

Evaluation of the product based on Recaldent™ technology in the treatment of dentin hypersensitivity

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Abstract

Purpose: The aim of the study was to evaluate the efficiency of GC Tooth Mousse in the treatment of patients with dentin hypersensitivity caused by various factors.

Material and methods: The evaluation was carried out on 101 teeth with dentin hypersensitivity in 13 patients. Patients with gingival recession and exposed dental necks and those with non-carious lesions at the initial stage were selected. The initial examination was to evaluate the intensity of pain induced by a stream of the air syringe and by probing the tooth surface. It was repeated directly after the preparation application, after 15 minutes, after 1 and 4 weeks.

Results: After the medicine application, the number of teeth reacting with strong or extremely strong pain decreased (from almost 80% to 37.62%). The percentage of teeth reacting with mild pain increased by 15% and the number of teeth which did not react to the cold air stream also increased by 27.72%. The values after 15 minutes were similar. A week later, the percentage of teeth with very strong pain was elevated and so was the percentage of medium pain. On the other hand, the number of teeth without pain and with mild pain decreased twice. After one month the percentage distribution was close to the results obtained after 7 days.

Conclusions:

1. GC Tooth Mousse preparation, based on Recaldent™ technology reveals insufficient effectiveness and short-term therapeutic effect in treating hypersensitivity of dentine.

2. It seems that soothing the pain by GC Tooth Mousse should be regarded rather as an additional remineralizing effect of the medicine.

Key words: dentin hypersensitivity, Recaldent™ technology, clinical evaluation of the treatment, GC Tooth Mousse.

Introduction

Dentin hypersensitivity is a common problem observed in clinical practice. It is defined as algescic overreaction, which cannot be explained otherwise, to harmless sensory stimuli on exposed dentine [1]. Pain hinders everyday activities, such as teeth brushing, consumption food and drinks of various temperatures, speaking, and even breathing. Dentin hypersensitivity is stated in patients with gingival recession as well as cervical and root exposure due to, most frequently, periodontal diseases, after periodontal and surgical treatment, and in teeth with non-cariou lesions. Tooth defects and malocclusion, parafunctions as well as improper tooth brushing are predisposing factors as far as cervical exposure and pain are concerned. Tooth hypersensitivity is frequently complained of by patients after whitening and those with removable prosthesis and appliances, at the place of claps adhesion [2-5].

A hydrodynamic theory is assumed to be the most probable theory concerning dentin hypersensitivity occurrence [6]. Liquid movement in dentinal tubules, influenced by a stimulus, causes sensory nerve irritation in the subodontoblastic plexus. Pain intensity, i.e. the degree of hypersensitivity depends on the condition of dentinal tubule openings. Open tubules release algescic reactions while their blockage abolishes the pain. Thus, the aim of the therapy of dentin hypersensitivity is closing dentinal tubules by e.g. crystal precipitation in tubule lumen or hydroxyapatite melting. Laser therapy, preparations with fluoride, hydroxyapatite, strontium and zinc chlorides, potassium oxalate as well as dental adhesives and glass ionomer cement are used for the treatment [4,7-10].

A material GC Tooth Mousse based on the Recaldent™ technology has been recently introduced to the market [11]. Recaldent™ is a unique complex containing amorphous calcium

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Table 1. Evaluation of GC Tooth Mousse effectiveness – the number and percentage of teeth reacting to cold air and mechanical stimuli

Examination	Cold Air				Probe	
	0	1-3	4-6	7-10	0	+
Before application	–	21 (20.79%)	43 (42.57%)	37 (36.63%)	89 (88.11%)	12 (11.89%)
After the application	28 (27.72%)	35 (34.65%)	29 (28.71%)	9 (8.91%)	94 (93.06%)	7 (6.94%)
After 15 minutes	23 (22.77%)	41 (40.59%)	31 (30.69%)	6 (5.94%)	96 (95.04%)	5 (4.96%)
After 7 days	12 (11.88%)	28 (27.72%)	49 (48.51%)	12 (11.88%)	94 (93.06%)	7 (6.94%)
After 30 days	7 (16.66%)	8 (19.04%)	23 (54.76%)	4 (9.54%)	40 (95.23%)	2 (4.77%)

Legend: 0 – no pain; 1-3 , 4-6 ,7-10 –VAS scale; + – positive pain reaction

phosphate (ACP) and casein phosphopeptide (CPP), obtained from milk casein. The preparation is recommended in hard tissue remineralization. The manufacturer compares the material to “liquid enamel”. CPP-ACP complexes make a strong binding with a biofilm on teeth and form a calcium and phosphate reservoir. They are then incorporated into the surface of enamel and dentine [11,12]. Thus, the medicine restores the mineral balance by strengthening hard tissues, reveals an anti-cariogenic potential, and acts synergistically with fluorine. It is used after tooth whitening, professional tooth cleaning, root planing, and curettage. It is also recommended in dentin hypersensitivity reduction due to its ability to block opened dentinal tubules [11]. Therefore, the aim of our study was the assessment of GC Tooth Mousse effectiveness in the treatment of dentin hypersensitivity due to various factors.

Material and methods

The evaluation was carried out on 101 teeth with dentin hypersensitivity in 13 patients, 10 women and 3 men, aged 23-48 years. Patients complaining of pain due to mechanical stimuli (tooth brushing), thermal (warm, cold) or chemical (sweet or sour food) were qualified to the clinical examinations. The exact assessment of patients' dentition was performed and patients with gingival recession and exposed dental necks and those with non-cariogenic lesions at the initial stage (angular lesion, dental erosion and pathological dental abrasion) were selected. Teeth with problems caused by cariogenic lesions, pulpitis, and non-cariogenic lesions qualified for filling (of depth of more than 1 mm) were excluded from the study [5]. We did not take into consideration teeth with cervical fillings and teeth in direct contact with removable prosthesis.

