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Innovative Approach of Periodontal Therapy before Orthopedic Prosthetics

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Annotation: Periodontitis is one of the most common dental diseases and therefore attracts increased attention from specialists. Treatment of periodontal pathology becomes more complicated in the duration of the process where it must take active participation of the patient himself. Numerous visits, an extensive list of medications, the pain of some manipulations, the need for surgical interventions often lead to refusal of treatment at various stages.The social significance of the problem is associated with time and economic costs, low level of patients' motivation for complex treatment. In the conditions of modern dentistry, when the doctor not only provides qualified periodontal help, but also sells it, the problem of quality and the most effective impact on the causative factors and mechanisms of the pathogenesis of the disease is acutely raised.

Keywords: Periodontitis, professional hygiene, Vector therapy, antimicrobial, scaling.

Using the most modern treatment technologies of periodontitis, it should be remembered that the greatest effect is possible only if they are used as a stage complex treatment with clear location indication and the role of the selected technology in terms of rehabilitation patient. A significant factor in the development of periodontitis is the active growth of bacteria in dental plaque, increased bacterial virulence and the appearance of periodontal pathogenic anaerobes, which trigger a cascade immunological process.

For a long time, dental practice was dominated by the surgical approach to the treatment of periodontitis, and the most common methods were curettage and patchwork operations, when incisions were made, exfoliation and removal of ingrown epithelium and pathologically changed tissues, bone filling pockets followed by suturing. Such cases, it was inevitable that recessions would occur, leading to aesthetic disturbances due to lengthening the clinical crown of teeth. Majority patients refused surgical treatment, when this could not be carried out for everyone due to the availability contraindications.

Modern trends in periodontology are the priority of conservative and refusal of the widespread use of surgical treatment, sparing relation to periodontal tissues, application of methods low-traumatic microsurgery, increasing the range etiotropic and pathogenic therapy.

Professional hygiene is the main stage of this otropic treatment, preceding other types therapy, carried out using hand instruments (scalers, curettes), electromechanical, rotating and air-abrasive systems. Hand tools are curved or twisted in a suitable manner and have sharp cutting edges on the working part to clean the accessible surfaces of the teeth, which gives the ability to cut off mineralized deposits, while leaving a relatively smooth surface

The hygienist must effectively remove supragingival plaque and deposits without unnecessary removal of soft tissue and dentin during pocket debridement. Periodontist carries out complete removal of deposits, polishes the root surface to slow down the reformation of plaque and facilitate hygiene measures during a long period of patient rehabilitation. At manual cleaning is difficult not to affect healthy tissue, since the doctor has to act practically blindly. Limited access to deep periodontal pockets, insufficient visibility and poor patient tolerance of some painful manipulations are typical obstacles to treatment.

For successful treatment, the “closed” method of working in the periodontal pocket requires skill and experience on the part of the practitioner, as well as choice suitable techniques and tools that are dynamically developing and improving. However, even optimized for manual surface processing Gracie root curettes, which are the gold standard, cause unwanted loss of tooth root cementum, which is important for subsequent tissue regeneration periodontal.

In addition to thorough mechanical cleaning of the tooth surface from hard and soft deposits, as well as removal of altered tissues from the pocket is necessary long-term and active control of dental plaque. The goal of etiotropic therapy is the destruction of the subgingival bacterial biofilm, for which they use mechanical and medicinal methods of influence. So how the structure of the biofilm does not allow penetration into plaque antibacterial agents, antibiotics used in treatment as a support, and not as a replacement for scaling.

Ultrasound devices have the properties ideally meeting the requirements of periodontal therapy. Thanks to the ultrasonic effect, the liquid cleans the root surface regardless of the morphology of the tooth without removing hard tissue. In addition, ultrasonic waves in a humid environment have an antimicrobial effect, and the cooling and rinsing solution removes a lot of bacteria from periodontal pockets.

Producing more precisely engineered working parts attachments adapted to work in periodontal pockets, has led to ultrasonic scalers becoming a good alternative to hand tools. The disadvantages of ultrasound include painful manipulation due to overheating of the root surfaces with insufficient cooling, as well as formation of a rough surface of the root zone due to not always high-quality contact cleansing. Remaining unevenness creates a risk for plaque re-formation. Tactile abilities the doctor's ability to work with ultrasonic attachments is limited compared to hand instruments. Multi-directional ultrasonic vibration of traditional devices can lead to damage to deep periodontal tissues.

