

Non-Surgical Endodontic Management of an Orofacial Lesion by Using Triple Antibiotic Paste as an Intracanal Medicament

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Abstract

Cutaneous fistula of odontogenic origin arises as a sequel of microbial invasion of the dental pulp. After pulp becomes necrotic, infection spreads into the periradicular area which results in the formation of sinus tracts that drain intraorally through mucosa or extra-orally through skin. An extra oral sinus tract from a lesion of endodontic origin is rare. To confirm the dental etiology of an extra-oral sinus, tracing of the sinus tract with a gutta-percha point or similar radiopaque material by radiographic examination and pulp vitality testing is done.

Such lesions can be managed by removal of the source of dental infection or extraction of the involved tooth. To eliminate the source of dental infection by using various instrumentation techniques, different irrigation regimens, and intra-canal medicaments have been suggested. Complete healing of an extra-oral sinus indicates the adequacy of the disinfection procedure. Selection of intra-canal medicament depends upon the precise diagnosis of the tooth condition, knowledge of the type of microorganisms involved and their mechanisms of growth and survival in dental as well as various skin infections. Various intra-canal medicaments, apart from

antibiotics and calcium hydroxide have been used in an attempt to accomplish the above aim. Triple antibiotic paste (TAP) can be used in such cases, which contains metronidazole, ciprofloxacin and minocycline, as a root canal medicament, due to its antimicrobial effect.

This case report highlights the non-surgical endodontic management of an extra-oral cutaneous sinus tract by using triple antibiotic paste as an intra-canal medicament.

Keywords: Extra-oral cutaneous sinus tract, Triple antibiotic paste, Intra-canal Medicament.

Key Message: Dental etiology should be considered as a part of a differential diagnosis for any orofacial skin lesion. Correct diagnosis and treatment will result in predictable and rapid healing of these lesions. The elimination of infection through nonsurgical root canal treatment led to the resolution of the sinus tracts and promoted periapical healing of the teeth involved as reported in the literature.

Introduction

A cutaneous sinus tract of odontogenic origin is a relatively uncommon condition and tends to be misdiagnosed easily.[1]

The most common cause of a cutaneous sinus tract is a chronic periradicular abscess; these abscesses arise from bacterial invasion, chemical irritation, or trauma.[2]

Depending on the path with the lowest resistance, the sinus tract opening may be located intraorally or extraorally.[3]

These tracts tend to occur more frequently from infected mandibular teeth (80%) than from infected maxillary teeth (20%).[4] Dental etiology can be confirmed by tracing the sinus tract to its origin with gutta-percha or similar radiopaque material, by radiographic examination and by pulp vitality testing.[1]

In the medical literature, approximately half of the patients reported as having a cutaneous sinus tract of dental origin have undergone multiple unsuccessful attempts at incision and drainage and numerous lengthy trials of antibiotics. When the lesion is recognized early and diagnosed properly and appropriate dental therapy or extraction of the infected tooth is performed, the cutaneous sinus resolves rapidly. [5] Hence this case report highlights the non-surgical endodontic management of an extraoral cutaneous sinus tract by using triple antibiotic paste as an intracanal medicament.

Case History

A 17-year-old male patient reported to the department of Conservative Dentistry and Endodontics with chief complaint of swelling on the right cheek and pain on mastication in lower right back teeth region of the jaw; along with extraoral purulent discharge from the same region of the jaw since last 3 days. Medical history was non-contributory. On extraoral examination, swelling was observed which was about 1.2-1.5 cm in width and 2-2.5 cm in length with punctum, pinkish red in color. (Figure 1).



Figure 1: Extra oral swelling.

On intraoral examination deep occlusal caries with permanent mandibular right first molar (46) and tooth were slightly sensitive to percussion and palpation. The

concerned tooth was nonresponsive to thermal and electric pulp testing. Gingival sulcus probing depth was within normal limits. On radiographic examination, 46 ill- defined radiolucency was seen in the periapical region of mesial and distal root of 46. (Figure 2).



Figure 2: Pre-Operative Intraoral Periapical Radiograph (IOPA) with 46.

Based on clinical and radiographic presentations, a final diagnosis of pulpal necrosis with chronic periapical abscess associate with extraoral sinus tract with 46 was arrived at.

