

REMOVABLE PARTIAL DENTURES. ALGORITHM OF PRODUCING

Minsk BSMU 2018

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**КЛИНИКО-ЛАБОРАТОРНЫЕ
ЭТАПЫ ИЗГОТОВЛЕНИЯ
СЪЕМНЫХ ЗУБНЫХ ПРОТЕЗОВ**

**REMOVABLE PARTIAL DENTURES.
ALGORITHM OF PRODUCING**

Учебно-методическое пособие



Минск БГМУ 2018

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Рекомендовано Научно-методическим советом университета в качестве учебно-методического пособия 21.03.2018 г., протокол № 7

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Представлены данные и иллюстрации клинико-лабораторных этапов изготовления частичных съемных пластиночных протезов, бюгельных протезов, нейлоновых протезов.

Предназначено для студентов медицинского факультета иностранных учащихся, обучающихся на английском языке по специальности «Стоматология».

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MOTIVATIONAL CHARACTERISTICS OF THE TOPIC.

Total time of the lesson:

- in the sixth semester — 80 h.
- in the 10th semester — 21 h.
- in the Elective course — 28 h.

Tooth loss is the absence of one, several or all of the teeth. With partial secondary adentia, there is a violation of the integrity of the dentition or dentition in the formed dentoalveolar system as a result of various etiological factors. Partial secondary adentia is one of the most common diseases. According to the World Health Organization, it affects up to 75 % of the population in various regions of the globe.

Partial secondary adentia causes a violation of the vital function of the body — chewing food, which affects the digestive processes and the intake of necessary nutrients in the body, and also often causes the development of diseases of the gastrointestinal tract of an inflammatory nature. No less serious are the consequences of partial secondary adentia for the social status of patients: violations of articulation and diction affect the communication abilities of the patient; they, simultaneously cause changes in appearance and developing atrophy of the masticatory muscles, can cause changes in the psychoemotional state. Partial secondary adentia is also one of the causes of the development of specific, secondary complications in the maxillofacial area, such as the Popov-Godon phenomenon, the temporomandibular joint pain dysfunction syndrome.

Untimely restoration of the integrity of the dentition in the event of partial tooth absence (partial secondary adentia) causes the development of such functional disorders as violations of the biomechanics of the dentoalveolar system, overloading periodontium of the remaining teeth, development of abnormal pathological abrasion.

The causes of partial secondary adentia can be:

1. Disturbances arising during the formation of the dentoalveolar system:
 - a) primary partial adentia caused by the absence of cuticles teeth;
 - b) abnormal development of the teeth cuticles (retained teeth).
2. Disturbances associated with loss of teeth in the already formed dentoalveolar system and resulting from:
 - a) complicated caries;
 - b) periodontitis of different etiology;
 - c) periodontal disease;
 - d) surgical interventions for osteomyelitis, neoplasms;
 - e) injuries of different etiology;
 - f) extraction according to the orthodontic indications.

Partial removable dentures are dentures replacing defects in the dentition, transmitting the gingival load to the underlying mucosa of the oral cavity and

bone tissue (plate prostheses), as well as to the periodontium of the supporting teeth (clasp prostheses). The main advantage of removable dentures is the possibility of removing the dentures for the purpose of hygienic care of the oral cavity.

Indications for the manufacturing of partial removable prostheses:

1. Partial removable prostheses are indicated for any topography and size of a dentition defect.
2. They can redistribute the chewing load on the supporting teeth, act as the ligating prosthetic construction of the dentures (clasp dentures).
3. Used as an implant dentures for various surgical interventions.

Contraindications to the manufacturing of partial removable dentures:

Relative: unsanitary oral cavity (the presence of dental deposits, uncapped carious cavities, the destroyed teeth and their roots are not removed, the crown of the tooth is destroyed by more than $\frac{1}{2}$ of the height);

- hypersensitivity or allergic reactions to the components of removable dentures;
- severe general health condition (myocardial infarction, ischemic heart disease, acute form of hypertension);
- Convulsive syndrome (epilepsy) and various psychological diseases;
- periodontal disease in the acute stage.

