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Case Report

Clinical Evolution of Facial Cellulitis of Pulpal Origin: A Case Report

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Abstract: Odontogenic infections represent a significant public health concern due to their high prevalence and potential for severe complications. These conditions commonly arise as a consequence of dental caries and periodontal disease, which remain leading causes of oral pathology worldwide.[1] In many cases, effective management requires an integrated approach combining pharmacological, dental, and surgical interventions[2], tailored to the specific clinical circumstances. The infection may originate within the dental structures or extend to the surrounding tissues. When the inflammatory process cannot be effectively controlled through antibiotic therapy, it may disseminate to the subcutaneous regions and, in severe cases, manifest extraorally.[3] Such infections frequently present with pain and swelling in the orofacial region, often necessitating emergency endodontic intervention to alleviate symptoms and control the spread of infection.[4] In patients exhibiting acute pain and clinical signs of facial swelling, endodontic management typically involves root canal treatment in conjunction with systemic antibiotic therapy.[1,2,3,4] Clinical Case: A 20-year-old male patient presented to the UABC Polyclinic in Mexicali with intense pain in the right submandibular region and noticeable right-sided facial asymmetry. Pulpal diagnosis: necrosis. Periapical diagnosis: acute periapical abscess affecting tooth #46. Endodontic treatment was initiated to achieve internal decompression, followed by completion using the crown-down biomechanical instrumentation technique, irrigation with 5.25% sodium hypochlorite (NaOCl), and obturation with MTA-Fillapex sealer. The clinical outcome was favorable, demonstrating complete resolution of the infection and absence of recurrence during follow-up.

Keywords: Pain, Necrosis, Acute Inflammation, Odontogenic Infections, Facial Cellulitis and Diagnosis.

INTRODUCTION

Dental pain is one of the most frequent causes of consultation in clinical practice; however, establishing an accurate diagnosis of pulpal pathologies remains challenging due to their nonspecific symptomatology and the inability to directly examine the pulp tissue. The diagnostic complexity increases when pain originates from adjacent structures yet is perceived as pulpal in origin [1]. A precise diagnosis requires a comprehensive clinical evaluation, including both intraoral and extraoral examinations, since odontogenic infections can progress rapidly and lead to severe complications such as osteomyelitis, brain or orbital abscesses, and even vision loss [4]. Among the most common manifestations is the dental abscess [4].

Odontogenic infections, also referred to as primary infections, arise from a dental source and may extend to involve the maxillary bone or the soft tissues surrounding the periapical region. If not properly addressed, these infections can spread to adjacent anatomical spaces [5]. They frequently originate from pulpal necrosis and give rise to clinical conditions such as periapical abscesses or cellulitis [6].

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Facial cellulitis represents one of the most serious complications of odontogenic origin and may require hospitalization depending on its extent and systemic impact [6]. It is characterized as an acute inflammatory process that can be classified according to its anatomical location, clinical progression, and etiology. Patients commonly present with facial asymmetry, trismus, fever, insomnia, and difficulty chewing. This condition may stem from dental (odontogenic) causes or from adjacent anatomical structures (non-odontogenic) [6]. The patient's age, systemic condition, and immune status play a crucial role in determining severity and prognosis.

Clinically, facial cellulitis typically evolves through two main stages: an initial phase presenting with soft, fluctuant swelling and ill-defined borders, followed by a more advanced stage characterized by induration, increased pain, and firmness of the affected tissues [6]. Diagnosis relies on a thorough medical history, physical examination, radiographic assessment, and complete clinical evaluation [1].

In the present clinical case, the patient was initially treated with antibiotic therapy; however, due to the absence of clinical improvement and the progression of symptoms, emergency endodontic treatment was required to manage the infectious source and prevent the need for hospitalization. Antibiotics are indicated in specific infectious scenarios such as necrotizing ulcerative gingivitis, acute periapical abscess, cellulitis, and pericoronitis; nevertheless, evidence supports that their use should not replace local intervention at the site of infection.

The primary objective of emergency endodontic treatment is to alleviate acute symptoms and eliminate the infectious focus [4]. Although antibiotic therapy is often initiated prior to endodontic access in an attempt to reduce bacterial load [7], multiple authors emphasize that in cases of acute apical abscess or odontogenic facial cellulitis, timely endodontic intervention is fundamental to achieve effective drainage and avoid dependence on systemic antibiotics [8].

