# DENTINAL HYPERSENSITIVITY IN ADULT POPULATION IN IASI - COMPARATIVE STUDY ON TREATMENT EFFICACY

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**Abstract**:

Dental hypersensitivity is a frequent condition found in the adult population, and it is defined as a pain which appears as a result of the action of a chemical, thermal or tactile stimulus, with a short duration of time . The most frequent causes of dental hypersensitivity are: sensitivity post whitening procedure, gingival recession, abrasion, enamel and dentinal erosion. The use of different desensitizing substances aims to obliterate the exposed dentinal tubules and reduce pulpal sensitivity. The aim of this study is to comparatively evaluate the effectiveness of two fluoridation products (gel and varnish) to reduce dentinal hypersensitivity. Matherial and methods: The study was conducted at the "Grigore T. Popa" Univeristy of Medicine and Pharmacy, Dental Faculty of Iasi, Romania, Discipline of Oro-Dental Prevention. The study had a duration of 6 weeks, on a group of 30 subjects aged 18 to 70 years with dental hypersensitivity. Tactile and cold hypersensitivity was determined. Subjects were divided into 3 groups for each group using a specific type of fluoridation product: group 1- Placebo (chlorhexidine gel - oral Elugelgel, 40 ml (Pierre Fabre), group 2 - Fluoride Protector Gel 20g (Ivoclar, Liechteinstein), group 3- Profluorid Varnish Single Dose 0.40ml (Voco GmbH, Germany). Results: The results of our study show a decrease in sensitivity to the groups in which fluoridation was performed compared to the placebo group. Regarding the reduction of sensitivity compared to gels and varnishes, it was observed that the use of varnish determined a more significant reduction of sensitivity compared to the gel even after the second application. Conclusions: The desensitizing agents used in the current clinical trial have been shown to be effective in reducing dental hypersensitivity with a statistically significant reduction in pain compared to the placebo group, and varnish has been shown to be more effective in reducing dentinal sensitivity compared to the gel tested.

**Keywords:** Dental hypersensitivity, desensitizing substances, varnish, gel

## Introduction

Dental hypersensitivity, in its many forms, (1) is a condition commonly found in the adult population (common in subjects aged 20-30 years) (2), more common in women than in men (3) is defined as pain which appears as a result of the action of a chemical, thermal or tactile stimulus, with a short duration of time (4). The causes of dental hypersensitivity are multiple: after the teeth whitening procedure (5,6), the gingival recession after an extremely aggressive brushing, especially the one made with hard toothbrushes (7), abrasion (8), enamel erosion and dentin after chronic acid consumption or in patients with gastroesophageal reflux disease (9,10). Treatment options for dentinal hypersensitivity include the use of preventive (fluoridation) and curative means. The use of desensitizing substances in order to obliterate the exposed dentinal tubules and reduce pulpal sensitivity is the most approached treatment option although the results are not persistent over time, so it is up to the clinician to determine the most satisfactory and effective treatment for patients with dental hypersensitivity (11 12). There are several in vivo studies to date that have attempted to evaluate the effectiveness in reducing dentinal sensitivity by using professional means of fluoridation (gels, fluoride

varnishes (13,14). The purpose of this study is to comparatively evaluate the effectiveness of two fluoridation products (gel and varnish) to reduce dentinal hypersensitivity.

**Material and method**

The study was conducted at the Discipline of Oro-Dental Prevention in a period of 6 weeks on a group of 30 subjects with dental hypersensitivity.The criteria for inclusion were as follows: subjects aged 18 to 70 years, in good health, with at least 3 teeth with cold or hot dentinal sensitivity or palpation with a probe and gingival recession and the teeth must not show tooth mobility, periodontal disease or coronary restorations or tooth decay.The exclusion criteria were: subjects with dental pathologies whose pain resembles that of dental hypersensitivity (such as dental caries, the presence of orthodontic appliances, physiognomic restorations and surgery performed on the tooth area more than 3 months), patients who have already received treatment with desensitizing agents in the last 6 months, subjects who have received medication in the last 30 days, subjects who are pregnant or breastfeeding subjects with systemic disease or a history of bleeding.