Removable dentures must meet the following requirements:

1. Maximize chewing efficiency for this type of dentures.
2. The base of the dentures should be adjacent to the mucous membrane of the prosthetic bed all the way, do not balance;
3. To provide a satisfactory level of fixation and stabilization of the dentures in the oral cavity;
4. To restore the broken aesthetic norms, the color of artificial teeth in a removable dentures must match the color of natural teeth.

The purpose of the lesson: to study the clinical and laboratory stages of the manufacturing of partial removable and clasp Frame prostheses.

Tasks of the lesson

1. To study the clinical and laboratory stages of manufacturing partial removable plate prostheses.
2. To study clinical and laboratory stages of manufacturing of clasp framework prostheses.
3. To study clinical and laboratory stages of manufacturing of partial removable prostheses replacing one tooth, made of nylon.

Requirements for the initial level of knowledge. To fully master the topic, the student must be repeated from:

- human anatomy: anatomical structure of the teeth of the upper and lower jaws; types of bite; anatomical structure of the TMJ;

– histology, cytology, embryology: morphological features of the structure of the teeth, bone tissue of the alveolar process of the upper and lower jaws;

– Normal physiology: functional changes in the dentition and bite with defects in hard tooth tissues and defects in the dentition;

– materials science: materials and tools necessary for the manufacture of removable dentures.

Control questions from related disciplines:

1. Functional anatomy of the dentoalveolar system.
2. Types of bite, the structure of teeth and dentition.
3. Basic and auxiliary materials used for the manufacture of removable dentures.

Control questions on the topic of the lesson.

1. Partial secondary adentia, classification by Kennedy, Gavrilov
2. Patient examination, diagnosis, treatment plan.
3. Removable dentures, their characteristics.
4. Medico-biological basis of treatment with removable dentures.
5. Removing impressions. Borders of prostheses. Making wax bases with occlusal ridges.
6. Groups of dentition defects in the determination of central occlusion. Definition of central occlusion.
7. Constructional elements of removable prostheses, their purpose. The location of the arch of the clasp dentures on the upper and lower jaws.
8. Parallaxometry technique: arbitrary, method of choice, graphic.
9. Ney's clam system, the choice of clamps depending on the topography the location of the boundary line.
10. Clinical and laboratory stages of manufacturing solid-cast skeletons of clasp dentures on refractory models.
11. Checking the design of removable dentures. Errors and their elimination.
12. Methods of gypsum dentures, replacement of wax reproduction on plastic.
13. Fitting and application of prostheses, instructions to the patient, adaptation processes.

EDUCATIONAL MATERIAL

Prostodontic treatment of defects in the dentition by partial removable dentures

Clinical and laboratory stages of manufacturing partial removable plate prostheses

Clinical stage	Laboratory Stages
1. Patient examination. Diagnosis. Treatment plan. The choice of dentures design. Receiving of working and auxiliary impressions	1. Casting of working and auxiliary models. Production of wax bases with occlusal ridges
2. Fitting in of wax bases with occlusal rollers in the mouth. Determination and fixation of central occlusion or central ratio of jaws. Placement of orientation devises for setting/placement of artificial teeth	
	2. Gypsum pouring of models in the occludator or articulator. Setting artificial teeth on individual anatomical landmarks
3. Verification of the design of the partial removable acrylic dentures (on the model and in the oral cavity)	
	3. Final modeling of the basis of a removable dentures. Replacement of wax for plastic. Handling, grinding and polishing of a partial removable denture
4. Fit and apply a partial removable denture in the oral cavity. Recommendations for care	
5. Correction of a removable denture dentures	

Prostodontic treatment of defects in the dentition with clasp framework dentures

Clinical and laboratory stages of manufacturing of removable dentures

Clinical Stages	Laboratory Stages
1. Patient examination. Diagnosis. Treatment plan. The choice of dentures design. Receiving of working and auxiliary impressions	1. Casting of working and auxiliary models. Production of wax bases with occlusal ridges.
2. Wax bases with occlusal rollers in the mouth. Determination and fixation of central occlusion or central ratio of jaws. Placemen of «orientees» for placement of artificial teeth. Conducting parallelometry. Drawing a picture of the future design «construction» of the skeleton of the clasp dentures	2. Preparation of the working model for duplication. Duplicating the model. Modeling of wax reproduction of the skeleton of a clasp dentures on a refractory model. Casting of the skeleton of the clasp dentures. Gypsum models in the occludator or articulator. Preliminary treatment and fit of the clasp dentures frame on the working model

