Published in final edited form as:
J Am Dent Assoc. 2013 March ; 144(3): 288–296.

The prevalence of dentin hypersensitivity in general dental practices in the northwest United States

Joana Cunha-Cruz, DDS, PhD, **John C. Wataha, DMD, PhD**, **Lisa J. Heaton, PhD**, **Marilynn Rothen, RDH, MS**, **Martin Sobieraj, DDS**, **JoAnna Scott, PhD**, and **Joel Berg, DDS, MS**
Northwest Practice-based Research Collaborative in Evidence-based DENTistry

Abstract

Background—The prevalence of dentin hypersensitivity is uncertain, yet appropriate diagnosis and treatment of dentin hypersensitivity require accurate knowledge regarding its prevalence. The authors conducted a study to estimate the prevalence of dentin hypersensitivity in general dental practices and to investigate associated risk factors.

Methods—The authors conducted a cross-sectional survey of 787 adult patients from 37 general dental practices within Northwest Practice-based Research Collaborative in Evidence-based DENTistry (PRECEDENT). Dentin hypersensitivity was diagnosed by means of participants' responses to a question regarding pain in their teeth and gingivae, and practitioner-investigators conducted a clinical examination to rule out alternative causes of pain. Participants recorded their pain level on a visual analog scale and the Seattle Scales in response to a one-second air blast. The authors used generalized estimating equation log-linear models to estimate the prevalence and the prevalence ratios.

Results—The prevalence of dentin hypersensitivity was 12.3 percent; patients with hypersensitivity had, on average, 3.5 hypersensitive teeth. The prevalence of dentin hypersensitivity was higher among 18- to 44-year olds than among participants 65 years or older; it also was higher in women than in men, in participants with gingival recession than in those without gingival recession and in participants who underwent at-home tooth whitening than in those who did not. Hypersensitivity was not associated with obvious occlusal trauma, noncarious cervical lesions or aggressive toothbrushing habits.

Conclusions—One in eight participants from general practices had dentin hypersensitivity, which was a chronic condition causing intermittent, low-level pain. Patients with hypersensitivity were more likely to be younger, to be female and to have a high prevalence of gingival recession and at-home tooth whitening.

Practical Implications—Given dentin hypersensitivity's prevalence, clinicians should diagnose it only after investigating all other possible sources of pain.

Keywords

Dentin hypersensitivity; prevalence; dental practice-based research networks

Introduction

Dentin hypersensitivity can be defined as a short, sharp pain that arises from exposed dentin in response to stimuli (typically thermal, evaporative, tactile, osmotic or chemical) and that cannot be ascribed to any other form of dental defect or pathology.[1] Patients have reported that pain was initiated mainly by cold drinks but also by hot drinks, toothbrushing and sweet foods.[2] The reported prevalence of dentin hypersensitivity varies from 3.8 to 74.0 percent, depending on the population, study setting and study design.[3] Investigators in studies

conducted in general dental practices have reported that the prevalences were 52 percent,[4] 42.4 percent,[5] 40.3 percent,[6] 15 percent,[7] 25 percent,[8] 4.1 percent,[9] 3.8 percent[2] and 1.3 percent.[10] The reason for this wide range of prevalences might be explained by how dentin hypersensitivity was estimated, by means of self-reports or questionnaires,[6] which can provide a higher prevalence than that estimated by means of a specific clinical examination.[2,7,9] In addition, prevalence estimated by means of self-reports may depend on how the patient is queried. A question specifically about sensitive teeth may generate more positive responses than may a general question about ill effects of daily activities such as drinking cold water.

Dentin hypersensitivity is diagnosed by means of a patient's self-report of pain, the results of an evaluation of the patient's response to stimulation and the exclusion of other dental and periodontal conditions.[11] Conditions that should be ruled out include dental caries, pulpitis, fractured teeth, fractured restorations, postrestorative sensitivity, marginal leakage, chipped teeth and gingival inflammation.[1] Dentin hypersensitivity is, therefore, a diagnosis of exclusion.[11] Diagnosis also may involve a subjective evaluation of how hypersensitivity affects the patient's daily life.[11]

Several possible etiologic and predisposing factors for dentin hypersensitivity have been proposed.[12] Dentin tubules may become exposed as a result of enamel loss from attrition, abrasion, erosion (acid dissolution) or abfraction (cervical stress lesion),[13] but dentin exposure often may be a result of gingival recession and cementum loss from root surfaces, most frequently in canines and premolars.[14] The enamel and cementum loss may be visible clinically as noncarious cervical lesions. A diet rich in acidic liquids and foods,[15] occupational exposure to acids,[16] use of tooth-whitening agents[17] and gastric reflux[18] have been implicated as causes of dental erosion. Aggressive or frequent toothbrushing[19] and periodontal treatment (such as scaling and root planing[20]) may contribute to gingival recession, cementum loss and subsequent dentin exposure. However, the prevalence of dentin hypersensitivity accompanying these factors has not been established beyond association in controlled clinical studies.

