

# Referred Dental Pain, an Analysis of their Prevalence and Clinical Implication

Dolor Dental Referido, Análisis de su Prevalencia e Implicancias Clínicas

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**SUMMARY:** The study objective was to evaluate the prevalence of referred dental pain (RDP) in a group of Brazilians subjects and identify possible partnerships with sex, age and the presence of periodontal or periapical lesions. A descriptive cross-sectional study was designed, 98 patients between 14 and 64 years old (59 women and 39 men), who consulted by dental pain were evaluated clinically and radiographically in order to determine the cause and partnership with periapical and periodontal lesions and its possible territories projection other than their origin. The prevalence of RDP was 31.6%, higher in women (67.74%) though without statistical significance. The RDP was presented at a 45.16% together with periapical lesion and a 25.8% along with periodontal lesion. There was no relationship between age and RDP presence. The high prevalence of RDP found reinforces the need for a diagnosis of orofacial pain.

**KEY WORDS:** dental pain, referred pain, periodontal lesion, periapical lesions.

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## INTRODUCTION

The pain in the oral and maxillofacial territory has a great impact on the quality of life (Murray *et al.*, 1996), its management requires a etiological diagnosis, which is not always easy, because the Painful conditions in this region, particularly for teeth, tends to be poorly located by the patient. In the trigeminal system high convergence at the spinal trigeminal nucleus of the trigeminal and cervical primary afferents neurons, originating in the pulp, periodontal, oral mucosa, tegument, muscles and joints, has been implicated in the mechanism of referred pain (Sessle *et al.*, 1986; Piovesan *et al.*, 2001; Albuquerque *et al.*, 2008; Dias *et al.*, 2009).

For this reason referred Painful conditions of the teeth may have originated in distant territories as the ear, muscles of occipital region, masticatory muscle or in other teeth (Silverglade, 1980; Zeng, 1980; Capuano *et al.*, 1984; Sulfaro & Gobetti, 1995; Wright, 2000; Abu-Bakra & Jones, 2001). That is why the description that makes the patient about the location of pain should be taken with caution; it is recommended that to reach a

proper diagnosis, in addition to anamnesis, the clinician should use tests that include a pulp vitality test and radiographs (Ehrmann, 2002).

Through clinical studies found that pain intensity presents a great partnership in the development of referred pain of dental origin, unlike what happens with the duration or quality of pain, linking this aspect with mechanisms of hyperexcitability due to central sensitization (Falace *et al.*, 1996). That is why in acute painful conditions of dental origin, high-intensity pain, is most likely development processes of referred pain, which has great clinical implications.

Due to the shortage of studies to analyze the prevalence of referred dental pain and the population-specific differences in some events associated with pain (Riley & Gilbert 2000; Riley *et al.*, 2002). The purpose of this study was to examine the prevalence of this event in a group of Brazilians subjects and determine possible associations with sex, age and the presence of periodontal or periapical lesions.

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## MATERIAL AND METHOD

This study was carried out at the Emergency Clinic of the Faculty of Dentistry at the Universidad de São Paulo. We performed a cross-sectional study, which examined the prevalence of referred pain from a tooth. The patients were incident cases who consulted for emergency dental pain between March and July 2008, as an inclusion criterion was seen as being more than 14 years old and were excluded from this study seriously ill patients, with physical, cognitive or psychological limitations which hinder the collection of data. The patients were informed of the nature of the study and agreed to voluntarily participate in it, signing a written consent to do so. This research included the adoption of the ethics committee on research at the University of São Paulo.

**Patients.** The sample consisted of 98 patients, between 14 and 64 years old (average 34.38; SD 12.77), of who 59 were women, with an average age of 33.28 years (SD 13.14) and 39 men whose average age was 36.05 years (SD 12.17).

**Evaluation.** In order to determine the tooth that caused pain, patients were assessed clinical and semiology using diagnostic tests series, which included visual inspection, palpation, percussion, sensitivity test (electricity, heat and cold).

This evaluation was supplemented by radiographic examination in which it was determined the presence of periapical and periodontal lesions associated with tooth considered the cause of pain.

**Referred dental pain.** Once the tooth that caused painful condition was determined, were explored through history and clinical examination the presence of referred dental pain. It was considered referred dental pain to one that is projected to a tooth, or a group of teeth, other than that which is considered etiological for the development of painful condition.

**Analysis.** Through the program SPSS 15.0 established the prevalence of referred dental pain. Using contingency tables analyzed the association of this condition with sex, the presence of periapical and periodontal lesions, determined probabilities of Clinical Importance, the significance was analyzed by means of the non parametric Chi Square test ( $p < 0.05$ ). The significance of differences in relation to the age of the patients with and without referring dental pain were performed using the Student's t-test ( $p < 0.05$ ).

## RESULTS

Of the 98 patients, 31 showed referred dental pain calculated for this sample a prevalence of 31.6%, of which 14 indicated that the pain was projected to the entire dental arcade (14.3%) and 17 who did it to a tooth in particular (17.3 %).

**Referred pain dental and sex.** In the group that submitted referred dental pain, to analyze the distribution by sex is noted that it was presented in 21 women and 10 men, however, the statistical analysis, this difference was not significant (chi-square = 0.3). We performed the calculation of probabilities for this sample and was obtained that the probability that a patient referred dental pain is this woman is 67.74% (Table I).

**Referred dental pain and periapical lesion.** Periapicals lesions evaluated radiographically, were found in 39 of total patients studied (39.79%). Of these, 14 had referred pain, which corresponds to 14.2% of total and 35.89% of those with lesion. In the group that submitted referred dental pain, to analyze the distribution according to the presence or absence of periapical lesions shows that it was more common in subjects with no periapical lesions, these differences were not significant (chi-square = 0.46), therefore, no association was found between the presence of periapical lesion and presence of referred dental pain.

