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**EVALUATION OF THE EFFECTIVENESS OF TREATMENT OF HYPERESTHESIA OF HARD DENTAL TISSUES IN DENTAL PRACTICE****© Shashmurina V.R., Kupreeva I.V., Devlikanova L.I., Mishutina O.L., Volchenkova G.V., Shashmurina A.B.***Smolensk State Medical University, 28, Krupskaya St., 214019, Smolensk, Russia**Abstract***Objective.** To study the clinical effectiveness of treatment of hyperesthesia of hard tissues of teeth.**Methods.** The treatment of hyperesthesia of hard tissues of teeth 118 was carried out in 63 patients aged 18 to 60 years. After the examination according to the standard method, the patients were divided into 3 groups depending on the treatment algorithm used. Non-invasive treatment of hyperesthesia of hard tissues of teeth was carried out in patients of group 1 using the means for professional use (application of the suspension «Desensetin») and home use (toothpaste, mouthwash and toothbrush «Lacalut sensitive»). Patients of group 2 were prescribed only toothpaste with mouthwash with a toothbrush «Lacalut sensitive». Patients of group 3 was carried out by application only suspension «Desensetin» on problem areas of the teeth.**Results.** The results of treatment demonstrated high effectiveness especially in complex application of suspension «Desensetin» and toothpaste with the mouthwash and toothbrush «Lacalut sensitive» treatment and preventive measures in hyperesthesia of hard dental tissues.**Conclusion.** In the course of the study it was established that the suspension of the «Desensetin» and toothpaste with mouthwash and a toothbrush «Lacalut sensitive» can be effectively applied for the treatment and prevention of hyperesthesia of hard tissues of teeth have a marked antisensitivity action. The use of the suspension «Desensetin» and toothpaste with mouthwash «Lacalut sensitive» in combination with a toothbrush «Lacalut sensitive» leads to the elimination of increased sensitivity of teeth to various types of stimuli (thermal, chemical, tactile), which is confirmed by a significant ( $p<0.01$ ) decrease in 100% of objective indices of prevalence and intensity of dental hyperesthesia.*Keywords:* hyperesthesia of hard tissues of teeth, desensitin, «Lacalut sensitive», comprehensive therapy**ОЦЕНКА ЭФФЕКТИВНОСТИ ЛЕЧЕНИЯ ГИПЕРЕСТЕЗИИ ТВЁРДЫХ ТКАНЕЙ ЗУБОВ В СТОМАТОЛОГИЧЕСКОЙ ПРАКТИКЕ****Шашмурина В.Р., Купреева И.В., Девликанова Л.И., Мишутина О.Л., Волченкова Г.В., Шашмурина А.Б.***Смоленский государственный медицинский университет, Россия, 214019, Смоленск, ул. Крупской, 28**Резюме***Цель.** Изучение клинической эффективности лечения гиперестезии твёрдых тканей зубов.**Методика.** Было проведено лечение гиперестезии твёрдых тканей 118 зубов у 63-х пациентов в возрасте 18-60 лет. После обследования по стандартной методике пациенты были разделены на 3 группы в зависимости от используемого алгоритма лечения. Пациентам 1 группы было проведено неинвазивное лечение гиперестезии твёрдых тканей зубов с использованием средства для профессионального применения (апликация суспензии «Десенсетин») и домашнего применения (зубная паста, ополаскиватель рта и зубная щётка «Lacalut sensitive»). Пациентам 2 группы назначались только зубная паста, ополаскиватель вместе с зубной щёткой «Lacalut sensitive». Пациентам 3 группы осуществляли аппликации только суспензии «Десенсетин» на проблемные участки зубов.**Результаты.** Результаты лечения наглядно показали высокую эффективность особенно комплексного применения суспензии «Десенсетин» и зубной пасты с ополаскивателем для рта и зубной щётки «Lacalut sensitive» в лечебно-профилактических мероприятиях при гиперестезии твёрдых тканей зубов.**Заключение.** В ходе проведённого исследования установлено, что суспензия «Десенсетин» и зубная паста, ополаскиватель и зубная щётка «Lacalut sensitive» могут эффективно применяться в

комплексе для лечения и профилактики гиперестезии твёрдых тканей зубов, оказывают выраженное антисенситивное действие, что подтверждено достоверным ( $p < 0,01$ ) снижением в 100% случаев индексов распространённости и интенсивности гиперестезии зубов.