Uncertainty regarding the prevalence of dentin hypersensitivity can have significant consequences for patients and dental practitioners. With vague prevalence comes uncertainty in diagnosis, the appropriate time to treat and how aggressive the treatment should be. These difficulties are exacerbated by uncertainty regarding factors associated with hypersensitivity that often make diagnosis elusive. Developing new treatments, assessing the effectiveness of treatments, choosing the appropriate treatment and understanding the mechanisms causing hypersensitivity all depend on a clear understanding of the prevalence of this condition. Therefore, we conducted a study to estimate better the prevalence of dentin hypersensitivity in general dental practice. We also investigated tooth and patient characteristics that are associated with dentin hypersensitivity.

METHODS

We conducted a cross-sectional survey to estimate the prevalence of dentin hypersensitivity in general dental practices from September 2010 through May 2011 within the Northwest Practice-based Research Collaborative in Evidence-based DENTistry (PRECEDENT), a practice-based dental research network. The Northwest PRECEDENT dental research network is composed of general and pediatric dentists and orthodontists from five states in the northwestern United States: Idaho, Montana, Oregon, Utah and Washington.[21] Practitioner-investigators completed training in principles of clinical research, responsible conduct of research for human participants and relevant regulations for research.[22] We calculated that a minimum sample size of 30 general dental practices with 20 participants

per practice was needed by using an intraclass correlation coefficient (ICC) of 0.05, half-widths of the 95 percent confidence intervals (CIs) of 0.034 for the overall prevalence estimate and approximately 0.05 for the estimates of prevalence, according to sex. For example, with a half-width of 0.05 and an estimated prevalence of 0.5, the 95 percent CI would be 0.45 to 0.55. The ICC of 0.05 was based on the ICC from a previous study conducted within Northwest PRECEDENT dental research network.[21]

Research coordinators (M.R. and others) assigned a starting date to each dental office and subsequently identified three to five randomly selected one-half days in each practice for participant selection. All patients seen by the dentist or the hygienist were invited by the dentist or dental team members to participate if they were at least 18 years old and had at least one tooth. Patients were invited to participate until at least 20 patients had agreed to do so. We enrolled an average of 21 participants (range, 16–27) per practice from 37 dental practices in the study. Dentists or dental team members explained the purpose and procedures of the study to the participants and obtained informed consent. The institutional review board at the University of Washington, Seattle, approved the study protocol and survey. The research coordinators trained the dentists and dental team members during a telephone conference and an in-person visit on the first day of data collection. After the dentist and dental team members collected the data by means of clinical research forms, they input data into an online data-capture system.

Dentists and dental team members assessed whether dentin hypersensitivity was present by asking participants a general question about pain in their teeth and gingivae, without mentioning dentin hypersensitivity (spontaneous report), and by confirming the diagnosis by excluding other causes of sensitivity by means of examination. Dentists and dental team members were trained to ask each participant at the beginning of the appointment with identical verbiage: “Have you recently had any pain, sensitivity or discomfort in your teeth or gums?” If the participant responded in the negative, then we considered the participant to not exhibit symptoms consistent with dentin hypersensitivity. Our rationale for this strategy was that even if more detailed questioning elicited hypersensitivity-related symptoms, the pain was not at a level that the participant perceived to be a problem. If the participant responded positively, the dentist confirmed the diagnosis by excluding by means of examination other causes of sensitivity (for example, dental caries, pulpitis, cracked or chipped teeth, fractured restorations, marginal leakage, postrestorative sensitivity and gingival inflammation). Our strategy was consistent with the accepted diagnosis of dentin hypersensitivity as a diagnosis of exclusion.[1,11] Information regarding the duration and impact of symptoms, pain frequency and intensity, the types and number of teeth affected and any hypersensitivity treatments received also were recorded by the dentist and dental team members.

