Case Report

Multiple Sinus Tracts Associated with a Non-vital Maxillary Second Molar: A Rare Clinical Finding

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Abstract

Introduction: Sinus tracts are routes of purulent drainage, which are supposed to be related to a specific source of infection. To the best of the authors' knowledge, there have been no documented cases of multiple intra-oral sinus tracts arising from a non-vital maxillary molar. This observation highlights a unique clinical scenario that has not been previously reported in the literature.

Case Presentation: A rare case with three intra-oral sinus tracts, all related to a non-vital, previously pulp-capped maxillary second molar is presented. After a two-visit root canal treatment, sinus tracts were closed and patient's symptoms relieved. In such cases, a proper disinfection of the root canal system combined with an ideal obturation of the prepared canals would be required.

Conclusion: Necrotic maxillary molars might be associated with multiple sinus tracts.

Key Words: Endodontics, pulp, sinus tract, necrosis, root canal treatment

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Introduction

A sinus tract is the pathway through which an enclosed area would be related to an epithelial surface (1). When an endodontic infection becomes chronic, a communication between the root canal system and gingival or cutaneous surfaces may occur, which is known as an intra- or extra-oral sinus tracts, respectively (2). The intra/extra-oral drainage of a sinus tract basically depends on the tooth type, the position of tooth apices, virulence of the bacteria, decreased immunity of the host, and the least resistance provided by adjacent structures (3). Commonly there is a single intra-oral sinus tract. However, multiple intra-oral sinus tracts related to a single tooth have been reported in few case reports (4-6).

When a clinician faces a sinus tract, the most critical point to be recognized would be the origin of the sinus tract (7). In order to trace the tract, the clinician needs to insert a gutta-percha (8) or orthodontic wire (9), i.e. something thin, flexible, and radio-opaque, into the tract. By taking a tracing radiograph the origin would be discovered. Once the appropriate treatment plan is implemented and the origin of infection is removed the stoma and the sinus tract will disappear within several days (2).

The following case report presents a maxillary second molar with three sinus tracts, which has been managed with non-surgical endodontic treatment.

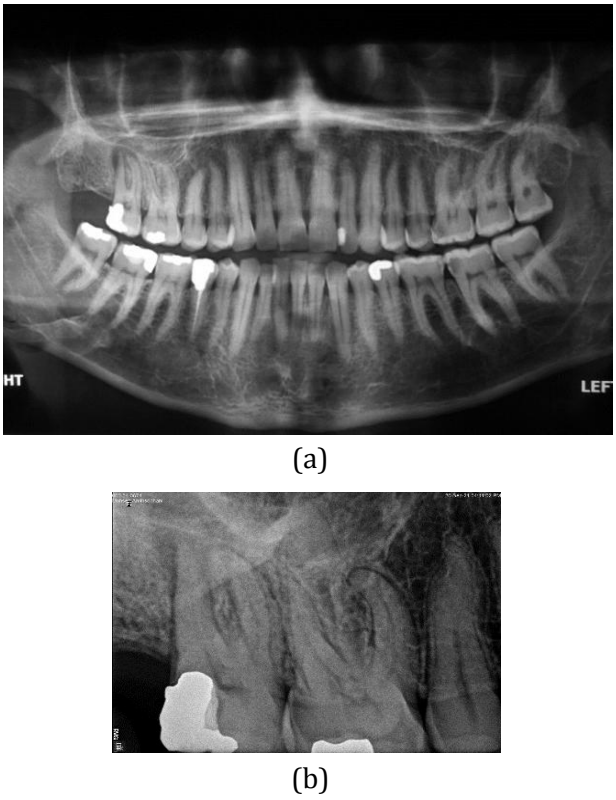
Case Presentation

A 41-year-old female was referred complaining of a past history of localized, constant, pulsating pain on tooth No. 2 that disappeared with time. According to the medical history the patient was ASA I, with no specific systemic disease. She gave a history of direct pulp capping in tooth No. 2 two years ago. The clinical examinations revealed a negative response to sensibility tests, pain on percussion, and three sinus tracts in posterior right side of maxilla (Figure 1).

(a) (b)

Figure 1. (a) buccal and distal sinus tracts, (b) distal and palatal sinus tracts

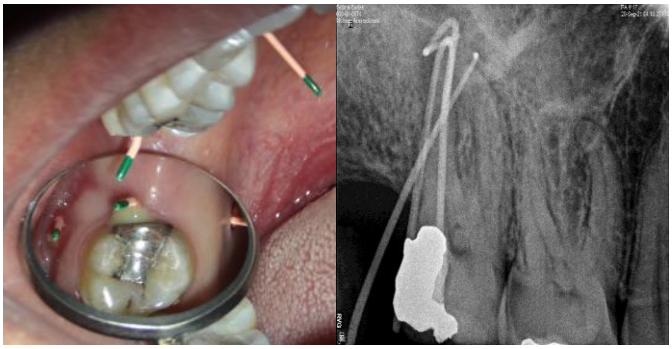
In the radiographic examinations, PDL widening and a diffuse radiolucency in the periapical area were present (Figure 2). Sinus tracts were traced using #35/0.02 tapered gutta-percha cones, and a radiograph was taken (Figure 3). Probing depths around the tooth were within normal limits. According to the examinations on tooth No. 2, pulpal status was diagnosed as being “necrotic” and the periapical status was diagnosed as having a“chronic apical abscess”.
After posterior superior alveolar nerve block injection of a cartridge of 2%lidocaine with 1:80,000 epinephrine (Persocaine-E; Daroupakhsh, Iran), access cavity was prepared, under rubber dam isolation. Four root canals including first and second mesiobuccal, distobuccal, and palatal canals were negotiated. The canals were prepared using A1 (NEOLIX, Châtres-la-Forêt, France) rotary files, and GPS (NEOLIX, Châtres-la-Forêt, France) as rotary



