МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ
БЕЛОРУССКИЙ ГОСУДАРСТВЕННЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ
КАФЕДРА ПЕРИОДОНТОЛОГИИ

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РЕСТАВРАЦИЯ ТВЕРДЫХ ТКАНЕЙ ЗУБОВ У ПАЦИЕНТОВ С БОЛЕЗНЯМИ ПЕРИОДОНТА

RESTORATION OF DENTAL HARD TISSUES IN PATIENTS WITH PERIODONTAL DISEASES

Учебно-методическое пособие

Минск БГМУ 2023

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Изложены принципы и этапы реставрации зубов у пациентов с болезнями периодонта: предреставрационная подготовка, прямая и непрямая реставрация, профессиональные профилактические мероприятия. Приобретенные знания позволят планировать компетентные лечебно-диагностические мероприятия, направленные на исключение ошибок и осложнений при реставрации зубов в деятельности врача-стоматолога.

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

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MOTIVATIONAL CHARACTERISTICS OF THE TOPIC

Compliance with the principles and criteria for the tooth restoration assessment, taking into account the biological width of the periodontium, is important in periodontology.

Aim of the lesson:

– didactic: acquisition of knowledge about the anatomical and topographic features of the periodontium, taking into account its biological width;

– methodological: designation of methodological principles for restoration measures planning in complex periodontology;

– scientific: formation of ideas about scientific planning of restoration measures in periodontology.

Lesson objectives:

1. Study:

– dynamics of the biological system of the periodontium;

– methods for determining the biological width of the periodontium;

– basic principles of restoration measures in complex periodontology;

– stages of restoration of the tooth shape in patients with periodontal diseases.

2. Learn to:

– determine the biological width of the periodontium in a dental patient (with the instructor's assistance);

– plan the stages of restoration of the tooth shape in patients with periodontal diseases (with the instructor 's assistance);

– plan the stages of restoration of the contact point and the shape of the tooth crown in patients with periodontal diseases (with the instructor's assistance);

– assess the quality of dental restoration in patients with periodontal diseases (with the instructor 's assistance).

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.
3. Clinical manifestations of periodontal diseases.
4. Prognosis and planning of periodontal diseases treatment.
5. Hygienic measures for preparatory treatment of periodontal diseases.
6. Ergonomics in periodontology.

Control questions from the related disciplines:

1. Anatomical and topographic features of the tooth and periodontium tissues.
2. Stages of inflammation in periodontal tissues.
3. Fundamentals of Dental Materials.
4. Stages of carious cavities preparation.
5. Deontology in the dentist's practice.

Control questions on the topic of the lesson:

1. Basic principles of restoration measures in complex periodontology.
2. Stages of tooth shape restoration in patients with periodontal diseases.
3. Primary visual characteristics of dental hard tissues in the framework of pre-restorative preparation.
4. Pre-restoration measures of the 1st priority.
5. Detailed assessment of the defect borders in dental hard tissues.
6. Determination of the periodontium biological width in the process of tooth restoration.
7. Pre-restoration activities of the 2nd priority.
8. Direct and indirect tooth restoration.
9. Professional preventive measures related to the oral cavity during tooth restoration in patients with periodontal diseases.
10. Criteria for dental restoration assessment in patients with periodontal diseases.

Tasks for independent work of students. To master the material, the student must study the lecture on the topic of the lesson along with the recommended literature. The practical part of the lesson is carried out during clinical assessment of patients. After making the diagnosis and setting prognosis, the student proceeds to dental hard tissues restoration planning. The treatment plan must be approved by the patient. Willingness of the patient to cooperate should be taken into account. Planning is carried out strictly individually.

INTRODUCTION

The clinical features of periodontal diseases give grounds to the dentist to make a plan of competent treatment and undertake diagnostic measures aimed at eliminating errors and complications during his practical activity.

Restoration of dental hard tissues or dentition in periodontology provides a rational balance in the crown and root adjacent tissues of the biological system of the periodontium and the dentoalveolar system as a whole. The effectiveness of tooth restoration in periodontology depends on the choice of the principles for preserving the anatomical and topographic zones of the periodontium. Practice has shown inconsistency of a number of methodological approaches to preserving the biological width of the periodontium during restoration, which requires clarification. In this regard, the training manual presents an expedient algorithm for restoration of dental hard tissues in patients with periodontal diseases.

THE MAIN PRINCIPLES OF RESTORATION MEASURES IN COMPLEX PERIODONTOLOGY

Characteristic features of the tooth shape restoration in patients with periodontal diseases consist in following the stages of restoration.

The basic principles of restoration measures in complex periodontology include:

1. Monitoring the clinical state of the restored tooth root and crown environment in the dynamics of the periodontal biological system.
2. Priority of measures in the field of peri-restoration complex.
3. Providing proper conditions for effective hygienic measures in the area of the peri-restoration complex.
4. Consistency in providing professional measures.

Monitoring the clinical state of the restored tooth root and crown environment in the dynamics of the periodontal biological system

The state of the periodontium depends on the dynamic balance of two systems: the tooth root and crown environment. This determines the periodontal homeostasis of the root and crown environment resistance to adverse factors (fig. 1).

