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MANAGEMENT OF PEDIATRIC ODONTOGENIC CELLULITIS: A CASE SERIES AND REVIEW OF CURRENT EVIDENCE

Abir Mannai [1,2], Atika Bouabid[1,2], Maryem Nait Melek[1,2], Selsebil Laajimi[1,2], Baaziz Ahlem[1,2]

1- Department of pediatric dentistry and prevention, university hospital RABTA, University of Tunis, Tunisia.

2- Research Laboratory: LR 12ES10: Biological and clinical dentofacial approach (ABCDF), University of Monastir, Tunisia

Corresponding author:

Abir Mannai

E-mail address: mannaiabir95@gmail.com

Abstract

Introduction

Pediatric odontogenic cellulitis is a common facial infection in children, often progressing rapidly due to anatomical and immunological factors. Early recognition and management are essential to prevent serious complications. This report aims to illustrate the clinical spectrum and management of pediatric odontogenic cellulitis through three representative cases.

Observation

Three pediatric cases with variable presentations were reported. Case 1 involved a permanent first molar and was successfully managed conservatively with systemic antibiotics and endodontic therapy. Cases 2 and 3 originated from primary molars, progressed rapidly, and required hospitalization, extraction, or pulpectomy along with systemic antibiotics. Clinical and radiographic follow-up confirmed infection resolution and proper healing.

Discussion

These cases highlight the importance of tailoring management to the infection stage and tooth type. Permanent teeth can often be preserved with endodontic treatment, while severely affected primary teeth may require extraction. Prompt intervention and judicious antibiotic use are critical to prevent severe complications. Preventive strategies, including early caries management and parental education, remain essential to reduce the burden of odontogenic infections in children.

Keywords:
pediatric odontogenic cellulitis, facial infection, endodontic treatment, extraction.

Introduction

Early diagnosis and management of pediatric facial cellulitis remains challenging due to its diverse clinical presentations, multiple potential sources of infection, and the involvement of various microorganisms within the head and neck region (1).

Odontogenic cellulitis, specifically, is an acute, deep, and diffuse inflammation of the subcutaneous tissues that can extend through intercellular spaces to multiple anatomical regions and fascial planes. It most commonly arises from infection of one or more teeth or from pathologies affecting the dental and supporting tissues (2).

Clinically, odontogenic cellulitis presents a wide spectrum, ranging from a mild, localized process to a progressive, diffuse condition that may lead to serious complications such as airway obstruction, orbital or mediastinal extension, and sepsis (3). In its early stages, the affected area typically feels soft and smooth, with poorly defined edges and subtle inflammatory signs; sometimes the overlying epidermis appears unraised. In more advanced stages, the tissue becomes indurated (2).

The diagnosis in children is often difficult due to atypical presentations, limited cooperation, and subtle early signs. In addition, odontogenic cellulitis is usually polymicrobial, which complicates the choice of initial antibiotic therapy. Epidemiologically, Biederman and Donson reported that odontogenic cellulitis accounts for approximately 50% of all facial infections in hospitalized patients over a 10-year period (4).

The aim of this article is to illustrate the diagnostic approach and management strategies for pediatric odontogenic cellulitis through the presentation of three clinical cases, highlighting the variability in clinical presentation, therapeutic decisions, and outcomes.

Case presentation:

Case 1:

A 12-year-old patient in good general health presented with a two-day history of swelling in the left lower cheek, which was painful, firm, and slightly erythematous, accompanied by fever (figure 1).

Submandibular lymph nodes were mildly tender and palpable. Intraoral examination revealed that the lower left first molar (#36) was undergoing dental treatment, with tenderness on percussion and painful vestibular palpation.

Figure 1: extraoral photograph showing a swelling in the left lower cheek

Periapical radiography showed a periapical radiolucency with an additional radix and external root resorption (figure 2).

Figure 2: Periapical radiography of the lower left first molar (#36)

Oral amoxicillin was prescribed, and endodontic treatment was performed during the first visit, with calcium hydroxide as an inter-appointment intracanal medicament. Two days later, the swelling had resolved and the tooth was asymptomatic (figure 3). Final root canal obturation was completed two weeks later (figure 4), followed by placement of a preformed pediatric crown (figure 5). Periapical radiography confirmed adequate obturation, and the tooth remained asymptomatic (figure 6). A three-month follow-up was scheduled but the patient did not attend.

Figure 3 : Extraoral photograph showing the resolution of swelling

Figure 4 : Postoperative radiograph

Figure 5: Placement of a preformed pediatric crown.

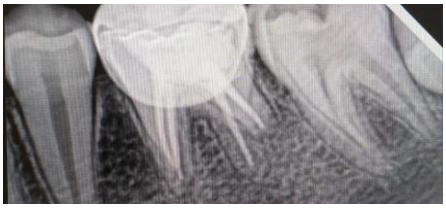

Figure 6: Postoperative periapical radiograph demonstrating proper obturation.

