ORIGINAL ARTICLE

Epidemiological Survey of Dentinal Hypersensitivity in Patients after Oral Prophylaxis

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Abstract

Aim: *To determine the prevalence of dentinal hypersensitivity in patients after oral prophylaxis.* ***Materials and Methods:*** *The study population for the survey consisted of 150 patients visiting the out patient, Department of Periodontics, A.B. Shetty Memorial Institute of Dental Sciences. A questionnaire form was given to all the patients after Oral Prophylaxis. After taking consent from all the patients, they were asked to mark their answers in the questionnaire form and was statistically analyzed using Chi squared test.* ***Results:*** *The effect of oral prophylaxis on dentinal hypersensitivity showed a significant correlation. 48 (32%) patients experienced increase in hypersensitivity after oral prophylaxis, 13 (8.6%) patients experienced decrease in hypersensitivity after oral prophylaxis, 40 (26.6%) patients had not experienced any change in hypersensitivity after oral prophylaxis.* ***Conclusion:*** *From this survey we can conclude that dentinal hypersensitivity is not dependent on beverage consumption, habits, mode and frequency of brushing. Other factors such as force of brushing, type of brush used, presence of dental caries, periodontal pocket, recession, furcation involvement, etc also could be a cause of dentinal hypersensitivity. This survey showed that there was an association between dentinal hypersensitivity and oral prophylaxis.*

Keywords*: Dentinal hypersensitivity, oral prophylaxis, oral hygiene maintenance.*

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Introduction

As a dentist, most of the times we come across patients who complain about dentinal hypersensitivity. It is a very common dental problem which is often neglected by the patients and comes into notice only in the dental office.

Dentinal hypersensitivity is a momentary tooth pain associated with a variety of stimuli. It is a relatively common problem, characterized by short, sharp pain arising from exposed dentin response to stimuli typically thermal, evaporative, tactile, osmotic or chemical which cannot be ascribed to any other form of dental defect or disease. [1,2,3,4] There is an ample variation in the cause and response of the patients. It is mostly caused due to exposed dentinal tubules. However, sometimes it can be also caused due to tooth bleaching or due to an associated pathology of the tooth.

The most accepted theory is the Brännström's Hydrodynamic Theory of Hypersensitivity which proposes that pain-producing stimuli cause a change in dentin fluid flow that activates intra-dental nerve fibers, via a mechanoreceptor, to cause pain.[5]

Dentinal hypersensitivity may impact the quality of life of the individual during the various day to day activities like eating, drinking, brushing and sometimes even breathing.[6,7] This limits the dietary choices thus sometimes leading to a

variety of nutritional deficiencies. The effective oral hygiene practices and esthetics can also be negatively affected. A variety of over the counter toothpaste are available for treating it. Various periodontal surgical procedures like root coverage procedures, flap surgeries etc may need to be carried out in extreme cases.

Aim and Objectives

To determine the prevalence of dentinal hypersensitivity in patients after oral prophylaxis.

Materials and Methods

Data collection

The questionnaire based survey was conducted for a period of 3 months. The study population for the survey consisted of 150 patients visiting the outpatient, Department of Periodontics, A.B. Shetty Memorial Institute of Dental Sciences. They were selected by simple random stratified technique. The patients who were willing to participate in the survey gave their verbal consent and were included in the survey. There were no exclusion criteria.

After taking consent from the patients, a questionnaire form was given to all the patients after Oral Prophylaxis. On an average, each patient took 10 minutes to fill the questionnaire form. All the patients were asked to mark their answers on the questionnaire form. Whenever the patients did not understand the questions or had any doubt regarding the survey, they were cleared. The questionnaires were then collected from the patients and were verified whether they were completed or not. The data collected from the questionnaire was then statistically analyzed.

Self-administered questionnaire

Demographic information such as name, age and address was collected. The questionnaire consisted of 15 questions relevant to dentinal hypersensitivity and oral prophylaxis. The questionnaire had questions regarding self-reported dentinal hypersensitivity, opinion regarding the relationship of dentinal hypersensitivity and oral prophylaxis, various triggering factors, the presence of systemic diseases, beverage consumption per day, habits, methods of oral hygiene maintenance, previous dental visits and treatment taken.