Clinical Stages	Laboratory Stages
3. Verification of the design of the solid frame of the clasp dentures (on the model and in the oral cavity)	3. Final treatment of the full cast carcass of the clasp dentures. Selection and staging of artificial teeth
4. Checking the design of the clasp framework dentures (on the model and in the oral cavity)	4. Final modeling of the basis of the clasp dentures. Replacement of wax for plastic. Processing, grinding and polishing of the clasp dentures
5. Placement and imposition a clasp dentures in the oral cavity. Recommendations for care	
6. Correction of the clasp dentures (according to indications)	

Prostodontic treatment of defects in the dentition by partial removable dentures replacing one tooth (butterfly) made of nylon

Clinical and laboratory stages of manufacturing partial removable acrylic dentures for one tooth, made of nylon

Clinical Stage	Laboratory Stage
1. Patient examination. Diagnosis. Treatment plan. The choice of dentures design.	
2. In preparation for prosthetics.	
3. Receiving of working and auxiliary impressions.	
	1. Casting of working and auxiliary models.
4. Wax bases with occlusal rollers in the mouth. Determination of central occlusion.	
	2. Gypsum model pouring in the occludator or articulator. Placement of artificial teeth. The final modeling of the basis of a removable dentures. Substitution of wax for nylon basis. Processing, grinding and polishing of a partial removable dentures.
5. Fitting and application a partial removable denture in the oral cavity. Recommendations for care.	
6. Correction of a removable denture.	

Clinical example of progressing of prostodontic treatment of defects of dentition with clasp framework dentures

When examining the oral cavity of the patient, the inclusive defects of the dentition in the chewing group of the teeth are observed (fig. 1, 2). Earlier, the patient was treated with permanent metal-ceramic prostheses. Diagnosis: Partial secondary adentia of upper jaw of III class according to Kennedy. Treatment plan: Replacement of defects of the upper dentition with a removable clasp framework dentures (fig. 1, 2).



Fig. 1. Defects of the dentition



Fig. 2. Defects of the dentition

Next, we take the removal of the working and auxiliary impressions according to the standard method by an alginate impression mass (fig. 3–6).



Fig. 3. Removing the working impression



Fig. 4. Obtainment of an auxiliary impression



Fig. 5. Working impression



Fig. 6. Auxiliary Impression

The next stage is the casting of combined models with the subsequent manufacturing of wax basis with occlusion rims (fig. 7–9).



Fig. 7. Pouring of model with stone on a vibration table



Fig. 8. Ready-made working model



Fig. 9. Wax base with occlusal ridges

At the next clinical stage, we determine the position of the central occlusion and conduct clinical parallelometry with the final determination of the structure of the clasp framework dentures and application of pattern «picture» to the gypsum model (fig. 10–14).



