

Odontogenic Maxillofacial Infections in a High-level Hospital: Orofacial Pain and Related Conditions

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ABSTRACT

Objective: *Odontogenic infection is a common condition in America; the aim of this research was to determine the profile of odontogenic maxillofacial infections and to identify the link between these and the pain felt by patients admitted to the emergency dental service of the Hernán Henríquez Aravena Hospital in Temuco, Chile.*

Methods: *A cross-sectional, double-blind study analysed 49 individuals admitted for emergency dental care. Included were admissions associated with odontogenic infection identified by clinical examination, establishing a relation to pain through a survey. The diagnosis was made clinically using the fascial spaces involved in the infection, presence of self-medication prior to admission, need for surgical treatment and the patient's systemic conditions. The data were analysed using descriptive statistics, Chi-squared, ANOVA, considering a value of $p < 0.05$ as significant.*

Results: *The average pain level measured by visual analogue scale (VAS) in emergency admission was 8.1. There was no association between the diagnosis (pulp infection, periodontal infection or pericoronitis) and the VAS ($p = 0.078$), but there was association between age and the diagnosis ($p = 0.022$), and the VAS was associated with pain compared to other types of pathologies or traumas ($p = 0.011$).*

Conclusion: *Odontogenic infection is frequent and linked to age and high-pain values. New public policies should be adopted based on these results. New studies are needed to assess new variables associated with these pathologies.*

Keywords: Maxillofacial infection, odontogenic infection, orofacial pain

INTRODUCTION

Maxillofacial infections are frequent in Latin America and create a high demand in emergency services (1). A large part of these are oral and most are odontogenic (2). However, on some occasions oral pathologies are relegated to being less urgent, losing priority in hospital admission and clinical attention. The pain that these infections cause is tremendous, frequently debilitating until clinical management and elimination of the aetiology of the infection (3).

A low percentage of odontogenic maxillofacial infections are fatal; however, those that spread have a high

percentage of morbidity and associated complications (4), often producing irreversible sequelae (5) such as amaurosis (6). In addition, the possible obstruction of the airway due to increased volume resulting from an infection accentuates the need for decisive and prompt treatment, and immediate attention and correct resolution by the technical and professional team is highly relevant (7).

The aetiology of the infection and its spread make necessary different types of antibiotherapy protocols and different clinical treatments such as pulp drainage or trepanation (when teeth are associated with

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the infection), which is different from what has been observed in other areas of the body (1, 8). The aim of this study was to characterize odontogenic infections, their aetiology, spaces involved, pain level, including the self-medicating pharmacology in patients admitted to the Emergency Service of the Hernán Henríquez Aravena Hospital (HHHA) in Temuco, Chile.

SUBJECTS AND METHODS

An inferential cross-sectional descriptive study was conducted, analysing 80 patients admitted to the emergency dental service of the HHHA in Temuco between November 2012 and April 2013. The procedures developed in this study were performed with the consent of the ethics committee of the HHHA. The patients participated voluntarily in the study, signing an informed consent that explained the scope of the research. In the case of minors, consent was sought from the legal guardian, who signed the consent form. All data were recorded with a number to ensure the patient's anonymity. The study was conducted in accordance with the hospital's biosafety standards, and the treatment did not vary after the diagnosis or the survey. In all, 49 individuals comprised the final sample.

Subjects of both genders were included, aged between 16 and 70 years, literate in Spanish, and with no relevant systemic pathologies that influenced the patients' general state. Patients were excluded who refused to sign the informed consent, who decided not to participate in the study, those under the influence of alcohol or other drugs upon admission, patients who could not communicate in Spanish correctly and fluently, patients diagnosed with psychiatric diseases and those with life-threatening diseases. All the patients were referred from the Emergency Service of the HHHA to the Emergency Dental Service by the emergency physician.

The diagnosis and clinical outreach of the infection were undertaken by Investigator 1 (emergency dentist). Given the controversy of nomenclature in the literature, the genian region was included and defined as such when it was not clear whether the content was buccal or canine. The clinical analysis and medical history questions were closed and mainly required a dichotomized response. Once the diagnosis had been made, Investigator 2, blind to the diagnosis made by Investigator 1, administered the survey to the patient, assessing the pain level through a visual analogue scale (VAS), where the subject expressed the pain level by marking a line where 0 was no pain and 10 was pain of the greatest possible intensity.

