Case report

Non-invasive management of extra-oral sinus with Radix-Entomolaris: A case report

ABSTRACT:

Endodontic failure is caused by a variety of factors such as improper mechanical debridement, bacteria persistence in the canals, poor obturation quality, under and overextension of the root canal filling, and coronal leakage. Clinically, the extraoral sinus tract of endodontic origin is confused with the cutaneous origin and sometimes it may get misdiagnosed. As a result, any cutaneous sinus tract involving the face or neck must be investigated for a dental cause. This case report describes the non-surgical management of an extra-oral sinus tract of odontogenic origin, which was the cause of long-standing endodontic failure.

KEYWORD: Extra-oral sinus tract, non-surgical endodontic management, radix entomolaris, calcium hydroxide dressing, triple antibiotic paste

INTRODUCTION:

The primary aim of endodontic treatment is to correctly diagnose, optimal mechanical and chemical preparation, and three-dimensional obturation of the root canal space.[1] The main objective of root canal therapy is to fill or seal all the root canals and form a hermetic seal on the apical foramen of the tooth to prevent peri-radicular tissue leakage and secondary infection.[2] The persistence of microbial infection in the root canal system and/or peri-radicular region is the main factor associated with endodontic failure. So, to prevent bacteria and their byproducts from invading the apex, a tight fluid-tight seal is required.[3] However, persistent microleakage which remains unnoticed or asymptomatic might leads to disease

progression to periodontal lesions such as apical periodontitis, periapical abscess, or sinus tract leading to fistula.

The term Sinus tract "refers to a pathway leading from an enclosed area of inflammation to an epithelial surface" Odontogenic dermal sinus tracts are rare dermatoses caused by chronic dental draining infections, particularly apical periodontitis.[4] The most effective treatment modality for draining sinus discharge is root canal treatment, which eliminates the infection source. In the case of a non-vital tooth, non-surgical care should always be the first option, and bacterial eradication is the key to infection recovery.[5]

This case report describes the non-surgical management of an odontogenic cutaneous sinus tract prompted by an inadequate coronal seal.

CASE REPORT

A thirteen-year-old female patient had reported to the Department of Pedodontics and Preventive dentistry with a chief complaint of pus drainage on the left lower jaw region. History of presenting illness reveals that the patient had pus discharge for 3 months, while it started as small swelling with mild discomfort in the left lower jaw. Soon after, it established into a skin lesion along with sinus drainage which was alternatively appearing and disappearing. The patient has taken over-the-counter medication after which the sinus tract did not subside.

On extra-oral, examination, gross facial asymmetry was noted due to swelling on the left side of the cheek region with ill-defined margins. A well-defined ulceration/scar was noticed 1 cm below the inferior border of the mandible and measured about 2×3 cm (oval in shape) in diameter. There was a local rise in

temperature was noted. On palpation, the nodule was soft, tender and elicitated a purulent discharge from it. (figure 1)

On intra-oral examination, there was temporary restoration left on the walls in relation to 36. On percussion, the tooth was tender. On radiographic examination, there was an indication of previous root canal treatment and the presence of a distolingual root, indicating radix entomolaris. It reveals ill-defined radiolucency involving the disto-lingual root in the peri-apical region (Figure 2). For the diagnostic purpose, sinus tract-tracing was done with a gutta-percha which was inserted until the resistance was felt. The cone extent till the distal lingual root of 36, thus confirming sinus was related to disto-lingual 36. A provisional diagnosis of dentoalveolar abscess with extraoral sinus in radix -entomolaris was made based on the history and clinical examination.