(a)

(b)

Figure 2. Radiographs; (a) panoramic view, (b) peri-apical view



(a) (b)

Figure 3. Tracing the sinus tracts

path files. During preparation, canals were irrigated by 5.25% sodium hypochlorite solution. Due to the continuing purulent discharge in the apical third of the palatal canal, canals were filled with a creamy mixture of calcium hydroxide powder and 2% chlorhexidine gluconate solution. Access cavity was sealed with a reinforced zinc oxide eugenol

cement. Sinus tracts were closed after two weeks (Figure 4). At this session after final shaping with A1 rotary instruments (NEOLIX, Châtres-la-Forêt, France) , canals were obturated using gutta-percha and CeraSeal (META BIOMED, Korea) with single cone obturation technique (Figure 5).

(a) (b)

Figure 4. After two weeks, buccal and distal sinus tracts disappeared and palatal sinus tract is not open any more

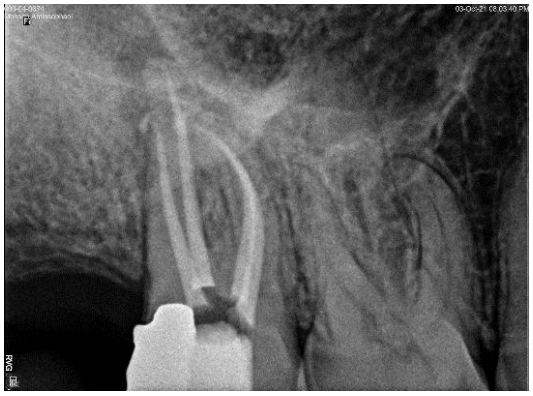


Figure 5. Final periapical radiograph after obturation

In two-month follow-up sinus tracts were completely disappeared and patient had no symptoms.

Discussion

Peri-radicular infections with endodontic origin may occur following pulpal necrosis due to caries, trauma, thermal, and chemical injuries. If the infection becomes established with a chronic behavior, a sinus tract may form through which purulent drainage would take place (10). Sinus tracts may be manifested as an intra-oral or extra-oral stoma, simply an isolated periodontal pocket, or a localized sinusitis. The pattern of sinus tract formation mainly depends on the adjacent anatomical structures. Presence of multiple intra-oral sinus tracts related to a single tooth is a rare finding.

Direct pulp capping is suggested as an effective treatment approach in the teeth with deep caries and pathological pulp exposures, as long as the pulpal diagnosis is reversible pulpitis. In a recent systematic review, success rates for DPC with calcium hydroxide, MTA and Biodentine at 2-to-3-year follow up were 59%, 84% and 86% respectively. This rate is affected by not only the capping material, but also the disinfection protocol, age of the patient, pulpal status, and the depth of caries penetration (11). The present case had undergone a direct pulp capping 2 years ago, in which pulpal tissue failed to survive.

Management of a sinus tract includes draining the pus and removing the source of infection. Antibiotics prescription is not suggested routinely. Recognition of the true nature of the lesion leads to prompt treatment, less patient discomfort and fewer esthetic problems, significantly reducing the possibility of further complications (12). On the other hand, in cases with resistant sinus tracts, actinomycosis should be ruled out. In such cases, surgical curettage and antibiotics prescription would be required (13). The present case respond favorably to non-surgical endodontic treatment. No more interventions, including antibiotics prescription, were required.

Multiple-visit treatment in all infected cases has not been supported as a more predictable option in comparison with single-visit treatment (14). Persistent pus drainage, as observed in the present case, is a contraindication for single-visit treatment. Calcium hydroxide, as an intracanal medicament, has been reported to be effective in root canal disinfection owing to its alkaline pH and anti-endotoxin features (15). Using 2% chlorhexidine gluconate as a vehicle for calcium hydroxide has been suggested to be effective in the management of persistent infections (16-18). In the present case a creamy mixture of calcium hydroxide with 2% chlorhexidine

gluconate was used as an intracanal medicament due to the persistent purulent discharge during the first session of the treatment.

Conclusion

The presence of multiple sinus tracts associated with a single tooth presents significant challenges not only in diagnosis but also in management. Accurate recognition of the lesion's true nature is crucial, as it facilitates prompt and effective treatment, thereby minimizing patient discomfort and reducing esthetic concerns. Moreover, timely intervention significantly lowers the risk of further complications. This case underscores the importance of thorough clinical examination and appropriate endodontic therapy in managing complex dental infections. Ensuring proper disinfection and obturation of the root canal system is essential for successful outcomes in such unique clinical scenarios.

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