For the evaluation of hypersensitivity, we used a scale of hypersensitivity VAS (Analog Visual Scale): 0 - without hypersensitivity, 1 - mild hypersensitivity. 2 - moderate hypersensitivity, 3 - severe hypersensitivity (15).

Tactile hypersensitivity was determined using a sharp dental probe with the tip of which touched surfaces with increased sensitivity. The cold sensitivity was determined by removing the air jet provided by the air spray of the dental unit on the sensitive surfaces in the same way proceeding with the cold water jet at a distance of 0.5 cm. All stimuli were applied on the cervical region of the evaluated teeth and the adjacent teeth were isolated with cotton rolls and a suction device. We did not extend the application time of the air jet and contact with water more than was necessary to obtain a response. Subjects were divided into 3 groups for each group using a specific type of fluoridation product: group 1- Placebo (chlorhexidine gel - oral Elugelgel, 40 ml (Pierre Fabre), group 2 - Fluoride Protector Gel 20g (Ivoclar, Liechteinstein), group 3- Profluorid Varnish Single Dose 0.40ml (Voco GmbH, Germany). After recording the first scores, subjects were randomly assigned to one of the treatment groups or the placebo group. The manufacturer's instructions have been followed. Two coats of product were applied and repeated after 5 minutes. This was done to ensure adequate desensitization, due to the thin film produced by these materials. All patients were instructed not to brush their teeth or eat for 3 hours after treatment. Reassessments were performed at 2, 4 and 6 weeks.

Statistical analysis was performed using the SPSS informatics program for Windows 20.0. The collected data were analyzed separately for the 3 types of determinations. Comparisons were made between groups and between stages.

**Results**

The study group had an average age of 33.63 years (minimum age 20 and maximum age 58 years), 53.3% of them being female and 46.7% male, most of the participants in the study came from urban areas (tab .1).

**Table 1. Gender distribution**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Female | **16** | **53.3** |
| | Male | **14** | **46.7** |
| | Total | **30** | **100.0** |
| | Urban | **23** | **76.7** |
| | Rural | **7** | **23.3** |
| | Total | **30** | **100.0** |

When tested with air, the results of the analysis showed that there are changes in the scores recorded for dentinal hypersensitivity. For Group 1- Placebo there were no differences because the product used does not have desensitizing properties (fig.1). The differences between the groups appear, these being small between groups 1 and 2 but significantly larger between the first 2 groups and the third group (fig.2 and 3). For group 2 the decrease in dentinal sensitivity values was significant compared to the values recorded in group 1 especially in weeks 4 and 6. There were 4 subjects who in the 4th week showed higher scores for dentinal sensitivity compared to week 2. (Figure 2)