*Ключевые слова:* гиперестезия твёрдых тканей зубов, десенсетин, «Lacalut sensitive», комплексная терапия

## Introduction

Hyperesthesia of hard tooth tissues is one of the common reasons for patients visiting a dentist [5], occupies a special place in the structure of dental morbidity and, according to WHO, 57% of the planet's population as a whole and more than 62% of the population of the Russian Federation has such complains. There is a tendency to rejuvenate this pathology, and the problem of tooth hypersensitivity acquires medical and social significance [6].

The high prevalence of hyperesthesia of hard tooth tissues, on the one hand, is caused by gum recession, periodontal diseases, non-carious diseases (abrasion, erosion, hypoplasia, a wedge-shaped defect) and a congenital absence of a cement-enamel compound [7]. On the other hand, the occurrence of this pathology is possible due to the lack of clear indications for the use of therapeutic and prophylactic agents that are adequate to specific clinical situations. Common iatrogenic causes are a violation of technology of filling teeth with composite materials, complications after teeth whitening (home, professional, combined), professional oral hygiene (up to 75%) and periodontal treatment [1].

Hyperesthesia hard tooth tissues can be caused by systemic (general) diseases (psychoneurosis, endocrinopathies, gastrointestinal diseases, menopause, metabolic disorders), which are based on impaired mineral metabolism, as well as local factors (the use of hard toothbrushes and abrasive pastes, the use of a large number of acidic products, vital teeth whitening).

In young people, hyperesthesia is observed in 78.8%. After teeth whitening sensitivity occurs in 14-78% of cases. The incidence of hyperesthesia of hard tooth tissues in inflammatory diseases of periodontal tissues is significantly higher and varies between 85-98%. The cervical areas of the vestibular surface of the canines and premolars on both the upper and lower jaws are most susceptible to hypersensitivity [4].

Despite the fact that many methods have been proposed for the treatment of hyperesthesia of hard tooth tissues, this pathology continues to be one of the problems of modern dentistry, since today the methodology for choosing treatment regimens is imperfect, existing methods of therapy are ineffective, there are no universal algorithms and protocols for the use of desensitive drugs.

To increase the effectiveness of the treatment of hyperesthesia of hard tooth tissues, it is important to prescribe not only professional preparations, but also means for home use [8]. With increased sensitivity of hard tissues, teeth require special treatment. Despite the pain, it is necessary to continue to carry out high-quality brushing of teeth at home. Particular attention should be paid to the choice of toothpaste. Toothpastes are the most common form of drugs for treating tooth hypersensitivity due to their low cost, ease of use and accessibility.

The «Lacalut» toothpaste of the «Sensitive» line is specially designed for sensitive teeth. «Lacalut sensitive» (Arcam GmbH, Germany) contains a unique olaflur fluoride component in combination with sodium fluoride, which can strengthen the enamel, fill it with minerals, eliminate pain reactions and protect open neck of the teeth from cervical caries, and also contains a modern high-quality abrasive based on silicon with a small size of cleaning particles, which carefully and effectively removes bacterial plaque, leaving the enamel intact. «Lacalut sensitive» toothpaste, in addition to an effective formula for sensitive teeth, also contains a combination of anti-inflammatory, astringent and wound healing components: chlorhexidine, aluminum lactate, allantoin and bisabolol.

Due to its composition, «Lacalut sensitive» reduces bleeding and friability of the gums, strengthens and protects them from inflammation, eliminates swelling of soft tissues and promotes their healing, and has an antiseptic effect. To achieve the maximum effect, it is recommended to use «Lacalut sensitive» toothpaste in combination with a similar mouthwash, which also contains a special formula with aminofluoride, chlorhexidine and aluminum lactate. The effectiveness of «Lacalut sensitive» toothpaste complements the use of the «Lacalut sensitive» toothbrush with soft bristles for more gentle cleansing of exposed teeth necks and interdental spaces, as well as the daily use of «Lacalut sensitive» mouthwash, which enhances and complements the effect of desensitizing and rejuvenating tooth paste. Each of the products of this system is an independent solution to the problem of increased sensitivity of hard tooth tissues. However, in addition to this, they are optimally adapted to each other, which ensures the complementarity and synergy of the effects they provide as a single system for using as an effective treatment and prevention of increased sensitivity of hard tooth tissues.

