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ORIGINAL ARTICLE

# Odontogenic cellulitis in children requiring hospitalization

Jun Kuo [a], Yai-Tin Lin [b], Yng-Tzer Joseph Lin [b*]

[a] *Department of Dentistry, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan*
[b] *Pediatric Dentistry, Kaohsiung Chang Gung Memorial Hospital and Chang Gung University College of Medicine, Kaohsiung, Taiwan*

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**KEYWORDS**
facial cellulitis;
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**Abstract** *Background/purpose:* Facial cellulites are frequently seen in children's hospitals, and it can lead to complicated systemic illnesses. The purpose of this retrospective study was to investigate clinical characteristics of odontogenic facial cellulitis in children requiring hospitalization.
*Materials and methods:* One hundred and fifty hospitalized children (75 boys and 75 girls), with an average age of $5.17 \pm 2.09$ years, who were treated for odontogenic facial cellulitis at Kaohsiung Chang Gung Children Hospital, Taiwan, were selected for this study. An infectious primary lesion was identified when the infection originated from a fresh lesion of an infected tooth, compared to a secondary lesion. Study variables included age, gender, location of the cellulitis, source of the infection, length of hospitalization, and symptoms and signs of infection during the hospitalization.
*Results:* The mean hospitalization length was $5.15 \pm 1.52$ days. A greater association of upper-face infections with upper anterior teeth was found than lower anterior teeth with lower-face infections. Fever during hospitalization and the source of the infection in the anterior teeth were found to have occurred significantly more frequently with a primary than with secondary infectious lesion ($P < 0.05$).
*Conclusion:* Differences in upper- and lower-face infections were not clinically significant except for the source of the infection. In terms of the effects of the infectious lesion,

* Corresponding author. Pediatric Dentistry, Kaohsiung Chang Gung Memorial Hospital, 123 Ta Pei Road, Niao-Sung, Kaohsiung 833, Taiwan.
*E-mail address:* Joe0430@ms13.hinet.net (Y.-T.J. Lin).


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significant differences were found between primary and secondary lesions in terms of having a fever during hospitalization and an anterior source for the infection.


## Introduction

Early diagnosis and treatment of pediatric facial cellulitis are challenging because of its variable clinical presentations, including multiple potential sources of infection and multiple organisms within the head and neck area.[1,2] Facial cellulitis is classified as nonodontogenic and odontogenic, depending on the source of the infection, and as upper or lower face, depending on the anatomical location.[3] Odontogenic facial cellulitis refers to infections arising from the dentition and its adjacent supporting periodontal structure. Biederman and Donson[1] found that odontogenic cellulitis accounted for approximately 50% of total facial infections in a hospitalized population over a 10-year period. Our previous retrospective study investigated all pediatric patients with odontogenic facial cellulitis in 2003, and found that hospitalization was needed for 53.6% of patients and, in 57.1% of cases, the upper face was affected.[4] Approximately half of patients requiring hospitalization prompted us to conduct this survey in order to discern any significant clinical characteristics that might help establish criteria for hospitalization.

Children with odontogenic facial cellulitis are commonly seen by many medical specialists in hospitals prior to being referred to a dental specialist. This may be partly due to difficulty in ascertaining the source of the infection, as mentioned above, and partly due to a lack of access to dental services. Thikkurissy et al[5] investigated the management of odontogenic facial cellulitis in hospitalized pediatric patients compared to nationally reflective data, and concluded that rapid treatment had a significant impact on the length of stay and the total cost of treatment. An early, accurate diagnosis of the source of infection is important in preventing the development of complications and reducing the length of hospitalization. To better understand and manage odontogenic facial cellulitis, especially in hospitalized pediatric patients, we conducted a retrospective study to investigate its clinical characteristics and to determine clinical differences between upper- and lower-face infections and between those resulting from primary and secondary infectious lesions.

## Materials and methods

One hundred and fifty hospitalized children (75 boys and 75 girls) being treated for facial cellulitis at Kaohsiung Chang Gung Children Hospital, Taiwan, were selected for this study. All participants complied with the following inclusion criteria: all were aged $<$17 years, the period of hospitalization determined from a computerized data was between January 1, 2006 and December 31, 2009, and all cases were diagnosed with a facial infection of odontogenic origin.

The ages of the selected 150 cases ranged from 1 year 10 months to 12 years 4 months, with a mean age $\pm$ standard deviation (SD) of $5.17 \pm 2.09$ years. Study variables included age, gender, location of the cellulitis, source of the infection, and length of hospitalization. Symptoms and signs of infection during hospitalization included subjective toothache and fever ($\geq$37.5°C) on the first day of hospitalization, and white blood cell (WBC) count and C-reactive protein (CRP) values prior to the initiation of treatment.

Infections were classified as upper or lower face according to their anatomical location, as modified from Dodson's definition.[3] Upper-face infections involved swelling located above the lip line, including the maxillary dentition and periorbital, maxillary, frontal, nasal, and upper-buccal regions. Lower-face infections were defined as those below the lip line, and included the mandibular dentition and the mandible, floor of the mouth, and cervical regions.

The source of infection was classified as a deciduous second molar (E), deciduous first molar (D), or deciduous canine and incisor (ABC). An infectious primary lesion was identified when the infection originated from a fresh lesion of an infected tooth, due to either dental decay or trauma. In contrast, a secondary infectious lesion was attributed to treatments such as restorations or pulp therapies on the infected tooth prior to the occurrence of swelling. Data on the location of cellulitis and the source of infection by gender were also collected and compared.

A chi-square test was used to assess differences between upper- and lower-face infections and between infectious primary and secondary lesions for the various study variables. A *t* test was used to compare continuous data such as age and length of hospitalization. A P value of $<$0.05 was considered statistically significant.

## Results

Upper- and lower-face infections were, respectively, reported in 56% and 44% of study participants. Infections originating from the deciduous posterior teeth (D and E) (81.3%) were more common than those originating from deciduous anterior teeth (ABC) (18.7%). No origin of infection from a permanent tooth was found. Sources of upper-face infections were more in the deciduous posterior teeth (67.9%) than in the deciduous anterior teeth (32.1%). Moreover, the source of lower-face infections was almost all in deciduous posterior teeth (98.5%) compared to deciduous anterior teeth (1.5%). Regarding the source of infection from primary or secondary lesions, the ratio of primary to secondary lesions in the deciduous posterior