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FACULTY OF DENTISTRY
DEPARTMENT OF ORTHOPEDIC DENTISTRY

APPROVED
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METHODOLOGICAL DEVELOPMENT TO PRACTICAL LESSONS FROM EDUCATIONAL DISCIPLINE

Faculty **of dentistry**, course **2**
Educational discipline **Propedeutics of orthopedic stomatology**

Approved:
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PRACTICAL LESSON No. 1

Topic: Organizational principles of the orthopedic office. Clinic and laboratory equipment. Workplace of a dentist-orthopedic doctor and dental technician, equipment and tools.

Goal: Familiarize the applicantswith the basics of organizing orthopedic care for the population of Ukraine. Structure of the dental department and dental office. Basic sanitary and hygienic requirements for the dental office. Study of the organization of the orthopedic doctor's workplace. Familiarization**with**keeping documentation, using tools and materials, with a dental technician's workplace and special premisesdentallaboratories (gypsum,polishing,lithiumrooms).Safety equipment. Formation of professional literacy and the ability to think logically in students. Formation of the principles of medical ethics and deontology in students.

Basic concepts: orthopedic stomatology, orthopedic office (department), workplace of an orthopedic doctor, dental laboratory, asepsis and antisepsis, dental installation, sterilization.

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform practical classes (knowledge requirements, list of didactic units);

Know:

- familiarize yourself with the structure of the orthopedic office, department, dental laboratory;
- study basic dental equipment and its purpose;
- to study the basic dental tools used in orthopedic surgery;

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

— Organization and structure of the dental laboratory.

— Organization and structure of the office of a dentist-orthopedic doctor.

— Goals and objectives orthopedic stomatology. Sections of orthopedic stomatology.

— Dental technician's work tools.

— Tools for the work of a dentist-orthopedic doctor.

— Requirements for ventilation, lighting and technical characteristics of the office (department|separation|) of orthopedic dentistry.

— Classification of materials used in orthopedic dentistry.

3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting

laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

The term "orthopedics" was proposed by the French surgeon Nicolas Henri (1658-1742), who in 1741 published the work "Orthopedics or the art of preventing|preventing, preventing| and correct deformations of the body in|in, near| children". The term "orthopaedics" consists of two Greek words: orthos—straight and paideuo—to educate, train. The word "dentistry" also comes from two Greek words: stoma - mouth and logos - word, teaching.

Prevention and treatment methods (functional, mechanical, surgical) used in orthopedic dentistry have a lot in common. with|with| methods used in the common|common| orthopedics, which deals with the study, prevention and treatment of persistent deformations of the entire human body. That is why orthopedic stomatology is rightly called a part of all orthopedics and often is organizationally represented in the form of jaw departments|separations| in institutes of orthopedics and traumatology.

As a result|as a result, as a result| development and improvement of orthopedic dentistry took place as follows: "prosthetic technique" orthopedic dentistry has grown into a large|large| medical discipline, which is currently is divided by character | disposition | orthopedic care in five independently organized departments: prosthetics of teeth and dental rows|law, low|, maxillofacial orthopedics, orthodontics, prosthetics technology and materials science.

1.Dental prosthetics deals with the replacement of defects in the dentition with the help of artificial teeth.

2.Maxillofacial orthopedics deals with correction with the help of maxillofacial braces tires, adjusting devices, jaw and facial prostheses, disorders of the jaws and the face that have occurred in most cases as a result|as a result|as a result| injuries of the maxillofacial region.

3.Orthodontics deals with prevention and, with the help of orthodontics devices, treatment of dento-jaw disorders areas that arose in|in, near| children as a result|as a result, as a result| of development, and in|in, near| adults — as a result|as a result, as a result| tooth loss

4.Laboratory and prosthetic equipment — technical production of orthopedic devices (dental, jaw, facial prostheses, jaw splints, various types of orthodontic devices, etc.).

5.Materials science also exists big and important|respectable| department of orthopedic stomatology.

Laboratory production (technical) of orthopedic devices is carried out under the guidance of a doctor dental technician in specially equipped orthopedic laboratories.

The clinical part is work with the patient, to whom an orthopedic device is made, is performed by a doctor dentist-orthopaedist in orthopedic offices (departments|separations|, clinics). It is produced here orthopedic treatment of

patients — appointment, initial stages of clinical production, inspection and acquisition orthopedic patients.

The fundamental basis of orthopedic dentistry, like all medicine (thanks to the works of I.P. Pavlov) is the unity of the organism and its connection with|iz| external environment|environment|. The leading task orthopedic dentistry, like all dentistry, is|appears, appears| prevention and treatment of dental diseases systems. Dento-jaw disease systems often|rarely| associated with diseases of the digestive tract! and other diseases of the human body. Orthopedic stomatology is thus connected with all medicine and is|appears, appears| its integral part.

Equipment of a doctor's office orthopedic dentist.

For the organization of a dental office, a spacious room should be allocated for one workplace with|with| good|good| natural lighting of the square|maidan| no less14 m2.

For each additional chair is added|added| square|maidan| no less7 m2. Height of premises|premises| should be no less3.3 m. It is desirable to place the chairs in one row|bench, row|, near the windows, which provides the best|the best, the best| natural lighting of the patient's oral cavity and access of fresh air to workplaces.

The cabinet must be provided with exhaust ventilation and artificial lighting for sharpening. It is advisable to paint the walls with oil paint|paint| or nitro paint soft tones (pale blue or salad|salad|) and cover the floor with linoleum. There should not be anything superfluous in the office where prosthetics of patients is performed and the furniture should be arranged in the most rational way so that the staff does not carry out unjustified movements; the most favorable conditions must be created for the work of a doctor, nurse, orderly, as well as for the patient's well-being.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

— Conduct an examination of a patient with a complete absence of teeth.

— Analyze the results of an examination of a dental patient with complete absence of teeth.

— Make a plan for an additional examination of a patient with a complete absence of teeth.

— Explain the results of clinical and special (additional) research methods.

— Determine the tactics of treatment of a patient with a complete absence of teeth in the clinic of orthopedic dentistry.

— Determine the design of complete removable prostheses.

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

— The structure of the dental department of the orthopedic profile.

— Sanitary and technical requirements for the orthopedic office.
— Organization of the workplace of an orthopedist-dentist.
— Orthopedic office equipment.
— Dental installations, their classification and characteristics.
— Tips, their types.
— Cutting tools in orthopedic dentistry.
— The main professional tasks and duties of a dental nurse.
— What a dental nurse should know.
— The rights of a dental nurse.
— Evaluation of the work and responsibility of the nurse.
— Qualification requirements for a dental nurse.

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukrainehttp://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 2

Topic: Functional anatomy and components of the chewing apparatus, their characteristics.

Goal: Acquaint students with the functional anatomy and components of the chewing apparatus. Extractors must know the anatomy of the chewing apparatus. To acquaint students with the important role in the practical work of an orthopedist-dentist, being fundamental in the planning of orthopedic

treatment, in creating guidelines for the further restoration of the functional integrity of the chewing apparatus, in the normalization of occlusal relationships and articulations of the jaws. Obtain functional impressions from the upper and lower jaws. Formation of professional literacy and the ability to think logically in students. Formation of the principles of medical ethics and deontology in students.

Basic concepts: upper and lower jaws, maxillofacial area,innervation,masticatory muscles, facial muscles.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform practical classes (knowledge requirements, list of didactic units);

• the structure of the upper and lower jaws;

• innervation, blood and lymph supply of the maxillofacial area

• anatomy and function of masticatory muscles;

• anatomy and function of facial muscles.

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- Methods of single-moment production of individual spoons. Methodology of Shrot, TSITO, Vasylenko.
- Methods of laboratory production of individual spoons.
- Materials for making individual spoons.
- Rules for making a spoon on a model made of fast-hardening plastic.
- The method of making a spoon on the model from AKR-P.
- Method of making an individual spoon according to Vares.
- Method of compression pressing of individual spoons.
- The method of casting pressing of individual spoons.
- Fitting hard individual spoons according to Herbst's method.
- Herbst tests for the upper and lower jaw.
- The technique of obtaining functional impressions with the help of rigid individual spoons, fitted using Herbst samples.
- Classification of functional prints.
- Actually functional and impressions that are functionally absorbed.
- Obtaining compression, unloading and differential pressure impressions.
-. Forming the edges of a functional impression.
- Choice of technique and impression material depending on the clinical situation.

3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting

laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

Oral muscles.

Masticatory muscles. The masticatory muscles mean the group of muscles that, by their contraction, contribute to displacement. of the lower jaw in different directions. Since|because| the lower jaw carries out their movements in different directions, then all masticatory muscles, depending on this, can be divided into separate subgroups with different directions bundles and which differ from each other both in the location of their attachment points and in the nature of actions

These subgroups are the following.

- A subgroup of muscles that lift the lower jaw; These include the following muscles: temporal muscle, masticatory muscle proper, internal pterygoid muscle.
- A subgroup of muscles that lower the lower jaw, they are also called mouth openers. These include: jaw-hyoid muscle, chin-hyoid muscle and anterior abdominal bib. muscle
- Only|only| belongs to the third subgroup one external pterygoid muscle, which, by its contraction, moves the lower jaw to the side.

FIRST SUBGROUP

*Temporal muscle*originates from the scales of the temporal bone|bone|, where it is located fan-shaped (Fig. 1.19).

The front bundles of fibers run vertically, and the back ones are almost horizontal and bend strongly. All these bundles converge downward and form a thick tendon that passes under the cheekbones arc and is attached to the coronal process|sprout| lower jaw. The temporal muscle is the most large|large| in the entire group of masticatory muscles. Despite the fact that individual bundles of the temporal muscle have different directions, the same these bundles when the muscle contracts pulls the lower jaw up|up| and a little back.

*It is actually a masticatory muscle*slightly shorter than the temporal, although somewhat thicker and stronger than it (Fig. 1.20). It consists of two layers: the surface layer, the bundles of fibers of which have an oblique direction, and the deep one, which runs more vertically. Superficial|floor, upper| the layer is attached by a tendon in|in, near| the lower edge of the cheekbone arches, and the deep one is attached directly to the inner surface of the cheekbone arcs Moving|lively, moving| the point of attachment of this muscle is the roughness of the outer surface of the corner lower jaw. This is the nature|luck| attachment causes|conditions| and direction its actions during contraction with bilateral|bilateral|contraction the muscle raises|raises| the lower jaw up, and with one-sided|one-sided| it, in addition, shifts|shifts| its outward towards the shortened muscle.

*Internal pterygoid muscle*has the same shape and the same direction as the chewing, with|from| that only|only| the difference is that it is located on the inner surface of the lower jaw (Fig. 1.21(1)). It is smaller than the masticatory muscle. The muscle begins|begins, begins| short, but|and| by a dense tendon in the fossa of the pterygoid process of the main bone|bone| and a small bundle from the body of the upper jaw and is attached to the roughness of the inner surface of the corner lower jaw.

Internal pterygoid muscle, due to similarity with|iz| chewing muscles performs a similar role - raises|raises| her up|up| with bilateral|bilateral| abbreviations; with one-sided|one-sided| during contraction, it shifts the lower jaw inward, to the side, opposite to the one on which this contraction occurred.

With compatible|common| contraction of the three muscles described above, the lower jaw rises up. Closing the mouth occurs due to the work of not one muscle, but the entire first subgroup, acting together, despite the fact that bundles of individual muscles or even whole muscles of this group provide against each other.

SECOND SUBGROUP

The antagonists of the entire first subgroup are|appears, appears| a group of muscles lowering the lower jaw. Both attachment points of this group are|appear, appear| mobile|lively, mobile| and are located on the lower jaw and on the hyoid bone. This feature determines|causes| extreme mobility of the floor of the mouth, consisting mainly of these muscles.

Chin-hypohyoid muscle(Fig. 1.22-2) begins|begins, begins| from the sternum, chin of the lower jaw; the other end is attached to the hyoid bone|bone| and pulls her forward and up|up|. When the hyoid bone is immobile the muscle lowers the lower jaw.

*Maxillohyoid muscle*forms the basis of the floor of the oral cavity — the diaphragm (Fig. 1.22-1). With a narrow edge, it is attached to|in, near| hyoid bone|bone|, and wide — to the inner surface lower jaw longitudinallywith an internal oblique line from the third molar to the middle of the chin on the right and on the left|left| Anterior fibers they lie horizontally and slightly crooked to the middle line of the mouth.

When the hyoid bone|bone| motionless, the muscle lowers the lower jaw down, with a motionless lower jaw it pulls the hyoid bone|bone| forward and up|up|.

*Double-abdominal muscle*Her back belly begins|begins, begins| from mammary| cuttings of the temporal bone|bone| and, going forward and down, is attached to|in,near| hyoid bone|bone| intermediate tendons. The anterior belly originates from this intermediate tendon, as well as from the hyoid bone|bone| and is attached in the region of the biceps dimples on the lower jaw.

The front abdomen lowers the lower jaw and pulls it back, and when the lower jaw is stationary, it raises|raises| hyoid bone|bone|.

EXTERNAL PENTHOSIS MUSCLE.

The external pterygoid muscle begins|begins, begins| with two heads: the upper (smaller) comes from the subtemporal ridge and the subtemporal surface of the large wing of the main bone, and the lower (large) from the lateral plate pterygoid process|sprout| of this bone, partly from the hump of the upper jaw (Fig. 1.21-2). The first one, attaching to the joint capsule, weaves its fibers into the disk of the interarticular cartilage and conditions|conditions| by its shortening, it slides along the back slope of the articular tubercle, the second is attached to the neck of the articular process|sprout|.

With bilateral|bilateral| contraction of the external pterygoid muscle, the lower jaw is pushed forward, and with unilateral|unilateral| it shifts to the side opposite to the one on which it is the muscle contracted.