Statistical analysis

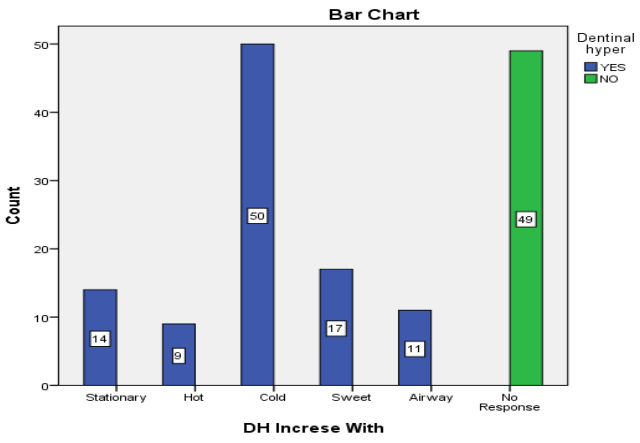
The data collected were analyzed using SPSS Software. Frequencies were used to document qualitative variable studied. To test the association between dentinal hypersensitivity and other parameters, Chi-squared (χ^2) test was carried out. $p<0.05$ was considered to be statistically significant.

Results

A total of 150 patients were included in the survey. An equal number of male and female patients were included i.e. 75 each. The effect of oral prophylaxis on dentinal hypersensitivity showed a significant correlation. 48 (32%) patients experienced the increase in hypersensitivity after oral prophylaxis, 13 (8.6%) patients experienced the decrease in hypersensitivity after oral prophylaxis and 40 (26.6%) patients had not experienced any change in hypersensitivity after oral prophylaxis.

Most of the patients reported that the dentinal hypersensitivity increased with exposure to cold, few patients reported it to increase with sweet, few also showed that there was no significant difference with exposure to hot, cold, sweet, airway syringe, etc. Very less number of patients complained of dentinal hypersensitivity to increase on exposure to hot food/ beverage (Figure-1).

Figure-1: Effect of various parameters on Dentinal Hypersensitivity



101 (67.3%) patients complained of dentinal hypersensitivity and the rest 49 (32.7%) patients did not complain of dentinal hypersensitivity. 83 (55.3%) patients complained of suffering from dentinal hypersensitivity even before oral prophylaxis whereas 67 (44.7%) patients

complained of the presence of dentinal hypersensitivity after oral prophylaxis.

Other parameters such as beverage consumption, habits, brushing technique and frequency of brushing per day did not show a significant correlation with dentinal hypersensitivity.

Discussion

Dental hypersensitivity is a painful clinical condition with an incidence ranging from 4 to 74%.[8-12]The variations in the reports may be because of difference in populations and different methods of investigations. The methods employed are usually patient's questionnaire or clinical examinations. Interestingly, the incidence of dental hypersensitivity is much higher in patient's questionnaire studies than in clinical studies which quote an incidence of mere 15%.[9,10]

An often neglected phase of clinical management of dentinal hypersensitivity is the identification and treatment of the causative factors of dentinal hypersensitivity. It can be mostly due to the unawareness of the patient and also sometimes due to the dentist negligence. By removing the etiological factors, the condition can be prevented from occurring or even recurring. Some of the etiological factors include faulty tooth brushing, poor oral hygiene maintenance, pre-mature contacts, gingival recession because of periodontal therapy or physiological reasons, attrition and exogenous/endogenous non-bacterial acids.

The dental wasting diseases such as attrition, abrasion, erosion, and abfraction also play a pivotal role in dentinal hypersensitivity. They might occur due to bruxism, faulty brushing technique, trauma from occlusion, acidic drinks, pocket reduction for surgery, tooth preparation for the crown, excessive flossing, etc. All of these ultimately lead to the exposure of the dentinal tubules causing dentinal hypersensitivity.