If a participant met the criterion for hypersensitivity, the dentist applied a one-second air blast from an air-water syringe 1 centimeter away from the vestibular or buccal surface to the most sensitive tooth identified by the participant. We did not instruct the dentists to cover the adjacent teeth. Absence of pain when we applied the air blast did not rule out the diagnosis of dentin hypersensitivity. Each participant completed five different pain scales after receiving the air blast, and we asked him or her to rate the pain he or she felt during the air blast. Participants recorded pain levels by using labeled magnitude scales called “Seattle Scales” that were developed at the University of Washington specifically to assess the pain associated with dentin hypersensitivity.[23] We used these four 100-millimeter horizontal scales labeled with descriptive terms to assess the intensity, duration, tolerability and description of the participant’s pain experience. Participants also completed a standard 100-mm horizontal visual analog scale (VAS) on which the endpoints were marked “no pain”

and "worst possible pain." All five scales appeared on the same sheet of paper for ease of use by the participants.

For all participants, we collected information on age; sex; race/ethnicity; signs of aggressive toothbrushing; history of scaling and root planning and in-office and at-home tooth whitening; and presence of noncarious cervical lesions, gingival recession and obvious occlusal trauma. We also collected the participants' information regarding completing or updating a health history form with dentin hypersensitivity questions during the office visit.

We estimated the prevalence of hypersensitivity by using the binary indicator variable of whether the participant had dentin hypersensitivity. We fit generalized estimating equation log-linear models to estimate the prevalence of dentin hypersensitivity, as well as the crude and adjusted prevalence ratios (PRs). We used generalized estimating equations to account for within-practice correlation. In addition, we calculated crude prevalence estimates and 95 percent CIs overall and within subgroups by using nonlinear combinations from crude models. We used robust Wald tests to compare subgroups.

RESULTS

The study sample was composed of 787 adults from 37 general dental practices, and the ICC for dentin hypersensitivity within dental practices was 0.01 (95 percent CI, 0.00–0.03). Dentists approached 1,116 patients to ask them to participate in the study; of those, 329 did not enroll. The reasons the patients were not enrolled in the study were refusal to participate (n = 91), time constraints (n = 81), language barrier (n = 15), canceled appointment (n = 71) or other reasons (n = 71). Participants were similar to patients who did not agree to participate in regard to sex but were on average 3.7 years older ($P = .002$).

On the basis of the survey, 315 participants (40.0 percent) indicated that they had experienced pain, sensitivity or discomfort in their teeth or gingivae. Queries on the health history form regarding tooth sensitivity did not influence participants' responses; 62.6 percent of those reporting pain or sensitivity and 55.4 percent of those not reporting pain had not completed or updated a health history form before they underwent the sensitivity evaluation the same day ($P = .175$). After clinical examination and exclusion of other causes of tooth pain, we found that 97 participants (12.3 percent; 95 percent CI, 9.8–14.8) had a confirmed diagnosis of dentin hypersensitivity. Participants whose dentin hypersensitivity was confirmed had higher rates of gingival recession than did participants without dentin hypersensitivity, and most were female (Table 1).

Participants with hypersensitivity had, on average, 3.5 (95 percent CI, 2.5–4.5) hypersensitive teeth (Table 2). Among the 342 hypersensitive teeth, molars (31.9 percent) and premolars (31.3 percent) predominated. Most of the participants reported that hypersensitivity symptoms had started six or more months previously (63.9 percent). Eleven (11.4 percent) participants experienced discomfort due to their hypersensitive teeth "most of the time" or "always," whereas 86 (88.6 percent) participants experienced discomfort less frequently ("never," "occasionally" or "half of the time"). The mean VAS score was 19.9 (95 percent CI, 15.7–24.1), and the scores of the Seattle Scales ranged from a mean of 15.8 (95 percent CI, 12.5–19.2) for the tolerability scale to a mean of 27.3 (95 percent CI, 21.5–33.2) for the pain description scale (Table 2).

Fifty participants (51.5 percent) had treated their hypersensitivity by using at-home treatments, and 36 of those (72.0 percent) were never without pain or were without pain for less than six weeks after treatment. Twenty-one participants (21.6 percent) had received in-office treatment and of those, eight participants (38.1 percent) did not experience pain for six months or more, but 12 (57.1 percent) were never without pain or were without pain for

less than six weeks after treatment. The most common in-office treatments participants had received were fluoride (47.6 percent), dentin adhesives (9.5 percent), glutaraldehyde/hydroxyethyl methacrylate (9.5 percent) and restorative treatments (9.5 percent).

