

## Sensitivity of Teeth: General Facts, Causes, Symptoms and Treatment Modalities

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### Abstract

Is there a feeling of discomfort on sipping hot tea or cold drink? Do you wince and feel a current or stinging sensation while having something sour or sweet? Then you are most likely dealing with a common problem that thousands of people face called sensitivity (Figure 1).

Do not worry! We have it sorted for you as you will find all relevant and comprehensive information about how to combat Tooth Sensitivity underneath.

**Keywords:** Sensitivity; Teeth; Symptoms



**Figure 1**

### Introduction

Technically known as Dentinal Hypersensitivity, this dental condition is chronic in nature i.e it may last from a few days to a few months. It can progress over time and exhibits due to multiple reasons. Previously it was described as an enigma because it was poorly understood. However, now there is enough data available that helps us treat this condition efficiently.

### Epidemiological facts

It generally occurs in people within 20- 50 years of age limit, however people younger or older can also face this condition. It has a peak in the age range of 30-40 and more prevalent in female individuals that would probably be related to their dental hygiene and

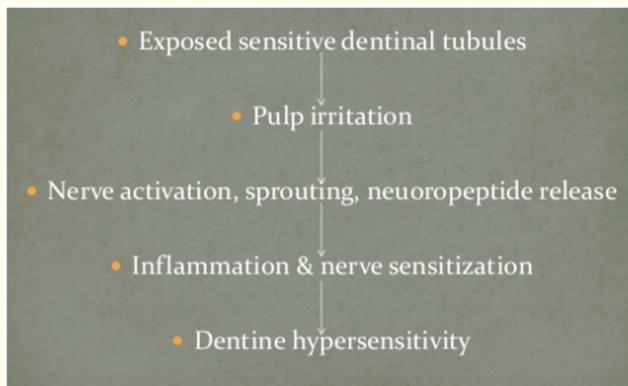
dietary habits. It has been observed that some people with DH do not pursue treatment of the disease. Patients do report this condition in a clinical visit to the dentist but usually don't turn up for treatment according to a few statistical data. This is perhaps due to the fact that they do not consider it as a specific disease.

The canines and premolars which are your third and fourth teeth from the centre are most commonly affected. The site where you generally feel the sensation is the visible front face of the tooth near the gums called the cervical area. However, in some situations the back side of the tooth can also be affected. The left side of the mouth is more prone to dentin hypersensitivity according to facts.

A brief description of the anatomy of the tooth is essential for all of us to understand the occurrence of this phenomenon. The tooth is made of an outer layer which is the hard white enamel and the inner layer is made up of dentin which is soft and yellowish. It has multiple microscopic channels called dentinal tubules that pass and rub through the dentin to the centre of the tooth. The nerve and nerve endings are connected to the dentin channels and exit into the pulp which inhabits blood and nerves. The dentin tubules or channels contain odontoblastic processes and are surrounded by fluid. Dentin's sensitivity to stimuli does not lead to any problem while it is covered with protective tissues; enamel on crown and cementum on the root.

### Mechanism of action of sensitivity

Once layer of dentin gets exposed to the environment and the structural integrity is disbalanced, external triggers or stimuli such as hot- cold, extremely sweet- sour food and beverages or sudden rush of air spray stimulates the nerves inside the tooth and therefore a short sharp sensation is felt immediately. When this phenomenon cannot be attributed to any other specific or evident dental pathology it is termed as dentin hypersensitivity.



**Figure 2**

Well researched scientific studies attribute to the fact that there are many theories as to why and how dentin hypersensitivity occurs. The fluid movement or hydrodynamic theory which explains that the dentinal fluid shifts in response to a stimuli and causes stimulation of nerves is widely accepted.

### Symptoms

Sensitivity feels like a short lasting, transient sharp piercing kind of sensation affecting a certain area of teeth which lasts for a short duration and subsides on its own only to recur in response to a similar stimulus as earlier or without any specific reason once it has been already initiated. Either one tooth or several teeth can be affected. There can be mild discomfort or extreme severity to the level that patients reject cold or hot food items outrightly and cannot bear the sensation any further.

