

Prevalence of Dentine Hypersensitivity among Adult Patients Attending a Dental Hospital Clinic in Turkey

H Çolak¹, S Demirer², M Hamidi¹, R Uzgur³, S Köseoğlu²

ABSTRACT

Objectives: The aim of this study is to determine the prevalence of dentine hypersensitivity (DH) and to examine some associated factors such as the initiating stimuli among adult patients attending the Restorative Clinic of the Kırıkkale University Dental Faculty, Turkey.

Methods: Questionnaires for 1169 patients, 678 men and 491 women, were completed and necessary clinical examinations performed during a one-year period and patients who were diagnosed with DH were questioned further about their occupation and smoking habits. Patients with at least two different quadrants which had sensitive teeth with sound exposed cervical dentine on the facial surface, were included in the study. The amount of cervical lesions, buccal gingival recession and initiating factors associated with the sensitive teeth were also recorded.

Results: Of the 1169 patients examined, 89 were diagnosed as having dentine hypersensitivity, giving a prevalence of 7.6%. The commonest teeth affected were the upper premolars and the commonest initiating factor was cold drinks.

Conclusions: The prevalence of dentine hypersensitivity in a postgraduate clinic in Turkey was 7.6%. The commonest teeth affected were the upper premolar and the commonest initiating factor was cold drinks.

Keywords: Epidemiology, dentinal hypersensitivity, dentine, prevalence

Prevalencia de la Hipersensibilidad Dentinaria entre los Pacientes Adultos que Asisten a la Clínica del Hospital Dental en Turquía

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RESUMEN

Objetivos: El objetivo de este estudio fue determinar la prevalencia de la hipersensibilidad dentinaria (HD) y examinar algunos factores asociados con ella, tales como los estímulos iniciadores entre los pacientes adultos que asisten a la Clínica Restaurativa la Facultad Dental Universitaria de Kırıkkale, Turquía.

Métodos: Cuestionarios entregados a 1169 pacientes, 678 hombres y 491 mujeres, fueron respondidos, y se realizaron los exámenes clínicos necesarios por espacio de un año. Los pacientes que fueron diagnosticados con HD, fueron interrogados ulteriormente acerca de su ocupación y el hábito de fumar. Los pacientes con al menos dos cuadrantes diferentes, que tenían dientes sensibles con exposición de dentina cervical sana sobre la superficie facial, fueron incluidos en este estudio. También se registró

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la cantidad de lesiones cervicales, la recesión gingival bucal y los factores iniciadores asociados con la sensibilidad de los dientes.

Resultados: De los 1169 pacientes examinados, 89 se diagnosticaron con hipersensibilidad de la dentina, para una cifra de prevalencia de 7.6%. Los dientes más comúnmente afectados fueron los premolares superiores y los factores iniciadores más comunes fueron las bebidas frías.

Conclusiones: La prevalencia de la hipersensibilidad dentinaria en una clínica postgraduada en Turquía fue de 7.6%. Los dientes más comúnmente afectados fueron los premolares superiores y el factor iniciador más común fueron las bebidas frías.

Palabras claves: Epidemiología, hipersensibilidad dentinaria, dentina, prevalencia

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INTRODUCTION

Dentine hypersensitivity (DH) is characterized by short sharp pain arising from exposed dentine, most commonly at the tooth cervical area, in response to stimuli (typically thermal, evaporative, tactile, osmotic or chemical) but which cannot be ascribed to any other dental defects, diseases or restorative treatments (1). It is a commonly encountered but frequently misunderstood clinical problem (2). Traditionally, the term dentine hypersensitivity was used to describe this distinct clinical condition; however, several authors have also used the terms cervical dentine sensitivity (CDS), cervical dentine hypersensitivity (CDH), dentine sensitivity (DS) and root dentine sensitivity (RDS)/root dentine hypersensitivity [RDH] (3–8). There has been a growing body of research carried out on the aetiology and epidemiology as well as management of dentine hypersensitivity, pointing not only to widespread occurrence of this problem but also to the somewhat ambiguous nature of it.

