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КАФЕДРА ПЕРИОДОНТОЛОГИИ

Л. Н. Дедова, В. И. Даревский, А. А. Володько

ПОДГОТОВИТЕЛЬНОЕ ЛЕЧЕНИЕ ПАЦИЕНТОВ С БОЛЕЗНЯМИ ПЕРИОДОНТА: ГИГИЕНИЧЕСКИЕ МЕРОПРИЯТИЯ

PREPARATORY TREATMENT OF PATIENTS WITH PERIODONTAL DISEASES: HYGIENIC MEASURES

Учебно-методическое пособие

Минск БГМУ 2026

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Д26 Подготовительное лечение пациентов с болезнями периодонта: гигиенические мероприятия = Preparatory treatment of patients with periodontal diseases: hygienic measures : учебно-методическое пособие / Л. Н. Дедова, В. И. Даревский, А. А. Володько. – Минск : БГМУ, 2026. – 55 с.

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Представлен инструментарий для удаления зубных отложений в клинической периодонтологии. Дана полная характеристика инструментов для скелинга и корневого сглаживания. Изложены принципы работы с периодонтологическими инстументами, а также некоторые вопросы эргономики. Представлены средства и методы заточки периодонтологических инструментов.

Предназначено для студентов стоматологического факультета и медицинского факультета иностранных учащихся, аспирантов, клинических ординаторов, врачей-интернов, врачей-курсантов.

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MOTIVATIONAL CHARACTERISTICS OF THE TOPIC

Topic. Preparatory treatment of patients with periodontal diseases: hygienic measures.

Total time of classes: 825 min.

Motivational characteristics of the topic. Hygienic measures are the main stage in the preparatory treatment of patients with periodontal diseases. The effectiveness of hygienic measures affects the results of complex treatment of periodontal diseases. The main task of treating inflammatory-destructive periodontal diseases is the elimination of local risk factors for their development, among which the leading place is occupied by the removal of supra- and subgingival mineralized dental deposits. The quality of this manipulation determines the result of treatment, the duration of remission.

Lesson objectives:

– didactic — to motivate students to study the stages of planning, methods and means of conducting professional hygiene and assessing the effectiveness of hygiene measures in patients with periodontal diseases;

– methodological — to teach students methodological principles: drawing up a treatment plan for patients with periodontal diseases, choosing the necessary means for professional hygiene and assessing the effectiveness of their use;

– scientific — to develop scientifically based clinical thinking in students when planning, choosing the method and means of conducting professional hygiene, analyzing and assessing the criteria for the effectiveness of preparatory treatment in patients with periodontal diseases.

Tasks of the lesson:

Know:

1. The purpose and objectives of the preparatory stage of periodontal disease treatment.
2. The sequence of treatment measures in preparatory treatment.
3. Classification of dental plaque.
4. Stages and methods of removing dental plaque.
5. Classification of instruments for scaling and root planing and their characteristics.
6. Structure of a periodontal instrument and general characteristics of its components (ergonomics of the instrument, functional core, significance of the terminal part)
7. Basic principles of working with periodontal curettes.
8. Methods of removing dental plaque using devices (sonic, ultrasonic and hydroaerosol).
9. Criteria for assessing the effectiveness of preparatory treatment.

Be able to:

1. Have communication skills when interacting with a patient, observing medical ethical principles.

2. Plan a sequence of preparatory treatment activities for a patient with periodontal disease.

3. Diagnose dental plaque in a patient with periodontal disease using periodontal probes.

4. Be able to correctly position the working part of the instrument on the tooth surface during periodontal manipulations.

5. Carry out hygienic measures in patients with periodontal diseases up to OHI-S ≤ 0.3–0.6 using periodontal curettes (with the help of a teacher).

6. Carry out hygienic measures in patients with periodontal diseases up to OHI-S ≤ 0.3–0.6.

Requirements for the initial level of knowledge:

1. The role of local and general factors in the development of periodontal diseases.

2. Diagnosis of periodontal diseases (chronic gingivitis, chronic periodontitis).

3. Clinical manifestations of periodontal diseases.

4. Methods of individual oral hygiene.

5. Prognosis of periodontal diseases.

6. Ergonomics in periodontology.

Test questions from the related disciplines:

1. Morphological features of periodontal tissues.

2. Predisposing factors and mechanism of development of inflammatory-destructive processes in periodontal tissues.

3. Composition of oral microflora.

4. Drug therapy in dentistry.

5. Deontology in the work of a dentist.

Test questions on the topic of the lesson:

1. The purpose of preparatory treatment of periodontal diseases and the sequence of treatment measures at this stage of treatment.

2. Classification of dental plaque and its characteristics.

3. Features of motivation of patients with periodontal diseases.

4. Instructions on oral care.

5. Features of removing dental plaque.

6. Stages, methods and means of professional mechanical removal of dental plaque.

7. Results of the effectiveness of preparatory treatment.

8. Systematics of periodontal instruments and their brief characteristics: universal curettes, zone-specific curettes, scalers, rasps.

9. Structure of a periodontal instrument and general characteristics of its components (ergonomics of the instrument, functional core, significance of the terminal part).

10. Basic principles of working with periodontal curettes.

11. Professional removal of dental plaque using devices, chemicals.

12. Rules for using an ultrasonic device.

13. Contraindications to the use of ultrasonic scalers.

INTRODUCTION

An important task in the treatment of periodontal diseases is the elimination of local risk factors for their development, among which the leading place is occupied by supra- and subgingival dental deposits. The effectiveness of the planned treatment of periodontal diseases depends on the high-quality removal of dental deposits. In this regard, the choice of means and methods of professional hygiene is relevant, among which the use of special instruments plays a decisive role in performing this procedure.

CLASSIFICATION OF DENTAL PLAQUE AND ITS CHARACTERISTICS. MOTIVATION AND INSTRUCTION ON ORAL CARE

The aim of the preparatory stage and the sequence of treatment measures at this stage of treatment

The aim of the preparatory stage — preparing the patient for a re-evaluation of the periodontal tissue condition, and the purpose of the re-evaluation is to evaluate the effectiveness of the preparatory treatment for planning subsequent manipulations.

Sequence of treatment measures at the preparatory stage of treatment:

1. Providing emergency care (for periodontal and periapical abscesses, etc.);

2. Carrying out hygiene measures (motivating the patient, teaching individual oral hygiene, selecting hygiene products, removing dental plaque with mandatory polishing of teeth, monitoring plaque growth);

3. Elimination of iatrogenic factors that contribute to the accumulation of dental plaque (replacement or correction of poor-quality fillings, dentures, orthodontic structures, restoration of contact points, treatment of caries, pulpitis, apical periodontitis, removal of tooth roots, teeth with apical periodontitis that cannot be treated, loose teeth with significant bone loss;

4. Primary occlusal correction;

5. Temporary prosthetics and splinting of teeth.

CLASSIFICATION OF DENTAL DEPOSITS AND THEIR CHARACTERISTICS

«Dental deposits» is a general term for dental plaque and dental calculus. According to the International Classification of Dental Diseases (ICD-DA, WHO, Geneva, 1995), dental deposits are classified:

К 03.6 Dental deposits
К 03.60 Pigmented plaque
Black
Green
Orange
К 03.61 Caused by the habit of using tobacco
К 03.62 Caused by the habit of chewing betel
К 03.63 Other extensive soft deposits
White deposits (materia alba)
К 03.64 Supragingival dental calculus
К 03.65 Subgingival dental calculus
К 03.66 Dental plaque
К 03.68 Other specified deposits on teeth
К 03.69 Unspecified deposits on teeth

When making a diagnosis of «Deposits on teeth», it is specified according to the classification. It is necessary to distinguish between deposits on teeth with a change in the color of the teeth. Thus, tooth discoloration is classified as follows:

К 03.7 Discoloration of hard dental tissues after eruption
К 03.70 Caused by the presence of metals and metallic compounds
К 03.71 Caused by pulp bleeding
К 03.72 Caused by the habit of chewing betel, tobacco
К 03.78 Other specified discoloration
К 03.79 Unspecified discoloration.

Orange pigmented plaque (К 03.60) is localized on the oral and vestibular surfaces of the front teeth. It is formed by chromogenic microorganisms.

Green pigmented plaque (К 03.60) is localized on the vestibular surface of the upper incisors. It is found in children, more often at a younger age, especially with tuberculosis of the lymph nodes. Its appearance on teeth is associated with chromogenic bacteria that secrete pigments such as chlorophyll. These can include both bacteria and certain types of fungi, such as Aspergillus and Penicillinum. This type of plaque is often associated with imbalanced oral microflora, decreased immunity, and poor hygiene.

Black pigmented plaque (К 03.60) is localized on the lingual surfaces of the teeth, closer to the gingival margin, more often in women even with good

hygiene, tightly attached to the surface of the teeth. It is formed by Bacteroides melaninogenicus and other chromogenic bacteria.

Deposits on teeth caused by the habit of using tobacco (K 03.61) — dark brown deposits, products of tobacco smoke, tightly attached to the cuticle of the teeth in pits, fissures, difficult to remove.

Other extensive soft deposits (soft plaque) (K 03.63) — is an accumulation of microorganisms, products of their vital activity, exfoliated epithelium, proteins, lipids of saliva, etc. Unlike plaque, it does not have a permanent structure, can appear on previously cleaned teeth within a few hours, even without eating. In soft plaque, microorganisms are in an active state, so it quickly causes gingivitis. Yellow, white soft sticky deposits tightly adhere to the surface of teeth, fillings, dental calculus, gums.

Supragingival calculus (K 03.64) is dental plaque calcified with mineral substances of saliva. Supragingival calculus is normally located in the area of crowns above the gingival margin and only a small part of it can come into contact with the gum. Since this type of calculus is easier to recognize by the doctor and the patient, it is removed more often than the more dangerous subgingival calculus, which is usually not even detected.

Subgingival calculus (K 03.65) is calcified dental deposits located below the edge of the marginal gum, which is not detected during examination of the oral cavity without the use of additional means. They contribute to the development of inflammation, hyperplasia or recession of the gums. The location of subgingival calculus is not affected by the location of the salivary gland ducts; it is associated with the nature of the periodontal inflammation and the features of the dentoalveolar apparatus. The surface of these deposits is almost completely covered with a layer of plaque. Plaque causes and activates the inflammatory process, increases the flow of gingival fluid, which leads to additional formation of dental calculus. Subgingival dental calculus is an important link in the chain of causal factors, and its timely diagnosis and removal are of exceptional importance in the treatment of periodontal diseases.

Dental plaque (K 03.66). A synonym for this term is «dental plaque». «Plaque» is called by the French word «plaque», which in translation into Russian dictionaries means «plate», «board», «plate», «tablet». This term was first proposed by Black in 1898 in the expression «gelatinous microbial plaques» when describing a jelly-like mass of microorganisms that is located on the surface of carious tooth enamel. Bowen in 1976 gave a definition of «Dental plaque» as soft deposits that form a biofilm stuck to the surface of the tooth. P. A. Leus (2007) calls these «soft deposits» on the teeth and other anatomical structures of the mouth — «plaque». In this regard, «Dental plaque» — K03.66 is called dental plaque, as the most acceptable term.

Dental plaque is a formation of various structures caused by the accumulation and growth of microorganisms on dental surfaces, consisting of various types and strains of microbes. Dental plaque consists of water, microorganisms (more than 400 million in 1 mg of dental plaque), inorganic substances (calcium, phosphorus, potassium, iron, zinc, copper and others) and organic components (proteins, carbohydrates, proteolytic enzymes). There is microbial homeostasis in dental plaque, which is considered as a certain interaction of various types of bacteria with each other and the human body on the one hand, and external and internal factors, such as oral hygiene, diet, and the body's defenses on the other. A prerequisite for the formation of dental plaque is the presence of microorganisms in the oral cavity with the participation of saliva.

All microorganisms of dental plaque are divided into 2 large groups: *acidophilic* microorganisms capable of developing in an acidic environment (streptococci, lactobacilli, actinomycetes, leptotrichia and corynebacteria); *proteolytic* microorganisms producing proteinases (veillonella and neisseria).

When the microbial homeostasis is imbalanced, colonization of exogenous pathogenic microorganisms, alien to the flora of the oral cavity, occurs, which ultimately leads to the risk of developing periodontal diseases. Direct effects on microbial homeostasis are exerted by unfavorable factors: decreased cellular immunity, decreased titers of IgG, IgM in saliva, hormonal shifts, age-related changes in the oral mucosa, exposure of the tooth root. Indirect effects on the microflora of dental plaque are dietary changes, dental prostheses, medication and radiation exposure.

The formation of dental plaque is a physiological process and depends significantly on the characteristics of the tooth and gum surfaces. Dental plaque is a white or yellowish substance that is not subject to physiological cleansing, which is formed when you refrain from brushing your teeth for 1–2 days. It is deposited on those surfaces that are rough. The rate of plaque formation on molars is 2 times greater than on incisors. This depends on their size, surface area and anatomical features. The presence of plaque on the tooth surface at any given moment reflects the balance between the level of plaque formation and the degree of its removal. After brushing your teeth, plaque formation begins within the first two hours, i. e. the rate of plaque deposition in the first 4 hours is the highest, in the next 4 hours it decreases, and then gradually increases, returning to the original level by the end of the day.

There are four stages of plaque formation. The *first stage* is the formation of a cell-free organic film on the tooth surface — pellicle, which plays an important protective role, reducing the solubility of hydroxyapatite in hard dental tissues by 4–6 times. The thickness of the daily film is 2–4 μm. It is formed as a result of spontaneous precipitation of saliva proteins on the tooth surface. This precipitation does not depend on bacterial activity, but is significantly enhanced by the presence of calcium and phosphate ions. Usually, its formation takes from several minutes to

several hours. In its chemical composition, the pellicle is a glycoprotein complex of protein-bound carbohydrates.

The second stage is the direct formation of plaque. This process begins to develop several minutes after the formation of the pellicle and accumulates within two hours after brushing the teeth. At this stage, the precipitation of proteins continues. The precipitated proteins are the first most important component of the plaque matrix. The second component of the matrix is sticky polysaccharides such as dextran, which are produced by the enzyme systems of streptococci using food sucrose as a substrate. This is how the main environment is formed, which is then colonized by microorganisms of the oral cavity. Their precipitation is affected by anions and organic microbial macromolecules and enzymes, as well as the concentration of bacteria and interaction with each other. After 8 hours, their number is up to 10^3–10^4 per 1 mm^2 of the tooth surface, and after 24 hours — 10^5–10^6 in 1 mm^2. In addition to microorganisms, epithelial cells are found in plaque. After 36 hours, dental plaque is clinically detectable.

The third stage — after several days and up to 2–3 weeks, mature plaque is formed. It is a structurally complex polymicrobial formation up to 200 microns thick. At this stage, plaque poses a danger to tooth enamel and gums.

The fourth stage. In cases where anaerobic conditions are created in mature plaque, the composition of microorganisms changes (aerobes are replaced by anaerobes), acid production decreases and pH increases. Within 12 days, plaque mineralizes. This occurs due to the accumulation of calcium and its deposition in the form of phosphorus salts. This is how plaque transitions to its fourth stage, which ends with the formation of tarar(dental calculus). tarar(dental calculus) is finally formed within 3–4 weeks. The rough surface of tarar(dental calculus) predisposes to the retention of microorganisms. tarar(dental calculus) growth occurs as a result of plaque accumulation.