Ultra disperse or powder-jet action consists of a directed supply of a jet stream an aerosol containing water and sodium bicarbonate powder. Devices based on the cavitation effect or air abrasion, facilitate the removal of subgingival deposits and biofilm, allowing more efficient carry out root polishing. However, the choice there may be a treatment that will preserve the root cement and partially soft tissues of the periodontal pocket for subsequent restoration of structures. Piezoelectric scalers have an effective the tool's action zone runs along its longitudinal axis, and the tip moves only in a linear direction with a frequency of 45 kHz. The impact is assessed as more comfortable, since heat is not generated. Increasing the pressure on the tool reduces it effectiveness, even if used incorrectly the rounded tip of the nozzle can cause damage to teeth.

Based on scientific achievements and clinical results in dentistry, a specialized system of conservative treatment of pathology was developed periodontal, focused on the cause of the disease. In everyday dental practice for a long time, it is possible to carry out effective and at the same time gentle therapy for periodontal diseases using Vector ultrasound system (Dürr Dental, Germany).

The main advantages that distinguish the Vector device from other devices operating on the basis ultrasound, is the ability to regulate the amplitude of vibrations, the use of a special suspension and a large assortment of removable tools and attachments. The system contains a device for sharpening tools, a torque wrench for fixing them, disinfectant and service kit, ensuring high-quality infection control.

To remove supragingival deposits, often massive and durable, uses a handpiece that transmits amplified ultrasonic energy to a special Vector-Scaler instrument that matches standards of professional teeth cleaning. Liquid is supplied inside the instrument and virtually no aerosol formation occurs, can be used polishing suspension.

Thanks to the unique the design of the Vector-Paro device eliminates the problem of random movements of the cleaning tool; the risk of damage in this technology is minimized due to the absence of uncontrolled oscillatory and rocking movements.

Vector therapy is intended for outpatient conservative periodontology. Efficiency confirmed by scientific research of foreign and domestic authors. Evaluation criteria tools in periodontal therapy when working on the root surface were the absence of damage to the hard tissues of the tooth, the duration of treatment (treatment), the force applied to the instrument, and ease of maintenance. Comparison results different methods of biofilm removal have been shown a gentler attitude of the Vector technology towards the hard tissues of the tooth, which had a positive effect on regeneration.

Another advantage is the ease of maintenance of the device compared to Gracie curettes, which require some time to sharpen and polishing. An important factor and feature technique is to minimize the effort when working with attachments in the periodontal pocket, which can be useful for experienced practitioners. The new Vector-Paro system has been improved and optimized for wider periodontal practice, prevention and implantology.

Clinical advantages of the Vector method compared to many years of practice using manual instruments and other ultrasound devices is that patients have a positive attitude to the treatment, since during and after Vector curettage there are practically no unpleasant or pain. Therefore, in many cases you can do without anesthesia, which is important when working with hyperexcited and young patients. More In addition, particles of the preparation included in the polishing suspension, reduce after treatment the traditional increased sensitivity of teeth to external irritations. As a result, patient motivation increases to cooperation. The system ensures ergonomic manipulation and a high degree of tactile sensitivity even in deep periodontal pockets.

After scaling, the tooth surface, often rough, can be the basis for the formation new plaque and plaque formation, so Vector provides a double effect: the smallest particles of hydroxyapatite (10 nm) in the composition of the Vector drug Fluid polish gently polishes surfaces during cleaning teeth. Even in hard-to-reach areas, the suspension elements that spray the surface of the nozzle optimize polishing, resulting in a clean finish and smooth root surface. The pocket is washed intensively without creating an aerosol. Number of microbes associations is significantly reduced due to hydrodynamic effects without damage to soft tissues. As a result, they are effectively removed not only biofilm, bacterial plaques, dental stone, but also endotoxins, which have a powerful damaging effect and slow down healing.

The Vector system works with affected tissues gums at the micro level. Moreover, the use of a suspension of hydroxyapatite has antimicrobial and anti-inflammatory effects in a humid environment. On the surrounding periodontal tissues and stimulates their regeneration, helping the gums to quickly recover after procedures. In this regard, it is important to use Vector therapy for preparing abutment teeth before prosthetics and after orthopedic treatment. Unlike hand tools, due to the lack of there is no danger of damage to fixed structures due to vertical pulling forces to the edge of the crown.