After obtaining patient consent, root canal treatment was initiated with pulp chamber access under the rubber dam (Hygienic, Coltene Inc, USA) isolation. Canals were irrigated copiously with normal saline (NS) (Influtec healthcare limited, Indore) as there was pus discharge from canal orifice. The canals were cleaned and shaped by using crown down technique. Sterile calcium hydroxide (CH) (Prime Dental Products, Thane, India) mixed with NS to a thin consistency was placed in the root canals. At the second visit the access cavity was observed under dental operating microscope (DOM) (Carl Zeiss PICO). Troughing was done for mid mesial canal under DOM by using ultrasonic handpiece and ET 18 D tip (Satelec. Acteon, Merignac, France). Mid mesial canal was located under DOM (Figure 3)

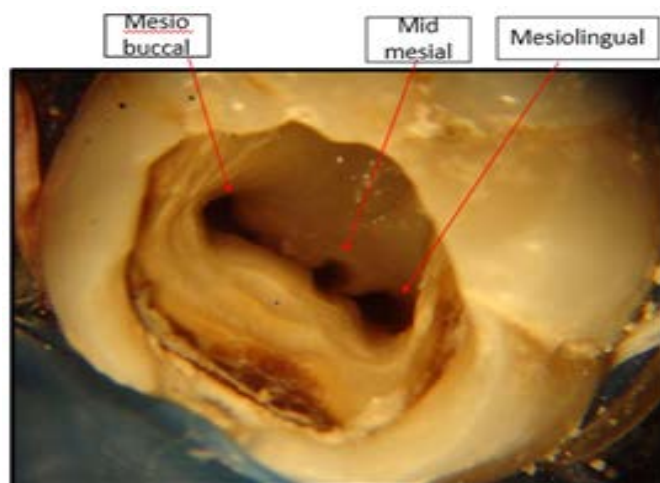


Figure 3: DOM image showing Mesiobuccal, Midmesial, Mesiolingual canal.

At zero reading in EAL radiograph was taken and working length confirmed with respect to middle mesial canal shown in figure no.4a.

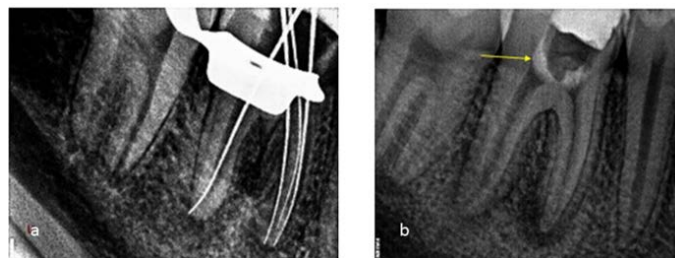


Figure 4: a) IOPA Showing Working Length Determination b) RMGIC barrier at the canal orifice level.

The middle mesial canal was found to be confluent with Mesiolingual canal. After completion of canal cleaning and shaping it was decided to place triple antibiotic paste (TAP) as the patient's symptoms had not resolved at that stage. The root canals were irrigated with 5 - 10 mL of 2.5 % sodium hypochlorite (NaOCl) (Trifarma Pvt Ltd, Bhiwandi, India) followed by NS. Smear layer was removed with 1 mL of 17 % Ethylene diamine tetra acetic acid (EDTA) (Prime Dental Products, Thane, India) for 1 minute followed by 5 mL of 2.5 % NaOCl. Following irrigation, TAP was placed. Armamentarium for triple antibiotic paste is shown in figure no. 5.



Figure 5. Armamentarium for triple antibiotic

Procedure followed for TAP preparation:

Enteric coating Ciprofloxacin 250mg, Metronidazole 400mg, Minocycline 100mg tablets removed by using sterile BP blade. Each of the drug was pulverized using glass mortal and pestle. Powder of each drug taken in 1:1:1 ratio by weight i.e 100mg of each drug was taken and by using sterile saline as a vehicle TAP was made till paste consistency was obtained. This paste was carried to the root canal with the help of master apical file. After placement of TAP, Resin modified glass ionomer (RMGIC) (GC FUJI) barrier was placed and cured at the orifice of canal for 20 sec. (figure no. 4b).