Many previous investigations of DH (Table 1) have examined a sample of patients referred to a university hos-

pital or specialist practice. The diversity of reports may be caused in part, by different methods used to diagnose the condition and it is generally considered that surveys which rely on patient questionnaires alone greatly exaggerate the prevalence figures and thereby yield misleading data. The prevalence of root sensitivity in the adult population varies considerably (9–16). The figures for self-reported root sensitivity range from 9 to 52%, and are higher than those determined by clinical testing, usually performed by air mechanical stimuli. The clinically determined figures range from 14 to 18%. The prevalence figures also seem to depend on the patient source. However, the prevalence was greater in patients referred to specialist periodontology clinics and hospital clinics (15, 17, 18) than in general practice patient populations (9, 19, 20) with reported figures of between 72.5% and 98% (15, 17). This led Dababneh *et al* (21) to suggest that the dentine hypersensitivity associated with periodontal disease may have a different aetiology, possibly related to bacterial penetration of the dentinal tubules (22).

It has been reported that there is a slightly higher incidence of dentine hypersensitivity in females compared to

Table 1: Summary of prevalence studies on dentine hypersensitivity

Authors	Country	Setting	Study type	n	Prevalence (%)
Jensen, 1964	USA	University	Clinical	3000	30
Graf and Glase, 1977	Switzerland	Practice	Clinical	351	15
Flynn <i>et al</i> , 1985	UK	University	Clinical	369	18
Orchardson and Collins, 1987	UK	University	Clinical	109	74
Fischer <i>et al</i> , 1992	Brazil	University	Clinical	635	17
Murray and Roberts, 1994	Indonesia	Not stated	Questionnaire	1000	27
Murray and Roberts, 1994	USA	Not stated	Questionnaire	1000	18
Murray and Roberts, 1994	Japan	Not stated	Questionnaire	1000	16
Murray and Roberts, 1994	France	Not stated	Questionnaire	1000	14
Murray and Roberts, 1994	Germany	Not stated	Questionnaire	1000	13
Murray and Roberts, 1994	Australia	Not stated	Questionnaire	1000	13
Chabanski <i>et al</i> , 1997	UK	University	Clinical	51	73
Irwin and McCusker, 1997	UK	Practice	Questionnaire	250	57
Liu <i>et al</i> , 1998	Taiwan	University	Clinical	780	32
Rees, 2000	UK	Practice	Clinical	3593	4
Taani and Awartani, 2002	Saudi Arabia	University	Clinical	295	42–60
McCarthy <i>et al</i> , 2002	UK	Air force	Questionnaire	228	50
Rees and Addy, 2004	UK	Practice	Clinical	5477	2.8
Bamise <i>et al</i> , 2007	Nigeria	University	Clinical	2165	1.34
Present study	Turkey	University	Clinical	1169	7.6

males (3, 12, 13, 23). This difference is, however, not statistically significant (12). The majority of studies report a tooth site predilection order of canines and first premolars, followed by incisors and second premolars and finally molars, with the vast majority of sites being buccal cervical (12, 13, 18–20).

When we reviewed the literature using the PubMed Database (National Library of Medicine), most publications concerning dentine hypersensitivity were case reports, clinical trials and reviews. Because of the insufficient epidemiologic data, there is little information about the true prevalence of this problem. Additionally, there were no prevalence data with respect to dentine hypersensitivity in Turkish dental patients. The aim of the present study was, therefore, to carry out a cross-sectional study of a group of patients attending the Restorative Dentistry Clinic at the Kırıkkale University Dental Faculty in Turkey.