FEATURES OF PATIENT MOTIVATION. THE MAIN STAGES OF ACQUIRING HEALTHY HABITS IN PATIENTS WITH PERIODONTAL DISEASES

Motivation is one of the most effective elements of treatment, in which the patient is oriented in the risk factors and causes of the occurrence or development of periodontal diseases, actively participates in the treatment and prevention of their disease and strives to achieve a healthy lifestyle.

Convincing a patient to change their habits or acquire new ones is a very difficult and long process that goes in slow, repeated steps. It should go in theory – from knowledge – through understanding – to conviction. The level of awareness of dental patients about the need for preventive measures is quite high, despite this, the

motivation of the patients themselves to prevent and treat dental diseases remains low and is a big problem. Therefore, the most important role in the prevention of dental diseases still belongs to the social component of the doctor's profession, that is, we are talking about how the doctor knows how to communicate, and whether he will be able to convince the patient.

When motivating, it is necessary to take into account the patient's age, mentality, and the presence of common somatic diseases that aggravate the course of periodontal diseases. In addition, it is necessary to take into account the socio-economic conditions that affect the effectiveness of motivation: change of residence, nutrition, climate, water, change of work and rest schedule, presence of bad habits, growing psychological stress. Mutual understanding between the doctor and the patient, established behavioral norms ultimately affect the choice, quality, and result of the provision of dental services, including preventive measures. The fact that patients understand the cause of their disease and know how to prevent it does not mean that they will take preventive measures. With regard to periodontal diseases, as well as with regard to other diseases that occur without pain, there are complex psychosocial barriers that prevent seeking help, as well as the implementation and maintenance of preventive measures.

First, the patient should be informed about the cause-and-effect relationships that led to the disease. Motivation and information should be provided from the very first visit. When discussing the medical history and collecting diagnostic data, the patient usually wants to get as much information as possible about his oral health. These first minutes of communication with the patient should be used to the maximum advantage to motivate the patient and gain his favor. The dentist should take into account and take seriously the fact that the patient is most interested in his own case. Panoramic radiographs, easily visible clinical signs of the disease, such as recession, dental calculus and plaque, poor-quality restorations, bleeding gums on probing — all this can be easily demonstrated and explained to the patient using a monitor or a regular mirror.

During subsequent visits, the interested patient can be informed and motivated again, for example, by using indicator solutions to visualise the plaque on the tooth surface and the degree of gum inflammation. In addition, other educational materials such as brochures, tooth models and high-tech tools such as digital intraoral cameras can be used to provide the patient with the necessary information about the state of hygiene and the health of the periodontal tissue.

It has been reported and demonstrated many times that the flow of new information often overloads a person's memory, so that he is no longer able to remember all the details. Therefore, it has proven useful to give the patient small but informative brochures that can be read and studied in addition to the information that the patient heard while sitting in the treatment chair.

One of the convincing methods of motivation is the demonstration of bleeding gums.

For several decades now, the clinical symptom of «bleeding on probing» has been the number one motivation for patients. Specialists have realized that what is most important for patients is not the amount or volume of plaque, or its image, but the reaction of the patient's own tissues to microbial contamination, which has the highest motivational value. If the gingival bleeding index decreases during treatment, this provides visible evidence of success, while simultaneously providing the patient with additional motivation.

The next steps include initial oral hygiene education and professional hygiene. Then, two weeks after professional hygiene, with careful implementation of hygiene measures, the patient can easily see the improvement of the gum condition. This success motivates the patient to further intensive cooperation and compliance. The clinical view after 4 weeks — the virtual absence of bleeding and a sharp reduction in the amount of plaque finally convinces the patient of the correctness of their hygiene actions.

ORAL HYGIENE INSTRUCTIONS

Oral hygiene instructions are given during the first visits to patients, during which the amount of information on methods for delaying plaque growth is gradually increased, with training in brushing teeth on a model. At the same time, attention is focused on the movements of the toothbrush bristles, the technique of using interdental brushes, floss, irrigators, and the features of using mouth rinses. To control the quality of hygiene procedures, they teach how to use plaque indicator devices. During this period of visits, much attention is paid to plaque growth indicators, which indicate the patient's level of competence in oral hygiene.

After the initial hygiene measures listed above, the patient acquires the following skills:

– brushes teeth twice a day using a toothbrush and therapeutic and prophylactic toothpastes;

– uses dental floss, interdental brushes, toothpicks, and brushes to clean interdental spaces;

– treats the oral cavity using irrigators and rinses;

– maintains oral hygiene by brushing the tongue and using plaque indicator dyes.

The doctor wins over the patient and chooses the optimal form of communication for fruitful cooperation and preparation for subsequent events.

Since plaque is the main etiological factor in the development of periodontal diseases, the doctor must increase efforts to teach the patient the optimal methods of brushing teeth. The effectiveness of this event depends on the choice of multifaceted methods of health education.

PROFESSIONAL MECHANICAL REMOVAL OF DENTAL PLAQUE

Peculiarities of dental plaque removal

Peculiarities of dental plaque removal:

1. Adequate access to the working area with the optimal working posture of the doctor and his assistant.

2. Maximum visualization of the working area. It is best to have direct visual contact in the area of the manipulation. To ensure visibility, it is effective to use binoculars in combination with headlamps of the surgical field.

3. Always work with well-sharpened instruments.

4. Maintaining full control over the instrument (use a stable support point for the operated hand when working with hand instruments).

5. If the teeth are mobile, they should be held with the fingers, counteracting the direction of the pressure force of the working instrument or fixing along the axis.

6. Maintaining the cleanliness of the field. Removing calculus alternates with antiseptic rinsing of the interdental spaces and periodontal pockets.

7. Maintain the sequence of removing dental plaque, use overlapping movements that allow you to avoid missing some tooth surfaces.

8. Constantly monitor the quality of removing subgingival plaque using a probe (Explorer 11F–12F).

9. It is necessary to treat the tooth surface with special therapeutic and prophylactic agents.

Stages, methods and means of professional mechanical removal of dental plaque

Periodontal diseases are caused and «supported» by accumulations of microorganisms in the form of dental plaque. Treatment of periodontal diseases begins with oral hygiene measures: motivating the patient with oral hygiene training, professional removal of dental plaque, and control of plaque growth.

The effectiveness of motivating the patient to achieve a healthy periodontium depends on the professionalism of the medical staff. This largely determines the success of the treatment.

Professional hygiene is performed by a dentist or hygienist. Removal of dental plaque consists of removing the pigment film, plaque, supra- and subgingival dental calculus.

Dental plaque is removed by mechanical, physical (ultrasonic), chemical or combined methods.

Pigment films and plaque are usually removed with a toothbrush, paste, floss, toothpick, as well as with a dental handpiece with low rotation speed and

abrasive. There are many types of abrasives in the form of a cup, rubber head, brush, etc. Abrasives are usually used with polishing pastes that contain penza powder, sodium fluoride, tin fluoride and flavor additives. These products are used to remove the pellicle and pigment film. Plaque is best removed mechanically (instrumental, powder-jet) or ultrasonic.

If the patient has dental calculus, the volume and sequence of activities are increased.

There are six stages of dental calculus removal.

Stages of plaque removal:

I. Assessment of dental plaque.

II. Anesthesia.

III. Preoperative treatment.

IV. Scaling and root planing.

V. Polishing of the tooth surface (crown and root).

VI. Treatment of the tooth surface with fluoride-containing agents;

Stage I. Assessment of dental plaque

Before starting the manipulations, the doctor determines the location and amount of dental plaque. The reliability of the calculation of the amount of plaque and the correlation between it and gingivitis is significantly reduced by additional teeth cleaning before examining the oral cavity.

During the process of removing dental plaque, a thorough assessment of the tooth surface is carried out to ensure the effectiveness of the procedure. Direct visual and dental plaque assessment is carried out using a heated dental mirror and dental plaque indicators.

Additional methods are used in assessing dental plaque:

– increasing the surgical field using binocular dental glasses with magnification from 2X to 5.5X, an operating microscope with magnification from 3.4X to 21.3X;

– moving back the gingival margin or gingival papilla using an air stream;

– using diagnostic radiographs: (occlusal (bite-wing), visiographs, orthopantomographs, cone beam computed tomography);

– illumination of the surgical field: additional lighting with LED bulbs, which are built into the saliva ejector, dental mirror, binocular glasses, an operating microscope. Periodontal endoscopy is used as indicated. The periodontal endoscopy device consists of a flexible optical fiber with a diameter of 0.99 mm with LED illumination, placed in a case, which is sterilized after each use. The endoscope is fixed on a specially designed periodontal probe or ultrasonic instrument. Water is supplied under pressure through the case into the periodontal pocket, which provides a clear field of view. The image from the endoscope is transmitted via a video camera to a flat monitor, on which the dentist controls the examination

of the subgingival zone or the process of removing subgingival dental plaque. This device allows you to visualize deep periodontal pockets and furcations, the presence and location of dental plaque. Magnification ranges from 24X to 48X, which allows you to detect even the smallest amount of plaque and dental calculus. Using this device, you can determine and remove dental calculus in areas where it is impossible to do it «blindly». In addition, the use of an endoscope allows for the evaluation of subgingival areas of tooth roots when diagnosing root caries, restoration defects, root fractures, and resorption.

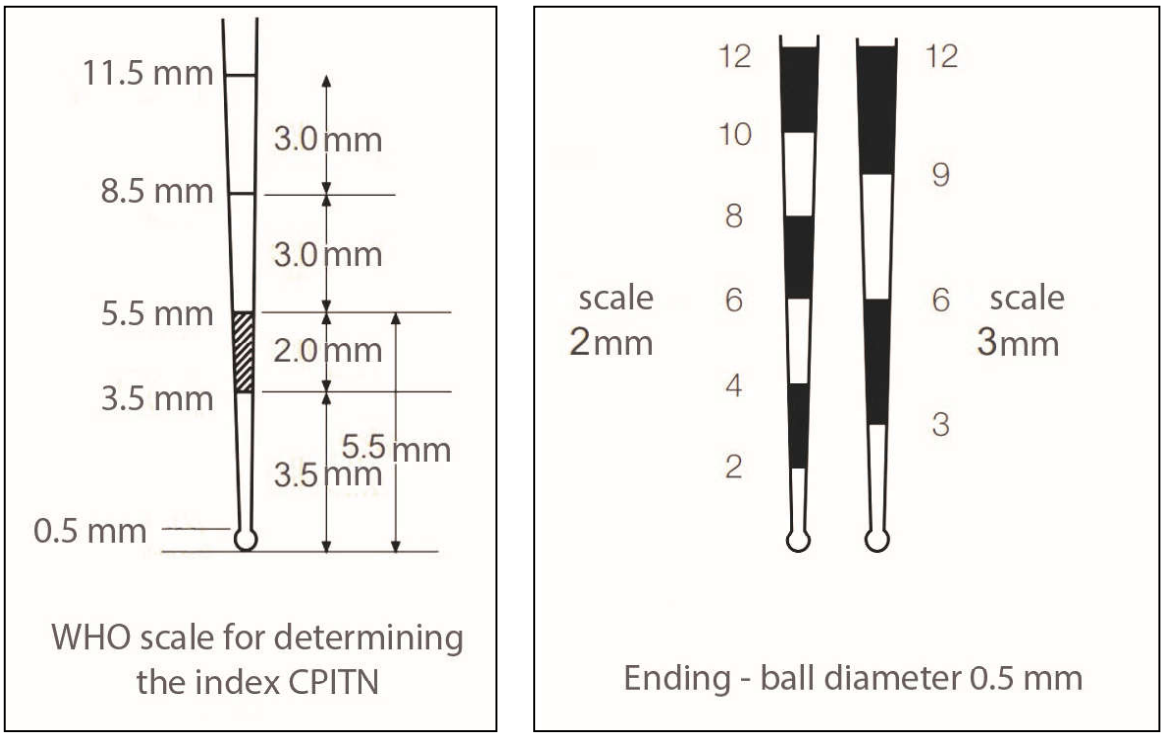
Probing of dental plaque

Determination of the periodontal pocket depth, the presence of subgingival calculus and furcation involvement are carried out using periodontal probes:

– a button probe for determining CPITN — WHO-E (epidemiological) — 0.5 mm ball, mark — 3.5–5.5 mm or WHO-C (clinical) — 0.5 mm ball, marks — 3.5–5.5 mm and 8.5–11.5 mm (fig. 1, *a*);

– a button probe with a 2 mm scale and with a 3 mm scale (fig. 1, *b*);

– with millimeter graduation — Goldman Fox, Williams with marks of 1, 2, 3, 5, 7, 8, 9, and 10 mm; North Carolina with marks 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 mm (fig. 2); — furcation (curved) — Naber with marks every 3 mm (fig. 3).



a ***b***

Fig. 1. Button periodontal probes

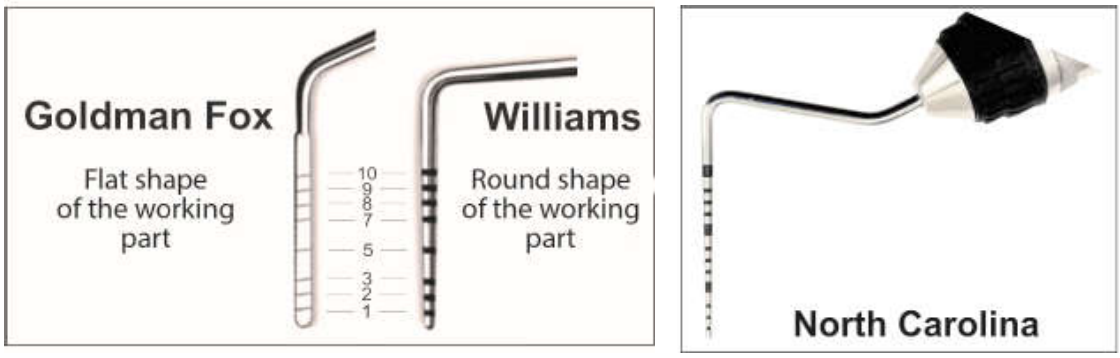


Fig. 2. Periodontal probes (Goldman Fox, Williams, North Carolina)

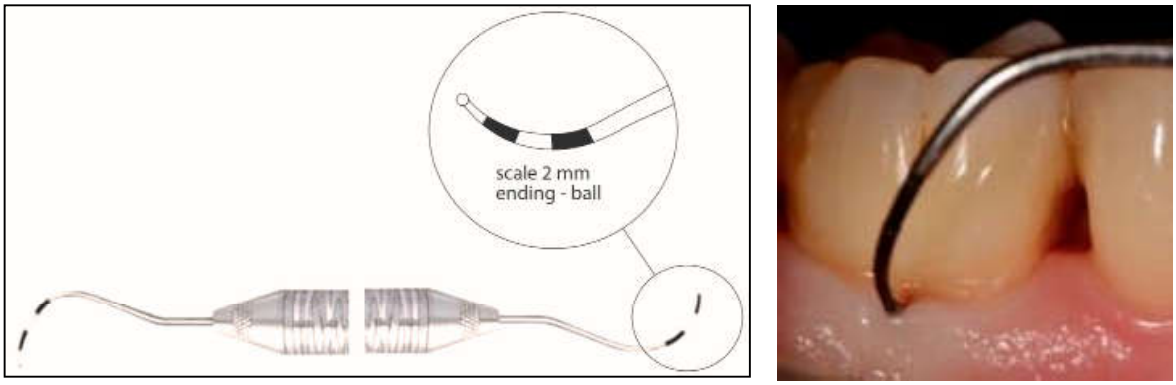


Fig. 3. Nabers furcation probe

To diagnose the presence and quality of removal of subgingival dental deposits, a probe 11F–12F is used, the functional rod of which follows the curves of a periodontal curette 11/12 (fig. 4).

