

Tooth sensitivity and whitening

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ABSTRACT

The study purposed to evaluate the basic concepts of tooth sensitivity, the etiology of cervical dentin hypersensitivity and costs of tooth whitening. The etiology and treatment of cervical dentin hypersensitivity are described. Total of 120 patients (50 men and 70 women aged 20-45) have been interviewed. Dentin hypersensitivity appeared more prevalent than many dentists believe. It's the most frequent side effect associated with vital bleaching procedures. Desensitizing dentifrices provide a convenient, inexpensive, and effective first line of defense for treating cervical dentin hypersensitivity.

KEYWORDS: *sensitivity, whitening, hydrodynamic theory, dentinal tubules*

The most widely accepted explanation of dentin hypersensitivity is Brannstrom's "hydrodynamic theory" [3]. According to this theory, various thermal, mechanical, evaporative, and osmotic stimuli can cause a rapid outward flow of fluid in the dentinal tubules. Rapid fluid flow causes a pressure change across the dentin, stimulating pulpal A- δ nerve fibers and resulting in the perception of pain. Cold is the most common stimulus for dentin hypersensitivity [2-5].

MATERIALS AND METHODS

Total of 120 patients (50 men and 70 women aged 20-45) have been interviewed during the period of 2002-2005. Studies concerning the prevalence of cervical dentin hypersensitivity have reported that 4% to 57% of adults experience cervical dentin hypersensitivity in 1 or more teeth [7-12]. The prevalence of hypersensitivity is substantially higher (60% to 98%) in periodontal patients [11-13]. The most common locations for dentin hypersensitivity are cervical areas on the facial surfaces of the canines and first premolars, followed by the second premolars and the incisors [4-14].

This survey also revealed that only half of affected individuals reported that they had talked to their dentist about their sensitive teeth and that only half of those individuals received a treatment recommendation.

Many patients believe that this problem is a minor annoyance not worthy of the dentist's attention, and some dentists might feel the same way. A surprisingly large proportion of dentists lack knowledge of the problem, its etiology and treatment alternatives [15]. A better understanding of dentin hypersensitivity is important for dental professionals, especially as more people are experiencing a similar type of sensitivity with tooth whitening.

Exposure of dentinal tubules – either through gingival recession and subsequent loss of cementum or through wear of enamel – is required for cervical dentin hypersensitivity to occur. However, dentin exposure does not inevitably result in hypersensitivity. A number of factors contribute to hypersensitivity with exposed dentin, including ingestion of acidic beverages and foods, use of abrasive or tartar-control dentifrices, overzealous or poor brushing technique, and brushing immediately after ingesting an acidic beverage or food [4,14,15].

Resin-based dentin adhesives are one of the methods for sealing dentin surface. These materials impregnate the dentin, occlude the tubules, and form a polymeric coating on the surface. The coating tends to be relatively thin (about a few microns) and therefore is susceptible to

abrasion. In clinical trials, several resin adhesives have demonstrated significant reductions in cervical dentin hypersensitivity.

The reported incidence of tooth sensitivity in clinical trials of whitening varies widely, from as low as 0% to 7% to as high as 75%.¹ Although some studies have reported occasional subject dropouts because of tooth sensitivity, nearly all sensitivity (~80% of occurrences) is described as "mild". A recent clinical trial and literature review concluded that mild sensitivity can be expected to occur in 54% of patients, moderate sensitivity in 10% and severe sensitivity in fewer than 5%. In other words, about two thirds of patients are likely to experience at least some tooth sensitivity at some point during the whitening process. (As a point of reference, this study evaluated a 15% carbamide peroxide gel containing fluoride that was applied 3 to 4 hours per day over a 4-week period).

- ❖ **Tooth is a semipermeable membrane**
- ❖ **Peroxide/urea penetrates to the pulp in 5 to 15 minutes**
- ❖ **Color change is same at pulp at dentin-enamel junction**

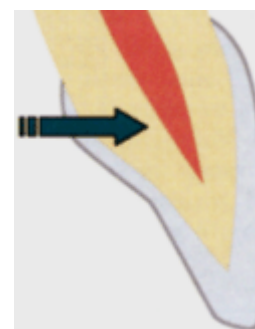


Fig.1 *Whitening sensitivity is related to the easy passage of peroxide through the enamel and dentin to the pulp.*

Interestingly, tooth sensitivity rates of up to 20% to 30% have been reported with placebos, which suggest that the sensitivity is not related strictly to the peroxide content of whitening gels. One example of this was reported in a clinical trial by Matis et al, who compared a 10% carbamide peroxide gel with a placebo gel. This study included 5 categories of subject-reported sensitivity – none, slight, moderate, considerable, and severe. With the whitening gel, the percentages of subjects in each category were 45%, 10%, 28%, 7% and 10%, respectively. For the placebo gel, the percentages were 80%, 10%, 10%, 0% and 0%. In summary, 55% of subjects in the active group experienced at least some tooth sensitivity, but so did 20% of subjects in the placebo group. A similar study by Leonard et al reported tooth

sensitivity in 58% of subjects in the active group and in 34% of subjects in the placebo group.

CONCLUSION

Dentin hypersensitivity is more prevalent than many dentists believe. Desensitizing dentifrices provide a convenient, inexpensive, and effective first line of defense for treating cervical dentin hypersensitivity. A variety of

professionally applied topical agents also are available, but no single method has proved to be 100% effective.

Tooth sensitivity is the most frequent side effect associated with vital bleaching procedures. Although it tends to be mild and transient, it is also very common and is annoying to patients. Its presentation is similar to that of cervical dentin hypersensitivity and may involve a similar mechanism.

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Чувствительность зубов и отбеливание

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РЕЗЮМЕ

Целью работы являлось изучение этиологии чувствительности зубов, гиперестезии дентина и связь с отбеливанием зубов. Опрос 120 пациентов (50 мужчин и 70 женщин в возрасте от 20-ти до 45-ти лет) показал, что гиперчувствительность дентина более распространена, чем было принято считать. Гиперчувствительность зубов - самый частый побочный эффект, связанный с бытовыми процедурами отбеливания. Зубные пасты обеспечивают удобную, недорогую, и эффективную первичную защиту от гиперчувствительности дентина.

Ключевые слова: чувствительность, отбеливание, теория гидродинамики, дентальные тубулы