Suspension «Desensetin» (LLC «TechnoDent», Russia) is intended for the treatment of hard tooth tissues in order to reduce sensitivity. It can be used not only in the clinic, but also at home on the recommendation of a doctor. The water-based «Desensetin» suspension contains arginine, calcium phosphate and flavoring. When applied to the tooth surface and rubbing the suspension into a defect, arginine, which has a high buffer capacity, under the influence of saliva forms a complex that neutralizes acid irritants, which quickly and permanently relieves pain. Calcium phosphate, falling into the defect, blocks the access of irritant and serves as a source of calcium and phosphorus, necessary for the remineralization of hard tooth tissues.

A number of authors [2, 3] believe that the most successful and modern is the Pro-Argin™ technology based on the formation of an arginine-calcium carbonate complex. Arginine is an amino acid that is involved in a number of important metabolic processes in the body. It is used by the body as a building material. Arginine has a protective function in saliva: it neutralizes the acidic pH of dental plaque and inhibits the growth of cariogenic bacteria (*Streptococcus mutans*). Arginine, which is part of saliva, due to the formation of a positively charged compound, arginine-calcium carbonate is deposited on a negatively charged dentin, forming a stable insoluble compound that firmly seals the dentinal tubules and is not washed out by saliva. Calcium phosphate serves as a source of ions necessary for the remineralization of the tooth, and also acts as a structural component that fills the defect on the tooth surface. The study [2] showed that with a single application of professional paste based on Pro-Argin™ technology, there is an instant reduction in tooth hypersensitivity that occurs after professional oral hygiene; The achieved result may last for 28 days or more. The most promising technology may be Pro-Argin™, which reflects a pathogenetic approach to solving the problem of hyperesthesia of hard tooth tissues over a long period of time. Thus, analyzing the results of modern research, it can be noted that to date there are no effective treatment regimens for hyperesthesia of hard tooth tissues. Therefore, the search for new tools and methods for treating hypersensitivity of hard tooth tissues remains an urgent task of modern dentistry.

The purpose of the study was to study the clinical effectiveness of the treatment of hyperesthesia of hard tissues of teeth.

## Methodos

A clinical study was carried out on the basis of the Dentistry Department of the Faculty of Additional Higher Education at the Smolensk State Medical University. The clinical trial groups included 63 patients (21 men and 42 women) aged 18-60 with localized hyperesthesia of the hard tooth tissues of 1-2-3 degrees (the teeth were sensitive to the effects of cold, chemical and tactile stimuli) [6] against erosion / abrasion in the neck of the tooth or with gum recession, and 25 patients included in the comparison group who do not have clinical symptoms of hyperesthesia (hypersensitivity) of the hard tissues of the teeth. A total of 118 permanent teeth were examined and treated. A prerequisite for medical intervention was voluntary informed consent of the patient. Before treatment, all patients had a conversation. The examination was carried out according to a standard method with filling out a medical record of a dental patient (form No. 043Y). In the questionnaire we developed for each patient, a detailed history was noted (concomitant diseases, bad habits, eating habits, data on oral hygiene, previous treatment and its effectiveness).

The diagnosis of hyperesthesia of the hard tooth tissues was made on the basis of a survey of patients, history, results of an objective examination in accordance with the classification of ICD-10. Assessment of the initial dental status began with a survey, clarification of complaints and collection of medical history. The survey found out which stimuli (cold, hot, acidic, mechanical) cause the appearance of increased sensitivity of hard tissues of teeth.