Fig. 4. Periodontal probe 11F – 12F

The recommended force for probing is 0.2–0.25 N. The force is checked by probing the nail bed (until it starts to turn pale).

Principles of Subgingival Calculus Determination

Principles of Subgingival Calculus Determination:

1. The examination area should be dry.
2. If necessary, use additional means to detect tarar(dental calculus) (magnification, illumination, moving the gingival papilla).
3. Maximum tactile sensitivity (basic grip of the instrument in the operator's hand and light contact of the probe with the tooth; the support of the doctor's operating hand is carried out by the 4th finger on the adjacent teeth).

4. The working part of the periodontal probe moves along the surface of the tooth root.

5. Visual characteristics of soft plaque, edges of fillings, structural defects and irregularities of the tooth surface.

In order to completely remove all dental deposits, it is necessary to consider the option of attachment of dental calculus to the root surface:

– with the help of the cuticle;

– unevenness of the root (lacunae in the cement provoke long-term inflammation);

– penetration of dental calculus into the root defect;

– resorption of individual areas of cement and dentin.

The first three options are characterized by a tight connection of dental calculus with the structure of the tooth.

Stage II. Pain relief

Anesthetics and the type of anesthesia are selected individually depending on the general condition of the patient, tolerance, nature and volume of the intervention.

To potentiate the effect of anesthetics, preparatory measures are carried out — 400 mg of ibuprofen is prescribed 1 hour before the procedure.

Conducting local anesthesia: application, infiltration, conduction or combined.

General anesthesia — anesthesia (mask, intravenous).

Stage III. Preoperative treatment

During the period of dental plaque removal, antimicrobial treatment of the oral cavity is carried out. Among all the topographic zones of the oral cavity, special attention is paid to the gingival margin, the cervical area of the teeth and the interdental spaces, irrigating them with non-irritating preparations using a syringe or a 3-functional gun of the dental unit. For irrigation of the oral cavity, antiseptic solutions are used (0.05 % chlorhexidine solution; «Aquin»; 8.5 % povidone iodine solution; 0.01 % miramistin solution, etc.) or herbal infusions (St. John’s wort, chamomile, sage, calendula, eucalyptus).

Stage IV. Scaling and root smoothing (root planning)

For successful periodontal treatment, it is necessary to remove supra- and subgingival deposits and the endotoxin-impregnated cement layer. This is an absolute condition for complete healing and regeneration of periodontal tissues.

Mechanical removal is one of the effective methods of removing dental deposits and includes scaling and root planing.

Scaling is scraping off plaque, calculus and their products from the surface of the crown and root of the tooth.

Root planing is smoothing the root surface in the area of cement or dentin. Root planing includes removing uneven (rough) cement or dentin impregnated with calculus. Root planing is performed both manually and mechanically. If root planing is performed mechanically, low-abrasive burs with conical and flame-shaped working parts of ISO sizes 012, 014 and 016, grain size 75, 40 and 15 μm, with long and short necks are usually used (fig. 5). Burs are used only with a mechanical tip at a speed of 6000 rpm, with reduced pressure application.

Fig. 5. A set of diamond burs for smoothing the root surface in the cementum or dentin area

If root planing is performed manually, the following instruments are suitable:

1. Zone-specific curettes «After five», «Mini five» (soft smoothing movements are performed at the final stage of dental calculus removal).

2. Diamond-coated files for dental calculus removal and root surface smoothing from hard-to-reach tooth surfaces (furcation area, approximal surfaces) (fig. 6).

There are open and closed scaling.

Open scaling — the approach to dental calculus is accompanied by an objective visual analysis of the surgical field (usually with the opening of a flap). This method of removing dental calculus is within the competence of a dentist who has the personal ability to solve a certain level of professional tasks.

Closed scaling — the approach to dental calculus is carried out with the help of an instrument and tactile sensations, does not require radical intervention in the periodontal tissue and can be performed by both a dentist and a hygienist.

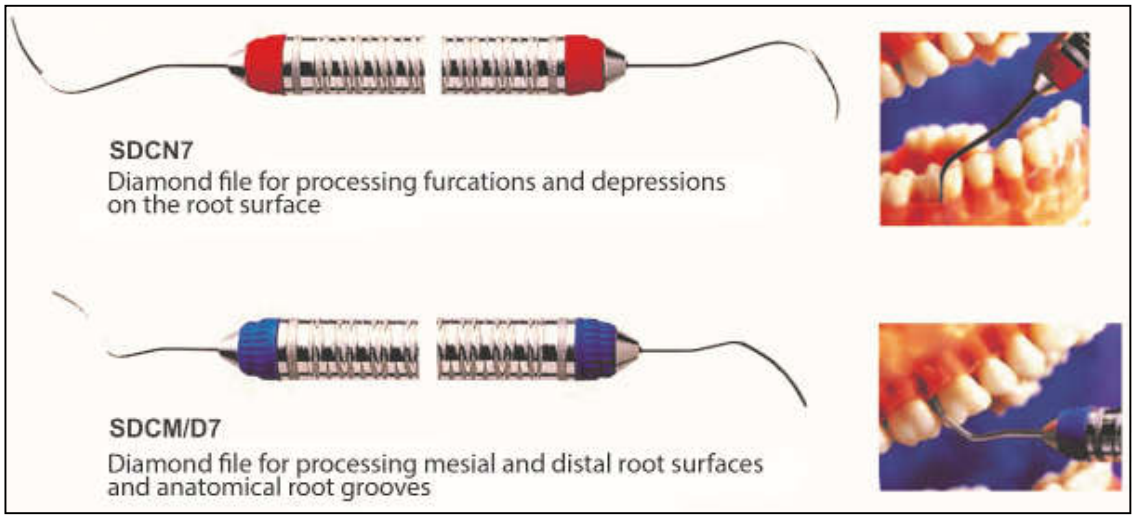


Fig. 6. Diamond coated files for removing dental calculus and smoothing the root surface from hard-to-reach tooth surfaces

Open scaling is more effective than closed scaling, as it allows for targeted control of the instrumental processing of the tooth surface.

Stage V. Polishing of tooth surfaces (crown and root)

Dental calculus must be removed from all surfaces of the tooth until a smooth surface appears. In this case, the surface layers of the affected cement of the dental calculus are removed along with the calculus. After removing the calculus, it is necessary to polish the hard tissues of the tooth and fillings using an abrasive polishing paste. Silicon dioxide is mainly used as an abrasive. Polishing is performed with rotating brushes and soft rubber caps filled with polishing paste, driven into rotation by a micromotor of a mechanical tip (5000 rpm).

Stage VI. Fluorization and coating of teeth with preparations for the prevention of sensitivity

After polishing, the surfaces of the crown, neck and root of the tooth must be covered with fluoride varnishes or applications of remineralizing solutions (10 % calcium gluconate solution, 2 % sodium fluoride solution, 1 % fluocal solution or gel).

Thus, daily implementation of an individual oral hygiene program allows the patient to effectively prevent plaque accumulation; the doctor must constantly re-evaluate the tissues after removing dental deposits after 7–14 days; if gum inflammation remains after ideally performed professional hygiene, then further treatment measures should be planned; successful elimination of gum inflammation provides grounds for further maintenance of the dynamics of the biological periodontal system by periodic professional hygiene and preventive treatment.

Results of the effectiveness of the preparatory stage of treatment

At the stage of re-evaluation of periodontal tissues, the reaction of periodontal tissues to the activities of the preparatory stage of treatment is assessed with the entry of objective data into the medical record. Thus, the following is re-evaluated:

1. Hygienic condition of the oral cavity (indices OHI-S, PHP, PLI, etc.).
2. Condition of the gums (indices GI, PMA according to Parma, etc.).
3. Condition of the wall of the periodontal pocket (palpation, probing depth, etc.).
4. Level of microcirculation of periodontal tissues (vacuum test for resistance of gingival capillaries, IPC, etc.).

Classification of tools for scaling and root smoothing

Classification of tools for scaling and root smoothing:

- Curettes (7, *a*);
- Sickle scalers(7, *b*);
- Files(7, *c*);
- Chisel scalers(7, *d*);
- Hoe scalers (7, *e*).

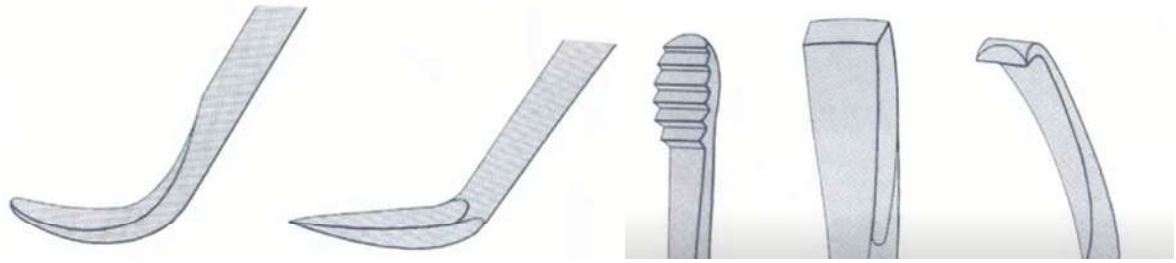


Fig. 7. Classification of tools for scaling and root smoothing

All hand instruments are conventionally divided into two large groups: curettes (zone-specific and universal, excavators), scalers (straight and curved), and are used to remove supra- and subgingival hard dental deposits. In most cases, these are symmetrical instruments with different end working parts. The instrument has its own marking, according to group affiliation, type of instrument handle, degree of its rigidity and metal features. Before removing dental deposits, you should always choose an instrument whose shape corresponds to the features of the crown, neck and root to ensure a tight fit of the instrument edge to the tooth surface. It should be noted that the material from which the instruments are made is stainless carbide steel.

The type of instrument is determined by its working-end part, which includes: tip, front surface, back and one or two cutting edges. In scalers, the working-end part has a sickle shape, a triangular cross-section and two cutting edges that converge in the area of the pointed tip (fig. 8). Due to the sharp tip of the scaler, it is not used in subgingival scaling, due to the possibility of serious injury to soft tissues. Sickle scalers are used to remove massive supragingival dental calculus and subgingival calculus at a depth of no more than 1–2 mm.

Fig. 8. Working-end design of the sickle scaler

Scalers come with a straight blade (for the front group of teeth): Sickle scaler H6/H7, Sickle scaler U15/30 (fig. 9); with a curved blade (for premolars and molars): Sickle scaler 204S, Sickle scaler Nevi2 (fig. 10). Sickle scaler mini 204SD, which has a thin working-end part and an extended shoulder, is suitable for removing supragingival dental calculus from the approximal surfaces of closely adjacent teeth.

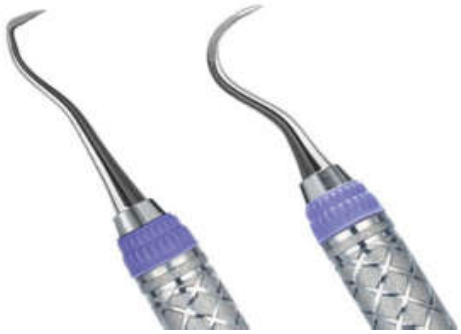


Fig. 9. Sickle scaler U15/30 with straight blade

Fig. 10. Nevi2 sickle scaler with curved blade

Unlike pointed scalers, curettage spoons (curettes) have a rounded end and are designed to remove subgingival, including bifurcation, dental deposits in the area of periodontal pockets, without damaging the periodontal tissues, as well as to remove minor supragingival deposits, necrotic infected root cementum, as well as to remove granulation tissue and epithelium of the periodontal pocket.

There are universal curettes and special (zone-specific) ones, designed for processing a certain tooth surface. Periodontal curettes are classified depending on the degree of shank rigidity. Rigid instruments are used to remove dense (mainly supragingival) dental calculus, but they are ineffective in detecting (probing) dental calculus due to the lack of tactile feedback. Curettes of medium flexibility are designed to remove moderately expressed mineralized deposits and provide good tactile sensations during probing. Flexible instruments are effective in detecting dental calculus and removing slightly expressed dental calculus), mainly in subgingival localization.

As a rule, universal curettes have a medium shank rigidity, zone-specific ones can be flexible (macro, mini), medium flexible (standard) and rigid (fig. 11).

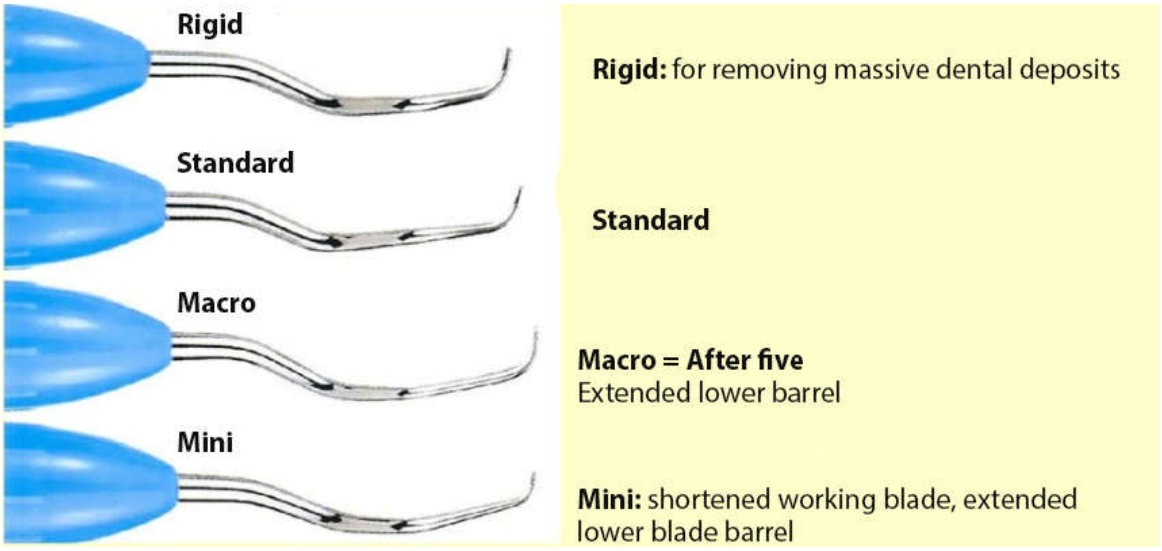


Fig. 11. Classification of instruments depending on the rigidity of the shoulder part

For effective operation, all types of curettes must be balanced. Balanced instruments are those whose working tip is located on the longitudinal axis of the handle. The working-end part of a universal curette has a semicircular cross-section, two parallel cutting edges, a rounded tip and a rounded back, the front surface is located at an angle of 90° to the terminal part of the shank (fig. 12).