The treatment plan was initiated with re-root canal treatment. The previous gutta-percha was removed using an H-file. The working length was estimated using the radiographic method. Cleaning and shaping of the canals were done with intermediate copious irrigation of sodium hypochlorite followed by saline irrigation. Initially, a triple antibiotic paste was prepared using ciprofloxacin (500mg), metronidazole (400mg), and minocycline (100mg) were mixed with saline media and placed in the root canal. Following after 1 week, calcium hydroxide dressing was given for 4 weeks. There was evidence of resolution of the sinus tract after calcium hydroxide dressing in about one month. (Figure 3,4)

Subsequently, the root canal was obturated with Gutta-percha using a single cone condensation technique with a Zinc-oxide eugenol-based sealer and the cavity was sealed with a temporary restoration. The next day tooth was restored using a preformed stainless-steel crown. After 6 months of the placement of the stainless steel,

crown-appreciated satisfactory healing was noted with an increase in radiopacity at the periapical region. (Figure 5,6)

DISCUSSION

A chronic dentoalveolar abscess is a long-standing infection of the peri-radicular tissue caused by acute non-suppurative periodontitis, acute pulpitis, and acute exacerbation of periapical abscess, granuloma, or cyst.[6] An intra-oral or extra-oral sinus develops depending on the direction of the inflammation, which is governed by supporting muscular attachment and facial planes. The apices of the teeth, which are located far below muscle attachment of the mandible and above in the case of the maxilla, cause the infection to spread extra-orally. The odontogenic infection spread from the apex of the tooth into the surrounding bone, then laterally or medially along the path of least resistance.[7]Dental sinuses are frequently located near to the tooth that is causing the problem. Kaban et al, noticed that sinus tracts were more commonly seen in mandibular teeth (80%) than in maxillary teeth (20%).[8]

The cause of the endodontic failure, in this case, was an insufficient coronal seal. Magura et al. investigated human saliva coronal leakage in endodontically restored teeth. They discovered that saliva penetration was significantly higher at 90th days than at 2, 7, 14, and 28 days. This study suggested that obturated root canals that have been subjected to the oral environment for more than three months should be re-treated before permanent coronal restoration is placed.[9]

According to Bender et al., these sinus tracts were previously assumed to be lined by epithelium and thus require surgical repair in addition to endodontic treatment. However, subsequent research revealed that it was lined by granulation

tissue rather than epithelium, enabling it to be treated non-surgically. [10] So, the choice of treatment in the present case report was a non-surgical intervention

Conservative non-surgical root canal treatment is often the treatment of choice if the diseased tooth is restorable. The treatment of an infection-caused periapical lesion consists of two steps procedure: First, antibiotics are used to treat bacteria, followed by a chemical disinfectant using calcium hydroxide.[11] In our case, calcium hydroxide and iodoform–silicone-based oil paste was used (METAPEX) for intracanal medicament placement. The sinus opening healed in about thirty days with satisfactory healing of the extraoral sinus was noted with minimal scar formation. These products are used as a temporary filling material after pulpectomy and it has shown excellent antibacterial and bacteriostatic properties. Its high pH neutralized the endotoxins produced by anaerobes and the H+ ion enhances the tissue enzyme activity such as alkaline phosphate and silicone oil lubricant ensuring complete coating of canal walls and solubilizing calcium hydroxide remain active in the root canal which promotes a favorable environment for osseous repair.[11,12]

The use of a mixture of antibiotics locally promotes healing of the pulp, peri-radicular tissue, and bone is referred to as lesion sterilization and tissue repair. As a result of using a combination of antibiotics, this method may minimize the chance of even resistant microbes sustaining. It promotes tissue repair and regeneration by delivering antimicrobials to the sites of infection, thus creating a synergistic effect. Metronidazole was selected as the first-line treatment because it is selectively toxic to anaerobic microorganisms and has the ability to penetrate deeper into dentin. Ciprofloxacin on the other hand has high antibacterial activity against Gram-negative microbes but has low affinity against Gram-positive bacteria.[13]

Several more methods have been developed, such as peri-apically reaching beyond the root canal and perforating it, draining the abscess through an orthograde manner, and thus creating an extraoral pathway. Furthermore, when conservative treatment fails, more invasive treatment is required, which may necessitate tooth structural loss and bone grafts. Orthograde root canal therapy is becoming the norm, with surgical revision reserved for cases that do not heal. This case results thus highlight the non-conservative management of extra-oral sinus tract