This article presents a descriptive case report illustrating the clinical progression of an Acute Periapical Abscess and its conservative endodontic management. It highlights the importance of direct treatment of the infection source and provides clinical evidence supporting endodontic therapy as an effective measure to resolve odontogenic facial cellulitis and prevent systemic complications.

CLINICAL OBSERVATION

Male patient, 20 years old, with no relevant medical history, attended the UABC Faculty of Dentistry Peripheral Clinic, Naranjos, for clinical evaluation. He was later referred to the Polyclinic for root canal treatment.

During the clinical examination, tooth #46 (FDI notation) showed an extensive restoration with swelling, discoloration, and marginal gingival detachment extending from the first premolar to the retromolar area. Radiographically, a radiopaque area was observed in the coronal third, close to the pulp chamber, along with a well-defined radiolucent area in the apical third of the mesial roots, where the periodontal ligament space was discontinuous (Fig. 1).

Fig. 1. A radiopaque area is observed in the coronal third, extending close to the pulp chamber, along with a radiolucent area in the apical third of the mesial roots, where discontinuity of the periodontal ligament space is evident.

During anamnesis, the patient reported pain with an intensity of 8 on the Verbal Numerical Pain Scale (VNS) [9], accompanied by fluctuant swelling in the submandibular region. To control the infectious process, inflammation, and pain, an antibiotic regimen was initiated prior to endodontic treatment. The prescribed pharmacological therapy consisted of metronidazole (Biotazol) at a dose of 500 mg administered every 8 hours, in combination with levofloxacin 750 mg once daily, both for a duration of 7 days.

The patient returned to the Polyclinic on August 18, 2025, showing no clinical improvement, with facial asymmetry, unilateral swelling of the subcutaneous

tissue (cheek and infraorbital region), right submandibular swelling, mandibular trismus, and increased volume in the retromolar gingival area with slight detachment of the periodontal tissue (Fig. 2 and 3).

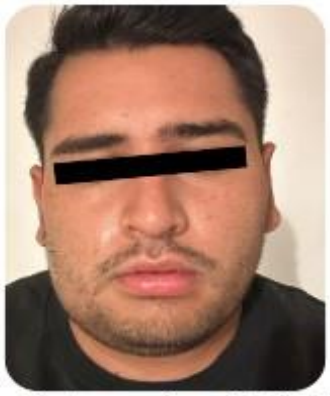

Fig. 2. Extraoral photograph. Male patient presenting with facial asymmetry, swelling of the subcutaneous tissue (cheek and infraorbital region), and right submandibular area inflammation.

Fig. 3. Intraoral photograph. Increased volume observed in the retromolar area of the marginal gingiva, with slight detachment of the periodontal tissue.

Endodontic treatment was indicated to eliminate the source of pain. Pulp vitality tests yielded negative responses, whereas both horizontal and vertical percussion tests were positive. Periodontal probing revealed a circumferential probing depth of 10 mm around the affected tooth. Based on the American Association of Endodontists diagnostic criteria, the following diagnoses were established: pulpal necrosis and acute periapical abscess.

Local anesthesia was achieved using one-quarter cartridge of 2% lidocaine with epinephrine (36 mg) administered via an inferior alveolar nerve block. Local infiltration was avoided due to the presence of active inflammation. Rubber dam isolation was performed using an atraumatic clamp (Kerr, Pais) and a latex rubber dam (Nic Tone). Endodontic access was obtained with a No. 5 carbide bur, and the cavity walls were refined using an Endo-Z bur. Remaining tissue within the pulp chamber was removed with a Hu-Friedy No. 33L dentin spoon excavator. Irrigation was carried out using 5.25% sodium hypochlorite (NaOCl), alternated with saline solution.

Root canal instrumentation was initiated using the manual crown-down technique with Mani K-files sizes 10, 15, and 20 (25 mm). Three canals were identified—mesiobuccal, mesiolingual, and distal—with a working length of 20 mm established for each canal. Intracanal medication consisting of calcium hydroxide paste (Ultra-Cal XS, 35%) was placed, followed by a Teflon spacer and temporary sealing with zinc oxide–eugenol cement (Fig. 4).

