MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS

EDUCATIONAL INSTITUTION
BELARUSIAN STATE MEDICAL UNIVERSITY

APPROVED by

Associate professor Ya.I.Timchuk
Head of the Dpt., Ph.D.

_____

METHODOLOGY TEXTS for Practical Training of Students
in the academic discipline
«REMOVABLE PROSTHETICS»

Topic: **Prosthodontic treatment of dental arch defects with removable dentures (4-d year, 7-th semester)**

For the specialty: 7-07-0911-03 "Dentistry"

Total time of classes: 160 hours

APPROVED by

Meeting Department of Prosthetic Dentistry and Orthodontics
Protocol № 1, August 31, 2026

APPROVED by

Associate professor Ya.I.Timchuk
Head of the Dpt., Ph.D.

_____

Protocol of the Methodical
Meeting of the Department № _1_,
31.08.2026

Thematic Plan of Practical Training in the academic discipline «Removable prosthetics» for 7th semester, 4th year students

1. Partial adentia.

Patients examination. Completion of medical documentation

2. General principles of treatment and medical prevention in case of partial adentia. Planning comprehensive treatment for patients with partial adentia.

Patients examination. Completion of medical documentation

3. Characteristics of partial removable dentures and their elements.

Patients examination. Completion of medical documentation

4. Methods of fixation and stabilization of partial removable plate dentures.

Taking impressions using alginate and silicone materials

5. Methods of taking impressions, characteristics of impression materials.

Taking impressions using alginate and silicone materials

6. Methods for determining central (habitual) occlusion and clinical landmarks for tooth selection and placement in case of partial adentia.

Determination of central (habitual) occlusion in various cases of partial adentia

7. Checking the construction of partial removable plate dentures (PRPD).

Checking the construction of PRDP

8. Final modeling of bases and manufacturing of partial removable plate dentures for upper and lower jaws.

Selection of tools and materials for final processing of PRPD

9. Fitting and application of partial removable plate dentures. Rules for using removable dentures.

Fitting and application of PRPDs

10. Correction of partial removable plate dentures.

Making correction of removable dentures

11. Clasp dentures.

Taking impressions using alginate and silicone materials

12. Clasp system of clasp denture construction. Parallelometry.

Taking impressions using alginate and silicone materials

13. Technique for manufacturing cast frameworks of clasp dentures on refractory models.

Fitting and checking the construction of the solid cast frame of the clasp prosthesis

14. Verification of the correctness of determining central occlusion, base boundaries, and tooth placement.

Fitting and placement of the finished clasp prosthesis

15. Prosthodontic treatment of patients with partial adentia using removable dental prosthetic constructions.

Making correction of removable dentures

Lectures - 10 (15 hours)
Practical lessons - 90 hours
Number of weeks - 15
Total training hours - 160 hours
Intermediate assessment - credit

APPROVED by

Associate professor Ya.I.Timchuk
Head of the Dpt., Ph.D.

_____

Protocol of the Methodical
Meeting of the Department № _1_,
31.08.2026

Thematic Plan of Lectures in the academic discipline
«Removable prosthetics» for 7th semester, 4th year students

1. Partial Adentia (PA). Causes. Examination and diagnostic methods. General principles of treatment of partial adentia. Indications and contraindications for the manufacture of removable prostheses. Modern construction materials.
2. Partial removable dentures and their elements. Types of clasps. Methods of fixation and stabilization, clasp lines.
3. Modern impression materials and their characteristics. Methods of obtaining impressions. Casting of models. Boundaries of partial removable plate prostheses (PRPP), concept of neutral zone.
4. Manufacturing wax bases with occlusal rims and requirements placed on them. Methods for determining and fixing central (habitual) occlusion.
5. Characteristics and components of the bent wire clasp. Selection and arrangement of artificial teeth, occlusal curves. Checking the design of the removable partial denture (RPD).
6. Final fabrication of RPD. Rules for fitting and placing finished prostheses, adaptation stage. Rules for use and care recommendations. Correction of removable prostheses.
7. Clasp prostheses, characteristics and components. Indications and contraindications for making clasp prostheses. Clinical-laboratory stages of fabrication.
8. Parallelometry. Clasping system of clasp prosthesis construction, Neia clasp system.
9. Methods of manufacturing a solid cast framework of a clasp prosthesis (direct casting and casting on a refractory model). Checking the construction of the solid cast framework of the clasp prosthesis.
10. Selection and arrangement of artificial teeth, checking the construction of the clasp prosthesis. Final fabrication of the clasp prosthesis. Fitting and placement. Care recommendations.

Lectures - 10 (15 hours)
Practical lessons - 90 hours
Number of weeks - 15
Total training hours - 160 hours
Intermediate assessment - credit

BELARUS STATE MEDICAL UNIVERSITY, DENTAL FACULTY

EXAMINATIONAL SHEET

PRACTICAL SKILLS ON REMOVABLE PROSTHETICS,

YEAR **4** SEMESTER **7** GROUP ☐☐

_____

Student

_____

Teacher Members of examinational group Date

Practical skills	Points	realization ("Yes", "No")		Examination group	Point
		Student	Teacher		
1. Diagnostic manipulations in the clinic of prosthodontics					
1.1 Filling in the patients history	3				
2. Methods of patient examination					
2.1 History taking, external and internal examination	2				
2.2 X-ray analysing	2				
2.3 Diagnosis setting and justification	3				
2.4 Treatment plan making	4				
2.5 Justification of choice of construction of					
2.5.1 Acrylic-base removable denture	3				
2.5.2 Removable denture with a cast framework	3				
3. Prosthodontic treatment with removable dentures:					
3.1 Selection of abutment teeth	3				
3.2 Selection of impression tray and material	2				
3.3 Taking impression with elastic masses	3				
3.4 Evaluation of impression quality	2				
3.5 Casting of models, model evaluation	3				
3.6 Selection of location of the margin for acrylic base of RPD in maxilla	3				
3.7 Selection of location of the margin for acrylic base of RPD in mandible	3				
3.8 Registration of centric occlusion at fixed vertical dimension of occlusion	3				
3.9 Registration of centric occlusion at non-fixed vertical dimension of occlusion	5				
3.10 Finding and correcting errors in registration of centric occlusion	5				
3.11 Methods of surveying the master cast	5				
3.12 Designing the clasp system and framework of maxillary removable partial denture	5				
3.13 Designing the clasp system and framework of mandibular removable partial denture	5				
3.14 Checking the fit of the RPD framework	3				
3.15 Trial fit of acrylic removable denture	3				
3.16 Trial fit of cast framework RPD	4				
3.17 Fitting and inserting of RPD:					
3.17.1 Acrylic-based denture	4				
3.17.2 cast framework denture	4				
3.18 Explanation to the patient rules of use of RPD	4				
3.19 RPD correction	2				
3.20 Relining RPD in clinic	5				
3.21 Relining RPD in dental laboratory	4				

POINTS ☐ **MARK** ☐

Comment: _____

Signs: _____

APPROVED by

Associate professor Ya.I.Timchuk
Head of the Dpt., Ph.D.

_____

Protocol of the Methodical
Meeting of the Department № _1_,
31.08.2026

CRITERIA FOR ASSESSING STUDENT KNOWLEDGE ON A 10-POINT SCALE

10 points – ten:

- Systematized, deep, and comprehensive knowledge of all sections of the curriculum for the discipline "Removable Prosthetics," as well as key issues beyond its scope;
- Accurate use of scientific terminology (including in foreign languages), stylistically correct and logically coherent presentation of answers to questions on the discipline "Removable Prosthetics";
- Flawless mastery of the tools for the discipline "Removable Prosthetics," ability to effectively use them in formulating and solving scientific and professional tasks;
- Pronounced ability to independently and creatively solve complex problems in non-standard situations within the discipline "Removable Prosthetics";
- Complete and thorough understanding of the primary and supplementary literature recommended by the curriculum for the discipline "Removable Prosthetics";
- Ability to navigate theories, concepts, and directions in the discipline "Removable Prosthetics" and provide critical evaluations, utilizing scientific achievements from other dental disciplines;
- Creative independent work in practical and laboratory sessions for the discipline "Removable Prosthetics," active participation in group discussions, high level of cultural execution of assignments.

9 points – nine:

- Systematized, deep, and comprehensive knowledge of all sections of the curriculum for the discipline "Removable Prosthetics";
- Accurate use of scientific terminology (including in foreign languages), stylistically correct and logically coherent presentation of answers to questions;
- Mastery of the tools for the discipline "Removable Prosthetics," ability to effectively use them in formulating and solving scientific and professional tasks;
- Ability to independently and creatively solve complex problems in non-standard situations within the curriculum for the discipline "Removable Prosthetics";
- Complete understanding of the primary and supplementary literature recommended by the curriculum for the discipline "Removable Prosthetics";
- Ability to navigate the main theories, concepts, and directions in the discipline "Removable Prosthetics" and provide critical evaluations;
- Independent work in practical and laboratory sessions for the discipline "Removable Prosthetics," creative participation in group discussions, high level of cultural execution of assignments.

8 points – eight:

- Systematized, deep, and comprehensive knowledge of all sections of the curriculum for the discipline "Removable Prosthetics";

- Use of scientific terminology (including in foreign languages), linguistically and logically correct presentation of answers to questions, ability to make reasoned conclusions;

- Mastery of the tools for the discipline "Removable Prosthetics," ability to use them in formulating and solving scientific and professional tasks;

- Ability to independently solve complex problems within the curriculum for the discipline "Removable Prosthetics";

- Understanding of the primary and supplementary literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Ability to navigate the main theories, concepts, and directions in the discipline "Removable Prosthetics" and provide critical evaluations;

- Independent work in practical and laboratory sessions, participation in group discussions, high level of cultural execution of assignments in the discipline "Removable Prosthetics."

7 points – seven:

- Systematized and comprehensive knowledge of all sections of the curriculum for the discipline "Removable Prosthetics";

- Use of scientific terminology, stylistically correct and logically coherent presentation of answers to questions, ability to make well-founded conclusions;

- Proficiency in the tools for the discipline "Removable Prosthetics," ability to use them in solving educational and professional tasks;

- Free command of standard solutions within the framework of the curriculum for the discipline "Removable Prosthetics";

- Mastery of the main and necessary additional literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Ability to navigate the main theories, concepts, and directions in the discipline "Removable Prosthetics" and provide comparative assessments;

- Independent work in practical and laboratory sessions, participation in group discussions, high level of execution culture in tasks related to the discipline "Removable Prosthetics."

6 points – six:

- Sufficiently complete and systematic knowledge within the framework of the curriculum for the discipline "Removable Prosthetics";

- Use of necessary scientific terminology, stylistically correct and logically coherent presentation of answers to questions, ability to make well-founded conclusions in the discipline "Removable Prosthetics";

- Proficiency in the tools for the discipline "Removable Prosthetics," ability to use them in solving educational and professional tasks;

- Ability to independently apply standard solutions within the curriculum for the discipline "Removable Prosthetics";

- Mastery of the primary literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Ability to navigate basic theories, concepts, and directions in the discipline "Removable Prosthetics" and provide comparative evaluations;

- Active independent work during practical and laboratory sessions, periodic participation in group discussions, high level of cultural execution of assignments in the discipline "Removable Prosthetics."

5 points – five:

- Sufficient knowledge within the framework of the curriculum for the discipline "Removable Prosthetics";

- Use of scientific terminology, stylistically correct and logically coherent presentation of answers to questions, ability to draw conclusions;

- Proficiency in the tools for the discipline "Removable Prosthetics," ability to use them in solving educational and professional tasks;

- Ability to independently apply standard solutions within the curriculum for the discipline "Removable Prosthetics";

- Mastery of the primary literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Ability to navigate basic theories, concepts, and directions in the discipline "Removable Prosthetics" and provide comparative evaluations;

- Independent work during practical and laboratory sessions, participation in group discussions, high level of cultural execution of assignments in the discipline "Removable Prosthetics."

4 points – four, PASSED:

- Sufficient knowledge within the framework of the educational standard;

- Mastery of the primary literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Use of scientific terminology, stylistic and logical presentation of answers to questions, ability to draw conclusions without significant errors in the discipline "Removable Prosthetics";

- Proficiency in the tools for the discipline "Removable Prosthetics," ability to use them in solving standard tasks;

- Ability to solve standard tasks in the discipline "Removable Prosthetics" under the guidance of the instructor;

- Ability to navigate the main theories, concepts, and directions in the discipline "Removable Prosthetics" and provide evaluations;

- Work under the guidance of the instructor during practical and laboratory sessions, acceptable level of cultural execution of assignments in the discipline "Removable Prosthetics."

3 points – three, NOT PASSED:

- Insufficient knowledge within the framework of the educational standard;

- Knowledge of part of the primary literature recommended by the curriculum for the discipline "Removable Prosthetics";

- Use of scientific terminology, presentation of answers with significant linguistic and logical errors in the discipline "Removable Prosthetics";

- Weak proficiency in the tools for the discipline "Removable Prosthetics," incompetence in solving standard tasks;

- Inability to navigate the main theories, concepts, and directions in the discipline "Removable Prosthetics";

- Passivity during practical and laboratory sessions, low level of cultural execution of assignments in the discipline "Removable Prosthetics."

This level is insufficient for current and final assessment; a retake is allowed with appropriate independent work from the student.

2 points – two, NOT PASSED:

- Fragmentary knowledge within the framework of the educational standard;

- Knowledge of individual literary sources recommended by the curriculum for the discipline "Removable Prosthetics";

- Inability to use scientific terminology in the discipline "Removable Prosthetics," presence of gross stylistic and logical errors in answers;

- Passivity during practical and laboratory sessions, low level of cultural execution of assignments in the discipline "Removable Prosthetics."

This level is insufficient for current and final assessment; a retake is allowed with significant independent work from the student in the discipline "Removable Prosthetics."

1 point – one, NOT PASSED:

- Absence of knowledge and competence growth within the framework of the educational standard or refusal to answer;
- Use of prohibited (unauthorized) materials and methods.

The student will not be reassessed and will be recommended for expulsion from the higher educational institution.

Total time of class – **6** academic hours (240 min).

PLAN FOR PRACTICAL CLASSES
4-th year, 7-th semester

№№	Stage of Class	Time in min
1.	Class organisation and instruction of students	**12**
2.	Student's basic knowledge control	**24**
3.	Training stage	**48**
4.	Practicing practical skills	**96**
5.	Checking the knowledge and mastering practical skills	**48**
6.	Final stage	**12**

LIST OF AVAILABLE TEACHING METHODS

Traditional method;
active (interactive) methods:
Problem-Based Learning (PBL)
Case-Based Learning (CBL);
training based on simulation technologies.

LIST OF SIMULATION EQUIPMENT USED

1. Dentist's workplace (desk, chair).
2. Dental unit with a light and spittoon.
3. Instrument table with a fixed rigid waste container of class B.
4. Dental chair (for the dentist).
5. Trolley with consumables and waste disposal containers.
6. Sink.
7. Container for collecting class A waste, 10 liters capacity.
8. Container for collecting class B waste, 10 liters capacity.
9. Set of tools in simulated sterile packaging (tray - 1 pc., dental tweezers - 2 pcs., dental mirror - 1 pc., dental probe - 1 pc., excavator - 1 pc., spatula - 1 pc., burnisher - 1 pc., angled probe - 1 pc.).
10. Set of cutting instruments for tooth preparation using a turbine handpiece.
11. Paper palette for mixing the second layer of silicone material.

12. Rubber bowl for mixing impression materials.
13. Spatula for mixing impression materials.
14. Dental spatula.
15. Impression trays for upper and lower jaws.
16. Scalpel.
17. Retraction cord.
18. Silicone impression material.
19. Alginate impression material.
20. Plaster.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

The time allotted for independent work may be used by students for:

preparing for lectures and practical classes;
preparing for the assessment and examination in the academic discipline;
studying topics (questions) assigned for independent study;
solving situational tasks;
completing research and creative assignments;
preparing thematic reports, essays, presentations;
taking notes from educational literature;
writing a review of scientific literature on a given topic;
preparing informational and demonstration materials (stands, posters, charts, tables, newspapers, etc.);
compiling thematic collections of literary sources and internet resources.

CLASS 1

Subject: Partial Adentia (PA)

Total duration of the session – 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students about the etiology, pathogenesis, and clinical features of partial edentulism; conducting patient examinations and diagnosing "partial edentulism" according to the clinical protocol of the Ministry of Health of the Republic of Belarus.

OBJECTIVES OF THE LESSON:

1. Study the etiology of partial edentulism.
2. Study the pathogenesis of partial edentulism development.
3. Study the clinical manifestations of partial edentulism in the oral cavity.
4. Study the methods for examining patients with partial edentulism.
5. Study the complications arising in patients with partial edentulism.

Location of the session: Clinical base.

Practical skills to be developed during the session: *Patients examination. Completion of medical documentation*

Form of control for the practical session: тest*; survey; solving situational tasks

Location for performing practical skills: At the patient's dental chair.

Criteria for assessing practical skills: According to the evaluation sheet (checklist) for monitoring practical skills in the discipline, scored from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

For full comprehension of the topic, students need to review:

- From anatomy: anatomical structure of teeth, dental arches, and jaws;
- From histology: structure of the oral mucosa;
- From general dentistry: new technologies and modern materials used in making partial removable dentures;
- From prosthetic dentistry (fixed prosthetics): partial edentulism, defects in dental arches, principles of transmitting masticatory pressure using various types of dental prostheses.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Anatomical structure of the upper jaw.
2. Anatomical structure of the lower jaw.
3. Muscles that elevate the lower jaw.
4. Muscles that depress the lower jaw.
5. Structure of the periodontium.
6. Structure of the oral mucosa.

CONTROL QUESTIONS:

1. Etiology, pathogenesis, and clinical aspects of partial tooth loss.
2. Methods for examining patients with partial defects in dental arches.
3. Changes in dental arches, jaws, and TMJ after partial tooth loss and their clinical manifestations.

4. Classification of dental arch defects according to Kennedy and Gavrilov.
5. Diagnosis of "partial edentulism (PE)" and its justification.

Partial Primary Adentia – a condition characterized by the partial absence of teeth and/or their buds, caused by genetic or other factors affecting the fetus during its development.

Partial Secondary Adentia – a pathological process resulting from the loss of one or more teeth in one or both jaws due to accidents, tooth extractions for medical reasons, periodontal diseases, the development of caries, and its complications.

Partial Tooth Loss (Partial Adentia (PA), primary and secondary) – code according to the International Statistical Classification of Diseases and Related Health Problems,

Tenth Revision (ICD-10) – K00.0 Edentia; K08.1 Tooth loss due to accidents, extractions, or localized periodontal disease.