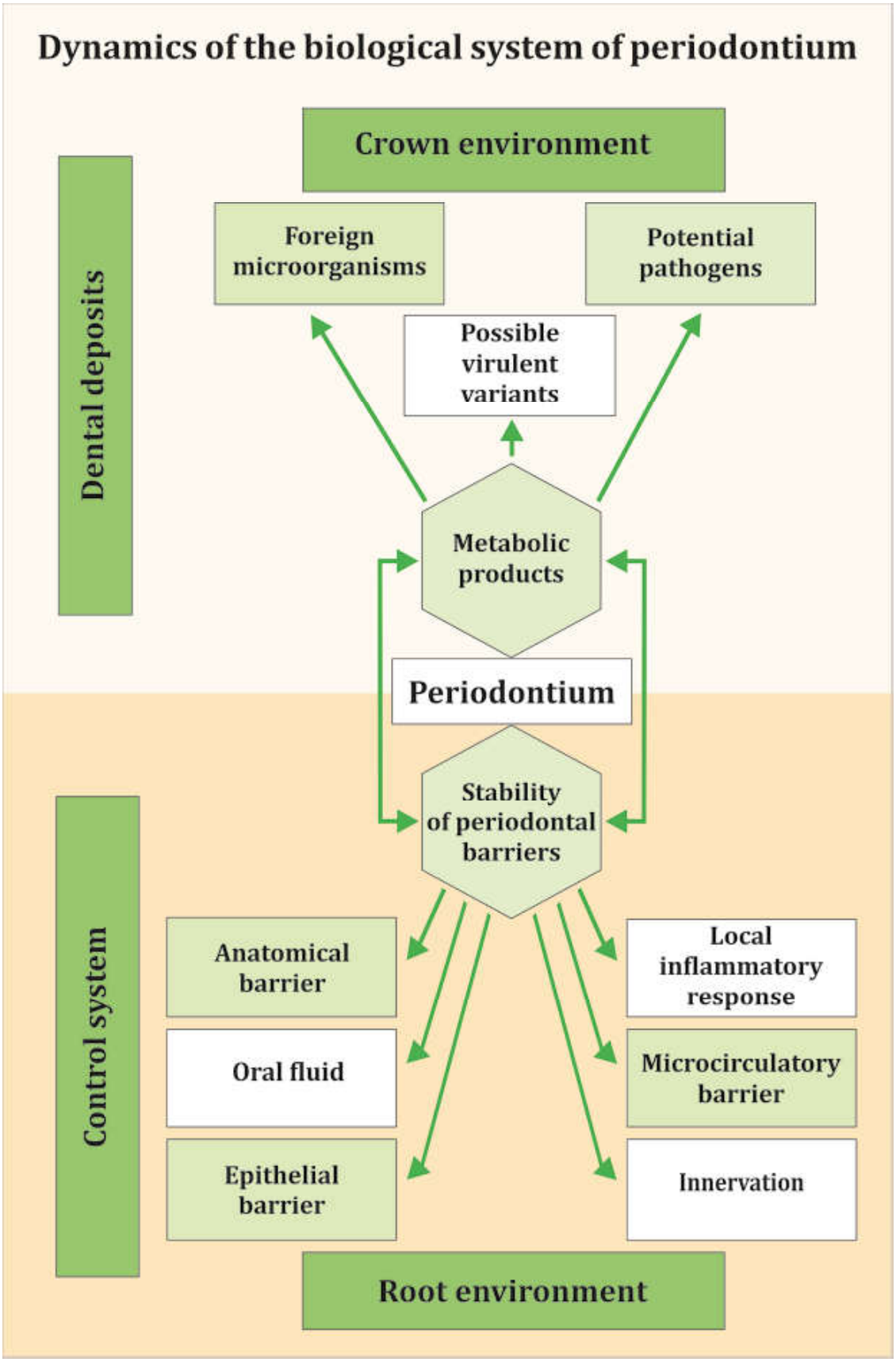


Fig. 1. Dynamics of the periodontal biological system

Restored teeth in patients with periodontal diseases provide their favorable compatibility with the biological system of the periodontium. Therefore, it is necessary to define the criteria for the tooth root and crown adjacent tissues, taking into account the physiological norm and the influence of unfavorable factors on them. The terms for eliminating adverse factors are selected according to indications and are individual in nature (table 1).

Table 1

Control of tissue stability of the periodontal biological system during tooth restoration

Criteria	Physiological norm	Unfavorable factor
Root environment control: anatomical factors		
Gingival biotype	Thin, medium, thick, extra thick	Thin
The position of the top of the alveolar ridge in relation to the enamel-cement border	High, normal, low	High, low
Bite	Neutral	Bite anomalies: open, deep, mesial, distal, cross; dentition
Dentition, position of teeth	Elliptical, parabolic shape	Diastema, trema, migration of teeth; crowding; torto-anomalies
Teeth	Tooth enamel without signs of change	Enamel hyperplasia (enamel pearl); presence of an enamel projection into the furcation of the tooth roots
	Presence of a normal tooth equator	Flattening or prominence of the tooth equator
	Presence of a bond between cement and enamel	No bond between cement and enamel
	The normal state of the tooth roots in terms of profile, curvature, width of the gap and the shape of the curve	Converging molar roots, bayonet roots; presence of a palatogingival sulcus of the root of the upper central and lateral incisors
	Crown height and tooth root length ratio (1:2)	Changing indicators
Root environment control: epithelial barrier		
Dental attachment	Saved	Periodontal pocket, abnormal periodontal pocket

