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Comparative Analysis of Various Methods of Gingival Retraction in Orthodontics

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Abstract: In modern orthodontic treatment, the display of the features of the formed tooth stump, especially the ledge line, is a prerequisite for high-quality restorations. We performed gingival retraction on 40 patients, ranging in age from 21 to 53 years, using traditional and modern methods. Retraction threads were used, whose impregnation included various chemical compounds and pastes for gingival retraction. Results were discussed in terms of the physicochemical properties of the means used, the quality of the impressions obtained, the atraumatic nature of the retraction, and its effect on the overall physical condition of the patient. Results were recorded using a multifunction laser diagnostic device "LAKK-M" and an electronic tonometer. The quality of the impressions was assessed visually. We conclude on the advantages and disadvantages of the systems used and their influence on the general dental condition of the patients

Keywords: effects of gingival recession, recession threads, recession paste, impressions in orthodontics, epinephrine.

Annotation: With the development of orthodontics, the demands on the quality of prosthetic structures have increased. In addition to the use of new materials and methods for the fabrication of fixed orthodontic structures, so-called auxiliary materials became necessary. Without auxiliary materials, it would be impossible to fabricate high quality prosthetic structures in today's reality. One type of such material is the retraction system, which assists the dentist in many stages of treatment in a variety of clinical situations [2,5]. Gingival retraction was first reported by Thompson in 1941. Retraction involved the use of moistened twine [4]. Today, various compounds are impregnated in the production of retraction threads, for example, epinephrine hydrochloride, alum (double sulfate of aluminum and alkali metals), aluminum chloride, aluminum sulfate, zinc chloride, tannic acid, and ferrous sulfate. These substances have the action of facilitating the dentist's work, mainly by stopping the bleeding that can occur during various procedures. In addition to retraction threads, there are other systems such as retraction pastes [4]. However, all methods of mechanical gingival retraction are traumatic, and the compounds that make up the threads not only improve their properties but also affect the surrounding tissues, which is manifested by temporary changes in the microcirculation of the marginal gingiva, with recovery periods ranging from 30 minutes to 2 weeks. [1,3,6]. Thus, the practical significance of this study is due to the widespread use of retractor systems by dentists. Objectives of the Study To compare and analyze different gingival retraction systems based on their characteristics. To display data on the changes in the condition of the periodontal ligament when these systems are used. To study the effect of the

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chemical compounds used to impregnate the threads and contained in the retraction paste on the periodontal tissue. To evaluate the quality of the prints obtained.

Materials and study methods: Forty patients, aged 21-53 years, without severe chronic diseases of the cardiovascular and endocrine systems, were included in the study. Equal groups of 8 patients each were formed according to the materials used. Three types of retraction threads and two types of retraction pastes ("3M ESPE Astringent Retraction Paste" and "Expasyl") with different physical and chemical properties were used for gingival retraction The following two impressions were taken. To take double impressions, a-silicone impression materials were used: Zhermack Hydrorise Putty Fast Set + DMG Silagum Light Body, Elite HD Plus Putty + Sildent Light Body. According to this study, epinephrine hydrochloride-impregnated threads not only have more pronounced local changes, but also affect the general condition of the body, potentially causing morbidity in certain groups of patients during dental visits. This levels the positive qualities of their exceptional capacity for hemostasis and creates a risk in their use. On the other hand, threads impregnated with aluminum chloride do not have such a pronounced effect on periodontal tissue and the human body as a whole, and the compounds contained in the impregnation have a good hemostatic effect. Threads without the impregnant can be used in cases of thick gingival biotypes, and they function qualitatively well with careful styling that does not cause bleeding. Gingival retraction pastes contain aluminum chloride, which promotes hemostasis. It is virtually nontraumatic and, because of its viscosity, has minimal local adverse effects on tissues. The change in the general state of the body when using an epinephrine hydrochloride-free retraction system is explained by the patient's excitement during the retraction procedure compared to the resting state, which is the norm for physiologic response. Attention should also be paid to the quality of the impressions we take, as we actually perform a gum retraction to clearly show the space behind the shoulder. The impressions we took were evaluated subjectively, visually, and by optical 5x magnification using an office magnifier. The results showed that the retraction paste was not inferior to the retraction threads. The data obtained are averages for each patient group using the various retraction methods, and it can be concluded that the retraction paste offers advantages over the traditional "single-threaded" retraction method. Highlighting the main advantages of the retraction paste compared to the retraction thread, mention should be made of the effect of the substances that make up the impregnation of the retraction thread. Its main hazard is epinephrine hydrochloride, which has a fairly strong effect on blood pressure, pulse rate, and hemoglobin oxygen saturation. It should also be taken into account that cardiovascular diseases have become very young in recent years. It used to be that after the age of 50-60 years, the disease was "age-related," but now the statistics have changed dramatically. Heart attacks and strokes are increasingly being hospitalized by young men and women between the ages of 30 and 35 who are wealthy and not engaged in hard labor. Many of these patients are unaware that they have cardiovascular morbidity.

Conclusion: In the course of this study, the use of retraction paste was found to be more reasonable when orthopedic manipulation is performed prior to impression taking. When retraction paste is used, there is no trauma to the circular ligament of the tooth, which can occur when inserting the thread into the periodontal ligament groove. The paste causes no discomfort to the patient during gingival retraction and eliminates the need for anesthetic injections

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intended to relieve the pain associated with the application of the thread. The use of the paste also reduces the risk factor of an emergency situation in response to the introduction of a local anesthetic contained in the retraction threads.

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