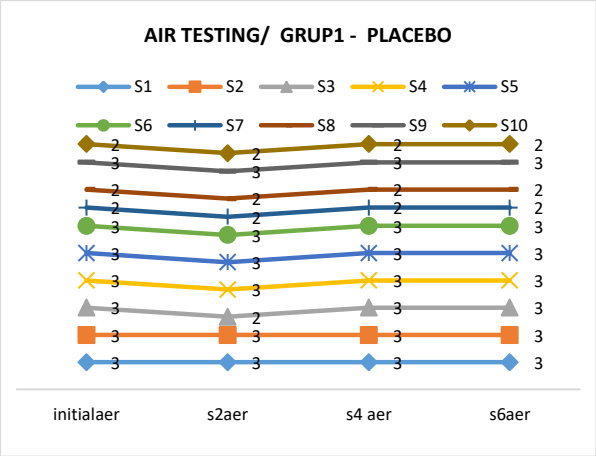


**Figure 1. Values recorded for group 1 in air testing**

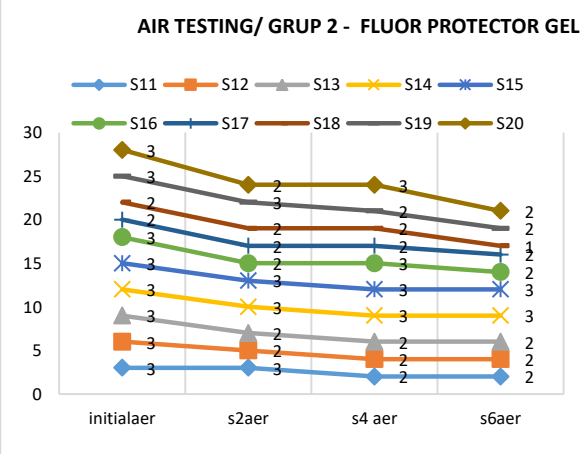


**Figure 2. Values recorded for group 2 in air testing**

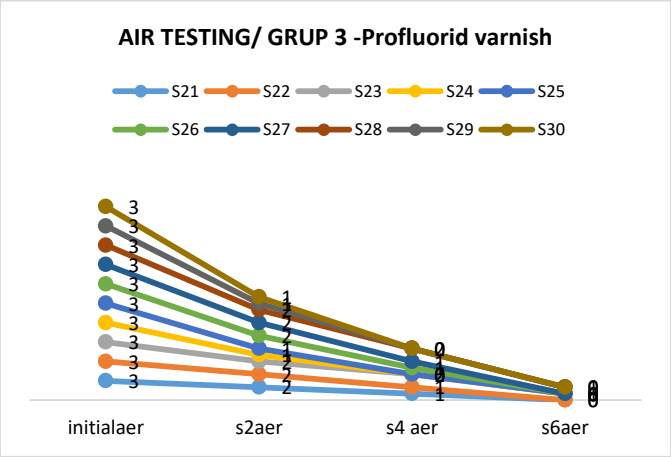


**Figure 3. Values recorded for group 3 in air testing**

In air testing, the largest decreases in sensitivity values were recorded in group 3, these decreases being significant especially between the initial stage and the

evaluation at 2 weeks, so that in week 6 most subjects no longer show dentinal sensitivity (fig.3).

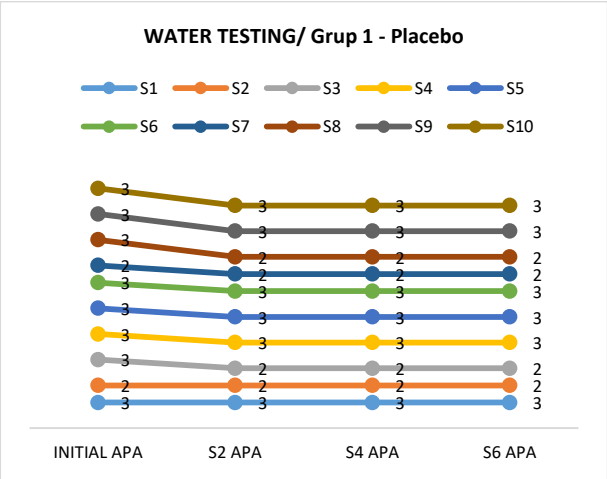


**Figure 4.**
**Values recorded for group 1 in the water test**

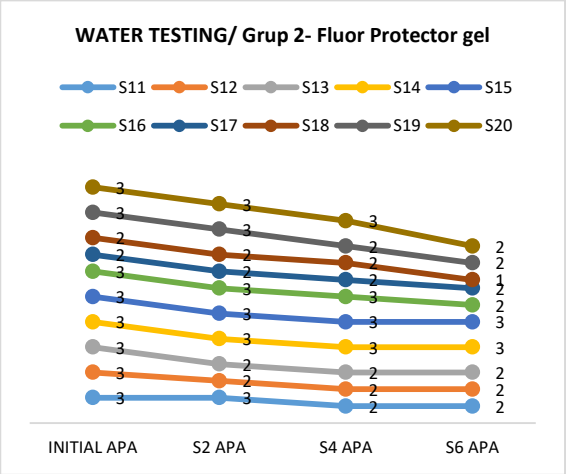


**Figura 5.**
**Values recorded for group 2 in the water test**

When testing the sensitivity with the help of water, the results of the statistical analysis indicate a maintenance of the sensitivity for group 1 during the 6 weeks (fig.4).