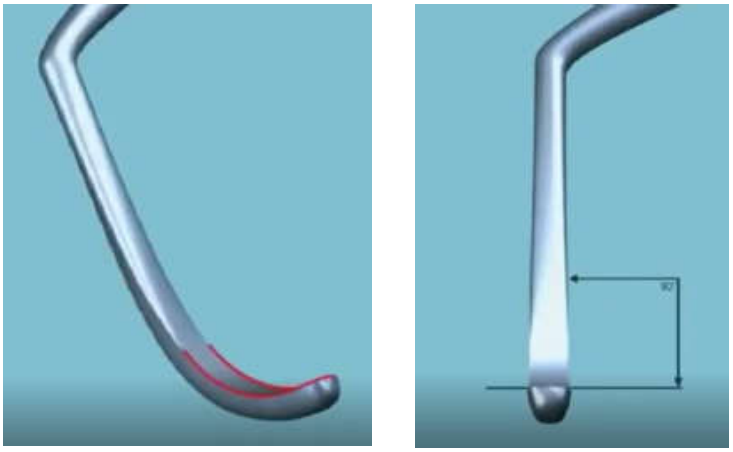


Fig. 12. Working-end design of the universal curette

Universal curettes can be used in all quadrants of the bite and on all surfaces of the teeth (both medial and distal) without changing the instrument. According to their shape, they can be divided into curettes for anterior teeth and lateral teeth. The following lines of universal curettes are available on the market: McCall 13-14, 15-16, 17-18; Goldman — Fox 3 (for premolars and molars), Goldman — Fox 4 (for molars); Columbia curettes 13-14 (for all surfaces of molars), 2R-2L (for incisors and premolars), 4R-4L (for incisors, canines and premolars), Barnhart curettes 5-6 (for molars); Langer curettes 1/2 (for premolars and molars of the lower jaw), 3/4 (for premolars and molars of the upper jaw, 5/6 (for the frontal group of teeth of both jaws) (fig. 13). It should be noted that Langer curettes combine the features of universal curettes (two cutting edges) and the shape of the bends of the functional shank of Gracey curettes. These instruments, like universal curettes, can be used on both the medial and distal surfaces of the tooth without replacing the instrument. Langer mini curettes have an elongated functional shank and a shortened working part, compared to the standard model. Convenient for working in tight interdental spaces. Provide better access to narrow deep pockets and the furcation area.

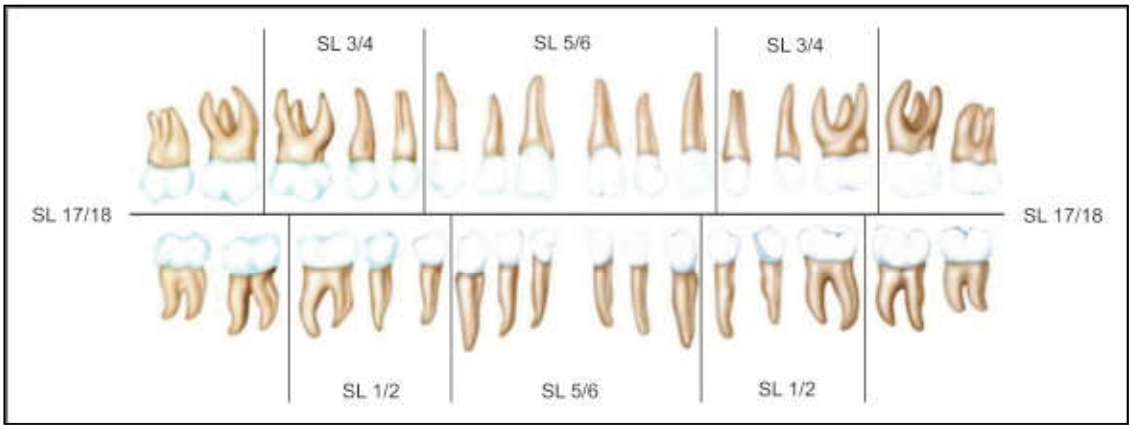


Fig. 13. Area of application of Langer curettes on the teeth of the upper and lower jaws

Special (zone-specific) curettes are designed for effective treatment of a specific tooth surface. The shape of the working-end part of the instrument ideally matches the shape of the tooth root. The working-end part of the Gracey curette has a semicircular cross-section and one curved cutting edge, the front surface is located at an angle of 70° to the terminal part of the curette (fig. 14). Gracey curettes are designed to remove small conglomerates of dental calculus and endotoxin from the root surface (finishing and polishing).

Special (zone-specific) curettes are marked with numbers and colors (table 1), which facilitates the optimal selection of an instrument for treating a specific tooth surface; separate instruments have been developed for the anterior and lateral teeth, palatine, lingual and vestibular surfaces (table 1).

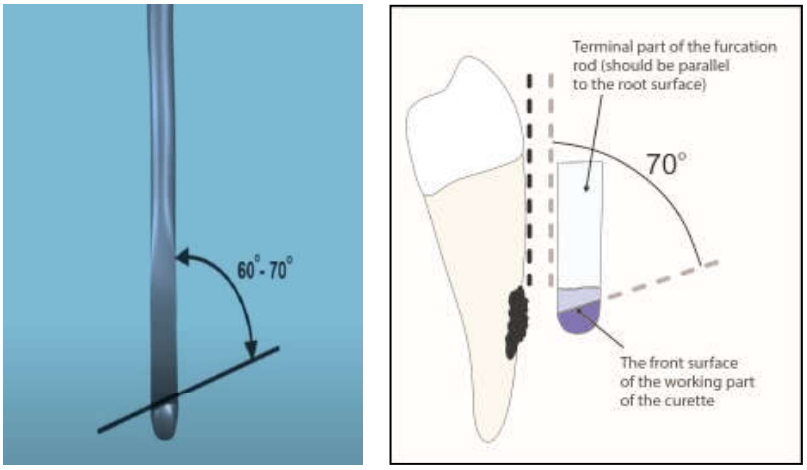


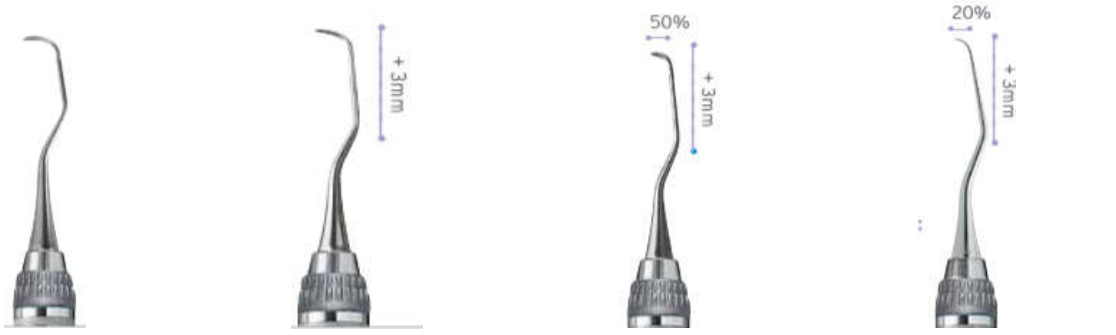
Fig. 14. Working-end design of the Gracey curette

Table 1

Color coding of Gracey curettes

Color coding	Numeric coding	Application
Gray	1/2	For incisors
Purple	3/4	For incisors and canines
Yellow	5/6	For vestibular and oral surfaces of premolars
Light green	7/8	For the vestibular and oral surfaces of premolars and molars
Red	9/10	For the vestibular and oral surfaces of molars and hard-to-reach areas of the root surface
Light orange	11/12	For mesial surfaces of premolars and molars
Dark orange	15/16	For mesial surfaces of molars
Light blue	13/14	For distal surfaces of premolars and molars
Dark blue	17/18	For distal surfaces of molars

Gracey curettes come in four varieties «Standard», «After five», «Mini five», «Mini Micro» (fig. 15).



«Standard»
The shape of the working part ensures maximum adaptation to the tooth surface

«After five»
Terminal part is 3 mm longer than standard Gracey curettes — for working in pockets deeper than 5 mm

«Mini five»
The terminal part is 3 mm longer and the blade is 50 % shorter than standard Gracey curettes — for working in narrow pockets deeper than 5 mm

«Mini Micro»
The terminal part is 3 mm longer and the blade length is 20 % of the standard blade length. It is used for working in the furcation area, in the area of deep and narrow pockets

Fig. 15. Varieties of Gracey curettes

Gracey Standard curettes are designed for work in the supragingival area to remove massive dental deposits, as well as in periodontal pockets up to 5 mm. Gracey After Five curettes provide access to deep periodontal pockets over 5 mm, since the terminal part of such curettes is 3 mm longer than that of standard ones. The thin blade of these curettes facilitates penetration into the periodontal pocket with minimal trauma to the gum (fig. 16).

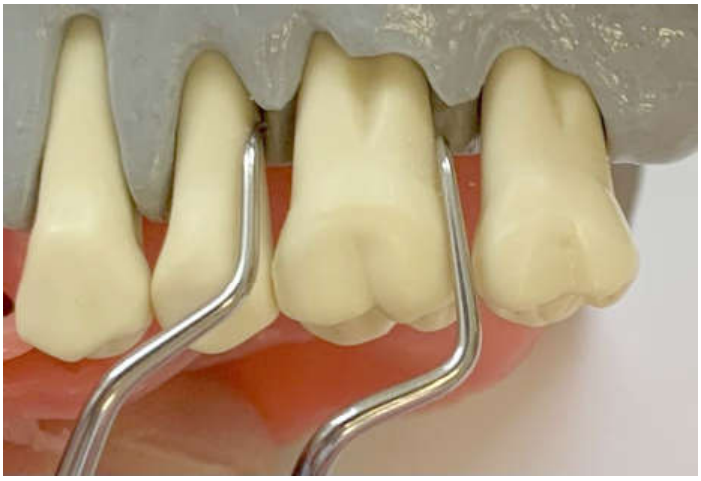


Fig. 16. Appearance and comparison of Gracie curettes «Standard» and «After five»

Gracey Mini Five curettes are used for work in narrow deep pockets, mainly in the area of the front teeth. Their terminal part is also 3 mm longer than the standard ones, which allows them to penetrate into pockets deeper than 5 mm, and the blade length is two times shorter than that of the Standard and After Five (fig. 17).

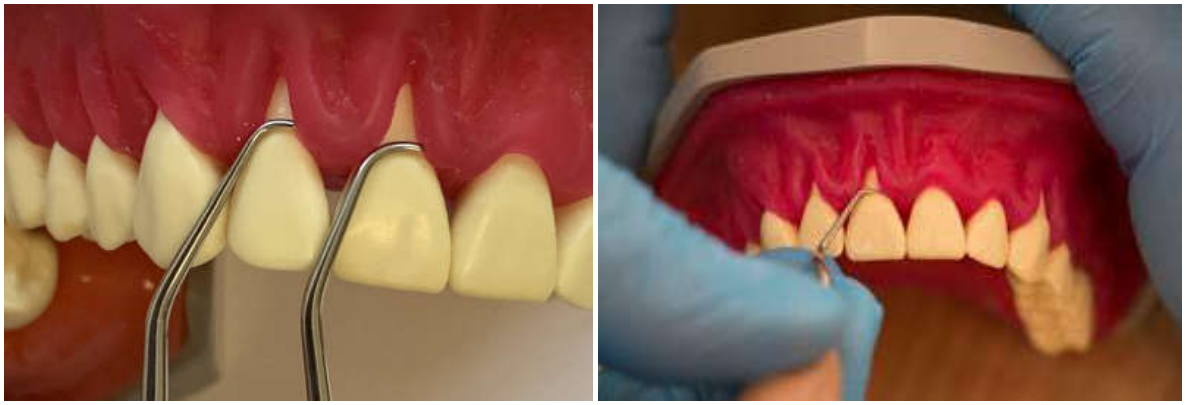


Fig. 17. Appearance and comparison of Gracie curettes «Standard» and «Mini five»

Scalers-hoes — instruments are characterized by the presence of a working part, curved at an angle of 99–100° to the terminal part of the instrument (fig. 18). The cutting edge has an angle of 45°. Such hooks can penetrate to a depth of 2–3 mm under the gingival margin. They are mainly used on the vestibular and oral surfaces of the teeth. These instruments are especially convenient for processing the lingual surfaces of the lower incisors, inclined inward.

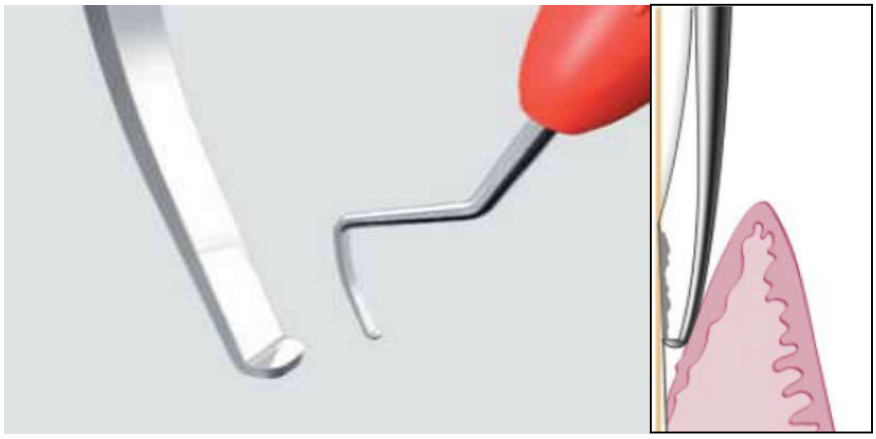


Fig. 18. Hoe scaler

Chisels — these instruments have a straight or slightly curved shoulder and one cutting edge. They are designed to remove dental plaque from the approximal surfaces of the frontal group of teeth. During operation, the instrument should slide along the approximal surface of the tooth from the vestibular to the oral surface.

Excavators — excavators are designed to remove dental plaque in the furcation zone and on concave surfaces of the tooth. They have a curved shoulder, and are available in several sizes depending on the size of the working part. The excavator works with chipping movements from the root to the crown (fig. 19).

Fig. 19. Three-angle excavator

Files are instruments with a very small working part of a round or oval shape with many notches (fig. 20). The instrument is designed to remove massive mineralized dental deposits mainly on flattened areas of the root by scraping them off the surface of the teeth.

