



A Novel Approach of Treating Dental Cellulitis with Intracanal Medicament Nitrofurantoin – A Case Report

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. Gabriela CIAVOI, University of Oradea, Romania.

Reviewers:

(1) Kavita Dhinsa, Sardar Patel Post Graduate Institute of Dental & Medical Sciences, India.

(2) Mona Ionas, University Lucian Blaga of Sibiu, Romania.

(3) Jéssyca Maria França de Oliveira Melo, Federal University of Pernambuco, Brazil.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/76398>

Case Report

Received 13 August 2021

Accepted 27 October 2021

Published 30 October 2021

ABSTRACT

Nitrofurantoin is a drug that is currently used in the treatment and prevention of urinary tract infections due to its anaerobic bacterial coverage. Dental cellulitis originates from primarily anaerobic bacteria in a necrotic pulpal environment invading into fascial spaces such as buccal, infraorbital, canine, sublingual, and submandibular. Patients who develop cellulitis present with severe pain or with no pain, swelling, sometimes associated with fever and malaise. The patient was diagnosed with dental cellulitis associated with the upper left 2nd premolar. Intra-oral drainage of the cellulitis was performed through the root canal with the placement of intracanal nitrofurantoin along with systemic antibiotics. The majority of the swelling had subsided within 3 days, which was followed by completion of the root canal treatment upon which the patient was symptom-free.

Keywords: Dental cellulitis; intracanal medicament; nitrofurantoin.

1. INTRODUCTION

Dental or Facial Cellulitis is a condition produced by a dental abscess from a tooth with necrosed pulp. It is one of a condition categorised as dental emergencies, that should be treated as soon as possible to avoid life-threatening complications such as Cavernous Sinus Thrombosis, Sepsis, and Meningitis if the infection reaches the brain [1]. Symptomatic irreversible pulpitis is one of the commonest dental pathologies which primarily arise from the carious process, and if untreated it finally leads to necrosis of the pulp. Furthermore, the necrosed pulp further causes damage to the surrounding tissues by abscess formation, and finally if still untreated, Cellulitis develops [2].

Initially, the dental abscess is localized around the offending tooth, but if left untreated, it spreads to superficial facial spaces which are characteristic depending on whether maxillary or mandibular teeth are involved. Infection from the maxillary teeth most commonly travels to canine, buccal, palatal, and infraorbital spaces, whereas, infections from mandibular teeth travel to vestibular, submental, sublingual, and submandibular spaces [3].

Caries is a bacterial process that consists of different types of bacteria mainly categorised as aerobes and anaerobes. Conditions with irreversible pulpitis, abscess, and cellulitis, anaerobic bacteria predominate, so medications that provide broader coverage for such bacteria prove to be the most beneficial for its eradication and ultimately curing the patient [4] At the present moment, the recommended antibiotics in cases of dental cellulitis are oral penicillins such as amoxicillin and amoxicillin-clavulanic acid, respectively [5].

Nitrofurantoin is an antibacterial drug with a broad antibacterial scope currently used to treat urinary tract infection since these bacteria dominate in this particular pathology [6] It is rapidly absorbed and distributed into body fluids and excreted in large amounts in urine and bile. Moreover, nitrofurantoin has a short half-life in the blood. Due to its anaerobic coverage, dental cellulitis where these bacteria predominate, this medication can prove to be of significant benefit.

So, the purpose of this article is to present the treatment of a patient presenting with dental cellulitis with intracanal medicament Nitrofurantoin and evaluate its effectiveness in this condition.

2. CASE REPORT

A healthy, 20 years old male patient reports to the Outpatient Department of Operative Dentistry, Sir Syed College of Medical Sciences for Girls, Pakistan. Earlier 2 months ago, the patient developed swelling in his upper left side of the jaw, not being able to localize to one particular tooth. The patient did not get any dental procedure performed, due to which when the patient visited the dentist after 2 months, there was a diffuse facial swelling accompanied with pain, slight fever, and malaise. Upon history taking from the patient, it was known that self-medication was performed to relieve the pain with no intake of antibiotics. Only when the pain and swelling both became bothersome did the patient visit the dentist.

About medical history, the patient was completely healthy along with no history of any drug intake, hospitalisation, or any allergies from drugs. Moreover, no dental history, social history, previous dental treatments, and family history was present. Now, upon performing extra-oral, intra-oral, and radiographic examinations, the patient was diagnosed with dental cellulitis which originated from the necrotic pulp of the left upper second premolar which previously was not treated 2 months ago, as shown in Fig.1. The swelling on the face was diffuse, being located in the canine space and around the eye, as shown in Fig. 2. On performing pulp vitality tests, the pulp was necrosed and the tooth was tender to percussion. The patient was informed of the diagnosis and explained the treatment process required to save the tooth. Upon taking written and verbal consent from the patient, the treatment was started.