Case 2 :

A 7-year-old girl presented with a right upper cheek swelling of two days' duration, associated with infraorbital edema (figure 7). Intraoral examination revealed carious maxillary primary molars (#54 and #55), tender to percussion with obliterated vestibular sulcus. Panoramic radiography showed a deep carious lesion on #54 with pathological root resorption (Figure 8).

The patient was referred for hospitalization with intravenous antibiotics. Tooth #54 was extracted three days later, resulting in significant regression of swelling and resolution of systemic signs (Figure 9).

Figure 7: extraoral photograph showing a right upper cheek swelling

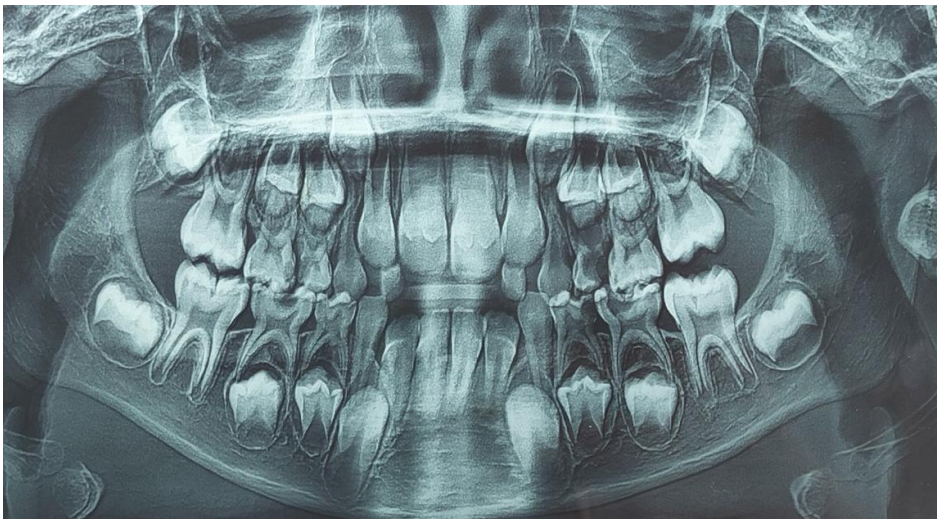

Figure 8: Radiograph revealing a deep carious lesion and pathological resorption of tooth #54.

Figure 9 : Extraoral photograph showing the resolution of swelling

Case 3 :

A 6-year-old girl presented with swelling in the right lower cheek. Clinical and radiographic examination revealed serous-stage odontogenic cellulitis associated with teeth #84 (non-restorable) and #85 (restorable) (Figure 10 and 11). Tooth #85 was initially opened, and 1g of penicillin was prescribed (figure 12).

After 48 hours, pulpectomy and canal obturation of #85 were performed, followed by coronal restoration with CVIMAR (Figure 13 and 14). Tooth #84 was subsequently extracted. Regression of swelling was observed within one week, and a preformed pediatric crown was cemented on #85 to prevent fracture (figure 15). One-year radiographic follow-up showed healing of the interradicular lesion and continued physiological resorption of tooth #85. (figure 16)

Figure 10: Intraoral photograph showing obliteration of the vestibular sulcus adjacent to carious teeth 84 and 85.

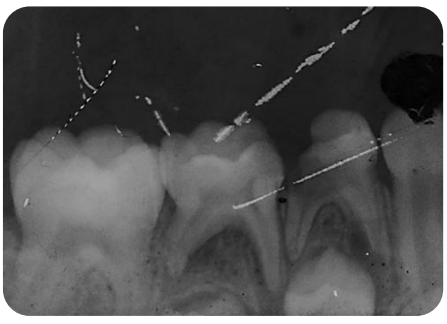

Figure 11: Preoperative periapical radiograph showing deep carious lesions on teeth 85 and 84, with bone rarefaction in the interradicular space.

Figure 12: "Necrotic tooth (#85) left open for drainage."

