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Non-Surgical Endodontic Management of Extraoral Sinus using Long Term Placement of Intracanal Medicament - A Case Report

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Abstract: ***Introduction: Extraoral sinus tracts of endodontic origin may often be misdiagnosed as lesions of non-odontogenic origin and may result in healing failure or unnecessary treatments. Case Report: An 18-year-old male patient presented with the chief complaint of facial lesion on the chin since 2 weeks and gave history of trauma 7 years back. On examination, a cutaneous lesion was seen in the submental region and complicated crown fracture was seen with tooth 41. Tooth 31 did not respond to cold test and the electric pulp test. Radiographic examination revealed a definitive periapical radiolucency associated with 41 and 31. Gutta percha tracing of the sinus tract was done. Nonsurgical endodontic treatment was initiated on tooth 41 and 31 and calcium hydroxide intracanal medicament was placed in the first visit and changed in subsequent visits over the course of 3 months. When adequate periapical healing was observed, obturation was done and follow up visit at 6 months showed complete healing of extra oral sinus tract. Conclusion: A possible dental origin should be suspected while diagnosing cases of infected facial lesions and in most cases, a non-surgical approach to treatment is sufficient.***

Keywords: Extraoral sinus, Extraoral cutaneous fistula, Calcium hydroxide, Intracanal medicament

1. Introduction

A communication between the confined inflammatory site and the epithelial surface which commonly results due to chronic inflammation is a sinus tract. Chronic inflammation of the periradicular tissues can be a result of necrotic pulp which can be the result of trauma, carious lesions or due to failed root canal treatment the teeth. [1,2]

These odontogenic sinus tracts are generally present intraorally but rarely may be seen extra orally depending upon the least resistant pathway which is determined by root location, bone thickness, muscle insertion and cortical bone perforation associated with the affected tooth.[3,4,5] The involvement of the alveolar bone occurs gradually due to the osteoclastic activity of dental infection which may spread into adjacent soft tissues and eventually break through the skin. Purulent exudate of the infection will move along the path of the least resistance from the periapical area.[6]

Mandibular teeth are more commonly associated with odontogenic sinus tracts as compared to maxillary teeth, with angle of mandible being the most commonly affected site followed by mental region. [5,6]

Many cutaneous fistulas are often misdiagnosed which leads to unfavorable treatment plans such as lesion biopsies leading to scarring to the tissue.[3,4]

Therefore, accurate diagnosis and definitive treatment of the underlying condition responsible for extraoral cutaneous sinus tract should be done for elimination of the infection nidus.

In this case report, an extra oral cutaneous sinus tract was successfully managed through non-surgical endodontic treatment with long term placement of intracanal medicament.

2. Case Description

An eighteen-year old male patient reported to the Department of Conservative Dentistry and Endodontics, KLE VK Institute of Dental Sciences with a chief complaint of blood

and pus discharge from a facial lesion on the chin region since two weeks. Patient gave history of trauma due to fall to the chin and lower anterior region seven years back.

On extraoral examination a nodular cutaneous lesion was seen in the submental region. Lymph nodes were normal on palpation. Intraoral examination revealed a complicated crown fracture with tooth 41. Probing depth of 3 mm was seen in lower anterior teeth. The teeth 31 and 41 were tender to percussion. On pulp sensibility testing tooth 31 and 41 were non responsive to both thermal and electric pulp testing. Radiographic examination revealed a definitive periradicular radiolucency with 31 and 41. Tracing of the extraoral sinus tract was done using a gutta-percha point and taking a periapical radiograph. This tracing pointed towards the apices of teeth 31 and 41.

On basis of clinical and radiographic examinations, a diagnosis of chronic periapical abscess with cutaneous sinus tract associated with pulpal necrosis due to trauma with tooth 31 and 41 was made. Non-surgical endodontic treatment of the offending teeth 31 and 41 was planned and initiated under local anesthesia.