In medical literature, a synonym for the nosology "defect of the dental arch" is "partial absence (loss) of teeth," or "partial secondary adentia."

THE MAIN DIAGNOSTIC METHODS FOR PARTIAL ADENTIA INCLUDE:

- Collection of medical history;
- External examination and palpation of the maxillofacial area;
- Oral cavity examination using additional tools;
- Percussion;
- Assessment of the condition of teeth, dental arches, and dental prostheses;
- Evaluation of the condition of periodontal tissues and oral mucosa; index assessment of dental health: hygiene index (Green, Vermillion Hygiene Index – OHI-S);
- Instrumental studies (radiological methods): targeted intraoral contact radiography or orthopantomography of the jaws.

When using dental implants for the treatment of PE, cone-beam computed tomography (CBCT) of the maxillofacial region is applied.

ADDITIONAL DIAGNOSTIC METHODS FOR PARTIAL ADENTIA INCLUDE:

- Instrumental studies (radiological methods): CBCT of the maxillofacial area, CBCT of the temporomandibular joints;
- Index of occlusal surface destruction of teeth;
- Use of devices (facial arch, HIP analyzer, others) for spatial orientation of the maxillary model in the articulator and for transferring the hinge axis of rotation of the mandible, followed by
- Functional analysis of the dental system;
- Identification and analysis of excessive occlusal contacts between teeth and artificial dental prostheses (supercontacts);
- Functional-diagnostic studies (functional tests, electromyography);
- Consultation with a specialist physician based on medical indications (orthodontist, maxillofacial surgeon, dental surgeon, otorhinolaryngologist, endocrinologist, hematologist, cardiologist, gastroenterologist, rheumatologist, neurologist, infectious disease specialist, allergist-immunologist, radiologist, clinical laboratory diagnostician, physiotherapist, general practitioner, psychotherapist, psychiatrist-narcologist, and others);
- Photography for assessing smile and facial aesthetics, as well as analyzing the dental system.

In diagnosing partial edentia, the general somatic condition of patients is also assessed, primarily identifying any pathologies that may influence the choice of treatment method (such as

bronchial asthma, epilepsy, endocrine system conditions, allergic reactions, etc.), and specifically identifying:

- Inadequate psycho-emotional state of the patient;
- Acute lesions of the oral mucosa and the vermilion border of the lips;
- Acute inflammatory diseases of the organs and tissues of the mouth;
- Periodontal diseases in the acute stage;
- Unsatisfactory hygienic condition of the oral cavity;
- Reluctance to undergo treatment or refusal of treatment.

Based on the results of the patient examination, the physician may recommend correcting the defect in the dental arch through dental implantation, a bridge prosthesis, or a partial removable clasp or plate prosthesis.

"Determining Indications for the Use of Orthopedic Structures in Partial Defects of Dental Arches"

Examination		
Methods of Examination	**Method**	**Criteria for Evaluating Results**
I. Subjective: | Interview	Interview	|Complaints disturbing the patient related to the disease Duration of tooth loss, reasons, previous therapeutic and orthopedic treatments, their effectiveness Allergic status, general diseases, hepatitis, diabetes, etc.
II, Objective: a) Inspection	Visual examination	Facial changes related to tooth loss, nature and degree of mouth opening Changes in the oral mucosa Topography of the defect Changes in dental arches Height of the clinical crown of supporting teeth Degree of atrophy and shape of the alveolar ridge, presence of exostoses, bony protrusions
b) Percussion and palpation	Using tweezers, probe; Palpation examination	Condition of the tooth support apparatus (pain, mobility) Degree of pliability of the mucosa; Depth of periodontal pocket

c) Instrumental and apparatus-based, radiological	Probing; Targeted X-ray; Orthopantomogram; Tomography of TMJ	Depth of periodontal pocket Condition of periodontal tissues of supporting teeth, quality of root canal fillings; Sizes and condition of bone tissue in alveolar processes Shape and position of bony structures in TMJ
d) Laboratory	Complete blood count; Blood tests for HIV, hepatitis; Allergological study, biopsy	Blood sugar concentration; Antibody titers to Co, Cg, M, Tc; Acrylic Histological structure of oral cavity tissues

The following types of dental arch defects are distinguished:
– included defects — limited by teeth on both sides;
– terminal defects — limited by teeth on one side.

Based on extent, all dental arch defects can be divided into:
– small (absence of no more than three teeth);
– medium (absence of four to six teeth);
– large (absence of more than six teeth).

Classification of Dental Arch Defects According to Kennedy

(Edward Kennedy, New York, 1925)

Dental arches with defects are divided into four classes:
– Class I — dental arches with bilateral terminal defects;
– Class II — dental arches with unilateral terminal defects;
– Class III — dental arches with unilateral included defects in the lateral section;
– Class IV — dental arches with included defects in the anterior section.

If there are several defects within one dental arch belonging to different classes, it should be classified according to the lower class. For example, if defects of Class I and Class IV are identified in the dental arch, it is classified as Class I.

Classification of Dental Arch Defects According to Gavrilov

(Prof. E.I. Gavrilov, Tver)

Professor E.I. Gavrilov proposed his classification, according to which all dental arch defects are also divided into four classes:

- Class I includes unilateral and bilateral terminal defects,
- Class II includes all included defects,
- Class III includes combined defects,
- Class IV includes single-standing teeth.

The distinction of this classification from others lies in highlighting jaws with single remaining teeth. They have their own clinical features and require special preparation of the patient before prosthetics.

SITUATIONAL TASKS

1. Patient M., 68 years old, presented with complaints of difficulty chewing food and painful sensations in the left area of the lower jaw. Medical history: teeth 12, 13, 14, 15, 23, 24, 25 were removed more than 10 years ago due to periodontal disease. She has not sought help before. Objective examination: teeth 17, 16, 26, 27 have unsatisfactory fillings (IROPZ>80%), tooth 45 has a filling in the cervical area, fillings in teeth 11 and 21 are in satisfactory condition, in the area of teeth 17, 16, 26, 27, 28 - dento-alveolar protrusion of the teeth exposing the necks up to bifurcation, mobility of teeth is grade III. The relationship of the upper and lower dental arches is orthognathic. Make a diagnosis considering Kennedy's classification. Develop a treatment plan.

2. Patient S., 56 years old, presented with complaints of difficulty chewing food, aesthetic deficiency, and periodic pain in the temporomandibular joint area. Medical history: missing teeth in the upper and lower jaws were removed due to periodontal disease and complicated caries 12 years ago; joint pain has intensified over the last six months. Objective examination: fillings in teeth 13, 23, 36 are in satisfactory condition; in the lower jaw teeth there are crater-like cavities down to the enamel-dentin junction; height of the lower face segment is reduced by 6 mm compared to the state of physiological rest. Make a diagnosis considering Kennedy's classification. Develop a treatment plan.

3. Patient A., 62 years old, is missing teeth 15, 16, 17, 18, 25, 26, 27, 28, 35, 36, 37, 38, 46, 47, 48. Make a diagnosis. Develop a treatment plan. How is the load distributed during chewing and what complications may arise from the temporomandibular joint?

4. Patient N., 57 years old, has had teeth removed: 17, 18, 16, 26, 27, 28, 34, 35, 36, 37, 38, 43, 44, 45, 46, 47, 48. In the central occlusion position, there is dento-alveolar elongation of upper teeth at the site of defects in the lower jaw dental arch. Make a diagnosis. What are the causes of the resulting deformation?

5. Patient K., 71 years old, has had all teeth removed except for teeth 13, 33, 34, and 35. Make a diagnosis. Develop a treatment plan.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 2

Subject: General Principles of Treatment and Medical Prevention in Partial Edentulism (PE). Planning Comprehensive Treatment for Patients with Partial Edentulism.

Total Duration of the Session – 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students the general principles of treatment and medical prevention of partial edentulism and to master the planning of comprehensive treatment for patients with partial edentulism.

OBJECTIVES OF THE LESSON:

1. Reinforce knowledge about the etiology and pathogenesis of partial edentulism.
2. Teach students the general principles of treating partial edentulism.
3. Familiarize with the basic principles of treating partial edentulism using fixed bridge and adhesive prostheses.
4. Familiarize with the basic principles of treating partial edentulism using partial removable plate and clasp prostheses.
5. Familiarize with the basic principles of treating partial edentulism using dental implants.
6. Understand the features of medical dispensary observation for patients with partial edentulism.

Location of the Session: Clinical base.

Practical Skills Developed During the Session: *Patients examination. Completion of medical documentation*

Form of Control for Practical Skills: тest; survey; solving situational tasks

Location for Practical Skill Execution: At the patient's dental chair.

Criteria for Assessing Practical Skills: According to the evaluation sheet (checklist) for monitoring practical skills in the subject, scored from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully grasp the topic, students need to review:

- From human anatomy: anatomical structure of the upper and lower jaws;
- From general dentistry: materials science and laboratory techniques for making fixed bridge, partial removable plate, and clasp prostheses;
- From surgical dentistry: tooth extraction operations, indications and contraindications for dental implantation.

CONTROL QUESTIONS FROM RELATED DISCIPLINES

1. Anatomical structure of the upper and lower jaws.
2. Modern materials and technologies for making fixed prostheses.
3. Clinical-laboratory stages of making fixed prostheses.
4. Modern materials used for making partial removable prostheses.
5. Clinical-laboratory stages of making partial removable plate and clasp prostheses.
6. Indications and contraindications for dental implantation.

CONTROL QUESTIONS:

1. General principles of examination, treatment, and stages of planning comprehensive treatment for patients with partial edentulism.
2. Orthopedic treatment of partial edentulism in the upper and lower jaw arches using fixed prostheses.
3. Orthopedic treatment of partial edentulism in the upper and lower jaw arches using adhesive prostheses for single defects.
4. Orthopedic treatment of partial edentulism in the upper and lower jaw arches using removable plate prostheses.
5. Orthopedic treatment of partial edentulism in the upper and lower jaw arches using clasp prostheses.
6. General principles of orthopedic and surgical treatment of partial edentulism in the upper and lower jaw arches using dental implantation.
7. Medical dispensary observation for patients with partial edentulism.

GENERAL PRINCIPLES OF TREATMENT AND MEDICAL PREVENTION OF PARTIAL EDENTULISM INCLUDE:

- Improvement of the patient's quality of life;
- Enhancement of the functional ability of the dental system;
- Improvement of chewing and speech functions;
- Elimination of overload on periodontal tissues;
- Enhancement of smile and facial aesthetics, as well as teeth and dental arches.

PLANNING COMPREHENSIVE TREATMENT FOR PATIENTS WITH PARTIAL EDENTULISM INCLUDES THE FOLLOWING STAGES:

- Motivation to develop healthy daily habits related to dental health;
- Recommendations for choosing methods, items, and means of personal oral hygiene;
- Nutritional recommendations;
- Professional removal of dental deposits;
- If necessary, therapeutic treatment (for caries, non-cariogenic lesions, periodontal diseases);
- Orthodontic treatment (for dental anomalies and deformities);
- Orthopedic treatment (for tooth defects, tooth mobility, increased tooth wear);
- Surgical treatment (for loss of epithelial attachment level);
- Supportive treatment (medical observation).

ORTHOPEDIC TREATMENT OF PARTIAL EDENTULISM (CONDUCTED BY A DENTIST-ORTHOPEDIST) USING FIXED BRIDGE PROSTHESES INCLUDES:

- Anesthesia according to medical indications;
- Preparation of supporting teeth for artificial crowns;
- Fabrication of temporary crowns and temporary bridge prostheses in the area of prepared teeth (exception: prepared teeth for stamped crowns);
- Obtaining analog or optical (3D) impressions;
- Determination and fixation of the central relationship of the jaws or centric occlusion using wax or plastic bases with occlusal rolls or occlusal silicone materials;
- Selection of color, size, and shape of artificial crowns and teeth in accordance with existing teeth and individual characteristics of the patient;
- Fitting and adjustment of the framework of the bridge prosthesis;
- Fitting and adjustment of the finished bridge prosthesis;
- Fixation of the bridge prosthesis on temporary material (based on medical indications);
- Fixation of a non-removable dental prosthesis structure on permanent material;

- Recommendations for hygienic care of dental prostheses, as well as service life (replacement) of structures.

ORTHOPEDIC TREATMENT OF PARTIAL EDENTULISM (CONDUCTED BY A DENTIST-ORTHOPEDIST) USING ADHESIVE PROSTHESES FOR SINGLE DEFECTS IN DENTAL ARCHES INCLUDES:

- Preparation of supporting teeth for support elements of adhesive constructions based on medical indications;
- Obtaining analog or optical (3D) impressions;
- Determination and fixation of the central relationship of the jaws or centric occlusion using wax or plastic bases with occlusal rolls or occlusal silicone materials;
- Selection of color, size, and shape of artificial teeth in accordance with existing teeth and individual characteristics of the patient;
- Fitting and adjustment of the finished adhesive prosthesis;
- Fixation of a non-removable dental prosthesis structure on permanent material;
- Recommendations for hygienic care of the adhesive prosthesis, as well as service life (replacement) of structures.

ORTHOPEDIC TREATMENT OF PARTIAL EDENTULISM (CONDUCTED BY A DENTIST-ORTHOPEDIST) USING PARTIAL REMOVABLE PLATE PROSTHESES INCLUDES:

- In the presence of medical indications for orthopedic treatment and considering the specifics of fixing the removable prosthesis on supporting teeth – fabrication of artificial crowns;
- Obtaining analog or optical (3D) impressions;
- Determining and fixing the central relationship of the jaws or centric occlusion using wax or plastic bases with occlusal rolls or occlusal silicone materials;
- Selecting the color, size, and shape of artificial teeth in accordance with the existing teeth in the patient's mouth or individual characteristics of the patient (age, size, and shape of the face);
- Checking the wax structure of the removable prosthesis;
- Fitting and applying the finished removable prosthesis;
- Recommendations for hygienic care of the removable prosthesis, as well as guidelines for adaptation and usage, and replacement timelines for the structures;
- Adjusting the removable prosthesis (based on medical indications).

ORTHOPEDIC TREATMENT OF PARTIAL EDENTULISM (CONDUCTED BY A DENTIST-ORTHOPEDIST) USING BALANCED PROSTHESES INCLUDES:

- In the presence of medical indications for orthopedic treatment and considering the specifics of fixing the balanced prosthesis on supporting teeth, fabrication of artificial crowns or telescopic crowns, or crowns (post-supported constructions) with attachments;
- Obtaining analog or optical (3D) impressions;
- Determining and fixing the central relationship of the jaws or centric occlusion using wax or plastic bases with occlusal rolls or occlusal silicone materials;
- Conducting parallelometry;
- Selecting the color, size, and shape of artificial teeth in accordance with the existing teeth in the patient's mouth or individual characteristics of the patient (age, size, and shape of the face);
- Fitting and applying the framework of the balanced prosthesis;
- Checking the wax structure of the balanced prosthesis;
- Fitting and applying the finished balanced prosthesis;

- Recommendations for hygienic care of the balanced prosthesis, as well as guidelines for adaptation and usage, and replacement timelines for the structures;

- Adjusting the balanced prosthesis (based on medical indications).

PRINCIPLES OF ORTHOPEDIC AND SURGICAL TREATMENT OF PARTIAL EDENTULISM USING DENTAL IMPLANTATION INCLUDE:

- Treatment planning for partial edentulism using dental implantation is carried out by a dentist-orthopedist in collaboration with a dentist-surgeon or maxillofacial surgeon.

- Immediate or delayed dental implantation may be performed based on medical indications.

- Non-removable bridge prostheses and single crowns supported by dental implants are used in the treatment of partial edentulism. Non-removable constructions supported by dental implants can be made from zirconium dioxide, ceramics, composite materials, as well as metal-ceramic prostheses.

- Immediate loading of dental implants using temporary dental prostheses may be applied based on medical indications.

- The fabrication of surgical templates is performed based on medical indications; the positioning of the implant in horizontal and vertical planes is determined by the anatomical conditions of the bone tissue, the biotype of the gums, the technical features of the implant system, and the type of planned orthopedic construction.

- The use of guided bone regeneration and soft tissue grafting is conducted either preliminarily or simultaneously with the installation of dental implants (gingiva formers), as well as at stages of medical rehabilitation (based on medical indications).

- The use of alternative types and positions of implants and/or increasing their number based on medical indications.

- The selection of abutments is carried out from standard factory-made options or abutments are individually manufactured using casting or milling methods.

- The use of cement or screw methods for fixing non-removable orthopedic constructions.

- Orthopedic treatment is performed immediately or delayed for 3–6 months, as determined by medical indications.

- The possibility of manufacturing temporary orthopedic constructions to replace defects in the dental arch is determined at the planning stages.

MEDICAL DISPENSARY OBSERVATION OF PATIENTS WITH PARTIAL EDENTULISM:

Medical monitoring of treatment outcomes is recommended to be conducted through medical examinations by a dentist-orthopedist six months after the completion of orthopedic treatment for partial edentulism. Subsequent medical monitoring of the condition of teeth and dental prostheses is recommended to be performed twice a year (every six months). During each medical examination, a repeated assessment of the condition of the hard tissues of the teeth, dental arches, fillings, dental prostheses, dental implants, periodontal tissues, peri-implant tissues, and the mucous membrane of the oral cavity is carried out, along with a hygienic evaluation of the oral cavity. Additionally, during each visit, it is recommended to conduct professional oral hygiene for the patient with partial edentulism by a dentist-therapist.

SITUATIONAL TASKS

1. Patient E., 62 years old, presented with complaints of difficulty chewing food and pain in the gum area of the lower jaw on the left side. From the history, teeth 13, 14, 15, 23, 24, 25 were removed 10 years ago due to apical periodontitis. He has not sought orthopedic assistance.

Objectively: in teeth 17, 16, 26, 27 – fillings (IRPZ > 80%) partially restore their shape; in tooth 45, there is a filling in the cervical area; in teeth 11, 21 fillings are in satisfactory condition; in the area of teeth 17, 16, 26, 27, 28 - dento-alveolar protrusion of teeth exposing the necks up to bifurcation, mobility of teeth grade III. In the central occlusion position, tooth 28 contacts the mucous membrane of the lower jaw's gum. The bite is orthognathic. Diagnose considering Kennedy classification. Develop a treatment plan.