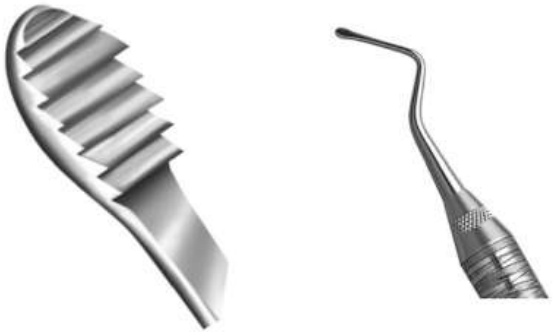


Fig. 20. Periodontal file

To remove deposits from implants and treat particularly sensitive exposed root surfaces, so-called soft scalers have been developed — curettes and hoe-shaped hooks with a non-metallic (made of super-strong plastic) working part, since metal instruments can easily damage the surface of the implanted implant (fig. 21).

Fig. 21. Scalers (implacers) — curettes made of super-strong plastic

The structure of a periodontal instrument and the general characteristics of its components (functional shank, the meaning of the terminal part, the ergonomics of the instrument)

As noted above, the dental market offers a variety of periodontal instruments that allow you to remove dental calculus from any tooth surface. To do this, the design of the instruments is developed in such a way that the working-end parts of the instruments correspond to the curvature of the root surface as much as possible. Each group of instruments has its own specific shape of the working-end part, the cutting edges which must be positioned at an angle of 70–80° to the root surface during scaling. To maintain this angle, it is necessary to adhere to certain guidelines: correctly position the terminal part of the shank. Due to these circumstances, a periodontist or hygienist must have a clear understanding of the elements of periodontal instrument, namely: what is the functional shank of a curette and accurately determine its terminal part, which is a visual reference for positioning the working part of the instrument on the tooth surface.

An important factor when working with a hand tool is the ergonomic parameters of its handle: optimal diameter, reduced handle weight, a system of special notches that provide a comfortable grip and improve tactile sensations when working with the tool. According to ergonomic standards, 15 grams in weight and 10 millimeters in diameter are recommended. Handles of a smaller diameter impair control of the tool and increase hand fatigue (risk of developing carpal tunnel syndrome). A number of factors lead to the development of this syndrome: lack of ergonomic design of the tool handle, force, duration of static loads over time, incorrect position of the hand in the wrist. The syndrome is manifested by prolonged pain and numbness of the fingers. Each tool consists of a handle, a functional shank and a working-end part (fig. 22).

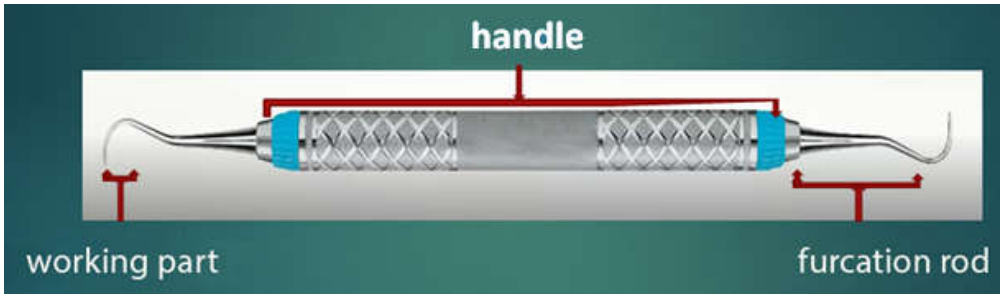


Fig. 22. Elements of periodontal instrument

The part of a periodontal instrument located between the working part and the handle of the instrument is called the functional shank (fig. 22, 23). In literary sources, you can find the designation of this element under different names: shank, neck, shoulder. The functional shank can have several bends and be long, medium-

length and short. Short shanks are convenient for work in the area of the front teeth and for removing supragingival dental calculus, long ones — in the area of chewing teeth and pathological pockets (fig. 23).

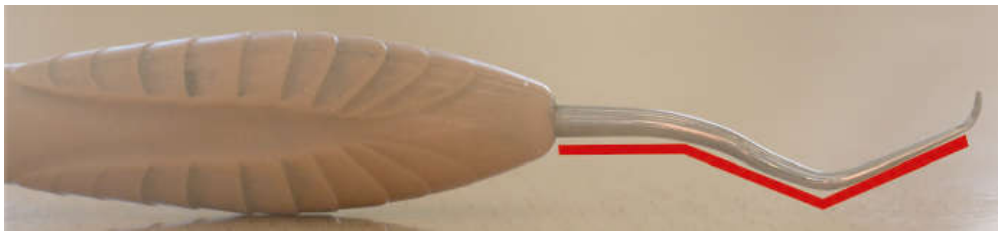


Fig. 23. Functional shank (highlighted in red)

The last bend of the functional shank before the working-end part is usually called the terminal part (fig. 24). And it is important to know this, since the location of the terminal part of the shank in relation to the tooth axis is the main reference point for the correct positioning of the working part of the periodontal instrument on the tooth surface.

Fig. 24. Terminal part of the shank (highlighted with a red line)

On the teeth of the lateral group (all surfaces): the terminal part of the shank of universal and zone-specific curettes should be positioned parallel to the tooth axis (fig. 25).

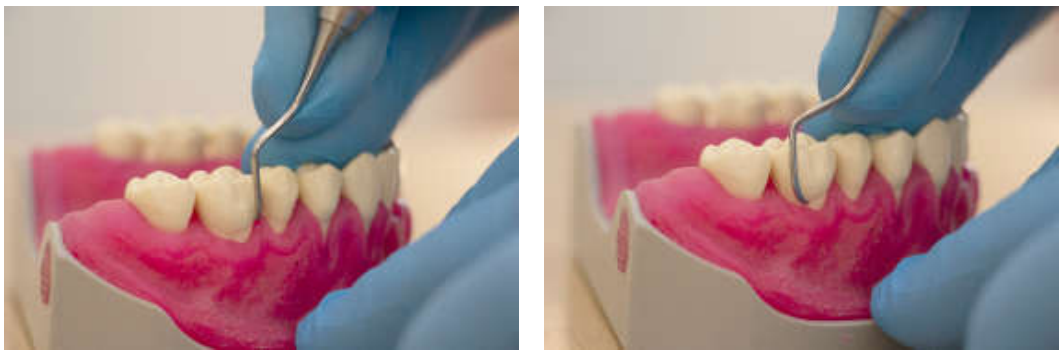
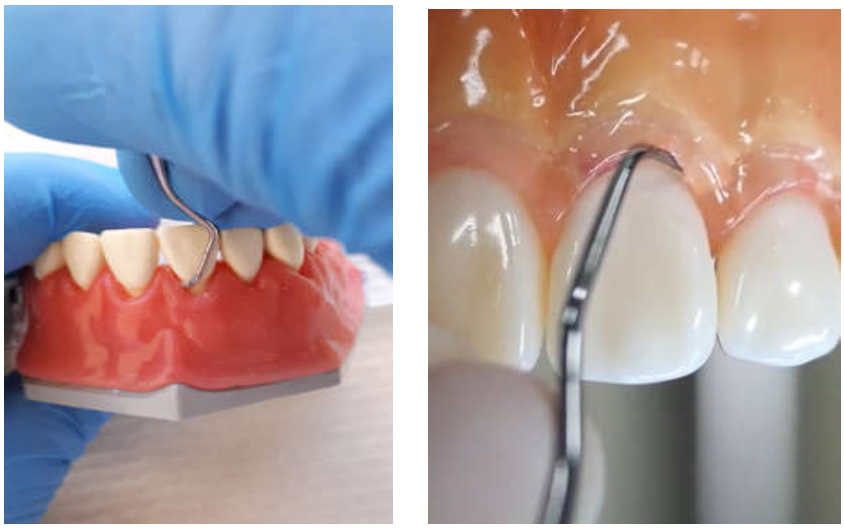


Fig. 25. The correct position of the terminal part of the curette and, accordingly, the working part of the instrument on the approximal, vestibular surfaces of the chewing tooth

On the frontal teeth (all surfaces): the terminal part of the shank of universal and zone-specific curettes should be positioned diagonally across the vestibular or oral surface of the tooth crown (fig. 26).



a ***b***

Fig. 26. The correct position of the terminal part of the curette:
a — universal; *b* — zone-specific

The process of removing dental calculus on the root surface or crown surface of the tooth takes place in a certain sequence. We start working from the distal corner of the crown on the vestibular surface and smoothly move to the medial wall, then the distal surface is processed (fig. 27). From the lingual or palatal side, we perform scaling in the same sequence as on the vestibular side.

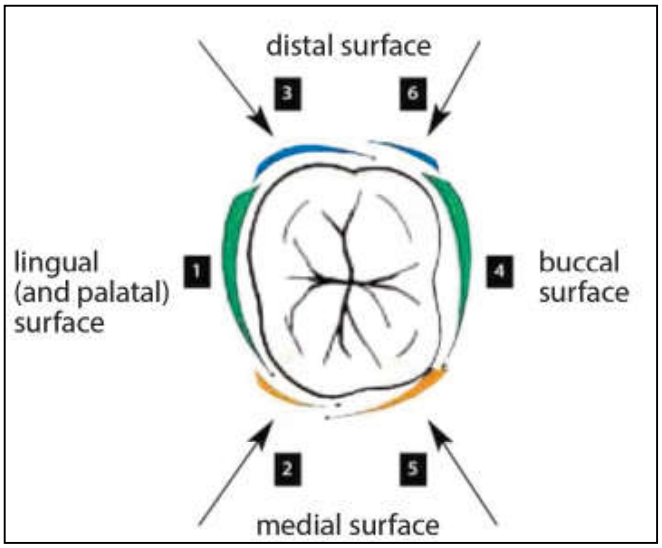


Fig. 27. The order of processing the surfaces of chewing teeth (the numbers indicate the sequence of processing)

On the front teeth, the scaling sequence is performed differently: the tooth is conditionally divided into two equal parts in the mesio-distal direction, and the process begins from the midline, smoothly moving to one approximal surface, and then to the other (fig. 28). The same sequence is used on the palatal and lingual surfaces.

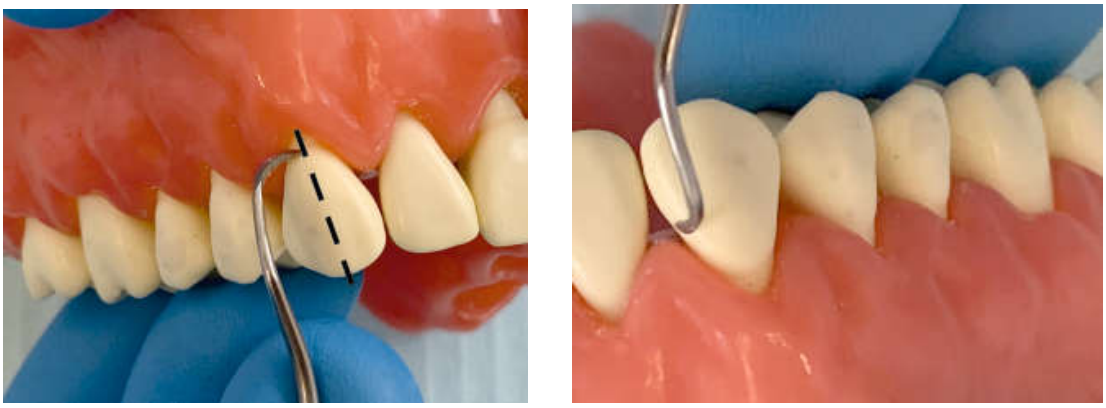


Fig. 28. The order of processing the surfaces of the front teeth (from the center to the periphery of the tooth)

Principles of working with periodontal instruments

Principles of working with periodontal instruments:

1. Grip and stabilization the periodontal instrument in the operator's hands.
2. Adaptation the periodontal instrument to the tooth surface.
3. Determination the angle between the front surface of the periodontal instrument blade and the tooth surface.
4. Activation the instrument (the movement process itself).

Grip and stabilization the periodontal instrument in the operator's hands

Grip and stabilization the periodontal instrument in the operator's hands:

1. Gripping and stabilizing the periodontal instrument in the operator's hands, similar to gripping a pencil.
2. Take the instrument with your left hand and place it on the medial-lateral surface of the 2nd and 3rd phalanges of the second finger of the operating hand (fig. 29, *a*).
3. Then fix the instrument with the palmar surface of the tip of the first finger at the level of the 3rd phalanx of the second finger (fig. 29, *b*).
4. Slide the handle of the instrument until the neck of the instrument touches the tip of the 3rd finger on the medial-lateral surface (fig. 29, *c*).
5. Then, maintaining contact of the instrument with the fingers, move the handle of the instrument from the 2nd phalanx of the second finger to the 1st phalanx (fig. 29, *d*).

6. This technique of fixing periodontal instruments in the operator's hands will be called the «basic grip».

7. When removing dental plaque, the «basic grip» must be maintained constantly. The instrument will move only due to the rotation of the operating hand relative to the support point (fig. 29, *e*).

8. The support point of the operating hand is most often the back of the 4th finger near the operated area (fig. 29, *f*).

9. A stable support point of the operating hand when working with manual periodontal instruments allows you to control the force of application and the precision of the work.

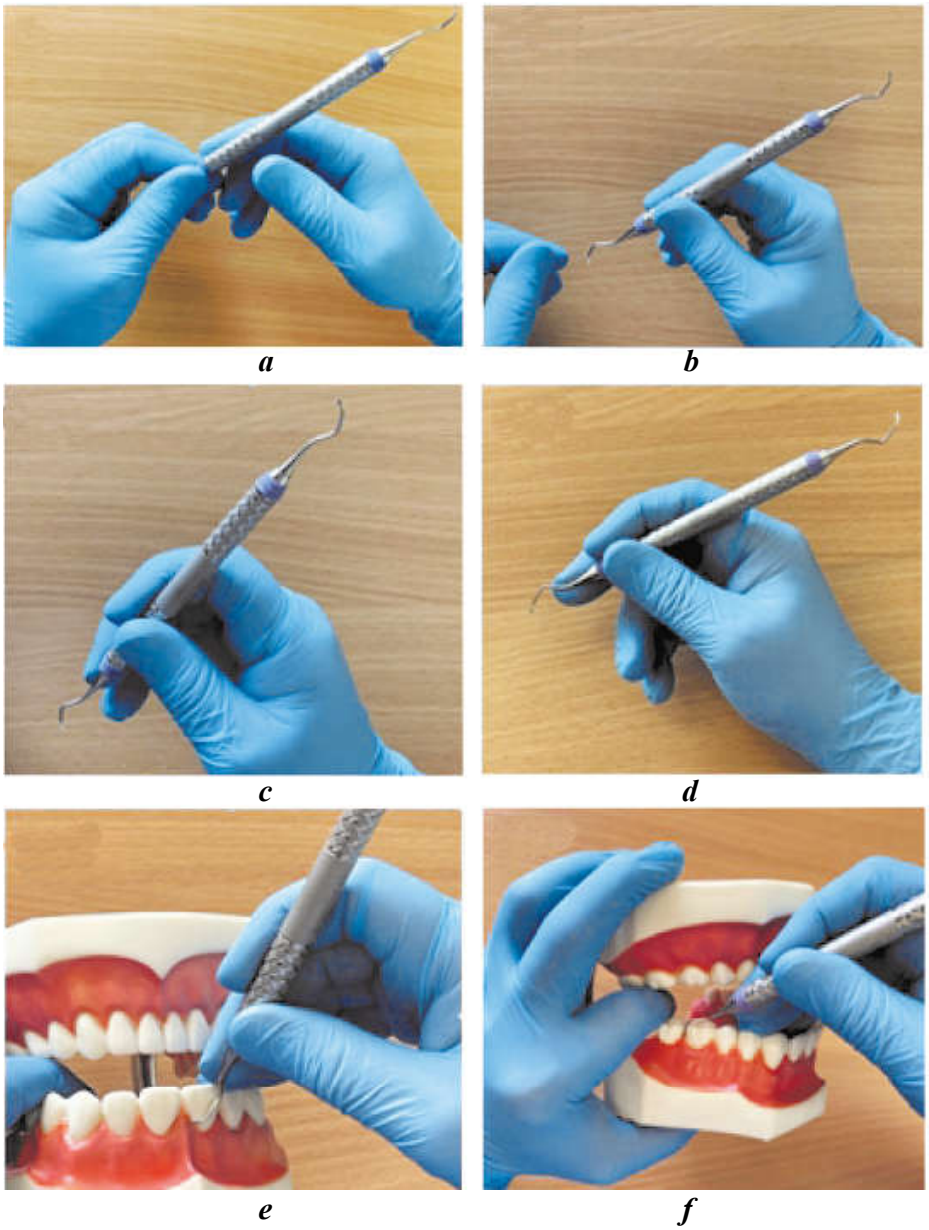


Fig. 29. Gripping and stabilization of the periodontal instrument in the operator's hands

Adaptation of the periodontal instrument to the tooth surface

Adaptation of the periodontal instrument to the tooth surface

The front surface of the working-end part of the curette is positioned on the tooth surface so that a zero angle is formed (fig. 30).

