

A Novel Tracing Method in Differentiating between Ectopic Odontogenic Fistulous and Sinus Infections

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Introduction

Odontogenic fistulous or sinus tract is one of the manifestations of chronic dental infections, which provides a path for drainage of pus, and infection. The opening of an odontogenic fistulous or sinus tract can be located either eutopic or ectopic. It depends on the location of the perforation in the cortical plate by the inflammatory process and its relationship to facial muscle attachments. An intraoral opening (parolis) usually indicates presence of necrotic pulp, chronic apical abscess, root fracture, periodontal abscess or even oroantral fistula [1,2].

Traditional wire or gutta percha marker placed in the fistulous or sinus tract assists in radiographic localization of the source of the infection [3,4]. In order to study the topography and extent of sinus tract, we suggest a novel gutta percha-Vitapex marker for tracing the sinus tract. The flowing ability, color and radiographic contrast of Vitapex paste assists the semisolid gutta percha cone in three-dimensional tracing. Vitapex (Neo Dental Chemical Products, Tokyo, Japan) is a radio-opaque paste containing a viscous mix of calcium hydroxide and iodoform in a syringe with disposable tips. The main ingredients of Vitapex are iodoform 40.4%, calcium hydroxide 30.3%, and silicone 22.4%. Vitapex, when extruded into tracts, either can diffuse away or be resorbed in part by macrophages in as short a time as one or two weeks [5-8]. Vitapex paste is used because of its easy delivery system and the clinical beneficial effect of disinfection. Because of the paste's flowing ability, the marker is able to traverse the tract system through the main tract to the branches.

An ectopic fistulous or sinus tract may be confused with a healthy tooth or implant. Many patients with ectopic fistulous or sinus tract undergo multiple inappropriate therapies before the correct diagnosis of the source of the lesion. Thus, it is important for clinicians to evaluate the prevalence of ectopic sinus tract in the society in order to promote the quality of diagnosis and treatment. A literature review revealed that only a few case reports have dealt with ectopic fistulous and sinus tracts [3,4,9-12]. However, the relationship between clinically detected lesions and factors such as sex, age, tooth type and location has not been investigated.

Case Report

A 28-year-old female had a chief complaint of constantly recurring pustule for two years at the mucosa of right maxillary second premolar (Figure 1).



Figure 1: Intraoral view showing infectious tract opening at the mucosa of tooth 15.

Further questioning revealed that the pustule used to heal spontaneously within 30 days of eruption and then again exuberated thereafter. A thorough medical history disclosed that the patient had been under endodontic treatment on tooth 15 for 3 years from a private practitioner and the constantly recurring pustule, which did not yield any positive outcomes. Additionally, the patient had no smoking history. Intraoral examination revealed a deep composite resin restoration on tooth 14. On suspecting the patient's odontogenic infectious tract to be of ectopic origin, we went in for further investigations. Initially, we performed the pulp vitality test with the help of heated gutta percha and electric pulp tester to find the negative results for tooth 14 indicating pulpal necrosis or dental abscess. Intraoral periapical (IOPA) radiograph and Cone beam computed tomography (CBCT; Newtown Bucks County, PA) showed no distinct periapical and periodontal pathosis in relation to tooth 14,15 (Figures 2-4).

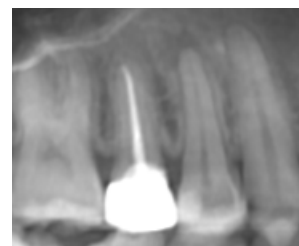


Figure 2: Intraoral periapical radiograph showed no distinct periapical and periodontal pathosis in relation to tooth 14, 15.

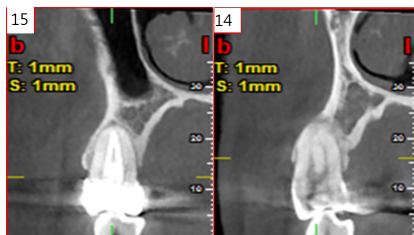


Figure 3: CBCT showed no distinct periapical and periodontal pathosis in relation to tooth 14,15.



Figure 4: CBCT showed no distinct infectious tract system in relation to tooth 14,15.