2. A 47-year-old female patient presented with complaints of difficulty chewing food, aesthetic deficiency, and pain in the temporomandibular joint area. From the history: teeth were removed due to complicated caries 12 years ago; joint pain has intensified over the last six months. Objectively: in teeth 11, 21, 37 fillings are in satisfactory condition; in the lower jaw teeth there are crater-like depressions down to the enamel-dentin border; the height of the lower facial section is reduced by 6 mm compared to physiological rest. Diagnose considering Kennedy classification. Develop a treatment plan.

3. The patient is missing teeth 14, 15, 16, 17, 18, 24, 25, 26, 27, 28, 35, 36, 37, 38, 46, 47, and 48. Diagnose. Develop a treatment plan. How is the load distributed during chewing and what complications may arise from the temporomandibular joint?

4. The patient has had teeth 17, 18, 27, 28, 34, 35, 36, 37, 38, 43, 44, 45, 46, 47, and 48 removed. In the central occlusion position, there is dentoalveolar elongation of the upper teeth at the sites of defects in the lower jaw dental arch. Diagnose. What are the causes of the resulting deformation?

5. The patient has remaining teeth 13, 33, and 34. Diagnose. Develop a treatment plan.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 3

Subject: Characteristics of Partial Removable Dentures and Their Components
Total duration of the class – 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to familiarize students with the methodology for determining the indications and contraindications for the use of partial removable plate dentures (PRPD); to teach students the techniques for selecting and justifying the design of PRPD; to study the structural materials and design elements of PRPD.

OBJECTIVES OF THE LESSON:

1. Master the methodology for selecting the denture design based on the clinical situation in patients with partial edentulism.
2. Familiarize with the principles of transmitting chewing pressure by various types of dental prostheses to the underlying tissues of the prosthetic bed.
3. Study the location of the borders of the base of PRPD on the upper jaw.
4. Study the location of the borders of the base of PRPD on the lower jaw.
5. Reinforce knowledge about the requirements for the condition of the mucous membrane of the prosthetic bed when using removable constructions.

Location of the class: Clinical base.

Practical skills to be developed during the class:

Patients examination. Completion of medical documentation

Form of control for practical classes: test; survey; solving situational tasks

Location for practical skills execution: At the patient's dental chair.

Criteria for assessing practical skills: According to the assessment sheet (checklist) for controlling practical skills in the subject, scored from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

For full comprehension of the topic, students need to review:

- From anatomy: anatomical structure of dental arches, jaws, and oral cavity organs.
- From general dentistry: modern technologies and current structural materials used in manufacturing partial removable dentures.
- From orthopedic dentistry (fixed prosthetics): principles of transmitting chewing load by various types of dental prostheses.
- From surgical dentistry: what special surgical preparation of the oral cavity entails for PRPD.
- From dermatovenerology: diseases of the oral mucosa.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. The influence of jaw and alveolar ridge structure on treatment tactics and design of partial removable plate dentures.
2. The impact of tooth convergence on fitting partial removable plate dentures.
3. The influence of chronic diseases of the oral mucosa on the selection and design features of partial removable dentures.

4. Main and auxiliary structural materials for manufacturing PRPD.

CONTROL QUESTIONS:

1. Types of prostheses used in treating partial edentulism (PE).
2. Indications and contraindications for using removable plate dentures in partial edentulism.
3. Characteristics of partial removable plate dentures.
4. Structural elements of partial removable plate dentures.
5. Structural materials for manufacturing PRPD.
6. Preparation of the patient and oral cavity for prosthetics with partial removable plate dentures.

«Elements of Partial Removable Plate Prosthesis»

Components of the Prosthesis	**Purpose**	**Variety**	**Materials**
1	2	3	4
Clasps	Retention and stabilization of the removable prosthesis; splinting of teeth in periodontal diseases	By location: tooth, tooth-gum, gum; By shape: round, semicircular, pellets; By tooth coverage: single-arm, double-arm, clasped, multi-link	Metal, cast from Co-Cr alloys or gold-containing alloys; Metal, bent from orthodontic wire (stainless steel); Plastic made of polyoxymethylene (polyformaldehyde) (Dental D, QuattroTi); Gum clasps and pellets based on polymethyl methacrylate (Etakril, Fluorax
Base and artificial gum	Foundation for placing all elements of the prosthesis and transferring chewing pressure to the mucosa of the alveolar ridges	Plastic - single-layer, double-layer; Metal - cast or stamped; Combined plastic base reinforced with cast or stamped metal mesh	Artificial gum - plastic based on polymethyl methacrylate. Base can be plastic (polymethyl methacrylate, polyoxymethylene) or metal cast from Co-Cr alloys, gold-containing alloys, stamped from stainless steel
Artificial teeth	Chewing function, aesthetics, speech	Plastic, porcelain, metal, and combined	Plastic, composite, porcelain, gold alloys, steel

SITUATIONAL TASKS

1. Patient I, 47 years old, presented with complaints of difficulty chewing food. Medical history: teeth were extracted due to complicated caries a year ago. Previously, he had not been fitted with dentures. Objectively, teeth 15, 16, 17, 18, 25, 26, 27 are missing. Teeth 36, 37, 46, 47 are destroyed at the gum level, painless upon percussion, with mobility of the first degree. The remaining teeth have a low clinical crown. The mucous membrane in the area of the roots is

inflamed, and there is dental plaque. The bite is orthognathic. Develop a treatment plan for the patient. What prostheses would you suggest after appropriate procedures?

2. Patient D, 63 years old, consulted a doctor with complaints of tooth loss, aesthetic deficiency, difficulty chewing food, and speech impairment (lisping). Medical history: previously not fitted with dentures; teeth were extracted due to complicated caries. Objectively, teeth 15, 16, 26, 27, 34, 35, 36, 37, 38, 31, 32, 33 are missing. The mucous membrane shows no visible pathological changes. The bite is orthognathic. Diagnose considering Kennedy classification and justify the treatment plan. What factors influence the choice of prosthesis design for the upper jaw?

3. Patient M, 35 years old, presented with complaints of aesthetic deficiency. Medical history: teeth 21, 22, 23 were lost due to trauma. Objectively: the lower jaw dental arch is intact; teeth 21, 22, 23 are missing from the upper jaw. The oral mucosa has a normal color. Diagnose considering Kennedy classification. What are the indications for making a removable prosthesis in this situation?

4. Patient B, 48 years old, presented with complaints of difficulty chewing food. Medical history: teeth were extracted six months ago due to complicated caries. A month ago, he suffered a recurrent myocardial infarction. Objectively, teeth 31, 32, 34, 35, 36, 37, 41, 42, 44, 45, 46 are missing from the lower jaw. The remaining teeth are intact; the mucosa shows no visible changes; the bite is orthognathic. Diagnose considering Kennedy classification. What prostheses would you suggest for the patient in this situation?

5. The patient has missing teeth 12, 13, 17, 18, 21, 22, 23, 24, 25, 26, and 28 on the upper jaw. Teeth on the lower jaw exhibit mobility of II and III degrees. What is the doctor's approach in this situation?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 4

Subject: Methods of Fixation and Stabilization of Partial Removable Plate Prostheses (PRPP)

Total duration of the session – 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students methods of fixation and stabilization of partial removable prostheses, determining the location of the clasp line, and rational selection of teeth for clasp placement.

OBJECTIVES OF THE LESSON

1. Study methods of fixation for partial removable prostheses.
2. Familiarize with options for clasp line placement and its influence on the fixation and stabilization of PRPP.
3. Study indications and contraindications for the use of dental implants in patients with partial edentulism.
4. Study the comparative characteristics of using clasps and dental implants for the fixation of removable prostheses.

Location of the session: clinical base.

Practical skills to be developed during the session:

Taking impressions using alginate and silicone materials

Form of control for the practical session: тest; survey; solving situational tasks

Location for performing practical skills – at the patient's dental chair.

Criteria for assessing practical skills - according to the evaluation sheet (checklist) for controlling practical skills in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully grasp the topic, the student needs to review:

- From anatomy: anatomical structure of the jaws, dental arches, and teeth;
- From general dentistry: new technologies and modern construction materials in the fabrication of partial removable prostheses; materials and laboratory techniques for making clasps.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Features of the anatomical structure of the upper jaw and their role in the fixation and stabilization of PRPP.
2. Features of the anatomical structure of the lower jaw and their role in the fixation and stabilization of PRPP.
3. Anatomical shape of the tooth and its role in the placement of clasp components.
4. Characteristics and properties of materials used for making flexible clasps.
5. Properties and requirements for materials used in making dental implants.

CONTROL QUESTIONS:

1. Definitions and methods of fixation and stabilization of PRPP.
2. Definition of the term "clasp line" and its significance for the fixation of PRPP. Types of clasp lines, their placement on the upper and lower jaws.

3. Types of clasps and clinical conditions determining their choice.
4. Characteristics of the retaining clasp and its components.
5. Fixation of partial removable plate prostheses using dental implants.

“Rules and Sequence for Fabricating a Flexible Retaining Clasp”

1. Indications - retention of a partial removable plate prosthesis.
2. Contraindications:
- Fabrication of dental prostheses that require other types of fixation due to their design.
- Presence of poorly defined anatomical shape, size, and position of the abutment tooth.
3. Fabrication of a wire retaining round single-arm clasp by bending wire three times. This involves using:
- Clasp wire 0.6 - 1.5 mm;
- Clasp pliers;
- Round-nose pliers;
- Gypsum models;
- Hammer and anvil.

PROCESS OF MANUFACTURING A FLEXIBLE CLASP:

1. ARM

1) Place the gypsum model on the workbench;
2) Round off the sharp ends of the wire;
3) Holding the wire with the left hand, bend the arm of the clasp with pliers, adjusting it to the vestibular and proximal surfaces (from the side of the tooth defect).

2. BODY

1) On the proximal surface of the tooth, 1 mm above the equator (at the point of contact with the bent wire), grasp the wire with clasp pliers;
2) Using round-nose pliers, bend the wire downward at a right angle.

3. BRANCH

1) The clasp pliers are fixed in the middle of the bent arm;
2) Using round-nose pliers or a second pair of clasp pliers, make a third bend in the wire also at almost a right angle;
3) Using a hammer and anvil, flatten or notch the branch.

REQUIREMENTS FOR PROPER CLASP MANUFACTURE:

- The ARM must be located between the equator and the neck of the tooth, touching the tooth surface at the maximum number of points (2/3 of its circumference).
- The BEND OF THE BODY must be made slightly above the equator but not touch the chewing surface of the tooth; it cannot be made below the equator, i.e., at the neck of the tooth.
- The BRANCH must be located along the edentulous alveolar ridge, under future artificial teeth; it should be positioned on top of wax composition.

It is necessary to consider:

a) The tooth on which the clasp is located must have a well-defined anatomical shape, size, and position;
b) Clasp lines are imaginary lines passing through the teeth where clasps are located. The sagittal clasp line is least favorable for fixation.

Violating clasp bending requirements leads to the following complications:

- For the arm:
a) poor fixation of the prosthesis;
b) contributes to rapid loosening of teeth;
c) injury to the mucosa of lips and cheeks when using the prosthesis.
- For the body:
a) the prosthesis cannot be used;
b) hinders free placement of the prosthesis in the oral cavity.
- For the branch:
a) breakage of the prosthesis.

SITUATIONAL TASKS

1. Upon checking the design of a partial removable plate prosthesis, it was found that single-arm retaining clasps are located on teeth 12, 22, 28, and on the lower jaw, on teeth 43, 32, 38. The arm of the clasp on tooth 32 is located above the equator, while the body is below the equator and closely adheres to the tooth. What mistakes were made in the positioning of the clasps? What clasps should be positioned to ensure good fixation and aesthetics of the prostheses on the jaws?

2. The patient has intact teeth 13, 18, 21, 27, 28, 31, 32, 37, 43. It is indicated to fabricate partial removable plate prostheses. What is your diagnosis? Which teeth should receive clasps to ensure good fixation of the prostheses on the jaws?

3. Patient A., 59 years old, consulted a doctor with complaints about missing teeth, aesthetic deficiencies, difficulty chewing food, and speech impairment. From history: previously not prosthetized, teeth were removed due to complicated caries. Objectively, teeth 15, 16, 24, 25, 26, 27, 31, 32, 33, 34, 35, 36, 37, and 38 were extracted. The mucous membrane shows no visible pathological changes. Provide a diagnosis considering Kennedy's classification and justify your treatment plan? What factors influence the choice of prosthesis design? On which teeth should clasps be placed?

4. The patient has had teeth 17, 18, 24, 25, 26, 27, 28, 34, 35, 36, 37, 38, 43, 44, -45, 46, 47, and 48 extracted. Provide a diagnosis. Develop a treatment plan. Indicate which teeth should receive clasps.

5. The patient has remaining teeth 13, 23, and 37. Provide a diagnosis. Develop a treatment plan. Indicate the location of dental implants in case of fabricating an overlay removable prosthesis.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 5

Subject: Methods of taking impressions, characteristics of impression materials
Total duration of the session – 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students the technique of taking impressions with different types of impression materials for the fabrication of partial removable dentures (PRD), making working models, determining the boundaries of PRD bases and making wax templates with bite rolls.

OBJECTIVES OF THE LESSON:

1. To study the properties of impression materials used for taking impressions during the production of PRD. 2. to master the technique of taking impressions from the upper and lower jaws depending on the properties of the materials used.
2. To master the technique of obtaining impressions from the upper and lower jaws depending on the properties of the materials used.
3. To master the technique of making and evaluating the quality of working and auxiliary models.
4. To learn to determine the boundaries of partial removable plate prostheses on the upper and lower jaw.
5. To master the methods of making wax templates with bite rolls.

The total lesson time is 6 academic hours (240 minutes).
The location of the lesson is a clinical base.

Practical skills practiced during the lesson: *Obtaining impressions from alginate and silicone materials.*

Form of control of practical training: тest; survey; solving situational tasks
Place of practical skill performance - at the patient's dental chair.
Criteria for evaluation of practical skills - according to the evaluation sheet (checklist) for control of practical skills in the discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

In order to fully grasp the topic, the student should repeat:
- from anatomy: anatomical structure of jaws, dentition and teeth;
- from histology: structure of mucous membrane of the oral cavity;
- from general dentistry: classification and properties of impression materials; materials and techniques for making working and auxiliary models for the fabrication of PRD; materials and laboratory techniques for making wax templates with bite rolls.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Structure of the mucous membrane of the oral cavity.
2. Anatomical structure of the upper jaw.
3. Anatomical structure of the lower jaw.

4. Classification and properties of impression materials used in the fabrication of PRD.

5. Classification and properties of materials used for the production of working and auxiliary models.

6. Materials for manufacturing wax templates with bite rolls and their properties.

CONTROL QUESTIONS:

1. Impression materials and their properties. Possibilities of using different impression materials in the fabrication of PRD.

2. Pliability and mobility of the oral mucosa. Selection of impression materials depending on the condition of the denture bed tissues.

3. Impression trays, requirements to them and their varieties. Selection of impression tray.

4. Technique of obtaining impressions with alginate materials and anhydrous elastomers for the subsequent fabrication of working and auxiliary models in prosthetics of halter prosthetics. Evaluation of the quality of the impressions obtained.

5. Fabrication of the working and auxiliary models for the fabrication of partial dentures. Boundaries of the base of partial removable plate prostheses on the upper and lower jaws and factors determining them.

6. Fabrication of wax templates with bite rollers. Materials used and requirements for wax templates with bite rollers.

«Technique of taking impressions from jaws with partial dentition defects for the fabrication of removable plate prostheses»

Stage	Means of fulfilment	Method of execution
I. Preparatory step: , Properly seat the patient to take an impression of the upper and lower jaws	Dental chair	Patient's head position, slight forward tilt.
II. Patient examination	Sterile set of dental instruments. A beaker with a weak solution of potassium manganese acid.	Dress the patient with a tissue and prepare sterile instruments for his/her examination.
III. Stages in obtaining an impression:		
1. Selection of the impression tray.	Standard impression trays for upper and lower jaws.	Spoons for anatomical impressions with teeth on the jaw are characterised by high sides and a sharp transition from the groove. The length of the spoon for the maxilla must overlap the alveolar cusps and for the mandible the mandibular cusps. The sides of the spoon should be 3 mm away from the teeth. If the inner rims of the mandible do not reach the maxillary hyoid line or the mucosal tubercles, they are lengthened with wax.

2. Preparation of impression material: correct. dosage of material according to instructions	Rubber mixing cup; spatula, impression material, water.	Making an impression with elastic alginate mass: take the required amount of powder, add water. Rub the impression material moistened with water on the inner walls of the rubber cup to a thick, creamy consistency.
3. Applying the impression material to the spoon.	Impression material, spatula, spoons	When receiving a working impression, the impression material should be above the sides of the spoon and the auxiliary impression should be level.
4. Preparation of the denture bed tissues ‘ (cleaning of saliva and mucus).	A glass of water, a cotton swab	1. 1. Rinse the patient's mouth with a weak solution of potassium manganese acid (in case of increased gag reflex - saline solution). 2. 2. Wipe the mucosa with a cotton swab. 3. 3. Lubricate hard-to-reach areas with impression material: a) on the upper jaw, pushing back the cheek with a mirror, behind the alveolar tubercles, the frontal area of the hard palate; b) on the lower jaw, pushing back the tongue with a mirror, the floor of the oral cavity, in the distal areas.
5. Insertion of the spoon with impression material into the oral cavity The spoon with impression material into the oral cavity.	Tray, spoon with impression material, mirror, tweezers,	Using a mirror held with the left hand, move the corner of the patient's mouth away from the patient and laterally introduce the spoon with the impression material into the oral cavity.
- spoon centring	-//-	The handle of the spoon should be in the centre of the face, with the rim of the spoon 3 mm from the alveolar process.
- superimposition	-//-	1. In the maxilla, the impression material is pressed down, first in the distal region so that the excess goes to the anterior region, and then in the anterior region with simultaneous pressing of the spoon over the entire jaw. Next, the mirror is cleaned in the distal region, removing the excess impression material. 2. On the lower jaw, the spoon with the impression material is immersed first in the anterior region. Slightly tilting it forward, and then press it to the entire jaw.

