INTRODUCTION
Dentinal hypersensitivity (DH) is characterized by short sharp pain arising from exposed dentine in response to stimuli typically thermal, evaporative, tactile, osmotic or chemical and which cannot be ascribed to any other form of dental defect or pathology.\[1\] Others terms to describe DH have been created by substituting the word dentinal, adding site descriptors, such as cervical or root, and combining this with either hypersensitivity or sensitivity.\[2,3\] DH is a painful clinical condition that affects 8 to 57% of the adult population. This is, in turn, activates nerves located on the pulpal aspect of the tubules, resulting in the generation of action potentials which are interpreted as pain by the patient.\[7,8\]

Before considering any treatment strategy for the management of DHS, it is important to elicit through case history and perform clinical examination to exclude risk factors overenthusiastic brushers. Periodontal treated patients, Bulimics, People with xerostomia, High-acid food/drink consumers, Older people exhibiting gingival recession and Chewing ‘smokeless’ or ‘snuff’ tobacco. Many substances have been advocated for the treatment of dentinal hypersensitivity pain with numerous clinical trials reporting their apparent efficacy. Attempts to reduce dentinal hypersensitivity have been aimed at either reducing the excitability of the nerve fibers within the pulp or occluding the open dentinal tubules. In the tubular occlusion approach, the tooth is treated with a concentrate in the interior of the dentinal tubules, causing a depolarization of the cellular membrane of the nerve terminal and a refractory period with decreased sensitivity.\[10\]

MATERIALS AND METHODS

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ABSTRACT

**Background:** Dentinal hypersensitivity (DH) is a painful response of a tooth to irritants such as toothbrushing, sweet or sour foods, and thermal changes. It is a cumbersome condition both for the patient and the dental care providers as well. **Aim:** to compare the clinical efficacy of four different commercially available dentifrices in the management of dentinal hypersensitivity. **Materials & Methods:** A total of 160 patients clinically diagnosed with dentinal hypersensitivity (93 males and 67 females) participated in this study. The participants were randomly divided into four groups: Group 1 - toothpaste containing 5% potassium nitrate; Group 2 - toothpaste containing 5% fluoro calcium phosphosilicate; Group 3 - toothpaste containing 10% strontium chloride; and Group 4 - a herbal formulation. The patients' DH scores for tactile, thermal, and evaporative stimuli were recorded on a visual analog scale at baseline, 2 weeks, 1 month, and 2 months. **Results:** Symptoms of dentinal hypersensitivity were reduced in all four groups. However, group 2 showed a better clinical response. **Conclusions:** The dentifrice containing fluoro calcium phosphosilicate is more efficacious in managing dentinal hypersensitivity.

This research was conducted in the city of Nepal with patients from the Universal college of dental sciences Bhairahawa, Nepal, after being approved by the institution's Ethics Committee. The patients signed Informed Consent and were informed of the characteristics and conditions of the research. Inclusion criteria were individuals with hypersensitivity to hot, cold, or sour stimuli on facial surfaces of at least two posterior teeth, good periodontal health (no probing depth >4 mm), and with no other conditions that might explain their apparent DH, aged between 20 and 60 years. Exclusion criteria were chipped teeth, defective restorations, fractured teeth, deep dental caries, orthodontic appliances, dentures, or bridgework that would interfere with the evaluation of hypersensitivity; periodontal surgery within the previous 6 months; ongoing treatment with antibiotics and/or anti-inflammatory drugs; ongoing treatment for tooth hypersensitivity; pregnancy or lactation; uncontrolled metabolic diseases; major psychiatric disorders; and heavy smoking and alcohol or drug abuse. The teeth were isolated with cotton rolls, and stimuli (sharp dental explorer, air blast test and cold water spray) were applied in each tooth according to a standard methodology. Sensitivity was measured using a 10 cm VAS, with a score of zero being a pain-free response and a score of ten being excreuciating pain or discomfort. The four kinds of toothpaste studied were

1. (1) Group 1 - a commercially available toothpaste containing 5% potassium nitrate (RA Thermosteel, ICPA Health Products Ltd., Ankleshwar, India)
2. (2) Group 2 - a commercially available nonaqueous toothpaste containing 5% fluoro calcium sodium phosphosilicate with fused silica (Elsenz, Group Pharmaceuticals, Hyderabad, India)
3. (3) Group 3-10% SC (Thermosteel, ICAP Health Products Ltd., Ankleshwar, India)
4. (4) Group 4 - a herbal toothpaste (Dantkanti, Patanjali Ltd India) which has herbal extracts such as neem, babul, tomar and pudina