The instrument is inserted into the pocket with close contact between the top and ⅓ of its working part, without deviating from the tooth surface (fig. 30).

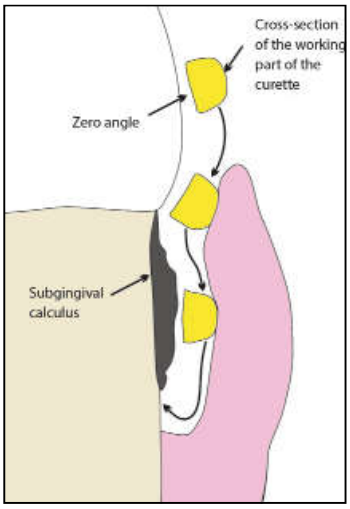


Fig. 30. Adaptation of the periodontal curette to the tooth surface with a zero angle

Determination of the angle between the blade face surface of a periodontal instrument and the surface of the tooth

By performing light probing movements, the tip of the instrument is positioned apically to the subgingival dental calculus, the instrument is given the required angle of 60–80 degrees (fig. 31). It is important to remember that the terminal part of the shank is a visual reference for the correct positioning of the instrument working part on the tooth surface.

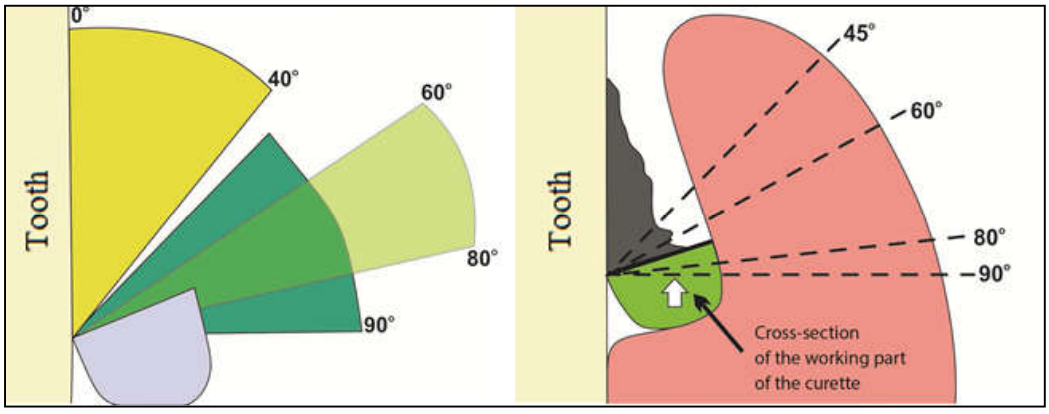
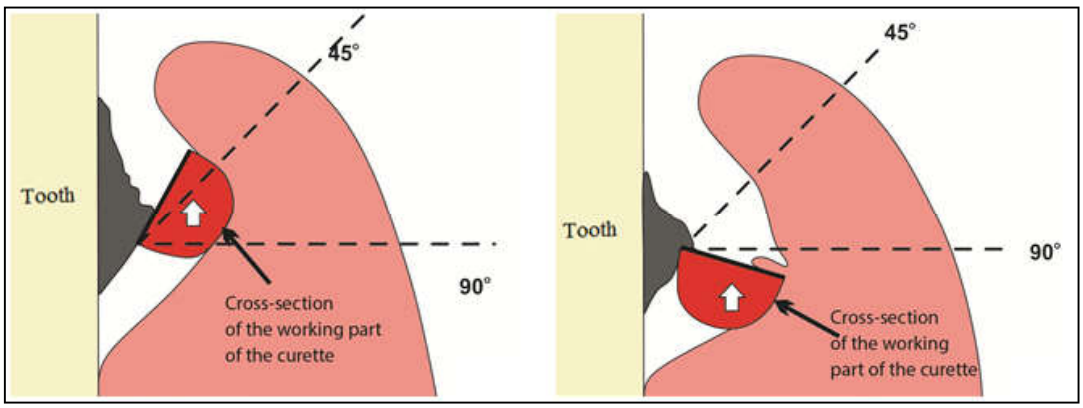


Fig. 31. Optimal angle of the front surface of the periodontal curette blade to the tooth root surface (60–80 degrees)

If the angle is established too low, less than 60 degrees (fig. 32, *a*), then in this case the dental calculus is not removed, but smoothed out. On the other hand, an excessive angle, 90 degrees or more (fig. 32, *b*), inevitably leads to trauma to the periodontal pocket wall.



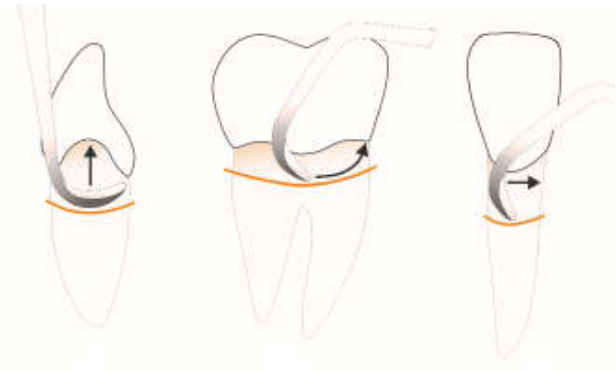
a ***b***

Fig. 32. Угол лицевой поверхности лезвия периодонтальной кюреты к поверхности корня зуба

a — insufficient angle of the face surface of the periodontal curette blade to the tooth root surface (45 degrees); *b* — excessively large angle of the face surface of the periodontal curette blade to the tooth root surface (more than 90 degrees)

Activation of the tool (the movement process itself)

After the angle is determined, the instrument is activated, and short (1–2 mm) translational movements are made in a predetermined direction. The instrument is moved by rotating the operating hand relative to the support point. The directions of the instrument movement depend on the root surface being treated: vertical — in the proximal spaces (fig. 33, *a*); oblique — on the lingual and vestibular surfaces (fig. 33, *b*), and usually horizontal — in the area of the tooth corners (fig. 33, *c*).



a ***b*** ***c***

Fig. 33. Directions of movement of the periodontal curette on the root surface depending on the surface being treated

Means and methods for sharpening periodontal instruments

A sharp cutting periodontal instrument is the key to effective and high-quality work of a periodontist. To maintain it in working condition, it is necessary to have special sharpening devices. Compact electric machines and sharpening stones for manual sharpening can be purchased on the dental instrument market (fig. 34, *a*, *b*). Of the above methods, manual sharpening is a fast and effective method using relatively inexpensive sharpening stones, which allows sharpening instruments immediately before their use and during work.

a ***b***

Fig. 34. Compact electric machine for sharpening tools (*a*); sharpening stones for manual sharpening (*b*)

The most common of them are natural stone «Arkansas», synthetic stones «India» and ceramic. They can have different shapes, compositions and sizes (table 2).

Table 2

Comparative characteristics of the main sharpening stones

Name	Origin	Lubricant	Grain	Application
Stone «Arkansas»	Natural	Oil	Small	Regular sharpening and finishing
Stone «India» («I»)	Synthetic	Oil	Medium	Sharpening a very blunt tool or changing the shape of the working part
Ceramic stone	Synthetic	Water or dry	Small	Regular sharpening and finishing
Diamond plates with different degrees of grain dispersion	Synthetic	Water or dry	Medium, small, very small	Sharpening a very blunt tool, regular sharpening finishing

Ceramic stone and Arkansas stone of fine grain are used for regular sharpening and finishing of tools. The India stone has a coarse-grained structure, which allows it to be used for sharpening a very blunt tool or changing the shape of its working part. In addition, diamond plates with different degrees of grain dispersion are a novelty. They are produced with three degrees of grain size: medium, fine, very fine (fig. 35).

Fig. 35. Diamond plates for manual sharpening of tools

Diamond plates can be used in turns if the tool is very blunt (medium – fine – extra fine). If the tools are sharpened regularly, it is permissible to use fine – extra fine diamond plates. A mandatory condition for sharpening tools is the use of lubricant (fig. 36).

Fig. 36. Special oil for sharpening tools

Lubrication improves the sliding of tools and prevents them from overheating during sharpening, and also retains metal particles. After the sharpening procedure is completed, the oil containing metal particles is removed by blotting with a clean napkin. It is not allowed to use technical oils or food oils instead of special oils for sharpening.

There are many methods of manual sharpening, however, in practice; a modification of the «stationary tool — moving stone» method is more often used, the so-called «clock face» method, in which the position of the tool and stone is similar to the hands of a clock (fig. 37).

Fig. 37. The «clock face» technique for sharpening periodontal instruments

When performing this technique, it is necessary to have a clear idea of the general structure of curettes, namely: what is the functional shank of a curette and accurately determine its terminal part, which is a visual reference for positioning the instrument during sharpening. It is very important when sharpening instruments to correctly observe the sharpening angles, which are set in factory conditions and are 100–110 degrees (fig. 38).

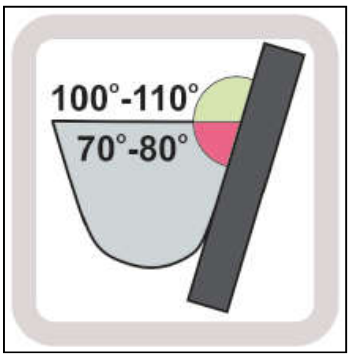


Fig. 38. Diagram of the location of the sharpening stone on the side surface of the working part of the periodontal instrument (according to Pattison A., 1992)

Sharpening a sickle scaler. When sharpening the cutting edge of a sickle scaler, the terminal part of the instrument is in the 12 : 00 position, the stone is 3 minutes after 12 or 3 minutes before 12 if the second cutting edge of the working part of the instrument is to be sharpened (fig. 39).

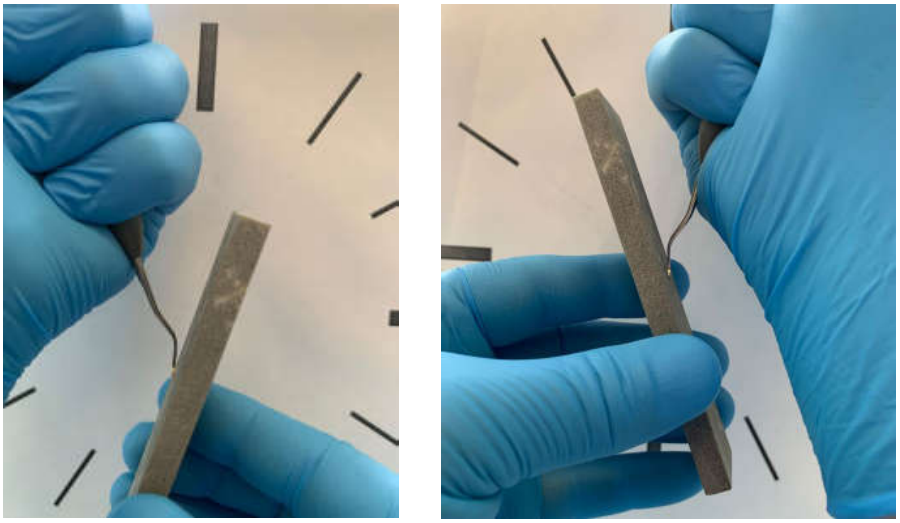


Fig. 39. Sharpening the cutting edge of the working part of the sickle scaler

Sharpening a universal curette. To sharpen one side of the universal curettes, the terminal part of the curette is also positioned at 12, respectively the stone for 3–4 minutes after 12 or 3–4 minutes before 12 (fig. 39, 40).

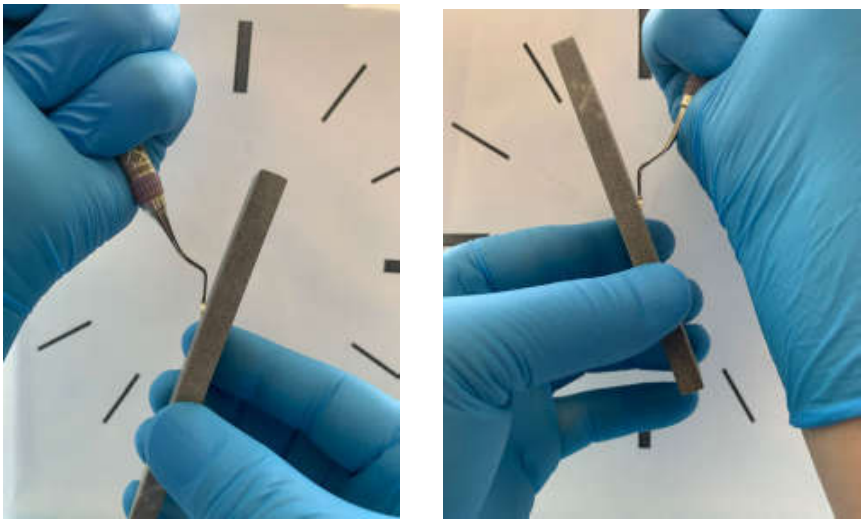


Fig. 40. Sharpening the cutting edges of the working part of the universal curette

Sharpening the Gracey Curette. When sharpening Gracey curettes, the terminal part of the functional shank is located at 11 o'clock or 13 o'clock, respectively, the stone is at 3 minutes after 12 or 3 minutes before 12 (fig. 41).

Sharpening the tip of the working part of the tool. To sharpen the tip of the tool working part, the handle of the tool must be positioned at 12 o'clock and the stone at 14 : 00 (fig. 42).