Mimic muscles. From|from| facial facial musclesin the process of chewing plays a predominant role only|only| and the group that is located in the lower part of the face and surrounds the oral cavity. In the center of this group is|is| the circular muscle of the mouth, consisting of fibers embedded in the upper and lower lip and contributing to the narrowing and widening of the oral cavity. This muscle can therefore be called mouth sphincter. The fibers of the rest of the muscles belonging to this group are woven into it, located|inclined| in the thickness of the soft tissues of the cheek and creating the walls of the anterior part of the oral cavity. These muscles cause|cause| rich mimicry of the lips and contribute to the performance of various functions of the oral cavity, such as: sucking, chewing, swallowing, etc. All these muscles are located in three layers.

The following are the most superficial muscles:

1) the triangular muscle that begins|begins, begins| in|in, near| of the outer surface of the lower jaw back from the opening, the chin, and which is woven into the circular muscle y|в, near| corner|corner, corner| mouth; with its abbreviation, it delays|delays, delays| corner|corner, corner| mouth down;

2) cheeky|cheeky| a muscle that begins|begins, begins| on the cheek surface of the cheekbones bones|bones| and weaves into the upper lip in|in, near| corner|corner, corner| mouth; when shortened, it raises|raises| corner|corner, corner| face up (antagonist of the first);

3) the square muscle of the upper lip, which begins|begins, begins| with three heads|heads| (on the outer surface of the zygomatic bone, on the frontal process of the upper jaw and near the inferior orbital rim, which go down and end in the nasolabial fold; the function of this muscle is to raise upper lip.

The middle layer consists of the following muscles:

1) the square muscle of the lower lip, which begins|begins, begins| on the outer surface of the lower jaw and weaves into the lower lip near corner|corner, corner| mouth; during contraction, it pulls the lower lip down;

2) canine muscle, recumbent quadrate muscle| upper lip, it begins|begins, begins| in the dog pit and, interweaving the fibers in the corner|corner, corner| mouth, when shortened, delays|delays, delays| its up.

Deeper than all lie the following|following| muscles:

1) muscle, chin, which begins|begins, begins| on the alveolar edge in|in, near| lower incisors and interweaving in the skin of the chin; having contracted, it pulls out|pulls out| lower lip forward;

2) the cheek muscle, embedded in the thickness of the cheek and creating a lateral|lateral| the front wall of the mouth;

3) incisor muscles, which are attached to the walls of the canine alveoli (on the upper and lower jaws) and are woven into the corners|horns, corners| company from different sides, when they are shortened, they act as antagonists.

All the listed group of mimic muscles are innervated branches of the facial and trigeminal nerves. They all work together in one or another combination. The more muscles are contracted at the same time, the more expressed|expressed, expressed| facial expressions, and the participation of these muscles in the process of chewing is revealed all the more sharply.

Soft sky|palate|.

Muscular layer of the soft palate consists of separate groups of muscles, z|iz| which only|only| the muscles of the tongue end in the very sky|palate|, and others, being|appearing, appearing| in pairs, connect|combine, connect| his with|with| other bodies.

These include: 1) the palato-lingual muscle, (which lies in the front bracket and connects the soft palate with the tongue; 2) the palato-pharyngeal muscle yaz, which goes behind the first and which lies in the back bracket, which connects|connects, connects| soft sky|palate| with|with| pharynx|throat|; between these two muscles there is a lymphoid tissue called the palatine tonsil; 3) two large|large| muscles that stretch and lift soft sky|palate|.

The bundles of these muscles reach the middle line of the soft palate, and sometimes pass through it, intertwining with|with| bundles of the muscles of the same name on the opposite side. When these muscles are shortened, the palate becomes soft rises to and passes air between the prosthesis and the mucous membrane, which must be taken into account when prosthetics of the edentulous upper jaw.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

— What is the anatomical structure of the tooth?

— Tell about the role of enamel, dentin, cementum in the functioning of the tooth.

— Name the features of the structure of the dental arches of the upper and lower jaws.

— Name the factors that ensure the stability of the dentition.

— Define the term "bite". Types of bite.

— Definition and characteristics of pathological bites.
— Definition of articulation according to A. Ya. Katts.
— Name the types of occlusion.
— Tell about the meaning of sagittal and transverse occlusion curves.
— What muscles perform the mechanism of chewing and swallowing?
— How are teeth divided by shape, function, location in the dental arch?
— Oral cavity as a resonator of speech and the role of teeth and tongue.
— What are the functions and structure of the periodontium?
— What is the role of the mucous membrane of the oral cavity in the case of orthopedic treatment?
— What are the types of masticatory reflexes that occur in the area of the maxillofacial system?
— What muscles perform sagittal, vertical and transverse movements of the lower jaw?

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.
- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.
- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.
- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukraine http://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 3

Topic: Teeth, dental rows. Anatomy of the occlusal surface of teeth.

Goal: Familiarize students withfeatures of topographical and functional anatomy of teeth.To study the anatomy of the occlusal surface of all groups of teeth.

Basic concepts:teeth, tooth rows, groups of teeth, occlusal surface of the tooth.

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform

• Histological structure of the tooth.
• Dental formulas.
• Signs of teeth.
• Anatomical features of each permanent bite tooth
• Types of dental arches
• The concept of "bite", types of physiological bites

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting

laboratory research, etc.):

3.1 content of tasks (tasks, clinical situations, etc.);

ANATOMY OF TEETH

Teeth are closest in structure to bone tissue, but surpass it in hardness and strength. Three parts are distinguished in the tooth. The part that protrudes above the alveolus is called the crown. The part of the tooth hidden in the alveolus is called the root; the root is usually almost twice as long as the crown. The border between the crown and the root is called the neck.

The substance of the tooth mainly consists of dentin, which has a bone-like structure and is covered with enamel in the crown part and cement in the root part. Inside the tooth is a cavity filled with loose connective tissue rich in blood vessels and nerves. This connective tissue is called the pulp. In the crown part, the volume of this cavity is larger, it is called the pulp chamber. Towards the root, the chamber narrows, taking on the character of a channel. The pulp chamber partially repeats the external shape of the tooth.

The following surfaces are distinguished in the crown of each tooth:

1) External, or vestibular (in Latin, vestibule - vestibule - the part of the mouth between the teeth and lips), which participates in the formation of the convex side of the dental arch. In frontal teeth, it is turned towards the lips and is therefore called labial, and in lateral teeth it is turned towards the cheeks and is called buccal.

2) Internal, or oral, turned towards the sky, called palatal on the upper teeth, and lingual on the lower

3) The contact surfaces of the teeth are called approximal. Moreover, the side facing forward is called medial, and the side facing back is called distal.

4) The surface involved in chewing or biting off food, called the chewing (occlusal) surface in lateral teeth and the cutting edge in front teeth.

The teeth, which contribute to the grinding of food, have a wide chewing surface with 3-5 humps; these are large molars, which are called chewing teeth, or molars. Small molars that help crush food are equipped with two humps. These teeth are called premolars. The teeth, whose role in the chewing process is reduced only to grasping and biting food, have a chewing surface in the form of a narrow edge, thanks to which they received the name of incisors. The teeth, called fangs, have a narrow cutting edge in the form of a triangle.

During a person's life, teeth erupt twice. The first teeth are called milk teeth. They erupt in the number of 20 and, starting from the age of 6-7, are replaced by permanent ones. There are 32 permanent teeth, 16 in each jaw, 4 incisors, 2 canines, 4 premolars, 6 molars, of which the last two are called wisdom teeth. The teeth are paired and symmetrically located in the jaw

The dental formula is used to indicate the teeth. There are two variants of common dental formulas. The standard formula adopted on the territory of Ukraine is that each tooth is marked with a number that gives its ordinal position in the dental row in relation to the middle line. The right side is separated from the left side by a vertical border, and the upper row of teeth from the lower one by a horizontal border:

8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8

The WHO (World Health Organization) formula is that each tooth is designated by a two-digit number. The second digit, as in the previous case, indicates the serial number of the tooth from the midline. The first digit denotes the angle of the maxillofacial system.

1 – upper right corner of permanent bite.
2 - left upper corner of permanent bite.
3 - left lower corner of permanent bite.
4 – lower right corner of permanent bite.
5 - the upper right corner of the milk bite.
6 - the upper left corner of the milk bite.
7 – lower left corner of milk bite.

8 – lower right corner of milk bite.

So, for example, the formula given above would look like in the WHO version:

18 17 16 15 14 13 12 11 | 21 22 23 24 25 26 27 28
48 47 46 45 44 43 42 41 | 31 32 33 34 35 36 37 38

Individual teeth differ from each other in their structure by a number of features, the knowledge of which is necessary for the technique of correct modeling, selection and anatomical placement of artificial teeth.

The shape of the teeth.

cutters All cutters have chisel-shaped crowns. The labial surface of the upper incisors is slightly convex in the longitudinal direction and slightly more in the transverse direction. The palatal surface is closer to the cutting edge, flat or concave, and towards the neck it thickens and forms a bulge, which is sometimes significantly pronounced and is called the dental tubercle.

The roots of the upper incisors are quite massive and straight. Distinctive features between the upper incisors of the right and left sides are clearly expressed. The medial half of the labial surface is more convex than the distal; the medial corner of the cutting edge is straight, and the distal corner is rounded. The upper lateral incisors differ from the central incisors in smaller sizes.

The lower incisors have the same shape as the upper ones, but are much narrower than them. Accordingly, their roots are smaller and flattened on the sides. The size of the lower lateral incisors is larger than the central incisors. The cutting edges of the lower central incisors are straight, and the lateral distal corners are slightly rounded.

Canines are the most powerful teeth from the entire group of frontal teeth. They are located on the border between the front and side teeth and experience chewing pressure directed in different planes. Their roots are more massive and longer than those of the rest of the front teeth. The labial surface of the fangs is sharply convex, especially closer to the neck, and is divided by a longitudinal ridge extending from the apex of the angle on the cutting edge into two facets: medial and distal. Medial — already distal and more convex in the transverse direction than in the longitudinal direction. The lingual surface is also convex and is divided by a longitudinal ridge into two ridges: medial and distal. The cutting edge of the canine has a triangular shape, and the medial side is shorter than the distal one; the apex of the triangle is called the cutting hump.

Signs of the right or left side of canines are pronounced and are determined by the cutting edge and facets on the labial side.

The lower canines are similar to the upper canines, but smaller than them in size, unlike the upper ones - their lingual surface is flat or slightly concave, as a result of which the tooth tubercle is less pronounced.

The upper premolars are convex, both with a sponge, and from the palatal side in the longitudinal and even more so in the transverse direction. The buccal

surface of the first premolar is wider and higher than the lingual one, and therefore its buccal hump protrudes above the level of the crown more than the lingual one. The chewing surface has a quadrangular shape, with the outer side wider than the inner side, and the corners are slightly rounded. On the chewing surface there are two tubercles separated by a transverse groove. In the first premolar, the groove is not located symmetrically, but closer to the palatal hump, which is why the buccal hump is larger on the side of the chewing surface than on the lingual.

The second premolar differs from the first in that its ridges are expressed in the same way.

The lower premolars differ from the upper ones in both shape and size. Their crown in a cross section approaches the outline of a circle. The lingual hump of the first lower premolar is poorly developed, the buccal is rounded and inclined towards the oral cavity. The facets on the cheek side are well defined, and the medial one is narrower than the distal one, which makes it easy to distinguish the teeth of the right and left sides.

The second lower premolars are larger than the first, their humps are equally developed, and the shape of the chewing surface is close to square.

Premolars have one root each, except for the first upper one, which in most cases has two roots, buccal and palatal. Sometimes two roots are found in the second upper premolar.

The upper molars have massive diamond-shaped crowns, and the medial-buccal and distal-palatal angles are sharp, and the opposite angles are obtuse. Their palatal surface is more convex than buccal. On the buccal surface there are two convexities located in the longitudinal direction (corresponding to the two buccal humps on the chewing surface), and one transverse convexity located near the middle of the tooth, somewhat closer to its neck.

There are four ridges on the chewing surface, the largest of which is the medial-palatal ridge. The palatal ridges are rounded, and the buccal ridges are pointed and turned towards the cheek.

The second upper molars are similar in shape to the first, but somewhat smaller. The upper molars have three roots, two buccal and one palatal.

The lower molars have a cuboidal shape. Their buccal surface is convex both longitudinally and transversely and is more convex than the lingual. The largest bulge is located in the lower third of the tooth (near the neck).

There are five humps on the chewing surface of the first lower molar: three buccal and two lingual. The cheek bumps are rounded, and the lingual ones are sharper. The largest hump is medial-buccal.

The second lower molar is slightly smaller than the first and has four cusps of almost equal size.

Lower molars have two roots, medial and distal. Wisdom teeth do not have the correct shape and are sometimes completely absent. The number of their roots is not constant.

ANATOMY OF DENTAL ARCHES.

Dental arches are understood as teeth and alveolar processes separated by bony partitions into separate cells. A dental arch is also called a conventional line drawn through certain surfaces of teeth, alveolar processes, or bone sockets. Based on this, the following are distinguished: basal dental arch (passes through the necks of the teeth), occlusal (passes through the occlusal surfaces and cutting edges of the teeth), vestibular dental arch (through the equators of the teeth on the vestibular surface), oral dental arch (through the equators of the teeth on the oral surface).

Sagittal compensation curve. A number of occlusal surfaces of chewing teeth and their location in the dental row form a curve that has a sagittal direction and was named Spee's occlusal curve, named after the author who first described this phenomenon.