The prevalence of dentin hypersensitivity according to participants' characteristics ranged from as low as 4.6 percent (95 percent CI, 2.2–7.1) among participants with no gingival recession to as high as 17.1 percent (95 percent CI, 13.2–21.0) among participants with gingival recession (Table 3). Before and after we made adjustments for other covariates, the PRs for age, sex, at-home tooth whitening and gingival recession were statistically significant (Table 4). After making adjustments for other covariates, the PR for adults aged 18 to 44 years was 3.5 when compared with adults 65 years or older (adjusted PR, 3.5; 95 percent CI, 1.7–7.1). The adjusted prevalence of dentin hypersensitivity was higher in women than in men (PR, 1.8; 95 percent CI, 1.2–2.8), in participants with gingival recession than in those without gingival recession (PR, 5.5; 95 percent CI, 3.0–10.1) and in participants who underwent at-home tooth whitening than in those who did not (PR, 1.4; 95 percent CI, 1.0–2.0) (Table 4).

DISCUSSION

The prevalence of dentin hypersensitivity in the general practice population surveyed in our study was 12.3 percent and was near the low end of previously reported values ranging from 1.3 to 52 percent for general practices.[2,4–10] Several factors likely contributed to this low value. We used a nonspecific question to identify participants who had pain or sensitivity, relying on the participant's own pain threshold as a trigger for identifying a positive result, and then used the results of a clinical examination to eliminate other potential causes of pain. This strategy is inherently more conservative than, for example, conducting an examination with the specific intent of identifying dentin hypersensitivity in every patient. Owing to the strategy we used, it seems likely that the results of our study omitted some participants who had dentin hypersensitivity. On the other hand, our strategy identified participants for whom dentin hypersensitivity was a self-perceived problem; this approach is consistent with the current definition of dentin hypersensitivity in which it is a spontaneously reported problem and is a diagnosis of exclusion.[11] Thus, our strategy ensured that participants who responded positively to the query had a significant problem, at least from their perspectives. With use of our strategy, the assessment of the impact of dentin hypersensitivity on a patient's quality of life is more meaningful.

Participants in our study who had dentin hypersensitivity generally were younger than 65 years (with the ages of participants split between 18 to 44 years and 45 to 64 years), and they were more likely to be female, to use at-home whitening agents and to have associated gingival recession. These results were consistent with those of previous studies,[4,12,17,24–26] particularly the results concerning gingival recession.[25,27] The decrease in dentin hypersensitivity with increased age might be explained by the continued deposition of dentin and subsequent pulp atrophy of the teeth during the lifetime or even by tooth loss in people in the older age group. The average participant had multiple teeth that were sensitive, with sensitivity occurring more frequently in molars, premolars and incisors than in canines. This latter finding is curious considering that gingival recession is commonplace with canines.[28] Investigators in future studies could explore the relationships among aging, gingival recession and dentin hypersensitivity in more detail.

We observed no particular predilection of race or ethnicity associated with dentin hypersensitivity in our study, but variation in race or ethnicity in the study sample was small. Unlike investigators in previous studies suggested,[12,19,20,29–32] the participants in our study did not tend to have aggressive toothbrushing habits, have noncarious cervical lesions,

have associated obvious occlusal trauma (in the judgment of the clinician), have undergone scaling and root planing or have undergone in-office whitening. Although the prevalences of dentin hypersensitivity for at-home and for in-office tooth whitening were similar, the number of participants who had undergone in-office tooth whitening treatment was small in this study, and the association of it with dentin hypersensitivity did not reach statistical significance. Thus, the results of our study would seem to dispel stereotypes of patients with dentin hypersensitivity as being aggressive "Type A" toothbrushers who had a tendency to exert above-average occlusal forces.

