



Analysis of Odontogenic Referred Pain - A cross-sectional study

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ABSTRACT

Objective: To evaluate the prevalence of referred odontogenic pain among adults and its possible relation with different characteristics of pain.

Method: A cross sectional study was designed .A detailed history of pain , clinical and radiographic examination of patients above 18 years of age was evaluated. Student's independent t-test was employed for comparing continuous variables. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparing categorical variables. A P-value of less than 0.05 was considered statistically significant.

Results: Intensity of pain influences pain referrals and reliable predictor. Females have lower threshold to pain. Irreversible pulpitis is more associated with referred pain and pulp necrosis creates more difficulty in locating the offending tooth

Conclusion: In order to reduce the incidence of pain in dental patients, especially when it comes to odontogenic pain, more attention should be paid to educate patients in the implementation of oral hygiene and regular check-up visits, for the purpose of an early diagnosis of possible pathological changes and preventive action.

Key words: referred pain, odontogenic pain, pain referral

Introduction

Oral and maxillofacial pain has a great impact on the quality of life, 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.¹

The mechanism for referred pain is not fully understood and no single mechanism can explain all aspects of referred pain. There are several theories for the mechanism of referred pain. The most widely-accepted theories are the convergent-facilitation theory, the axon reflex theory, the thalamic-convergence theory, the central-hyperexcitability theory, and the convergent-projection theory.

Referred pain is a common and confusing problem encountered by every dental practitioner. This is a kind of pain perceived in a part of body, which is far from the source of pain. Usually the pain originated in a visceral organ could be referred to a superficial anatomic region such as cardiac pain, which radiates to the shoulder, arm, mandible and face.² 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. Thus the patient description of 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.

There are very few studies that analyze the prevalence of referred dental pain and the population specific differences in some events associated with pain. The purpose of this study was to examine the prevalence of this event in population of Jammu City and determine possible associations with sex, age and the presence of periodontal or periapical lesions.

Materials and Methodology

This cross-sectional study was carried out at the Department of Conservative and Endodontics, Indira Gandhi Government Dental College, Jammu, JK-UT. Consecutive incident cases who reported with posterior toothache were included in the study, between January 2019 and January 2022. The sample consisted of 252 adult patients.

Inclusion criteria was, age > 18 years of age and pulpal and periapical pathology in posterior teeth. Exclusion criteria was anterior teeth pain, multiple posterior teeth, non-odontogenic and gingival cause of pain, 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. Ethical clearance was taken from ethics committee of Government Medical College, Jammu.

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. 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.

Clinical questionnaire regarding demographic, duration, intensity of pain using VAS scale (Fig:1) taken prior to clinical examination.

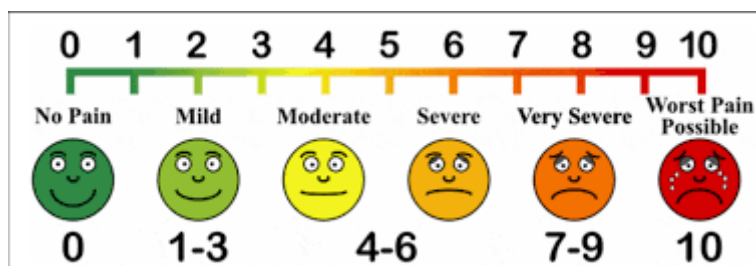


Figure 1: Visual Analogue Scale

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean \pm SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams. Student's independent t-test was employed for comparing continuous variables. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparing categorical variables. A P-value of less than 0.05 was considered statistically significant.