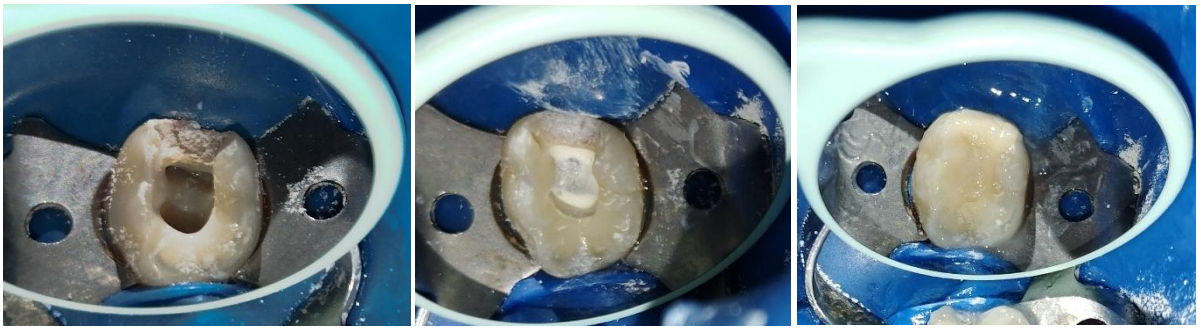

Figure 13: Pulpectomy on tooth #85

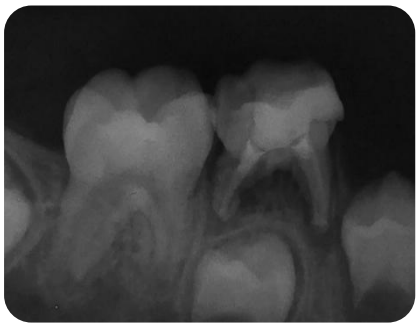

Figure 14: Postoperative periapical radiograph of tooth #85.

Figure 15: An occlusal mandibular photograph and a lateral occlusal view showing the preformed pediatric crown sealed in place.

Figure 16 : a follow-up periapical radiograph after one year

Written informed consent for both treatment and case publication was obtained from the parents of the three patients.

Discussion

Pathophysiology and Etiology

Facial cellulitis of odontogenic origin most commonly arises from untreated dental caries that progress to pulpal necrosis, allowing bacterial spread along fascial planes into the soft tissues of the head and neck (5). In children, infections progress more rapidly than in adults due to anatomical factors, thinner cortical bone, larger medullary spaces, and proximity of primary tooth roots to adjacent fascial spaces, combined with relative immunologic immaturity, facilitating rapid dissemination. Odontogenic sources remain a leading cause of head and neck infections in the pediatric population (6). Deciduous teeth are more frequently implicated, reflecting poor oral hygiene or dietary habits such as prolonged bottle use (6).

The presented cases illustrate this spectrum: Case 1, involving a permanent first molar (#36), demonstrates that early-stage (serous) infections can be managed conservatively with endodontic treatment and antibiotics. Cases 2 and 3, affecting primary teeth (#54, #84), show rapid progression requiring extraction and highlight the importance of timely intervention to prevent systemic complications.

Diagnostic Approach

Odontogenic infections evolve through three stages (serous, suppurative, and diffuse/gangrenous) making early recognition critical. Diagnosis relies on thorough clinical history, examination, and standard radiographs in early or localized cases. Advanced imaging (ultrasound, CT, MRI) is reserved for

suspected multi-space involvement or deep extension, such as persistent fever,

trismus, dysphagia, or signs of mediastinal or orbital spread (PMC). The cases illustrate the dichotomy between permanent teeth, often amenable to conservative therapy, and primary teeth, more frequently requiring extraction (7).

Therapeutic management

Management combines systemic control with definitive elimination of the infectious source.

Antibiotics are indicated for systemic signs or spreading cellulitis, with amoxicillin (or amoxicillin–clavulanate for suspected beta-lactamase producers) as the first-line oral agent; intravenous therapy is reserved for severe cases (2, 8).

Current evidence discourages leaving a tooth open for drainage due to risk of contamination; pulpectomy, extraction, or surgical drainage are recommended (9). Kara et al. (2014) (10) showed that eliminating the infectious source within 48 hours significantly shortens hospital stay. Local treatment decisions should consider tooth type and prognosis: permanent teeth with favorable restorability can often be preserved, whereas primary teeth with advanced destruction typically require extraction (11, 12). The cases reflect these principles: Case 1 achieved full recovery with pulpectomy and crown placement, while Cases 2 and 3 required extractions of severely affected primary teeth, with subsequent resolution of infection.

Prognosis and Complications

With early intervention, pediatric odontogenic cellulitis generally resolves well. Delayed or inadequate treatment can lead to severe complications, including airway compromise, orbital extension, descending mediastinitis, necrotizing fasciitis, and sepsis (3). The clinical cases reinforce that rapid identification and prompt management according to tooth type are essential to prevent morbidity.

Conclusion

Odontogenic infections are a leading cause of pediatric facial cellulitis and related hospitalizations. Infections originating from primary teeth progress rapidly and

often require extraction, whereas timely diagnosis in permanent teeth allows conservative endodontic management. Prevention through caries control, parental education, and school-based programs, combined with judicious, guideline-based antibiotic use, is crucial to reduce the clinical and public health burden. Early recognition, prompt intervention, and tailored treatment based on tooth type remain the cornerstone of effective management.

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