Before and after the treatment of hyperesthesia of hard tooth tissues in each patient, the prevalence and severity of dental hyperesthesia (this pathology) was evaluated. To characterize the frequency of this pathological process, the prevalence index of dental hyperesthesia (PIDH) was determined. The calculation of the index was carried out in percent according to the formula [6]:

$$\text{PIDH} = \frac{\text{the number of teeth with increased sensitivity}}{\text{the number of teeth in this patient}} \times 100\%$$

The index of dental hyperesthesia intensity (IDHI) was calculated by the formula [6]:

$$\text{IDHI} = \frac{\text{the sum of the index values for each tooth}}{\text{the number of teeth with increased sensitivity}} \times 100\%$$

IDHI was calculated in points, which were evaluated on the basis of the following indicators: 0-lack of response to temperature, chemical and tactile stimuli; 1 – the presence of sensitivity to temperature (cold, hot) stimuli; 2 – the presence of sensitivity to temperature and chemical (sweet, sour) stimuli; 3 – the presence of sensitivity to temperature, chemical and tactile stimuli. With digital values of the index from 1.0 to 1.5 points, hyperesthesia of the 1st degree was diagnosed; with an index value of 1.6 to 2.2 points – hyperesthesia of the 2nd degree; with an index value of 2.3 to 3.0 points, grade 3 hyperesthesia was diagnosed.

To assess the severity of hyperesthesia, cold and tactile tests were used, as well as an analysis of patient complaints during anamnesis. To assess the temperature sensitivity, the teeth were irrigated from a syringe with water at a temperature of 30<sup>0</sup> C. The use of water at this temperature is explained by the fact that with functional enamel insufficiency, pain in the tooth occurs under the influence of a cold irritant, whose temperature is less than 37<sup>0</sup>C [4]. The tactile sensitivity of the hard tissues of the teeth was determined using a dental probe: the tip of the instrument was placed perpendicular to the vestibular surface of the tooth under study and made zigzag movements along the enamel-cement border for several seconds. If this irritation caused a pain reaction in the patient, the presence of hyperesthesia of the tooth was recorded. To assess the sensory component of pain, electroodontodiagnostics (EDI) was used. Electroodontometry (EOM) was performed using the IVN-98 Pulpotest-Pro apparatus according to the generally accepted method at the classical point and in the defect area-the hyperesthesia zone before and after treatment and 3 months after dental treatment for hard tissue hyperesthesia. A state of 5-7  $\mu$ A was taken as the norm [6].

For objectification of the obtained data, we used an assessment scale for the intensity of the pain response (NRS), which allows expressing the subjective sensations of the patient in conventional units: lack of response to the stimulus – 0; weak reaction – 1; moderate reaction – 2; strong reaction – 3 [6]. The sensitivity of hard tissues of teeth to an air-cold stimulus (Shiff test or air test) was determined by the patient's reaction to a stream of compressed air directed perpendicular to the test surface (to the cervical region from the vestibular side of the tooth) from a distance of about 1 cm. The temperature of the air stream was 19-21<sup>0</sup>C, exposure was performed for 1 second using a standard dental unit hollow. The interpretation of the results was carried out in accordance with the recommendations for working with the index: 0 points-no reaction; 1 point – the patient notes discomfort, but does not insist on stopping the test; 2 points – he patient notes discomfort, demonstrates motor reactions (for example, a mimic reaction) aimed at stopping the stimulus; 3 points – the patient notes a pronounced pain response to the stimulus, demonstrates pronounced motor reactions aimed at the immediate termination of the stimulus [4].

The oral hygiene was judged by the Green-Vermillion Hygiene Index (OHI-S) (J. Greene, J. Vermillion, 1964) in dynamics (before and after treatment, 3 months later). Depending on the treatment method, patients were divided into 3 main groups and control (comparison group) (Table 1).

Table 1. Study groups and prescribed treatment regimens

Group	Desensitizer (professionaluse)	Desensitizer (home use)
1 (n=21; 38 teeth)	Desensetin	Lacalut sensitive
2 (n=18; 32 teeth)	Lacalut sensitive	Lacalut sensitive
3 (n=24; 48 teeth)	Desensetin	Desensetin
comparison (n=25)	-	Colgate