This curve on the lower jaw is concave, and on the upper, on the contrary, it is convex downwards. The uniqueness of this curve is that when the lower jaw is extended to the contact of the incisors with the cutting edges (anterior occlusion), at least two contacts of the chewing teeth (right and left) are preserved. That is, there will always be a three-point contact. This feature of the curve bears the name of Bonville (three-point contact of Bonville). This curve is part of a conditional circle, the center of which is located in the eye socket. The radius of the circle, and hence the Spee curve, is approximately 60-70 mm. The severity of this curve depends on the degree of overlap of the frontal teeth. The greater the frontal overlap, the more sharply curved the dental arch in the sagittal direction. The area of the Spee curve is the smaller the angle between the tangent to it and the horizontal plane.

Occlusal curve. It begins at the medial-buccal hump of the first premolar and ends at the distal hump of the third molar of the lower jaw. This curve is caused by the deviation of the roots to the lateral sides. Accordingly, the crowns on the upper jaw fan-like diverge, and the roots converge to one point. This phenomenon adds additional lateral stability to the dentition. In addition, each tooth receives additional fixation from its neighbor.

Transversal (transverse) compensation curves. Simultaneously with the presence of the sagittal occlusal curve on each chewing tooth, the arrangement of humps along the curve in the transverse direction is also emphasized. These curves were called transverse compensatory curves, as they ensure the contact of dental ridges during lateral movements of the lower jaw. They are formed as a result of different levels of buccal and palatal ridges, both on the upper and lower jaw. This position is explained by the inclination of the crowns of the chewing teeth on the lower jaw inward, and on the upper one - outward.

Thus, the sagittal curvature of the dental arches informs the chewing teeth of stability in the anteroposterior direction, and the inclination of the crowns of these teeth in the buccal-palatal direction creates conditions for their stability in the lateral direction. It should be noted that the stability of the dental arches is also supported by the buttresses (thickenings) of the jaw bones themselves, on

the lower jaw - by internal and external oblique lines, and on the upper - by a thickening that goes to the zygomatic arch.

3.2. requirements for work results, including registration;

— Teeth, groups of teeth, anatomotopography.

— The structure of the tooth rows and their shape on the upper and lower jaws.

— Factors that ensure the stability of the dentition.

— Concept of dental, basal, alveolar arches.

3.3. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukraine http://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua

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PRACTICAL LESSON No. 4

Topic: Functional anatomy of the frontal and lateral groups of teeth of the upper and lower jaws.

Goal: Familiarize students withfeatures of topographical and functional anatomy of teeth.To study the anatomy of the occlusal surface of the frontal and lateral groups of teeth.

Basic concepts:teeth, tooth rows, frontal group of teeth, lateral group of teeth, occlusal surface of the tooth.

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

• Histological structure of the tooth.

• Dental formulas.

• Signs of teeth.

• Anatomical features of each permanent bite tooth

• Types of dental arches

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1 content of tasks (tasks, clinical situations, etc.);

ANATOMY OF TEETH

Teeth are closest in structure to bone tissue, but surpass it in hardness and strength. Three parts are distinguished in the tooth. The part that protrudes above the alveolus is called the crown. The part of the tooth hidden in the alveolus is called the root; the root is usually almost twice as long as the crown. The border between the crown and the root is called the neck.

The substance of the tooth mainly consists of dentin, which has a bone-like structure and is covered with enamel in the crown part and cement in the root part. Inside the tooth is a cavity filled with loose connective tissue rich in blood vessels and nerves. This connective tissue is called the pulp. In the crown part, the volume of this cavity is larger, it is called the pulp chamber. Towards the root, the chamber narrows, taking on the character of a channel. The pulp chamber partially repeats the external shape of the tooth.

The following surfaces are distinguished in the crown of each tooth:

1) External, or vestibular (in Latin, vestibule - vestibule - the part of the mouth between the teeth and lips), which participates in the formation of the convex side of the dental arch. In frontal teeth, it is turned towards the lips and is therefore called labial, and in lateral teeth it is turned towards the cheeks and is called buccal.

2) Internal, or oral, turned towards the sky, called palatal on the upper teeth, and lingual on the lower

3) The contact surfaces of the teeth are called approximal. Moreover, the side facing forward is called medial, and the side facing back is called distal.

4) The surface involved in chewing or biting off food, called the chewing (occlusal) surface in lateral teeth and the cutting edge in front teeth.

The teeth, which contribute to the grinding of food, have a wide chewing surface with 3-5 humps; these are large molars, which are called chewing teeth, or molars. Small molars that help crush food are equipped with two humps. These teeth are called premolars. The teeth, whose role in the chewing process is reduced only to grasping and biting food, have a chewing surface in the form of a narrow edge, thanks to which they received the name of incisors. The teeth, called fangs, have a narrow cutting edge in the form of a triangle.

During a person's life, teeth erupt twice. The first teeth are called milk teeth. They erupt in the number of 20 and, starting from the age of 6-7, are replaced by permanent ones. There are 32 permanent teeth, 16 in each jaw, 4 incisors, 2 canines, 4 premolars, 6 molars, of which the last two are called wisdom teeth. The teeth are paired and symmetrically located in the jaw

The dental formula is used to indicate the teeth. There are two variants of common dental formulas. The standard formula adopted on the territory of Ukraine is that each tooth is marked with a number that gives its ordinal position in the dental row in relation to the middle line. The right side is separated from the left side by a vertical border, and the upper row of teeth from the lower one by a horizontal border:

8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8
8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8

The WHO (World Health Organization) formula is that each tooth is designated by a two-digit number. The second digit, as in the previous case, indicates the serial number of the tooth from the midline. The first digit denotes the angle of the maxillofacial system.

1 – upper right corner of permanent bite.
2 - left upper corner of permanent bite.
3 - left lower corner of permanent bite.
4 – lower right corner of permanent bite.
5 - the upper right corner of the milk bite.
6 - the upper left corner of the milk bite.
7 – lower left corner of milk bite.
8 – lower right corner of milk bite.

So, for example, the formula given above would look like in the WHO version:

18 17 16 15 14 13 12 11 | 21 22 23 24 25 26 27 28
48 47 46 45 44 43 42 41 | 31 32 33 34 35 36 37 38

Individual teeth differ from each other in their structure by a number of features, the knowledge of which is necessary for the technique of correct modeling, selection and anatomical placement of artificial teeth.

The shape of the teeth.

cutters All cutters have chisel-shaped crowns. The labial surface of the upper incisors is slightly convex in the longitudinal direction and slightly more in the transverse direction. The palatal surface is closer to the cutting edge, flat or concave, and towards the neck it thickens and forms a bulge, which is sometimes significantly pronounced and is called the dental tubercle.

The roots of the upper incisors are quite massive and straight. Distinctive features between the upper incisors of the right and left sides are clearly expressed. The medial half of the labial surface is more convex than the distal; the medial corner of the cutting edge is straight, and the distal corner is rounded. The upper lateral incisors differ from the central incisors in smaller sizes.

The lower incisors have the same shape as the upper ones, but are much narrower than them. Accordingly, their roots are smaller and flattened on the sides. The size of the lower lateral incisors is larger than the central incisors. The cutting edges of the lower central incisors are straight, and the lateral distal corners are slightly rounded.

Canines are the most powerful teeth from the entire group of frontal teeth. They are located on the border between the front and side teeth and experience chewing pressure directed in different planes. Their roots are more massive and longer than those of the rest of the front teeth. The labial surface of the fangs is sharply convex, especially closer to the neck, and is divided by a longitudinal ridge extending from the apex of the angle on the cutting edge into two facets: medial and distal. Medial — already distal and more convex in the transverse direction than in the longitudinal direction. The lingual surface is also convex and is divided by a longitudinal ridge into two ridges: medial and distal. The cutting edge of the canine has a triangular shape, and the medial side is shorter than the distal one; the apex of the triangle is called the cutting hump.

Signs of the right or left side of canines are pronounced and are determined by the cutting edge and facets on the labial side.

The lower canines are similar to the upper canines, but smaller than them in size, unlike the upper ones - their lingual surface is flat or slightly concave, as a result of which the tooth tubercle is less pronounced.

The upper premolars are convex, both with a sponge, and from the palatal side in the longitudinal and even more so in the transverse direction. The buccal surface of the first premolar is wider and higher than the lingual one, and therefore its buccal hump protrudes above the level of the crown more than the lingual one. The chewing surface has a quadrangular shape, with the outer side wider than the inner side, and the corners are slightly rounded. On the chewing surface there are two tubercles separated by a transverse groove. In the first premolar, the groove is not located symmetrically, but closer to the palatal hump, which is why the buccal hump is larger on the side of the chewing surface than on the lingual.

The second premolar differs from the first in that its ridges are expressed in the same way.

The lower premolars differ from the upper ones in both shape and size. Their crown in a cross section approaches the outline of a circle. The lingual hump of the first lower premolar is poorly developed, the buccal is rounded and inclined towards the oral cavity. The facets on the cheek side are well defined, and the medial one is narrower than the distal one, which makes it easy to distinguish the teeth of the right and left sides.

The second lower premolars are larger than the first, their humps are equally developed, and the shape of the chewing surface is close to square.

Premolars have one root each, except for the first upper one, which in most cases has two roots, buccal and palatal. Sometimes two roots are found in the second upper premolar.

The upper molars have massive diamond-shaped crowns, and the medial-buccal and distal-palatal angles are sharp, and the opposite angles are obtuse. Their palatal surface is more convex than buccal. On the buccal surface there are two convexities located in the longitudinal direction (corresponding to the two buccal humps on the chewing surface), and one transverse convexity located near the middle of the tooth, somewhat closer to its neck.

There are four ridges on the chewing surface, the largest of which is the medial-palatal ridge. The palatal ridges are rounded, and the buccal ridges are pointed and turned towards the cheek.

The second upper molars are similar in shape to the first, but somewhat smaller. The upper molars have three roots, two buccal and one palatal.

The lower molars have a cuboidal shape. Their buccal surface is convex both longitudinally and transversely and is more convex than the lingual. The largest bulge is located in the lower third of the tooth (near the neck).

There are five humps on the chewing surface of the first lower molar: three buccal and two lingual. The cheek bumps are rounded, and the lingual ones are sharper. The largest hump is medial-buccal.

The second lower molar is slightly smaller than the first and has four cusps of almost equal size.

Lower molars have two roots, medial and distal. Wisdom teeth do not have the correct shape and are sometimes completely absent. The number of their roots is not constant.

ANATOMY OF DENTAL ARCHES.

Dental arches are understood as teeth and alveolar processes separated by bony partitions into separate cells. A dental arch is also called a conventional line drawn through certain surfaces of teeth, alveolar processes, or bone sockets. Based on this, the following are distinguished: basal dental arch (passes through the necks of the teeth), occlusal (passes through the occlusal surfaces and cutting edges of the teeth), vestibular dental arch (through the equators of the teeth on the vestibular surface), oral dental arch (through the equators of the teeth on the oral surface).

Sagittal compensation curve. A number of occlusal surfaces of chewing teeth and their location in the dental row form a curve that has a sagittal direction and was named Spee's occlusal curve, named after the author who first described this phenomenon.

This curve on the lower jaw is concave, and on the upper, on the contrary, it is convex downwards. The uniqueness of this curve is that when the lower jaw is extended to the contact of the incisors with the cutting edges (anterior occlusion), at least two contacts of the chewing teeth (right and left) are preserved. That is, there will always be a three-point contact. This feature of the curve bears the name of Bonville (three-point contact of Bonville). This curve is part of a conditional circle, the center of which is located in the eye socket. The radius of the circle, and hence the Spee curve, is approximately 60-70 mm. The severity of this curve depends on the degree of overlap of the frontal teeth. The greater the frontal overlap, the more sharply curved the dental arch in the sagittal direction. The area of the Spee curve is the smaller the angle between the tangent to it and the horizontal plane.

Occlusal curve. It begins at the medial-buccal hump of the first premolar and ends at the distal hump of the third molar of the lower jaw. This curve is caused by the deviation of the roots to the lateral sides. Accordingly, the crowns on the upper jaw fan-like diverge, and the roots converge to one point. This phenomenon adds additional lateral stability to the dentition. In addition, each tooth receives additional fixation from its neighbor.

Transversal (transverse) compensation curves. Simultaneously with the presence of the sagittal occlusal curve on each chewing tooth, the arrangement of humps along the curve in the transverse direction is also emphasized. These curves were called transverse compensatory curves, as they ensure the contact of dental ridges during lateral movements of the lower jaw. They are formed as a result of different levels of buccal and palatal ridges, both on the upper and lower jaw. This position is explained by the inclination of the crowns of the chewing teeth on the lower jaw inward, and on the upper one - outward.

Thus, the sagittal curvature of the dental arches informs the chewing teeth of stability in the anteroposterior direction, and the inclination of the crowns of these teeth in the buccal-palatal direction creates conditions for their stability in the lateral direction. It should be noted that the stability of the dental arches is also supported by the buttresses (thickenings) of the jaw bones themselves, on the lower jaw - by internal and external oblique lines, and on the upper - by a thickening that goes to the zygomatic arch.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

- What is the anatomical structure of the tooth?

- Tell us about the role of enamel, dentin, and cementum in the functioning of the tooth.

- Name the features of the structure of the dental arches of the upper and lower jaws.

- Name the factors that ensure the stability of the dentition.

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- What is the anatomical structure of the tooth?

- Tell us about the role of enamel, dentin, and cementum in the functioning of the tooth.

- Name the features of the structure of the dental arches of the upper and lower jaws.

- Name the factors that ensure the stability of the dentition.

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukraine http://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadsky http://www.nbuv.gov.ua/

PRACTICAL LESSON No. 5

Topic: Physiological and pathological types of bites. Their characteristics and signs.

Goal:get acquainted with physiological and pathological types of bites. Know the characteristics of each type of bite and their signs. To be able to distinguish pathological and physiological types of bites.