After 3 weeks, as there was a sign of healing of the extraoral lesion with no purulent discharge and patient was asymptomatic it was decided to remove TAP. Final irrigation of canal was done as described above. After removal of TAP it was observed that there were no seepage from the canals, obturation was carried out with Gutta-Percha (GP) ((Dentsply Maillefer, Ballaigues, Switzerland) and AH plus sealer (Dentsply DE Trey GmbH, Germany) (Figure no.6a, b)

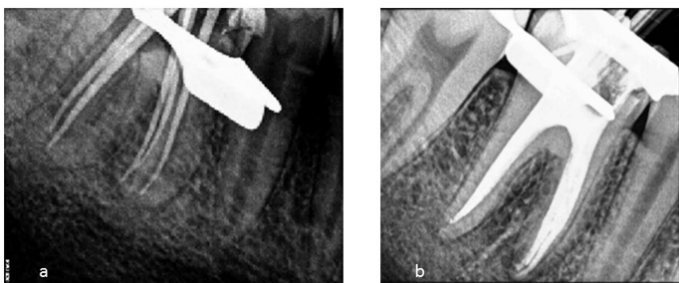


Figure 6: a) Master Cone Selection Radiograph. b) Obturation Radiograph

Following obturation, the canal orifice was sealed with RMGIC (GC Fuji Telangana, India) and access cavity restored with resin composite restoration. (Filtek Z350 XT, 3M, United States). Healing of extraoral cutaneous sinus tract was occurred which was recorded in follow up clinical photographs as shown in figure no. 7.



Figure 7: follow up clinical photographs day 1(a), 1 week(b), 1 month(c), 3 months(d), 6 months(e).

Discussion

Although most of the patients with orofacial lesion do not have any dental symptoms, careful questioning about past symptoms may help the clinician to identify a dental etiology of the patient. Johnson et al. reported a possible correlation between the application of heat to the face to relieve pain and cutaneous sinus tracts of odontogenic origin.1 A wide variety of disorders such as local skin infections, ingrown hairs, occluded sweat gland ducts, neoplasms, tuberculosis, actinomycosis, and a congenital midline sinus of the upper lip may be misdiagnosed with an extraoral sinus tract of dental origin.[2]

The treatment of choice for such a lesion is root canal therapy (for a restorable tooth) and to remove the source of dental infection or extraction (for a non-restorable

tooth).[2] As the tooth in this report was restorable, a non-surgical endodontic therapy was initiated.

The presence of bacteria within the root canal is the main factor of endodontic disease, and therefore the use of an antimicrobial agent is essential. Many forms of intracanal medicaments, apart from antibiotics and calcium hydroxide have been used in an attempt to accomplish the above aim.

Few bacteriological studies of sinus tracts of dental origin have been undertaken, they found facultative anaerobes, especially *Enterococcus faecalis*, to be the most commonly isolated microorganism.[3]

In the current case TAP was used as an intracanal medicament because lesion was associated with non-vital young permanent tooth; and had not subsided after the calcium hydroxide medication. The ratio and dosage used in this study was based on study done by Hoshino et al. [8] Triple antibiotic paste mimic scaffolds on elimination of *Actinomyces israelii* biofilm, the main bacteria of permanent teeth with necrotic pulps, TAP was also able to completely disrupt the *E. faecalis* biofilm structure, showed that they hold significant ability in eradication of bacterial biofilm.[5]

Triple antibiotic paste was largely developed by Hoshino and colleagues, who investigated the effectiveness of the paste on the removal of microorganisms from the root canals. The outcome showed excellent results in the eradication of the bacteria from the radicular system.[4]

Johns et al, compared between TAP and calcium hydroxide on disinfecting the root canal, 15% failure for calcium hydroxide and 5% failure for TAP and concluded that TAP is more efficient in disinfecting the root canal. Considering the polymicrobial nature of tooth infection, single empirical antibiotics are not able to provide a bacteria-free zone in the canal. It is essential to use a combination of antibiotics against all endodontic

pathogens to prevent microbial resistance.[7] According to Hoshino et al Antibiotic (3Mix) – ratio 1:1:1 in which Ciprofloxacin 200mg, Metronidazole 500mg, Minocycline 100mg Carrier – ratio 1:1 Macrogol ointment, Propylene glycol. According to Takushige T et al The drugs are powdered and mixed in a ratio of 1:3:3 (3 Mix) and added either with macrogol propylene glycol (3 Mix-MP) or a canal sealer (3 Mix-sealer).[9]

Crown discoloration has been more frequently reported after the use of TAP in root canal treatment. To prevent this in current case canal orifices were sealed with RMGIC barrier. In this case, we observed healing of the sinus tract from 1 week after placing TAP as an intracanal medicament. After 3 weeks there were signs of healing of the sinus tract with the absence of purulent discharge.

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