End of the table 1

Criteria	Physiological norm	Unfavorable factor
Root environment control: local inflammatory response		
Inflammation in periodontal tissues	Absent: indicators of inflammation indices (gingiva[1] bleeding, GI[1], PMA[2], Schiller-Pisarev testetc.) within the normal range	Present: Inflammation indices are outside the normal range
Root environment control: microcirculatory barrier		
State of periodontal microcirculation	Indicators of periodontal microcirculation (vacuum test, PBCI[3], LODdsp[4] etc.) within the normal range	Impairment of the periodontal microcirculation indicators; occlusal trauma
Root environment control: oral fluid		
Saliva	Biophysical indicators (salivation rate, pH, viscosity, microcrystallization) within normal limits	Impairment of one or more saliva parameters
Gingival fluid	Quantity within the normal range	Increased
Root environment control: innervation		
Gum	No complaints	Burning and itching
Dentin and dental pulp	Indicators of EOM[5], thermal tests are within the normal range; sentient dentine	Changes in EOM and thermal tests in comparison with the norm; dentine sensitivity
Chewing muscles	No signs of parafunctions	Signs of parafunctions
Crown environment control:products of metabolism		
Dental deposits	OHI-S[6] ≤ 0,3–0,6 PLI[7] < 1,0	OHI-S > 0,3–0,6 PLI ≥ 1,0

[1] GI — gingival index
[2] PMA — papillary-marginal-alveolar index
[3] PBCI — peripheral blood circulation index
[4] LODdsp — laser-optical diagnostics based on digital speckle photography
[5] EOM — electroodontometry
[6] OHI-S — hygiene index
[7] PLI — plaque index

In clinical assessment of the tooth with hard tissue defects in patients with periodontal diseases, the following parameters are determined: localization of the borders of the surgical field (above and below the gum), condition of the gum, presence or absence of dentogingival attachment, gingival or periodontal pockets, dental deposits (fig. 2).

Fig. 2. Impairment of the periodontium biological system in a patient with the restoration of the upper anterior teeth

Priority of measures in the field of the peri-restorative complex

A peri-restorative complex is a single complex that includes a part of a tooth with a restoration and its adjacent periodontal tissues. The results of the clinical monitoring of teeth with hard tissue defects make it possible to determine the priority measures in carrying out periodontal restoration. It should be noted that tooth restoration is contraindicated in case of gum inflammation (GI > 0.8). However, it is possible to carry out first temporary tooth restoration according to indications following local anti-inflammatory therapy of the gums up to GI ≤ 0.8, and then carry out the final restoration.

Providing proper conditions for effective hygiene measures in the peri-restorative complex

To prevent the development of inflammatory processes in the area of the peri-restorative complex, it is necessary to ensure a distance from the borders of the restoration to the crest of the alveolar bone of 3 mm or more, which makes it possible to effectively remove dental deposits in the restoration subgingival region (fig. 3).

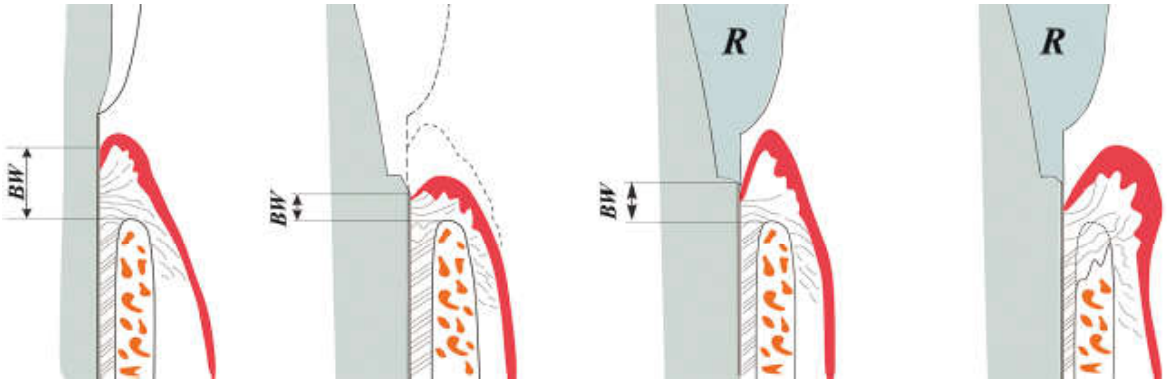


Fig. 3. The results of restoration (R) without taking into account the biological width of the periodontium (BW):
a — BW is within the normal range (≥ 2.04 mm) relative to the level of the alveolar ridge; *b* — absence of BW after flap surgery; *c* — immediately after restoration (BW< 2.04 mm); *d* — long-term results of restoration without BWP, accompanied by chronic inflammation of the marginal part of the gums and resorption of the alveolar ridge

Consistency of professional measures

Strict adherence to all stages of restoration followed by dynamic monitoring and implementation of preventive treatment and prophylactic measures in patients with periodontal diseases provide good results in the long-term follow-up period.

STAGES OF THE TOOTH SHAPE RESTORATION IN PATIENTS WITH PERIODONTAL DISEASES

Stages of tooth shape restoration in patients with periodontal diseases:

1. Pre-restoration preparation.
2. Direct and indirect restoration of the tooth shape.
3. Professional preventive measures of the oral cavity.

Pre-restoration preparation

The purpose of pre-restoration preparation is to identify the stages of carrying out measures to create a peri-restoration complex.

Stages of pre-restoration preparation:

1. Primary visual characteristics of the tooth hard tissues.
2. Pre-restoration measures of the 1st priority.
3. Detailed assessment of the defect borders in the tooth hard tissues.
4. Determination of the biological width of the periodontium (BWP) of the tooth under restoration.
5. Pre-restoration measures of the 2nd priority.

Primary visual characteristics of the tooth hard tissues

The primary visual characterization of the tooth hard tissues is performed at the stage of periodontal disease diagnosis to determine the scope and nature of the restoration measures in the formation of the anatomy of the tooth. Precise visual characteristics of the tooth hard tissues are defined.

Pre-restoration measures of the 1st priority

Pre-restoration measures of the 1st priority are carried out to prevent or eliminate possible difficulties in the process of restoration and after its completion.