Basic concepts: physiological bite, pathological bite, central occlusion.

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform

practical classes (knowledge requirements, list of didactic units);

- Define the concept of bite, physiological and pathological types of bites.
- Orthognathic bite, symptoms affecting the entire dental arch.
- Signs of an orthognathic bite, which refer to the closing of the chewing teeth in the anterior-posterior direction.
- Signs of a direct bite.
- Pathological types of bite.

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- Define the concept of bite, physiological and pathological types of bites.
- Orthognathic bite, symptoms affecting the entire dental arch.
- Signs of an orthognathic bite, which refer to the closing of the chewing teeth in the anterior-posterior direction.
- Signs of a direct bite.
- Pathological types of bite.

3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting

laboratory research, etc.):

3.1 content of tasks (tasks, clinical situations, etc.);

Bite is the relationship between the rows of teeth in the state of central occlusion. Central occlusion, as is known, is the closing of the dental rows, in which case the teeth have the maximum number of contact points, and the articular heads of the lower jaw are located with the help of a disc at the base of the slope of the articular tubercles.

Bites are divided into 2 groups according to their function: physiological and pathological. Physiological ones include bites that provide full function regardless of various morphological features, and pathological ones - bites with impaired function.

Physiological bites. Physiological bites include orthognathic, straight, physiological biprognathia and physiological opisthognathia.

Orthognathic bite. Orthognathia is characterized by morphological features, some of which apply to the entire dental arch, the second - only to the front teeth, and the third - only to the chewing teeth.

Symptoms affecting the entire dental arch:

The upper dental arch has an elliptical shape, the lower - a parabola.

On the upper jaw, the dental arch is larger than the cellular one, and the cellular one is larger than the basal one. On the lower jaw, the reverse relationship is observed: the dental arch is smaller than the cellular one, and the latter - from the basal one. Thus, the upper dental arch is larger than the lower one, and the upper cellular arch is smaller than the lower one. This explains the fact that in the presence of teeth in an orthognathic bite, the upper dentition overlaps the lower one, and in the case of loss of all teeth and even with slight atrophy of the cellular processes, the reverse ratio of the cellular arches is observed.

Each of the teeth usually closes with two antagonists, one of which is called the main one, and the second - additional (Altukhov), with the exception of the upper wisdom teeth and the lower central incisors, which have one antagonist each.

Each upper tooth closes with the lower tooth of the same name (main) located behind; each lower tooth closes with the upper tooth of the same name (main) and placed in front.

The teeth of each tooth row, adjacent to each other, touch each other with contact points located on the proximal surfaces.

The height of the dental crowns gradually decreases from the central incisors to the molars (canines are an exception).

The upper teeth are inclined with their crowns outward, and their roots are inward, the lower teeth, on the contrary, are inclined with their crowns toward the tongue, and their roots are outwards

Signs that concern the closing of the front teeth:

The upper front teeth overlap, like scissors, the lower teeth by about one third of the crown (1.5-3 mm).

The middle lines between the upper and lower central incisors are in the same sagittal plane.

There are two types of signs related to the closing of chewing teeth:

a) in case of closure in the buccal-palatal direction;

b) in the case of closing in the front-back direction.

Signs that relate to the closing of the teeth in the buccal-palatal direction:

The buccal cusps of the upper teeth are located outward from the cusps of the lower teeth, and the buccal cusps of the lower teeth are inward from the cusps of the upper teeth, so the upper palatal cusps fall into the occlusal fissures of the lower teeth, and the lower buccal cusps fall into the cusps of the upper teeth.

The lingual cusps of the lower teeth are located inward from the palatal cusps of the upper teeth.

The external (buccal) and internal tubercles of both the upper and lower chewing teeth are located at different levels on both sides of the jaws. The frontal section of the jaws through the chewing teeth, which goes from right to left or in the opposite direction, is a transverse curve, convex on the upper teeth and concave on the lower ones.

Signs that relate to the closing of the chewing teeth in the anterior-posterior direction:

The anterior buccal tubercle of the first upper molar is located on the buccal side of the first lower molar in the transverse groove between the buccal tubercles, and the posterior buccal tubercle of the upper first molar is located between the distal buccal tubercle of the first lower molar and the medial buccal tubercle of the second lower molar.

The chewing surfaces of the lower teeth, starting from the premolars and ending with the last molar, create sagittal concave curved surfaces. The chewing surfaces of the upper teeth create a sagittal curve, but not concave, but convex, which repeats the shape of the lower concave curve.

This relationship between tooth rows has an explanation:

The upper central incisors are wider than the lower central incisors and articulate with the two lower incisors, so the upper teeth are displaced distally in relation to the teeth of the lower row and each tooth has two antagonists. The upper wisdom tooth is narrower than the lower wisdom tooth, so the distal displacement of the upper teeth in relation to the lower ones of the same name is equalized in the area of the wisdom teeth, and the back surfaces of the upper and lower wisdom teeth are in the same frontal plane. Closing one tooth with two antagonists is very important: even if one antagonist is lost, the second protects the tooth on the opposite jaw from displacement. From this point of view, the front teeth are more precisely located than the lateral ones.

The teeth of the same row, growing next to each other, touch each other with their proximal surfaces. Areas located in the area of contact of teeth are called contact points. And This mutual arrangement of the teeth is of great importance both for their stability and function. First, it protects the teeth from shifts in the anterior-posterior direction, reducing the amplitude of their physiological mobility during the action of the horizontal components of chewing pressure, which is important from the point of view of the stability of the teeth. Secondly, the contact points on the proximal surfaces of the teeth cause the passage of food towards the gingival papilla and thereby protect it

from injury and from food particles getting stuck. After all, if the teeth had no contacts, then the tooth row would be a simple sum and each tooth would act autonomously, that is, independently, isolated from other teeth. Thanks to lateral contacts, not only one tooth connects with another, but also the entire dental row from the number of teeth acting independently turns into a system of closely related elements of the dental arch. Due to the physiological mobility of teeth and contacts, on the one hand, the work of each tooth depends on the work of other elements of the dental-jaw system, and on the other hand, the function of each tooth is reflected in the work of the entire branch.

According to Katz, the fact that the crowns of the lower molars are inclined medially, and the roots - distally, prevents the back movement of the tooth row and its loosening; the teeth placed behind seem to support the teeth placed in front.

Starting from the incisors, the length of the crowns decreases towards the chewing teeth, especially in the lower dentition. This placement of the teeth is a good condition for the functioning of the tooth, its chewing ability depends on the location and the length of the crown: the further the tooth is located from the midline, the higher its functional value should be.

On the upper jaw, the crowns are directed outward, toward the cheek and lip, and the roots are inward. On the lower jaw, the crowns are directed toward the tongue, and the roots are outward. Thanks to this, the upper dental arch is larger than the lower one and the upper tooth row overlaps the lower one. All these anatomical features greatly contribute to the stability of the lower dental arch.

The lower front teeth, like all others, have a tendency to move forward, but this possibility is limited due to the overlapping of the lower teeth by the upper ones.

For the teeth of the upper jaw, the tendency to move forward is somewhat limited by the fact that the upper jaw is immovably connected to the local bones.

6. The crowns of the lower molars are tilted inward, and the upper molars are tilted outward. This contributes to the entry of the lingual tubercles of the upper molars into the closing slits of the lower molars, and the buccal tubercles of the lower molars into the closing slits of the upper molars. In this way, the teeth are kept from shifting in the buccal-palatal line. Since the upper dental arch is larger than the lower one, it covers the lower one, as the described arch is inscribed, and the front teeth act on the food lump as a cutting device similar to scissors.

The scissor-like structure of the dental arches of the orthognathic bite increases the chewing surface and provides a large scope for chewing excursions of the lower jaw.

Finally, the overlapping of the upper dental arch with the lower one prevents the cheeks and tongue from closing when closing the teeth.

7. The lower tooth row is formed, from the point of view of stability, more perfectly than the upper one. The wedge-shaped shape of the crowns, the mediodistal inclination of the molars and the inclination of the chewing teeth towards the tongue contribute to its stability. In addition, according to A. Ya. Kats, the outer plate of the compact substance of the mandibular bone covers the entire dental arch. After all, the stability of the lateral areas of the dental arch is facilitated by the curvature of the cortical plate in the area of the internal and external oblique lines. The upper dentition is formed, from the point of view of stability, less favorably. The crowns of the upper teeth are tilted outwards, so during chewing movements directed at the upper jaw outwards, the tooth row can take on an even more fan-like shape. Four factors protect the upper tooth row from this: 1) the presence of a system of buttresses in the area of canines and chewing teeth; 2) palatine processes that connect the lateral areas in the transverse direction; 3) high elasticity of the end wall of the cellular process in the area of the front teeth; 4) the presence of a third root - palatal, which is present in the upper molars. All these features give the upper dental arch undeniable stability.

Direct bite. Another variant of physiological bite is direct. Direct bite differs from orthognathic in that the cutting edges of the upper teeth do not overlap, but fall directly, like forceps, on the cutting edges of the lower teeth. In the area of the lateral teeth, the relationship between the teeth is the same as in the orthognathic bite. As a result, in the presence of a direct bite, sometimes faster wear of teeth occurs than in the case of an orthognathic one. Under such conditions, the surfaces of the teeth are polished, the latter are resistant to caries, are firmly held in the cells and are affected by periodontitis or periodontitis less often than in other forms of physiological bite.

Physiological opisthognatia and physiological biprognathia are characterized by the same relation of the tooth rows as in orthognathic bite. The difference is only in the direction of cellular processes and parts and frontal teeth. In the case of an orthognathic bite, the front teeth together with the cellular process are directed backwards. In the case of prognathic - ahead. The character of the closure of the dental rows in the state of central occlusion under the condition of these types of bite is the same as in the case of orthognathia, so they are also functionally complete.

Pathological bites. Pathological bites include prognathia, progenia, deep, open, crossbite. Pathological bites are characterized by a violation of both the relationship of the tooth rows, as well as the function of chewing, speech, and the patient's appearance.

Prognathia is characterized by a protruding position of the upper jaw. As a result of the distal shift of the lower jaw or the forward movement of the upper jaw, there is a violation of the closure of both front and side teeth. Under the

condition of normal proportions of the jaws, the frontal teeth of the upper jaw overlap the lower ones with the presence of an incisal-cuspid contact. The teeth of the upper jaw are pushed forward in case of prolapse, and there is a gap between them and the lower teeth. Often, the lower teeth touch the mucous membrane, damaging it during closing the jaws. In this case, they talk about a traumatic bite. In the presence of prognathism, the disproportion in the area of the molar teeth leads to the fact that the anterobuccal tubercle of the first upper molar falls on the tubercles of the same name of the lower molar, and sometimes in the closing gap between the premolar and the anterobuccal tubercle of the first lower molar. In the case of pronounced prognathia, the teeth of the upper jaw are very protruding forward, pushing out the upper lip, from which the cutting edges of the teeth are visible. The lower lip, on the contrary, falls under the upper front teeth. All this was generally reflected in the appearance and at the same time disrupts the function of chewing and speech.

Progeny. In the case of a progenic ratio of the dentition, the lower jaw is pushed forward, as a result of which the lower front teeth overlap the upper ones of the same name. If the lower jaw protrudes slightly, contact is maintained between the front teeth. Food is bitten off with the front teeth in the case of similar jaw relationships. In the presence of a significant displacement of the lower jaw forward, a gap forms between the teeth, biting off food with the incisors becomes impossible and is transferred to the side teeth. Since there is a medial shift of the lower jaw, the anterior buccal tubercle of the upper first molar comes into contact with the posterior buccal tubercle of the lower molar of the same name or falls into the closing gap between the first and second molars. The lower dental arch in the case of progeny is often wider than the upper one, due to which the buccal tubercles of the chewing teeth are placed outward from the upper ones of the same name. The patient's appearance has changed dramatically, his speech and chewing are impaired.

A deep bite is characterized by a significant overlapping of the frontal teeth of the upper jaw with the frontal teeth of the lower jaw in the absence of incisor-bite contact. The cutting edges of the lower teeth can touch the neck of the upper teeth. Sometimes there is no contact and the teeth touch the gums, damaging them. lateral incisors are closed, as in the case of an orthognathic bite.

A deep bite and a deep overlap should be distinguished. In the presence of a deep overlap, the upper frontal teeth overlap the lower ones by more than 1/3 of the height of their crowns, but the incisal-cuspid contact is preserved. In the case of a deep bite, it is usually absent. A deep overlap is an anatomical variant of an orthognathic bite. A deep bite, on the contrary, belongs to anomalies.

Open bite. With this type of bite, there is no closing of the front teeth, and sometimes the premolars, only the molars come into contact. At the same time, there are deep functional disorders. The lack of contact between the front teeth forces the patient to bite off food with premolars or molars. Reduction of the useful chewing surface (occlusion field) also makes it difficult to chew food.

The tongue, which increases in size, takes a significant part in grinding food. The patient's language is impaired, as well as his appearance.

Cross bite. A crossbite is understood as such a ratio of tooth rows, in which the buccal tubercles of the lower lateral chewing teeth are located outwards from the upper ones of the same name. The front teeth close correctly. This bite occurs as a result of the narrowing of the upper dental arch and can be unilateral or bilateral.

SAGITAL, TRANSVERSAL OCCLUSION CURVES

The surface that passes through the chewing and cutting edges of the teeth is called the occlusal surface of the closure. F. Spee (1890) first described the sagittal occlusal curve of the lower jaw in the area of the chewing teeth, on the dental arch. According to Spee, it is manifested by the fact that a conventional line drawn through the chewing surfaces of the lower teeth starts from the distal contact surface of the first premolar and ends at the distal buccal tubercle of the last molar.