Dentin hypersensitivity appeared to be a chronic problem for participants, most of whom reported that their symptoms started more than six months previously. However, the problem also appeared to be intermittent, affecting most participants "occasionally" and few participants "always." On the basis of the results of the VAS and the Seattle Scales, in general, the severity of pain was not severe, but the scores for each scale provided different perspectives. With the exception of the tolerability scale scores, participants' ratings of pain on the Seattle Scales were higher than those on the VAS. Whereas the VAS is a standard measure used in pain assessment, its lack of labels to guide patients often introduces additional variability in measuring pain[33]; this problem is more pronounced when the pain is intermittent. In addition, many people with low- to moderate-level pain conditions such as dentin hypersensitivity tend to respond on the lower one-third of the VAS.[23] Consistent with the results of previous studies,[23] the results of our study showed that the standard deviations for the scales indicated that participants in our study responded using a broader range of scores on the Seattle Scales than they did on the VAS. The results of our study support use of the Seattle Scales to quantify a moderate-level, chronic, intermittent pain condition such as dentin hypersensitivity. It appears that this scale can help providers obtain a more thorough understanding of a patient's pain than can the VAS.

Our results suggest that patients often seek relief from their dentin hypersensitivity pain but that treatments are far from perfect in relieving their pain. More than one-half of the participants tried at-home treatments for dentin hypersensitivity, but most reported that the treatment had no effect or that relief lasted less than six weeks. Fewer participants (21.6 percent) sought in-office treatment, but more than one-half (57.1 percent) reported that the treatment was either not effective or lasted less than six weeks. On the other hand, in-office treatments provided sustained relief to 38.1 percent of the participants. The diverse response to in-office treatment is consistent with the myriad treatments and treatment strategies that have been reported for dentin hypersensitivity.[34]

One should consider several limitations in interpreting our study results. Because the general practitioners in our study were mostly from the northwest United States, it is not prudent to assume that the findings are applicable to a broader geographic population. Furthermore, the results must be interpreted with the caveat that practitioners who participate in a practice-based research network may or may not be representative in their abilities and treatment philosophies of all of general practitioners.

CONCLUSIONS

Dentin hypersensitivity has a relatively low prevalence, is primarily a chronic condition producing intermittent but not severe pain and affects multiple teeth in most people. This condition occurs most often in women younger than 65 years and is associated commonly with gingival recession and the use of at-home tooth whitening. It is not associated as often with aggressive toothbrushing habits, noncarious cervical lesions, scaling and root planing or obvious occlusal trauma. At-home and in-office treatments are more often than not ineffective in eliminating pain caused by this condition in the long term.

Acknowledgments

This article was submitted on behalf of the Northwest PRECEDENT network, with support from grants DE016750 and DE016752 from the National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, Md.

The authors thank the dentist-investigator members of the Northwest Practice-based Research Collaborative in Evidence-based DENTistry (PRECEDENT) and their staff members for their invaluable contributions.

References

1. Canadian Advisory Board on Dentin Hypersensitivity. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. J Can Dent Assoc. 2003; 69(4):221–226. [PubMed: 12662460]
2. Rees JS, Addy M. A cross-sectional study of dentine hypersensitivity. J Clin Periodontol. 2002; 29(11):997–1003. [PubMed: 12472992]
3. Rees JS, Addy M. A cross-sectional study of buccal cervical sensitivity in UK general dental practice and a summary review of prevalence studies. Int J Dent Hyg. 2004; 2(2):64–69. [PubMed: 16451464]
4. Gillam DG, Seo HS, Bulman JS, Newman HN. Perceptions of dentine hypersensitivity in a general practice population. J Oral Rehabil. 1999; 26(9):710–714. [PubMed: 10520145]
5. Taani SD, Awartani F. Clinical evaluation of cervical dentin sensitivity (CDS) in patients attending general dental clinics (GDC) and periodontal specialty clinics (PSC). J Clin Periodontol. 2002; 29(2):118–122. [PubMed: 11908469]
6. Irwin CR, McCusker P. Prevalence of dentine hypersensitivity in a general dental population. J Ir Dent Assoc. 1997; 43(1):7–9. [PubMed: 9584750]
7. Graf H, Galasse R. Morbidity, prevalence and intraoral distribution of hypersensitive teeth (abstract 479). J Dent Res. 1977; 56(special issue A):162.
8. Fischer C, Fischer RG, Wennberg A. Prevalence and distribution of cervical dentine hypersensitivity in a population in Rio de Janeiro, Brazil. J Dent. 1992; 20(5):272–276. [PubMed: 1452864]
9. Rees JS. The prevalence of dentine hypersensitivity in general dental practice in the UK. J Clin Periodontol. 2000; 27(11):860–865. [PubMed: 11073330]
10. Bamise CT, Olusile AO, Oginni AO, Dosumu OO. The prevalence of dentine hypersensitivity among adult patients attending a Nigerian teaching hospital. Oral Health Prev Dent. 2007; 5(1): 49–53. [PubMed: 17366761]
11. Holland GR, Narhi MN, Addy M, Gangarosa L, Orchardson R. Guidelines for the design and conduct of clinical trials on dentine hypersensitivity. J Clin Periodontol. 1997; 24(11):808–813. [PubMed: 9402502]
12. Pashley DH, Tay FR, Haywood VB, Collins MA, Drisko CL. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. Inside Dent. 2008; 4(9 special issue): 1–37.
13. Smith BG, Knight JK. A comparison of patterns of tooth wear with aetiological factors. Br Dent J. 1984; 157(1):16–19. [PubMed: 6588978]
14. Orchardson R, Collins WJ. Clinical features of hypersensitive teeth. Br Dent J. 1987; 162(7):253–256. [PubMed: 3472555]
15. O'Sullivan EA, Curzon ME. A comparison of acidic dietary factors in children with and without dental erosion. ASDC J Dent Child. 2000; 67(3):160, 186–192.
16. Chikte UM, Naidoo S, Kolze TJ, Grobler SR. Patterns of tooth surface loss among winemakers. SADJ. 2005; 60(9):370–374. [PubMed: 16320527]
17. Leonard RH Jr, Haywood VB, Phillips C. Risk factors for developing tooth sensitivity and gingival irritation associated with nightguard vital bleaching. Quintessence Int. 1997; 28(8):527–534. [PubMed: 9477880]