Stages of pre-restoration measures of the 1st priority include:

1. Oral hygiene.
2. Temporary closure of defects in hard tissues of the tooth.
3. Elimination of adverse factors according to indications.
4. Anti-inflammatory treatment of periodontal tissues.

Initially, according to indications, oral hygiene is performed, then preliminary preparation with temporary closure of defects in the hard tissues of the tooth, and finally anti-inflammatory treatment of periodontal tissues is carried out.

If necessary, eliminate other adverse factors. The stage is considered completed if the oral hygiene objective tests data and the condition of the gums indicate that the work has been carried out effectively.

Detailed assessment of the defect borders in the hard tissues of the tooth

The purpose of this stage is to determine the methods and means of the forthcoming restoration of teeth in patients with periodontal diseases. To do this, the supragingival and subgingival borders of the defect in the hard tissues of the tooth are defined.

The supragingival border is determined using a heated mirror and a probe. To improve the view and illumination of the surgical field, binocular dental glasses, an operating microscope and additional LED lighting are used.

Evaluation of the subgingival border of the defect of hard tissues of the tooth has its own characteristics. Subgingival access is carried out using non-invasive or invasive methods. The choice of the method depends on the clinical case: the state of the gums, topography of the defect from the enamel-cement border, the amount of gingival fluid, presence of bleeding gums and general state of the patient.

Non-invasive methods include retraction of the gingival margin or gingival papilla using an air jet, retraction cord or special instruments (gingival retractors).

Application of special retraction threads made of soft linen or cotton makes it possible to expand the space between the gum and the tooth in the horizontal and vertical directions (fig. 4).

Fig. 4. Location of the retraction cord under the gum:
a — correct; *b* — incorrect

Retraction threads are distinguished by:

– size: #000, #00, #0, #1, #2 or #7, #8, #9, #10;
– filling: impregnated with various medications or unimpregnated ones;
– structure: knitted, twisted or braided.

Knitted threads are packed under the gum for its retraction and isolation from the moisture of the surgical field. Among them there are threads reinforced with copper wire to improve their advancement under the gum. Twisted retraction threads are used less frequently due to rapid defibration. In braided threads, high strength and the absence of defibration during operation are noted. In patients with periodontal disease unimpregnated retraction cords are used.

The thread is placed deep into the gingival margin using special tools - packers. Depending on the type of retraction thread, different types of packers are used. For example, a twisted thread is laid with a packer with a smooth surface of its working part, and a braided and knitted thread is laid with a notched packer (fig. 5).

a ***b***

Fig. 5. Notched packer:
a — general view of the tool; *b* — working part

The excess thread is cut off with special scissors, leaving a small part of it above the gingival margin. Injury to the gingival margin and the inclusion of thread fibers in the restoration is considered a work error. If the gums are damaged, treatment is interrupted for several days for the healing process.

Invasive methods of subgingival access to the boundaries of a defect in the hard tissues of the tooth include correction of the shape of the gingiva in patients with hyperplasia or the alveolar ridge with significant subgingival destruction of the hard tissues of the tooth and violation of the BWP.

Determination of the biological width (BW) of the periodontium of the restored tooth

BW is the distance from the coronal part of the epithelial attachment to the top of the crest of the alveolar process, which averages 2.04 mm (fig. 6).

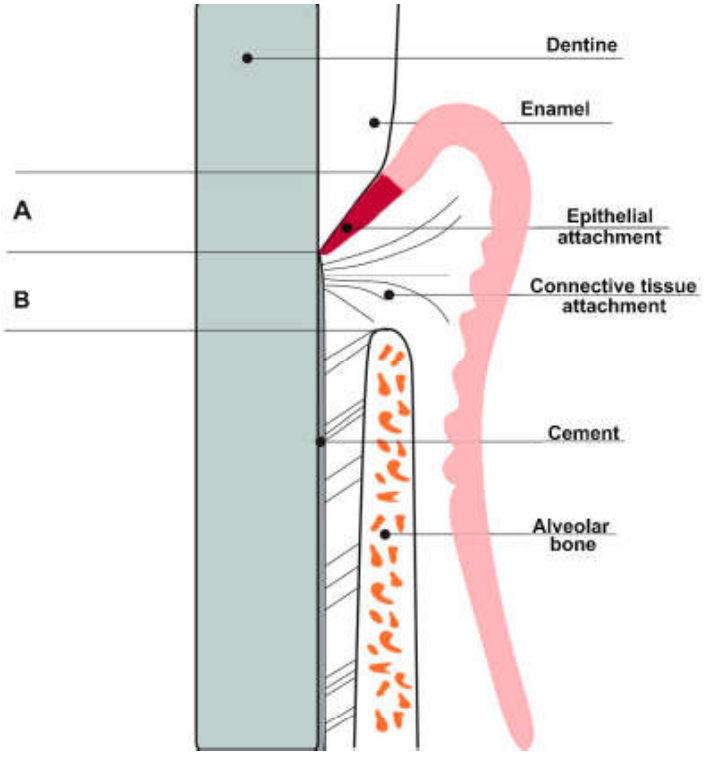
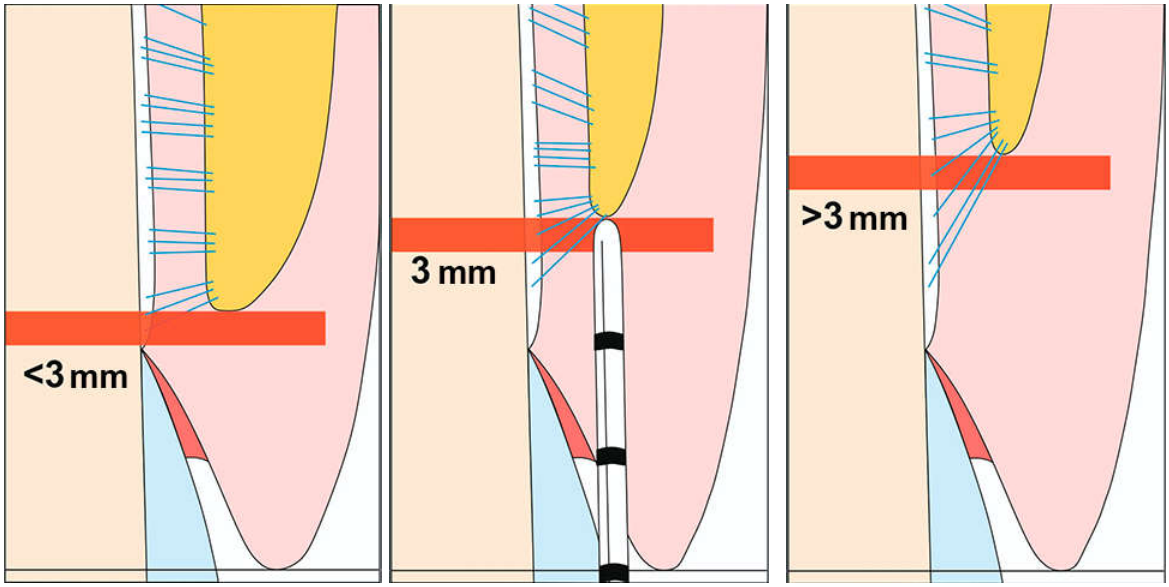