Vector effectively eliminates infection on the implant surface. Flexible carbon fiber tools combined with a polishing slurry allow surfaces to be cleaned without damage complex shape, superstructures, sensitive materials. Inflammation of the tissue around the implant is one of the most important problems in implantology. In fact, the Vector device is the only alternative for the treatment of such complications.

A conventional ultrasonic scaler does not allow treating periodontal pockets deeper than 5 mm. Feature of Vector technology in treatment chronic inflammatory periodontal diseases is high efficiency in removing excess granulation tissue from periodontal pockets due to indirect binding of ultrasonic energy, and not “scraping out” granulations instrumentally.

The energy gently penetrates into the periodontium to a great depth (up to 11 mm), which in general can replace such surgical manipulation, such as curettage, and can be used with great success in patch surgeries, gingivoplasty, etc. After such a gentle treatment, as a rule, gum retraction is not observed. In many cases, surgery can be avoided treatment methods. Therefore, using Vector allows achieve more pronounced dynamics of this indicator and reduce the depth of periodontal pockets.

For underlying diseases of the mucous membrane oral cavity work with ultrasound system Vector on the periodontium due to the atraumatic nature of soft tissues does not cause exacerbation or worsening of the condition, and a decrease in overall microbial contamination and active sanitation of foci of infection in periodontal pockets has a positive effect on the treatment of pathology mucous membrane.

To increase efficiency and achieve the best clinical results of treatment, it is necessary comply with the systematic procedure, which consists of in the treatment of all teeth and surfaces using appropriate tools, as well as performing maximum volume in one visit with minimal tissue trauma.

In the clinic of the Department of Orthopedic Dentistry SamSMU Vector technology is used in complex treatment of patients with periodontitis of varying degrees severity before orthopedic treatment. Before prescribing Vector therapy, a thorough history taking and examination of the patient is necessary. for clinical diagnosis and planning treatment. At the same time, the periodontogram indicates the depth of probing, recession of periodontal tissue, the presence and depth of furcations, tooth mobility and the condition of bone tissue according to an x-ray. Hygienic we use indices and bleeding indicators to monitor the progress of treatment.

After sanitation, correction of individual hygiene and scaling, ultrasonic treatment of tooth root surfaces with the Vector device, using the entire range of attachments. The primary intervention is completed in one visit (Fig. 1-4).

Fig. 1 *Patient K., chronic generalized periodontitis moderate severity.*

State before Vector therapy

Fig.2. *Patient K., chronic generalized periodontitis moderate severity. Condition after Vector therapy*

The procedure is painless for most patients and lasts from 40 minutes to two hours, depending on the number of teeth being treated.

10-14 days after procedures, a follow-up visit was scheduled, where hygiene skills were monitored and analyzed dynamics of recovery, excluding probing of periodontal defects. If necessary, the root surface was cleaned again.

Fig.3. *Patient A., Chronic generalized periodontitis severe in the acute stage. Condition before Vector therapy.*

Fig.4. *Patient A., Chronic generalized periodontitis severe in the acute stage.*

State after Vector therapy (Vector-Scaler and Vector-Paro).

In accordance with the recommendations, they were examined after 1.5 months periodontium to detect relapse of inflammatory process, gave recommendations on oral hygiene for long-term preservation of results. Further the intervals between visits were determined for each patient individually, taking into account the clinical paintings. Primary patients for the most part preferred the Vector treatment, despite its price. Patients who had already undergone Vector therapy noted significant improvement, which was expressed in a persistent decrease in bleeding, a feeling of a “clean” mouth, decreased tooth mobility.

An integral part of complex treatment are supportive procedures. Thanks to the use of carbon fiber tools repeated manipulations are simple and gentle. Regular control of index indicators of periodontal condition, analysis of the dynamics of the depth of periodontal pockets and their re-infection, systematically preventive measures taken during the period dispensary observation contribute to the stabilization of processes in the periodontium with possible subsequent restoration of its structures.

Thus, the scientifically proven and improved Vector technology for conservative periodontal therapy is as close as possible to the ideal surface treatment tool root, taking into account the specifics of its use and indications. Today she is the only a method that allows you to delay or eliminate surgical phase of treatment.

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