For a tooth to be hypersensitive, the dentinal tubules must be exposed to the external environment.[13] Gingival recession is one of the primary cause of hypersensitivity. Often these sites are covered by plaque and calculus thus closing the dentinal tubules. Once oral prophylaxis is done and the plaque and calculus have been removed, patients might complain of dentinal hypersensitivity. This could be the probable reason behind dentinal hypersensitivity after oral prophylaxis which is detected when the patients visit the dental office.

Various other periodontal problems such as furcation involvement and periodontal pocket formation lead to the exposure of the cementum and the cemento- enamel junction (CEJ), thus the tubules are exposed and the tooth becomes sensitive. Carious tooth with or without periapical pathology can also lead to dentinal hypersensitivity. Due to caries there is a cavity formed in the tooth, which opens the dentinal tubules and exposes it to the oral environment, making the tooth hypersensitive.

Improper oral hygiene maintenance leads to accumulation of plaque and calculus, which leads to severe hypersensitivity as the plaque and calculus serve as the nidus for a variety of microbial colonies which might release their toxins and products, which could be the reason of dentinal hypersensitivity in patients with periodontitis.

Faulty tooth brushing includes hard brushes, excessive forces, prolonged duration of brushing, excessive scrubbing at the cervical areas or even lack of brushing which causes plaque accumulation and gingival recession. The patient should be taught the correct method of tooth brushing with the help of a model. Highly abrasive tooth powder or pastes should be avoided. Also, the patients should be instructed to avoid brushing for at least 2 hours after acidic drinks to prevent agonist effect of acidic erosion on toothbrush abrasion.

Erosive agents are also important agents in the initiation and progression of dentinal hypersensitivity. They tend to remove the enamel or open up the dentinal tubules. The erosive agents can be either exogenous dietary acids or endogenous acids. The exogenous dietary acids include carbonated drinks, citrus fruits, wines, yogurt, and professional hazards (workers in battery manufacturing, wine tasters). A detailed dietary history should be taken. The quantity and frequency of the foods containing acids should be reduced. The patient should be advised to take something alkaline (milk) or at least neutral (water) after acidic drinks and to use a straw to sip the drink and avoid swishing it around the teeth. The endogenous acid comes from gastro-esophageal reflux or regurgitation

(GERD). It is also common in patients with eating disorders. This condition is characterized by generalized erosion of the palatal surfaces of maxillary anterior teeth. Such patients should be referred to the medical practitioner for expert management of the underlying disease. An occlusal splint can be fabricated to cover the affected areas, to prevent their contact with the acids.

Various conditions which might mimic dentinal hypersensitivity should be excluded for the proper diagnosis and treatment planning of dentinal hypersensitivity. In dental caries, the highest degree of sensitivity is experienced when caries passes the dento- enamel junction (DEJ). Traumatized or chipped tooth induces rough edges in the surface of enamel and dentin leading to sensitivity or pain. Sometimes, the patient gets confused with the sharp, intermittent pain caused by reversible pulpitis which is provoked by hot, cold or sweet food/ beverage and mistakes it for dentinal hypersensitivity. Few treatment procedures can also produce dentinal hypersensitivity such as bleaching sensitivity which is attributed to the penetration of the bleaching agents to the pulp chamber leading to reversible pulpitis. Postoperative sensitivity can be due to heat generation during cavity preparation; excessive pressure applied during cavity preparation, leakage of restoration, improper bonding procedure, cuspal strain or fractured restoration. [14]

Dentinal hypersensitivity should be managed efficiently by a dentist as it is a very common problem prevailing among the patients. The main etiology of the dentinal hypersensitivity should be treated. Some of the strategies which could be helpful for the management of dentinal hypersensitivity are as follows- [14, 15]

- A detailed clinical and dietary history needs to be taken.
- The condition should be differentially diagnosed from other dental pain conditions.
- Identifying and managing etiological and predisposing factors.
- In case of mild-to-moderate sensitivity, at-home desensitizing therapy should be advised.
- If there is no relief or in case of severe sensitivity, initiate in-office treatment.
- In extreme cases, if the patient does not respond to the therapy and there are individual teeth exhibiting the symptoms, then endodontic or periodontal therapy can be initiated.
- Prevention measure should be given importance and the patient should be followed up regularly.