		After the impression is immersed, the patient must lift the tongue up and forwards onto the spoon.
- shaping of the impression edges: a) on the upper jaw b) on the lower jaw	-//-	1. Hold the spoon on the upper jaw, the patient makes active or passive movements of the cheeks and lips. 2 Hold the spoon on the lower jaw, the patient makes passive movements of the cheeks and lower lip on the vestibular side; on the lingual side, movements of the tongue upwards and forwards on the spoon.
- holding the spoon on the jaw. until the impression material is ready.	-//-	On the upper jaw, the practitioner holds the spoon in the front of the cavity with the index finger; On the lower jaw, the doctor presses the spoon against the jaw with two fingers.
6. Removal of the impression from the oral cavity	Tray, tweezers, mirror, scalpel.	Ask the patient to cover the mouth, insert the index fingers along the edge of the impression on both sides, ask the patient to open the mouth and simultaneously push the impression off the denture bed with a rotating movement of the fingers. The patient is asked to rinse the mouth.
7. Evaluation of impression quality (impression requirements)	Visual inspection	Must be: Integral, not separated from the impression tray, reflecting a clear relief of all tissues of the prosthetic field: teeth, dentition, alveolar process, transitional fold with all mobile anatomical. formations (frenulum of the tongue, lips, etc.).

«Sequence and rules of making wax templates with bite rolls»

Action step	**Material equipment**	**Method of execution**
1	2	3.
Fabrication of a wax base for the upper jaw	Plate of base wax, spirit, spatula, modelling wire	The model is moistened with cold water. The dental wax plate is heated gently, then pressed against the palatal surface of the model with the thumb, taking care not to press through or thin the wax plate. Use a heated spatula to trim off the excess wax at the borders of the denture bed. Strengthen the wax base with a wire to prevent it from deforming in the oral cavity. The wire is bent to the relief of the palatal surface and heated. When heated, it is inserted

		into the wax base. The base is removed from the model and cooled with water.
Fabrication of a wax base for the mandible	Plate of base wax, spirit, spatula, modelling wire	The mandibular model is wetted. The wax base is made of two layers of wax. Two layers of well-warmed wax are placed on the model and pressed down firmly. Then remove excess wax with a heated spatula. They are trimmed so that the base covers the anterior teeth close to the incisal edge and reaches the level of the chewing surface of the molars. As in the upper jaw, the wax base is reinforced with wire and cooled.
Fabrication of occlusal rollers	Plate of base wax, spirit, spatula, modelling wire	The heated plate of wax is rolled into a roll and placed on the waxed basal area free of teeth. The rolls are placed exactly in the centre of the alveolar process. The rolls should be monolithic and have a height of 1-1.5 cm and a width of 1 cm. In the presence of natural teeth, the rollers should be 2-3 mm above the level of the teeth. The length of the roll is determined by the length of the alveolar process free of teeth. The rollers must be tightly glued to the wax bases. To do this, a well-heated spatula is used to run along the outer and inner sides of the roll, while the wax melts and glues the base to the rolls. The rollers are given a smooth surface. Their ends are nullified, the edges of the wax base are levelled out.

SITUATIONAL TASKS

1. Patient M, 27 years old, came to the clinic with complaints of an aesthetic defect. From the anamnesis: a month ago, teeth 11, 21, 22, 23, 24, 25, 26 were lost due to trauma. Objectively: the dental row of the lower jaw is intact. The mucosa is without visible pathological changes, the bite is neutral. Make a diagnosis taking into account the Kennedy classification. Draw up a prosthetic plan. Specify the construction of the removable prosthesis. How should the border of the removable denture on the upper jaw pass?

2. A patient has teeth 11, 12, 13, 21, 22, 23, 33, 34, 35 with mobility of II degree. Make a diagnosis. Draw up a treatment plan. What impression masses do you use? What complications may occur when taking an impression from the mandible, how can they be prevented?

3. A patient has missing teeth on the upper jaw. On the lower jaw, teeth 32, 33, 43, 44 are left with mobility of II degree. The roots are exposed on 1/2 root length, acute alveolar ridge. Make a diagnosis. Select and justify the design of prostheses.

4. The patient has teeth 11, 12, 13, 14, 21, 22, 23, 36, 37. The roots are exposed by 1/2 of their length. The bite is deep. Make a diagnosis. Make a treatment plan. What will be the boundaries of the denture bases?

5. A dentist has taken an alginate impression of the upper jaw during the fabrication of an upper jaw MTFP in the morning. The plaster model was cast at the end of the shift, after which the dental technician made wax bases with bite rollers. Identify the errors made. How can they be corrected?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 6

Subject: Methods for determining central (habitual) occlusion and clinical landmarks for tooth selection and placement in case of partial adentia

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students to determine and fix central occlusion during prosthetics with partial removable laminar dentures.

OBJECTIVES OF THE LESSON:

1. Learn to determine central occlusion.
2. Learn to determine the central relationship of the jaws.
3. Learn how to make wax bases with occlusal ridges.
4. Learn the rules for selecting and placing artificial teeth.

The location of the lesson is a clinical base.

Practical skills practiced during the lesson: *Determination of central (habitual) occlusion in various types of partial adentia.*

Practical skill control form**:** rest; survey; solving situational tasks

The place where the practical skill is performed is at the patient's dental chair.

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:

- from anatomy: the anatomical structure of teeth and dentition;
- from physiology: have knowledge about the function of the TMJ, muscles of the maxillofacial area;
- from general dentistry: new technologies and modern structural materials in the manufacture of partial removable plate dentures.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Anatomical and functional changes with partial loss of teeth.
2. Anatomical structure of the maxillofacial region.

CONTROL QUESTIONS:

1. Bite and its varieties.
2. What is articulation and occlusion, its types. Signs characterizing central occlusion in orthognathic occlusion. The concept of the central relationship of the jaws.
3. Determination of the central relationship of the jaws (three options) depending on the number and location of antagonizing teeth.
4. Methods for determining the height of the lower part of the face. Method for determining the centric relation in the absence of opposing teeth.
5. Clinical guidelines for the selection and placement of artificial teeth. Rules for setting up artificial teeth.

Determination of central occlusion with partial loss of teeth

No.	Sequence of work	Means and conditions	Execution method
1	2	3	4
1.	Position the patient correctly in the chair	Dental chair	The arms are bent at the elbow joint. The hands are at the level of the patient's mouth, the head is slightly distal.
2.	Check the quality of production of models and wax bases with occlusal ridges	Set of tools: dental spatula, alcohol lamp, mirror, tweezers, base wax	The model must be without pores or damage , and have clear boundaries of the transitional fold, marked with a pencil. Wax bases with occlusal ridges should fit tightly to the model; there should be no balance in the transverse and sagittal directions. The wax base must be reinforced with wire (to avoid its deformation in the oral cavity). The rollers must be monolithic and tightly glued to the base. The height should be 1 - 1.5 cm, width 1 cm. If there are natural teeth, the ridges should be 2 -3 mm above their level. The length of the roller is determined by the length of the alveolar process free from teeth; their ends should be reduced to nothing, the edges of the wax base should be rounded. The boundaries must correspond to the line marked on the model. If defects in the models or basis are detected, they must be redone.
3.	Determine the height of the lower part of the face and find out whether there is a) one basis b) two bases	Tool set	Measure the height of the lower part of the face in a state of physiological rest. - Insert the base into the oral cavity. - Determine the height of the lower part of the face in the position of central occlusion ; - Identify facial and intraoral signs. - Measure the height of the lower part of the face at physiological rest. - Insert the base into the oral cavity where there is a large defect in the dentition. - Measure the height of the lower part of the face in a state of central occlusion. - Apply wedge-shaped cuts to the top roller.
4.	Fix the central relationship of the jaws	Tool set	The lower occlusal ridge tightly closes with the upper one. The height of the lower part of the face with closed ridges is 2-4 mm less than in a state of physiological rest. 1-2 mm of wax is cut off from the occlusal surface of the rollers and a heated strip of wax is glued.

			The wax base is introduced into the patient's oral cavity. The lower jaw is placed in a medial-distal position and the central relationship of the jaws is fixed. The patient swallows saliva and closes the jaws or touches the distal border of the base surface with the tip of the tongue and closes the mouth. The doctor controls the movements of the lower jaw with his right hand.
5.	Indicate landmarks on the roller	Tray with tools, dental spatula	The midline on the bolsters coincides with the midline of the face. The line of the fangs is marked along the outer wing of the nose. The smile line is drawn along the level of the red border of the lips when smiling (grin).
6.	Check the correctness of determination of central occlusion	Tool set	The cooled bases are separated and introduced into the mouth. The rollers close tightly. The reference lines coincide. The height of the lower part of the face is correct.
7.	Choose the color of your teeth	Teeth coloring, mirror, good lighting	The color of existing teeth, complexion, and age of the patient are taken into account. The color of the artificial teeth is coordinated with it.

Methodology for determining central occlusion and clinical landmarks in case of partial absence of teeth

Position of antagonist teeth - (relationship of dental arches)	Means of action	Execution method
1. Along a triangle.	Wax bases are not used	Models are compiled based on tubercle-fissure contacts of antagonists
2) Only on two or one side.	A wax base is made for a jaw with a large number of missing teeth. Obtaining gypsum blocks	Models are compiled according to the imprints of teeth on the rollers or according to the relationship between the tubercle-fissure contacts of the antagonists.
3) There are no opposing teeth.	Bases are made for both jaws	Determination from the height of the lower part of the face and the central relationship of the jaws. Fixation of the central relationship of the jaws using rollers.

Morphological and physiological signs, landmarks and elements of artificial occlusion

Signs	Landmarks	Elements
1. Pupillary line, wings of the nose, Camper's horizon.	Occlusal plane.	Symmetrical occlusal surface of the dentition.
2. Physiological rest.	Height of the lower part of the face on the occlusal ridges.	The height of the lower part of the face on artificial teeth.
3. Functional activity of the lips, anatomical and topographical features of the jaws.	Level of the upper and lower - bite ridges.	Length of upper and lower teeth.
4. Configuration of the face, - interpalveolar angle.	Relief of the vestibular surface of the bite ridges.	The position of the teeth is in the tibular direction.
5. Central-occlusal position of the articular heads, symmetrical tension of the masticatory muscles.	Central occlusion of wax ridges, uniform contact of occlusal ridges, absence of deformation of the wax base.	Central occlusion of artificial dentition.
6. Midline of the face.	Aesthetic center on the occlusal ridges.	Aesthetic center of artificial dentition.
7. Lines of the corners of the mouth, width and length of the face.	Fang lines.	The location of the cutting cusps of the canines.
8. Active movement of lips when talking and smiling.	Smile line.	The location of the necks of - artificial teeth.
9. Patient's age, complexion and hair.	Color of natural teeth.	Color of artificial teeth.
10. Type, width and length of the patient’s face, its position .	Shape and arrangement of - natural teeth.	The shape of the dentition, the location of artificial teeth.

SITUATIONAL TASKS

1. Patient S., 22 years old, complained of an aesthetic defect due to the absence of a central incisor. From the anamnesis: due to injury, tooth 21 was removed a week ago. Objectively: 21 is missing, the remaining teeth are intact, the oral mucosa is without visible pathological changes, the bite is orthognathic. Make a diagnosis. Draw up a treatment plan taking into account dental implant prosthetics. Is it necessary to make a wax base with occlusal ridges to determine the central occlusion when making a temporary restoration?

2. Wax bases with occlusal ridges were made for the patient on both jaws. From what basis will you start work, on what basis will you apply wedge-shaped cuts?

3. Examination of patient K. revealed that there are teeth on both jaws, but no antagonists. When checking the correctness of determining the height of the lower part of the face in the position of central occlusion, the doctor found that it was 8 mm less than the height of the lower part of the face in a state of physiological rest. What mistake was made? How to fix it?

4. When checking the correctness of the determination of central occlusion, the doctor discovered a 1.5-2 mm gap between the bite ridges in the lateral area on the right. What mistake was made? How to fix it? When checking the design of dentures in the oral cavity, the lateral teeth are in occlusion, and there is a sagittal gap between the front teeth of the upper and lower jaws. What is the reason for this error? How to fix it?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 7

Subject: Checking the construction of partial removable plate dentures (PRPD)
Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students to check the design of partial removable laminar dentures.

OBJECTIVES OF THE LESSON:

1. Know the stages of checking the design of a prosthesis.
2. Know the signs of central occlusion in orthognathic occlusion.
3. Be able to evaluate the quality of plaster models.
4. Check the alignment of teeth in the occluder.
5. To teach how to check the wax reproduction of the CVS in the patient's oral cavity.

The location of the lesson is a clinical base.
Practical skills practiced during the lesson: *Checking the construction of PRDP*
Practical skill control form**:** test; survey; solving situational tasks
The place where the practical skill is performed is at the patient's dental chair.
Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:
- from anatomy: Possess knowledge about the structural features of toothless jaws, the structure of teeth, the dentition of the upper and lower jaws;
- from physiology: have knowledge about the function of the TMJ, muscles of the maxillofacial area;
- from general dentistry: new technologies and modern structural materials in the manufacture of partial removable plate dentures.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Anatomical and functional changes with partial loss of teeth.
2. Occlusion and its varieties.
3. Bite and its varieties.

CONTROL QUESTIONS:

1. Types of artificial teeth used in prosthetics.
2. Requirements for PRPD retaining elements.
3. Requirements for wax reproductions of PRPD.
4. Sequence of checking the design of the PRPD in the model.
5. Criteria for clinical evaluation of the PRPD design.
6. Mistakes made at the stage of determining the CO and tactics for correcting them.

Scheme of the OOD "Checking the design of a partial removable plate prosthesis"

Requirements for the components of PRPD	**Execution Tools**	**Execution method**
CHECKING ON JAW MODELS		
The base of the prosthesis should: a) fit tightly to the prosthetic bed (should not balance on the model); b) boundaries (the boundaries of the prosthesis base must coincide with the contours of the prosthetic bed, marked by the doctor on the model)	Models of jaws in an occluder with wax compositions of a removable denture	The fingers of both hands are placed on the artificial teeth, the base is pressed tightly against the model
Clasps must: a) have a holding shoulder, body, appendage; b) arrangement of elements *the shoulder should* be located on the supporting tooth between the neck and the equator, *body* - on the equator of the abutment tooth, on its proximal side, *process* - in the base of the prosthesis under artificial teeth	Same	Evaluated visually
Artificial teeth : ***a)*** the position of each tooth in relation to: • *to the alveolar process* (the vertical axis of each tooth must correspond to the middle of the ridge); • *to adjacent teeth* (there must be close contact between natural and artificial teeth); • *to antagonist teeth* (dense multiple contact of all teeth);	Same	Evaluated visually To check the density of closure between the dentition, a dental spatula is inserted
b) the form of the relationship of the dentition in the bite (depends on the bite or the relationship of the alveolar processes of the patient's jaw)		Evaluated visually

CHECKING THE DESIGN OF THE ORAL CAVITY		
Checking the correct manufacturing of the base, clasps and placement of artificial teeth is carried out in the same way as on the model. Additionally, the height of the lower part of the face, aesthetic parameters and speech tests are checked.		
Checking the height of the lower part of the face with the jaws closed (should be 2-4 mm less than the height of the lower part of the face with relative physiological rest)	Ruler or dental spatula	Measure the height of the lower part of the face in a state of relative physiological rest and reduce it by 2-4 mm
Aesthetics check: a) *shape and color of teeth* matching natural teeth; b) *location of the front teeth* When speaking, the upper front teeth should protrude from under the edge of the red border by 1.0-1.5 mm; When smiling, the artificial gum should not be visible; c) *anatomical arrangement of teeth, taking into account the correct oval of the lips and in relation to the cosmetic center* in a calm state of the patient, the correct oval of the lips (lip prochelia) must be restored; the line between the central incisors must coincide with the line of the cosmetic center.	Wax reproductions PRPD	Evaluated visually
Checking the phonetic correctness of the placement of artificial teeth *for the upper jaw* - clear pronunciation of sounds [t], [d], [n], [s], *for the lower one* - sound [and] and **Checking the phonetic correctness of the basis,** clarity of pronunciation of sounds [g], [k], [x] –	Wax reproductions PRPD	Speech tests

ERRORS AT THE CHECKING STAGE OF PARTIAL PLATE DENTURE		
Medical errors	**Clinical manifestations**	**Elimination methods**
Understatement interalveolar heights	On external examination - an senile face, its lower third is reduced, nasolabial folds are pronounced, the chin is pushed forward, the red border of the lips is reduced	The wax plate is heated, applied to the artificial teeth of the lower jaw and the required height of the lower part of the face is restored with the help of this plate. The teeth are set again in the laboratory.
Overstatement interalveolar heights	Tension of the soft tissues of the face during external examination, smoothness of the nasolabial folds. In the oral cavity - dense fissure-tubercle contact of teeth, teeth chattering when talking	The technician makes wax templates with bite ridges, the doctor again determines the interalveolar height and fixes the position of the jaws in central occlusion at the desired height
Lower jaw displacement: • *forward;* • *left, right*	In the oral cavity when closing the jaws: prognathic relationship of dentition, cuspal contact; crossbite and center line shift	Making a new wax base with occlusal ridges, repeating the stage of defining and fixing the jaws in the position of central occlusion
Deformation of the upper and lower wax templates	Increased bite with uneven and vague cuspal contact of the lateral teeth, gap between the anterior teeth	The technician makes a new template with bite ridges, the doctor again determines the central occlusion

SITUATIONAL TASKS

1. A patient with terminal defects of the lower dentition, who was replaced a week ago with a partial removable denture, complains of tightness of the tongue, its fatigue at the end of the day. Teeth marks are visible on the lateral surfaces of the tongue. What error could be causing these symptoms? At what stage of prosthesis manufacturing was the mistake made?

2. The patient still has teeth 13, 25 in the upper jaw. When checking the design of a partial removable plate denture, the arm of the retaining clasp of tooth 25 is short; on tooth 13, the clasp process has a palatal location of the process. Is this arrangement of clasp elements acceptable? If not, what consequences can this lead to and how can they be eliminated?

3. When checking the design of a partial removable plate denture for the lower jaw, damage to the model is determined in the area of the crest of the alveolar process of the chewing teeth on both sides in the form of notches. What are the causes of the damage? What is the doctor's tactics in this case?

4. When checking the design of removable dentures, a spatula could be freely inserted between the chewing artificial teeth on the upper and lower jaws. What is the cause of the error? What is the doctor's tactics in this case?

5. When checking the design of dentures in the oral cavity, the vertical line between teeth 11 and 21 does not correspond to the cosmetic center. What is the reason for the error? What are the ways to eliminate it?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 8

Subject: Final modeling of bases and production of partial removable plate dentures for the upper and lower jaws

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students to carry out final modeling of the bases of partial removable dentures; methods of plastering wax reproduction of a prosthesis and replacing wax with plastic; carrying out grinding and polishing of dentures.

OBJECTIVES OF THE LESSON:

1. Master the skills of final modeling of the bases of partial removable laminar dentures.
2. Study the structure of the cuvette and become familiar with the methods of plaster of wax reproduction of the prosthesis.
3. Familiarize yourself with the injection molding technique and its characteristic features.
4. Study the polymerization mode and master the skills of replacing wax with plastic.
5. Master the skills of processing, grinding and polishing partial removable laminar dentures.
6. Familiarize yourself with the mistakes that can be made at the stages of final production of partial removable laminar dentures.