An item was included to evaluate the patient's self-medication and its effect. For this item, the question was whether any medication had been self-administered to manage the pain and what type of drug had been used, for which a second VAS was included that expressed the degree of pain after self-medicating. To finalize, the treatment received and the medication indicated was registered in the patient's record. The sociodemographic and clinical variables evaluated were: age, gender, type of pathology (pericorony, pulp, periodontal), facial spaces (FS) and number of spaces involved in the infection, increase in volume, pain level, type of pain, self-medication, clinical treatment selected and pharmacological treatment chosen.

The statistical analysis was performed using the software SPSS/PC v. 20.0, SPSS, Chicago, IL. The descriptive statistics were calculated for the different measurements; averages and standard deviation were calculated. Pearson's Chi-squared test and a one-way ANOVA were performed, considering a value of $p < 0.05$ to determine statistical significance.

RESULTS

The sample comprised 49 individuals who were interviewed and diagnosed with some type of odontogenic infection. The average age was 32.6 years (± 12.2 years); 32 were women (65.3%) and 17 were men (34.7%).

The most frequent pathology was pulp pathology (73.46%), with a higher frequency in subjects aged between 16 and 50 years of age as shown in Table 1. There was no record of subjects between 36 and 65 who presented pericorony pathology; in the range of 51 years and over, disease most associated with odontogenic infection was periodontal disease (Table 2).

The analysis of variables confirmed a link between pain at the infection site and the female gender compared to the male group ($p = 0.46$). The pain reported by the subjects on the VAS scale was 10 (maximum possible) in 38.8%, 9 in 14.3%, 8 in 12.2% and 7 in 12.2%; 22.5% had a VAS rating equal to or lower than 6. The greatest intensity of pain was related to facial cellulitis (Table 1).

Of the 49 subjects, 42 had already self-medicated prior to admission. The VAS average in this patient group was 8.1 prior to self-administering medication and 4.2 afterwards. In terms of analgesic therapy with professional indication in the hospital, the most used drug was 500 mg acetaminophen (72%), followed by 50 mg diclofenac (13%), 100 mg ketoprofen (9%) and other NSAID drugs (6%).

With respect to the involvement of FS, in 60.8%, there was no FS involvement and only involvement at intraoral level. In 39.2% of the subjects with FS involvement, 17.6% of the cases presented with involvement of the buccal space, 7.8% the canine space, whereas the palatal, genian, submental, masseteric and infratemporal spaces appeared in 2% per space. The treatment for each patient is shown in Table 3, where it is confirmed that extraction and pharmacological treatment were the best options in these cases.

DISCUSSION

This cross-sectional study evaluated mainly Chileans, in some cases of Mapuche origin, in southern Chile. The patients were mainly from a low- and middle-socio-economic level, with the majority being of productive age, meaning that the presence of pain and odontogenic infection could have consequences at work and a reduction in production, apart from the health complications.

Odontogenic maxillofacial infections are the main reason for admission in emergency dental services (2). These pathologies are present in all ages, but are more prevalent between 21 and 50 (9), similar to the ages found in our study. In terms of the gender of the sample, our results reveal that this condition was more frequent in women (65.3%), as in other investigations (9).

In this study, the increase in volume resulting from these infections was pathology-related ($p = 0.012$), as were the occupied FS ($p = 0.000$). These infections have the capacity to spread to different fasciae, being able to generate increased volumes in different spaces of the head and neck (9, 10). The most commonly occupied spaces described in the literature are the buccal and sub-mandibular (8, 11), which is consistent in some respects with our study; however, the severity of the infections presented in this sample did not present with cervical involvement.