SUBJECTS AND METHODS

The data were collected over a period of one year from April 2010 to April 2011. The investigation was carried out in the form of a questionnaire followed by a clinical examination. All patients were clinically examined for dentine hypersensitivity regardless of their response to the questionnaire. Informed consent was obtained from all recruits. The inclusion and exclusion criteria are shown in Table 2. If the den-

tist received a positive response, the diagnosis was confirmed using a blast of air from a triple syringe and by ruling out other causes of sensitivity, such as caries. Where a diagnosis of DH was made, a study form was completed. This included details of the patients' age, gender and occupation, smoking habits, teeth affected and any factor known to initiate the sensitivity. In addition to this, any buccal and lingual/palatal gingival recession associated with these sensitive teeth was recorded with measurements being made using a 1 mm graduated periodontal probe from the cemento-enamel junction to the free gingival margin. Any cervical dental wear cavities associated with the sensitive teeth were also recorded. Data were entered, transformed and analysed by employing SPSS 15.0 for Windows.

RESULTS

Questionnaires for 1169 patients, 678 men and 491 women, were completed and necessary clinical examinations performed. Patients' age ranged from 14–70 years (36.1). The mean age was 35.7 years for men and 36.5 years for women. Data showed that only 89 patients had dentine hypersensitivity, a frequency of 7.61% (36 males, 53 females). Figure 1 shows the age distribution of patients with hypersensitive

Table 2: Inclusion and exclusion criteria (5)

Inclusion criteria

Have at least two different quadrants which have sensitive teeth with sound exposed cervical dentine on the facial surface showing a response of ≥ 15 mm on a 100-mm visual analogue scale (VAS) to a 1-s evaporative stimulus.

Exclusion criteria

Current and/or previous use of professional desensitizing treatment
Use of over-the-counter desensitizing products within the previous six weeks
Long-term use of anti-inflammatory, analgesic and psychotropic drugs
Pregnancy or breastfeeding
Allergies and idiosyncratic responses to product ingredients
Eating disorders
Systemic conditions that cause or predispose patients to develop dentine hypersensitivity
(*eg* chronic acid regurgitation)
Excessive dietary or environmental exposure to acids
Periodontal surgery in the preceding three months
Orthodontic appliance treatment within the previous three months

Exclusion criteria for teeth

Carious and/or restored tooth
Crowned teeth
Teeth or supporting structures with any other painful pathology or defects

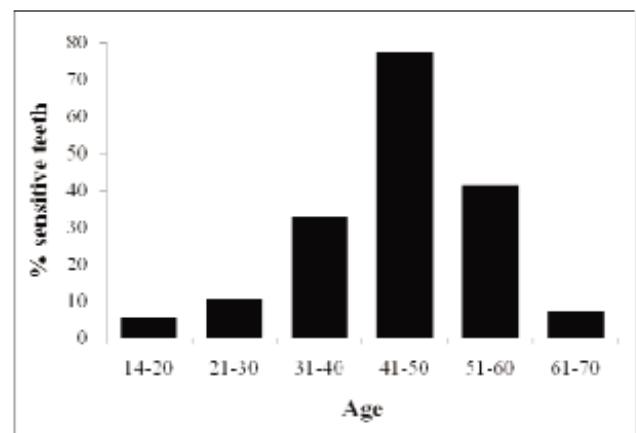


Fig. 1: Age distribution of patients with dentine hypersensitivity.

dentine. The symptoms of dentine hypersensitivity were perceived to be commonest among 41–50-year olds, whereas patients younger than 20 years were perceived to be the least affected.

The number of sensitive teeth classified by tooth type (Fig. 2) shows that the upper premolars were most commonly affected, followed by lower incisors, upper molars, canines and lower premolars. Figure 3 presents the average number of sensitive teeth per patient by age group and shows a peak of 5.5 sensitive teeth for the 41–50-year age group.

The amount of gingival recession associated with the sensitive teeth (Fig. 4) shows that, overall, 341 (95.7%) of the 356 sensitive teeth had some associated buccal gingival recession, the majority (89.9%) in the range of 1–3 mm.