After the antiseptic treatment of the tooth surface (s) with hypersensitivity of 2% chlorhexidine abigluconate solution, all patients of the 1st group underwent non-invasive treatment using professional and home use products. For professional use, the «Desensetin» suspension (application) was used due to the presence of pain symptoms for tactile and cold stimuli. «Lacalut sensitive» toothpaste, «Lacalut sensitive» mouthwash, and «Lacalut sensitive» toothbrush were prescribed as home remedies for the treatment of hypersensitivity to hard dental tissues. All patients were trained in toothbrushing using a «Lacalut sensitive» toothbrush. Patients used «Lacalut sensitive» toothpaste on their own at home by brushing their teeth (2 times a day in the morning and evening after eating with a «Lacalut sensitive» soft toothbrush for 1 month), followed by «Lacalut sensitive» mouthwash after brushing 2 times day morning and evening. For patients of the 2nd group for the treatment of hyperesthesia of hard tissues of the teeth, only «Lacalut sensitive» toothpaste, «Lacalut sensitive» mouthwash, and «Lacalut sensitive» toothbrush were prescribed. Before treating patients of the 3rd group, they performed antiseptic treatment of the tooth surface (s) with increased sensitivity with a 2% solution of chlorhexidine abigluconate, dried damaged hard tissues of the teeth were dried, followed by the application of only «Desensetin» suspension. Suspension «Desensetin» was applied using an applicator to problem areas of the tooth and carefully rubbed into the damaged surface. After treatment (procedure), patients were advised to refrain from eating food and water for 2 hours, and also not to eat acidic drinks and fruits for 3-5 days after the

procedure. The procedure was performed 1 time per day; the course of treatment was 5 procedures in accordance with the instructions for the drug. The control group (comparisons) consisted of 25 healthy individuals who did not have hyperesthesia of hard dental tissues.

A comprehensive clinical examination of patients was carried out before treatment, the clinical effectiveness of therapy was evaluated after the end of the course of treatment, and also after 3 months. The data obtained are statistically processed using t-student test. All calculations during statistical processing of the research results were performed using the Ms Excel software.

## Results and discussion

The study found that the presence of sensitivity only to temperature stimuli was noted in 7.5% of cases. Soreness from temperature and chemical irritants was detected in 42.3% of cases. Hypersensitivity from temperature, chemical, and mechanical stimuli was recorded in 50.2% of cases. Moreover, the reaction to temperature stimuli (cold test) and the least to chemical (the weakest to sweet) was the most pronounced [1]. Moreover, according to the anamnesis, in some patients painful sensations appeared not only during brushing, but also during the meal. Among the hard tooth tissues examined with hyperesthesia, 19% of the patients complained of a slight feeling of discomfort, 81% of the patients complained of pain, moreover, it was mainly an intense but rapidly passing reaction. The results obtained on a subjective assessment scale of pain and Shiff tests showed that all patients suffered from hyperesthesia of hard tooth tissues (Table 2).

Table 2. The results of the tests study for tooth sensitivity before and after treatment of the studied groups

Group, study time	the presence of increased tooth sensitivity complaints, %	Shiff test (points)	digital pain rating scale (NRS) (conventional units)
1 group			
Before treatment	100	2,52±0,20	2,46±0,23
After treatment	9,5	0,6±0,3	0,3±0,2
In 3 months	0	0	0
2 group			
Before treatment	100	2,67±0,24	2,66±0,21
After treatment	5,5	0,6±0,3	0,3±0,2
In 3 months	0	0	0
3 group			
Before treatment	100	2,67±0,18	2,54±0,20
After treatment	8,3	0,4±0,2	0,2±0,1
In 3 months	0	0	0

When examining patients of 1st group after completion of the course of treatment (after 7 days), 19 (90.5%) patients noted a complete disappearance of sensitivity in the teeth, 2 (9.5%) – a significant decrease in sensitivity. 3 months after treatment, examination of patients of this group showed a good clinical result, since all patients had no complaints of hyperesthesia, and an objective examination of the reaction to the studied types of stimuli was not detected, all patients reported a complete absence of pain in the area of sensitive teeth [7]. In almost all patients of the 1st group, the disappearance of symptoms of hyperesthesia of the hard tissues of the teeth, the absolute absence of complaints of hyperesthesia with a significant ( $p<0.01$ ) decrease in the corresponding objective indicators of the clinical examination: reaction to a temperature irritant (cold), to a chemical (acidic), to tactile stimulus.