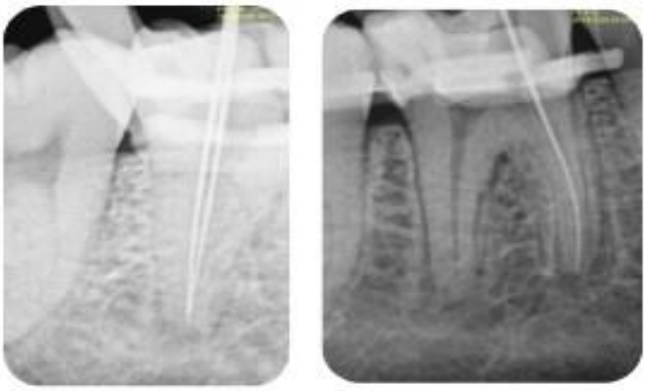

Fig. 4. Working length determination of tooth #46 — D: 20 mm, MB: 20 mm, and ML: 20 mm

On August 20, 2025, the patient presented with notable clinical improvement, including a reduction in subcutaneous and infraorbital swelling and increased gingival firmness with improved tissue adherence. A fistulous tract was clinically evident (Fig. 5).

Fig. 5. Extraoral and intraoral photographs. A decrease in subcutaneous and infraorbital tissue swelling is observed. The marginal gingiva shows greater adherence to the supporting tissues, soft consistency, and the presence of a fistulous tract.

Local anesthesia was administered using one and a half cartridges of 2% lidocaine with epinephrine (36 mg); one cartridge was used for the inferior alveolar nerve block and the remaining half cartridge for local infiltration. The temporary restoration (zinc oxide–eugenol) was removed using a No. 5 round carbide bur. Canal irrigation was performed with 5.25% sodium hypochlorite (NaOCl), alternated with saline solution.

Biomechanical preparation was continued using Mani Flexo K-files (25 mm) in sizes 15 to 40. Irrigation was carried out in three cycles of 20 seconds each to ensure complete removal of the intracanal medication (Ultra-Cal XS). Working lengths were reassessed and established as follows: mesiobuccal, 19 mm; mesiolingual, 20.5 mm; and distal, 20 mm. Final apical preparation sizes were #35 for the mesiobuccal and mesiolingual canals and #50 for the distal canal.

Calcium hydroxide intracanal medication (Ultra-Cal XS) was reapplied, followed by placement of a polytetrafluoroethylene (PTFE) spacer and temporary sealing with zinc oxide–eugenol cement. A subsequent appointment was scheduled for root canal obturation (Fig. 6).

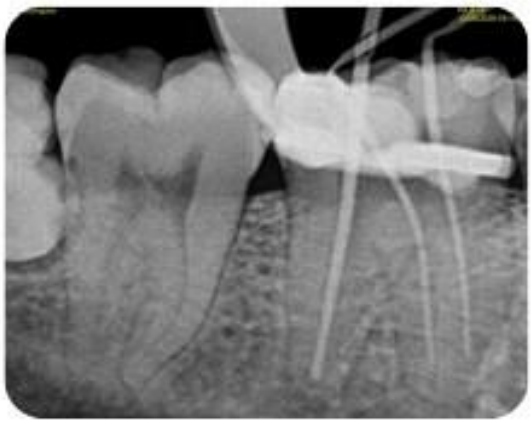

Fig. 6. Master cone trial — MB: 35, ML: 35, and D: 50.

Final Appointment

On September 12, 2025, the endodontic treatment was completed. Periodontal conditions showed marked improvement, with coral pink marginal gingiva firmly attached to tooth #46 (Fig. 7).

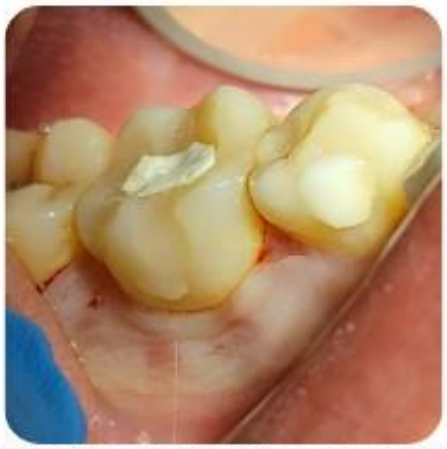

Fig. 7. Reduction of swelling around tooth #46. The marginal gingiva exhibits a coral pink color.

The temporary restoration was removed using a No. 5 round carbide bur, and the intracanal medication (calcium hydroxide paste; Ultra-Cal XS) was eliminated by copious irrigation with saline solution. Working lengths were verified and confirmed as follows: mesiobuccal canal, 19 mm; mesiolingual canal, 20.5 mm; and distal canal, 20 mm.