Fig. 6. Biological width (A + B):
A — epithelial attachment; *B* — connective tissue attachment

To ensure the state of normal dynamics of the periodontal biological system, the distance between the alveolar ridge and the border of the restoration should be ≥ 3.0 mm: A + B + 1.0 mm ≥ 3.0 mm. It allows the dentist to carry out targeted hygienic measures in the area of the peri-restoration complex, which prevents growth of plaque, the metabolic products of which can contribute to the inflammatory process onset in periodontal tissues.

At the same time, phenotypic variations in the structure of the alveolar ridge and gums should be taken into account (fig. 7).



Low position of the top of the alveolar ridge (less than 3 mm).	Normal position of the top of the alveolar ridge (about 3 mm).	High position of the top of the alveolar ridge (more than 3 mm).
Connective tissue attachment less than 1 mm.	Connective tissue attachment about 1 mm.	Connective tissue attachment more than 1 mm.
Frequency of occurrence is 2%.	Frequency of occurrence is 85%.	Frequency of occurrence is 13%.
Risk of development of inflammatory-destructive changes	Favorable prognosis	Risk of gum recession
a	***b***	***c***

Fig. 7. Morphological variants of the structure of the alveolar ridge and gums: *a* — high alveolar process, BWP < 2.04 mm; *b* — normal structure of the alveolar ridge and gums (probing under anesthesia is shown); *c* — deeply located alveolar ridge, BWP > 2.04 mm

Known invasive and non-invasive methods to determine the BWP.

Invasive method: clinical (J. C. Kois, 1994). In practical dentistry, the traditional invasive method to determine BWP is applied (fig. 8).

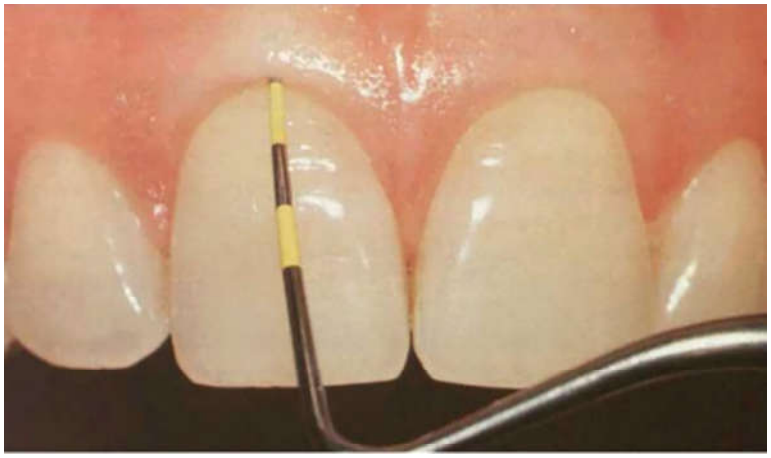


Fig. 8. Invasive method for determining BWP (according to J. C. Kois, 1994)

Using a periodontal graduated probe, the depth of the periodontal sulcus or pathological periodontal pocket is measured. Under infiltration anesthesia, a periodontal probe is inserted into the periodontal sulcus or pathological periodontal pocket parallel to the long axis of the tooth to the top of the alveolar ridge (until it stops), taking into account the upper limit of the measurement from the gingival margin to the lower immersion point of the probe. BWP is determined by the result of the mathematical difference between the above two measurements.

Non-invasive methods: radiation and clinical-radiation (A. S. Rubnikovich, V. A. Solomevich, 2020, 2022). At the Department of Periodontology of the Belarusian State Medical University, non-invasive methods for determining BWP have been developed (fig. 9, 10).