Considering there was no pain, the patient was not administered local infiltration anesthesia (Lidocaine 2% with epinephrine 1:100,000) to ensure a pain-free treatment process. In the first visit of the treatment, firstly, isolation around the upper left 2nd premolar was achieved using a rubber dam, followed by an access opening, and then a pulpectomy was performed using manual hand K files by watch winding movement. After determining the working length, next, cleaning and shaping were performed using 3% sodium hypochlorite as irrigation solution and 17% EDTA to remove the smear layer. The canals were prepared using a universal ProTaper system. For the drainage of the swelling, gentle pressure on the face was applied to the space around the swelling and the pus was drained using the

intracanal approach. Subsequently, nitrofurantoin medicament in the paste form was placed in the root canals using Lentilspiral and temporary restoration was placed to seal the coronal cavity. The patient was prescribed antibiotics (Amoxicillin-Clavulanic acid and Metronidazole) and analgesics (Naproxen Sodium) for 5 days to further aid in the resolution of the swelling. The patient was recalled for the second visit of the treatment after 2 weeks. In the second visit, the

patient reported that the swelling had subsided almost completely after 3 days of treatment, as shown in Fig. 3. Since the patient was now symptom-free, obturation was completed in the second visit using gutta-percha points upon radiographical confirmation, as presented in Fig. 4. This was followed by Core-buildup in the third visit and finally placement of a crown (Metal-Ceramic Crown) in the final visit of the treatment.



Fig. 1. Preoperative x-ray of maxillary second premolar



Fig. 2. Preoperative clinical picture of patient presenting diffuse swelling around left side of face



Fig. 3. Postoperative clinical picture showing resolution of swelling



Fig. 4. Postoperative x-ray of maxillary second premolar

3. DISCUSSION

Dental cellulitis is a frequent finding in a tooth which is left untreated with necrosed pulp, which can prove to be detrimental to life if it spreads to deep facial spaces, which mandates timely management. Abscess and cellulitis of dental origin most frequently involve anaerobic bacteria which makes antibiotics with such coverage very beneficial for the patient. Nitrofurantoin is such antibiotic that is frequently used to cover anaerobic bacteria such as in urinary tract infections.

The application of Nitrofurantoin in dentistry is very limited, as one study experimental has been

carried out with positive results in the elimination of *Enterococcus faecalis*, one of the primary bacteria involved in dental infections [7]. As currently, nitrofurantoin is mainly prescribed to treat urinary tract infections and studies report it to effectively cure the patients [8].

Currently, the recommended treatment options for treating patients with dental cellulitis have been using oral penicillin [5]. These antibiotics do provide coverage towards the causative anaerobic bacteria. Since anaerobic bacteria are also primarily responsible to cause dental cellulitis, nitrofurantoin can be beneficial for the patients. Furthermore, a study in the literature concluded successful use of nitrofurantoin as an

intra canal medicament to alleviate pain in patients suffering from symptomatic irreversible pulpitis [9]. One study concludes effective antimicrobial activity of nitrofurantoin when used as an intra canal medicament against *Enterococcus faecalis* but with limited transdental diffusion [10].

In this case, using an intra canal approach, the cellulitis was drained by applying gentle pressure over the areas of swelling. However, literature states that incision and drainage through soft tissues can also be proven beneficial in drainage of the pus from cellulitis [11].

Due to the excessive use of antibiotics, resistance seems to develop against many of the commonly used antibiotics. Recent studies do report resistance against amoxicillin-clavulanic acid against gram-negative bacteria [12]. So, in such cases, the antibiotics used should be switched to combat resistance. Nitrofurantoin, therefore, remains a useful choice to treat dental infections such as dental cellulitis since its use is yet to be explored.

4. CONCLUSION

Dental cellulitis is a frequent finding when the necrosed pulp is left untreated which can lead to further life-threatening conditions if left untreated. Considering the anaerobes to be the primary pathogens in causing dental cellulitis, Nitrofurantoin can be proven to be an effective intra canal medicament to timely treat the patients.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

Ethical approval was granted by the ethics review committee of Sir Syed College of Medical Sciences for Girls, Pakistan.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

The peer review history for this paper can be accessed here:
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