Prevalence of Referred Pain with Pulpal Origin in the Head, Face and Neck Region

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ABSTRACT

INTRODUCTION: This study was designed to evaluate the prevalence of referred pain with pulpal source in the head, face and neck region among patients referred to Dental School of Shahid Beheshti University MC, Tehran, Iran in 2004.

MATERIALS AND METHODS: In this cross-sectional study, 100 patients (55 males and 45 females) referred to oral medicine department of Shahid Beheshti Dental School evaluated via clinical and radiographic examination to seek their pain sources and sites. Inclusion criteria were report of pain and a dental clinician accomplished detection of pain origin. Exclusion criteria were non-odontogenic painful diseases, advanced periodontal disease, and substantial carious lesions. Visual analogue scale (VAS) was used to score pain intensity; meanwhile the patients were asked to mark the painful sites on an illustrated head and neck mannequin.

RESULTS: Sixty-five percent of patients reported pain in sites which diagnostically differed from the pain source. According to statistical analysis, duration (P<0.01), spontaneity (P<0.001) and quality (P<0.01) of pain influenced its referral nature, while sex and age of patients, kind of stimulus, throbbing and intensity of pain had no considerable effect on pain referral (P>0.05).

CONCLUSION: The prevalence of referred pain with pulpal origin in the head, face and neck region is moderately high which requires precise diagnosis by dental practitioners. Some hallmarks of irreversible pulpitis (e.g. spontaneous and persistent pain after elimination of stimulus) are related to pain referral.

Keywords: Dental Pulp; Endodontic; Referral Pain

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INTRODUCTION

Referred pain is a common and confusing problem every dental practitioner may encounter (1). 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 (2-3). Referred pain may also be detected in the face and teeth e.g. a toothache may be referred to non dental anatomic structures and vise versa pain from other regions may be perceived in teeth (4-6). Many theories have been proposed to explain referred pain such as “convergence theory” and “expansion of receptive fields” (7). Obviously, a successful dental treatment requires detection of the source of pain. If the origin of pain is not found it may lead to inappropriate dental care like extraction or root canal therapy. Meanwhile, pain originated from other anatomic sites like masticatory muscles and mucosa will not be relieved by extraction or endodontic treatment. These illogical therapies, unfortunately, are very common as attempts to decrease pain, but they are not only ineffective but also cause more complications for patients and legal affairs for dentists (8). Falace et al. surveyed 400 patients attended at an emergency dental clinic in Kentucky with posterior tooth pain. The referred pain was reported to be 89.9%. The most common site for referred pain was neighboring teeth (80%), and the frequency of pain radiating to opposite dental arch was 24%. The results of Falace’s
A questionnaire filled including demographic information, medical history, and characteristics of pain resulted in diagnosis of source and site of pain. After interview and clinical examination, practitioner’s clinical verification and finally appropriate radiographs (mostly periapical) were taken to confirm the diagnosis and the interpretation was recorded on the questionnaire.

RESULTS

Among 100 patients (55 males and 45 females), ranging from 14 to 66 years old, with pulpal pain 65% (n=65) had experienced pain referral to head, face and neck region. Mean of pain duration was 26 days for these subjects and there was a statistical relation between pain duration and its referral status (P<0.01) (Table 1). Among patients with referred pain, 7.7% had spontaneous pain, 20% had provoked pain and 72.3% had both of them, (Table 2). 83.3% reported lingering and 16.7% announced brief provoked pain; %76.9 had experienced dull while others had sharp pain. All of pain characteristics had significant association with pain referral status (P<0.01), while kind of stimulus like temperature (i.e. cold and warm irritation), mastication and pressure had no effect on prevalence of referred pain. Likewise throbbing pain showed no meaningful relation with its referral nature. Mean pain intensity according to VAS among those with referred

Table 1. Pain duration related to pain referral status

| Pain            | Number | Mean of pain duration |
|-----------------|--------|-----------------------|
| Referred        | 65     | 26 days               |
| Non-referred    | 35     | 62.2 days             |

Searching for pain source began using subjective reports of patients, clinical verification and radiographic interpretation. All subjects underwent diagnostic procedures and subsequently a definite diagnosis was obtained for each case. After recognition of pain source and site, if they were the same, the pain considered as primary (or non-referred); otherwise, it was considered as a referred pain. Furthermore, to measure pain intensity, visual analogue scale (VAS), as a world wide accepted method, was applied. In addition, patients were asked to draw their site of pain on a mannequin. The mannequin was depiction of head and neck region from different views. Moreover, the chi-square test was used to detect the association of referred pain incidence with verbal description of its characteristics (i.e. spontaneous or provoked, dull or sharp, throbbing or not and longevity of provoked pain) and kind of stimulus (e.g. thermal or pressure). Also, two-sample t-test in two modes of equal and unequal variances was used to find out the association of pain referral with quantitative variables (i.e. pain intensity and duration). At the end, logistic regression was applied to test the degree of association of referral pain with age of subjects.
Table 2. Pain referral status related to pain qualities

| PAIN Characteristics | Referred | Non-Referred | Total |
|----------------------|----------|--------------|-------|
|                      | No       | %            | No    | %     | No  | %   |
| Spontaneous          | 5        | 7.7          | 0     | 0     | 5   | 5   |
| Provoked             | 13       | 20           | 20    | 57.1  | 33  | 33  |
| Both of the above    | 47       | 72.3         | 15    | 42.9  | 62  | 62  |
| Brief                | 10       | 16.7         | 19    | 54.3  | 29  | 30.5|
| Lingering            | 50       | 83.3         | 16    | 45.7  | 66  | 69.5|
| Sharp                | 15       | 23.1         | 17    | 48.6  | 32  | 32  |
| Dull                 | 50       | 76.9         | 18    | 51.4  | 68  | 68  |
| Temperature provoked | 10       | 16.7         | 7     | 20    | 17  | 17.9|
| Mastication & pressure provoked | 7 | 11.7 | 6 | 17 | 13 | 13.7 |
| Both of the above    | 43       | 71.6         | 22    | 62.9  | 65  | 68.4|
| Throbbing            | 37       | 56.9         | 19    | 54.3  | 56  | 56  |
| Non-throbbing        | 28       | 43.1         | 16    | 45.7  | 44  | 44  |

and non-referred pain was 7.6 and 6.6, respectively. Statistically, intensity of pain didn’t have any association with its referral nature. Pain referral didn’t show any difference to occur in different age groups.

**DISCUSSION**

In this study the prevalence of referred pain was 65% in comparison with Falace’s study in which 89.8% of samples reported referred pain (7). The difference may be due to study design. We used radiographic imaging as a powerful diagnostic aid to detect pulpal pathosis unlike Falace’s study in which only subjective reports and clinical verification were used, so even mild cases of pulpal involvement (reversible pulpitis) which may less frequently cause referred pain were included in our study and this may lead to lower overall estimation of referred pain prevalence.

In addition, we found out a relationship between the duration of pain and its referral nature, i.e., in cases with referred pain the mean duration of pain was lower (26 days) than that of non-referred pain ones (62 days) because the latter is more tolerable and this was contrary to Falace’s study (7). The mean duration of 26 days for referred pain seems a little long. This may be due to denophobia, economic problems or consumption of analgesics, which may cause delay to visit a dentist.

**CONCLUSION**

Over one half of dental patients with pulpal involvement have referred pain to face and head region, which mandates exact diagnosis. The intensity of referred pain was higher, and the duration of it was shorter than that of non-referred pain.

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**Conflict of Interest: ‘None declared’.

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