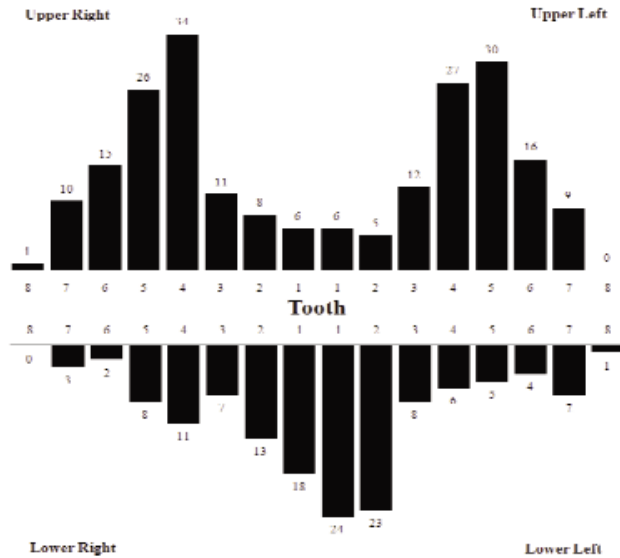


Fig. 2: Dentine hypersensitivity by tooth type.

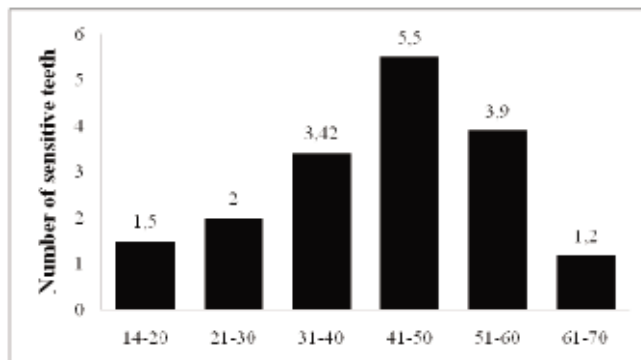


Fig. 3: The mean number of sensitive teeth per patient.

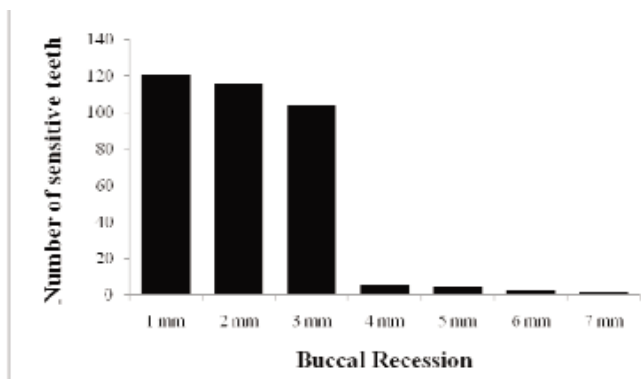


Fig. 4: Amount of buccal gingival recession.

The frequency of teeth with dentine hypersensitivity that also had cervical dental wear cavities is shown in Fig. 5. This distribution shows that the lower incisor teeth were most

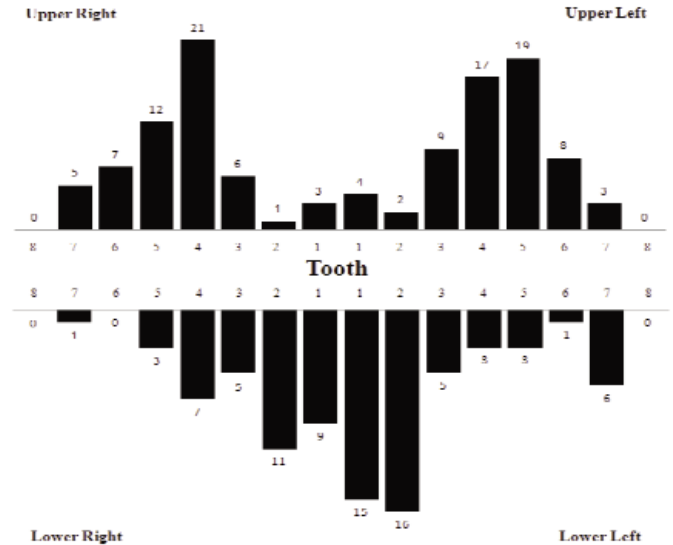


Fig. 5: Frequency of dentine hypersensitive teeth with cervical tooth surface loss.

commonly affected. Figure 6 gives an overview of the various initiating factors recorded and demonstrates that cold