In patients of group 1, the use of «Desensetin» suspension and toothpaste with mouthwash and «Lacalut sensitive» toothbrush led to a marked decrease in sensitivity, which was reflected in the Shiff test parameters – reduction to 0.6±0.3 points and data of subjective rating scale pain – a decrease of 0.3±0.2 conventional units after 7 days treatment (table 2). All patients were invited for control after 3 months. They noted a persistent lack of increased sensitivity of the teeth to temperature and air irritants: on a subjective rating scale – 0 points, on the Shiff scale – 0 points for this period of time. Long-term follow-up results showed the preservation of a positive treatment result in all patients [8].

The value of PIDH in patients of group 1 before treatment was 7.14±0.89%. As a result of treatment, PIDH decreased to 1.78±0.84% and after the end of the course of treatment was zero (Table 3).

Table 3. Features of the clinical course of hyperesthesia of hard tissues of teeth

Group, studytime	Characteristic	
	PIDH, %	IDHI, points
Comparisons	0	0
1 group		
Before treatment	7,14±0,89	2,50±0,17
After treatment	1,78±0,84	0,75±0,19
In 3 months	0	0
2 group		
Before treatment	10,7±1,32	1,65±0,11
After treatment	3,19±0,56	0,83±0,12
In 3 months	0	0
3 group		
Before treatment	3,57±0,44	1,45±0,13
After treatment	1,53±0,48	0,67±0,09
In 3 months	0	0

The dynamics of changes in IDHI in patients of group 1 are presented in table. 3. The initial data of IDHI before treatment in patients of the 1st group were 2.50±0.17 points. After treatment, a decrease in this indicator to 0.75±0.19 points was observed; after 3 months, a maximum decrease to zero was noted.

A statistically significant difference was revealed ( $p < 0.05$ ) between the data of the PIDH and the IDHI before the treatment and after the treatment of hyperesthesia of the teeth at the follow-up period of up to 3 months in patients of the 1st group.

When examining patients of the 2nd group after completion of the course of treatment (after 7 days), 14 (77.8%) patients noted a complete disappearance of sensitivity in the teeth, 3 (16.7%) – a significant decrease in sensitivity, and 1 (5.5%) the patient noted no changes. 3 months after treatment, all patients reported a complete absence of pain in the area of sensitive teeth. In patients of the 2nd group, treatment of hyperesthesia of hard tooth tissues led to a decrease in Shiff test indices to 0.6±0.3 points and the data of the subjective assessment pain scale to 0.3±0.2 cu after 7 days. 3 months after treatment, all patients noted a lack of hyperesthesia of the hard tissues of the teeth. The value of PIDH in patients of group 2 before treatment was 10.7±1.32%. As a result of treatment, the PIDH decreased to 3.19±0.56, and 3 months after treatment amounted to zero. The initial data of IDHI before treatment in patients of the 2nd group amounted to 1.65±0.11 points. After treatment, a decrease in this indicator to 0.83±0.12 points was observed up to zero after 3 months. Thus, a home treatment for hyperesthesia of hard tooth tissue with toothpaste with mouthwash and «Lacalut sensitive» toothbrush leads to a noticeable decrease in dental hyperesthesia on average after a week of use. After 3 months, a positive treatment result is maintained.

It should be noted that in all patients of groups 1 and 2 when using toothpaste and mouthwash «Lacalut sensitive», there was a lack of irritating effect on periodontal tissues, a good cleansing effect, and prevention of calculus formation. Almost all patients of groups 1 and 2 noted the disappearance of pain in previously sensitive teeth, indicated the pleasant organoleptic properties of the toothpaste and mouthwash «Lacalut sensitive», the absence of any discomfort in the mouth, and the absence of an undesirable effect on tooth color, fillings and artificial crowns, good oral hygiene. All respondents paid special attention to the duration of the obtained antisensitive effect, which persisted throughout the observation period [3].

