Cutaneous sinus tracts: An endodontic approach

Diagnosis and treatment for a successful outcome

The differential diagnosis of the case in question included the following:

- Localised infection of the skin, such as pyoderma, pimples, ingrown hairs and obstructed sweat glands;
- Traumatic or iatrogenic lesions;
- Osteomyelitis;
- Tuberculosis;
- Actinomycosis.

Case presentation

The patient was referred to me from overseas with a large mandibular fistula from which he had previously been misdiagnosed as an infection of the sub-mandibular gland. Surgery had been performed and the submandibular gland had been extracted. The wound had not healed and the clinical situation was fast worsening. Thus, the wound had opened and subincised with a heavy discharge of pus.

A dentist invited to see the pa-

Curettage of the sinus tract with a circular incision of the orifice of the cutaneous fistula and excision of its entire tract with all the ramifications cannot be considered to comply with the present standard of care. Unfortunately, cutaneous fistulas are sometimes treated as though they are independent dermatologic lesions with pathologic characteristics and treatment prognosis typical for mucosal fistula. However, even skin biopsy may produce unnecessary scarring.

Attempts to treat cutaneous fis-
tulae by themselves usually suffer from the cutaneous fistula usu-
ally seek treatment from a physician or a plastic surgeon instead of a den-
tist and often undergo multiple surgi-
cal excisions, multiple biopsies and antibiotic regimens with eventual re-
currence of the cutaneous sinus tract because the primary dental cause is frequently misdiagnosed.

The evaluation of a cutaneous sinus tract must begin with a thor-
ough patient history and awareness that any cutaneous lesion of the face and neck could be of dental origin.

The patient’s history may include complaints of dental problems. However, patients may have any history of an acute or painful onset. There may also be complaints of episodic bleeding or drainage from the cutaneous site with persistence of the cutaneous lesion. Occa-
sionally, there is a history of injury to the tooth.

Correct diagnosis is the key to treating this kind of lesion. A gentle digital finger pad pressure on the overlying region of the area suspected can create a discharge of pus. A Dentascan can provide reliable information that will help with the final diagnosis and the subsequent treatment plan. A correct diagnosis will lead to a simple, yet effective treatment—the removal of the infected pulp canal tissue from the root canal space—resulting in minimal cutaneous scarring.

Cutaneous sinus tracts of dental origin have been well documented in the medical literature, dental literature and dermatological literature. However, these lesions continue to be a diagnostic dilemma. Patients suffering from cutaneous fistulas usually seek treatment from a physician or a plastic surgeon instead of a dentist, and often undergo multiple surgical excisions, multiple biopsies and antibiotic regimens with eventual recurrence of the cutaneous sinus tract because the primary dental cause is frequently misdiagnosed.

The differential diagnosis of the cutaneous sinus of dental origin should be suspected by the gross appearance of the lesion. These cases typically present as erythematous, symmetrical, smooth, non-tender nodules of one to 20 mm in diameter with crusting and periodic drainage in some cases. The most characteristic feature of the nodule is its depression or re-
tection, bounded by a gutta-percha. This cutaneous retraction or dimpling is caused by the fixation of the tract to the underlying tissues and may be secondary to the healing process or a late finding in active disease. Lesions that previously underwent biopsy and treatment are usually characterised by the absence of at least part of the nodule and frequently by an orifice of draining sinus at the base of the fixed depression.

Endodontic infection, the prod-
cellular degeneration-bacterial tox-
ical lesions—and occasionally, the bacteria themselves within the canal spread through the apical foramen into the surrounding tissue. Thus, a slow inflammatory process begins in the tissue contained within the peri-
odontal ligament. Left to itself, it may manifest in a variety of ways, ranging from simple widening or thickening of the ligament to granuloma or cyst. Sometimes a fistula may develop, with the patient reporting intermittent dis-
charge of pus.

The fistula provides a means of continuous drainage of the lesion. The opening of the fistula may be found on the mucosa overlaying the tooth that sustains it, but often it may also be found at a considerable distance from the diseased tooth. In some cases, the fistula may run in the space of the per-
odontal ligament of the same tooth. It may even traverse the periodontal ligament of the adjacent tooth, thus simulating a lesion of peri-
odontal origin. In such cases, negative pulp tests performed on the crown of the mesial root and the upper para-
cone inserted into the fistula, assist in making the correct diagnosis.