Fig. 10. Wax base fitting with occlusal rims in the oral cavity



Fig. 11. Heating of occlusal rims

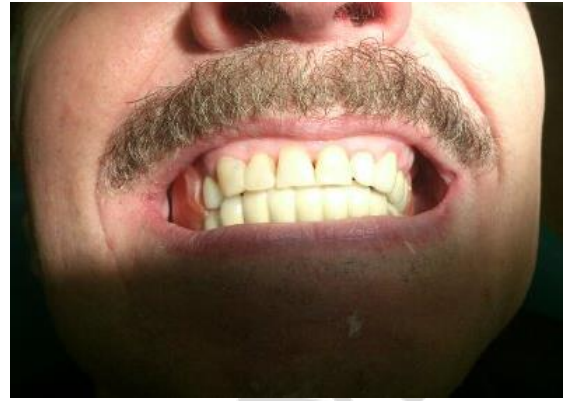


Fig. 12. Fixation in position of central occlusion



Fig. 13. Analysis the model in a parallelometer

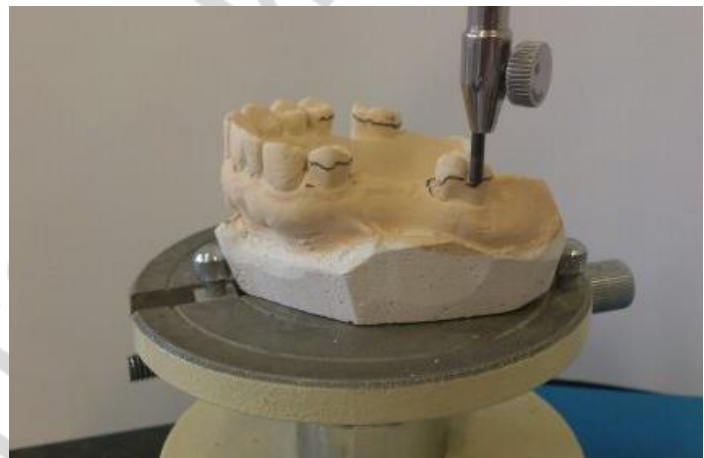


Fig. 14. The application of the boundary line with the analyzing core/rod

Title of the next laboratory stage: Manufacturing of a clasp framework dentures. The stage includes the preparation of the model for duplication in order to manufacture a refractory model, modeling the wax reproduction of the clasp framework dentures frame and the actual production of the metal frame carcass by the casting method. Gypsum model placement in the articulator, machining and fitting the frame on the model (fig. 15–20).



a



b

*Fig. 15. Prepared model for duplication:
a — Side View; b — Up View*



*Fig. 16. Duplicated working model
made of refractory mass*



*Fig. 17. Modeled wax reproduction
of framework on the duplicated model*



*Fig. 18. Ready-made skeleton of a clasp
framework dentures casted on a refractory
duplicated model*



*Fig. 19. Models in the position of the
central occlusion are plastered in the simple
articulator*



Fig. 20. Processed and fitted skeleton of the clasp framework dentures on the working model

Clinical stage: Checking the structure of the clasp dentures frame on the model and in the oral cavity (fig. 21).

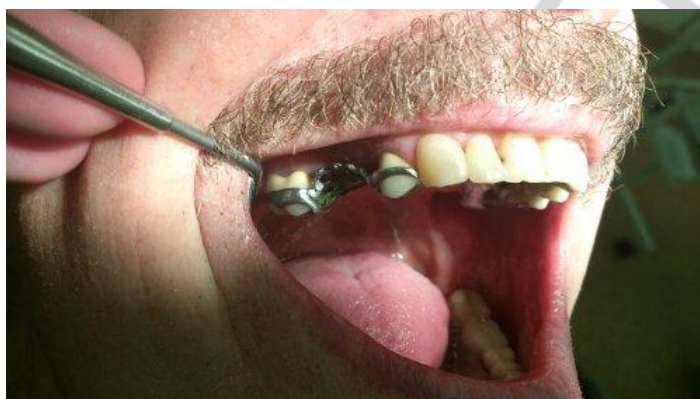


Fig. 21. Verification of the structure of the clasp framework dentures in the oral cavity

In the dental laboratory at this stage the placement of artificial teeth is performed (fig. 22).



Fig. 22. Performed placement of artificial teeth

The next clinical stage is to perform verification check the design of the clasp dentures in the oral cavity (fig. 23).



Fig. 23. Checking the design of the clasp framework dentures in the oral cavity

The last laboratory stage includes the final modeling of the wax base of the clasp dentures, placement of dentures in the gypsum flask, replacement of the wax by plastic, processing, grinding and polishing of the clasp dentures (fig. 24–27).



Fig. 24. The final modeling of the wax basis



Fig. 25. Placement of the clasp framework dentures (with wax and artificial teeth) in a flask



Fig. 26. Filling the top of the flask



Fig. 27. Compression flask parts under press

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