Master gutta-percha cones were selected according to the final apical preparation sizes: ISO size 35 for the mesiobuccal canal, size 30 for the mesiolingual canal, and size 50 for the distal canal. Accessory gutta-percha cones (medium-fine and fine-fine) were used to achieve adequate lateral compaction.

The final irrigation protocol consisted of 5.25% sodium hypochlorite (NaOCl), followed by saline solution, 17% ethylenediaminetetraacetic acid (EDTA) for smear layer removal, and a final rinse with saline solution.

Root canal obturation was performed using the lateral condensation technique with an MTA-based sealer (MTA Fillapex). Lateral compaction was carried out using D11T (Hu-Friedy) and A25 (Maillefer) spreaders. Excess gutta-percha was removed with a heated instrument and vertically compacted using a size 30 condenser. The access cavity was then sealed with a polytetrafluoroethylene (PTFE) spacer and a temporary zinc oxide–eugenol restoration (Fig. 8).

Fig. 8. Extraoral photograph taken on October 12, 2025, and final radiograph of the completed root canal treatment.

DISCUSSION

Several authors emphasize the importance of establishing an accurate and timely diagnosis in cases of periapical abscess and, in more severe situations, facial cellulitis. A thorough evaluation of the etiological factors underlying the periapical inflammatory process, followed by the implementation of an appropriate and effective treatment plan, is essential to prevent disease progression and future complications.

Facial cellulitis of pulpal origin represents one of the most serious and frequent complications of untreated pulpal and periodontal infections [1]. Its development is considered multifactorial, involving local factors such as extensive dental caries and pulpal necrosis, as well as systemic conditions including the patient's immune status [1]. In addition, the microbiological characteristics of odontogenic infections significantly influence the clinical course and severity of the disease [8]. Evidence consistently demonstrates that prompt elimination of the infectious focus is associated with improved clinical outcomes and a reduced risk of dissemination [1-5].

Severe odontogenic infections have been closely associated with delayed diagnosis and inadequate primary dental care, conditions that facilitate the progression of localized infections into extensive facial involvement [5]. Patient-related factors, including age and immune competence, further influence the extent of the infection and overall prognosis. These findings highlight the importance of comprehensive clinical evaluation and early endodontic intervention in preventing advanced odontogenic infections [1-5].

From a therapeutic perspective, effective management of facial cellulitis of odontogenic origin relies primarily on controlling the source of infection. Endodontic treatment aimed at eliminating intracanal infection is fundamental when the tooth is considered restorable, while surgical drainage and decompression of the affected spaces are essential adjunctive measures in cases with extensive involvement or fluctuant collections [3].

The indication for systemic antibiotic therapy should be carefully evaluated and based on the clinical severity of the infection and the presence of systemic signs. Current evidence supports reserving antibiotics for cases with diffuse spread, systemic involvement, or a high risk of dissemination, thereby avoiding unnecessary prescription in localized infections that can be adequately managed with definitive dental treatment alone [2-4].

Inadequate or delayed management of odontogenic facial cellulitis has been associated with serious and potentially life-threatening complications, including deep cervical abscesses, osteomyelitis, and airway compromise. Therefore, early diagnosis, prompt elimination of the infectious focus, and appropriate therapeutic decision-making are essential to ensure favorable outcomes. In complex cases, an interdisciplinary approach involving dental professionals and medical specialists is often required [5, 6].

The present case supports existing evidence emphasizing the importance of timely endodontic intervention and appropriate clinical management in achieving effective infection control and favorable tissue healing in cases of facial cellulitis of pulpal origin.

CONCLUSION

Performing emergency endodontic treatment is beneficial in addressing the source of pain, resulting in significant patient relief. However, the proper management of a patient presenting with pain and signs of an acute inflammatory process requires a detailed anamnesis, thorough clinical examination, and understanding of the clinical manifestations associated with acute odontogenic infections. Therefore, it is essential for the dentist to recognize these clinical signs and treat the underlying cause of the problem, complemented by pharmacological therapy, which plays a crucial role in achieving complete resolution.

In the present clinical case, a conventional endodontic treatment was performed, allowing effective drainage, progressive reduction of the swelling, and

functional recovery of the patient without recurrences or systemic complications. Effective results were achieved, including a notable decrease in the patient's facial inflammation.

It is concluded that the optimal approach involves the direct elimination of the dental origin of the infection, accompanied by rational antibiotic prescription and a thorough understanding of the possible complications associated with odontogenic infections. This represents a more effective therapeutic strategy for the management and control of such pathologies.

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