ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN-POLONIA
VOL. LX, N1, 22 SECTIO D 2005

Chair of Conservative Dentistry, Medical University of Lublin

MAŁGORZATA KLICHOWSKA-PALONKA, BARBARA MADEJCZYK, AGATA NIEWCZAS, ANIELA BOŻYK

Clinical treatment with Green Or in patients suffering from dentine hypersensitivity

Teeth hypersensitivity is a discomfort that occurs more often among adults. Its symptoms are: a nagging and sometimes a severe pain that appears while brushing teeth and consuming hot or cold food containing sugar or mild acids. It often manifests itself in the places where dentine is exposed and it goes together with erosion and abrasion.

There are several hypotheses that explain the mechanism of conducting impulses from the surface of dentine to the pulp cells. Brannstrom's theory (hydrodynamic theory of dentine hypersensitivity) that is currently accepted says that the impulses in the shape of thermal or osmotic stimulation are transmitted by the movement of liquid in dental tubules to nerve endings in the pulp. It is easier for a quick movement of liquid in dental tubules to stimulate the pain if there is a greater number of dental tubules and they are more open and more accessible (6, 9, 11).

The treatment of hypersensitivity consists mainly in closing the tubules physically or mechanically. It causes the blockage of the movement of liquid in the tubules or the excitability of the sensory nerve fiber endings in the pulp (1, 10). Stomatologists have access to a variety of medicines fighting dentine hypersensitivity, however, none of them is effective in each case.

The paper presents the results of the clinical use of Green Or. The way this preparation works is connected with the double replacement reaction between potassium, calcium and strontium salts on a tooth surface. A crystalline complex, which forms itself in the outcome of this reaction, closes open dental tubules and the potassium ions released to the dental tubules depolarize nerve fibres and inhibit their excitability.

The aim of the study was to present the results of the clinical use of Green Or in the treatment of tooth's neck hypersensitivity.

MATERIAL AND METHODS

Green Or – the tested preparation is a liquid for a professional use in a dentist's office. A package contains two bottles: green and orange. The green bottle contains water, potassium phosphate, potassium carbonate and the orange one contains water, calcium chloride, strontium chloride and sodium benzoate. The preparation was recommended for those patients who suffered from hypersensitivity and had the following symptoms: gum recession with the exposure of enamel-cement junction, teeth with the exposed dentine (wedge-shaped cavities, erosions, abrasions). The preparation was used according to the recommendations of the producer. The place of the procedure was protected with cotton wool rolls. A mechanical brush removed a bacteria plate and the tooth surface was dried very accurately for 10 seconds. First, a solution from a green bottle was rubbed into with a single applicator and then from an orange bottle with another single applicator. In the case of persisting pain the medicine was used again after a week.

The preparation was used for 242 teeth of 32 patients who reported pains characteristic of hypersensitivity. In the initial treatment feeding and hygienic habits of the patients were noted down

in the questionnaire papers and then in the clinical treatment the surface graphs were drawn (non-carious cavities and the cases of gum recession were marked on them).

RESULTS AND DISCUSSION

Questionnaires showed that the factors that provoked toothaches were: cold impulses – 87.5%, warm – 46.9%, sour – 43.8%, sweet – 40.6% (Fig.1). Similar results of the reaction of teeth to cold impulses were achieved in another research where cold impulses were the reason for hypersensitivity in 84.2% and 86.5% (7,8). Urbaniak shows lower percentage of the occurrence of pain provoked by warm impulses – 25.7% and sour – 33.8% and a bit higher by sweet impulses – 45.9% (8). Patients most often talked about two factors as the reason for pain and they constitute 34.4% of all the tested, 28.1% about one or three factors, and 9.4% about four impulses that caused hypersensitivity (Fig. 2).

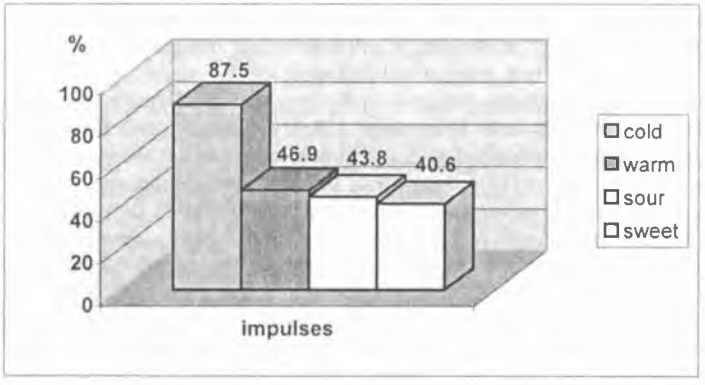

Fig. 1. The occurrence of pain provoked by impulses (in percent)