Results:

Out of 252 patients 180 (71.4%) had referred dental pain. Referred pain was more among females in comparison to males and it was found out to be Statistically Significant (P-value=0.015). (Figure 2)

It was observed that referred pain was more in younger age groups. (Figure:3)

Referred Pain according to intensity of pain on Visual Analogue Scale (VAS) is Shown in figure 4 and Table 1

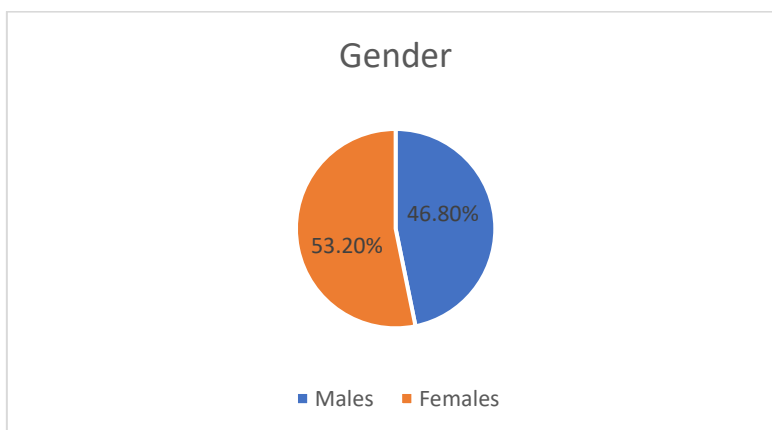


Figure 2: Gender Distribution

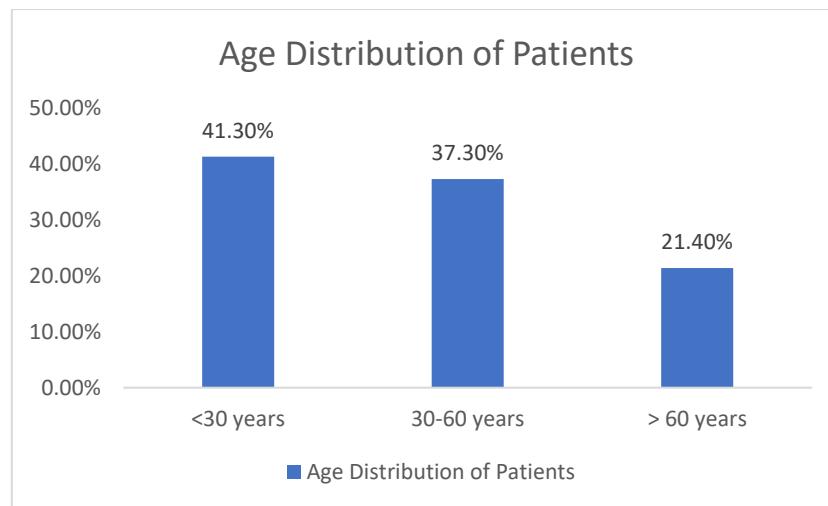


Figure 3: Age Distribution of Study Subjects

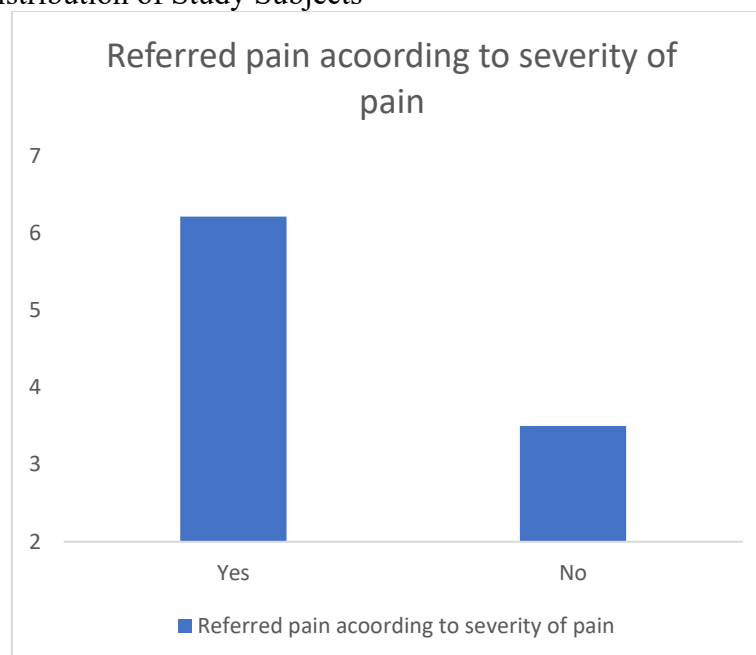


Figure 4: Referred Pain According to Severity of Pain on VAS Scale.