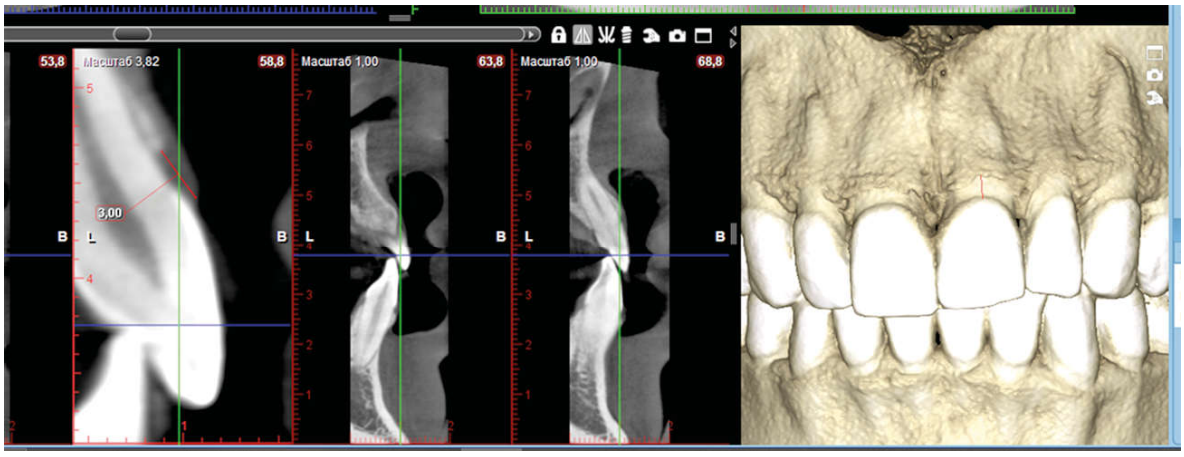
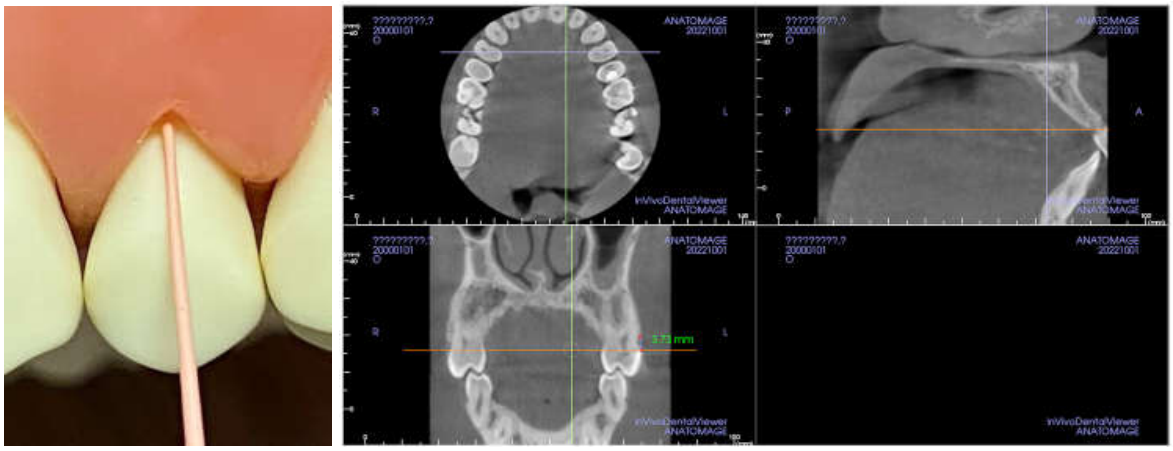


Fig. 9. Non-invasive visual method for determining BWP using cone beam computed tomography (CBCT) (according to A. S. Rubnikovich, V. A. Solomevich, 2020)



Rice. 10. Non-invasive visual method for determining BWP using CBCT and gutta-percha pin (according to A. S. Rubnikovich, 2022)

Radiation method for diagnosing BWP. To determine BWP, CBCT is used with the «Implant» tab with the «Ruler», «Panorama curve» tools, which mark the distance between the top of the alveolar ridge and the enamel-cement border of the tooth. Then, the obtained BWP value is recorded.

The clinical-radiation method for diagnosing BWP is carried out in two stages.

First stage. First, the base of the periodontal sulcus or the pathological periodontal pocket is determined using a periodontal probe by its digital marking to determine the probing depth. This makes it possible to accurately immerse the gutta-percha pin, the top of which must advance to a predetermined depth. Further, the obtained values are transferred to the gutta-percha pin # 30 (taper 2 %) and injected until it stops, attaching it to the surface of the tooth. Then the patient is referred for CBCT.

Second phase. CBCT is also carried out with the Planmeca Romexis Viewer Program and «Implant» with «Ruler» and «Panorama curve» which analyze the distance between the top of the alveolar ridge and the tip of the gutta-percha pin.

This method eliminates errors in determining the marker point in the gingival sulcus base of the region or the pathological periodontal pocket.

Pre-restoration measures of the 2nd order

The purpose of this stage is to prepare the operative field for direct or indirect tooth restoration.

Stages of pre-restoration measures of the 2nd order:

1. Isolation of the surgical field.
2. Preparation of the tooth hard tissues.

Isolation of the surgical field from the oral fluid and the content of the periodontal pocket in patients with periodontal diseases during restoration of defects in the hard tissues of the tooth is carried out using a rubber dam.

To fix tightly the rubber dam to the neck or the root of the tooth, a floss ligature is applied and medium or dense latex veils are selected. To speed up the process of applying ligatures, self-tightening floss knots are preliminarily prepared — a half-bayonet or a double half-bayonet. A pre-prepared ligature is placed on the tooth using a spatula.

