A clinical predicament—diagnosis and differential diagnosis of cutaneous facial sinus tracts of dental origin: a series of case reports

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A cutaneous draining sinus tract of dental origin is often a diagnostic challenge, because of its uncommon occurrence and absence of dental symptoms. Proper diagnosis, treatment, and the elimination of the source of infection are a must; otherwise, it can result in ineffective and inappropriate outcome of treatment. This article presents 4 cases of facial lesions misdiagnosed as being of nonodontogenic origin. The correct diagnosis in each case was cutaneous sinus tract secondary to pulpal necrosis, suppurative apical periodontitis, and osteomyelitis. In all cases, facial sinus tracts of dental origin were excised and the source of infection eliminated. The purpose of this paper is to provide diagnostic guidelines and examination protocols for differential diagnosis of cutaneous facial sinus tracts of dental origin. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2011;112:e132-e136)

A cutaneous sinus tract of dental origin is relatively uncommon and may easily be misdiagnosed, owing to its uncommon occurrence and absence of dental symptoms.1 Such a lesion continues to be a diagnostic dilemma. A systematic review of several reported cases revealed that patients have had multiple surgical excisions, radiotherapy, multiple biopsies, and multiple antibiotic regimens, all of which had failed, with recurrence of the cutaneous sinus tract, because the primary dental etiology was never correctly diagnosed or addressed.2

However, all chronic draining sinus tracts of the face and/or neck should signal the need for thorough dental evaluation. The purulent by-products of pulpal infection will seek the path of least resistance when exiting from the root apex area and traveling through bone and soft tissue. Once the cortical plate has been penetrated, the sinus tract’s exit point is determined by the location of muscle attachments and fascial sheaths. Dental etiology can be confirmed by tracing the sinus tract to its origin with gutta-percha or similar radiopaque material, both by orthopantomogram and intraoral periapical radiographic examination and by pulp vitality testing.

Differential diagnosis of a cutaneous draining sinus tract should include suppurative apical periodontitis, osteomyelitis, congenital fistula, salivary gland fistula, an infected cyst, and deep mycotic infection. Skin lesions, such as pustules, furuncles, foreign-body lesions, squamous cell carcinoma, and granulomatous disorders may be superficially similar in appearance to a draining sinus tract of dental origin, but they are not true sinus tracts.1

Definitive treatment of the draining sinus tract requires elimination of the source of infection, either by root canal therapy in case of restorable tooth or by extraction in case of nonrestorable tooth, along with complete excision of sinus tract lining.

CASE REPORTS

Case 1

A healthy 12-year-old girl had a pedunculated tumor-like growth under her chin, 1 cm in diameter for the past 2 years. Previous treatment of the patient was with systemic antibiotics and repeated excision 4 times, which were unsuccessful. Intraoral examination revealed that the patient had a slight distoincisal angle fracture of tooth 31. Electric pulp test and heat test were nonresponsive in teeth 31, 32, and 41. The other teeth responded within normal limits. Radiologic examination with gutta-percha cone introduced through the sinus opening revealed a radiolucent area in relation to tooth 31 extending mesial to the distal surface of the root of tooth 41 and distally to the mesial surface of the root of tooth 32. Endodontic therapy in teeth 31, 32, and 41 was started; the canals were enlarged and made infection free with sodium hypochlorite solution and hydrogen peroxide. Subsequently, an elliptic incision was placed around the extrorgal discharging sinus, and the whole sinus tract was excised, starting from the extroral side to the origin, by combination of sharp and blunt dissection; curettage of the apical pathology was done. After that, root canal fillings with gutta-percha cones, api-
coectomies, and retrograde fillings with glass ionomer cement of involved teeth were performed (Fig. 1).

**Case 2**
A 35-year-old woman sought treatment with a chief complaint of purulent and hemorrhagic discharge from the submandibular region for 6 months after extraction. The patient gave a history of excision of sinus lining done twice, but the purulent discharge continued. The patient was suffering from uncontrolled type II diabetes for the past 10 years. Radiologic examination revealed an irregular radiolucent area with the presence of a radiopaque mass inside the socket of tooth 46. First, her uncontrolled diabetes was controlled in consultation with an endocrinologist. Then an extraoral spindle-shaped incision was placed around the extraoral discharging sinus. With the help of blunt and sharp dissection, the cord-like sinus tract was identified, starting from the extraoral side to the origin, and the whole sinus tract was excised. After that, soft bone was removed with bone rongeur, reached up to the socket of tooth 46, which was confirmed by passing smooth stellate through from extraoral to intraoral region, and sequectomy was performed from the socket of tooth 46. Histopathologic report confirmed osteomyelitis (Fig. 2).

**Case 3**
A 14-year-old girl presented with an extraoral discharging sinus with tumoral mass on the left cheek for 3 years. The patient had carious exposure of tooth 36 with slight mobility. Electric pulp test and heat test was nonresponsive in tooth 36. Radiologic examination with gutta-percha cone introduced through the sinus opening revealed a periapical radiolucency in relation to tooth 36. Endodontic therapy in tooth 36 was started; the canals were enlarged and made infection free with sodium hypochlorite and hydrogen peroxide, and root canal filling was done with gutta-percha cones. Subsequently, a spindle-shaped incision was placed around the extraoral discharging sinus; the whole sinus tract was excised starting from the extraoral side to the origin by a combination of sharp and blunt dissection. Curettage of pathologic tissue from the furcation area and periodontal therapy was instituted (Fig. 3).