18. Bartlett DW, Evans DF, Anggiansah A, Smith BG. A study of the association between gastro-oesophageal reflux and palatal dental erosion. Br Dent J. 1996; 181(4):125–131. [PubMed: 8840581]
19. Khocht A, Simon G, Person P, Denepitiya JL. Gingival recession in relation to history of hard toothbrush use. J Periodontol. 1993; 64(9):900–905. [PubMed: 8229627]
20. Chabanski MB, Gillam DG, Bulman JS, Newman HN. Clinical evaluation of cervical dentine sensitivity in a population of patients referred to a specialist periodontology department: a pilot study. J Oral Rehabil. 1997; 24(9):666–672. [PubMed: 9357747]
21. DeRouen TA, Cunha-Cruz J, Hilton TJ, et al. Northwest Practice-based REsearch Collaborative in Evidence-based DENTistry (PRECEDENT). What's in a dental practice-based research network? Characteristics of Northwest PRECEDENT dentists, their patients and office visits. JADA. 2010; 141(7):889–899. [PubMed: 20592411]
22. DeRouen TA, Hujoel P, Leroux B, et al. Northwest Practice-based REsearch Collaborative in Evidence-based DENTistry (PRECEDENT). Preparing practicing dentists to engage in practice-based research. JADA. 2008; 139(3):339–345. [PubMed: 18310739]
23. Heaton LJ, Barlow AP, Coldwell SE. Development of labeled magnitude scales for the assessment of pain of dentin hypersensitivity. J Orofac Pain. 2013; 27(1):72–81. [PubMed: 23424722]
24. Leonard RH Jr, Bentley C, Eagle JC, Garland GE, Knight MC, Phillips C. Nightguard vital bleaching: a long-term study on efficacy, shade retention, side effects, and patients' perceptions. J Esthet Restor Dent. 2001; 13(6):357–369. [PubMed: 11778855]
25. Jorgensen MG, Carroll WB. Incidence of tooth sensitivity after home whitening treatment (published correction appears in JADA 2002;133[9]:1174). JADA. 2002; 133(8):1076–1082. [PubMed: 12198987]
26. Gillam DG, Seo HS, Newman HN, Bulman JS. Comparison of dentine hypersensitivity in selected occidental and oriental populations. J Oral Rehabil. 2001; 28(1):20–25. [PubMed: 11298905]
27. Bamise CT, Olusile AO, Oginni AO. An analysis of the etiological and predisposing factors related to dentin hypersensitivity. J Contemp Dent Pract. 2008; 9(5):52–59. [PubMed: 18633469]
28. Matas F, Sentis J, Mendieta C. Ten-year longitudinal study of gingival recession in dentists (published online ahead of print Oct. 4, 2011). J Clin Periodontol. 2011; 38(12):1091–1098.10.1111/j.1600.051X.2011.01799.x [PubMed: 22092502]
29. Liu HC, Lan WH, Hsieh CC. Prevalence and distribution of cervical dentin hypersensitivity in a population in Taipei, Taiwan. J Endod. 1998; 24(1):45–47. [PubMed: 9487867]
30. Smith WA, Marchan S, Rafeek RN. The prevalence and severity of non-carious cervical lesions in a group of patients attending a university hospital in Trinidad (published online ahead of print July 11, 2007). J Oral Rehabil. 2008; 35(2):128–134.10.1111/j.1365-2842.2007.01763.x [PubMed: 18197846]
31. Chabanski MB, Gillam DG, Bulman JS, Newman HN. Prevalence of cervical dentine sensitivity in a population of patients referred to a specialist Periodontology Department. J Clin Perio-dontol. 1996; 23(11):989–992.
32. Bamise CT, Kolawole KA, Oloyede EO, Esan TA. Tooth sensitivity experience among residential university students (published online ahead of print June 12, 2009). Int J Dent Hyg. 2010; 8(2):95–100.10.1111/j.1601-5037.2009.00385.x [PubMed: 20522131]
33. Heft MW, Parker SR. An experimental basis for revising the graphic rating scale for pain. Pain. 1984; 19(2):153–161. [PubMed: 6462727]
34. Cunha-Cruz J, Wataha JC, Zhou L, et al. Treating dentin hypersensitivity: therapeutic choices made by dentists of the Northwest PRECEDENT network. JADA. 2010; 141(9):1097–1105. [PubMed: 20807910]

