EFFECTIVENESS OF TWO DIFFERENT DESENSITIZING VARNISHES IN REDUCING TOOTH SENSITIVITY: A RANDOMIZED DOUBLE-BLIND CLINICAL TRIAL

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SUMMARY
Purpose. The aim of this study is to evaluate and compare the effectiveness of two different desensitizing varnishes.
Materials and methods. Ninety healthy adults suffering from tooth sensitivity were divided into three groups. Two different varnishes were used for the study: Fluor Protector S, containing 7700 ppm fluoride (group I), and Cervitec F, containing 1400 ppm fluoride and 0.3% chlorhexidine (group II). A placebo containing water and ethanol was applied for the third group. Tooth sensitivity was collected according the Schiff' scale at baseline and after 30 and 90 days.
Results. Group I and group II improved with statistically significant results. Group III did not show any improvements.
Conclusions. Desensitizing varnishes are a valid treatment for tooth hypersensitivity.

Key words: fluoride, tooth sensitivity, desensitizer.

Introduction

Cervical dentine sensitivity can be defined as a short painful response to an external stimulus (thermal, chemical, tactile) applied to the buccal surface around the cervical region of the tooth (1-3). Discomfort from dentine sensitivity is a common finding in adult populations, with the available prevalence data ranging from 8 to 57% (1, 2). Although several hypotheses have been expressed to explain how external stimuli may influence the nerve fibers, the most widely accepted is the hydrodynamic theory (3). The movement of the dentinal fluid within the dentine tubules transduces surface stimuli by deformation of pulpal mechanoreceptors, causing pain and hypersensitivity (4).

Also plaque accumulation seems to have an important role, invading dentinal tubules causing decalcification of peritubular dentine and the consequent enlargement of tubules, leading to dentine hypersensitivity (5-7).
The painful response does not necessarily reflect a clinical situation of enamel and/or dentine and/or gingival loss. The fact is that the symptom does not correspond to a clinical sign: the patient feels but the clinician does not see.
Tooth sensitivity can be achieved also in different situations (8-11). Many different treatments have been proposed, both in office and at home, including lasers, fluoride ionophoresis, fluoride application, tubule sealants, toothpastes and mouthwashes. An effective therapy can be offered by varnishes: creating a mechanical barrier, they seal dentinal tubules and can release dif-

ferent desensitizing agents without adverse effects. Varnishes used nowadays can contain fluoride, a substance known for its properties to prevent tooth decay. A new formulation that combines fluoride with chlorhexidine, an antimicrobial agent, seems to be promising in the symptoms control and remission.
The aim of this study was to evaluate and compare the effectiveness of 2 different desensitizing varnishes in controlling tooth sensitivity on vestibular gingival recessions.

Materials and methods

Ninety healthy adults suffering from tooth sensitivity were recruited for the study. This study was approved by the local ethical committee and conducted according to the Declaration of Helsinki.
Inclusion criteria: age >18 years and in general good health with minimum of two hypersensitive teeth. Subjects were required to be available for the duration of the study, and to sign an informed written consent form.
Exclusion criteria**:** history of periodontal diseases and/or dental decays during the six months before, patients wearing orthodontics and/or prosthodontics, endodontically treated teeth, restored teeth, gingival recessions >3 mm, patients taking NSAIDs, antibiotics, psychoactive drugs and others drugs with possible desensitizing effects.
Patients were divided into three groups of 30 patients each using a dedicated randomization software (https://www.randomizer.org).

Clinical protocol

A blinded operator asked for teeth sensitivity to each patient. A professional oral hygiene treatment including airpolishing (Mectron Turbodent) with glycine powder <63 µm (Mectron Glicyne powder) and supragingival ultrasonic scaling with universal tip (Mectron S1) using the "soft mode" setting of the scaler (Mectron Multipiezo pro) was performed to all enrolled patients. Schiff test was used to evaluate teeth sensitivity (12). It consists in the application of a stimulus using air/water syringe from 1 cm with 45-60 psi for 1 second.
The answers were collected according to the Schiff's scale:
0= no pain;
1= mild pain;
2= pain reaction of the patient evident to the operator;
3= trying of pushing away the syringe.
The blinded operator selected the tooth with the highest value. This tooth was treated using the subsequent protocol.
Two different varnishes were used for the study (both from Ivoclar Vivadent Schaan, Liechtenstein): Fluor Protector S, containing 7700 ppm fluoride (group I), and Cervitec F, containing 1400 ppm fluoride and chlorhexidine (group II). A placebo containing water and ethanol was applied for the third group.
Varnish or placebo was applied to the buccal surface of each selected tooth by a blinded operator. The teeth were dried off with a cotton pellet and air, then the varnish was applied with a dental brush for 30 seconds, to allow penetration of varnish into the dentinal tubules. Patients were advised not to eat for three hours and not to brush their teeth on the day of application.
Patients were asked to brush at home twice per day for two minutes with a medium bristles toothbrush (Gum Technique Pro Compact Medium) without any toothpaste to avoid bias via a second source of fluoride for the whole study period.
After one and three months, selected teeth were re-evaluated for sensitivity and the Schiff score recorded. An application of varnish was performed after each control session.
Sometime local anesthesia can be used for professional dental hygiene but it may have relevant side effect (13-16) and severe complications (17).
Side and adverse effects were recorded for the duration of the study.

Statistical analysis

A different operator evaluated the results and carried out statistical analysis. T-test for paired data was applied ($p<0.05$).