The following features of the tooth hard tissues preparation in patients with periodontal diseases are taken into account:

– among the methods of the tooth hard tissues preparation, preference is given to mechanical, ultrasonic and laser ones;

– in the process of the tooth hard tissues preparation, a medical treatment of a defect in the hard tissues of the tooth is carried out with 0.5–2 % chlorhexidine aqueous solution;

– in case of approximal defects preparation with the help of elongated burs, the carious cavity (the approximal contact) is opened, overhanging edges are removed, necrectomy is performed, weakened tissues are excised at a height of at least 2 mm from the occlusal surface, enamel edges are bevelled and smoothed;

– mechanical preparation of hard tissues of the tooth is carried out with elongated ceramic burs for good access to the underlying tissues (fig. 11);

– for ultrasonic preparation, tips with hemispherical and angular diamond burs are used to prevent damage to the hard tissues of the adjacent tooth, interdental papilla and rubber dam (fig. 12);

– when accessing from the proximal-sagittal surface (external cavity, class II), to create the possibility of direct access after cavity preparation in an adjacent tooth or in the absence of an adjacent tooth, ultrasonic angled burs are used;

– to form a carious cavity, to bevel the enamel and finish its edges, ultrasonic nozzles are used — oblique burs;

Fig. 11. Kerabors

Fig. 12. Ultrasonic preparation of the tooth hard tissues with an angled diamond bur

– if enamel is preserved on the gingival wall of the carious cavity, a bevel is made on it towards the periodontal gap;

– to prevent cracks in the hard tissues of the tooth, violation of the marginal fit and the appearance of a «white line» along the edges of the restoration, hard tissues are treated with ultrasonic oblique burs;

– in hard-to-reach areas to achieve additional antimicrobial effect and prevent iatrogenic events laser preparation is used.

Direct and indirect restoration of the tooth shape

Measures to restore the shape of the tooth include direct or indirect restoration, the choice of which depends on the condition of the BWP and the biotype of the patient's gums.

With preserved BWP, direct or indirect restoration is carried out. In case of BWP displacement, it is restored first, often by lengthening the crown part of the tooth, and then priority is given to indirect restoration. To lengthen the crown of the tooth, excision of the gums (gingivectomy), correction of the alveolar ridge or orthodontic measures are performed.

Direct restoration of the tooth is carried out in one stage using restorative materials directly in the patient's oral cavity. Indirect restoration is carried out by restoring the shape of the tooth with the help of aesthetic orthopedic structures, including veneers, inlays and crowns. In periodontal diseases, preference is given to composite microphilic, hybrid, nanohybrid materials and ceramic structures.

When restoring approximal defects in patients with periodontal diseases, only elongated contouring metal, plastic or combined matrices, matrix holders, rings, retainers, wedges are used (fig. 13).

Fig. 13. Instruments and accessories for the restoration of approximal defects in hard tissues of the tooth

Filling of the gingival proximal wall of the defect is carried out using special tools ensuring close contact between the matrix and the tooth (fig. 14).

a ***b***

Fig. 14. Tool to form a contact point:
a — general view of the tool; *b* — working part

In case of final restorations processing, the occlusal surfaces, proximal edges and contact points are ground, and the correct contours of the buccal and oral surfaces are created. If the equator of the tooth is flattened, the food bolus will cause injury to the marginal gingiva, and if it is excessively convex, the self-cleaning process of the tooth will be impaired.

The stage of restorations grinding and polishing is carried out until a perfectly smooth surface of the restoration is obtained.

The long-term results of the restoration depend on the nature of the gum biotype, the choice of restorative material, and the contact point. The formation of a restoration with a depth of more than $^{2}/_{3}$ of the gingival sulcus should not be allowed. This prevents disturbance in the biological system of periodontal tissues and inflammatory-destructive processes development, accompanied by changes in the microbial landscape, inflammation and / or recession of the gums, and formation of a pathological periodontal pocket.

Professional preventive measures related to the oral cavity

Professional preventive measures are aimed at ensuring long-term restoration.

Patients with periodontal diseases and restored teeth undergo mechanical scaling using metal curettes in a horizontal and parallel direction along the edge of the restoration without use of chlorhexidine, ultrasonic and air abrasive devices. This eliminates uneven restorations and prevents chipping of ceramics, abrasion of composites and destruction of the adhesive bond between the tooth tissues and the restoration.

After restoration the patient is recommended to visit the dentist every 3 months, as well as to carry out individual oral hygiene, applying:

– low- or non-abrasive toothpastes with neutral (alkaline) pH containing fluoride and soft toothbrushes, avoid abrasive toothpastes with low pH;

– chlorhexidine-free mouthwashes and stannous fluoride-free toothpastes;
– solutions that do not contain alcohol for irrigation of the oral cavity;
– avoid low pH foods containing stannous fluoride.

Following the above recommendations by the patient prevents rapid formation of plaque, abrasion, staining of the surface and borders of restorations.

Knowledge of the basic principles of the concept proposed by the authors and their strict observance in case of tooth shape restoration in patients with periodontal diseases provide a favorable interaction between the restoration and the adjacent tissues of the periodontal biological system. Long-term application of the above conceptual restoration of the tooth hard tissues with periodontal diseases allows the dentists to obtain good results in 98 % of cases (Appendix).

QUALITY CRITERIA FOR RESTORATION OF THE TOOTH FORM IN PATIENTS WITH PERIODONTAL DISEASES

Assessment of dental restoration quality in patients with periodontal diseases is carried out immediately after the treatment and in the mid and long-term period.

When evaluating the quality of already functioning dental hard tissue restorations, depending on the results of the study, dentists have a choice: to keep the restorations and monitor them, correct or replace.