We performed the calculation of probabilities for the sample and found that the probability of a patient who referred dental pain was periapical lesion is 45.16%.

**Referred Dental Pain and Periodontal lesions.** By radiographic evaluation were found 17 subjects with periodontal lesion, which corresponds to 17.3% of the total analyzed, of which 8 (47%) were presented in conjunction with referred dental pain. Differences between the presence or absence of periodontal lesion in the group that submitted referred dental pain was not significant (chi-square = 0.132).

Based on the contingency table (Table II) we note that the probability of a patient in the sample that this referred dental pain and periodontal lesion related is 25.8%.

**Referred dental pain and age.** The group presented referred dental pain had an average age of 33.48 years (SD 10.96), while the average age in the group not planned to another site pain was 34.8 years (SD 13.59).

The differences between these groups were not statistically significant ( $p = 0.63$ ).

Table I. Contingency table related the presence or absence of referred dental pain to the sex of the patient. Calculated based on 98 patients who consulted pain in the dental clinic at the Faculty of Dentistry at the Universidad de São Paulo, Brazil.

Sex	Group		Total
	No Referred pain	Referred pain	
Female	38	21	59
Male	29	10	39
Total	67	31	98

Table II. Contingency table related the presence or absence of referred dental pain to the presence of periapical lesion or periodontal lesion, based on the radiographic evaluation of 98 patients who consulted pain in the dental clinic at the Faculty of Dentistry at the Universidad de São Paulo, Brazil.

	Group		Total
	No referred pain	Referred pain	
<b>Periapical lesion</b>			
<b>Absent</b>	42	17	59
<b>Present</b>	25	14	39
<b>Total</b>	67	31	98
<b>Periodontal lesion</b>			
<b>Absent</b>	58	23	81
<b>Present</b>	9	8	17
<b>Total</b>	67	31	98

## DISCUSSION

Pain of odontogenic origin is semiologically relevant, because some aspects of the morphological components were very complex. First, the high convergence of primary afferent neurons of the trigeminal nerve, which, from various territories, are projected to spinal trigeminal nucleus neurons (Sessle et al.) Second, by the presence of other nerves, such as facial, glosopharyngeal, vague nerves and the first cervical nerves, which have have cutaneous, mucous or deep territory, projecting some of its primary afferent to the spinal trigeminal nucleus (Bowsher, 1979; Myers, 2008).

Third, because the involvement of neuromodulation of intercellular diffusion to spinal nucleus level, as NO<sub>2</sub>, associated with NMDA glutamatergic receptors activity, thus facilitating the emergence of hyperalgesia and extent of the sensitive fields involved in the location of pain. Fourth, due to poor somatotopy that having some structures innervated by the trigeminal system, which complicates the exact location of the origin of pain (Bowsher). All these factors make the irradiated and referred pain condition frequently observed in clinical practice.

In this study, we found a high prevalence of referred dental pain, approximately one in three patients who consulted (31.6%), from the site of pain origin, assessed through various diagnostic procedures, it was projected to other territories. In all these cases the attention to the description made by the patient generate wrong diagnoses and inappropriate treatments (Ehrmann). The absence of a gold standard that allows diagnoses and compare referred dental pain difficult the standardization of clinical evaluation procedures, it should be implemented, especially in cases where the pain intensity is high (Falace et al.).

The highest prevalence of referred dental pain is in women, this is consistent with some studies indicating that women have a higher prevalence in some painful facial conditions (Dannecker et al., 2008), but reported pain in an inappropriate manner, hindering their therapeutic management (Donovan et al., 2008), joined some modulation mechanisms of pain differ between men and women (Quiton & Greenspan, 2007), possibly linked to estrogen receptors in the spinal trigeminal nucleus, this has been recently questioned by some authors who have found no relationship between the menstrual cycle and use of contraceptives with the sensitivity associated with dental and myofascial pain (Tófoli et al., 2007 ;Vignolo et al., 2008).

The probability, in our sample, of finding referred pain in pulp and periapical lesion was greater than the probability that it is given in conjunction with an periodontal lesion, which is interesting to analyze in neurophysiological terms, this may be related to three points: first, the differences in dental and periodontal somatotopy in pain perception; second, due to the increased probability of awareness system in case of periapical lesion, because this resulted in an prior pulp injury; third, due to the presence of proprioceptors in the periodontal tissues, which contribute to improving the location of the tooth affected by a periodontal lesion.

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**RESUMEN:** El objetivo de este estudio fue analizar la prevalencia de dolor referido dental (DRD) en un grupo de sujetos brasileiros y determinar las posibles asociaciones con sexo, edad y la presencia de lesión periapical o periodontal. Se diseñó un estudio descriptivo de corte transversal, con 98 pacientes, de entre 14 y 64 años (59 mujeres y 39 hombres), que consultaron por dolor dental, ellos fueron evaluados clínica y radiográficamente con el fin de determinar la causa y la asociación con lesión periapical y periodontal y su posible proyección a territorios distintos de su origen. La prevalencia del DRD fue de 31,6%, mayor en mujeres (67,74%) aunque sin significancia estadística. El DRD se presentó en un 45,16% junto con lesión periapical y un 25,8% junto a lesión periodontal. No se encontró asociación entre la edad y la presencia de DRD. La alta prevalencia de DRD encontrada refuerza la necesidad de un diagnóstico etiológico del dolor orofacial.

**PALABRAS CLAVE:** dolor referido, dolor dental, nervio trigémino; prevalencia.

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