For group 2, the decrease in water sensitivity occurred slowly, being evident only in the evaluations from week 4 and 6. In general, the sensitivity values in week 6 are higher compared to the results obtained by group 1 (fig.5).

Regarding group 3, the water sensitivity decreased significantly faster than for the other 2 groups, the differences between the values recorded being large since the evaluation performed in week 2 reaching the value 0 in week 6 (fig.6).

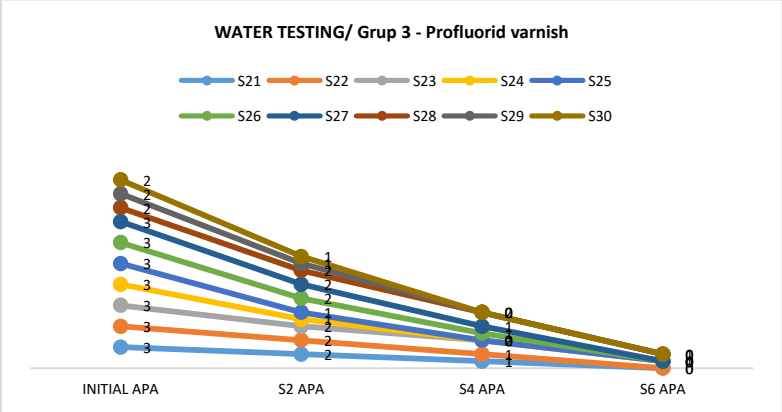


**Figure 6. Values recorded for group 3 in the water test**

When testing the dentinal sensitivity by palpation with the dental probe, the same tendency to decrease the sensitivity after the use of fluoridation products is generally observed, slower for group 2 and a significant decrease in the case of group 3. For group 1 there were no changes in values. for no stage (fig.7-9)