If the drainage of the fistula is not continuous but intermittent, it is pre-
ceed by a slight swelling of the area as a result of the increased pressure of pus behind the closed orifice. When enough pressure is built up to rupture the thin wall of soft tissue, the suppurative discharge issues ex-
ternally through the small opening of the fistulous orifice. This orifice may heal and then re-open, only to re-open later. The discharge of pus is never accompanied by intense pain. At most, the patient will complain of slight soreness in the area prior to occasional episodes of suppuration. The pus creates a tract in the surrounding tissues, following the locus minoris resistenciae: It may exit, at any point, into the oral mucosa or even the skin. It is not uncommon, particularly in young patients, to find a cutaneous fistula at the level of the mental sym-
physis, if lower incisors are involved, or in the sub-mandibular region, if a lower first molar is involved. Also, it may be found in the floor of the nasal fossa, if a central incisor is involved.

In attempting to cure an extra-oral fistula, there are variables to be considered, such as the size of the orifice, the nature of the pus, the patient and the medical or surgical history. The orifice of a sinus tract may be from one to two millimetres in size, but often it may be several millimetres, even to one centimetre. A persistent sinus tract is never accompanied by intense pain.

The fistula provides a means of continuous drainage of the lesion. The opening of the fistula may be found on the mucosa overlaying the tooth that sustains it, but often it may also be found at a considerable distance from the diseased tooth. In some cases, the fistula may run in the space of the peri-
odontal ligament of the same tooth. It may even traverse the periodontal ligament of the adjacent tooth, thus simulating a lesion of peri-
odontal origin. In such cases, negative pulp tests performed on the crown of the mesial root and the upper para-
cone inserted into the fistula, assist in making the correct diagnosis.

If the drainage of the fistula is not continuous but intermittent, it is pre-
ceed by a slight swelling of the area as a result of the increased pressure of pus behind the closed orifice. When enough pressure is built up to rupture the thin wall of soft tissue, the suppurative discharge issues ex-
ternally through the small opening of the fistulous orifice. This orifice may heal and then re-open, only to re-open later. The discharge of pus is never accompanied by intense pain. At most, the patient will complain of slight soreness in the area prior to occasional episodes of suppuration. The pus creates a tract in the surrounding tissues, following the locus minoris resistenciae: It may exit, at any point, into the oral mucosa or even the skin. It is not uncommon, particularly in young patients, to find a cutaneous fistula at the level of the mental sym-
physis, if lower incisors are involved, or in the sub-mandibular region, if a lower first molar is involved. Also, it may be found in the floor of the nasal fossa, if a central incisor is involved.

In attempting to cure an extra-oral fistula, there are variables to be considered, such as the size of the orifice, the nature of the pus, the patient and the medical or surgical history. The orifice of a sinus tract may be from one to two millimetres in size, but often it may be several millimetres, even to one centimetre. A persistent sinus tract is never accompanied by intense pain.

The fistula provides a means of continuous drainage of the lesion. The opening of the fistula may be found on the mucosa overlaying the tooth that sustains it, but often it may also be found at a considerable distance from the diseased tooth. In some cases, the fistula may run in the space of the peri-
odontal ligament of the same tooth. It may even traverse the periodontal ligament of the adjacent tooth, thus simulating a lesion of peri-
odontal origin. In such cases, negative pulp tests performed on the crown of the mesial root and the upper para-
cone inserted into the fistula, assist in making the correct diagnosis.

If the drainage of the fistula is not continuous but intermittent, it is pre-
ceed by a slight swelling of the area as a result of the increased pressure of pus behind the closed orifice. When enough pressure is built up to rupture the thin wall of soft tissue, the suppurative discharge issues ex-
ternally through the small opening of the fistulous orifice. This orifice may heal and then re-open, only to re-open later. The discharge of pus is never accompanied by intense pain. At most, the patient will complain of slight soreness in the area prior to occasional episodes of suppuration. The pus creates a tract in the surrounding tissues, following the locus minoris resistenciae: It may exit, at any point, into the oral mucosa or even the skin. It is not uncommon, particularly in young patients, to find a cutaneous fistula at the level of the mental sym-
physis, if lower incisors are involved, or in the sub-mandibular region, if a lower first molar is involved. Also, it may be found in the floor of the nasal fossa, if a central incisor is involved.

In attempting to cure an extra-oral fistula, there are variables to be considered, such as the size of the orifice, the nature of the pus, the patient and the medical or surgical history. The orifice of a sinus tract may be from one to two millimetres in size, but often it may be several millimetres, even to one centimetre. A persistent sinus tract is never accompanied by intense pain.