Various over the counter desensitizing kinds of toothpaste are available which are helpful in reducing dentinal hypersensitivity. These toothpaste contain potassium oxalate, sodium monofluorophosphate, sodium fluoride, stannous fluoride, strontium chloride, etc. which percolates inside the dentinal tubules to cover or plug them or forms precipitates.

When the dentinal hypersensitivity still persists, the patient visits the dental office. The dentist plays a major role in diagnosing and treating dentinal hypersensitivity. When there is a significant loss of cervical tooth structure, use of restorative materials such as glass ionomer cement (GIC) and composite resins is helpful. Periodontal surgeries such as free gingival grafts (FGG), lateral sliding grafts, connective tissue and coronally repositioned flaps can be performed to cover the exposed roots in the cases of gingival recession or furcation involvement. If the symptoms of hypersensitivity still persist, the offending tooth has to be endodontically treated and if it still does not resolve then the last resort is extraction.

Conclusion

Dentinal hypersensitivity is a relatively common and significant problem among the population. Many people do not give it the desired attention it requires and often neglects it. Oral prophylaxis is a periodontal therapy which removes plaque and calculus rendering the surface of the tooth exposed often leading to dentinal hypersensitivity. It is clear from the survey that a lot of patients complains of dentinal hypersensitivity after oral prophylaxis. This could be probably due to the exposure of the tooth surface exposing the dentinal tubules which were previously covered by the plaque and calculus. From this survey, it could be concluded that dentinal hypersensitivity increased with the exposure to cold food/ beverages after oral prophylaxis.

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References

1. Braimoh OB, Ilochonwu NA. Dentin hypersensitivity among undergraduates in a university community. Saudi J Oral Sci 2014;1:90-3
2. Canadian Advisory Board on Dentin Hypersensitivity. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. J Can Dent Assoc 2003;69:221-6
3. Addy M. Dentin Hypersensitivity: New perspective on an old problem. Int Dent J 2002;52:367-5
4. Rees JS. The prevalence of dentin hypersensitivity in general dental practice in the UK. J Clin Periodontol 2000;27:860-5
5. Jacobsen PL et al. clinical dentin hypersensitivity: understanding the causes and prescribing a treatment. J Contemp Dent Pract, 2001 Feb 15;2(1):1-12
6. Dababneh RH, Khouri AT, Addy M. Dentine hypersensitivity- An enigma? A review of terminology, mechanisms, etiology and management. Br Dent J 1999;187:606-11
7. Banoczy J. dentin hypersensitivity and its significance in dental practice. Fogrov Sz 2002;95:223-8
8. Rees JS, Jin U, Lam S, Kudanowska I, Vowles R. The prevalence of dentine hypersensitivity in a hospital clinic population in Hong Kong. J Dent. 2003;31:453–6
9. Flynn J, Galloway R, Orchardson R. The incidence of hypersensitive teeth in the west of Scotland. J Dent. 1985;13:230–6.
10. Fischer C, Fischer RG, Wennberg A. Prevalence and distribution of cervical dentine hypersensitivity in a population in Rio de Janeiro, Brazil. J Dent. 1992;20:272–6.
11. Irwin CR, McCusker P. Prevalence of dentine hypersensitivity in general dental population. J Irish Dent Assoc. 1997;43:7–9.
12. Taani DQ, Awartani F. Prevalence, and distribution of dentin hypersensitivity and plaque in a dental hospital population. Quintessence Int. 2001;32:372–6
13. Cummins D. dentin hypersensitivity: from diagnosis to a breakthrough therapy for everyday sensitivity relief. J Clin Dent. 2009;20(1):1-9
14. Bubteina N, Garoushi S. Dentine Hypersensitivity: A Review. Dentistry 2015;5:330.
15. Tusharluthra, Gupta S, Bharadwaj S, Choubey A, Yadav H, Singh H. Dentin Hypersensitivity and its management: a review. IJOCR. July-Sep 2015;3(3):59-3