The quality indicators of dental restorations are as follows: absence of patient complaints and the highest «A» ratings according to the USPHS (Modified United States Public Health Service, Ryge Criteria for Direct Clinical Evaluation of Restoration), anatomical shape, marginal fit, marginal staining, surface condition, color matching.

Probing, flossing and X-ray determine presence / absence of a contact point, overhanging edges of the filling on the proximal surfaces and in the subgingival region.

In addition, to assess restorations in relation to the adjacent hard tissues of the tooth, the relationships of restorations with periodontal, endodontic, functional and aesthetic indicators are also examined.

SELF-CONTROL

Situational tasks

Task 1

Patient K., 36 years old, complained of bleeding and the appearance of the gums to the dentist. 9 months ago, a bridge was installed in the area of the upper anterior teeth, the patient refused further treatment.

1. Describe the clinical picture.
2. List the alleged reasons for the development of this clinical situation.
3. Specify which basic and additional diagnostic tests should be performed.
4. Suggest a diagnosis.
5. Determine the tactics of the dentist in planning the patient K treatment.

Task 2

Patient T., 44 years old, went to a dentist for a preventive examination. 8 years ago, metal-ceramic crowns were installed in the area of the upper anterior teeth.

1. Describe the clinical picture.
2. List the alleged reasons for the development of this clinical situation.
3. Specify which basic and additional diagnostic tests should be performed.
4. Determine the tactics of a dentist in planning treatment in this clinical situation.

Task 3

Patient R., 50 years old, went to a dentist for a preventive examination. 11 months ago, a direct restoration of the upper anterior teeth was carried out.

1. Describe the clinical picture.
2. List the alleged reasons for the development of this clinical situation.
3. Specify which basic and additional diagnostic tests should be performed.
4. Determine the tactics of a dentist in planning treatment in this clinical situation.

Tests

1. Treatment of carious defects and restoration of dental hard tissues in patients with periodontal diseases are planned (one correct answer):

a) during preparatory treatment;

b) when re-evaluating the condition of periodontal tissues; c) during orthodontic treatment;

c) during surgical treatment.

2. Indications for replacement or correction of the filling are…. (two or more correct answers):

a) rough surface, overhanging edges of the seal;

b) the absence of a contact point with an adjacent tooth and a violation of the marginal fit;

c) color matching;

d) untimely contact with the antagonist tooth in the area of the filling.

3. In periodontal diseases, the carious process in cavities of II–V classes according to Black, as a rule, proceeds (one correct answer):

a) with a combined lesion of the crown and root areas;

b) with only the coronal region damage;

c) with only the root of the tooth damage;
d) with the cutting edges and tubercles of the teeth damage.

4. Preparation of proximal defects of the teeth in patients with periodontal diseases is carried out using (one correct answer):

a) elongated burs;
b) shortened burs;
c) excavators;
d) enamel knives.

5. For clear visualization of the carious defect borders in patients with periodontal diseases during the restoration of teeth, dentists use (two or more correct answers):

a) a rubber dam;
b) a clasp that moves the gum;
c) retraction thread;
d) cotton rolls.

6. To isolate the surgical field during the restoration of carious defects in patients with periodontal diseases, dentists use (one correct answer):

a) a rubber dam;
b) a mouth expander;
c) retraction thread;
d) cotton rolls.

7. When restoring carious cavities on the proximal surfaces extending to the contact point, occlusal surface, lateral edges of the tooth, in patients with periodontal diseases, it is recommended to use (two or more correct answers):

a) hybrid composite materials;
b) nanofilled composite materials;
c) cements;
d) ormokers.

8. When restoring approximal defects in patients with periodontal diseases, one should apply (two or more correct answers):

a) elongated contouring metal matrices, matrix holders, rings;
b) elongated contouring plastic matrices, clamps;
c) shorte ned metal, plastic, combined matrices;
d) elongated contouring combined matrices, wedges.

9. For contouring, grinding and polishing the proximal surfaces of restorations in patients with periodontal diseases, dentists use (two or more correct answers):

a) metal strips of various fineness;
a) plastic strips of various dispersion;
a) special oscillating tools;
a) carborundum stones.

10. Dental restoration quality assessment in patients with periodontal diseases is carried out according to the following criteria (two or more correct answers):

a) anatomical shape;
b) marginal fit;
c) surface condition;
d) presence of a ledge.

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Appendix

SCHEME
of referential basis of actions in the restoration of dental hard tissues in patients with periodontal diseases

Sequence of actions	Means
Carrying out subjective and objective examination methods, differential diagnostics	Friendly environment for conversation, attentiveness of the doctor, dental kit, tools for additional examination methods
Carrying out hygiene measures	Dental kit, tools and materials for hygiene measures
Material and color palette for restoration	Dental materials & color set
Carrying out anesthesia	Dental kit, anesthetic, carpool injector
Isolation of the surgical field and visualization of the borders of the carious defect	Dental kit, rubber dam system, gingival clasps, retraction thread of various diameters, packers
Preparation of a carious cavity	Dental set, elongated instruments for carious cavity preparation, fins
Preparation of proximal defects for restoration	Elongated contouring metal, plastic, combined matrices, matrix holders, clamps, rings, wedges
Creating an adhesive base for the upcoming restoration	Dental kit, adhesive systems
Selection and application of restorative materials	Dental kit, filling materials: hybrid composite materials, nanofilled composite materials, ormokers
Finishing the restoration: contouring, grinding and polishing the proximal surfaces of the restoration	Dental set, instruments and materials for grinding and polishing restorations: metal and plastic strips of various dispersion, special oscillating instruments
Restoration quality assessment	Dental kit

CONTENTS

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