A third generation electronic apex locator, Root ZX (J Morita, Kyoto, Japan) was used to determine the working length which was then confirmed using a periapical radiograph. Both the teeth, 31 and 41 had Vertucci type II canal configuration where in two canals, buccal and lingual, were located. Biomechanical preparation of each canal was done till 4% 25 Neo-endo NiTi rotary file systems (Orikam healthcare). Irrigation with sodium hypochlorite between successive files was done. Calcium hydroxide intracanal medicament (Apex Cal, Ivoclar Vivadent) was placed. The patient was recalled after 15 days. During second visit, the polyethylene glycol-based calcium hydroxide medicament was removed from the canals and the canals were irrigated with 2.5% sodium hypochlorite and its activation was done using ultrasonics and placement of iodoform based calcium hydroxide (Metapex, Meta Biomed) was done. This iodoform based calcium hydroxide was changed twice over a period of two months.

In the last visit, adequate periapical healing was observed and the patient was completely asymptomatic signs of complete healing of extra oral sinus tract was observed; single cone obturation with 31, 41 was done with a calcium-hydroxide based sealer (Apexit Plus, Ivoclar Vivadent).

Follow up visit at one month, 6 month and 9 month recall showed completely healing of periapical lesion and patient was completely asymptomatic.

3. Discussion

Extraoral sinus tracts/ cutaneous lesions have a clinical appearance similar to some facial lesions such as that of bacterial infection, congenital fistulas, carcinomas, pyogenic granulomas, osteomyelitis, etc.[7] This makes diagnosis of the origin of the lesion difficult and lead to misdiagnosis. Such misdiagnosis of the lesion leads to inappropriate course of treatment including antibiotics and surgeries, alleviating the symptoms temporarily but not solving the main cause of lesion.[7,8] Hence, knowledge about dental origin of extra oral sinus tract is necessary to arrive at an accurate definitive diagnosis so that appropriate therapy can be initiated.

Dental as well as medical journals have documented the odontogenic origin of extraoral sinus tracts, moreover in a case report by Caliskan *et al*. presence of both- obligate bacteria and facultative anaerobic bacteria, were seen in microbiological culture. Generally these bacteria are identified as representatives of endodontic abscesses and skin infections.[7,8] Dental conditions like pulp necrosis leading to chronic abscesses or chronic apical periodontitis have been associated with formation of extra oral sinus tract in the orofacial region.[1,7]

The diagnosis of sinus tract due to dental etiology is possible by using pulp sensibility test and also by using a radiopaque material for example, gutta percha for tracing the sinus tract or by using a lacrimal probe to the apices of the teeth involved.[8] in this case report use of gutta percha point was done for tracing the sinus tract.

The manifestations of odontogenic cutaneous fistulas on the skin have seldom been discussed and are non-specific, the orifices of the cutaneous fistula may present as a dimpling, nodule, an abscess or a cyst, ulcer or a draining lesion, or a nodulocystic lesion.[9] A classic lesion as described by Samir et al. is an erythematous nodule having a maximum diameter of about 20 mm, with or without drainage with skin retraction seen secondary to healing. [10]

Systemic antibiotics results in apparent healing and temporary decrease in drainage but does not resolve the lesion completely until the source of infection is eliminated.[1] According to the guidelines given by the European Society of Endodontology, antibiotic therapy is generally contraindicated unless there is a possibility of systemic illness and a chance of rapid dissemination.[11] If diagnosed accurately and treated properly, tract resolves within seven to fourteen days. Conventional endodontic therapy and extraction of offending tooth in case of non-restorable teeth are two effective treatment approaches of cutaneous sinus tracts which result in healing in few weeks.[7] Hence in our case non-surgical endodontic treatment with placement of intracanal medicament was done.