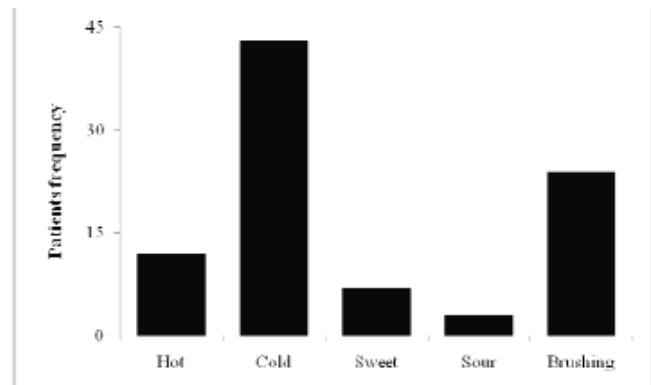


Fig. 6: Provoking stimuli for dentine hypersensitivity.

drinks were the major stimulus causing dentine hypersensitivity followed by brushing and hot drinks. Thirty-seven patients had dental hypersensitivity related to smoking [21 men and 16 women] (Fig. 7). Twenty-five smoked one pack or more per day.

DISCUSSION

Dental hypersensitivity has been referred to as one of the most painful and chronic dental conditions, with a reported prevalence of between 4% and 57% (9, 13, 19, 20) in the general population and a higher prevalence in periodontal patients (15, 17). Most studies were published in the last 40 years in different populations on prevalence of dentine hypersensitivity, however, this is the first study done to examine dentine hypersensitivity in Turkey. In this study, the prevalence of DH was 7.6% which was lower than many previous studies and higher than several studies (Table 1).

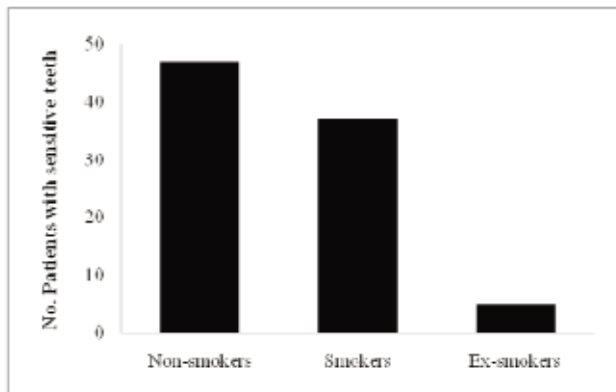


Fig. 7: Frequency of dentine hypersensitivity according to smoking habit.

Gingival recession was found in 95.7% of patients with dentine hypersensitivity. Clinical studies (15, 17) that aimed to assess the prevalence of dentine hypersensitivity in a population of patients referred to a periodontal department, found a much higher percentage affected than cited in other epidemiological studies (9, 13, 19, 20). This could suggest that periodontal disease and/or treatment may play a role in the aetiology of dentine hypersensitivity (15, 17) or as alluded to previously, this type of sensitivity is not considered as dentine hypersensitivity. Relevant to this, the role of plaque in the aetiology of dentine hypersensitivity is an area of controversy. Some authors point out that most sensitive surfaces, particularly on the buccal aspect of the teeth, show very low plaque scores and enthusiastic tooth brushing has long been associated with gingival recession and sensitivity (24).

In the present study, the premolar region is the most affected area (41.29%) followed by the incisor (39.6%) and molars (19.1%) in both maxilla and mandible which shows similarity with the study performed by Fisher *et al* (13), Graf and Galasse (11) and Orchardson and Collins (26). A recent study by Gillam *et al* (16) reported that of those teeth responding to the stimuli used to evaluate DH, 477 (30.6%) were premolars, 437 (28%) incisors, 415 (26.8%) molars and 232 (14.9%) canines. These results were similar to those reported by Chabanski *et al* (15) and Coleman *et al* (27) although the latter study failed to detect any anterior teeth with DH/RDS.

