SUMMARY

Discomfort and pain in the course of dentine hypersensitivity decrease the quality of life of patients and force them to seek help in dental offices. Despite the wide range of techniques and methods for reducing sensitivity of dentine, an optimal therapeutic method that provides immediate pain relief and shows long-term therapeutic effect has not yet been found.

The aim of the study was to compare the therapeutic effectiveness of selected methods of reducing dentine hypersensitivity: chemical methods (Tooth Mousse, Green Or, Duraphat, Seal&Protect desensitizing agents) and a physical method (biostimulating laser) in the course of one month observation period. The auxiliary objectives were to check for the existence of a relationship between the frequency and intensity of dentine sensitivity and the age and gender of the studied individuals, as well as the location of the tooth in the dental arch, the comparison of therapeutic effects of selected methods depending on the intensity of dentine sensitivity and the assessment of speed and durability of the desensitizing effect.

Materials and methods

The study included 50 patients of both genders aged 16 to 65, who were diagnosed with dentine sensitivity in at least 5 teeth based on clinical examination and a questionnaire. Four sensitive teeth were treated with a chemical method (a different agent was applied to each sensitive tooth) while the fifth tooth was irradiated with the biostimulatory diode laser CTL-1106M with a power of 75 mW and a wavelength of 780 nm. Single applications of chemical agents in various forms (liquid, paste, varnish) with different mechanisms of action were used: varnishes (Duraphat and Seal & Protect) and complex agents (Tooth Mousse paste and Green Or liquid). Two provocative stimuli were used to induce pain: mechanical (touching and moving the dental probe over the cervical surface of the tooth) and thermal (a stream of air from an air/water syringe). The intensity of pain was measured using the VAS scale based on the patient's subjective feelings. Each sensitive tooth was classified into one of three groups: low dentine sensitivity (Group A, VAS 1-3), medium dentine sensitivity (Group B, VAS 4-7), and high dentine sensitivity (Group C, VAS 8-10). For the chemical methods the initial sensitivity of the teeth was measured, as well as immediately after a single application of the agents (15 minutes after the procedure) and on follow-up visits: after 3, 7, and 30 days. For the physical method, the initial sensitivity of the teeth was measured, as well as before and after each laser therapy session, which were carried out a total of three to six times at 2–3-day intervals. The

therapeutic effectiveness of all methods was compared immediately after the procedure and in follow-up examinations: after 3 days from the application of chemical agents and after the second laser therapy session, after 7 days from the application of chemical agents and after the fourth laser therapy session, and after 30 days from the procedures. The results were compared at all the above-mentioned measurement points in the entire study material and in individual groups with different intensity of dentine sensitivity. The influence of the age and gender of the studied individuals, as well as the location of the tooth in the dental arch on the frequency and degree of dentine sensitivity was also analyzed. The obtained results of the clinical effectiveness of the tested methods were subjected to statistical analysis. Statistical data was considered significant for $p < 0.05$

Results

The analysis of the results of the questionnaire and clinical study showed the significant role of erosion, mechanical injury and stress in the etiology of dentine hypersensitivity. The clinical effectiveness of the tested chemical methods was found to be better than the physical method (biostimulatory laser therapy) in reducing dentine sensitivity throughout the study period (one month). Among all the tested methods (chemical and physical), Tooth Mousse paste had the best desensitizing properties (statistically significant at $p < 0.05$). It provided immediate pain relief after application and had the strongest desensitizing properties, which remained at a high level throughout the study period. Among the chemical agents, Duraphat varnish had the weakest effect on reducing sensitivity. Green Or liquid and Seal & Protect varnish had comparable effectiveness and were classified between Tooth Mousse paste and Duraphat varnish. Immediately after the procedure, the physical method had the lowest clinical effectiveness (statistically significant) among the tested methods. Laser therapy in the initial series of irradiation (from I to III) had the weakest (statistically significant) desensitizing effect compared to all the chemical agents tested in this study. Only the fourth irradiation session produced an effect similar to the results obtained 7 days after the application of chemical agents. In the follow-up examination conducted 30 days after the application of chemical agents and the last laser irradiation session, a decrease in the therapeutic effectiveness of the tested methods was observed. In the group of teeth treated with Tooth Mousse paste, the return of dentine sensitivity was the weakest and in the teeth treated with laser, the strongest (statistically significant). At the same time, in none of the methods did the level of pain discomfort return to the pre-treatment state after one month. A correlation between the frequency and intensity of

dentine sensitivity and the age, gender of the subjects studied or the position of the tooth in the dental arch was not observed. Incisor teeth were an exception, which showed lower initial sensitivity of the dentine and at the same time were less amenable to treatment than other tooth groups (statistically significant data).

Conclusions

Based on the obtained results, the following conclusions were formulated. Chemical desensitizing agents present better clinical effectiveness in decreasing dentine sensitivity compared to biostimulatory laser therapy. Complex agents (Tooth Mousse paste and Green Or liquid) have stronger desensitizing properties than fluoride varnishes. Due to its strong and long-lasting desensitizing effect, Tooth Mousse paste can be recommended as the first-choice treatment method for immediate and medium-term dentine hypersensitivity relief in everyday clinical practice. Biostimulatory laser therapy can be used to aid chemical methods of treating intense dentine hypersensitivity, as well as an alternative to conventional (chemical) methods in cases of low intensity dentine hypersensitivity. It is recommended to repeat biostimulating laser irradiation 30 days after the initial procedure, due to the decrease of clinical effectiveness with time.