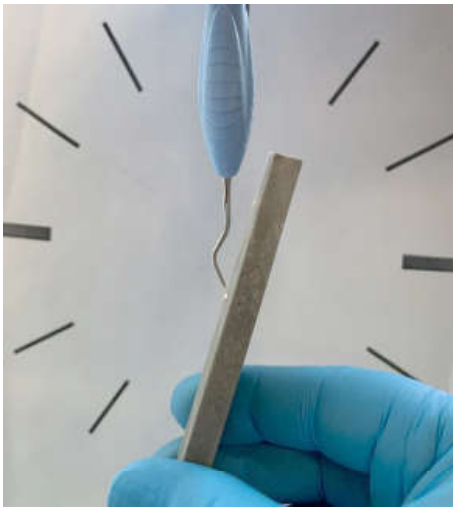


Fig. 41. Sharpening the cutting edge of the Gracey curette working part

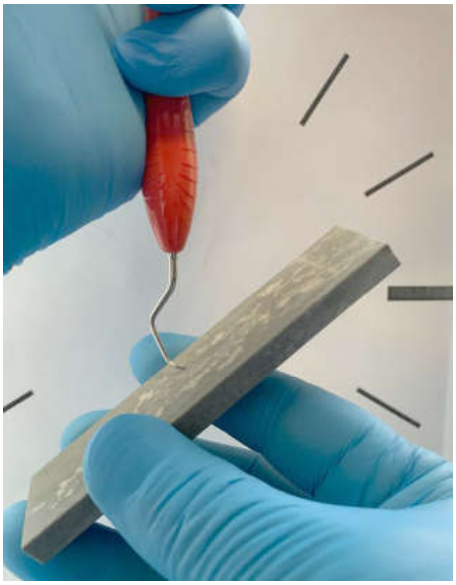


Fig. 42. Sharpening the tip of a universal and zone-specific curette

Considering the fact that the working part of the curette has a semicircular cross-section, we move the stone from top to bottom, gradually describing a semicircle.

Sharpening the front surface of the instrument working part (finishing). Sharpening the front side of the instrument is recommended only for removing the rough edge, metal burrs. For this procedure, a sharpening stone with a round cross-section is used (fig. 43). The process of finishing curettes and scalers occurs by lightly rotating the stone on the front surface, thus removing metal burrs from the cutting edges.

Fig. 43. Sharpening the front surface of the tool

Cleaning and sterilization of sharpening stones. After each use, sharpening stones are thoroughly cleaned with a brush, soap and water, then they are treated in an ultrasonic bath to remove metal residues, after which they are autoclaved. It is important to remember that sharpening of instruments is carried out after their autoclaving and with sterile sharpening stones.

Preparing the workplace for sharpening instruments and the sharpening technique. For high-quality sharpening, it is not enough to have a whetstone and a tool; the following conditions must be ensured:

1) a flat, stable work surface for reliable support of the operator's hands;
2) good lighting;
3) magnification (binoculars or a magnifying glass);
4) correct grip of the tool (fig. 44);
5) set the correct angle of the whetstone in relation to the front surface of the tool.

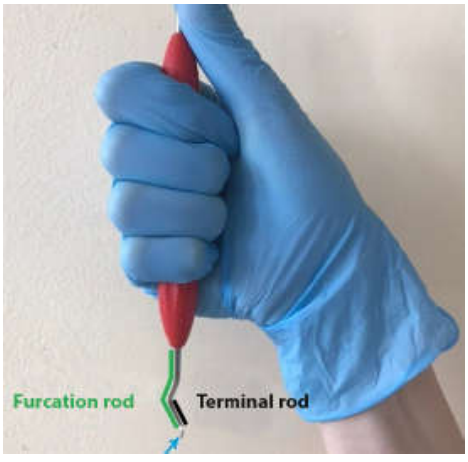


Fig. 44. The correct position of the tool in the operator's hand when sharpening it using the «clock face» method

As stated above, the cutting edge of scalers and curettes should be sharpened in a position where the stone is at an angle of 110 degrees relative to the front surface. To set the most correct angle for sharpening, it is customary to position the terminal rod of the tool and the stone relative to the watch face. In practice, a disposable paper template (sharpener) with guide angles of 110 degrees helps to create the image of the watch face (fig. 45). The sharpening process is performed by moving the sharpening stone from top to bottom, slowly moving the sharpening stone from the heel of the working part of the tool to the toe. Then we sharpen the toe and finish the sharpening process by finishing the front surface.

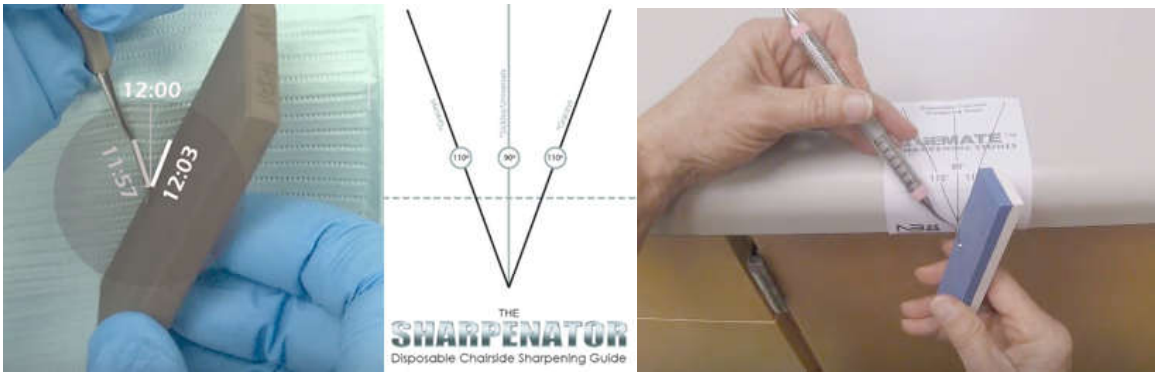


Fig. 45. Disposable paper template for sharpening

An equally interesting and convenient method for manual sharpening is the Gleason guide (fig. 46). This device for sharpening periodontal instruments is a flat rectangular block with longitudinal through-cuts on both sides of the block. Each longitudinal cut has a special guide plane on one side for Gracey curettes, on the other — for universal curettes and scalers. The sharpening process of the instrument occurs by sliding the instrument along the guide plane, placing the terminal part of the curette parallel to this plane. The sharpening stone or diamond plate is fixed with the operator's left hand under the block.

Fig. 46. Gleason guide

Evaluation of the quality of tool sharpening. The quality of sharpening of the blade of the working part of the tool is determined by its sharpness. To determine the sharpness of the blade of the tool, a test with a plastic cylinder and a visual test are used. To conduct the first test, you need to apply pressure to the cutting edge of the tool to the plastic cylinder. If the tool «cuts» or leaves a mark, it is sharp. If the tool slides along the surface of the stick, then it needs sharpening (fig. 47).

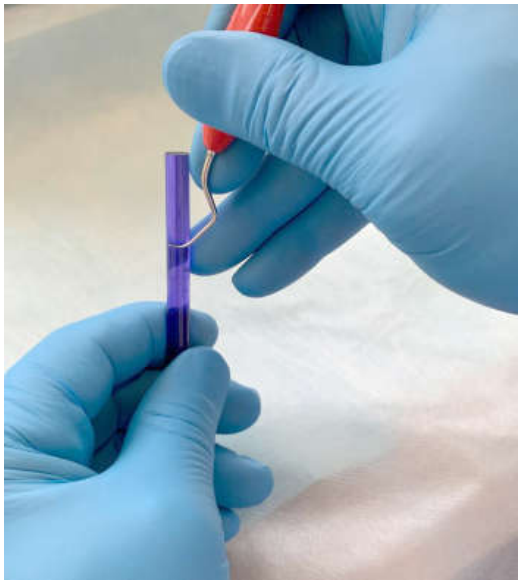


Fig. 47. Plastic cylinder test

To visually assess the sharpness of the blade, it is necessary to direct the light source at the instruments placed on a flat matte surface with the cutting edge facing up. When the cutting edge rotates relative to the light source, the blunt cutting edge will reflect the light rays (fig. 48).

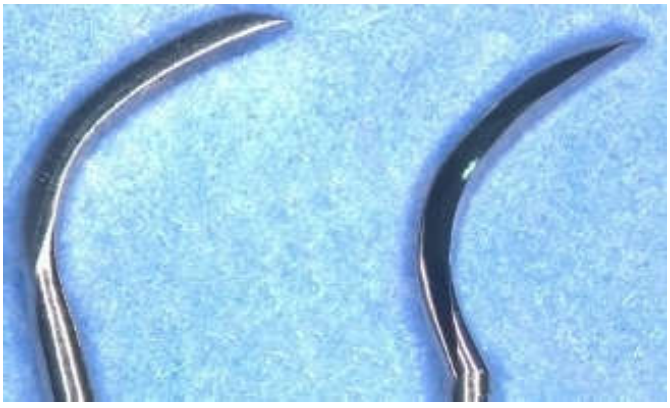


Fig. 48. Visual test

PROFESSIONAL REMOVAL OF DENTAL PLAQUE USING DEVICES AND CHEMICALS

Methods of removing dental plaque using devices and chemicals

It is possible to distinguish three types of impact on dental plaque:

1. Low-frequency sound impact (Sonic). Sonic (pneumatic) scalers work with the help of compressed air, which is supplied from the turbine of the dental unit. The tip of the instrument makes circular oscillatory movements up to 1 mm with a frequency of 1500–1700 Hz. The efficiency of this method is very low. At the same time, it is possible to injure periodontal tissues, therefore the Sonic device is used only for removing supragingival dental plaque. Its use in the area of open cement is contraindicated.

2. Ultrasonic impact:

1) magnetostrictive scalers (vibration of the tip of the instrument occurs with a frequency of 25000–30000 Hz). Inside the tip there are many thin metal plates or a ferromagnetic rod, which are able to expand and contract under the action of a magnetic field formed when an electric current passes. The oscillatory movements of the tip of the nozzle vary from linear to circular, and allow all surfaces of the nozzle to be active. Ultrasonic action generates heat and therefore requires water cooling;

2) Piezoelectric scalers (the movement of the tip of the instrument is linear or reciprocating, which makes only two side surfaces of the nozzle active). Due to such oscillatory movements, piezoelectric scalers cause less trauma to periodontal tissues, and therefore, they are more comfortable for the patient. Working with them requires a certain skill: the stronger the pressure of the instrument, the less effective.

3. Ultrafine (powder-jet) impact «Air Flow» (EMS, Switzerland). Unlike the kinetic energy of moving instruments, this method consists of a directed supply of a jet stream — an aerosol containing water and an abrasive.

Due to the ability to regulate the water supply to the tip, the possibilities of using this method are expanded: removing dental plaque, treating fissures before sealing, eliminating deep enamel pigmentation, preparing surfaces for composite restorations and orthopedic structures.

If sufficient water supply is not provided when using these devices, the heating of the working part can reach 200 °C. Such a temperature can lead to injury to the tissues of the teeth and gums.

The most optimal method is the internal supply of water to the working part of the instrument. The water is not only cooled, but also, due to spraying with ultrasonic waves, washes away the removed deposits, cleaning the treated area. The resulting aerosol removes a large number of microorganisms from the patient's oral cavity. Therefore, it is necessary to wear a mask and protective glasses while working.

The nozzles used in ultrasonic devices have different shapes of the working part. It is necessary to use thin instruments with rounded edges. However, if used incorrectly, even such a tool can damage teeth. The effective area of the instrument is along its axis. Do not process directly with the tip of the ultrasonic nozzle, as this can lead to chips in the enamel and dentin. Care should be taken when processing the edges of fillings. With frequent use, the working part of the instrument wears out, which reduces its effectiveness, and requires replacement. A special calibration ruler is used to assess the degree of wear of the working part. When removing dental plaque, the working part of the instrument must be moved along the tooth at an acute angle without pressure. If, after processing with ultrasonic devices or pneumatic scalers, islands of tarar(dental calculus) remain on the surface of the tooth, then subsequent processing is carried out with hand instruments designed to clean any surface of the teeth. The direct damaging effect of ultrasound on microorganisms and ZK is achieved due to the cavitation effect (under the action of ultrasonic waves in a liquid medium, many bubbles with highly compressed gas are formed, the destruction of which creates a powerful shock wave that destroys the membranes of the m/o and helps remove the ZK).

Rules for using the ultrasound device

Rules for using the ultrasound device:

1. Turn on the water 2 minutes before the procedure to reduce the level of microorganisms in the water.
2. Put on protective glasses for the patient, glasses, mask and gloves for the doctor.
3. Use a sufficient amount of water to prevent overheating of the instrument and the tooth root.
4. Avoid applying pressure to the tooth during the procedure (light touch is allowed).
5. Direct the working part of the instrument to the root surface at an acute angle (no more than 45°).
6. Do not set the tip perpendicular to the root surface.
7. Move the tip «like a brush».

Contraindications to the use of ultrasonic scalers

Contraindications to the use of ultrasonic scalers:

– acute inflammatory processes of the oral cavity;
– erosive and ulcerative lesions of the oral mucosa;
– cardiovascular diseases (in the acute period, postoperative condition, in the decompensation stage);

– malignant tumors;
– obstructive pulmonary diseases (emphysema);
– bronchial asthma;
– patients with features of psychoneurological status (epilepsy);
– patients with severe diabetes mellitus;
– pregnancy;
– patients with an implanted unshielded pacemaker;
– acute and chronic nasal breathing disorders;
– acute infectious diseases transmitted by airborne droplets (tuberculosis) and hematogenously (viral hepatitis, HIV);
– conducting immunosuppressive and corticosteroid therapy in patients.

Advantages of the procedure of ultrasonic removal of dental plaque using ultrasound:

1) reduction of procedure time;
2) relative painlessness of the procedure;
3) minor bleeding;
4) less labor intensity for the operator;
5) less traumatic procedure.

Disadvantages of the procedure of ultrasonic removal of dental plaque using ultrasound:

1) insufficient visibility of the surgical field (fog due to the resulting aerosol);
2) many microorganisms in the workplace (need to use a vacuum cleaner);
3) need to use distilled water, not tap water;
4) with an inadequate procedure, a very long period of regeneration of Shar Pei fibers to the root of the tooth;
5) with an overdose, dentin sensitivity and pulpitis may develop.

Root smoothing is not performed using the ultrasonic method. Root smoothing is performed using special burs or curettes. It is best to perform manual removal of dental plaque or combine manual removal with the ultrasonic method.

Chemical method of removing dental plaque

In the presence of pigmented plaque, a chemical method is used. For this purpose, low concentrations of sulfuric, trichloroacetic acid, lactic, ascorbic acid, etc. are used.

TASKS FOR INDEPENDENT WORK OF STUDENTS

To master the material of this lesson, the student must study the lecture material on the topic of the lesson and the recommended literature. After the diagnosis is made and the prognosis is made, the student begins planning the treatment of

periodontal diseases. The treatment plan must be agreed upon with the patient. In this case, the patient's willingness to cooperate and economic capabilities are taken into account. Planning is carried out strictly individually.

The practical part of the lesson is carried out at the clinical reception of patients. First of all, emergency care is provided, if required, and then according to the situation.