Previous investigators have reported on the age distribution of dentine hypersensitivity. Orchardson and Collins observed a reported peak prevalence between 20 and 25 years (26), Graf and Galasse between 25 and 29 years (11), Addy *et al* between 20 and 40 years with a peak prevalence at the end of the third decade (24), Fischer *et al* between 40 and 49 years (13), Chabanski *et al* between 40 and 49 years (15,17), Liu *et al* between 50 and 59 years (23), Gillam *et al* noted dentine hypersensitivity between the third and fourth decades (16) and Rees observed a peak prevalence between 30 and 39 years (19). The present study showed a peak

prevalence between 40 and 50 years of age, which would appear to be in agreement with Fischer *et al* and Chabanski *et al* (13, 15).

The mean number of sensitive teeth per patient for the sample was 1.5 with a range of 1–19. This is lower than the previously published studies (18–20, 26). In the group of 21–30-year old, this number increased to two which was lower than studies conducted by Orchardson and Collins (26) and Rees *et al* (18). The mean number of sensitive teeth per patient reached a peak of 5.5 in the 41–50-year age group and then reduced slowly in the older cohorts. This finding is consistent with the study reported by Rees (19) and Rees and Addy (20).

In the present research, most of the subjects had experienced dentine hypersensitivity with cold drinks (48%) followed by brushing (27%) than with hot drinks. Irwin and McCusker (28) in their prevalence study on the general population found that in the vast majority of cases (89.3%), cold was the major stimulus for pain, other commonly reported causes being tooth brushing (38.6%), hot (37.9%) and sweet (25%) stimuli (28%). This finding shows similarity to the present study.

Results from the first United States National Health and Nutrition Examination Survey (NHANES) demonstrated that, even though current smokers had higher levels of plaque and calculus, after adjusting for oral hygiene and other confounding variables, they still had greater periodontal destruction than former, or 'never smokers' (29). Because of attachment loss, root surfaces become exposed, potentially leading to sensitivity. Therefore, it was decided to investigate whether there was any difference in the number of sensitive teeth per patient when the patient was a smoker or non-smoker, and if they did or did not have periodontal disease. In the present study, 37 patients had dentinal hypersensitivity related to smoking. The data from this study (Fig. 7) found no association between dentine hypersensitivity and smoking habit. A recent study by Muller *et al* (30) found that smoking *per se* was not a risk factor for gingival recession, while Al-Wahadni and Linden (31) and Rees and Addy (20) found more gingival recession and sensitivity in smokers.

Dentine is normally covered by enamel in the crown region and by periodontal tissues in the root area. Under these circumstances, dentine is protected from wear. However, dentine may be exposed by loss of enamel or periodontal tissues (24), the latter usually referred to as gingival recession. Removal of enamel may occur as a result of non-carious cervical lesions (erosion, abrasion, abfraction) and attrition while exposure of root may be due to chronic trauma from faulty tooth brushing and habits, acute and chronic inflammatory gingival and periodontal diseases or surgical periodontal treatment (32). Cervical lesions may cause dentine hypersensitivity. In this study, premolar teeth were most commonly affected with both sensitivity and cervical tooth surface loss; this is reminiscent of the distribution of sensitive teeth in previously reported studies (10–12, 26).

Dentinal sensitivity in periodontal patients is a factor to be taken into account by dental professionals, in view of the high prevalence in this population. Correct management of the disorder requires a precise diagnosis – hence the importance of adequate knowledge of the underlying aetiology and a correct differential diagnosis with respect to other dental processes that can be accompanied by brief and acute pain (3).

In conclusion, this cross-sectional study found that the prevalence of dentine hypersensitivity among patients attending the Kirikkale University Dental Faculty in Turkey was 7.6%. The upper premolars were most commonly affected, followed by lower incisors, upper molars, canines and lower premolars, and the average number of sensitive teeth shows a peak of 5.5 for the 41–50-year age group. Moreover, 95.7% of patients had some associated buccal gingival recession, the majority (89.9%) in the range of 1–3 mm. The prevalence of dentine sensitivity in this sample was lower compared to studies carried out previously in different populations, both in general practice and hospital clinics.

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