CONCLUSION

Proper diagnosis is essential for successful planning of odontogenic cutaneous sinus tracts of endodontic origin, as the odontogenic sinus tract often recurs if the underlying dental cause is not resolved. A clinician should always have sound knowledge of anatomic variations as well as internal morphology. The possibility of extra roots should be considered to avoid confusion during the negotiation of the canals. The 3-D analysis serves a better picture for analysis of the internal as well as external morphology of the root canal and should be considered. The main aim should be to attain a coronal and hermetic seal with full crown restoration after endodontic treatment. The case with endodontic failure should be diagnosed first with non-surgical intervention and should be considered as the first line of treatment. Unlike the intra-oral sinus tract, the extra-oral sinus tract heals with granulation tissue leaving a scar so scar revision should be considered according to patient needs.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

Ethical Approval:

As per international standard or university standard ethical approval has been collected and preserved by the author(s).

Consent:

The patient's written inform consent was taken to care out the study.

REFERENCES

1. Yamaguchi M, Noiri Y, Itoh Y, Komichi S, Yagi K, Uemura R, Naruse H, Matsui S, Kuriki N, Hayashi M, Ebisu S. Factors that cause endodontic failures in general practices in Japan. BMC oral health. 2018;18(1):1-5.
2. Khurayzi TA. The Prevalence of Radix Entomolaris (RE) in the Mandibular Permanent First Molars among the Saudi Arabian Population–A Systematic Review. Saudi J Oral Dent Res. 2021;6(1):22-30.
3. Chaurasiya S, Yadav G, Tripathi AM, Dhinsa K. Endodontic failures and its management: a review. Int J Oral Health Med Res. 2016 Feb;2(5):144-148.
4. Malhotra S, Sirohi R. Management of an odontogenic cutaneous sinus tract with surgical endodontic intervention. Guidant. 2020 Apr 1;13(5):1-5
5. Siqueira Jr JF. Etiology of root canal treatment failure: why well-treated teeth can fail. Int Endod J. 2001 Jan;34(1):1-10.
6. Varghese LL, Bhattacharya A, Sharma P. Non-surgical management of an extraoral cutaneous sinus tract of odontogenic origin. BMJ Case Reports CP 2020;13(7):1-7
7. Keerthana G, Duhan J, Sangwan P, Yadav R. Nonsurgical management of cutaneous sinus tract of odontogenic origin: A report of two cases. J Conserv Dent. 2021 Mar-Apr;24(2):219-222.

8. Kaban LB. Draining skin lesions of dental origin: the path of the spread of chronic odontogenic infection. Plast Reconstr. 1980;66(5):7-11.
9. Magura ME, Kafrawy AH, Brown CE, Newton CW. Human saliva coronal microleakage in obturated root canals: an in vitro study. J Endod. 1991 Jul 1;17(7):324-331.
10. Bender IB, Seltzer S. The oral fistula: Its diagnosis and treatment. Oral Surg Oral Med Oral Pathol. 1961; 14: 1367-76
11. Al Khasawnah Q, Hassan F, Malhan D, Engelhardt M, Daghma DE, Obidat D, Lips KS, El Khassawna T, Heiss C. Nonsurgical clinical management of periapical lesions using calcium hydroxide-iodoform-silicon-oil paste. Biomed Res. Int. 2018;2:1-8.
12. Xia X, Man Z, Jin H, Du R, Sun W, Wang X. Vitapex can promote the expression of BMP-2 during the bone regeneration of periapical lesions in rats. J Ind Soc Pedod Prev Dent. 2013 Oct 1;31(4):249-253
13. Padhye L, Jagan IN, Unnikrishnan P, Mandke L, Kulkarni R, Toprani N. Management of extraoral sinus via nonsurgical root canal treatment. Indian J Oral Health Res. 2018 Jul 1;4(2):66.

Figure 1: Pre-operative view of the draining sinus

Figure 2: pre-operative radiograph of 36 with periapical radiolucency

Figure 3: 1-month follow-up after Calcium hydroxide dressing

Figure 4: 1-month follow-up after calcium hydroxide dressing

Figure 5: Complete healing of the lesion with minimal scar after 6 months of follow-up

Figure 6: Postoperative radiograph after 6 months follow-up