheological action and it inhibits metalloproteinase. Hence, CHX was used in addition to other irrigants and medicaments [9].

Bacterial culture provides accurate results regarding the type of micro-organism present and its sensitivity to best suited antibiotic. The culture grew *Streptococcus anginosus* in this particular case, which is part of normal microbial flora, but can source pathology under certain circumstances. There are a number of antimicrobial resistant strains of this microbe. The majority *Streptococcus milleri* strains are found to be resistant to bacitracin, sulfonamides, and nitrofurazone. Nevertheless, a large number of strains are susceptible to penicillin, erythromycin, ampicillin, and tetracycline. In the presented case 1-week amoxicillin-clavulanate oral course worked successfully [10].

Many authors believe that if the principal endodontic source is eliminated, the cutaneous tract and periapical lesion make well without any other management. Healing is achieved by secondary intention in the majority of cases. Aesthetic plastic surgical procedure may be performed at a later stage, if the healing consequences are cutaneous retraction or dimpling [11]. In this case complete healing was observed after a long term, i.e. 8 years follow-up.

### Conclusions

The cutaneous sinus tract of odontogenic origin is commonly misdiagnosed owing to its extensive differential diagnosis. An interdisciplinary consultation between dentist, physician, surgeon and dermatologist should be considered before initiating such cases in order to avoid misdiagnosis. The non-surgical endodontic management is the treatment of choice and has provided long term success in the reported case.

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