When examining patients of the 3rd group after completion of the treatment course, 18 (75%) patients noted a complete disappearance of sensitivity in the teeth, 4 (16.7%) – a significant decrease in sensitivity, and 2 (8.3%) patients did not notice any changes. 3 months after treatment, all patients reported a complete absence of pain in the area of affected teeth. The value of PIDH in patients of group 3 before treatment was 3.57±0.44%. As a result of treatment, the PIDH decreased to 1.53±0.48% after the course of treatment and 3 months after treatment amounted to zero. The initial data of IDHI before treatment in patients of the 3rd group amounted to 1.45±0.13 points. After 3 months, the maximum decrease in this indicator to 0 points was noted. The treatment in patients of group 3 led to a decrease in Shiff test results to 0.4±0.2 points and a decrease in the pain scale (NRS) to 0.3±0.2 cu After 3 months, all patients noted a lack of hypersensitivity to the hard tissues of the teeth. The study shows that the use of «Desensetin» suspension gives a quick and reliable effect, leads to the elimination of dental hyperesthesia immediately after use. After 3 months, a positive treatment result is maintained.

When determining the electrical conductivity (EOM) of hard tissues of intact teeth in the comparison group, it was found that the threshold of electrical excitability, determined at the classical point and in the region of the neck of the tooth, was in the physiological range [4].

Table 4. Electrical conductivity (EOM) in the studied patients at the stages of treatment

Index	Comparison group	Stages of treatment								
		Before treatment			After treatment			In 3 months		
		groups								
		1	2	3	1	2	3	1	2	3
EOM, $\mu\text{A}$	6,2 $\pm$ 0,8	1,87 $\pm$ 0,3	3,5 $\pm$ 0,3	3,7 $\pm$ 0,26	4,7 $\pm$ 0,51	5,32 $\pm$ 0,18	5,7 $\pm$ 0,4	5,7 $\pm$ 0,2	5,3 $\pm$ 0,4	6,08 $\pm$ 0,3

During hyperesthesia of hard tissues of teeth, the threshold of electroexcitability determined in the defect area in patients of the studied groups was lower than at the classical point ( $p < 0.05$ ) (Table 4). In addition, when conducting EDI in the studied groups, it was found that the treatment leads to a significant ( $p < 0.01$ ) increase in the threshold current strength in the area of the defect. Patients with hyperesthesia of hard dental tissues recorded mostly satisfactory oral hygiene (OHI-S) (Table 5).

Table 5. The value of oral hygiene index (OHI-S) in the observed patients at the stages of treatment

Index	Comparison group	Stages of treatment								
		Before treatment			After treatment			In 3 months		
		groups								
		1	2	3	1	2	3	1	2	3
OHI-S, points	0,27 $\pm$ 0,16	1,54 $\pm$ 0,27	1,83 $\pm$ 0,16	1,13 $\pm$ 0,23	0,97 $\pm$ 0,2	0,87 $\pm$ 0,13	0,63 $\pm$ 0,12	0,34 $\pm$ 0,21	0,64 $\pm$ 0,21	0,57 $\pm$ 0,18

The distribution of patients according to the value of the Green-Vermillion Hygiene Index (OHI-S) is presented in Table. 5. An assessment of the dynamics of the Green-Vermillion Hygiene Index (OHI-S) showed that the treatment of hyperesthesia of hard dental tissues significantly improves the hygienic condition of the patients' mouths in all groups. Undoubtedly, the systematic control of the dentist increases the patient's motivation for regular quality oral care.

## Conclusion

Thus, in the course of the study, it was found that the «Desensetin» suspension and toothpaste with mouthwash and «Lacalut sensitive» toothbrush can be effectively used to treat and prevent hyperesthesia of hard tooth tissues and have a pronounced antisensitive effect. The use of «Desensetin» suspension and «Lacalut sensitive» toothpaste with mouthwash in combination with «Lacalut sensitive» toothbrush eliminates the hypersensitivity of teeth to various types of irritants (thermal, chemical, tactile), which is confirmed as reliable ( $p < 0.01$ ) a reduction in 100% of cases of objective indices of the prevalence and intensity of hyperesthesia of the teeth, the achieved antisensitive effect persists for 3 months of observation, the most appropriate combination of the suspension «Desensetin» with toothpaste and mouthwash in combination with the «Lacalut sensitive» toothbrush for hyperesthesia of hard tooth tissues.

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