The deepest point in this curve is the chewing surface of the lower first molar. The upper dentition in the region of the molars is also a sagittal curve, but not concave, but convex, which repeats the lower concave curve. Practically, it is installed at the level of overlapping of the buccal tubercles of the lower teeth with the upper ones.

The transverse occlusal curve is the surface that passes through the chewing surfaces of the molars on the right and left sides in the transverse direction. Studying the placement of the chewing teeth, it can be determined that the buccal tubercles on both sides of the lower jaw are placed at a higher level compared to the lingual tubercles. Therefore, the transverse line drawn along the chewing surfaces of the molars of the lower jaw, which passes from right to left or in the opposite direction, is a concave transverse curve.

Spee's sagittal occlusal curve.

Wilson's transverse occlusal curve.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and skills, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- Define the concept of bite, physiological and pathological types of bites.
- Orthognathic bite, symptoms affecting the entire dental arch.
- Signs of an orthognathic bite, which refer to the closing of the chewing teeth in the anterior-posterior direction.
- Signs of a direct bite.

- What pathological types of bite do you know?

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukraine http://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadsky http://www.nbuv.gov.ua/

PRACTICAL LESSON No. 6

Topic: Occlusion of dental rows. Definition. Types of occlusion. Contacts of tooth rows in anterior and lateral occlusions. Signs of central occlusion. Articulation of the lower jaw. Occlusion factors.

Goal: Know the definition of occlusion and articulation. Understand the ratio of the elements of the maxillofacial system in the main types of articulation and occlusion.

Basic concepts:articulation, occlusion, types of occlusions, central occlusion.

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform

- Articulation and occlusion.

- Biomechanics of lower jaw movements.

- Chewing. Phases of chewing.

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- Articulation and occlusion.

- Biomechanics of lower jaw movements.

- Chewing. Phases of chewing.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1 content of tasks (tasks, clinical situations, etc.);

Articulation — all kinds of positions and movements of the lower jaw in relation to the upper jaw, carried out with the help of the masticatory muscles (A. Ya. Katz). The movement of the lower jaw during chewing is of the greatest practical importance.

Occlusion is any locking of the teeth. A special case of articulation (A. Ya. Katz). The number of occlusions is large. Of them, four occlusions are the most important in practical terms: central occlusion, front and two lateral (left and right).

It is clear that occlusion, being a clinical expression of masticatory movements, is divided into separate phases according to the types of masticatory movements. Chewing movements of the lower jaw, as well as its general movements, are divided into sagittal, transverse and vertical. In this regard, occlusal phases or phases of tooth rows should also be divided into sagittal (anterior-posterior), transverse (lateral) and vertical (central). This coincides with the division of the chewing process into three phases:

1) the phase of grasping and cutting food, which is characterized by the sliding of the cutting edges of the lower front teeth along the palatal surface of the upper ones to their edge closure and back; in this phase, sagittal movement and, therefore, sagittal occlusion prevail;

2) the phase of crushing food, which is carried out by the vertical movement of the lower jaw and is characterized by the maximum contact of the teeth of both jaws; occlusion of the dental rows in this phase was called central and is the initial and final moment of all chewing movements of the lower jaw;

3) the phase of grinding food, which is characterized by alternating movements of the lower jaw to the sides. When the lower jaw moves in any direction, on this side, the humps of the chewing teeth of the lower jaw will contact the humps of the same name in the upper jaw (cheek with cheek, palatal with lingual).

The word "articulation" is borrowed from anatomy, where it denotes a joint, articulation, but many authors put different meanings into this word. In domestic dentistry, the definition of this term, given by A.Ya. Katsem, is the most widespread - articulation means all kinds of positions and movements of the lower jaw in relation to the upper jaw, carried out with the help of the masticatory muscles. V

This definition of articulation includes not only the chewing movement of the lower jaw, but also its movement during conversation, swallowing, etc.: For practical purposes, it is most convenient to define articulation as a chain of alternating occlusion options. This definition is more specific, as it covers only chewing movements of the lower jaw, the study of which is very important for the design of special devices that reproduce them - articulators.

Occlusion is the closure of tooth rows as a whole or individual groups of teeth for a longer or shorter period of time.

Thus, occlusion is considered as a special case of articulation — one of its moments.

There are four main types of occlusion: central, front and side (right and left).

Central occlusion is characterized by the closing of the teeth with the maximum number of contacting points

Signs of central occlusion: — the middle line of the face coincides with the line passing between the central incisors;

- the articular heads are located on the slope of the articular tubercle at its base.

Simultaneous and uniform contraction of the masticatory and temporal muscles on both sides is emphasized.

With anterior occlusion, the lower jaw is pushed forward. This is achieved by bilateral contraction of the lateral pterygoid muscles.

Signs of anterior occlusion:

— the middle line of the face coincides with the middle line passing between the incisors;

— the articular heads in anterior occlusion are shifted forward and are located at the tops of the articular tubercles.

Lateral occlusion occurs when the lower jaw is moved to the right (right occlusion) or to the left (left occlusion).

Signs of lateral occlusion:

— when mixing the lower jaw to the right on the side of mixing, the articular head remains at the base of the articular tubercle, rotating slightly. On the left side, the articular head is located at the top of the articular tubercle;

— right lateral occlusion is accompanied by contraction of the lateral pterygoid muscle of the opposite (left) side and, conversely, left lateral occlusion — contraction of the pterygoid muscle of the right side.

The state of relative rest of the lower jaw.

Outside of chewing and talking, the dental rows are usually open, since the lower jaw is pubescent and there is a gap of 1-6 mm between the front teeth. When the jaws are hanging, the muscles are slightly stretched, which causes irritation of the proprioceptors.

This causes a tonic contraction of the muscles, which keeps the jaw in the specified position. In the masticatory muscles, different groups of fibers alternately contract at this time, which provides them with peace and at the

same time allows them to be ready for a new contraction. Energy expenditure of muscles in a state of relative physiological rest is minimal. The width of the space between the central incisors in the rest position of the lower jaw is individually different. There is evidence that it increases with age. In addition, the position of relative rest of the lower jaw is an appropriate reflex act (intermittent chewing pressure is physiological for the periodontium, while constant chewing pressure would cause its ischemia and the development of dystrophy).

The resting position of the lower jaw is a protective innate reflex. It is the beginning and end of all her movements.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical abilities and skills, etc.);

- Inspection of the placement of teeth in complete removable prostheses in the occluder.
- Review of plaster models of edentulous jaws.
- Inspection of wax compositions of complete removable prostheses in the oral cavity.

3.3. requirements for work results, including registration;

- What should you pay attention to when checking the position of teeth in complete removable prostheses on models in the articulator?
- How should the front and side teeth be positioned in relation to the alveolar process?
- What are the requirements for the image of prosthetic bed tissues on plaster models?
- How is the correct determination of the interalveolar height checked?
- What is characterized by overestimation and underestimation of the interalveolar height at the stage of checking wax compositions of complete removable prostheses? How to eliminate these errors?
- How do the teeth on complete removable prostheses close when checking in the oral cavity, if at the previous stage, instead of the central occlusion, the front or side was fixed?
- How to eliminate errors associated with incorrect fixation of the mesiodistal ratio of the jaws?
- How to check the density of closure of opposing teeth on wax compositions of complete removable prostheses in the oral cavity?
- What aesthetic requirements require attention at the stage of checking wax compositions of complete removable prostheses?

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- Definition of articulation according to A. Ya. Katz.
- Name the types of occlusion.
- Tell about the meaning of sagittal and transverse occlusal curves.

- What muscles carry out the mechanism of chewing and swallowing?

- What are the types of masticatory reflexes that occur in the area of the maxillofacial system?

- What muscles perform sagittal, vertical and transverse movements of the lower jaw?

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukraine http://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadsky http://www.nbuv.gov.ua/

PRACTICAL LESSON No. 7

Topic: The sequence of examination in the clinic of orthopedic dentistry. Subjective and objective examination. Components of the diagnosis.

Goal: to know the stages of examination of a patient in a clinic of orthopedic dentistry. Be able to collect anamnesis and form a diagnosis.

Basic concepts: Anamnesis, examination, objective methods of examination, additional methods of examination

Equipment: Computer, multimedia projector, phantoms.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform practical classes (knowledge requirements, list of didactic units);

- Hardware research methods.
- Thermometry and electrometry.
- X-ray studies.
- Determination of the absolute strength of the masticatory muscles pressure

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- Plaster the wax composition of the complete removable prosthesis in the cuvette.
- Conduct instrumental research methods.
- Hardware research methods.
- Thermometry and electrometry.
- X-ray studies.
- Determination of the absolute strength of the masticatory muscles pressure
- Advantages and disadvantages of gnathodynamometry.
- Static methods of determining masticatory efficiency.
- functional methods of determining chewing efficiency

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

PATIENT EXAMINATION IN ORTHOPEDIC DENTISTRY CLINIC

Increasing the course of pre-clinical training in orthopedic dentistry sets as its goal not only the study of the anatomy and physiology of the organs of the maxillofacial system, but also aimed at a more in-depth mastery of practical skills, and thus at the general improvement of the quality of training of dental students.

Orthopedic treatment of patients is carried out with the aim of final restoration of the maxillofacial system, reproduction of the lost form of individual organs of this system, and their functional relationships.

The maxillofacial system is a set of organs and tissues, anatomically functionally interdependent, performing different but subordinate functions. It includes hard tissues - the maxillofacial skeleton, including the upper and lower jaws, masticatory and facial muscles, salivary glands, the temporomandibular joint - a paired organ - the mobile connection of the lower jaw with the temporal bone of the skull.

In a properly formed maxillofacial system, the structure of each organ is clearly coordinated with its function. In case of damage to the maxillofacial system, for example, when the body is affected by environmental factors: physical, chemical, biological, social, with a genetic defect or under the influence of local factors, a compensatory process first develops, i.e. compensation of the impaired function due to the activity of intact organs. But the compensatory process has a limit, after which a relatively persistent deviation from the norm, which has a biologically negative meaning for the body, develops a disease.

Each disease is characterized by a certain sign or a group of such signs, they are called symptoms. There are subjective and objective symptoms.

Subjective symptoms are symptoms revealed during the interview of the patient, those unusual sensations that the patient began to experience. For example, difficulty in chewing food, pain, itching in the gums, dryness in the mouth, retention of food between the teeth, etc.

Objective symptoms are detected by the doctor in the process of examination: examination, palpation, instrumental and hardware research.

To find out the function of the maxillofacial apparatus, it is sometimes necessary to resort to functional methods of research - chewing samples, graphic records of the movements of the lower jaw, studies of muscle biocurrents, etc.

The disease can be manifested by one or several objective symptoms, one of which is characteristic only for this type of disease, and others are also observed in other diseases. Examination of the patient aims to find out the symptoms, etiology and pathogenesis, the course of the disease, his physical and mental state, the function of the maxillofacial apparatus. A thorough and comprehensive clinical examination of the patient will contribute to the correct diagnosis and targeted orthopedic treatment.

Examining the patient, the doctor must clearly present the meaning of physiological norms, possible variants of the structure and functioning of individual organs of the maxillofacial system, topography and functional relationships. At the same time, he must not only reveal the phenomena, but also be able to understand them logically, determine the leading symptoms, based on the data from the study of the patient. To do this, he must clearly present the meaning of all sections of dentistry, the clinical picture of each nosological form of the maxillofacial system.

Examination of the patient is carried out consistently according to a certain plan and includes: anamnesis (survey of the patient), external examination, examination and examination of oral cavity organs; examination of the temporomandibular joint; head and neck muscle examination, laboratory and instrumental research methods.

SUBJECTIVE RESEARCH METHODS

Taking an anamnesis is the first stage of the patient's examination. The anamnesis consists of the following sections: 1) complaints and subjective condition of the patient; 2) history of this disease; 3) history of the patient's life.

During the first visit to the patient, the patient's story about the unusual sensations (complaints) that he began to experience is carefully listened to. At the same time, it is important to find out the earliest manifestations of the disease, the nature and peculiarities of its course, to find out what the patient himself considers the cause of the appearance of unusual sensations. In some cases, the anamnesis can be very short and there is no need to go into the details of the patient's life history, in other cases, for example, when a patient is treated with complaints of a burning sensation in the mucous membrane of the oral cavity under a prosthesis, the anamnesis and all examinations will be detailed with the use of hardware and laboratory methods with the involvement of doctors of other specialties.

It is necessary to listen carefully and patiently to patients, at the same time concentrating his attention on the main, from his point of view, sensations, correctly clarifying individual points by purposefully asking questions. All this will be able to determine the range of questions required for making a diagnosis, special or additional research methods.

When listening to the patient's complaints, it is worth paying attention to the patient's reaction when presenting the complaints. This will help to form an idea about the type of his nervous activity, which is of great importance in the choice of the design of the prosthesis and the subsequent habituation of using it, more quickly establishing mutual contact between the doctor and the patient.

During the examination, it is important to obtain data about the onset of the disease, the causes of its occurrence, how it progressed before coming to the doctor, whether any treatment was used, and if it was used, then find out the type and amount of treatment.

With some diseases, it is difficult to establish the cause of their occurrence. So, for example, the appearance of pain, burning in the mucous membrane of the oral cavity under the prosthesis can be caused by a poorly made prosthesis, mechanical trauma or an allergic reaction to the base material. The same type of pain is observed in glossalgia, heat exchange disorders of prosthetic bed tissues, diseases of the gastrointestinal tract. Therefore, pain by its nature can be caused by various reasons, and the mechanism of its occurrence is also different.

Sometimes, during questioning, it is possible to establish that the deterioration of the dento-jaw system occurred during the period of some general disease or after its transfer. Then the question arises whether the detected disease is an independent nosological form or is one of the symptoms of other diseases (ulcer disease, gastritis, diabetes, etc.) - Therefore, it is important to assess the general condition of the subject.