### Etiology

- Periodontal problems like gum recession or secondary to periodontal diseases: The downward movement of gums called recession is a byproduct of either the ageing process or some dental or systemic infections. Sensitivity is highly prevalent in periodontally compromised patients (60-80%).

- Thin enamel or enamel loss: This can happen due to aggressive horizontal brushing, using hard bristled toothbrush, excessive flossing or brushing for more than 3 mins very frequently. It leads to abrasions and abfractions and exposes the dentin. Moreover, habits like night grinding also contribute to enamel loss through attrition of teeth.
- Gastric acid reflux which is a systemic disorder in which there is regurgitation of dietary acids or intake of acidic food in large amounts or eating disorder like bulimia can also cause erosion of enamel on the side of the tooth that faces the palate and tongue and eventually lead to sensitivity. Erosive agents include carbonated drinks, citrus fruits, alcoholic drinks, yogurt, dairy products, and occupational hazards.
- Sometimes dental procedures like scaling, polishing, bleaching can also induce sensitivity. There has to be proper checkup regarding the susceptibility and genetic predisposition of the people before undertaking dental procedures to keep sensitivity at bay.
- People with xerostomia or lack of adequate amount of saliva are also vulnerable to sensitivity.
- At times habits like chewing tobacco can also worsen this condition to extreme levels.



**Figure 3**

Therefore, when one observes such habits or symptoms it is wise to go to a dentist. Do not always self diagnose and worsen the situation even though it is not an emergency. Following this we will present to you the ways in which dentin hypersensitivity can be managed in the best way possible.

Now, let's get to know some similar dental conditions which a differential diagnosis for dentin hypersensitivity can be. In some

cases, sensitivity of teeth is confused with tooth pain. However, with a thin line of differentiation from pain, sensitivity can be a result or symptom of many other dental problems like tooth decay which needs extensive care and professional assistance by a dentist. Pain in a tooth region is more constant, prolonged and can aggravate in the night as well. Therefore, many diagnostic tools are used to reach to the conclusion that the case is of dentin hypersensitivity and this job can be proficiently done by a clinician.

The practitioners need to rule out conditions like cracked tooth syndrome, caries, defective restorations, trauma due to occlusion of teeth, postoperative sensitivity, atypical facial pain which can be referred to teeth, hypoplastic enamel or pulpitis. There are a set of diagnostic protocols and tools available to assess the condition which will be elaborated underneath.

- An appropriate medical and dental history of the patient is necessary.
- The source of the pain or sensation, its nature should be assessed.
- Dietary and oral hygiene habit history is also important.
- The patient's response to various stimuli like thermal, mechanical, electrical and chemical is also checked.
- For mechanical also known as tactile: sharp tipped instrument or mechanical stimulator is used.
- For chemical also known as osmotic: hypertonic solution, cold air or water stimulation is done and response is assessed.
- For electric methods, electric pulp testers are used.
- To gauge the apparent severity some scales like verbal rating, visual analog scale, Mc Gill questionnaire are quite popularly used.

### Treatment measures for dentinal hypersensitivity

#### Depending on the mode of administration

##### At home desensitizing agents

- Anti Sensitivity or Desensitizing toothpastes available over the counter are the first step in routine management of sensitivity. It is the most effective and least invasive method. Apart from this, toothpowders or mouthwashes are also available
- The ideal requisites of a desensitizing agent like a toothpaste should be that it should be non toxic to living oral tissues, non irritating and pleasant in taste as well. It should act without taking much time and be easily available for use.

- Directions for use: For instant relief, apply directly to the sensitive area of teeth with finger tip and massage gently for 1 minute, once a week. Apart from this, apply a pea sized amount to a soft bristled toothbrush and brush all the sensitive teeth twice daily. Do not swallow and rinse immediately for safety purposes.
- Use these toothpastes only for 15 days to 1 month and discontinue if sensitivity reduces. However, if there is no relief, then consult a dentist as the sensitive teeth may indicate an underlying problem that may need prompt care as mentioned above.
- When the available desensitizing toothpaste in market are not working, then the next step indeed is clinical care of the problem in a focused way.

