

Desensitizing Efficacy of a Herbal Toothpaste: A Clinical Study

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ABSTRACT

Aim: This double-blinded randomized parallel-group comparison study aimed to investigate the efficacy of an herbal desensitizing toothpaste (test group) compared to a 5% potassium nitrate toothpaste (control group) and a base toothpaste (benchmark group), with respect to dentine hypersensitivity.

Materials and methods: Ninety healthy participants were arbitrarily allotted into three groups. All subjects received instructions on oral hygiene using a toothbrush with these toothpastes for a 4-week period. The subjects were evaluated at baseline, week 2, and week 4. During the visits, two hypersensitive teeth were assessed using two validated stimulus tests: a tactile test and an airblast test. Data on the percentage of positive responses to the tactile stimulus and visual analog scale (VAS) scores for air stimulation were analyzed.

Results: The mean airblast VAS score and percentage of positive responses to the tactile stimulus after using the test and control toothpastes were significantly reduced compared with the benchmark. At week 4, the airblast VAS score and percentage of positive responses to the tactile stimulus decreased significantly in the test and control groups ($p < 0.01$), whereas the scores in the benchmark group decreased slightly.

Conclusion: After 4 weeks of use, the herbal desensitizing toothpaste significantly diminished dentine hypersensitivity to the same extent as did the synthetic desensitizing toothpaste.

Clinical significance: An herbal desensitizing toothpaste can reduce dentine hypersensitivity, supporting its usefulness in clinical practice.

Keywords: Clinical trial, Dentine hypersensitivity, Herbal toothpaste, Potassium nitrate.

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INTRODUCTION

Dentine hypersensitivity is well defined as a common unpleasant pain arising from dentine exposed to a variety of stimuli, which cannot be attributed to any forms of dental pathology.¹ The reported prevalence of dentine hypersensitivity varies from 3 to 57%.²⁻⁴ Some risk indicators have been identified as contributing factors, e.g., abrasive toothpaste, gingival recession, and post periodontal treatment status.⁵ The mechanism of dentine hypersensitivity is described with the hydrodynamic theory by Brännström.⁶ The movement of dentinal tubule contents by increasing outward fluid flow causes pressure change across the dentine, which results in A-delta fiber distortion via a mechanoreceptor action.⁷ The preventive management strategy for hypersensitivity should aim to minimize dentine exposure, for example, through proper brushing techniques, unaggressive periodontal instrumentation, and limiting the frequency of acidic beverage consumption. Desensitizing toothpaste has been suggested as a home care application to relieve the pain from hypersensitivity. The mode of action can be either nerve stabilization or tubular occlusion. Synthetic active components such as strontium chloride or sodium fluoride can interact with dentine and cause dentine precipitation.⁸ Toothpaste that contains potassium salts has a depolarizing effect on electrical nerve conduction along nerve fibers, causing dentine to be less excitable by stimuli.⁹

This project aimed to examine the efficacy of an herbal desensitizing toothpaste on dentine hypersensitivity with 4 weeks of home use compared to the efficacy of a 5% potassium nitrate toothpaste and a base toothpaste not containing these active agents.

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MATERIALS AND METHODS

Study Design and Population

The protocol for the human study was approved by the Ethical Committee of the Research Institute of Rangsit University (Project number RSEC 2/2559). The study was carried out at the College of Dental Medicine, Rangsit University, Pathum Thani, Thailand. The subjects were required to have at least twenty permanent teeth with a hypersensitive area on the facial or lingual surfaces of the teeth (incisors, cuspids, bicuspid, first and second molars with exposed cervical dentine) with a minimum of two teeth showing a painful response elicited by both a dental explorer and an airblast. Moreover, the subjects had to (1) have good periodontal health (no probing depth exceeding 4 mm and no bleeding on probing); (2) have received nonsurgical periodontal treatment longer than