Table 1

Survey results.

	Dentin hypersensitivity?		
	Yes (N = 97) N(%)	No (N = 690) N(%)	Overall (N = 787) N(%)
Age			
18 – 44	44 (45.4%)	226 (32.7%)	270 (34.3%)
45 – 64	43 (44.3%)	309 (44.8%)	352 (44.7%)
65+	10 (10.3%)	155 (22.5%)	165 (21.0%)
Gender			
Female	70 (72.2%)	385 (55.8%)	455 (67.8%)
Male	27 (27.8%)	305 (44.2%)	332 (42.2%)
Race/ethnicity			
White	74 (76.3%)	568 (82.3%)	642 (81.6%)
Other	11 (11.3%)	59 (8.6%)	70 (8.9%)
Missing	12 (12.4%)	63 (9.1%)	75 (9.5%)
Aggressive tooth brushing habits			
Yes	28 (28.9%)	157 (22.8%)	185 (23.5%)
No	69 (71.1%)	532 (77.1%)	601 (76.4%)
Missing	0	1 (0.1%)	1 (0.1%)
Scaling & root planing			
Yes	18 (18.6%)	166 (24.1%)	184 (23.4%)
No	79 (81.4%)	524 (75.9%)	603 (76.6%)
In-office tooth whitening			
Yes	16 (16.5%)	82 (11.9%)	98 (12.5%)
No	81 (83.5%)	608 (88.1%)	689 (87.5%)
At-home tooth whitening			
Yes	41 (42.3%)	206 (29.9%)	247 (31.4%)
No	56 (57.7%)	484 (70.1%)	540 (68.6%)
Non-carious cervical lesions			
Yes	39 (40.2%)	218 (31.6%)	257 (32.7%)
No	58 (59.8%)	472 (68.4%)	530 (67.3%)
Gingival recession			
Yes	83 (85.6%)	402 (58.3%)	485 (61.6%)
No	14 (14.4%)	288 (41.7%)	302 (38.4%)
Obvious occlusal trauma			
Yes	27 (27.8%)	215 (31.2%)	242 (30.7%)
No	70 (72.2%)	475 (68.8%)	545 (69.3%)

Table 2

Characteristics of participants with dentin hypersensitivity.

	N (%) or Mean (sd) N=97 patients
Number of teeth with dentin hypersensitivity	
	3.5 (4.8)
Tooth (N=342 *)	
Incisors	88 (25.7%)
Canines	38 (11.1%)
Premolars	107 (31.3%)
Molars	109 (31.9%)
Start of symptoms	
< 6 weeks	16 (16.5%)
6 weeks – < 3 months	8 (8.3%)
3 months – < 6 months	11 (11.3%)
6 months or more	62 (63.9%)
Frequency of discomfort from sensitive teeth	
Never	4 (4.1%)
Occasionally	69 (71.1%)
Half of the time	13 (13.4%)
Most of the time	9 (9.3%)
Always	2 (2.1%)
100-mm VAS Pain Scale, mean (sd)	
	19.9 (20.4)
Seattle Scales (0 – 100), mean (sd)	
Intensity	25.2 (23.7)
Duration	20.7 (18.9)
Tolerability	15.8 (16.5)
Pain “description”	27.3 (28.6)
At-home treatments	
Yes	50 (51.6%)
No	47 (48.4%)
In-office treatments	
Yes	21 (21.7%)
No	76 (78.3%)

* Total number of hypersensitive teeth among the 97 participants with hypersensitivity.