The aetiopathology of these infections is the product of a range of clearly identified aerobic and anaerobic pathogenic agents and is associated in greater and lesser amounts to various degrees of severity of the infections (12–14). In our study empirical antibiotherapy was used with metronidazole and amoxicillin, which was also used by Bakathir *et al* (11). Although there are studies revealing its indiscriminate use and poor indication (14, 15), here the use of antibiotherapy administered to the patients followed the regulations imposed by the Chilean Ministry of Health based on the protocols validated in the literature (16).

Table 1: Association between the sociodemographic and clinical variables analyzed in 49 subjects with odontogenic infection

Variable	Variable	Level of significance
Age	Diagnosis	0.001*
Gender	Type of pain	0.046*
Age	Type of pain	0.049*
Gender	FS	0.188
Gender	Days with pain	0.416
Gender	Diagnosis	0.697
Age	FS	0.347
Gender	VAS level	0.876
Diagnosis	Increased facial volume	0.012*
Diagnosis	FS	0.000*
Type of pain	Diagnosis	0.890
Type of pathology	FS	0.991

*Statistically significant ($p < 0.05$).

FS = fascial spaces; VAS = visual analogue scale.

Table 2: Presence of associated pathologies according to the age group of 49 subjects observed with odontogenic infection

Group (age)	Aetiology of the odontogenic infection					
	Pulp		Pericoronary		Periodontal	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
16–35	19	76	4	16	2	8
36–50	12	70	2	12	3	18
51 and over	5	71	0	0	2	29
Total	36	73.46	6	12.24	7	14.28

Table 3: Distribution of 49 patients with odontogenic infection treated in the Emergency Dental Service of the HHHA

Treatment	<i>N</i>	%
Extraction	11	22.4
Antibiotic treatment and other drugs	10	20.4
Extraction and other drugs	6	12.2
Other drugs	5	10.2
Dental trepanation, ATB treatment and other drugs	4	8.2
Dental trepanation and other drugs	4	8.2
Dental trepanation	2	4.1
Drainage, antibiotic treatment and other drugs	2	4.1
Extraction, ATB and other drugs	2	4.1
Trepanation and ATB	2	4.1
Extraction and drainage	1	2
Total	49	100

ATB = antibiotic.

The aetiology of the infection is similar to that observed in other studies, with the pulp and periodontal pathologies being the most frequent (2, 9); among these, periapical abscesses were the most prevalent (43%), followed by pulpitis (17%) and pericoronitis (12%). This study revealed a connection between the individual's age

and the pathology ($p = 0.001$), and there was a tendency towards periodontal disease at more advanced ages and pulp infection in younger individuals ($p = 0.026$).

The patients aged between 16 and 35 years presented with pulp pathology in 76%, pericorony pathology in 16% and periodontal in 8%; those between 36 and 50 years presented with pulp pathology in 70% and 12% pericorony pathology. There were no significant differences in the diagnoses between the two genders.

In this study, the average score measured using the VAS was 8.1; our results showed no association between this scale and the diagnosed pathology ($p = 0.890$) (Figure). Gender was also related to pain, where a greater periodic pain was experienced by women than by men ($p = 0.046$). The treatment provided in the emergency service for these patients was extraction of the affected tooth (22.4%), antibiotic therapy and analgesics (20.04%), extraction and analgesics (12.2%) and treatment with analgesics (10.2%). Although drainage of the infection is a fundamental therapy in the treatment of abscesses (17), in our study, it was the least frequent treatment because only three patients warranted it.

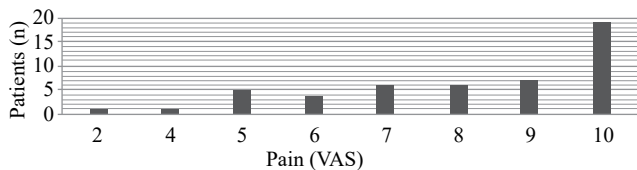


Figure: Orofacial pain reported by 49 patients in hospital admission due to odontogenic infection.

That the diagnoses were made only with clinical methods and without support of imaging represents a limitation of this study. Nevertheless, it can be concluded that pain is highly associated with odontogenic infection and that the intensity depends on factors like gender and age; in addition, self-medication is frequent in these patients prior to their admission to the emergency services.

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