The location of the lesson is a clinical base.

Practical skills practiced during the lesson: *Selection of tools and materials for final processing of CSP.*

Practical skill control form**:** test; survey; solving situational tasks

The place where the practical skill is performed is at the patient's dental chair.

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:

- from human anatomy: the anatomical structure of the upper and lower jaws;
- from general dentistry: materials science and laboratory technology for the manufacture of partial removable laminar dentures;
- from surgical dentistry: operations to remove exostoses, plastic frenulum and deepen the vestibule of the oral cavity

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Anatomical structure of the upper and lower jaws.
2. Components of the cuvette.
3. Basic materials for the manufacture of partial removable dentures.
4. Plastics used to make partial dentures.
5. Indications for surgery to remove exostoses, frenuloplasty and deepen the vestibule of the oral cavity.

CONTROL QUESTIONS:

1. Final modeling of the bases of partial removable lamellar dentures.
2. Cuvette and its components. Methods of plastering a wax reproduction of a prosthesis in a ditch.
3. The injection molding method and its features.
4. Preparation and mode of polymerization of base plastics.
5. Processing, grinding and polishing of removable dentures and instruments used for these purposes.
6. Errors possible at this stage of prosthetic manufacturing and tactics for correcting them.

"Plastering the wax composition of the prosthesis into a ditch. Stages of replacing wax with plastic"

1. Separation of the model from the occluder or articulator arc.
2. Preparing the model for plastering.
3. Plastering the model into a ditch.
4. Final plastering of the ditch
5. Wax boiling.
6. Applying insulating material to the model.
7. Preparation of plastic mass.
8. Pressing.
9. Polymerization of the prosthesis.
10. Removing plastic dentures from a ditch.
11. Cleaning the prosthesis from plaster.
12. Finishing of the prosthesis.
13. Grinding the prosthesis.
14. Polishing the prosthesis.
15. Final polishing of the prosthesis.

OOD diagram on the topic: "Plastering the wax composition of the prosthesis into a ditch. Stages of replacing wax with plastic"

Action steps	Material equipment	Execution method
1	2	3
Separate the model from the occluder or articulator arch	Jaw models, hammer, occluder, articulator	To separate the model from the occluder, it is necessary to lightly hit the frame with a hammer to separate the model.
Prepare the model for plastering:	Plaster knife, ditch, prosthesis with wax base on the model	The model must fit in the cuvette.
Direct way	Plaster knife, ditch, prosthesis with wax base on the model	The model is trimmed so that it fits at the base of the cuvette. The outer sides of the ditch should be slightly higher than the level of the teeth.
The reverse way	Plaster knife, ditch, prosthesis with wax base on the model	Plaster teeth are cut with a slope towards the vestibular side, so that there is a gap between them and the clasp.

Combined method	Plaster knife, ditch, denture with wax base on the model	Preparing a model for plastering using a combined method is no different from preparing it in the opposite way.
Plastering the model into a counter ditch:	Prosthesis with wax base, models, plaster, cuvette	Before plastering the model, it is placed in cold water.
- direct way	Prosthesis with wax base, models, plaster, cuvette	Half the base of the cuvette is filled with liquid gypsum, the model is immersed with the displaced gypsum, rollers are formed around the teeth, covering the vestibular surface, the cutting edge and the chewing surface of the teeth.
- in reverse way	Prosthesis with wax base, models, plaster, cuvette	The upper part of the cuvette is filled with plaster and the model is immersed in such a way that only the model is plastered, i.e. to the boundaries of the wax composition of the prosthesis. The alveolar ridge area, teeth and palatal surface remain free of plaster.
- combined method	Prosthesis with wax base, models, plaster, cuvette	The model is plastered at the base of the ditch, the teeth in the "groove" are covered with a roller, the lateral teeth and the alveolar process remain free.
Final plastering	Plaster knife, ditch	After the gypsum has hardened in the base or upper part of the cuvette, depending on the method of plastering, it is immersed in water for several minutes, then covered with the other part of the cuvette and filled with plaster.
Open the cuvette	Plaster knife, ditch	The cuvette is immersed in hot water for 5-10 minutes, then removed and, using a spatula, using a lever-like movement, at the junction of the base of the cuvette with the upper part, it is opened freely.
Boil down the wax	Open the cuvette, the water is boiling	The wax is boiled down by placing the base and then the top of the cuvette under a stream of mountains. water.
Applying insulating material to the model	Izokol, isolak	Immediately after boiling the wax, a thin layer of insulating material is applied to the warm model using a brush. Then, after the cuvette has completely cooled, a second layer is applied.
Prepare the molding mass	Porcelain cup with lid, plastic, spatula	The powder is poured into a porcelain or glass cup and the monomer is added drop by drop until the powder is saturated. Then the mass is mixed and the cup is closed with a lid. After 3-5 minutes. The monomer layer is removed from the surface of the mass,

		and the mass is mixed. The mixture is brought to the consistency of a thick dough.
Pressing plastic in a cuvette	Press, clasp frame	First, teeth and clasps are degreased with monomer. Then, with clean hands, take the required amount of plastic dough and form a cuvette. The cuvette is clamped under a press, then in a clasp.
Polymerization of plastic	Clasp frame, polymerizer	The clasp frame with the cuvette is placed in a polymerizer (a pan of water), brought to a boil for 1 hour and boiled for another 1 hour, then the cuvette is cooled with water to room temperature.
Removing plastic dentures from a ditch	Ditch, press, plaster knife, chisel, hammer.	Open the clasp, then use a spatula to open the cuvette. Using a press, the prosthesis is squeezed out along with the plaster. Then carefully use a spatula to free the prosthesis from the plaster.
Cleaning dentures from plaster	Stiff brush, running water.	Using a stiff brush, rinse the denture in cold water, then wipe dry.
Finishing the prosthesis	Grinding motor, cutters.	Using grinding motors, grinding wheels, burs, and cutters, excess plastic is removed at the border of the prosthesis, the edges of the prosthesis are trimmed, and excess plastic is cleaned from the necks of the teeth.
Grinding the prosthesis	Sandpaper	Sandpaper is placed in the paper holder and inserted into the tip of the sanding motor.
Polishing the prosthesis	Polishing heads	Using felts of various shapes, they polish first between the teeth and the teeth themselves, and then the outer surface of the prosthesis base, while constantly moistening the surface of the prosthesis with pumice slurry, then proceed to polishing with a stiff brush.
Final polishing of the prosthesis	Chalk-based polishing pastes, felts.	The denture is moistened with water, then polished with a soft brush and chalk to a mirror shine.

SITUATIONAL TASKS

1. The technician obtained an anatomical impression of the maxilla from the orthopedic office, attached with wax to a standard tray. I prepared a 3% saline solution and began casting the model, although part of the impression was 2 mm behind the bottom of the spoon. What mistakes did the technician make when casting the impression? What should you do in this case?

2. The plastic prosthesis received from the dental laboratory basically meets the requirements, but the color of the base is striped and uneven. Why? Is it right to start fitting such a prosthesis?

3. The technical quality of the prosthesis is good. The upper dentition has a bilateral limited defect, tooth 27 has a medial inclination, tooth 24 has a palatal inclination. The prosthesis cannot be applied. Which of the main elements of the prosthesis (base, teeth, clasp) needs to be adjusted.

4. The dental technician packs and polymerizes 8 cuvettes at once. What errors might occur? How to avoid them?

5. After melting the wax from the cuvette, the dental technician did not degrease the artificial teeth and began packing and polymerizing the plastic. What complications may arise? What is the technical mistake?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 9

Subject: Fitting and application of partial removable plate dentures. Rules for using removable dentures.

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students the technique of fitting and seating a ready-made partial removable baseplate denture and to develop skills in patients how to use dentures.

OBJECTIVES OF THE LESSON:

1. To consolidate knowledge of the requirements for the manufacture of partial removable baseplate dentures.
2. To master practical skills on the rules for using partial removable baseplate dentures and study the complications that arise during the use of dentures.
3. To get acquainted with the rules and means of hygienic care for removable dentures.
4. To teach students to give practical recommendations to patients on the rules of using and hygienic care of partial removable baseplate dentures.
5. To teach students to give practical recommendations to patients on the rules of using and hygienic care of partial removable dentures.

The location of the lesson is a clinical base.

Practical skills practiced during the lesson: *Fitting and application of PRPDs*

Practical skill control form: тest; survey; solving situational tasks

The place where the practical skill is performed is at the patient's dental unite.

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:

- from human anatomy: the anatomical structure of the upper and lower jaws;
- from general dentistry: new technologies and modern construction materials for the manufacture of partial removable dentures;
- from normal physiology: I.P. Pavlov's teaching on cortical inhibition for understanding the complex neuro-reflex processes occurring in the patient's body after sitting a prosthesis.

- **CONTROL QUESTIONS FROM RELATED DISCIPLINES:**

1. Anatomical structure of the upper and lower jaws.
2. Physico-chemical properties of plastics used in dental prosthetics.
3. Mode of polymerization of base plastics.
4. Types of porosity of plastics. Changes that occur in plastic when the polymerization regime is violated.
5. Conditioned and unconditioned reflexes.

CONTROL QUESTIONS:

1. Assessment of the quality of finished partial removable baseplate dentures.
2. Sequence and methodology for fitting and seating removable dentures.
3. Possible difficulties in fitting and seating removable dentures and ways to solve them.
4. Stages of adaptation of the patient to the prosthesis (irritation, partial inhibition, complete inhibition).
5. Recommendations to the patient on the rules of use and hygienic care of partial removable dentures.

OOD diagram on the topic:

Actions	Material equipment	Self-control criteria
1. Sitting the patient in a dental unit.	Dental unit	Comfortable fixation of the patient's head and body height.
2. Evaluation of the finished prosthesis outside the mouth.	Partial removable denture	Condition of the base, artificial teeth and clasps.
3. Disinfection of the prosthesis.	3% H2O2 solution	Processing of the prosthesis
4. Fitting and seating removable dentures	Correction of the prosthesis base, bite, fixation of the prosthesis.	The denture is easily inserted, and the base's oral surface adheres to the natural teeth. The teeth are evenly closed, articulation is free. The fixing part of the clasp is located slightly higher - on the upper jaw or lower on the lower jaw of the equator of the tooth, and fits tightly to the tooth.
5. Clinical evaluation of the seated prosthesis.	Partial removable denture.	Visual inspection
6. Patient information: a) about expected difficulties; b) about the mode of use of the prosthesis. c) care of the prosthesis.	Conversation with the patient.	Recommendations for the use, care and storage of the prosthesis.
7. Finishing clinical work with documentation.	Documentation samples.	Control, final documentation.

SITUATIONAL TASKS

1. Having received the model along with the wax template from the doctor's office, after checking the design, the dental technician began the final modeling of the wax bases of the removable dentures. The technician applied wax bases to the models according to the boundaries, made the adjustments indicated by the doctor regarding the placement of the teeth, knocked off the models, trimmed them further and began flasking procedure. Have all the points been taken into account by the technician during the final modeling of the removable denture bases? What methods of isolating bony prominences do you know?
2. After fabricating the partial denture, the dental technician discovered that the plastic had a marbled appearance with whitish streaks. What caused the plastic to change color? How can this phenomenon be eliminated?
3. The dental technician placed 5 dentures for polymerization, prepared the plastic, and the ambient temperature was 28 degrees. The dental technician applied considerable pressure when

packing the last cuvettes. What are the possible consequences of such packaging? What should you do in this situation?

4. An examination of the plastic base of a partial removable denture of the lower jaw revealed many small superficial pores on the lingual outer surface. Specify the reasons for the formation of pores in plastic? How can they be eliminated?

5. The dental technician immersed the model along with the template into the base of the cuvette and plastered them together with the clasps. The arrangement of teeth is without any peculiarities. Did the technician do the right thing during the plastering process? If not, why not?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 10

Subject: Correction of partial removable plate dentures

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students methods of adjustment of removable dentures. To study clinical and laboratory errors that arise during the manufacturing of prostheses.

OBJECTIVES OF THE LESSON:

1. To get acquainted with possible errors when making partial removable baseplate dentures.
2. To master practical skills on the rules for correcting removable baseplate dentures.
3. To consolidate knowledge of the stages of manufacturing partial removable dentures.

The location of the lesson is a clinical base.

Practical skills practiced during the lesson: *Making correction of removable dentures*

Practical skill control form: test; survey; solving situational tasks

The place where the practical skill is performed is at the patient's dental unite.

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:

1. from human anatomy: the anatomical structure of the upper and lower jaws;
2. from general dentistry: new technologies and modern construction materials for the manufacture of partial removable dentures;
3. from prosthodontics (fixed prosthetics): principles of transfer of chewing load by various types of dentures;
4. from surgical dentistry: what is the special surgical preparation of the oral cavity for dental prosthetics;
5. from dermatovenerology: diseases of the oral mucosa.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Give characteristics of the oral mucosa.
2. The location of the anatomical structures of the prosthetic bed, the requirements for them.
3. Anatomical structure of the TMJ.
4. Assessment of occlusal relationships of teeth.

CONTROL QUESTIONS:

1. Clinical errors that arise at the stages of manufacturing partial removable baseplate dentures and their elimination.

2. Laboratory errors that arise during the manufacturing stages of partial removable baseplate dentures and their elimination.

3. Possible changes in the oral mucosa when using partial removable baseplate dentures and the reasons for their occurrence.

4. Instrumentation used for the correction of partial removable baseplate dentures and the methodology for its implementation.

Relining of a partial removable denture (clinical, laboratory).

OOD diagram on the topic:

Sequence of action	Tool and means	Methodology
1. Patient preparation	Dental unit	The patient should take a position so that the hand of the doctor, bent at the elbow, is at the level of his mouth.
2. Examination of the oral cavity of a patient with a prosthesis, without a prosthesis.	Patient examination tool kit	Establishing the topography of the injury.
3. Evaluation of the prosthesis outside the mouth	Visually, tactilely.	Identification of errors (errors in prosthesis manufacturing)
4. Adjustment of the prosthesis: base, occlusion, clasps	Crampons, cutters.	If there are damaged areas of the mucous membrane along the transitional fold, the border of the prosthesis base is corrected. Using articulating paper on the chewing teeth, check their closure. In places where the teeth are in supracontact, the artificial teeth are ground with a milling cutter, bringing the teeth to a close fit to each other. Achieve a tight, uniform closure of artificial and natural teeth. The clasp arm is positioned between the equator and the neck using crampons.

ADJUSTMENT *METHOD FOR REMOVABLE DENTURES*

The adjustment is prescribed the next day after the prostheses are sitted. After clarifying complaints and examining the mucous membrane, areas where injury occurs (hyperemia, damage to the mucous membrane) are identified. The first manipulation when adjusting removable dentures is the determination of occlusal contacts. To identify supercontacts, special occlusal dental paper of different colors (blue, red) and different thicknesses (30, 60, 100, 200 microns) is used. The identified supercontacts are ground off with a metal mill.

If after the procedure the pain and discomfort do not disappear, then the second stage is carried out - correction of the prosthesis base. For this purpose, special marker pastes or impression materials are used. They are applied to the inner surface of the prosthesis base, after which the prosthesis is sat. Then it is removed from the oral cavity and a metal cutter is used to remove the part of the plastic where the pressure is present. In this case, care must be taken in the area of the transitional fold and the distal (posterior) border of the palate. Excessive removal of plastic in these areas may disrupt the fixation of the dentures.

Sometimes patients complain of biting their cheeks and tongue. The reason may be a violation of occlusal contacts, their absence, or the location of the masticatory cusps in the reverse overlap. Normally, the upper molars should overlap the lower molars of the same name. When this is not observed, biting of the cheeks and tongue occurs. When carrying out this adjustment, the doctor must adjust the occlusal relationships, achieving maximum contact, and also grind the vestibular cusps of the lower molars (filling them up), thus creating an overlap of the lower molars with the upper ones.

MATERIALS FOR RELINING REMOVABLE DENTURES

Temporary:

- silicone materials of hot polymerization (long-term - more than 30 days);
- silicone materials of cold polymerization (long-term - more than 30 days);
- plasticized acrylates (short-term - less than 30 days).

Permanent:

- acrylic plastics of cold polymerization;
- acrylic plastics of hot polymerization.

Soft (elastic):

- silicone materials cold polymerization;
- silicone materials of hot polymerization.

Hard:

- acrylic plastics hot polymerisation;
- acrylic plastics cold polymerization.

Having a therapeutic effect on the mucous membrane of the oral cavity:

- plasticized acrylics (fabric conditioners)

For clinical rebasing:

- acrylic plastics of cold polymerization;
- silicone materials cold polymerization;
- plasticized acrylics.

For laboratory rebasing:

- acrylic plastics hot polymerisation;
- silicone materials hot polymerization;
- plasticized acrylics.

COMPARATIVE CHARACTERISTICS OF ACRYLIC PLASTICS FOR RELINING PROSTHESIS

lABORATORY RELINING	*CLINICAL RELINING*
- hot polymerization plastics	- самополимеризующиеся пластмассы
- more complete polymerization	- менее полная полимеризация
- high molecular weight compound	- низкомолекулярное соединение
- residual monomer 0.2-0.5%	- остаточный мономер 3-5%
- water absorption 0.25%	- поглощение воды 3%
- less porous	- более пористые
- solubility 0.05 mg/cm2	- solubility 0.2 mg/cm2
- less susceptible to deformation	- more susceptible to deformation
- more durable	- less durable
- better color stability	- worse color stability
- less irritating to the mucous membrane of the prosthetic bed	- more irritating to the mucous membrane of the prosthetic bed

CLINICAL RELINING OF REMOVABLE DENTURES USING SOFT MATERIALS

Indications for the use of soft lining materials:

- the presence of areas in the area of the prosthetic bed covered with thinned mucous membrane (exostoses, sharp edges of the sockets);
- dry, poorly pliable mucous membrane of the prosthetic bed;
- sharp and/or uneven atrophy of the alveolar process;
- the presence of chronic diseases of the mucous membrane;
- intolerance to acrylic plastics ("prosthetic stomatitis");
- immediate prosthetics;
- maxillofacial prosthetics and postoperative prosthetics;
- the presence of undercuts of the alveolar process

The optimal choice for long-term clinical relinings using soft linings are materials based on VPS (vinylpolysiloxane, additional type silicone).