History of life. Life anamnesis is a "medical biography" of the patient. It is important for understanding the causes and conditions for the development of a real disease. For example, data on nutrition (artificial feeding, the use of soft

pureed food during the period of formation of milk and variable bite) can approximately indicate the cause of anomalies in the development of the maxillofacial system.

Place of birth, peculiarities of natural conditions (deficiency or excess of fluorine in water) may be the cause of some non-carious lesions of the teeth.

Harmful working conditions, such as work related to the production of acids, alkalis, in the coal mining industry can contribute to the development of pathological tooth wear.

It is important to find out the transferred diseases and the presence of zagalsomatic diseases on the day of the examination, because they can also contribute to the development of pathological changes in the maxillofacial system. Knowing the peculiarities of their course will also help the doctor to choose the right tactics for orthopedic treatment. Thus, in the case of a disease of the cardiovascular system (myocardial infarction, angina pectoris, stroke), in order to remove such a factor that injures this system, such as tooth preparation, it is better to recommend prosthetics with removable prostheses. If the patient has bronchial asthma, it is not possible to use odorous materials (Repin, Thiodent, Dentafol) to remove casts. They should also not rebase the prosthesis directly in the oral cavity. Otherwise, it can cause an asthma attack. Thus, based on the anamnesis and subjective data of the patient, the doctor makes a possible conclusion about the nature and form of the disease. This is a working diagnostic hypothesis that will facilitate further focused research to clarify the assumptions that have arisen.

OBJECTIVE RESEARCH METHODS

In order to clarify the assumption about the disease, to better understand the disease, a detailed examination of all organs included in the jaw system is carried out. The data of an objective examination reject or increase the probability of the assumptions about the disease. Objective examination includes: external examination, examination and examination of oral cavity organs, X-ray and laboratory (analysis of blood, strength, saliva, smears and biopsies, myography, rheography, etc.) research methods.

Objective research methods are carried out while continuing to question the patient, because it is important to know subjective feelings. For example, does the patient feel pain during probing, percussion, etc.

External examination of the patient. After the survey, they begin the examination of the person, which is carried out inconspicuously for the patient. Before the formation of the facial and cerebral skull, the person acquires individual features. The type of person is affected by the development of the brain skull, respiratory system, masticatory system or musculoskeletal system. Accordingly, four types of person are distinguished: cerebral, respiratory, digestive and muscular (Fig. 1).

The cerebral type is characterized by a strong development of the brain and, accordingly, the cerebral skull. The high and wide frontal part of the face

sharply prevails over the other parts, as a result of which the face acquires a pyramidal shape with a base directed upwards (Fig. 1, a).

The respiratory type is characterized by the predominant development of the middle part of the face, in connection with which the facial parts of the head, neck and trunk acquire a number of characteristic features. The nasal cavity and its appendages are strongly developed, the maxillary sinuses are large, and the cheekbones are slightly protruding. The face has a rhomboid shape, the nose is strongly developed in length, its back is often convex.

The digestive type is characterized by the predominant development of the lower part of the face. The upper and lower jaws are excessively developed. The distance between the corners of the lower jaw is large. The branch of the lower jaw is very wide, massive, its coronal process is short and wide, the chewing muscles are highly developed. The mouth is bordered by thick lips. The chin is wide and high. As a result of the strong development of the lower part of the face, with the relative narrowness of the frontal part, the face sometimes acquires a characteristic trapezoidal shape (Fig. 1, c).

Muscular type - the upper and lower parts of the face are approximately equal, the hairline is usually straight, the face is square (Fig. 1, d).

It should also be noted that the person's face is disproportionate: there is an asymmetry in the structure of the left and right halves. This is manifested in the fact that the left half of the skull is larger than the right, and the left half of the face is longer, the bridge of the nose does not coincide with the middle line, the tip of the nose is shifted to the side, the distance between the outer corner of the eye and the corner of the mouth is not the same on both halves of the face, the right zygomatic bone and the lower half of the upper jaw are shifted to the right, the right canine fossa is deeper and narrower, the teeth of the upper jaw and the lower part of the nasal septum are shifted to the right.

In the clinic of orthopedic dentistry, the division of the face into three parts: the upper, middle and lower thirds (Fig. 2) has become widespread. The upper third of the face is located between the border of the hair on the forehead and the line connecting the eyebrows. The boundaries of the middle part of the face are the line connecting the eyebrows and the base of the septum of the nose. The lower third of the face is the part of the face from the base of the septum of the nose to the lower point of the chin.

The division of the person into three parts is conditional, since the position of the dots changes during life. For example, the border of the hairy part of the head is located differently in different people and moves with age. The height of the lower third of the face is also variable and depends on the type of closure and the preservation of the number of teeth. Only the middle part of the face has relatively stable dots. The lack of permanent anatomical landmarks and a strict functional subdivision of various departments determines the low value of the proposed division of the person for reconstructive orthopedics.

Thus, the expressiveness of the chin fold suggests the presence of a deep bite, a distal shift of the lower jaw with a decrease in the vertical size of the

lower third of the face due to the loss of lateral teeth or their pathological wear. Frequent lowering of the lower third of the face is accompanied by the formation of cavities in the corners of the mouth. At the same time, they get wet and have a hyperemic appearance. Drooping of the lips indicates the absence of the front group of teeth, and if at the same time the expressiveness of the nasolabial folds is still observed, then it can be concluded that the teeth are completely lost.

The establishment of such deviations during the examination indicates a sharp decrease in the lower third of the face between the alveolar height, which are interdependent with the absence of teeth, which are antagonists.

For orthopedic purposes, it is important to distinguish two heights of the lower part of the face: the height of relative rest and the occlusal height. The height of relative rest is characterized by the fact that the tooth rows are not closed, there is a gap between them from 1 to 8 millimeters, depending on the depth of the incisal overlap, while the muscles of the person are in a state of physiological rest. The occlusal height is characterized by tight closing of the tooth rows in the state of central occlusion, the musculature is in a shortened state. Knowledge of these characteristics is important when designing removable prostheses.

The examination of the person also allows to establish previously transferred diseases or accompanying halsomatic diseases. For example, the presence of freckles in the area of the upper lip indicates surgical interventions for a cleft. Dryness of the skin, the presence of tightening folds of the skin in the area of the upper and lower lip with a decrease in the size of the oral cavity suggests a diagnosis of systemic scleroderma. The presence of blisters indicates the effects of chemical or thermal burns. With a number of endocrine diseases, such as acromegaly, the person has a characteristic shape. The presence of mustaches and beards in women is characteristic of Itsenko-Cushing's disease.

A careful examination of the person, accompanied by a purposeful questioning of the patient, will contribute to the correct formulation of the diagnosis, both primary and secondary.

Oral examination. Examination of the oral cavity is one of the main points, because the detection of local manifestations of the disease will determine the tactics of orthopedic treatment in the future.

The examination is carried out in the following sequence: examination of the oral cavity, assessment of the teeth, assessment of the dentition, the presence of defects in them, ratio of the dentition, assessment of the mucous membrane of the oral cavity, assessment of the jaw bones.

First of all, pay attention to the degree of mouth opening. Restriction of mouth opening is possible when the mouth opening is narrowed as a result of muscle or joint contracture and will interfere with many manipulations during prosthetics (introduction of impression spoons to remove an impression, putting on a prosthesis, preparation of teeth).

Examination of teeth. Dental examination is carried out with a probe, a mirror and tweezers. For convenience, the examination of the teeth begins with the right side of the lower jaw, then the left side with a transition to the upper jaw, continuing the examination from left to right. During the examination, the mirror is held in the left hand, and the probe or tweezers in the right. The mirror makes it possible to examine the tooth from all sides. At the same time, they pay attention to the position of the tooth, its shape, color, state of hard tissues (caries, fluorosis, hypoplasia, etc.), stability of the tooth, the ratio of its extra-alveolar and intra-alveolar parts, its position in relation to the occlusal plane, the presence of fillings, crowns, their condition. The probe determines the integrity of the crown part, sensitivity of the tooth, and the depth of the gingival pocket. At the same time, the color of the tooth is evaluated (decrease or lack of enamel shine, presence of chalk-like or brown spots, grooves). In depulped teeth, the enamel does not have a characteristic shine, it has a grayish-yellowish tint. Enamel is changed in smokers, in workers involved in the production of acids and alkalis. With a number of diseases, the shape of the teeth also changes.

An important point during the dental examination is the determination of tooth mobility. Physiological and pathological mobility of teeth are distinguished. The first is natural and imperceptible to the eye. Its existence is confirmed by the erasure of contact points and the formation of contact pads. Pathological mobility is characterized by a noticeable shift of the tooth with little effort.

The mobility of the teeth is a sensitive indicator of the state of the periodontium, its supporting apparatus, which is of great importance for making a diagnosis, evaluating the results of treatment or prognosis.

There are four degrees of pathological tooth mobility (according to Entin). In the first degree, there is a shift in the vestibulo-oral direction. With pathological mobility of the second degree, the tooth is displaced both in the vestibulo-oral and mesiodistal directions. With the third degree, the tooth, in addition, shifts in the vertical direction, when pressed, it sinks into the hole, and then returns to its original position. With the fourth degree of pathological mobility, the tooth not only has visible mobility in the three specified directions, but can also rotate.

Pathological mobility is always accompanied by the presence of pathological gum pockets. Their presence and depth are determined by the probe.

Pathological tooth mobility is often accompanied by pronounced atrophy of the alveolar process, as a result of which the extra-alveolar part of the tooth prevails over the intra-alveolar part. This is most characteristic of single standing teeth. An increase in the external lever causes a functional overload of the tooth. The use of such teeth for the purpose of prosthetics requires special preparation, which consists in shortening the crown part of the tooth.

Restored defects of the crown of the tooth with a filling, a crown, are carefully inspected, paying attention to the safety of the filling, compliance of

the artificial crown with the proposed requirements (tight fit of the edge of the crown to the neck of the tooth, its integrity, discoloration, etc.).

The results of the dental examination are recorded in the dental formula. At the same time, milk teeth are marked with Roman numerals, permanent ones with Arabic numerals.

When examining teeth and making a clinical diagnosis, the method of percussion (tapping), probing and palpation is widely used.

Tapping is carried out with the handle of tweezers or a dental probe, lightly tapping on different surfaces of the tooth. Percussion of a healthy tooth produces a loud sound and the patient does not respond to it. When there is a change in the pulp, the periodontium, painful sensations of varying intensity occur. Percussion is carried out carefully, and the appearance of pain with a weak blow does not require a further increase in the force of the blow. Teeth with dead pulp, depulped teeth with sealed canals emit a hollow sound. For comparison, percussion is always performed on adjacent teeth. A muffled sound is heard during the expansion of the periodontal gap. Dulling of sound occurs as a result of impaired blood circulation in the periodontium, swelling. At the same time, the swollen tissues seem to absorb the sound. In the case of a pathological process, there is a dulling of the sound at the top of the root when percussion is performed.

Probing is used to determine the depth of the carious cavity, the nature of the softened tissue, as well as to study the state of the periodontium. The term periodontium includes a complex of formations that have a genetic and functional unity: tooth, periodontal tissue, bone tissue and periosteum, gums. The neck of the tooth in the gums has a circular ligament that attaches the gum to the tooth and protects the periodontium from external damage. Violation of the integrity of this formation leads to inflammation, the formation of pathological gingival pockets of different depths. To determine the depth of the pocket, an angle probe is used, the end of which is blunt, and there are millimeter divisions on the surface. The probe is effortlessly inserted into the gingival groove one by one from all sides of the tooth. If the probe sinks 1-2 millimeters, then it is said that there is no pocket or it is called a physiological gingival pocket. When the probe is immersed from the anatomical neck to half the vertical size of the crown of the tooth or more, talk about the degree of atrophy of the alveolar wall.

The presence of a pathological gingival pocket should be differentiated from a false gingival pocket, which is formed during inflammation and significant swelling of marginal periodontal tissues and hypertrophic gingivitis. With appropriate treatment, the mucous gum returns to normal and the pocket disappears.

With a number of diseases, there is a decrease in the volume of the tooth, as a result of which it is at a certain level in relation to the root of the tooth. In this case, we talk about the clinical neck of the tooth.

Palpation is used to determine tooth mobility. Tooth mobility is a symptom of many diseases: periodontitis, periodontitis, acute and chronic trauma resulting from inflammatory processes and swelling of surrounding tissues.

During examination and instrumental examination, the absence of teeth is established. At the same time, through questioning, it is found out whether the tooth has been extracted or whether there is primary adentia.

Assessment of the condition of the dentition. Inspection of dental rows is carried out separately. At the same time, the following are determined: 1) the number of remaining teeth; 2) presence and topography of the defect; 3) replacement of defects with prostheses and their type; 4) nature of contacts with adjacent teeth; 5) shape of dental arches; 6) the level and position of each tooth in relation to the occlusal plane; 7) type of bite.

In a correctly formed maxillofacial system, the tooth rows represent a single entity both morphologically and functionally. The unity of the tooth row is ensured by interdental contacts, the alveolar process and the periodontium.

Interdental contact points in the front teeth are located near the cutting edge, and lateral - near the chewing surface of the proximal sides. Under them are triangular spaces, facing the base of the alveolar process, which are filled with gingival papillae. They are protected in this way from damage by food. In addition, the pressure falling on the teeth is distributed not only on the root of the tooth, but also on the interdental contacts on the adjacent teeth, ensuring the unity of the dentition.

With age, contact points are erased and instead of them, contact pads are formed. Their wear is proof of the physiological mobility of the teeth. At the same time, a mesial displacement of the teeth occurs, as a result of which the tooth row is shortened to 1 cm. At the same time, there is no violation of the continuity of the dental arch.

