

DENTIN HYPERSENSITIVITY:

Consensus-Based Recommendations for the Diagnosis & Management of Dentin Hypersensitivity

The Role of the Dental Hygienist in the Management of Dentin Hypersensitivity

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The role of the dental hygienist is pivotally important in the prevention and management of dentin hypersensitivity. Prevention of hypersensitivity is the most cost-effective treatment option for patients. Through promotion of good oral hygiene practices, nutritional counseling, nonsurgical periodontal therapy, and application of desensitizing agents, dental hygienists are uniquely placed to be a first line of defense in the prevention of dentin hypersensitivity and its major predisposing conditions.

Patients may be reluctant to report symptoms of dentin hypersensitivity to the dentist during the comprehensive or periodic oral examinations. The first discussion is frequently with the dental hygienist during the dental prophylaxis, when hypersensitive areas may be stimulated.

When symptoms of hypersensitivity first become apparent to the dental hygienist, it is important that a thorough health questionnaire is completed and that the sites of sensitivity are documented, including duration, onset, and the nature of stimuli (if any) initiating the symptom. All contributory and predisposing factors and conditions should be explored, such as gingival recession, tooth wear, oral hygiene, and any harmful or factitious habits.

Due to the common nature of symptoms of hypersensitivity, a differential diagnosis is essential (see Figure 1 in Introduction). The dentist, as diagnostician, should follow the appropriate protocol to ensure that the most appropriate restorative or surgical treatment is rendered.

TOOTH WEAR

Tooth wear may be a result of mechanical (attrition and abrasion) or chemical (erosion) activity or, quite commonly, both (chemical softening of the surface prior to its mechanical removal). Attrition is wear resulting from tooth-to-tooth contact during normal mastication and abrasion is mechanical wear by forces other than mastication. Erosion is a loss of tooth substance by chemical processes unrelated to bacterial action, most commonly, dietary acids. With all three types of tooth wear, dentin hypersensitivity commonly results when enamel is lost and dentin is exposed.

An aspect of patient education, within the scope of dental hygiene practice, is nutritional counseling and referral. The dental hygienist must thoroughly assess the nutritional habits of patients with dental history that includes intake of soft drinks/acidic beverages or eating disorders (bulimia/anorexia nervosa, GERD) that may lead to dental erosion. With the rapidly increasing changes in lifestyles and consumption of acidic beverages, chemical tooth wear (erosion) of enamel and dentin may inevitably result in more tooth hypersensitivity for many patients.¹

Dietary modifications should include limiting foods and beverages that cause hypersensitivity such as citrus fruits, acidic beverages, pickled foods, and ciders, as well as incorporation of foods and beverages into the diet immediately after an acid exposure that encourage saliva secretion and

remineralization (eg, milk, cheese, yogurt). Some erosive tooth wear is caused by chronic vomiting related to pregnancy or bulimia. Patients should be instructed not to brush immediately after vomiting to allow the acidity of the oral cavity to decrease. Patients with these conditions should be referred for medical and psychological evaluation.

Mechanical tooth wear from abnormal habits (abrasion) and wear from normal occlusion (attrition) also can contribute to dental hypersensitivity.² The dental hygienist should frequently assess these behaviors during recare and periodontal maintenance appointments that follow active periodontal/restorative therapy.³

ORAL HYGIENE INSTRUCTION

One of the most important roles of dental hygienists is to effectively communicate individualized oral hygiene instructions to all patients. Patients should demonstrate their routine brushing technique while the dental hygienist actively observes.

Traditionally, it has been concluded that overzealous brushing and using a hard-bristled toothbrush could cause or worsen gingival recession.⁴ However, in a recent systematic review of several studies assessing this correlation, Rajapakse et al⁵ concluded that data to support or refute an association between toothbrushing and gingival recession are inconclusive. This is echoed by Drisko.⁶ Although the evidence is inconclusive, brushing duration and frequency are the most-cited causes of toothbrush-related gingival recession. Other factors studied are brushing technique, brushing force, toothbrush age, and hardness of toothbrush bristles.⁴

Patients should be advised to brush at least 2 minutes, twice per day.⁷ Toothbrushes should be discarded and replaced every 3 months or sooner when the patient experiences a transmissible infection or when bristles begin to fray.⁷ To reduce brushing force, patients with normal dexterity should be advised to use a finger grip on their toothbrush handles as opposed to a palm grip. Brushing with the non-dominant hand may also alleviate destructive brushing since studies have reported a higher proportion of sensitive teeth on the left side of the mouth versus the right side in right-handed patients.⁷ Because hard bristled toothbrushes may contribute to tooth and gingival wear, a soft-, sensitive-, or extra-soft bristled brush should be recommended to all patients, especially those experiencing sensitive teeth.^{1,4,8}

Marginal biofilm can cause gingival recession to worsen so brushing technique should be routinely emphasized. Manual toothbrush bristles should be adapted at a 45° angle toward the sulcular area. Then, the patient should be instructed

to gently brush back and forth, progressing around the arch in small increments. Once the gum line brushing has been done on the facial and lingual surfaces of both arches, the patient can be instructed to then brush the teeth surfaces. Redirecting patient brushing habits from toothbrushing to sulcular brushing will effectively remove harmful bio-film and promote firmly attached and resilient marginal gingiva.