The advantages of using VPS-based lining materials are:

- production of a soft lining directly at a clinical appointment (one visit);
- the materials are easy to use and do not require additional equipment;
- affordable cost of the material;
- the presence of a special adhesive that ensures a strong bond between the soft lining and the denture base;
- the materials are compatible with any acrylic-based base plastics;
- spatially stable;
- have good rheological properties;
- are biocompatible (do not contain methyl methacrylate);
- have a neutral taste and odor;
- are characterized by a stable color and practically do not disturb the aesthetics of the denture;
- are resistant to the effects of everyday denture care products;
- can also be used for laboratory production of elastic linings.

PLASTICIZED ACRYLIC PLASTICS

Chemical structure:

Powder:

- poly-ethyl-methacrylate [PEM];
- dye.

Liquid:

- plasticizer - aromatic esters (dibutyl phthalate, phthalyl-butyl glycolate);
- alcohol (ethyl/butyl/methyl) up to 30%.

Plasticized acrylic plastics do not contain acrylic monomer. It is necessary to remember that from 3 to 6000 ppm of plasticizer is released into the biological environment of the oral cavity within 14 days (risk of sensitization of the body). The process of hardening of fabric conditioners is not polymerization, but the so-called “gel formation”, since the alcohol component of the liquid prevents the unification of PEM particles into long polymer chains. Characteristic features: have good fluidity, remain plastic for a long time, deform in areas of high pressure. As the alcohol base evaporates, they harden.

Field of application:

- to eliminate chronic inflammation of the mucous membrane of the prosthetic bed caused by mechanical or chemical irritants, infections and other reasons;
- to form the relief of the prosthetic bed during the manufacture of immediate prostheses;
- as a soft lining material for short-term (1-2 weeks) relining;
- to obtain delayed functional impressions during the relining of removable dentures.

SITUATIONAL TASKS

1. A patient with a distal defect of the lower dental arch had a partial removable denture seated a day ago. During a follow-up examination, he complained of pain when swallowing, reminiscent of symptoms of tonsillitis. Make a diagnosis and indicate the cause of the pain. What is the doctor's tactic in this situation?

2. A patient with a combined defect of the dental arches (fixed bite) complains of an unpleasant feeling in the masticatory muscles and temporomandibular joint. When talking, the teeth chatter. What is the cause of the described phenomena, and who is to blame? What are the ways to eliminate them?

3. After the seating of a partial removable denture on the upper jaw, the patient complains of biting the cheek while eating. What are the possible causes of the complaints? What is the doctor's tactic?

4. The patient has been using partial removable dentures for 3-4 days. Complaints of pain under the denture base. Objectively: bedsores in the area of the frenulum of the upper lip and frenulum of the tongue, in the retromolar area. What is the diagnosis? What is the doctor's tactic?

5. A partial removable denture was seated on the upper jaw a day ago. The patient complains of pain in the mucous membrane along the transitional fold in the frontal area of the alveolar process of the upper jaw. What is the diagnosis? At what stage was the error made, how can it be corrected?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 11

Subject: Clasp dentures

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: teach students to determine the indications for the use of framework partial removable dentures, study the design elements, their purpose and location, take impressions with various impression materials and evaluate their quality.

OBJECTIVES OF THE LESSON

1. To get acquainted with the indications and contraindications for making framework partial removable dentures.
2. To study various methods for making framework partial removable dentures.
3. To master practical skills in the rules of fitting and seating a framework partial removable denture and study the complications caused by a framework partial removable denture.

The location of the lesson is a clinical base.

Practical skills practiced during the lesson:

Taking impressions from alginate and silicone materials.

Practical skill control form: тest; survey; solving situational tasks

The place where the practical skill is performed is at the patient's dental unite.

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must repeat:

1. from human anatomy: the anatomical structure of the upper and lower jaws;
2. from general dentistry: new technologies and modern construction materials for the manufacture of framework partial removable dentures;
3. from normal physiology: I.P. Pavlov's teaching on cortical inhibition for understanding the complex neuro-reflex processes occurring in the patient's body after seating a prosthesis.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Classification of impression materials.
2. Replacing the wax composition with plastic.
3. Basic and auxiliary structural materials for the manufacture of framework partial removable dentures.
4. The influence of convergence of teeth on the seating of framework partial removable dentures.

CONTROL QUESTIONS:

1. Framework partial removable dentures, characteristics. Indications and contraindications for the use of framework partial removable dentures.
2. Methods for making framework partial removable dentures.
3. Structural elements of framework partial removable dentures.

4. Positive sides of framework partial removable dentures in comparison with partial removable baseplate dentures.

5. Materials used to take impressions for prosthetics with framework partial removable dentures.

Indications for the use of framework partial removable dentures:

- bilateral distal defects of the dentition;
- unilateral distal defects of the dentition;
- included defects of the dentition in the lateral region with the absence of more than three teeth;
- defects in the dentition in the anterior region;
- dental defects in combination with periodontal diseases;
- multiple dental defects.

Indications for choosing a framework partial removable denture depend on:

- topography of dentition defects,
- length of dentition defects,
- condition of supporting teeth,
- tissues of the prosthetic bed,
- antagonists,
- type of bite
- individual characteristics of the patient.

Positive features of framework partial removable dentures:

- functional efficiency is higher than partial removable baseplate dentures have;
- distribution of the chewing load is distributed between the periodontium of the supporting teeth and the mucous membrane of the prosthetic bed;
- distribution of the functional load is possible with the help of clasps and other elements;
- allow you to splint the remaining teeth
- reduce the horizontal component of the functional load on the supporting teeth and alveolar processes due to more stable fixation;
- slight disturbance of taste, temperature, tactile sensitivity of oral tissues when using these dentures.

According to the manufacturing method, framework partial removable dentures are divided into

- soldered and
- cast (with removal from the model, on a fire-resistant model; through a plastic composition).

Consists of clasps, major connector, minor connector (mesh).

BASIC CONSTRUCTION ELEMENTS OF FRAMEWORK PARTIAL REMOVABLE DENTURES

Framework	Consists of clasps, major connector, minor connector (mesh).
Basis	Designed for fixing artificial teeth and replacing the lost part of the alveolar process.
Artificial teeth	Designed to restore lost functions and aesthetics.

SITUATIONAL TASKS

1. The patient has an edge to edge bite. Teeth 14,15, 16, 17, 18, 24, 25, 26 are missing. All teeth are stable, have high clinical crowns, and correct anatomical shape. The vault of the palate is of medium depth. Dome-shaped. Atrophy of the toothless alveolar processes of both jaws is moderate and even. Make a diagnosis taking into account classification by Kennedy. Make a treatment plan. Justify the choice of denture design.

2. The patient is 45 years old, teeth 31, 32, 35, 36, 38, 41, 42, 44, 45, 46, 48 are missing. The remaining teeth are stable and have the correct anatomical shape. The lingual surface of the alveolar ridge runs vertically behind the front teeth, and there is a low attachment of the lingual frenulum to the alveolar process. The edentulous alveolar processes are well expressed. Make a diagnosis taking into account classification by Kennedy. Make a treatment plan. Justify the choice of denture design.

3. Patient K. 50 years old. On the lower jaw, teeth 35, 36, 37, 38, 46, 47, 48 were removed. The remaining teeth are stable, 34 and 44 have extensive fillings, are discolored, percussion is painless. According to the patient, 34, 32, 31, 43,44 were treated for complicated caries four years ago. No complications were noted after treatment. The edentulous alveolar processes are well expressed. The lingual surface of the alveolar ridge behind the anterior teeth slopes posteriorly. The frenulum attachment is low. Dental implantation is contraindicated due to the general health of the patient. Make a diagnosis taking into account classification by Kennedy. Make a treatment plan. Justify the choice of denture design.

4. Patient V., 47 years old. Teeth 15, 16, 17, 18, 25, 26, 27, 28 are missing. The teeth adjacent to the defect are stable, have the correct anatomical shape, intact, high clinical crowns. Atrophy of the alveolar process is insignificant, the vault of the palate is of moderate height. In the middle third of the hard palate there is a small torus. Make a diagnosis taking into account classification by Kennedy. Make a treatment plan. Justify the choice of denture design.

5. Patient A. 43 years old. Teeth 34, 35, 36, 37, 44, 45, 46 were extracted. The remaining teeth have high clinical crowns, correct anatomical shape, and are intact. The alveolar processes are slightly atrophied. The lingual surface of the alveolar ridge behind the anterior teeth runs vertically. There is a high attachment of the frenulum of the tongue, exastoses are big. Make a diagnosis taking into account classification by Kennedy. Make a treatment plan. Justify the choice of denture design.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 12

Subject: Clasp system of clasp denture construction. Parallelometry

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the topic: to teach students the methods of parallelometry and planning of the design of braces, the regularities of the selection of the clasp system.

OBJECTIVES OF THE LESSON:

1. to familiarise themselves with the indications for selecting a clamp system.
2. to learn the practical skills of different parallelogram techniques.
3. to consolidate the knowledge of the elements of braces that reduce masticatory pressure on the periodontium of the supporting teeth.

The location of the class is the clinical site.

Practical skills practised during the class:

Taking impressions using alginate and silicone materials

Form of control of the practical skill: тest; survey; solving situational tasks

Place of performance of the practical skill - at the patient's dental chair/

Criteria for assessment of practical skills - according to the evaluation sheet (checklist) for control of practical skills in the discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

In order to fully grasp the topic, the student should repeat:

- from anatomy: anatomical structure of dental rows, jaws and oral organs;
- from general dentistry: modern technologies and modern constructional materials for fabrication of braces;
- from orthopaedic dentistry (fixed prosthetics): principles of masticatory load transfer by different types of dentures.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. The structure of the periodontium of the tooth.
2. Functional endurance of the tooth.
3. Odontoparodontogram.

4. Characteristics of claspers, their importance.

CONTROL QUESTIONS:

1. Anatomical shape of the crown part of the tooth. Elements of the supporting and retaining clammer, their functional purpose.
2. Purpose of parallellometer and its components.
3. Methods of parallellometry: arbitrary, selection method, graphic.
4. Ney's clammer system, choice of clammers depending on the topography of the boundary line location.
5. Elements of the bracket to reduce the masticatory pressure on the periodontium of the supporting teeth.

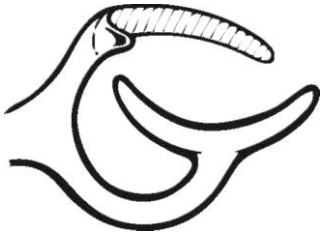
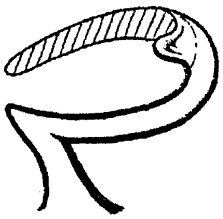
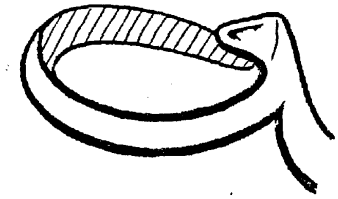
«Study of the model in the parallelogram»

Student Actions	Means of action	Methodology and control criteria
Casting of the working model	Grinder, large size carborundum discs, plaster knife	The impression is filled with super gypsum until the denture bed is covered. The base of the model is cast with normal gypsum. The base of the model must be trimmed with a plaster knife until it is fully hardened. The final trimming of the plinth is carried out in a special apparatus, which is a grinding machine with a large-diameter abrasive disc attached.
Learning a model in a parallelogram: basic rules of parallelogrammetry	Parallelometer	Parallelometer in the fabrication of braces is necessary to determine the methods of fixation of the braces; to draw an equatorial line on the supporting teeth, which allows to find the supporting and retention surfaces for the location of the clamp arms; to create an artificial parallelism of the teeth. 1. The parallelometer provides the final determination of the design of the bracket prosthesis, 2. The overall clammer line, although curved, should be generally parallel to the occlusal plane. 3. The prosthesis should transmit masticatory pressure along the tooth axis when fixed in the oral cavity. 4. The denture must be designed to distribute the masticatory pressure rationally between the remaining teeth and the alveolar processes.
Mounting models on the articulated table	Parallelometer, working model	1. The working model of the jaw is placed on the rotating platform of the parallelogram table. To the middle of the chewing surfaces of the supporting teeth, 5 cm long metal rods are attached with sticky wax so that they are extensions of their vertical axes.
Determination of the insertion path according to the Novak method There is also a method of determining the path of insertion of the prosthesis according to Berezovsky S.S., which consists in determining the average inclination of the long axes of the supporting teeth by finding the bisector of the angle.	Working model fixed on the articulated table	1.Use an analytical rod to transfer the axes of the supporting teeth on one side to the lateral surface of the model base. Two lines are drawn parallel to the base of the model, which are at the greatest distance from each other until they intersect with the vertical axis lines of the teeth. 2. Divide each of the horizontal lines in half and, by connecting their centres, obtain the average axis of inclination of the supporting teeth on one side. 3.This line is transferred to the posterior surface of the model base using an analytical rod. 4. If there is one support tooth on the opposite side, its axis is immediately transferred to the rear surface of the base of the model, if there are two, then do the same as in the previous case. 5. On the posterior surface of the base of the model, the lines of the average axes of the inclination of the supporting teeth on both sides are

The method of selection, in which the inclination of the model allows to find the most rational type of clammer for each supporting tooth and to arrange its elements in functional and aesthetic terms.		connected by two parallel lines, divided in half and the points obtained are connected. In this way, the average inclination axis for all the supporting teeth on both sides is obtained. 6. The analytical rod of the parallelogram is aligned with the obtained average axis of inclination and thus the inclination of the model is obtained, at which parallelogrammetry is performed, for which the analytical rod is changed to a graphite rod. 7. The reference teeth are delineated with the graphite rod, obtaining the boundary line
Measurement of the depth of the undercuts of the supporting teeth to determine the location of the end of the retention arms of the clasps	Calibres with measuring disc diameter: No. 1 -0.25 mm No. 2 - 0.5 mm No. 3 - 0.75 mm	1. Select the calibration rod for the desired type of clamp according to the recommendation of the authors of the NEJA system. 2. Bring the calibration rod to the tooth so that its stem touches the equator of the tooth, then the disc of the rod will indicate the point where the end of the retention clamp should be located.
Pencil drawing of the future brace framework	Model, a chemical pencil	Release the screws securing the working model on the hinge table and cast the occluder model in the central occlusion position. The framework of the brace is drawn out.

NEA CLAMMER SYSTEM

Klammer	Characterisation	Indications
Neu No. 1, Ackers, Ackers, two-shoulder with overlay, three-shoulder, E-clammer, 	It consists of an occlusal onlay, a body and two arms. The onlay is placed on the occlusal surface perpendicular to the longitudinal axis of the tooth. The body of the clammer is located on the aproximal surface of the tooth at right angles to the axis of the occlusal onlay. The shoulders of the clammer start from its body and run at an angle of about 45° until they intersect with the boundary line, after which they move to the retention part.	Single molars and premolars at the typical location of the boundary line.

Neu #2, Roach clammer, T-clammer, Y-clammer, split clamper 	The structure has a vertebral body. It has an occlusal pad and two elongated rod arms with T-shaped ends on the vestibular and oral sides of the supporting tooth.	-Inclined teeth, positioning the boundary line on both sides close to the neck of the tooth; - to create high esthetics; - on incisors, canines and premolars.
Neya #3, Combined Acker and Roach 	It consists of an occlusal pad, two bodies. The first one ends with the shoulder of the Acker clamp, the second one is elongated like the Roach clamp.	- Vestibularly inclined molars and premolars; - teeth with a low equator and low clinical crowns; - when the boundary line is close to the occlusal surface on the oral side and close to the tooth neck on the vestibular side.
Neya #4, back-acting clammer, back-acting clammer, back clammer 	The outgrowth and the initial part of the clammer arm are located on the vestibular surface of the teeth. The process starts from the arch of the framework in the middle of the premolar crown and does not touch the mucosa. The vestibular part of the arm continues distally, where the occlusal pad comes off of it.	-Premolars, less frequently molars, of the mandible when orally inclined; - When the boundary line is located on the vestibular side near the neck of the tooth and on the oral side closer to the chewing surface.
Neya No. 5, circular, one-shoulder clammer 	The clammer consists of one (two) occlusal onlays, a long arm that almost completely surrounds the tooth, a body (on the defect side) and an outgrowth on the side opposite the inclination.	- is used on single premolars and molars - in case of significant tooth inclination, when the boundary line is close to the tooth neck on one surface and close to the occlusal line on the other.

SITUATIONAL TASKS

1. Examination of the model in the parallelogram shows the following: Supporting teeth 17, 14, 25 with a typical position of the boundary line. Suggest the most effective clamp design for stabilisation and retention of the bracket under these conditions.

2. When studying the model in the parallelogram, the following was found: the boundary line on the supporting teeth 34, 36, 24 is close to the cervicals of the supporting teeth

on the vestibular and oral surfaces. Suggest the most effective clamp design for stabilising and retaining the bracket under these conditions.

3. Examination of the model in the parallelogram shows the following: the boundary line on the support teeth 37, 48 has a typical position. The support teeth 34, 44 have a pronounced vestibular inclination. Suggest the most effective clamp design for stabilisation and retention of the bracket under these conditions.

4. Examination of the model in the parallelogram shows the following: the boundary line on the support tooth 48 has a typical position. The support teeth 34, 37, 44 have a pronounced oral inclination. Suggest the most effective clamp design for stabilising and retaining the bracket under these conditions.

5. Examination of the model in the parallelogram shows the following: the boundary line on the supporting teeth 37, 47 is close to the tooth neck on one surface and close to the occlusal line on the other surface (the teeth have a medial inclination). Suggest the most effective clamp design for stabilising and retaining the bracket under these conditions.

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 13

Subject: Technique for manufacturing cast frameworks of clasp dentures on refractory models

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students the basic technological methods of fabrication of all-moulded frameworks of braces on refractory models.

OBJECTIVES OF THE LESSON:

1. to familiarise with the indications for the fabrication of braces on refractory models;
2. to master the technological methods of manufacturing refractory models;
3. to master the technological methods of framework modelling, cuvette moulding;
4. To consolidate the knowledge of basic and auxiliary materials, tools and equipment necessary for the manufacture of braces.

The location of the class is the clinical site.

Practical skills practised during the class:

Fitting and checking the construction of the solid cast frame of the clasp prosthesis

Form of control of the practical skill: тest; survey; solving situational tasks

Place of performance of the practical skill - at the patient's dental chair/

Criteria for assessment of practical skills - according to the evaluation sheet (checklist) for control of practical skills in the discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

In order to fully grasp the topic, the student should repeat:

- from anatomy: anatomical structure of dental rows, jaws and oral organs;
- from general dentistry: modern technologies and modern constructional materials for fabrication of braces;
- from orthopaedic dentistry (fixed prosthetics): principles of masticatory load transfer by different types of dentures.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Definition of the term ‘boundary’ line.
2. Types of clammers, their functional purpose.
3. Impression materials and their properties.
4. Materials and technology of refractory models manufacturing.
5. Alloys used for casting frameworks of braces and their characteristics.