When examining the dentition, the absence of a tooth (teeth) is established, and the reason for its loss is identified. A tooth may not erupt due to the absence of a rudiment of a permanent tooth, then one speaks of primary or congenital adentia. If the loss of a tooth occurred after eruption, it is said to be secondary or acquired adentity.

There are many options for missing defects

teeth To systematize their proposed classification of dentition defects resulting from tooth loss. The most common in our country and abroad is the classification proposed by Kennedy, which takes into account the position of the defect in the dental arch and its length (Fig. 4). He divides all defects of dental arches into 4 classes.

The first class includes dental arches with bilateral end defects that were formed as a result of the loss of chewing teeth.

The second class consists of dental arches with a unilateral end defect.

The third class includes dental arches with an intermediate defect in the lateral part of the back.

In the fourth class, only the front teeth are missing.

If there are several defects of different classes in the dental arch, then the dental arch is assigned to a smaller class one by one. For example, with a dental formula

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there is a defect of the fourth and first class, in this case the dental arches belong to the first class.

At the physiological norm, each tooth has a certain position in relation to the occlusal plane. The occlusal plane is the plane drawn from the cutting edge of the central incisor of the lower jaw to the top of the distal buccal tubercle of the second (third) molar. The teeth are located in an orthognathic bite in relation to the occlusal surface in a certain order: the cutting edges of the incisors, canines and the distal buccal tubercle of the third molar touch the plane, the first and second premolars and molars are located below this plane. The central incisors and canines of the upper jaw are 2/3 mm (to the depth of the incisor overlap) below the occlusal plane. This arrangement of the teeth ensures the curvature of the dental arch in the anterior-posterior and lateral directions.

The appearance of defects in the dentition violates not only the morphological unity of the dentition, but also leads to a complex restructuring of it, first in the area of the defect, and then spreads to the entire dentition. This rearrangement is manifested by the inclination of the teeth to the side of the defect, the vertical movement of the teeth devoid of antagonists, rotation around the axis, and other disturbances that lead to deformation of the occlusal surface.

A distinction is made between primary and secondary tooth movement. Primary movement begins with the eruption of teeth and ends with the formation of dental arches. By secondary movement, it is customary to understand the change in the position of the teeth after their eruption and the formation of tooth rows due to the appearance of defects in the dental arches or as a result of periodontitis, jaw tumor, traumatic occlusion.

Secondary movement of teeth that occurs in different directions is most common.

The following types of secondary displacement are most common.

The first group.

1) Vertical movement of the upper teeth is unilateral or bilateral.
2) Vertical movement of upper and lower teeth, unilateral or bilateral.
3) Mutual vertical movement of upper and lower teeth is unilateral or bilateral.

The second group.

1) Distal or mesial shift of the upper teeth is unilateral or bilateral.
2) Distal or mesial displacement of the lower teeth is unilateral or bilateral.

The third group.

1) The inclination of the upper teeth in the palatal or buccal side.
2) Inclination of the lower teeth in the palatal or buccal side.
3) The fourth group.

1) Rotation of the tooth around the longitudinal axis. The fifth group.

1) Combined tooth movement.

Secondary movements of teeth sometimes come to the fore, determining the nature of the entire clinical picture, and determine the relative typicality of treatment measures for various types of secondary movements. Hence the importance of their detection during the clinical examination of the patient.

Evaluation of the condition of the mucous membrane of the mouth. A healthy mucous membrane has a pale pink coloring in the gum area and pink in other areas. In pathological processes, the color of the mucous membrane changes, various elements of the lesion appear on it. The most common of them are: erosions - a surface defect, aphthae - small areas of ulcers of yellow-gray colors with a bright red rim of inflammation, ulcers - a primary morphological element in the form of a defect with uneven and undercut edges and a bottom covered with gray plaque.

The patient complains of areas of redness of the mucous membrane, bleeding, swelling and burning of the mucous membrane of the prosthetic bed.

The cause of these symptoms can be: mechanical trauma, heat exchange disorders of the mucous membrane due to poor heat conduction bridges of the plastic prosthesis, toxic-chemical effects of plastic ingredients, allergic reaction to plastic, systemic diseases (vitaminosis, endocrine diseases, diseases of the gastrointestinal tract, mycosis, etc.).

During the examination, it is important to establish the nature of the lesion of the mucous membrane, the cause of the lesion, the stage of the disease (aggravation, remission). All these factors are important for choosing the method of treatment and the material from which prostheses will be made, as well as determining the beginning of prosthetics. For example, in the presence of erosions, ulcers of a traumatic nature, prosthetics is performed after their complete healing. When manifestations of lichen planus, leukoplakia and other chronic diseases are detected in the oral cavity, prosthetics is performed during the period of remission.

When the above-mentioned lesions of the mucous membrane of the oral cavity are detected, it is necessary to conduct additional studies (blood analysis, cytology), consult with a dental therapist and, if necessary, a dermatovenerologist for the purpose of differentiation. For example, traumatic ulcers must be differentiated from cancerous and tubercular ulcers, syphilitic ulcers.

Prolonged trauma can lead to hypertrophy of the mucous membrane and the formation of fibromas and papillomas.

Examination of the jaw bones. When examining the mucous membrane of the oral cavity, during palpation, bone bed formations are simultaneously examined. Attention is drawn to the expressiveness of the alveolar process, the arch of the hard palate, and the maxillary cusps. The zone of the median seam must be examined for the purpose of determining the torus (Fig. 69, a).

In the region of the edentulous alveolar process, sharp bony protrusions are sometimes identified, which were formed as a result of incomplete overgrowth of the tooth socket and protruding interdental septum. These protrusions are painful, because the mucous membrane covering them is thinned, without special surgical preparation of these areas, it is not advisable to carry out prosthetics.

On the lower jaw, in a number of cases, it is possible to establish the presence of bone protrusions (exostoses) on the lingual side of the right; and the left half of the jaw, their considerable expressiveness requires special preparation before prosthetics with removable prostheses.

Examination of the temporomandibular joint. With the formation of dentition defects, due to the loss of chewing teeth, pathological wear of the remaining group of teeth, periodontal diseases, the inter-alveolar distance decreases, the position of the lower jaw changes, which causes a change in the position of the articular heads and all the ratios of the joint elements. All this leads to the disease joint

The synchrony of the displacement of the articular head in relation to the articular disc and the articular fossa during movements of the lower jaw may be disturbed in diseases of the muscles, especially the external pterygoid muscle, the central nervous system, diseases of the joint itself (arthritis, arthrosis). Therefore, during the examination, it is important to identify the root cause of the disease of the joint, because the technique of prosthetics and the nature of therapeutic treatment depend on it.

The following complaints about pain in the joint are most often presented: swelling in the joint area, difficulty opening or closing the mouth, pain, clicking, headache, burning of the tongue, dry mouth. The palpation method is used to examine the joints. For this, the index fingers of the hands are placed on the front surface of the scapula and the patient is asked to slowly open his mouth. At the same time, the palpator determines the surface of the articular head and the back zone of the joint gap. By moving the fingers forward and pressing on the projection of the joint gap and the joint head, painful points are determined. Palpation is carried out when the teeth are closed, at the moment of opening and when the mouth is wide open.

The sound of friction, crepitation in the joint may be associated with a violation of the release of synovial fluid. A snapping, crunching sound at the moment of opening the mouth is more due to a decrease in the height of the bite and a distal shift of the lower jaw, and, therefore, the articular heads. Crepitation, crunching, clicking can also be determined by auscultation methods using a phonendoscope. With the appearance of pain in the joint, clicking and crunching, it is necessary to conduct additional studies (x-ray, rheography, arthrography).

LABORATORY AND INSTRUMENTAL RESEARCH METHODS

Laboratory-instrumental research methods are considered additional because they are not always used. The goal of these studies is to establish and confirm an accurate diagnosis.

X-ray research is based on obtaining and reading X-ray images. Various methods are used for this:

— intra- and extra-oral radiography;
— tomography;
— panoramic radiography.

Radiography is the most common and available method of radiological examination of teeth, alveolar processes, jaws, bones of the facial skeleton and skull.

Radiography provides valuable information about the condition of the hard tissues of the crown and root, the dimensions and features of the pulp chamber, root canals, the width and nature of the periodontal fissure, the condition of the alveolar process cavity wall. the presence of pathological processes in areas inaccessible to external inspection, deformation of the bones of the maxillofacial region.

On the X-ray image, the image is negative: bone tissue has light shades, soft tissues, air spaces - dark. Enamel has a lighter tone than cementum and dentin. Carious cavities have dark shades. The cavity of the tooth, the periodontal gap look like dark lines of different configurations.

An intraoral X-ray allows to determine carious cavities, impacted teeth, pulp topography, canal patency, the presence of denticles, stanperiapical tissues overhanging the edges of the crowns, the degree of alveolar bone tissue atrophy.

Tomography. X-ray examination, convenient for studying structural changes of the alveolar process and jaws, turned out to be insufficient for studying the temporomandibular joint, because it has a complex structure and is located near the base of the skull. Therefore, it is almost impossible to obtain an X-ray image of the temporomandibular joint using conventional radiography methods.

Conventional X-ray of the joint gives an idea of only gross changes in articulation (fractures, sharp deformations of the joint surfaces during inflammatory and degenerative processes). Subtle changes in the initial stages of the disease cannot be detected by this method, and the joint looks normal on the X-ray.

All this, of course, prompted the search for new, more advanced methods of X-ray examination of the joint. Such methods include tomography. It allows you to get an X-ray image of a certain cartilage located at one or another depth. This method makes it possible to study the ratio of the elements of the temporomandibular joint at a certain depth. With its help, it is also possible to detect small structural changes in the bones of the joint, caused by both general and local (disruption of function, trauma) diseases.

Panoramic radiography (panography). Panoramic radiography proposed by Blackman. It allows you to get a complete picture of all the teeth in the form of

a panoramic picture of sufficient sharpness with a 2-fold increase and significantly less radiation than with a regular picture. Shooting is carried out while the object and the cassette are moving, and the X-ray tube remains stationary. At the same time, only those layers of the object are determined, which are removed at the same speed as the film. These layers appear more sharply, while others are blurred. The X-ray tube is placed behind, below the back of the head. During the production of the image, the chair with the patient rotates clockwise, and the cassette with the X-ray film rotates in the opposite direction. As a result of such arrangement of the patient and the film, an expanded image of the jaws is obtained. The availability of the X-ray method has given rise to the opinion of some doctors about its harmlessness. This led to an unjustified expansion of the indications for radiography of the teeth and alveolar process. Meanwhile, X-ray exposure is not indifferent to the body, and it is necessary to remember the limits of its use.

When examining a patient before prosthetics, an X-ray is shown of teeth with affected periodontium, in case of suspicion of a hidden carious cavity, roots covered by a mucous membrane, teeth with fillings, teeth that were the support of bridge-like prostheses, clasps covered with crowns, teeth with pathological wear of teeth, changed in color, etc. .d.

Radiography. Recently, there have been devices that combine an X-ray unit and a video camera, so-called X-ray visiographs. They make it possible to receive on the screen with the help of a video camera the images of the tissues of the tooth and soft tissues, enlarged by 27 times. In addition, with the help of an x-ray visiograph, you can get a photo of the image received on the screen, which favorably distinguishes it from an ordinary x-ray machine, because it does not need time to develop the film. The image on the photograph is clearer than on X-ray film. The radiograph is placed directly in the doctor's office.

Methods of determining masticatory pressure. Absolute silage of muscles. The masticatory muscles belong to the power muscles, that is, developing mainly strength, in contrast to other muscles, which tend to develop mainly speed.

Absolute muscle strength is determined by the number of fibers that make up a given muscle, that is, by the area of the physiological diameter. The more fibers in a muscle, that is, the larger the area of the physiological cross-section, the more effort this muscle can develop. Weber believes that "the strength of a muscle, other things being equal, is proportional to its cross-section."

According to Weber, a muscle with a diameter of 1 cm2 develops a force equal to 10 kg. The muscles that raise the lower jaw have the following cross-sections: temporal muscle — 8 cm2, masticatory muscle — 7.5 cm2, external pterygoid muscle — 4 cm2. Based on the cross-sectional data, the absolute strength of the temporal muscle is 80 kg, the masticatory muscle is 75 kg, and the external pterygoid is 40 kg, that is, the total absolute strength of the muscles of one side is 195 kg. The total absolute strength of the masticatory muscles of the right and of the left side is 290 kg (195x2).

The absolute strength of the muscles, established theoretically by adding the indicators of the physiological diameters of the masticatory muscles that raise the lower jaw, and multiplying the obtained amount by the possible development of strength by each square centimeter of the cross-sectional muscle, naturally does not correspond to reality. When working together, the masticatory muscles cannot develop a force equal to 290 kg. The absolute strength of both chewing and other muscles develops only in moments of danger and mental turmoil, and in everyday life a person does not need to develop such strength when chewing food. Therefore, researchers are mainly interested in the pressure that develops on a certain part of the body for biting and chewing food of the appropriate consistency (meat, bread, crackers, etc.). It is also important to know the endurance of periodontal teeth to masticatory pressure, which would allow orientation in the permissible load of it during prosthetics with bridge-like and other prostheses.

The endurance of the periodontium is measured with special devices - gnathodynamometers. The gnathodynamometer was first proposed in 1893 by Bleck. After that, others based on the same principle were designed. The device is supplied with a platform for teeth. When closing the mouth, the teeth transmit a certain pressure through the platform to the spring, which is registered on the scale in kilograms. In recent years, new designs of the gnathodynamometer have been proposed, which perceives the strain gauges as a device.

The gnathodynamometry method was not accurate enough, because these devices measure the endurance of the periodontium to pressure that has only one direction (vertical or lateral). When the force is applied to the tooth, the pressure is distributed and acts, in addition, both on the supporting tooth and on the nearby guard.