Table 3

Prevalence of dental hypersensitivity, according to participants' characteristics (N = 787).*

	Prevalence	95% CI	p-value
Overall			
	12.3%	(9.8%, 14.8%)	
Age			0.02
18 – 44	16.3%	(12.2%, 20.4%)	
45 – 64	12.2%	(8.5%, 15.9%)	
65+	6.1%	(2.3%, 9.8%)	
Aggressive tooth brushing habits			0.16
No	11.4%	(8.4%, 14.5%)	
Yes	15.1%	(10.9%, 19.4%)	
Scaling & root planing			0.24
No	13.1%	(10.3%, 15.9%)	
Yes	9.8%	(5.2%, 14.3%)	
At-home tooth whitening			0.004
No	10.4%	(7.3%, 13.4%)	
Yes	16.6%	(13.4%, 19.8%)	
In-office tooth whitening			0.25
No	11.7%	(9.0%, 14.5%)	
Yes	16.3%	(8.2%, 24.5%)	
Non-carious cervical lesions			0.14
No	10.9%	(8.1%, 13.8%)	
Yes	15.2%	(9.9%, 20.4%)	
Gingival recession			<0.001
No	4.6%	(2.2%, 7.1%)	
Yes	17.1%	(13.2%, 21.0%)	
Obvious occlusal trauma			0.47
No	12.8%	(9.9%, 15.8%)	
Yes	11.1%	(7.3%, 15.0%)	

* Sample sizes were 787 participants for all models, except for aggressive toothbrushing (N=786)

J Am Dent Assoc. Author manuscript; available in PMC 2014 March 01.

Table 4

Association between dentin hypersensitivity and participants' characteristics.

	Crude PR* (N=787)***	95% CI	p-value	Adjusted PR** (N=711)	95% CI	p-value
Age			**0.012**			**<0.001**
18 – 44	2.7	(1.3, 5.3)		3.5	(1.7, 7.1)	
45 – 64	2.0	(1.0, 4.0)		2.1	(1.0, 4.2)	
65+	1	--		1	--	
Gender			**0.006**			**0.006**
Female	1.9	(1.2, 3.0)		1.8	(1.2, 2.8)	
Male	1	--		1	--	
Race/ethnicity			0.333			0.184
Other	1.4	(0.7, 2.6)		1.4	(0.8, 2.4)	
White	1	--		1	--	
Aggressive toothbrushing habits			0.160			0.941
No	1	--		1	--	
Yes	1.3	(0.9, 1.9)		1.0	(0.7, 1.4)	
Scaling & root planing			0.240			0.251
No	1	--		1	--	
Yes	0.7	(0.5, 1.2)		0.7	(0.4, 1.3)	
At-home tooth whitening			**0.004**			**0.048**
No	1	--		1	--	
Yes	1.6	(1.2, 2.2)		1.4	(1.0, 2.0)	
In-office tooth whitening			0.249			0.846
No	1	--		1	--	
Yes	1.4	(0.8, 2.4)		1.1	(0.6, 1.7)	

	Crude PR* (N=787)***	95% CI	p-value	Adjusted PR** (N=711)	95% CI	p-value
Non-carious cervical lesions			0.142			0.991
No	1	--		1	--	
Yes	1.4	(0.9, 2.1)		1.0	(0.6, 1.5)	
Gingival recession			**<0.001**			**<0.001**
No	1	--		1	--	
Yes	3.7	(2.1, 6.6)		5.5	(3.0, 10.1)	
Obvious occlusal trauma			0.470			0.342
No	1	--		1	--	
Yes	0.9	(0.6, 1.3)		0.8	(0.5, 1.3)	

*PR = Prevalence ratio

**Adjusted for all other covariates.

***Sample sizes were 787 participants for all crude models, except for race (N=712) and aggressive toothbrushing (N=786)