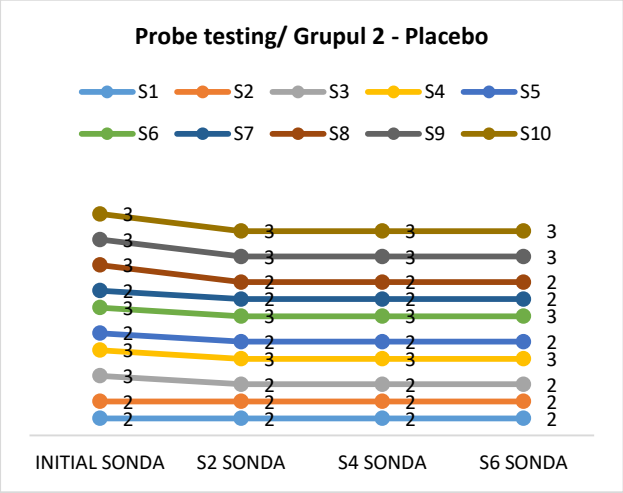


**Figure 7. Values recorded for group 2 in probe testing**

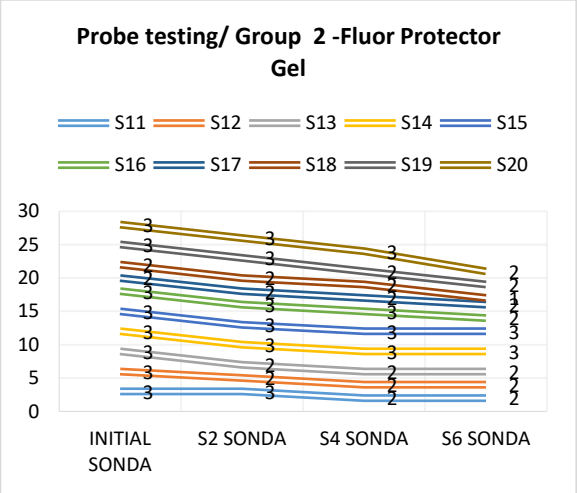


**Figure 8. Values recorded for group 2 in probe testing**

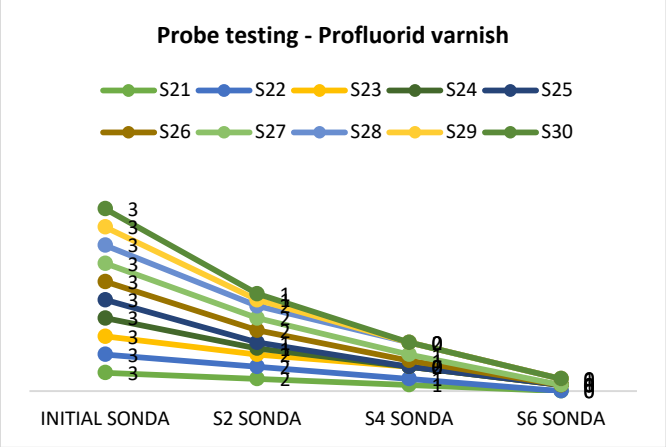


**Figure 9. Values recorded for group 2 in probe testing**

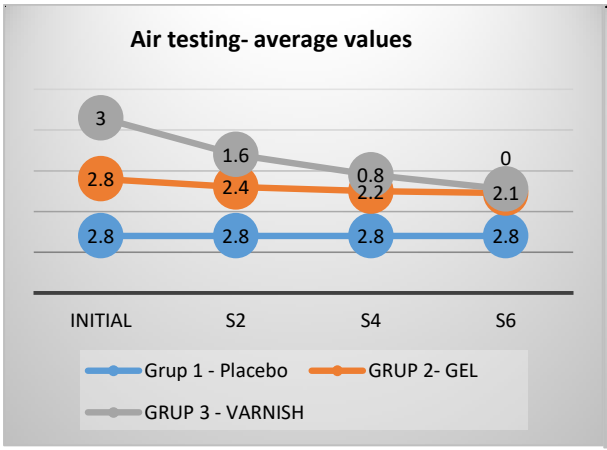


**Figure 10. The average values recorded at the air test for each stage for the 3 groups**

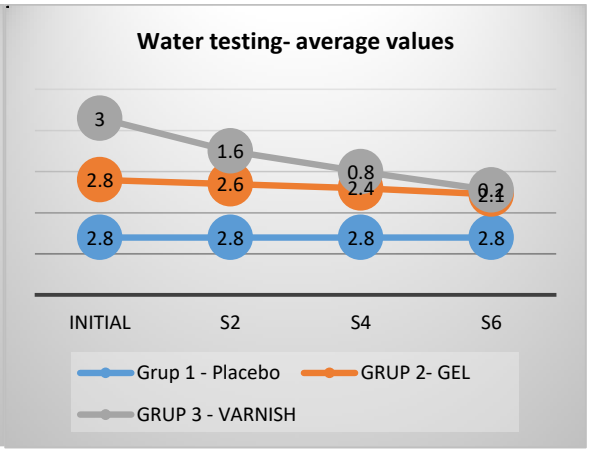


**Figure 11. The average values recorded at the water test for each stage for the 3 groups**

Figure 10 shows the evolution of the average values for the 3 groups in the air test. The values remained the same for group 1 because the product used does not contain fluorine. Regarding the average values obtained, it is observed that their decrease is obvious for groups 2 and 3 from the initial stage to 2 weeks where

there was a decrease from a value of 2.8 to 2.4 for group 2 and from 3 to 1.6 for group 3 while for group 3 the decrease in sensitivity is higher only at the assessment in week 4 when there was a decrease from 1.6 to 0.8 to finally reach the value of 0 (fig.14). Results are similar for testing water sensitivity.