Before GC Tooth Mousse application, patients answered to questions concerning their complaints (intensity, duration, analgesics), oral hygienic procedures, and nutrition habits, which could intensify the symptoms.

The initial examination was to evaluate the intensity of pain induced by a one second stream of the air syringe and mechanically, by moving the probe on the tooth surface. Patients' sensations were classified according to the 10-degree VAS scale (Visual Analogue Scale) [1,13]. The values from 1 to 3 were determined as the mild pain, 4-6 – medium pain, and 7-10 – unbearable pain. The examination was repeated directly after the medicine application, after 15 minutes, after 1 and 4 weeks.

The preparation GC Tooth Mousse is available as a foam and in 5 flavors. Flavor substances stimulate saliva secretion, which intensifies the effectiveness of the medication [11]. The foam application was performed strictly according to the manufacturer indications: the surfaces of examined teeth were carefully cleaned with zinc oxide with water, the operative area was isolated with cotton wool rollers and the thick layer of the preparation was applied on the surfaces, and left for 3 minutes. Then, the patient was instructed to massage the rest of the foam on the teeth with the tongue for 1-2 minutes, without swallowing and spitting out, and to rinse his mouth. He was also forbidden to eat and drink for 30 minutes after GC Tooth Mousse application. In case of persisting pain, the procedure was repeated after 1 week.

Results

The results were presented in *Tab. 1*. During the initial examination of hypersensitive teeth reaction to the stream of cold air, almost 80% of patients described the pain as strong or very strong, hard to resist. After GC Tooth Mousse application, the number of teeth reacting with extremely strong pain decreased and the percentage of teeth reacting with mild pain increased by 15%. The number of teeth which did not react to the cold air stream (scale 0) also increased by 27.72%. The values after 15 minutes were similar. A week after the first application, the percentage of teeth with extreme pain was elevated (from 5.94% to 11.8%) and so was the percentage of medium pain (from 30.69% to 48.51%). On the other hand, the number of teeth without pain and with mild pain decreased twice. On a check-up after 30 days we could only examine 42 teeth as less patients attended the examination. The percentage distribution was close to the results obtained after 7 days. Most teeth did not react with pain to probing during the initial evaluation (88.11%). The percentage increased to above 93% after the application and maintained at the approximate level during the whole period of studies.

Patients histories were presented in *Tab. 2*. It shows that more than half of patients complained of pain due to dentin sensitivity for several years or months. And about 40% of them had tried to treat the disease before. The majority showed the hygienic and nutritional habits that predisposed to pain reaction: inappropriate technique of tooth brushing, with horizontal moves and abrasive toothpastes (for smokers and whitening) and frequent ingestion of products which have a strong acidifying effect on the oral cavity environment.

Table 2. Data of ailments, oral hygiene and dietary habits (% of patients)

Hypersensitivity duration	years	months	weeks
	61.54%	23.08%	15.38%
Hypersensitivity factors	thermal	chemical	mechanical
	55.31%	27.65%	17.02%
Using of any desensitizers before	yes	no	
	38.47%	61.53%	
Method of toothbrushing	horizontal	circular	„roll”
	36.84%	52.63%	10.52%
Hardness of toothbrush	hard	medium	soft
	7.14%	78.57%	14.28%
Toothpaste	daily using	sensitive	abrasive
	45.00%	35.00%	20.00%
Frequency of fruits and juice consumption	a few times a day	once a day	a few times a week
	46.15%	38.46%	15.38%

The patients assessed GC Tooth Mousse and only 23% described it as pleasant while 30% stated that it was unpleasant and irritating.

Discussion

The initial observation of the medicine reveals that its action is short and most effective in the first days of application. Complete elimination of complaint was obtained directly after the application in approximately 28% of cases. The number of teeth with mild pain also increased markedly. However, despite the drug application, 9% of examined teeth still reacted with unbearable pain to the cold air. After a week, the percentage distribution in particular groups changed significantly and unfavorably as the number of teeth with strong and extremely strong pain was elevated. Despite the repeated application of GC Tooth Mousse after a month, the sensitivity of teeth remained at the similar level.

The literature concerning other preparations, like Seal & Protect, Isodan, Green Or, Gluma Desensitizer points to full effectiveness in 60-96% of examined teeth [2-4,7,14]. Moreover, their curative effect persists for more than a month. Those values exceed that obtained in the case of the foam GC Tooth Mousse. Thus, it can be said that this preparation appeared to be less effective, in comparison to others, in treating ailments connected with sensitive dentine. Perhaps, in order to increase its desensitizing effect, the applications should be repeated in intervals shorter than 7 days. Further studies, on a bigger number of teeth and according to such a design, are needed.

It should be stressed that symptomatic treatment would not cure hypersensitivity in case of maintaining bad hygienic, nutritional, and other customs [3,4,7]. Information gathered from patients revealed certain habits that favor the ailment to be persistent or intensified. It should be included into oral hygienic instructions and patients should be persuaded to change their habits.

Conclusions

1. GC Tooth Mousse preparation, based on Recaldent™ technology reveals insufficient effectiveness and short-term therapeutic effect in treating hypersensitivity of dentine.
2. It seems that soothing the pain by GC Tooth Mousse should be regarded rather as an additional remineralizing effect of the medicine.

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