CONTROL QUESTIONS:

1. Clinical and laboratory steps in the fabrication of all-moulded bracket frameworks on refractory models. Equipment and materials required for the fabrication of all-cast bracket frameworks on refractory models.
2. Duplicating masses, characterisation. Preparation of the working model for duplication. Fabrication of the refractory model.
3. Modelling of the denture framework. Moulding of the cuvette (opoka).

4. Quality assessment and verification of the design of the all-moulded framework of the denture.

5. Errors and complications arising in the fabrication of a bracket framework on a refractory model.

The introduction of refractory masses into foundry practice has made it possible to cast complex prosthetic designs on ceramic models without removing the wax reproduction. In this case, the refractory model serves as the main part of the mould with the wax framework of the prosthesis modelled on it. The essence of this method is that during heat treatment the ceramic model expands by an amount equal to the shrinkage coefficient of the metal alloy based on cobalt and chromium. The refractory model has sufficient strength, accurately reproduces the original gypsum model and, if produced with high quality, guarantees the fabrication of brace frameworks of any complexity and high accuracy.

The working model made of high-strength gypsum is prepared for duplication after examination in a parallelogram. For this purpose, the areas of the supporting teeth that have recesses and where the arms of the retention clasps will not be placed are filled with wax up to the level of the boundary line. The locations of the arches are isolated with wax and the saddle part with a 1-2 mm thick plate of wax or lead. (pic. 13.1).



pic. 13.1. Model prepared for duplication

Refractory modelling

Sequence of work	Means and conditions	Criteria and form of self-monitoring
Preparing the model for duplication	Working model with a drawing of a brace framework, parallelogram, wax, spirit flame, wax for bracket work, spatula	The wax is heated on a spirit flame. The areas of the supporting teeth that have recesses in which the retaining arms of the claspers will not be placed below the line of sight are filled with melted wax. The model is fixed in the parallelogram. Fix the instrument blade in the collet holder with the fixation sleeve. Bring the model on the table to the instrument knife and carefully, without damaging the model, scrape off the excess wax on the supporting teeth below the line of sight. All supporting teeth of the line of sight are parallel to each other. Spacers are made of wax for bracket work. The spacers are pressed onto the model in the area of the arch and the mesh of the future framework of the bracket and fixed with melted wax.
Duplicating the plaster model		The gypsum model is dipped in water for 5-8 minutes and then placed in the centre of the cuvette base. Fix the model to the base with plasticine and put the cuvette on.

- preparation for duplication of the hydrocolloid mass	Water bath, Gelin mass	Grinding of the hydrocolloid mass. Put the pulverised mass into a vessel. The vessel is placed on a water bath. Melt the mass to a temperature not exceeding 90˚
-pouring of the hydrocolloid mass into the cuvette		Cool the hydrocolloid mass to 42-45˚. Fill the cuvette through one of the holes in the lid until the mass appears in all three holes.
-cooling of the hydrocolloid mass		Cool the cuvette at room temperature for 10-15 minutes. Place the cuvette in a vessel with cold water for 20-25 minutes.
-model extraction from the masses	Spatula, plaster knife, metal rod	Remove the cuvette base. Remove the plastic from the bottom of the model. Carefully remove the plaster model from the cuvette.
-evaluation of impression quality		There must be no pieces of hydrocolloid on the model. The impression should have smooth walls with a clear relief.
Fabrication of the refractory model 1. Mixing the refractory mass	«Silamine», water, rubber bulb, spatula, vibration table, other masses can be used	Weigh out 100-200 g of powder and pour into a rubber flask. Pour water. Mix thoroughly with a spatula. Put the mass together with the cup on a vibration table, its surface becomes matt.
2.Pouring the fire-resistant mass into the impression		The cuvette with the impression is placed on the vibration table. A funnel (cone) is placed in the centre of the impression. Switch on the vibrating table. Small portions are placed on the edge of the impression refractory mass with such calculation that it flows down and evenly fills the recesses, it protects from the formation of pores. Casting of the model should be carried out within 2-3 minutes.
3. Improving the quality of the refractory model		Place the model in the tank, from which the air is pumped out for 4-5 minutes. Switch off the vibrating table.
4. extracting the model		After 10-12 minutes remove the funnel (cone). Final solidification of the model occurs after 40-45 minutes. Carefully remove the model from the hydrocolloid mass.
Quality assessment of refractory model manufacturing	visually	It has a smooth shiny surface without pores. It is an exact copy of the original.
Strengthening of the refractory model	Drying cabinet, beeswax, electrothermal device	Place the model in a dry oven. Dry for 30 minutes at a temperature of 200-250˚. Heat the wax in an electrothermal appliance to 150˚. Remove the model from the oven and place it in the heated wax for 10 seconds. The model cools down in the air.

«Auxiliary materials used for the fabrication of braces»

Name of materials	Composition of material	Purpose of material
Hydrogum, orthoprint, phase.	Sodium salt of alginic acid. Gypsum. Fillers - white carbon black, barium sulphate, sodium carbonate	Impressions in the prosthetic treatment of dental defects. Impressions from edentulous jaws (unloading). In orthodontics for the treatment of dentoalveolar deformities.
Zetaplus, speedex, orthosil.	Impression masses based on silicones	Taking impressions for convergence and divergence of teeth, high tooth mobility, periodontal disease, fabrication of fixed dentures, crowns, half crowns, braces. And also in prosthetics of edentulous jaws.
Gypsum	Lime rock	Obtain models, modelling stamps for crowns, press moulds for working with plastic, fix models in occludators and articulators with plaster, parts of dental prostheses before soldering. Face masks, moulages. Gypsum is a part of a number of moulding mixtures.
High-strength gypsum (super gypsum)	Gypsum type 4 finely dispersed, the ratio of water:gypsum - 1:5.	Obtaining models for the fabrication of braces, porcelain, metal-ceramic crowns and bridges.
Fusible metal alloy	Composition: tin 33.3% lead 32.0% bismuth 55.5% cadmium 11,2 - 13,0% Board temperature: 95˚C	For making dies. For producing combined models.
Base wax - 02	Rectangular wax plates 2 mm thick. Softening point 36-40˚ Melting point 57 ˚C Composition (in % by mass): paraffin - 77,99; ceresin - 20,0; dammar resin - 2,0; colouring agent - 0,01.	For modelling the bases of removable dentures, making individual spoons, bases with occlusal rollers, for auxiliary work when placing artificial teeth in removable dentures.
Formodent hard wax (for bead work)	INGREDIENTS: paraffin (29.98%), beeswax (65%), carnauba wax (5%) other additives (0.02%). PROPERTIES: melting point 60°C. Ash content of wax is not more than 0,06%.	For modelling full-face brace frameworks and other parts of the brace.
Bugel wax	Wax discs 0,5 mm thick INGREDIENTS: paraffin - 94%, synthetic ceresin - 4%, beeswax - 2%, dammar resin, colouring agent.	For creating intermediate spaces when modelling brace frameworks.

Waxolite-1 (green colour)	INGREDIENTS: rosin - 2%; paraffin - 40%; ceresin - 58%; colouring agent - 0,003%.	For the creation of sprues, the feeding system for casting brace frameworks directly on the refractory model.
Waxolite-2 (blue or pink colour))	INGREDIENTS: rosin - 2%; paraffin - 60%; ceresin - 38%; colouring agent - 0,008%.	To create a sprue-feeding system. Wax melting is carried out in muffle furnaces with gradual increase of temperature during 1 hour from 60 to 200°C.
Mass Gelin	Agar-agar hydrocolloid Melting point - 90°C Working temperature - 50-55°C Solidification temperature - 40°C Gelling time - 45 min	To duplicate the plaster model
Refractory mass «Bugelit»	Refractory powder (filler) 4 parts. Hydrolysed ethyl silicate 1 part (binding component) Sodium hydroxide solution, hardener.	To obtain a refractory model.
«Silamine» mass	Binder - zinc, magnesium, aluminium phosphates. Fillers - cristaballite, quartz, silicon oxide. Liquid - water.	To obtain refractory models.
«Christosil» mass	Filler - crisballite. Binder - hydrolysed tetraethyl silicate	To produce refractory models
Moulding mass	Marshalite - 50-60% Ethyl silicate - 40% Alcohol	For coating of wax models (application of facing layer) - at casting on melted models.
Packing material	Gypsum - 1 part Sand - 2 parts	For packing models into cuvettes for investment casting.
Fluxing material	Borax Sodium salt, boron, acids, rosin	Used for soldering crowns, denture body to crowns, clasps in a brace (soldering method).

SITUATIONAL TASKS

1. After removal of the refractory model, the presence of pores on the supporting teeth is noted, the surface of the denture bed is rough. What mistakes were made, at what stage of fabrication? How can these errors be corrected?

2. When duplicating the plaster model, the technician used Gelin mass. Without isolating the subcavities and saddle parts, the technician placed the model in a duplication cuvette and filled it with Gelin heated to 80 °C. What mistakes did the technician make. Indicate the sequence of duplicating the model.

3. When casting the framework of a bracket prosthesis on a refractory model made of cobalt-chromium alloy, the dental technician cooled the pillar in cold water, after which he freed the framework from the moulding mass by hitting the moulding and the framework with a hammer. What mistakes the technician made. Indicate the correctness of actions when replacing wax with metal.

4. After removing the framework of the brace from the moulding mass, small pores and underfilling of the metal were detected. What are the possible causes? How can these errors be avoided?

5. At the stage of checking the framework of the bracket in the oral cavity, it was found that the framework is applied with great force, and the occlusal onlays are 1 mm away from the chewing surfaces of the teeth. What are the possible errors? How can these errors be avoided? How can they be corrected?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken's Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 14

Subject: Verification of the correctness of determining central occlusion, base boundaries, and tooth placement

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to teach students to check the design of a clasp denture, fit and apply of finished clasp denture, identify and eliminate possible clinical and laboratory errors made at the stages of manufacturing a clasp denture.

OBJECTIVES OF THE LESSON:

1. To consolidate knowledge of the requirements for the manufacture of a clasp denture.
2. To acquire practical skills in the rules of fitting and applying a clasp denture and to study the complications caused by a clasp denture.
3. To become familiar with the theory of adaptation of removable dentures.
4. To become familiar with the rules of hygienic care of removable dentures.
5. To teach students to give practical recommendations to the patient on the rules of use and hygienic care for clasp dentures.

The location of the class a clinical site.

Practical skills practiced during the class: *Fitting and placement of the finished clasp prosthesis*

Form of practical skill assessment: тest; survey; solving situational tasks

Place of practical skill performance – at the patient's dental chair

Practical skill assessment criteria – according to the assessment sheet (checklist) for assessing practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

For completed master the topic, the student needs to repeat:

- from anatomy: anatomical structure of teeth and dentition;
- from general dentistry: new technologies and modern construction materials in the manufacture of clasp dentures;
- from normal physiology: the works of I.P. Pavlov on cortical inhibition to understand the complex neuroreflex processes occurring in the patient's body after the prosthesis is applied.

CONTROL QUESTIONS FROM RELATED DISCIPLINES

1. Methods of manufacturing of frames of frame dentures.
2. Replacing wax composition with plastic.
3. Basic and auxiliary structural materials for manufacturing of frame dentures.
4. Effect of tooth convergence on the fitting of frame dentures.

CONTROL QUESTIONS:

1. The importance of the stage of controlling the design of the frame denture in the clinic. The sequence of controlling the design of the frame denture in the clinic (on the model and in the oral cavity).
2. Technical requirements for the finished frame denture.

3. Rules for fitting and applying of completed frame denture and their sequence.

4. Possible causes of poor fixation of the frame denture and ways to eliminate them.

5. Errors made when determining the central occlusion, base boundaries, setting the teeth, their elimination.

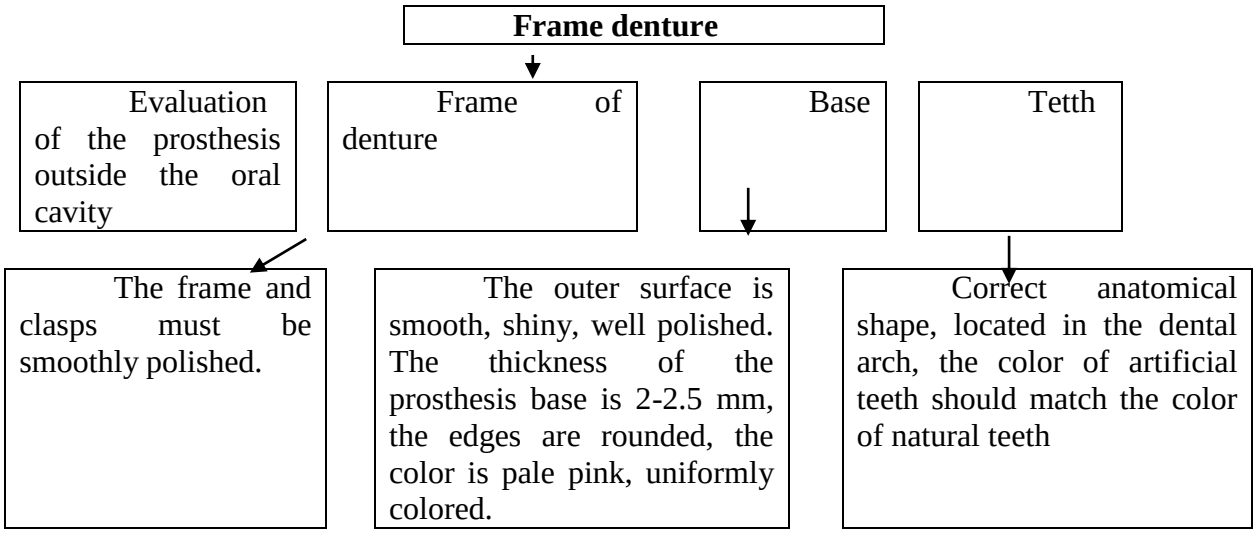
6. Rules for using frame dentures. Recommendations for patients on caring for frame dentures.

Algorithm of actions when checking the design of a frame denture

Stage	Criteria and means of self-control
Check all structural elements of the frame denture on jaw models	
Prosthesis base: - density of fiting of the base	The base of the prosthesis should not balance on the model and fit tightly to the alveolar process;
- borders	Must match the boundaries marked by the doctor. The base must correctly repeat the contours of the prosthetic bed. There should be no pores, cracks, or defects in the plaster models.
Clasps: -correct the position of clasps elements	All elements of the frame denture must comply with the boundaries recommended by the doctor.
- shoulders	On the supporting tooth, the fixing part of the clasp is located in a niche between the line of sight and the neck of the tooth.
- occlusal pad	Located in fissures or artificially created depressions.
Arrangement of artificial teeth: -relationship with antagonist teeth	Dense multiple contact of all teeth (in the area of chewing teeth, fissure-tubercular closure)
- the shape of the relationship between the dental arches (bite)	Depends on the bite or the relationship of the alveolar processes of the patient's jaw
- положение каждого зуба к альвеолярному отростку	The vertical axis of each tooth should correspond to the middle of the alveolar process
The position of each tooth in relation to the rows of standing teeth	There must be close contact between natural and artificial teeth.
Check the design of dentures in the oral cavity	
Correct position of clasps on supporting teeth	No balancing of the prosthesis, good fixation, clasps tightly grip the teeth.
- occlusal pad	Located in fissures or artificially created depressions, tightly adjoining the surface of the tooth;
- frame of denture	It is located 0.5 mm away from the mucous membrane on the upper jaw and 0.5-1.5 mm away from the mucous membrane on the lower jaw, depending on the shape of the slope of the oral surface of the alveolar process.
Tightness of fitting to alveolar prosess	The edge of the base along the periphery should fit tightly to the mucous membrane of the prosthetic bed; lack of balance of the base.
Clarify the boundaries of the basis	The base must follow the contours of the prosthetic bed (indicated by the doctor).
Relationship of dental arches in central occlusion	Tight closure of teeth throughout

Check the height of the lower part of the face with the teeth closed	Tight closure of natural and artificial teeth (no gaps between natural teeth).
Check the implementation of aesthetic guidelines for the arrangement of teeth: - shape and color of teeth	Must match remaining natural teeth
Check the phonetic correctness of the placement of the arcs: lower arc, upper arc	When speaking, it should not hinder the movement of the tongue.
Identify errors if they were made at the stage of determining the central relationship of the jaws and eliminate them	Dental occlusion disorders. Eliminate them in the clinic, assign the patient for a repeat check of the denture design.

ALGORITHM OF ACTIONS FOR FITTING AND APPLYING OF FRAME DENTURE. RULES OF USING THE DENTURES



1. Hygienic treatment of the clasp denture.
2. Fitting and application of the denture.

Base:	**Frame:**	**Teeth:**	**Clasps:**
The prosthesis is not placed on the jaw. Look for places of obstacles on the base with carbon paper. The base is corrected with a metal cutter.	Attachment of the frame to the mucous membrane: -tight -large clearance -low on the lower jaw -normal	Checking the occlusion of the teeth. Artificial teeth that impede occlusal movements are ground down.	Location on teeth. Tight fit of shoulders and occlusal pad to the tooth. Occlusal parts of supporting-retaining clasps do not block movements of the lower jaw.

3. Evaluation of the prosthesis application.

Base:	**Frame:**	**Clasps:**	**Teeth:**
-easy to insert and remove;	- is at the required distance from the mucous membrane; - does not injure the	- fixes the prosthesis well	- multiple contact in the central occlusion position; - free articulation;

-the doctor-specified baseline boundaries are preserved	frenulum of the tongue on the lower jaw		- correspond to group affiliation and aesthetic requirements

4. Patient instructions.

Expected difficulties:	**Feeling of pain:**	**Mode of use:**	**Denture care:**
The patient feels the prosthesis as a foreign body. Speech impairment. Feeling of pressure on the mucous membrane. Profuse salivation	Apply the prosthesis 3-4 hours before visiting the doctor. Make corrections to the prosthesis.	Teach how to insert and remove prostheses; Use only during the day.	Rinse your mouth after eating; wash thoroughly with a toothbrush before going to bed. Possible storage methods: -dry; -in a humid environment; -in a disinfectant liquid.