#### In-office clinical management

When the etiologic agent is identified and causes are categorized treatment is planned accordingly. Based on mechanism of action of the chemical agents applied by the dentists in a clinical set-up, the following measures are undertaken:

- Nerve desensitization: Potassium nitrate is one agent which renders the nerve endings of the tooth less sensitive or less responsive.
- Precipitation of protein: Glutaraldehyde, Silver nitrate, Zinc chloride, Strontium chloride. These chemicals can form a precipitate of protein over the exposed areas of dentin and eventually defer the process of sensitivity.
- Plugging of dentinal microchannels: Strontium acetate, Sodium fluoride, Stannous fluoride, Arginine based products. These are the most widely used components and popular in terms of managing this condition. The dentinal tubule openings on the surface will be plugged with these compounds and help in reducing the symptoms.
- Dentin adhesive sealers: Fluoride varnishes, Resins, Glass ionomer cement, Composites. They just create an external barrier layer over the exposed areas.
- These chemical agents are applied to the sensitive sites tip using a brush or a rubber tip quite gently and may require a few definite appointments.
- Lasers: Nd-yag, He-Ne lasers. This treatment modality should be used in severe cases. It is an advanced technique, newer in market but used less frequently due the cost involved.
- Anti-inflammatory corticosteroids and bioactive glass are also used often.

- Flouride iontophoresis: With a fixed percentage of sodium fluoride it is also an advanced method of treatment in which ionic drugs are induced into the teeth for therapeutic purposes.
- Nano dentistry: In this procedure, nanorobots are delivered to site of sensitivity and the chemical agents are delivered locally and effectively. It demands extreme skill and high cost, therefore will take a long time to come into the market.
- Homeopathy: Propolis and Plantago can be used. These are rich in flavonoids, hence are anti-inflammatory and help in healing.
- Recent trends are looking into potential avenues to remineralize the tooth structure exposed or lost by increasing the calcium and phosphate levels and elevating the pH levels.
- Considering Root canal treatment in cases where at-home and in-office treatments were not effective or when a number of teeth display the symptoms for a long time should be considered after some serious contemplation and patient's approval. It should not be the go to treatment step for making money as it is against ethics.
- Researches are on continuously as to how to tackle and bring the best relief to the patient for this common and widespread condition.
- Avoid picking or scratching the gumline with a sharp object like a toothpick.
- Avoid the use of abrasive tooth pastes and ones which do not contain fluoride. Try using mouthwashes which also contain fluoride.
- Dentinal hypersensitivity can recur and definitely can be an issue with no final solution. Therefore, consistent and continuum of care is essential.
- Be conscious of the diet you take and avoid acidic food and beverages.
- If the dentist suspects underlying systemic or general conditions and diseases while diagnosing and treating sensitivity then do follow up with a general medicine doctor.
- Do not undermine dental issues and defer them for months.
- Afterall, it is very rightly and aptly said oral health is the mirror to the overall health of the individual.
- Follow up and feedback is necessary in dental treatment. Therefore, never fear or shy away from them.

Thus, maintain proper oral hygiene and visit your dentist regularly for routine checkups and battle dental problems like sensitivity like a boss!.

#### Some footer notes

Dentin hypersensitivity is a diagnosis of exclusion where confirmation is possible when all other dental conditions have been eliminated [1-3].

As we all know prevention is better than cure, implementing preventive measures is the best way to curb this dental condition. Here are some useful tips which can help you maintaining good oral hygiene and stay away from this menace of dentin hypersensitivity.

- Avoid overbrushing with excessive pressure in horizontal direction and for long duration. The maximum recommended time is 2-3 mins.
- Use a soft bristled brush and change it every 3-4 months. Avoid medium to hard ones.
- Floss regularly following the correct technique but do not over floss and use interdental cleaning devices without the need.
- Avoid brushing immediately after intake of acidic drinks.
- Learn the correct method of brushing eg. Modified Bass or Stillman's according to the dental health of one's oral cavity.

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