The cases were randomly divided into four groups of forty subjects each. Each group was provided with one of the test dentifrices in its blind package. Each patient was advised to brush their teeth in the usual manner for 3 min, twice daily, with soft bristle toothbrush, and to apply the dentifrice in an amount equal to about half the length of the bristle head. They were also instructed not to eat or drink anything within half an hour of brushing with the dentifrices. They were recalled at 1 week, 1 month, and 2 months for the assessment of tooth sensitivity. During the study period, the use of other oral hygiene products as well as any other dental treatment for hypersensitive teeth was not permitted. Drugs that may alter the

**KEYWORDS:** Dentinal hypersensitivity, sensitivity, visual analog scale, desensitizer, Calcium fluoro phosphosilicate, , herbal, potassium nitrate, strontium chloride.
reducing dental hypersensitivity symptoms. Potassium nitrate, strontium chloride, or a herbal dentifrice in group showed significantly better results compared to either

CONCLUSION

More numbers of clinical trials done over a larger population are essential in future to find out best treatment strategy. In the present study, no control group or placebo was included, thus there is possibility of biased results. There is possibility of biased results. More numbers of clinical trials done over a larger population are essential in future to find out best treatment strategy.

DISCUSSION

There are varieties of treatment regimens recommended over the years to cure dentinal sensitivity. Particular attention has been focused on home use dentifrices containing various active compounds, which act by either blocking the hydrodynamic mechanism or the neural response.[7] This study compared four commercially available dentifrices. Findings of the present study indicate that the efficacy of toothpaste containing fluoro calcium phosphosilicate is comparatively better than the other toothpastes. The toothpaste in group 2 offers long lasting relief and protection from dentinal hypersensitivity in following four steps:

1. Step 1: Chemical Bonding: its particles chemically bind to the tooth surface
2. Step 2: Release of minerals: components slowly dissolve to release calcium, phosphate and fluoride ions into saliva.
3. Step 3: Rapid Apatite Formation: ions precipitate and crystallize to form fluorohydroxyapatite over dentin surface and within dentinal tubules. These highly acid resistant crystal provide deep occlusion within dentinal tubules

Limitations and Future prospects of the study

In the present study, no control group or placebo was included, thus there is possibility of biased results. More numbers of clinical trials done over a larger population are essential in future to find out best treatment strategy.

CONCLUSION

This study demonstrated that the fluoro calcium phosphosilicate group showed significantly better results compared to either potassium nitrate, strontium chloride, or a herbal dentifrice in reducing dental hypersensitivity symptoms.

**RESULTS**

This parallel double blind randomised control trial included 160 cases (93 males and 67 females of mean 36.9 ± 10.8 years). No cases of drop-outs or adverse effects were noted. Mean VASs for tactile, air, and cold-water stimulus for all groups at baseline, 2 months, 1 month, and 2 months are shown in Table 1. Intragroup comparison showed that all groups recorded a significant improvement from baseline to 2 months. No significant difference between groups at baseline was found for tactile, air, and cold-water stimulus [table 1].

Results of Intergroup comparison revealed that Group 2 resulted in more improvement at all-time intervals compared to the other groups for all stimuli. Group 1 did not show any statistical significance with Group 3 except for the tactile stimulus test. Although Group 1 showed no statistical difference with Group 4 at 2 weeks, Group 1 fared consistently better than Group 4 at 1 month and 2 months recalls. Group 3 and Group 4 exhibited significant differences at 2 weeks and 1 month, but over a 2 months recall, Group 3 and Group 4 did not show a statistical difference for tactile and cold water stimulus.

**REFERENCES**


**Table 1: Intra-group comparison of sensitivity scores**

<table>
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<tr>
<th>Toothpaste group</th>
<th>Baseline</th>
<th>2 week</th>
<th>1 month</th>
<th>2 month</th>
<th>P value</th>
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<tr>
<td><strong>Tactile method</strong></td>
<td></td>
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<tr>
<td>1</td>
<td>4.81±0.62</td>
<td>3.90±0.98</td>
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<td>2</td>
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<tr>
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<td>3.54±0.75</td>
<td>2.20±0.45</td>
<td>1.65±0.24</td>
<td>0.001</td>
</tr>
<tr>
<td>4</td>
<td>4.59±0.21</td>
<td>3.70±0.34</td>
<td>3.02±0.23</td>
<td>2.00±0.91</td>
<td>0.001</td>
</tr>
</tbody>
</table>

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