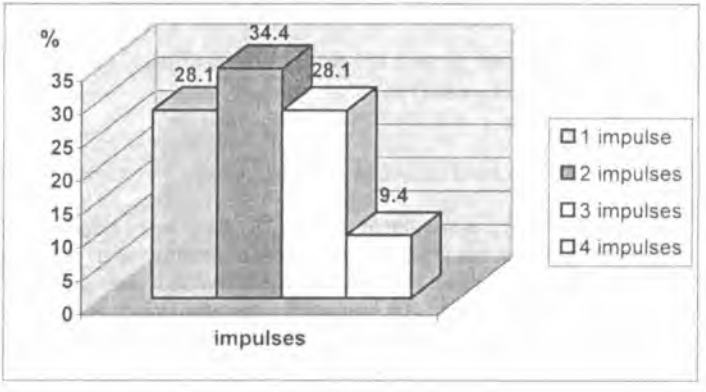

Fig. 2. The occurrence of one or more impulses causing pain (in percent)

Patients regarded Fones method of brushing teeth as the most popular (40.6%), and the rolling method as almost equally popular (37.5%) (Table 1a). Urbaniak and co-authors present similar results. 39.18% of all tested brush their teeth in a circular way, and 17.56% horizontally (8).

Table 1a. Hygienic habits – the methods of brushing teeth

Methods of brushing	H	%
Rolling	12	37.5
Fones method	13	40.6
Scrubbing	6	18.8
Other	1	3.1

Among all the tested, 78.1% use a medium-hard toothbrush, 15.6% – soft, and 6.3% – hard (Table 1b). Other authors achieved accordingly the following results: 75.7%, 16.2%, 8.1% (8). It is worth noticing that only 28.1% people use a toothbrush for hypersensitive teeth. (Table 1c.) Trąbska-Świetlicka and co-authors give similar results (8).

Table 1b. Hygienic habits – a type of toothbrush

A type of a toothbrush	H	%
Soft	5	15.6%
Medium	25	78.1%
Hard	2	6.3

Table 1c. Hygienic habits – a type of toothpaste

A type of a toothpaste	H	%
"Sensitive"	9	28.1
Other	23	71.9

In the questionnaire patients were asked about their feeding habits, food they eat before and between main meals. Most of them (59.4%) answered that they ate a lot of fruit, 31.3% drank fruit juices every day, and the least (15.6%) ate nibbles (Table 1d). *In vitro* research proved that there were statistically significant differences in the sensitivity of enamel to erosion together with the increase of a fruit juices intake (3).

Table 1d. Feeding habits

Food products and drinks consumed every day	H	%
Juices	10	31.3
Fruit	19	59.4
Nibbles	5	15.6

The research shows that the erosion of enamel in the acid solutions contained in food depends on pH solutions, acid concentration, and the presence of calcium. Its presence, so the increase of calcium concentration with a determined pH of citric acid is a condition to lower erosion (4).

While defining the frequency of hypersensitivity occurrence in individual tooth groups in the upper jaw it was stated that it occurs most often in premolar teeth (38.9%), incisor and canine teeth (25%), and least often in molar teeth (11.1%) (Table 2). The frequency of hypersensitivity occurrence in the lower jaw teeth similarly to the upper jaw is the greatest in the premolar tooth group (36.6%). The differences occur in incisor teeth (29.8%) and canine teeth (17.2%). Hypersensitivity, similarly to the upper jaw part, occurs least often in molar teeth (16.4%) (Table 3). Other authors working on the occurrence of non-carious cavities stated that 96% of pathologic detritions were accompanied by shallow neck of a tooth cavities (5). The differences in the number of teeth

marked with pain between the upper and the lower jaw are accordingly 44.6% and 55.4%, so there is a slight overbalance of the number of teeth in the lower jaw (Table 2, Table 3).