In this case report, we have used sodium hypochlorite as an irrigating solution during biomechanical preparation, which was activated using passive ultrasonic device to increase its antimicrobial efficiency. Also, Attavar et al in an invito study concluded that, use of sodium hypochlorite as the irrigant along with passive ultrasonic activation showed reduction in the count of E. faecalis compared to other irrigating solutions.[11,12]

Calcium hydroxide ($Ca(OH)_2$ till today is the most frequently used intracanal medicament and has been widely studied in dental literature due to its beneficial effects.[8] Several case reports advocating the use of calcium hydroxide during endodontic treatment, as an intracanal medicament have shown it to be highly effective. Its mechanism of action is that it dissociates into $Ca^{+2}$and OH^{-1}ions which owes to its strong alkalinity (pH 12.5).[3] The high alkaline pH changes the biological properties o bacterial lipopolysaccharides in the cell

wall of Gram-negative bacteria, it inactivates the membrane-transfer mechanisms and leads to bacterial toxicity. Antibacterial properties, bacteriostatic properties, high pH, promoting healing and subsequent stimulation of fibroblasts, neutralization of acidic pH, inhibition of internal root resorption and easy application comprise among its other advantages. It also has the ability to encourage bone healing and successfully cleanse the root canal system.[1]

We used polyethylene glycol-based calcium hydroxide paste (Apexcal) as well as oil-based calcium hydroxide (Metapex). Compared to aqueous vehicles, Viscous vehicles such as polyethylene glycol, glycerine and propylene glycol are also water-soluble substances, which release Ca2+ and OH- ions at relatively slow pace, for prolonged periods and have lower solubility. Oil based vehicles or non-water-soluble substances like silicone oil, olive oil and camphor encourage lowest solubility the paste within the tissues and hence, can be kept for a longer duration.[14] Gomes et al. in his study found that oily-vehicles encourage the antibacterial properties against *Enterrococcus faecalis* and other microorganisms with higher zones of microbial inhibition as compared to aqueous-based and viscous vehicles.[15]

Hence, the use of calcium hydroxide is favorable to aid in repair of bone and healing of sinus tract though its intentional insertion beyond the apex might be questioned as per modern endodontic principles.[8] In our case, healing in the form cutaneous retraction occurred after 15 days.

The sinus tract usually heals leaving slight dimpling and some hyperpigmentation of skin that diminishes over time. Revision cosmetic surgery may be recommended in cases which resolve with notable retraction or with dimpling. In our case, cosmetic surgery was not deemed necessary as the lesion had resolved considerably and was cosmetically tolerated.[3]

Though use of calcium hydroxide as intracanal medicament for longer duration may result in weakening of the dentin, in cases of large periapical lesions with sinus tract for thorough disinfection it may be deemed necessary as it was done for this case report.

4. Clinical Significance

Extraoral cutaneous fistulas of odontogenic origin are generally misdiagnosed and may lead to unnecessary treatments which may give patient temporary relief. Hence, accurate diagnosis and definitive treatment of the underlying condition responsible for extraoral cutaneous sinus tract should be done for elimination of the infection nidus.

Images:

Figure 1: Extraoral view of midline draining sinus on the chin

Figure 2: Pre- operative extraoral image

Figure 3: Gutta-percha cone is used to trace the origin of the sinus tract.

Figure 4: Pre- operative intraoral image

Figure 5: Pre-operative radiograph

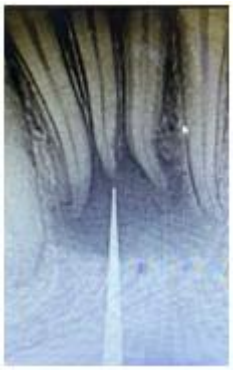

Figure 6: Radiographic view- GP cone pointing to the apical region of 41

Figure 7: Working length radiograph

Figure 8: $Ca(OH)_2$ placement(Apexcal)

Figure 9: $Ca(OH)_2$ placement(Metapex) radiograph

Figure 10: Post obturation radiograph

Figure 11: 6 months follow up

Figure 12: 9 months follow up

Figure 13: Post- operativeextraoral image at 9 months follow up

Figure 14: Post- operativeintraoral image at 9 months follow up

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