Results

All the 90 subjects completed the study. The mean age was 41±10.5 years with a female/male ratio of 0.8/1. In group I the mean age was 46.5±12.2 years with a female/male ratio of 0.9/1. In group II the mean age was 51.4 ± 9.07 years with a female/male ratio of 0.9/1. In group III the mean age was 47.8±10.5 with a female/male ratio of 0.6/1. No statistical differences in age and sex were recorded between the three groups.

Group I showed a Schiff test score mean at baseline of 2.3. After 30 days it was 1.4 and after 90 days it decreased to 0.5. Both the values showed a statistically significant reduction compared with baseline ($p<0.0001$). Evaluation of group II revealed a statistically significant reduction in hypersensitivity after 30 days compared with baseline ($p<0.0001$) and after 90 days compared with baseline ($p<0.0001$). The mean Schiff values were 2.5 at baseline, 1.7 after 30 days and 0.5 after 90 days.

Group III did not show any significant decrement of Schiff score values during the study period ($p=0.0831$ at T30, $p=0.2927$ at T90). Schiff score at baseline was 2.4, after 30 days was 2.2 and after 90 days was 2.3. No statistically significant differences were found (Figure 1).

Comparing Schiff's scores of group 1 and group 2 at baseline and at T90, no statistically significant differences were found.

No adverse or side effects were noticed or recorded. In Table 1 are reported the statistical data of the present study.

Discussion

There are various methods used for the treatment of dentin hypersensitivity obliterating the dentinal canaliculi. Dentinal tubule sealing can be secured with the use of restorations, dental adhesives or the formation of a smeared dentin surface.

Considering plaque accumulation in the etiology of dentin hypersensitivity due to progressive tubules' enlargement, the addition of chlorhexi-

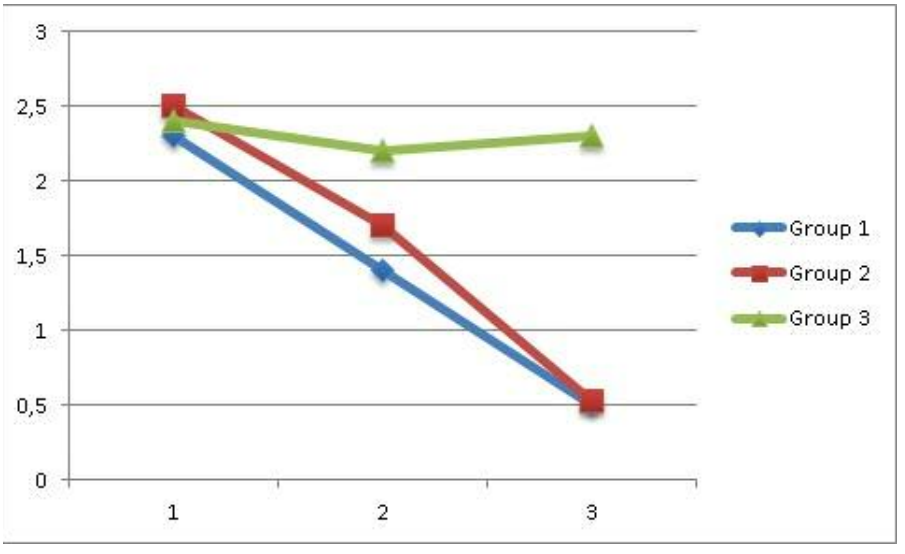

Figure 1
The variation of Schiff's values of the groups at the three different time-points of observation.

Table 1 - Schiff test scores in three groups at baseline, after 30 and 90 days.

	Demographical data			Schiff score (mean)			p values	
	n. of patients	F/M ratio	Mean age	Baseline	After 30 days	After 90 days	Baseline *vs* 30 days	Baseline *vs* 90 days
Group 1 (Fluor Protector S)	30	0.9/1	46.5 ±12.2	2.3	1.4	0.5	<0.0001	<0.0001
Group 2 (cervitec F)	30	0.9/1	51.4 ±9.07	2.5	1.7	0.53	<0.0001	<0.0001
Group 3 (placebo)	30	0.6/1	47.8 ±10.5	2.4	2.2	2.3	<0.0831	<0.2927
Total/mean	**90**	**0.8/1**	**41 ±10.5**	**2.4**	**1.8**	**1.1**		

dine to fluoride seems to be effective in reducing symptoms, playing an anti-plaque and an antibacterial role. A study conducted comparing Cervitec Plus with a glutaraldehyde varnish (5) revealed that Cervitec Plus was more effective after 4 and 12 weeks. Cervitec Plus was shown to be effective also at 120 days follow-up (18).

Our study confirms that chlorhexidine in combination with fluoride is effective, but not the only alternative to reduce hypersensitivity.

In our study two different varnishes containing various percentage of fluoride were used. Solvents of the varnish evaporate when applied, leaving a thin layer of material covering the exposed tooth surfaces. Our results seem to confirm that the mechanism of action is the deposition of calcium fluoride on the tooth surface, with the formation of fluoroapatite. This mineral is able to seal completely dental tubules and to promote a secondary dentin surface (19).

This study has several strengths including the homogeneity of the data, which were achieved by including patients with similar sensitivity and the careful collection of data over the experiment. However, this study has some limitations, such as the small sample and the short follow-up period.

Desensitizing varnishes are a valid treatment for tooth hypersensitivity but further controlled and randomized clinical trials are necessary to better evaluate the potentiality and the limits of this procedure.

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