We injected the Vitapex into infectious tract prior to gutta percha cone inserting. After traced with novel gutta percha-Vitapex marker, the re-examination of above-mentioned investigations further confirmed the diagnosis of an ectopic odontogenic origin in relation to the right maxillary first premolar escaping through the right maxillary second premolar (Figures 5-8).

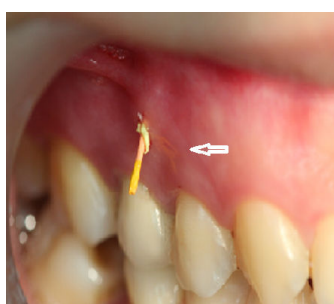


Figure 5: The novel tracing method showing superficial fistulous tract system with opening at the mucosa of tooth 15.



Figure 6: Intraoral periapical radiograph showed distinct periapical pathosis in relation to tooth 14.

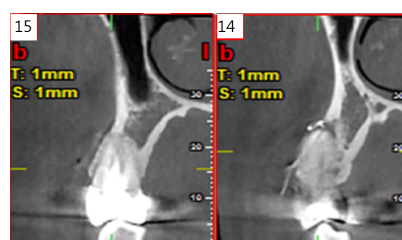


Figure 7: CBCT showed distinct periapical pathosis in relation to tooth 14.



Figure 8: The novel tracing method showing deep sinus tract system with opening at the mucosa of tooth 15.

Discussion

It is extremely important to distinguish between fistula and sinus, but this may not be easy, as the internal opening of a fistula may be difficult to demonstrate and detect. A fistula is an abnormal communication pathway between two internal organs or from one epithelial lined surface to another epithelial lined surface [13]. A sinus tract is a pathway from an enclosed area of infection to an epithelial surface; opening or stoma may be intraoral or extra oral and represents an orifice through which pus is discharged; usually disappears spontaneously with elimination of the causative factor by treatment [14]. Accurate detection of any associated infection or complex extensions of the sinus or fistula is paramount for successful treatment. Failure to do this will result in recurrence of the sinus at either the same site or an adjacent location.

Odontogenic infection is often accompanied by drainage of the suppuration by fistulous or sinus tract. Thus an accurate diagnosis is

important because the ectopic tract may be derived from root fracture induced pathosis, implantitis, periodontitis, apical periodontitis, residual root infection of an adjacent odontogenic tissue, etc. The inflammatory stage of the ectopic tract and the position of the orifice of the tract can markedly vary due to a number of factors [12].

In this case sinus tract had intraoral opening. The sinus tracts had been traced with gutta percha-Vitapex marker and radiographs had been taken. The clinician must take into consideration that the location of the tract opening does not necessarily indicate the origin of the infection source. The etiology could be confirmed by tracing the sinus tract to its origin with gutta percha-Vitapex radiopaque marker, by radiographic examination and by pulp vitality testing. Bonness and Taintor (4) reported an ectopic sinus tract case in maxillary anterior region. In ectopic tract cases, the flowing ability of the marker is important to trace the involvement of surrounding tissue. Because the default of radiographic resolution, it is important for meticulous visual examination of the mucosal color contrast under gutta percha-Vitapex marker. The topography of ectopic tract is even more complex than eutopic tracts.

Conclusion

Ectopic fistula and sinus occurring are complications of chronic supportive infection. It was difficult to manage successfully without meticulous diagnosis. The ectopic fistulous and sinus tract are not uncommon. The topography and extent of tract is complex. The novel tracing method with gutta percha-Vitapex marker has advantage in detecting tract branching and topography. The tract is a system in nature.

The ectopic tracts for odontogenic infection are not in stomas exactly opposite to the causative teeth, which have resulted in numbers of misdiagnosis cases. We classified them into ectopic fistulous tract, ectopic sinus tract, and mixed type. We presented a mixed type with superficial fistulous and deep sinus tract system. Healthy gingival or mucosa tissue may become a stoma for the tract of odontogenic infection of an adjacent tooth, which manifests as a lesion resulting from periodontal pathosis. Different drainage pathways of periodontal infection mainly related to factors including previous infectious topography, gravity, barriers against the infection, and the causative tooth itself. We presented a novel method facilitating in differentiation three kinds of infectious tracts. It is not only improving in radiographic contrast also in visual examination.

Disclosure

The authors claim to have no financial interest, either directly or indirectly, in the products or information listed in the article.

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