Algorithm of actions for fitting and applying of frame denture and patient instructions

Action of students	Devises	Criteria of selfcontroling
1. Seat the patient in a dental chair	Dental chair	Comfortable fixation of the patient's head and body height.
2. Evaluation of the finished prosthesis outside the patient's oral cavity (base, teeth, clasps, arches)	Visual inspection	Not to be in a harry
3. Denture disinfection	Hygienic rinsing	
4. Fitting and application of the prosthesis: - fitting and correction of the base - checking the fixation - checking the bite	Copy paper, drill, cutter, grinding head	The prosthesis is fixed on the jaw with little effort. Lack of balance of the prosthesis on the supporting teeth. Teeth (artificial and natural) close evenly, free articulation.
5. A clinical assessment of the prosthesis application is given.		Tutorial (samples of prostheses on models).
6. Inform the patient: - about the expected difficulty; - about the mode of using the prosthesis;		
7. Completion of clinical work with documentation	Medical history, coupon for the next visit	Samples of documentation.

SITUATIONAL TASKS

1. During controlling of frame denture on upper jaw the following was discovered: the clasps are correctly positioned on the supporting teeth, tightly covering them. The structure is easily inserted into the oral cavity, is well fixed, does not balance and does not interfere with occlusion. The distance between the arch and the mucous membrane is 2.5-3 mm. Determine the error detected at the stage of checking the design of the clasp denture frame in the clinic. How to correct it?

2. During controlling of frame denture, a weak fixation of the supporting-retaining clasp on the supporting tooth was found in a patient. The doctor's tactics in this situation.

3. During controlling of frame denture an overbite of the patient was found - separation of the dental arches in the frontal section by 2-3 mm. What is the reason for the separation of the dental arches? What is the doctor's tactics?

4. When checking the design of the patient D.'s dentures in the oral cavity, there is a sagittal gap between the front teeth, and a tubercular closure in the area of the chewing teeth. What is the cause of the error? What is the doctor's tactic? 5. The patient complains of pain under the arch of the lower jaw denture, which intensifies when chewing food. Examination of the oral cavity revealed the presence of a 0.5 hyperemic strip on the mucous membrane of the lingual slope of the alveolar process. What caused the inflammation of the mucous membrane? What measures should be taken to eliminate this deficiency?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.

2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.

4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223

CLASS 15

Subject: Prosthodontic treatment of patients with partial adentia using removable dental prosthetic constructions

Total lesson time is 6 academic hours (240 minutes).

Class planning

№	Stages of a practical class	Time in min.
1.	Organizational stage	**12**
2.	Control of the initial knowledge level	**24**
3.	Training stage	**48**
4.	Practicing a practical skill	**96**
5.	Monitoring the level of the obtained knowledge or mastery of a practical skill	**48**
6.	Final stage	**12**

Purpose of the lesson: to control and consolidate the knowledge acquired by students on the topic of clinical and laboratory stages of manufacturing of removable plate and frame dentures.

OBJECTIVES OF THE LESSON:

1. To consolidate knowledge on the production of partial removable plate and clasp dentures in the treatment of patients with partial edentia.
2. To monitor students' knowledge of indications and contraindications for the production of partial removable plate and clasp dentures.
3. To acquire practical skills in fitting and applying removable dentures (PSD and clasp dentures).
4. To consolidate the acquired knowledge of possible errors and complications in the production of partial removable plate and clasp dentures.
5. To teach students to determine indications and contraindications for the use of telescopic, beam systems and locking fasteners for fixing removable dentures.

The location of the class a clinical site.

Practical skills practiced during the class: *Making correction of removable dentures*

Form of control of practical skills: тest; survey; solving situational tasks; Credit

Place of performing practical skills - at the patient's dental chair

Criteria for assessing practical skills - according to the assessment sheet (checklist) for monitoring practical skills in the academic discipline in points from 0 to 3.

REQUIREMENTS FOR THE INITIAL LEVEL OF KNOWLEDGE

To fully understand the topic, the student must review:

- from human anatomy: the anatomical structure of the upper and lower jaws;
- from histology, cytology, embryology: morphological changes occurring in the bone tissue and mucous membrane of the jaws after tooth loss;
- from surgical dentistry: removal of exostoses, mobile mucous membrane, elimination of cords and scars;
- from orthodontics: treatment of secondary deformations;
- from therapeutic dentistry: treatment of defects in hard dental tissues, indications for depulpation of teeth;
- from general dentistry: clinical materials science and laboratory equipment.

CONTROL QUESTIONS FROM RELATED DISCIPLINES:

1. Changes in the dental system in case of partial absence of teeth.
2. Surgical measures aimed at optimization and improvement of fixation and stabilization of partial removable plate and clasp dentures.
3. Modern construction materials for manufacturing partial removable plate and clasp dentures.

4. New technologies for manufacturing partial removable plate and clasp dentures.

CONTROL QUESTIONS

1. Partial secondary edentia. Etiology, pathogenesis. Classifications by Kennedy, Gavrilov E.I.; Kurlyandskiy V.Yu.
2. Examination of patients with partial edentia. Diagnosis, treatment plan.
3. Clinical and laboratory stages of manufacturing partial removable plate dentures.
4. Clinical and laboratory stages of manufacturing frame dentures.
5. Indications and contraindications for the use of telescopic, beam (rod) systems and lock fastenings for fixing removable dentures.
6. Errors made in the manufacture of partial removable plate dentures and frame dentures.

CLINICAL AND LABORATORY STAGES OF PRODUCING PLATE DENTURES

Clinical stages	***Laboratory stages***
1. Examination, diagnosis, treatment plan. Taking impressions of the upper and lower jaws. Determining the quality of the impressions. 2. Determining the central occlusion or central relationship of the jaws. Determining the height of the lower part of the face, fixing it in the position of central occlusion. Outlining the boundaries of the prosthesis and its retaining elements on the model, as well as places requiring additional insulation (torus, exostoses) 3. Checking the design of the prosthesis on the model and in the patient's oral cavity after preliminary drug treatment. 4. Fitting and applying the plate denture. Checking the quality of the finished prosthesis and placing it on the prosthetic bed of the corresponding jaw of the patient. If necessary, correct the prosthesis. Recommendations to the patient regarding the use of the prosthesis and its care	1. Casting models with plaster and making wax bases with occlusal rims to fix the central jaw relationship. 2. Fixing plaster models in the occluder in accordance with a certain central occlusion; isolating toruses and exostoses in accordance with the boundaries determined by the doctor; making clasps and other devices to strengthen the prosthesis; placing artificial teeth on a wax base 3. Final modeling of the prosthesis base, plastering the latter in a cuvette, replacing wax with plastic, polymerization, grinding and polishing the prosthesis. Submitting the finished prosthesis to the registry.

CLINICAL AND LABORATORY STAGES OF PRODUCING FRAME DENTURES

Clinical stages	***Laboratory stages***
1. Patient examination: 1) Diagnosis; 2) Treatment plan	
2. Preparation of dental arches and teeth for prosthetics	
3. Taking impressions	
	4. Casting models
	5. Production of wax bases with occlusal rims
6. Determinig and fixation of central occlusion	
7. Study of models in a parallelometer	
8. Applying a drawing of the clasp denture frame	
	9. Preparing the model for duplication

	10. Duplicating the plaster model
	11. Manufacturing of a refractory model, its thermochemical treatment
	12. Applying a drawing of the clasp denture frame.
	13. Modeling the frame of a clasp denture
	14. Installation of the gating system.
	15. Molding in a flask
	16. Casting the frame.
	17. Mechanical processing of the frame, grinding, polishing
	18. Fitting the metal frame to the model
19. Checking the design of the cast metal frame of the clasp denture in the oral cavity.	
	20. Modeling of wax base, selection and placement of artificial teeth.
21. Checking the wax reproduction of the clasp denture.	
	22. Replacing wax with plastic
	23. Final mechanical processing (grinding, polishing) of the prosthesis.
24. Fitting and application of the clasp denture	
25. Recommendations for use and care of the prosthesis.	

Telescopic fixation systems (telescopic crowns, telescopes) have long established themselves as a very effective, reliable and highly aesthetic type of fixation of partial removable dentures. Recently, there have been many different systems: traditional cast telescopic crowns made of noble and non-noble alloys, galvano telescopes made on metal or ceramic primary parts. A telescopic crown consists of two structural elements: a supporting (non-removable) element fixed to the tooth, and a fixing (removable) element connected to the base of the removable denture (Fig. 1).

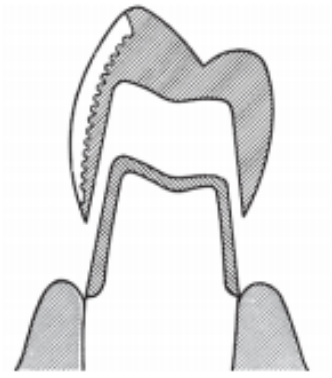


Fig. 15.1. Telescopic crown

The advantages of telescopes include:

- the longest service life among all attachments for clasp dentures;
- the fact that this is the most rigid of the attachments;
- the anatomical shape of telescopic crowns, which is much more hygienic compared to any type of clasp fastenings.

Laboratory stages of telescopic crown production:

1) modeling, wax milling and casting of primary crowns;

2) milling of primary crowns;
3) modeling and casting of secondary crowns;
4) fitting of secondary crowns;
5) modeling and casting of the clasp denture framework;
6) connection of the framework and secondary crowns.

There must be frictional relationships between the primary and secondary crowns, on which the holding force of the telescopes depends.

Requirements for milling of the primary crown:
- the surface must be plane-parallel;
- finished with cutters to a silky glossy appearance;
- polished to a mirror shine.

Secondary crowns are modeled from two materials: first from modeling plastic, then from wax to an anatomical shape. Modeling plastic allows to stabilize the composition so that it can be cast with the required accuracy. Casting secondary crowns is a key preparatory stage for setting up the correct frictional relations.

Fitting secondary crowns, if the previous stages are performed correctly, consists of eliminating small spherical inclusions on the inner surfaces of secondary crowns, cleaning in corners and joints, processing the inner surfaces with felt heads and finishing to uniform contact with the force already mentioned. Control of the fit of the surfaces is performed with graphite paste.

The connection of secondary crowns to the frame of the clasp denture is carried out by soldering, laser welding and (or) gluing. During soldering, deformation of the secondary crown and its displacement may occur due to shrinkage of the solder after its crystallization. Due to incorrect preparatory work for soldering and the soldering itself, secondary crowns with a frame do not fit well on the primary crowns. In this case, a new labor-intensive fitting will be required with an unpredictable result.

One of the modern methods of manufacturing clasp dentures with telescopic fixation, which allows to some extent to eliminate the disadvantages of the classical method, is casting secondary crowns together with the denture frame on a refractory model.

Lock fastenings (attachments) are an alternative to clasp fixation of removable dentures. The indisputable advantage of attachments is their aesthetics (absence of visible retaining elements on the supporting teeth). When using lock fastenings, retention of the removable part of the denture on the denture bed is more reliable than with clasp fixation. The lock connection provides a more physiological functional interaction of the parts of the combined denture by reducing the horizontal load on the supporting teeth.

Depending on the method of transmitting the chewing load, attachments are divided into rigid, hinged, rotary and attachments that have freedom of movement within the limits of the compliance of the mucous membrane of the denture bed.

The topography of the defect of the dentition significantly affects the choice of attachment. In case of class I Kennedy dental defects, it is recommended to use attachments that provide mobility of the removable part of the combined denture in one plane (hinge lock fastenings).

In case of class II defects and asymmetrical class I defects, it is recommended to use attachments that have mobility in several directions - rotational or hinged. The use of these structures requires an increase in the number of supporting teeth, which allows the denture to perform the function of counteracting horizontal shift. Fixing the attachment on one tooth leads to the concentration of the load at one point and an increase in the mobility of the support.

For the treatment of included class III dental defects, it is recommended to use rigid attachments. When replacing class IV dental defects, a beam system of fixing removable dentures is widely used.

However, it is not always possible to use attachments. Their use is contraindicated in cases of poor periodontal condition, tooth supporting tissues and low clinical crowns. In addition, for most attachments, the required vertical distance should be at least 4 mm, therefore, to strengthen

the attachment without exceeding the crown size, its height should be at least 6 mm. Such a distance between the gum and the occlusal plane is necessary to place the attachment and artificial teeth.

The placement of attachments on incisors and canines can be difficult due to the limited lingual-buccal width of the teeth. Therefore, it is always necessary to consider the anatomy of the supporting teeth and determine the space required for the attachments. An obligatory condition for placing the intracoronal component of the attachment is an adequate distance between the pulp and the normal contour of the tooth. Sometimes, when preparing a tooth for a crown and additionally removing hard tissues to place an internal attachment, depulpation of the tooth may be required.

The beam (rod) system consists of a supporting non-removable part in the form of crowns or root caps, between which there is a rod or beam (patrix), and a removable part located in the base, as well as a metal counter-rod (matrix), which precisely repeats the shape of the rod (Fig. 2, 3).

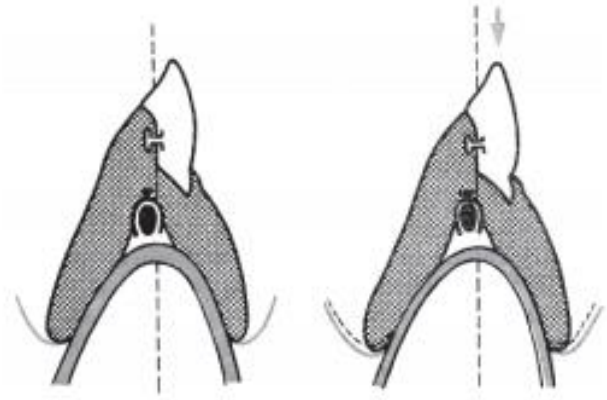


Fig. 15.2. Relationship between the inner and outer parts of the Tiller-Schroeder-Dolder arc clamp.

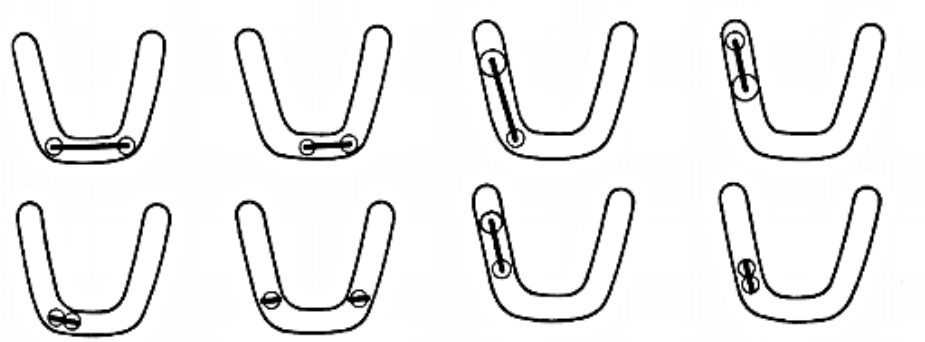


Fig. 15.3. Variants of the arrangement of the Tiller-Schroeder-Dolder beams

To strengthen the plastic, wire branches are soldered to the cover plate. Various companies produce plastic and metal blanks of telescopic rods with a square, elliptical and teardrop-shaped cross-section. Such rods fix the prosthesis well during all chewing movements and, in addition, provide reliable stabilization of the supporting teeth. Thanks to the beam, the teeth are united into a common block, which makes them more resistant to chewing pressure.

METHOD OF CORRECTION OF REMOVABLE DENTURES

The patient is scheduled for correction on the day following the application of the dentures. The patient is warned that the dentures must be inserted into the oral cavity 1.5-2 hours before visiting the doctor. After identifying complaints and examining the mucous membrane, the areas where the injury occurs (hyperemia, damage to the mucous membrane) are visually identified. The area of injury to the mucous membrane is marked with a special marker, dentin powder or gypsum and the dried denture is applied. Then the denture is removed from the oral cavity and a metal cutter is used to remove the part of the plastic where there are imprints of the marker, gypsum, dentin. It is necessary to be very careful when removing the plastic in the area of the transitional fold and the distal (posterior) border of the palate. Excessive removal of plastic in these areas may disrupt the fixation of the dentures.

SITUATIONAL TASKS

1. A 37-year-old female patient came to the clinic complaining of difficulty chewing food and an aesthetic defect. History: teeth 11, 15, 16, 17, 18, 21, 26, 27 were removed 1.5 months ago due to complicated caries. The mucous membrane has no visible pathological changes, the bite is orthognathic. Make a diagnosis. Make a treatment plan?

2. A 58-year-old patient came with complaints of difficulty chewing food due to missing teeth. Teeth 11, 12, 13, 14, 21, 22, 23, 24, 25 were removed 5 years ago due to complicated caries. Teeth 33 and 43 are preserved on the lower jaw. Objectively: the oral mucosa has no visible pathological changes, the remaining teeth are intact, the jaws are in orthognathic occlusion. Make a diagnosis. In what sequence will you work with the bases when determining landmarks for tooth placement?

3. The patient complained of a burning sensation in the area of contact with the denture base on both jaws. No other complaints. From the anamnesis: the patient had the same complaints when using old dentures, which were replaced with new ones. What mistake did the doctor make? How can it be corrected?

4. The patient is 45 years old, teeth 31, 32, 35, 36, 38, 41, 42, 44, 45, 46, 48 are missing on the lower jaw. The remaining teeth are stable and have the correct anatomical shape. The lingual surface of the alveolar ridge slopes vertically behind the anterior teeth, with a low attachment of the lingual frenulum to the alveolar process. The edentulous alveolar processes are well defined. Make a diagnosis based on the Kennedy classification. Make a treatment plan. Justify the choice of denture design.

5. Patient S., 59 years old, complains of difficulty chewing food due to missing teeth. History: teeth 13, 14, 23, 24 have been removed. Teeth 33, 43 remain on the lower jaw. Make a diagnosis. What method can be used to determine central occlusion?

LITERATURE

Basic (relevant):

1. Complete Dentures. The Legacy Prosthetic System / Steffen Rohrbach. – 1st Edition. – Quintessence Publishing, 2025. – 152 p.
2. McCracken’s Removable Partial Prosthodontics / Lisa A. Lang, Lily T. García, Ahmed Mahrous. – 14th Edition. – Mosby, 2026. – 332 p.

Additional:

3. Complete dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 32 p.
4. Removable partial dentures. Algorithm of producing : educational-methodical manual / S. A. Naumovich [et al.]. – 3rd ed. – Minsk : BSMU, 2018. – 16 p.

Electronic courseware in the academic discipline «Removable Prosthetics»:

5. https://etest.bsmu.by/course/view.php?id=223