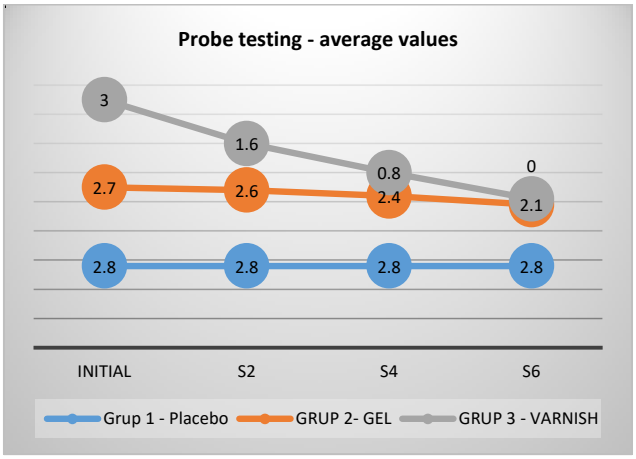


**Figure 12. The average values recorded at the air test for each stage for the 3 groups**

For the sensitivity test with the probe, the evolution of the sensitivity is approximately similar, the only difference being registered in the case of group 2 the initial value at the probe test is lower than at the previous tests (fig.12). For groups 1 and 2 the differences are statistically significant for the values recorded in the initial and final stage while for group 3 the differences are significant between the evaluation stages and between the initial and final stages (p <0.001) (tab.2)

Table 2. Mean values and statistical significance for each type of test

| | Initial value | Two weeks value | Four weeks value | Six weeks value | Statistical significance |
|---|---|---|---|---|---|
| **Air stimulation** | 2.87±0.42 | 2.17±0.65 | 1.60±0.93 | 1.13±0.86 | <0.001 |
| **Water stimulation** | 2.87±0.42 | 2.27±0.69 | 1.60±0.93 | 1.13±0.86 | <0.001 |
| **Probe stimulation** | 2.87±034 | 2.13±0.62 | 1.67±0.92 | 1.13±0.86 | <0.001 |

## Discussions

Dental hypersensitivity is one of the most common and uncomfortable conditions, affecting comfort and oral functions. Studies on the prevalence of cervical dental hypersensitivity have reported that 4% -57% of adults have this type of condition in one or more teeth. (16,17). Some epidemiological studies have shown a prevalence of 15-18% (18,19) but other studies have empathized with a score greater than 50% (20). Studies to date indicate that gels, mouthwashes and fluoride varnishes have a preventive effect on caries but also the prevention or treatment of dentinal hypersensitivity (21-

23). Regardless of the type of fluoridation product, dentinal hypersensitivity decreased in intensity, with a significant reduction in sensitivity according to the VAS evaluation scale for professional fluoridation products (Durapaht, Gluma, Seal & Protect, Vivasens, BisBlock) (24) or through the use of laser therapy (25) in reducing cervical dental hypersensitivity.

The results of our study show a decrease in sensitivity to the groups in which fluoridation was performed compared to the placebo group, results supported by those obtained in other studies in the literature, although the period was shorter (26-31).

Regarding the reduction of sensitivity compared to gels and varnishes, it was observed that the use of varnish determined a more significant reduction of sensitivity compared to the gel even after the second application, the results being comparable to those obtained in other studies in the literature (32-35).

## Conclusions

The desensitizing agents used in the current clinical trial have been shown to be effective in reducing dental hypersensitivity with a statistically significant reduction in pain compared to the placebo group, and varnish has been shown to be more effective in reducing dentinal sensitivity compared to the gel tested.

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