The fistula provides a means of continuous drainage of the lesion. The opening of the fistula may be found on the mucosa overlaying the tooth that sustains it, but often it may also be found at a considerable distance from the diseased tooth. In some cases, the fistula may run in the space of the peri-
odontal ligament of the same tooth. It may even traverse the periodontal ligament of the adjacent tooth, thus simulating a lesion of peri-
odontal origin. In such cases, negative pulp tests performed on the crown of the mesial root and the upper para-
cone inserted into the fistula, assist in making the correct diagnosis.

If the drainage of the fistula is not continuous but intermittent, it is pre-
ceed by a slight swelling of the area as a result of the increased pressure of pus behind the closed orifice. When enough pressure is built up to rupture the thin wall of soft tissue, the suppurative discharge issues ex-
ternally through the small opening of the fistulous orifice. This orifice may heal and then re-open, only to re-open later. The discharge of pus is never accompanied by intense pain. At most, the patient will complain of slight soreness in the area prior to occasional episodes of suppuration. The pus creates a tract in the surrounding tissues, following the locus minoris resistenciae: It may exit, at any point, into the oral mucosa or even the skin. It is not uncommon, particularly in young patients, to find a cutaneous fistula at the level of the mental sym-
physis, if lower incisors are involved, or in the sub-mandibular region, if a lower first molar is involved. Also, it may be found in the floor of the nasal fossa, if a central incisor is involved.

In attempting to cure an extra-oral fistula, there are variables to be considered, such as the size of the orifice, the nature of the pus, the patient and the medical or surgical history. The orifice of a sinus tract may be from one to two millimetres in size, but often it may be several millimetres, even to one centimetre. A persistent sinus tract is never accompanied by intense pain.
An intermittent paste was injected inside the shaped root canal system. The paste of two different antibiotics (Augmentin and Metronidalone) was manually mixed and injected with a paste filler. A hermetic temporary filling was placed for a week. The wound was covered with a dressing of steroids and antibiotic paste to prevent further external infection. A week later, the patient was already showing good progress. The wound had started to close and less inflammation and swelling were observed (Fig. 5). The root canal was reopened and cleaned, and no internal fluids were coming from the periapical region. Root canal material was used as obturation material in a vertical condensation using RCSL (Hofriedly) and an immediate build-up was performed. Thereafter, the patient was invited for regular control check-ups. A few weeks later, a post-op X-ray (Fig. 6) and photos were taken. The wound seemed to be in good condition and some skin and fibrous tissues were forming.

While I was writing this article, the patient visited Beirut and decided to come in for a check-up. He complained of a muscle disturbance of his lower lip, but all the previous numbness had disappeared. He agreed to perform an i-Cat scan in order to find out what was going on and to detect any pathology. I was amazed by the bone formation and complete healing (Figs. 7–9). The wound had also healed very well (Figs. 10a & b). I contacted a plastic surgeon and asked his opinion regarding the muscle disturbance. He pointed out that such symptoms may be caused by the tremendous loss of structure.

**Discussion**

An important diagnostic modality is the determination of the nature of fluid draining (if any) from the cutaneous sinus. During palpation, an attempt should be made to milk the sinus tract. Any discharge obtained should be scrutinised to determine its nature (saliva, pus or cystic fluid). Culture and sensitivity testing of the fluid should also be performed to rule out fungal and syphilitic infection.

Laskin elaborates on the physiological and anatomical factors that influence the spread and ultimate localisation of dental infections. Stout and Solomon also emphasise that the ultimate path of the sinus (irrespective of the source) depends on several factors: most importantly, the anatomy of the tooth involved, muscular attachments to the jaw, fascial planes of the neck, and involvement of permanent or deciduous teeth. Cutaneous rather than intra-oral lesions are likely to occur if the spires of the teeth are superior to the maxillary muscle attachments or inferior to the mandibular muscle attachments.

A fistula is the most common of all purulent draining lesions and is readily recognised by its superficial location and short course. Actinomyces 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 actinomyces (Fig. 5).

The challenge in these kinds of cases is to assemble all the pieces of the puzzle and build up a full idea of the clinical situation. Assembling the pieces means that all the diagnostic materials, such as a history questionnaire, X-rays, CT scans, and sometimes biopsy and bacteria culturing, must be provided in order to establish a correct diagnosis. Most of the time, the solution will only be a simple routine that must be performed in certain conditions. Turning to solutions that are more complicated—and that certainly can be more profitable—is not always the right choice, nor is the most ethical one.

The author would like to thank Yulia Vorobyeva, PhD, interpreter and translator, for her help with this article.