TEST QUESTIONS

1. The purpose of the preparatory stage of treatment of a patient with periodontal diseases is:

a) preparation for re-evaluation of the periodontal tissue condition;
b) elimination of etiologic risk factors for periodontal diseases;
c) correction of the mucogingival relationship;
d) restoration of the integrity of the dentition.

2. The preparatory stage of treatment of patients with periodontal diseases includes:

a) provision of emergency care;
b) professional oral hygiene;
c) correction of fillings and dentures;
d) final restoration of the integrity of the dentition.

3. To smooth the root surface, use:

a) sickle scalers;
b) zone-specific curettes «After five», «Mini five»;
c) excavators;
d) sonic scalers.

4. Removal of dental plaque is performed in the following sequence:

a) scaling, root smoothing, polishing of tooth surfaces;
b) polishing of tooth surfaces, scaling, root smoothing;
c) polishing of tooth surfaces, root planing, scaling.

5. The preparatory stage of treatment of periodontal diseases includes:

a) provision of emergency care;
b) motivation;
c) professional hygiene;
d) gingivoplasty.

6. The effectiveness of the preparatory stage is indicated by the values of the GI index (H. Loe, J. Silness, 1963):

a) 1.5–2.0;
b) 0.6–0.8;
c) 1.3–1.4;
d) 2.1–3.0

7. Specify the correct sequence of activities for the preparatory stage of complex treatment of periodontal diseases:

a) elimination of iatrogenic factors in the oral cavity;
b) removal of dental plaque to OHI-S=0.5-0.6 with preliminary motivation;
c) monitoring the presence and growth of dental plaque;
d) training in oral hygiene.
1) a, d, c, b; 2) b, g, c, a; 3) a, g, c, b.

8. Specify the correct sequence of treatment planning stages for chronic periodontitis:

a) maintenance treatment;
b) preparatory stage;
c) re-evaluation of periodontal tissues;
d) orthopedic stage;
e) orthodontic and surgical stage (as indicated).
1) a, d, c, d, b; 2) a, d, c, d, b; 3) b, c, d, d, a.

9. Establish the correct sequence of treatment stages for chronic complex periodontitis:

a) orthopedic treatment;
b) preparatory stage;
c) orthodontic and surgical treatment (as indicated);
d) maintenance therapy;
e) re-evaluation of periodontal tissues.
1) a, d, c, d, b; 2) a, c, d, d, b; 3) b, d, c, a, d.

10. Establish the correct sequence of stages of treatment of chronic gingivitis:

a) preparatory stage;
b) orthodontic treatment (according to indications);
c) maintenance therapy;
d) re-evaluation of periodontal tissues.
1) a, d, b, c; 2) b, d, c, a; 3) a, d, c, b.

11. Establish the correct sequence of stages of treatment of hyperplastic gingivitis:

a) surgical treatment (according to indications);
b) preparatory stage;
c) maintenance therapy;
d) re-evaluation of periodontal tissues;
1) a, d, c, b; 2) b, d, a, c; 3) a, d, c, b.

12. An ultrasonic scaler is used when performing:

a) scaling;
b) curettage;

c) gingivoplasty;
d) correction of overhanging edges of fillings.

13. Demonstrating the patient's existing dental plaque during motivation:
a) is not allowed, as this may offend him;
b) is required;
c) is not required, as it is sufficient to demonstrate drawings and other visual aids;
d) does not matter.

14. Conducting professional hygiene for a patient with periodontal disease with OHI-S=1.2 points:
a) is not required;
b) is always required;
c) is required depending on the degree of inflammation in the gum;
d) is required depending on the state of microcirculation in the periodontal tissues.

15. Special stains of dental plaque are used at the preparatory stage:
a) to detect latent inflammation;
b) to determine the Green-Vermillion index (1964);
c) to demonstrate dental plaque;
d) to determine the prevalence of inflammation in the gum.

16. At the preparatory stage, the diagnostic method that allows for the reliable detection of dental plaque is:
a) bacteriological examination;
b) immunofluorescence examination;
c) electron microscopy;
d) hygienic indices.

17. Gracey curettes with number markings 1/2, 3/4 are used to remove dental plaque from:
a) lateral teeth — (mesial surface);
b) lateral teeth — (buccal and lingual surfaces);
c) anterior teeth — (all surfaces);
d) lateral teeth — (distal surface).

18. Gracey curettes with number markings 5/6 are used to remove dental plaque deposits from:
a) lateral teeth — (distal surface);
b) lateral teeth — (buccal and lingual surfaces);
c) lateral teeth — (mesial surface);
d) canines, premolars — (all surfaces).

19. Gracey curettes with number markings 7/8, 9/10 are used to remove dental deposits from:

a) lateral teeth — (buccal and lingual surfaces);
b) lateral teeth — (mesial surface);
c) lateral teeth — (distal surface);
d) anterior teeth — (all surfaces).

20. Gracey curettes with 11/12 number markings are used to remove dental plaque from:

a) posterior teeth (distal surface);
b) posterior teeth (mesial surface);
c) anterior teeth (all surfaces);
d) incisors, canines, premolars.

21. Gracey curettes with number markings 13/14 are used to remove dental plaque from:

a) lateral teeth — (distal surface);
b) anterior teeth — (all surfaces);
c) incisors, canines, premolars — (all surfaces);
d) lateral teeth — (buccal and lingual surfaces).

22. To remove subgingival dental calculus and granulation tissue, use:

a) Gracey curettes;
b) Langer curettes;
c) Sickle scaler H6/H7 (sickle scaler);
d) Excavators.

23. In narrow and deep periodontal pockets, use:

a) universal curettes, sickle scalers;
b) Gracey standard curettes;
c) Langer curettes;
d) Langer curettes mini, Gracey curettes «Mini five».

24. Part of the periodontal curette, which helps to correctly position the working part of the curette on the tooth surface is called _____.

25. On the front teeth, the terminal part of the curette should be positioned:

a) diagonally across the vestibular surface of the tooth crown;
b) diagonally across the oral surface of the tooth crown;
c) parallel to the tooth axis;
d) does not matter.

26. On the lateral teeth, the terminal part of the curette should be positioned:

a) diagonally across the vestibular surface of the tooth crown;
b) perpendicular to the tooth axis;

c) parallel to the tooth axis;

d) does not matter.

27. The process of removing dental calculus on the surface of the root or crown of lateral teeth occurs in a certain sequence:

a) in the mesio-distal direction;

b) from the distal corner of the crown on the vestibular surface and smoothly move to the distal wall, then the medial surface is processed;

c) does not matter;

d) from the distal corner of the crown on the vestibular surface and smoothly move to the medial wall, then the distal surface is processed.

28. The process of removing dental calculus on the surface of the root or crown of the front teeth occurs in a certain sequence:

a) from the medial surface, then the vestibular surface and smoothly move to the distal wall;

b) from the distal surface, then the vestibular surface and smoothly move to the medial wall;

c) does not matter;

d) from the midline of the crown of the tooth, smoothly moving to one approximal surface, and then to the other.

Correct answers to test questions: 1 — a, b; **2** — a, b, c; **3** — b; **4** — a; **5** — a, b, c; **6** — b; **7** — 2; **8** — 3; **9** — 3; **10** — 1; **11** — 2; **12** — a; **13** — b; **14** — b; **15** — c; **16** — d; **17** — c; **18** — d; **19** — a; **20** — b; **21** — a; **22** — a, b; **23** — d; **24** — terminal part of the shank; **25** — a, b; **26** — c; **27** — d; **28** — d.

SITUATIONAL TASK

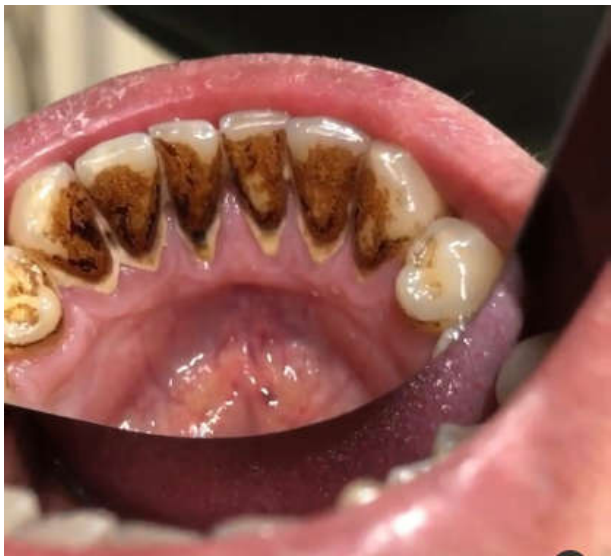
Task № 1

Patient M., 36 years old, male, consulted a dentist complaining of soreness and bleeding gums when brushing teeth, eating hard food, and bad breath. Has been bothering for 1–2 years. History: no systemic or infectious diseases, no allergic reactions. Has been smoking for over 10 years. Bleeding gums began about a year ago. Has never received professional training in individual oral hygiene. Brushes teeth 1–2 times a day. Reciprocating and horizontal movements predominate.

Clinical picture: External examination — no visible pathological changes. Oral mucosa is pale pink, moderately moist.

In the oral cavity: teeth 25, 26, 47 have been removed, in teeth 1.5, 1.4 — class ll fillings with overhanging edges, no contact point, in teeth 1.3, 2.3 class ll carious cavities, on the vestibular surface of 3.4, 4.4 — class 5 carious cavities, on the occlusal surfaces of teeth 1.7, 2.7, 3.6, 4.6 — fillings with impaired marginal adhesion. The gums in the area of teeth 1.7, 1.6, 1.3-2.3, 3.4-4.4 are swollen, hyperemic, bleed when probing. No violation of the integrity of the periodontal attachment was detected.

Objectively: OHI-S = 3,4 GI = 1,8.



Determine the prognosis, make a treatment plan. Select hand scaling instruments for the group of teeth you see in the picture.

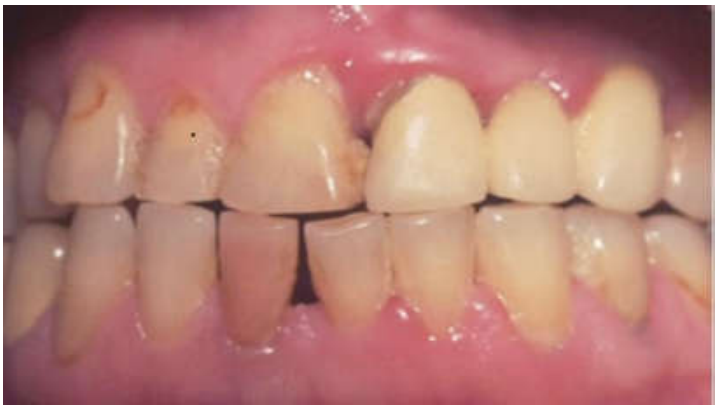
Task № 2

Patient K., 42 years old, female. Complaints of bleeding gums when brushing teeth, bad breath. History: first noticed bleeding gums about 10 years ago, periodically visited a dentist, dental calculus was removed, applications and dressings of medicinal products were made, a short-term improvement occurred,

but bleeding persisted. Uses rinsing with decoctions of medicinal herbs (chamomile, sage). No training in professional hygiene was conducted, brushes teeth once a day: sometimes in the morning, sometimes in the evening. Horizontal movements predominate. Uses prophylactic toothpaste, a soft toothbrush, because she is afraid of injuring the gums due to bleeding. General diseases, allergic reactions were not noted. Examination: oral mucosa is moderately moist, pale pink, plaque on the tongue. OHI-S = 3.3; GI = 2.1; The gum is swollen, hyperemic, and bleeds on probing. The gingival papillae and marginal gingiva in the area of teeth 16 and 26 are enlarged, have a loose consistency, and bleed on probing. In the area of the remaining teeth, the tips of the gingival papillae are rounded.

On the contact surfaces of teeth 16, 15 and 25, 26, there are class II carious cavities, on the vestibular surfaces of teeth 13, 12, 11, there are insolvent class V fillings, and in the cervical area of teeth 21, 35, 34, 44, 45, there are class V carious cavities. Teeth 37, 46 were removed.

X-ray: destruction of the compact plate of the alveolar ridge apex, osteoporosis of the bone of the interdental septa, horizontal resorption of bone tissue by ⅓ of the root length, supraosseous pockets.



Determine the prognosis, make a treatment plan.

Task № 3

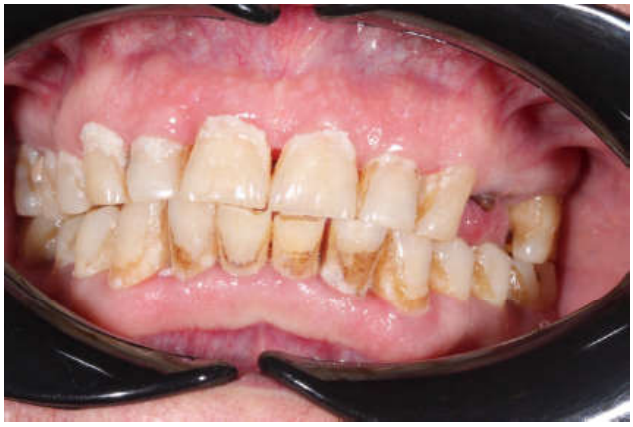
Patient A., 54 years old. Complaints of bleeding gums, pain when brushing teeth, bad breath. No previous treatment by a periodontist. No systemic diseases, no aggravated allergy history.

Brushes teeth once a day, predominantly reciprocating movements.

External examination — no visible pathological changes. Oral mucosa is pale pink, moderately moist.

Objectively: OHI-S=3.5; GI=2.1.

X-ray: horizontal bone resorption up to 1/3-1/4 of the root length.



Determine the prognosis, make a treatment plan.

Task № 4

Patient M. was admitted to a dental clinic for professional hygiene. To remove dental calculus from the front teeth of the upper and lower jaws, the dentist selected periodontal instruments: Gracey curettes 11/12, 13/14, universal Columbia curette «2R / 2L».

Identify the errors and suggest your own set of instruments.

Task № 5

Patient H. came to the dental clinic for professional hygiene. To remove dental calculus on the chewing teeth of the upper and lower jaws, the dentist chose the following periodontal instruments: Gracey curettes 1/2, 3/4, 7/8, universal Columbia curette «4R / 4L».

Identify the errors and offer your own set of instruments.

Task № 6

Patient M. came to the dental clinic complaining of bleeding gums. During the examination, deep and narrow periodontal pockets were found in the area of the approximal surfaces of the teeth — 1.6, 2.6, 3.6 and subgingival calculus. To remove subgingival calculus from the periodontal pockets, the dentist selected the following periodontal instruments: Gracey standard curettes 11/12, 13/14.

Identify the errors and suggest your own set of instruments.

Task № 7

To remove dental plaque on the upper jaw teeth, the periodontist selected the following instruments: Langer curettes 1/2, 5/6, Sickle scaler H6/H7 (sickle scaler), Gracey standard curettes 11/12, 13/14.

Identify the errors and suggest your own set of instruments.

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CONTENTS

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Дедова Людмила Николаевна
Даревский Вячеслав Иосифович
Володько Александр Александрович

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