The dental hygienist should be clear in explaining that how the toothbrush is used is more important than the toothbrush design. This is true whether the toothbrush is powered or manual. In a few studies, the results obtained using a power toothbrush were superior to manual toothbrushing.^{9,10} Since those investigations, power toothbrushes have undergone much innovation with enhanced features of particular benefit for patients with hypersensitivity, which include visual timers, brush guide location by quadrant, and visual pressure indicators to alert patients when they are brushing too hard.¹¹

Clinicians and patients must realize the importance of meticulous oral hygiene in suppressing and preventing periodontal disease, regardless of tooth hypersensitivity. Children and patients with poor manual dexterity will often benefit from a powered brush because of the larger handles and it being less technique dependent than manual toothbrushing. The supply and demand for more convenient and efficient oral care has sparked rapid advancements in several manual and powered brush designs. Innovation and product development may possibly eradicate the factors that were/are thought to link toothbrushing with gingival recession.

DESENSITIZING AGENTS

The hydrodynamic theory is widely accepted as the mechanism of action of dentin hypersensitivity. This theory states that the hypersensitivity or pain is caused by various stimuli (temperature, pressure, touch, chemical) which can lead to changes in the movement of fluids in and out of exposed dentinal tubules leading to changes in pressure or flow around the mechano-receptors found in the nerve endings surrounding the odontoblastic processes.¹² The mechanism of action for most desensitizing agents is either to desensitize the nerve so that the fluid flow and resulting changes in pressure do not cause the mechanoreceptors to fire; or to block exposed tubules so there can be no fluid movement at all.

Potassium salts (nitrate most commonly, but also chloride and citrate) are found in desensitizing toothpastes and have been proven safe and effective in several clinical trials.



Potassium delivered in the form of toothpaste is the most clinically evaluated desensitizing agent. Office-prescribed potassium nitrate has been shown to be effective in patients experiencing hypersensitivity from vital teeth bleaching. Potassium nitrate is thought to work by depolarizing the nerve and preventing pain signals from reaching the brain.¹³ Custom-tray application of potassium nitrate before bleaching has provided relief for many patients experiencing teeth hypersensitivity.¹⁴

Other desensitizing agents work typically as dentinal tubule blockers. Several professionally applied agents are available with various levels of clinical evaluation (see Table in Introduction). These include high-concentration fluorides, various oxalate salts, protein precipitants, and physical agents such as filled and unfilled resins and glass ionomers.

Patients should be instructed to use OTC desensitizing agents exclusively for maximum results. They should be advised that the full desensitization effect may not occur immediately (2 or more weeks) and be encouraged to use the dentifrices continually.⁸ Patients with dentin hypersensitivity and high caries or erosion risk should select a desensitizing dentifrice that also has high fluoride availability and demonstrated fluoride uptake.¹⁵

NONSURGICAL PERIODONTAL THERAPY

Traditionally, the objective of mechanical therapy was to aggressively root plane the tooth surface to achieve a surface that was glassy smooth to a lightly held dental explorer. This aggressive debridement with sharp periodontal instruments was found to create or worsen tooth hypersensitivity. A contemporary objective is to remove all calculus deposits and cementum contaminated with endotoxins with the least amount of effective lateral pressure. After hard-deposit removal, a root-surface debridement technique follows. Root-surface debridement is a paradigm shift from traditional dental hygiene practice in that light pressure using fine finishing curettes is advocated to gently debride root surfaces and remove harmful endotoxins.¹⁶

The use of power scalers is another important step in reducing hypersensitivity caused during dental hygiene therapy. Ultrasonic and sonic scalers enable dental hygienists to debride hard deposits with minimal lateral pressure applied to the tooth surface. Additionally, the lavage action of power scalers assists with removal of endotoxins.

Removal of extrinsic stains is another dental hygiene treatment that can promote or aggravate tooth hypersensitivity.

Tenacious deposits traditionally have required repeated application of lateral pressure using periodontal instruments. Advances in air power-polishing technology have drastically reduced the need for this method of debridement.¹⁶

For patients who do not require extensive power scaling, prophy pastes are often used to remove biofilm and light stains from the teeth. When using abrasive polishing agents, such as coarse-grit prophy paste, damage in the form of surface scratching and loss of enamel and cementum may result. Fine-grit prophy paste is recommended to reduce this potential damage.^{7,16}

Recent advances in prophy paste include formulas that deliver amorphous calcium phosphate (ACP), an agent shown to desensitize dentin by depositing ACP into the tubules.¹⁵ Another innovation is a prophy angle that embeds the paste within the prophy cup and claims to reduce enamel abrasiveness by 50% when compared with using a prophy cup and medium-grit paste separately. As a general rule, when selecting a prophy paste, the least abrasive will be the paste of choice, and it should be deployed with the least amount of pressure commensurate with removing the stain and leaving a smooth and minimally scratched surface.^{7,16}

Innovations in nonsurgical periodontal instrumentation for the removal of hard deposits, biofilm, and extrinsic stains are continuously providing dental hygienists with greater armamentarium for preventing and managing dentin hypersensitivity.

CONCLUSION

The dentist is responsible for the diagnosis and initial therapy in the treatment of sensitive teeth. Concurrently, the dental hygienist must become actively involved in the suppression of symptoms and prevention of severity as the patient returns for recare appointments. Based on the patient's oral health status and oral hygiene habits, appropriate intervals for recare should be established. Current treatment modalities in nonsurgical periodontal instrumentation, in-office and OTC desensitizing medicaments, and oral hygiene products have provided dental hygienists with effective means of managing patients with dentin hypersensitivity. New knowledge and products are rapidly developing. It is critical for dental hygienists to engage in lifelong learning through continuing education and review of the published literature regarding advancements in evidence related to dental hypersensitivity. Contributions by dental hygienists to the body of knowledge through participation

in research, publication, and presentation are equally vital to the dental profession and to the patients they serve.

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RECOMMENDED READING

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