Table 2. The occurrence of hypersensitivity in individual tooth groups – the upper jaw

Upper jaw	H	%
Incisor teeth	27	25.0
Canine teeth	27	25.0
Premolar teeth	42	38.9
Molar teeth	12	11.1
Altogether	108	44.6

Table 3. The occurrence of hypersensitivity in individual tooth groups – the lower jaw

Lower jaw	H	%
Incisor teeth	40	29.8
Canine teeth	23	17.2
Premolar teeth	49	36.6
Molar teeth	22	16.4
Altogether	134	55.4

A full remission of hypersensitivity after a single use of Green Or was reported in 56.6% of teeth, discomforts were reduced in 40.5% of teeth, the increase of discomforts was reported in only one case (0.4%), and in six cases (2.5%) there were no changes noticed after using Green Or (Table 4a). In the case of the decrease of discomfort or noticing no changes Green Or was used for the second time. In 82.6% of all the cases the full remission of symptoms was reported or the decrease in the rest of the cases (17.4%) (Table 4b). Other authors estimate the efficacy of Green Or between 88% and 89% (2).

Table 4a. The efficacy of Green Or after a single use

Symptoms	H	%
Full remission	137	56.6
Decreased	98	40.5
Increased	1	0.4
No changes	6	2.5

Table 4b. The efficacy of Green Or after the second use

Symptoms	H	%
stopped	76	82.6
decreased	16	17.4
increased	0	0.0
no changes	0	0.0

The research carried out proves that Green Or is a very efficient preparation to stop dentine hypersensitivity. It is easy to use and shows an immediate improvement just after a single use (56%), and after the second use (82%).

REFERENCES

1. Bachanek T., Zamościńska J.: Współczesne poglądy na powstawanie i leczenie ubytków przyszyjkowych niepróchnicowego pochodzenia. Przegl. Stom. Wieku Rozw., 2/3, 22, 1998.
2. Betleja K. et al.: Preparat Green Or w zwalczaniu nadwrażliwości zębiny. Mag. Stomat..12, 6, 32, 2002.
3. Hunter M.L. et al.: Erosion of deciduous and permanent dental hard tissue in the oral enviroment. J. Dent. , 28, 4, 257, 2000.
4. Hughes J.A. et al.: Effects of pH and concentration of citric, malic and lactic acids on enamel, in vitro. J. Dent., 28, 2, 147, 2000.
5. Khan F. et al: Dental cervical lesions associated with occlusial erosion and attrition. Aust-Dent. J., 44, 3, 176, 1999.
6. Lussi A., Schaffner M.: Progression of and risk factors for dental erosion and wedge-shaped defects over a 6-year period. Caries Res., 34, 2, 182, 2000.
7. Trąbska-Świetlicka M. et al.: Skuteczność preparatu Green Or w zwalczaniu nadwrażliwości zębiny. Mag. Stomat., 13, 5, 38, 2003.
8. Urbaniak B. et al.: Charakterystyka pacjentów z nadwrażliwością zębiny. Mag. Stomat., 9, 36, 2001.
9. Wagner L., Niewiadomski K.: Najnowsze osiągnięcia w leczeniu nadwrażliwości zębiny. Stomat. Współ., 1, 8, 2002.
10. Wagner L., Trykowski J.: Uwagi o etiologii i leczenie przyszyjkowych ubytków o niepróchnocowym pochodzeniu. Nowa Med., 10, 24, 1995.
11. Wierzbicka M.: Ubytki twardych tkanek zęba pochodzenia niepróchnicowego. Czas. Stomat. 9, 558, 1997.

SUMMARY

The paper presents a clinical appraisal of the efficacy of Green Or in fighting dentine hypersensitivity. Besides, it contains the results of the survey on a diet and hygienic habits that were carried out among treated patients. Green Or was tested on 242 teeth of 32 patients. After a single use of the preparation 56.6% of all the patients tested noticed a total remission of dentine hypersensitivity. The second use of Green Or brought a total relief to the rest of the patients (82.6%).

Badania kliniczne preparatu Green Or u pacjentów z nadwrażliwością zębiny

Praca przedstawia kliniczną ocenę skuteczności preparatu Green Or w zwalczaniu nadwrażliwości zębiny, ponadto zawiera wyniki ankiety na temat diety, nawyków higienicznych, przeprowadzonej wśród leczonych pacjentów. Preparat Green Or zastosowano w 242 zębach u 32 pacjentów. Stwierdzono w 56,6% całkowite zniesienie nadwrażliwości zębiny po jednokrotnym zastosowaniu preparatu. Powtórna aplikacja preparatu u pozostałych pacjentów w 82,6% przyniosła całkowite ustąpienie objawów nadwrażliwości.