**Case 4**
A 45-year-old woman wanted to get rid of nonhealing pus discharge from a growth on her left cheek of 10 months’ duration. Drug history of repeated antibiotics administration was reported. Radiologic examination with gutta-percha cone introduced through the sinus opening revealed a periapical radiolucent area in relation to tooth 25. Complete excision of the sinus lining as in the other cases, along with extraction of tooth 25, was done (Fig. 4).

**DISCUSSION**
Extraoral manifestation of pulpoperiradicular pathology, is easily misdiagnosed by physicians and dentists. A sinus tract prevents swelling or pain from pressure build-up, because it provides drainage from the primary odontogenic site.³

**Diagnostic guidelines**
The following guidelines are advocated.

1. Evaluation of a cutaneous sinus tract must begin with a thorough history and awareness that any cutaneous lesion of the face and neck could be of dental origin. An acute or painful onset and the
cutaneous tract and lesion are seldom accompanied by symptoms from the oral cavity.

2. Palpation of the tissues surrounding the sinus tract should reveal a cord-like tract attached to the underlying alveolar bone in the area of the suspect tooth. During palpation, an attempt should be made to “milk” the sinus tract; production of a purulent discharge confirms the presence of a tract.

Fig. 2. A, Extraoral view of the sinus tract in the right submandibular region. B, Orthopantomogram showing irregular radiolucent area at apical area with presence of radiopaque mass inside the socket of right first molar of the mandible. C, Orthopantomogram showing gutta-percha traced to a radiolucent area at the apex of the right first molar of the mandible. D, Postoperative orthopantomogram. E, Healed sinus tract area in the right submandibular region.

Fig. 3. A, Intraoral periapical radiograph with files. B, Periapical radiograph after obturation with gutta-percha. C, Gutta-percha inserted into sinus tract. D, Sinus lining removed and curettage of granulation tissue done from furcation area. E, Postoperative periapical radiograph shows healing furcation area.
3. If the sinus tract is patent, a lacrimal probe or a gutta-percha cone can be used to trace its track from the cutaneous orifice to the point of origin, which is usually a nonvital tooth, but in dentulous patients could be a retained tooth fragment, an impacted tooth, or an odontogenic cyst. A radiograph is then exposed with the probe in situ, pointing to the origin of the primary pathosis. Oral examination may reveal 1 severely decayed teeth or a healthy looking tooth with an intact crown or slight fracture of crown.

4. Pulp tests and periradicular diagnostic testing should be performed on the suspected tooth and adjacent teeth. More than 1 tooth may be pulpally involved and associated with the cutaneous odontogenic sinus tract.

5. Microbiologic culturing and sensitivity test of the sinus tract exudate should be done for microbial flora identification. Culture should also be carried out for suspected fungal or syphilitic infections.

6. Physiologic and anatomic factors that influence the spread and ultimate localization of dental infections need to be considered. The ultimate path of the sinus (regardless of the source) depends on several factors, most importantly the anatomy of tooth involved, muscular attachments to the jaw, fascial planes of the neck, and involvement of permanent or deciduous teeth. Cutaneous sinus tracts rather than intraoral sinus tracts are likely to occur if the apices of teeth are superior to the maxillary muscle attachments or inferior to mandibular muscle attachments.

Examination protocols for differential diagnosis

The clinical differential diagnosis includes pustule, actinomycosis, osteomyelitis, orocutaneous fistula, neoplasms, local skin infections (carbuncle and infected epidermoid cyst), and pyogenic granuloma. Other causes are salivary gland fistula, thyroglossal duct cyst, branchial sinus, dacyrocystitis, and suppurative lymphadenitis.

Pustule is the most common of all purulent draining lesions and is readily recognized by its superficial location and short course.

Actinomycosis exhibits multiple draining lesions and characteristic fine yellow granules in the purulent discharge. The tooth is often not involved radiographically. If a sinus tract does not close after appropriate removal of the primary cause, the most common alternative cause is actinomycosis.

Osteomyelitis of jaw is usually secondary to some type of exogenic trauma, acquired infection after extraction of diseased teeth, impacted teeth, or retained roots. It rarely gives rise to a cutaneous sinus and is mostly associated with history of some debilitating systemic disease or fracture.
Orocutaneous fistula is a common sequela of trauma to the head and neck region and leads to continual leakage of saliva to lower face or neck.

Neoplasm usually presents with fixation to underlying osseous structures.4

Carbuncle involves a group of hair follicles and weeping ooze; a red swollen lump under the skin has a white or yellow center.

Infected epidermoid cyst or sebaceous cyst is a superficial, solitary, freely moveable secondarily infected mass.5

Pyogenic granuloma is small reddish vascular lump on the skin; it bleeds easily owing to a high number of blood vessels.5

A salivary gland fistula has a characteristic location and associated patient history. Moreover, the defect is not through and through as in orocutaneous fistula. Probing the duct and performing sialography aid in diagnosis.

Thyroglossal duct cyst and branchial sinus are developmental lesions and therefore are observed early in life. The former is found high up along the midline and extrudes when the tongue is protruded, whereas the latter is found in the lateral neck region.4

Dacaryocystitis is redness, swelling, and pus ooze near the inner corner of eye.

Suppurative lymphadenitis usually occurs in teenagers or young adults and presents with a sore throat, fever, malaise, and prominent tender cervical lymphadenopathy. The pharynx is red with gray-yellow exudates. Neck stiffness is a symptom.5

In conclusion, the cutaneous dental sinus is an uncommon but well documented condition. Its diagnosis is not always easy unless the treating clinician bears in mind the possibility of its dental origin. A thorough diagnosis requires cooperative referrals between physicians, dermatologist, surgeons, and dentists. Recognition of the true nature of the lesion facilitates prompt treatment, minimizes patient discomfort and esthetic problems, and reduces the possibility of further complications.

REFERENCES

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