Table 1: Referred Pain According to Severity of Pain on VAS Scale.

Referred Pain	N	Mean (\pm SD)	P- Value
Yes	180	6.21(\pm 2.23)	0.006*
No	72	4.96 (\pm 2.28)	

*Statistically Significant (P-value<0.05)

Referred dental pain and Pulpal Diagnosis:

Necrotic Pulp with referred pain was seen in 76.7% of the patients. Irreversible Pulpitis was more associated with Referred Pain than necrotic Pulpitis. (Table 4)

Table 2: Referred dental pain and Pulpal Diagnosis

Parameters	Referred Pain	Localised Pain	p- value
Necrotic Pulp	46 (76.7%)	14(23.3%)	<0.001*
Apical Periodontitis	12 (30%)	28 (70%)	

Irreversible Pulpitis	122 (80.3%)	30 (19.7%)	
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***Statistically Significant (P-value<0.05)**

Duration pain in subjects with Referred pain was 13.5 ± 11.34 days and 12.1 ± 10.81 days in subjects with no referred pain and it was found out to be statistically insignificant (p value-0.527)

It was seen that 38 patients with referred pain had pain on apparent site and 142 patients had pain in both actual and apparent site. Referred Pain was seen more in Maxillary Teeth (79.2%) as compared to mandibular teeth. Maxillary and mandibular teeth showed ipsilateral distribution of referred pain with almost similar frequency of absolutely apparent site of pain. (Table 3)

Table 3: Referral Pattern of Pain

Parameter		Referred pain	Localise pain	P- value
Site	Apparent site	38 (100%)	0 (0.0%)	<0.001*
	Actual site	0 (0.0%)	72 (100%)	
	Apparent site & Actual site	142 (100%)	0 (0.0%)	
Site	Maxillary Teeth	84 (79.2%)	22 (20.8%)	0.097
	Mandibular Teeth	96 (65.8%)	50 (34.2%)	
Character of referred pain	Spontaneous	23 (76.7%)	7 (23.3%)	<0.001*
	Provoked	6 (30.0%)	14 (70%)	
	Both spontaneous and provoked	61(80.3%)	15 (19.7%)	

***Statistically Significant (P-value<0.05)**

Discussion

Odontogenic pain is semiologically relevant, because of very complex aspects of the morphological components. First, the high convergence of primary afferent neurons of the trigeminal nerve, which, from various territories, are projected to spinal trigeminal nucleus neurons. Second, by the presence of other nerves, such as facial, glossopharyngeal, vagus nerves and the first cervical nerves, which have cutaneous, mucous or deep territory, projecting some of its primary afferent to the spinal trigeminal nucleus.^{6,7}

In the present Study 252 patients were included out of which 180 (71.4%) had referred dental pain. Referred pain was more among females in comparison to males and it was found out to be Statistically Significant (P-value-0.015). This was in accordance to study done by BRANDÃO et al.,¹ Dannecker et al.³

In this study, we found a high prevalence of referred dental pain, (71.4%), from the site of pain origin, assessed through various diagnostic procedures, it was projected to other territories. In all these cases description made by the patient generate wrong diagnoses and inappropriate treatments.⁴ 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.⁵

Intensity of pain influences pain referrals and reliable predictor. Irreversible pulpitis is more associated with referred pain and pulp necrosis creates more difficulty in locating the offending tooth.

Conclusion

This investigation can serve as an educational tool. The data collected can be utilised to create a programme on AI based diagnosis of offending tooth. This would likely reduce the number of teeth that are endodontically treated that either do not need the treatment or are not the source of the patient's current pain.

Conflict of Interest: NIL

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