Static methods of determining masticatory efficiency. To determine the endurance of the periodontium and the role of each tooth in chewing, special tables have been proposed, which have received the name of statistical systems of accounting for chewing efficiency. In these tables, the degree of participation of each tooth in the act of chewing is determined by a constant value expressed as a percentage.

When compiling these tables, the role of each tooth is determined by the size of the chewing and cutting surface, the number of roots, the size of their surface, the distance at which they are removed from the angle of the jaw. Several tables constructed according to the same principle have been proposed (Dushanzh, Vustrov, Mamlok, etc.). In our country, the static system of accounting for chewing efficiency, developed by N.I. Agapov (Table 1), has become widespread.

Table 1 Chewing coefficients of teeth according to N.I. Agapov

Teeth		1	2	3	4	5	6	7	8	In total
Chewing	in/sh	2	1	3	4	4	6	5	-	25

coefficients	n/a	1	2	3	4	4	6	5	-	25

N.I. Agapov accepted the chewing efficiency of the entire dental apparatus as 100%, and the unit of chewing ability and endurance of the periodontium is the small incisor, comparing all other teeth with it. Thus, each tooth in his table has a constant chewing coefficient.

N.I. Agapov made corrections to this table, recommending that when calculating the chewing efficiency of the remaining dentition, antagonistic teeth should be taken into account. For example, with a dental formula

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chewing efficiency is equal to 58%, and with dental formula

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it is zero because there is no pair of antagonists.

As already noted, in the Agapov system, the value of each tooth is constant and does not depend on the condition of its periodontium. For example, the role of a canine in chewing is always determined by the same coefficient, regardless of whether it is stable or has pathological mobility. This is a serious drawback of the proposed system.

V. Yu. Kurlyandsky proposed a static system of accounting for the state of the supporting apparatus of the teeth, which he called the periodontogram. The periodontogram is obtained by entering data about each tooth in a special table.

As in other static schemes, in the periodontogram, a conditional coefficient is assigned to each tooth by a healthy periodontium. These coefficients are based on the proportional ratios of the periodontal endurance of different teeth to the load, which was determined by gnathodynamometry with an intact periodontium. The coefficient of periodontal endurance to load is correspondingly reduced at different degrees of atrophy of the socket in different teeth. With stage IV atrophy, the periodontium has no endurance to load (the tooth must be removed).

In practice, it is generally accepted that the periodontium of a tooth is able to withstand twice as much load as the load during food processing.

FUNCTIONAL RESEARCH METHODS

Functional chewing samples. Static methods turned out to be not very acceptable for determining the degree of disturbances in chewing efficiency, and not only because they do not accurately determine the role of each tooth in chewing and the perception of chewing pressure, but also because they do not take into account the type of bite, the intensity of chewing, the strength of chewing pressure, the influence saliva for grinding food, the role of speech in the mechanism of food lump formation. Therefore, in order to take into account the influence of all the above-mentioned factors, functional (chewing) tests were proposed, which allow to obtain a more correct representation of the disturbance of the chewing function.

The masticatory force of the muscles is in physiology the force that can be developed by all the masticatory muscles that raise the lower jaw. It is equal, according to Weber's data, to an average of 390--400 kg (the physiological diameter of all three pairs of levator muscles of the lower jaw is 39 cm2, and 1 cm2 of the area of the physiological diameter of the muscle can develop a force of 10 kg. Hence, it is necessary that the entire masticatory the musculature can develop a force of 390-400 kg. The physiological diameter of the internal pterygoid muscle is 4.0 cm2, characteristic of the masticatory muscle is 8 cm2, temporal muscle is 7.5 cm2, that is, the internal pterygoid muscle can develop a force of 40 kg, characteristic chewing — 75, and temporal — 80 kg, only on one side 195 kg, and on both - 390 kg.

Masticatory pressure is the force exerted by the masticatory muscles on one side of grinding food. Vertical and horizontal masticatory pressure are distinguished. It is measured in kilograms using a gnathodynamometer.

Chewing efficiency is the degree to which food is crushed by the teeth. The masticatory efficiency is measured as a percentage compared to the intact dentition-jaw system, the masticatory efficiency of which is taken as 100%.

The Christiansen mastication test is the first of the methods for determining mastication efficiency. He investigated the degree of crushing of a certain food - a forest nut or a coconut. For the sample, 5 m of walnut were taken, after 50 chewing movements, the patient spat the chewed mass onto a strainer with a diameter of 2.4 mm. The mass was sieved, the remainder was weighed. The remainder, divided by 5 m and multiplied by 100%, was the Christiansen coefficient.

Chewing test according to Gelman is a modified technique of Christiansen, proposed for assessing the functional state of the maxillofacial system and determining chewing efficiency. The test was based on the author's observation that the intact maxillofacial system grinds 5 m of almonds in 50 seconds. to the size of the particles sifted through a sieve with holes with a diameter of 2.4 mm. If there are defects in the tooth rows in 50 seconds. the almonds are not completely crushed, and part of them remains on the sieve.

Methodology: 5 m of almonds are weighed and the examinee is asked to put the almond in his mouth and start chewing after the "start" signal. The start of chewing is marked on a stopwatch. After 50 sec. at the "step" signal, the subject stops chewing, spits out the chewed mass into a tray, rinses his mouth and spits out water into the same cup. For disinfection, add 5-8 drops of a 5% sulema solution to the tray. The contents of the tray are filtered through cheesecloth, and the residue is evaporated into a water tank. Then the mass is carefully sifted through a sieve, stirring often, preferably with a wooden stick. Part of the mass remaining on the sieve is carefully poured into an hour glass of the appropriate size and weighed. The percentage of chewing disorder is calculated according to the following formula. Let's assume that a mass weighing 2.62 m remained on the sieve, then:

5:2.82= 100:X, where X is the percentage of chewing disorder

x : 2.82= 100 : 5

x = 2.82x100 282:5= 56.4%.

Chewing efficiency is 100% - 5b.4% = 43.6%.

Chewing test according to I. S. Rubinov - proposed to assess the functional state of the maxillofacial system. Technique: products with different physical properties are used (nuts, breadcrumbs, soft bread, etc.). On the basis of the chewing test, it was found that, as the state of the dental system deteriorates, the time of chewing before swallowing when processing solid food substances (nuts) is prolonged, and despite this, food particles of relatively large sizes are swallowed. It is known that in adults with a complete chewing apparatus, the duration of chewing the kernel of one nut before swallowing is on average 14 seconds, and the residue in the food is zero (according to the Christiansen method), and in the absence of 2-3 teeth, the chewing time is 23 seconds, and part of the kernel remains insufficiently fragmented. In cases of intact and broken dental system, the time spent chewing soft food differs little. I. S. Rubinov will use one walnut kernel for the sample instead of 5 m of almonds. This makes it possible to judge the functional state of individual groups of teeth. The processing of the obtained core chewing data is carried out according to the method of S. E. Gelman.

Graphic methods of studying chewing movements of the lower jaw. Various diseases of the oral cavity and masticatory muscles disrupt the biomechanics of the lower jaw. As the patient recovers, the movements of the lower jaw may return to normal. Normal movements of the lower jaw, their violation and the dynamics of recovery can be studied using a graphic method. At this time, the chewing movements of the lower jaw can be recorded on various devices: kymograph, oscilloscope, etc.

I.S. Rubinov developed in detail the recording of chewing movements of the lower jaw (masticography) and deciphered the meaning of each of the component parts of the graphic recording.

Study of the function of masticatory muscles.

The function of the masticatory muscles changes not only during various movements of the lower jaw, but also in connection with pathological conditions of the masticatory apparatus: loss of teeth, joint disease, change in bite height. Therefore, for a complete characterization of the clinical picture accompanying this or that disease of the masticatory apparatus, it is desirable to obtain data on the functional state of the masticatory muscles by means of myotonometry and electromyography.

With the help of myotonometry, the tone of the masticatory muscles is measured. Devices used for this purpose are called myotonometers. The degree of tension (density) of the muscles is judged by the expended force with which the probe of the device plunges to a given depth. The arrows of the dial show the degree of muscle tension in grams.

Electromyography. Electromyography refers to the measurement of biopotentials of muscles in general and chewing muscles in particular. During

the contraction of the muscles, currents of action appear in them. These action currents can be amplified by special devices and recorded on the photo paper of the oscilloscope in the form of a curve. This research method is called myography.

Thermal diagnostics. Determining the reaction of a tooth to temperature stimuli (heat or cold) — thermodiagnostics — is one of the simplest methods of examining the condition of the tooth pulp. Teeth that do not have changes in hard tissues and pulp react to a heat factor above +50° C, to cold below +10° C. In case of pulpitis, irrigation of the tooth with a stream of hot water +50° C, sometimes lower, or application of a tampon to the tooth , moistened with hot water, causes a sharp pain that does not go away for a long time, and in case of deep caries, the pain goes away quickly. Teeth react to cold and heat after preparation, when the necks are exposed, wedge-shaped defects.

To determine the reaction of the tooth, a special thermoodontochronometer device will be used. With the help of the device, the specified temperature effect is detected on a certain area of the tooth. The sensor of the device makes it possible to receive the temperature from 0 to +70 ° C and smoothly adjust it. The device records the time of occurrence of the corresponding reaction.

Diagnosis is one of the most difficult sections of clinical medicine in general and orthopedic stomatology in particular. Correct diagnosis is possible if the results of various studies are obtained, confirming the likelihood of symptoms, if there is a clear presentation of the etiology, pathogenesis of the disease, clinic and pathological anatomy.

The doctor collects individual facts (symptoms) in a certain sequence, analyzes them in order to synthesize the collected facts.

Having received the results of various studies that confirm the probability of symptoms, they are compared with the symptoms of known diseases and put forward an assumption (hypothesis) or several hypotheses. There can be several working hypotheses when making a diagnosis. All of them, especially in complex clinical cases, should be carefully checked to prevent medical errors: diagnosis of one disease instead of another; diagnosis of one disease, while the patient suffers from several diseases, diagnosis of complications of the main disease without defining this main disease, diagnosis of complications as the main disease, and the main one is interpreted as a complication.

Hypothesis testing necessarily involves differential diagnosis.

Thus, the diagnosis should be formulated in such a way as to, firstly, characterize the cause of the disease, i.e. etiology and pathogenesis, secondly, give an idea of the patho-anatomical basis of the disease, its localization; in the third, to indicate the degree and nature of functional disorders, in the fourth, to specify the specifics of the course and form of the disease.

Medical history. The medical history or ambulatory card of a dental patient is a mandatory official and medical document in which examination data, diagnosis, orthopedic treatment plan and its implementation are entered. All data must be recorded consistently and completely, so that not only fills the

medical history, but also another doctor can form a complete picture of the patient, the validity of the chosen method of prosthetics and its result. For a young doctor who is just starting his practice, it is not superfluous to remember that this document, reflecting the dynamics of the development of the disease, the method of treatment and its result, is at the same time a certificate of medical maturity, which testifies to the level of clinical thinking of the doctor, his capacity for work.

The medical history must be filled in so that the sequence of treatment can be carried out. In other words, another doctor who will continue to treat the patient, based on the records, must clearly imagine the clinical picture that existed before the treatment, the validity of the diagnosis and the method of treatment.

The medical history in some cases can play the role of a legal document, so the entries in it should be clear and given in sufficient volume.

SCHEME FOR COMPLETING THE HISTORY OF THE DISEASE

I. Official data:

and) P.I.B. •

b) age

in) profession

d) address

II. Complaints of the patient (disturbance of mastication, aesthetics, defect of crowns, mobility, increased grinding of teeth, pain in the temporalmandibular joint; pain under the basis of a schematic prosthesis, tooth pain under an artificial crown, etc.)

III. Medical history:

1. From what age and beginnings to lose teeth and which ones, in what sequence (incisors, canines, premolars, molars).

2. Does the patient note the connection of dental pathology with working conditions, living conditions, transferred diseases (rickets, infectious diseases, bad habits, etc.).

3. Why were the teeth extracted (crown destruction, mobility, increased attrition, osteomyelitis, etc.).

4. Does the patient note the appearance of diseases after losing teeth

gastrointestinal tract (disturbance of taste, appetite, belching, nausea, vomiting, feeling of weight in the bed area before and after meals, pain, etc.).

5. Did the loss of teeth affect the language?

6. Did he run after losing his teeth to restrictions when eating (noticeable hard food for more soft food). Which side mainly chews food.

7. How is tooth care carried out, from what age and whether regularly (using a toothbrush, powder, paste, brushing teeth only in the evening or in the morning, before meals, after meals).

8. The patient is getting prosthetics for the first time or again. Uses removable or fixed prostheses (for how long, feedback on prostheses).

9. Reasons for dissatisfaction with prosthetics (pain, poor fixation of a removable prosthesis, unsatisfactory aesthetics, burning of the mucous membrane of the oral cavity under the prosthesis, nausea, fatigue of the masticatory muscles, speech impediments, impaired diction, long habituation, decubitus ulcers, etc.).

10. Evaluation of the old prosthesis (aesthetics, occlusion, fixation, condition of artificial teeth, condition of tissues of the prosthetic bed, staples, relation to the gingival margin, etc.).

11. What common diseases does the patient suffer from (anemia, allergy, stomach ulcer, duodenal ulcer, diabetes, hypertension, hemiplegia, polyarthritis, bronchial asthma, trigeminal neuralgia, etc.).

12. Presence of bad habits (smoking, drinking alcohol).

13. Does the patient constantly or only recently use pharmacological drugs, which ones exactly.

14. Does he experience excitement, anxiety before the upcoming orthopedic treatment. What causes for concern.

15. Was anesthesia performed in the past during treatment or tooth extraction, its effectiveness.

16. Peculiarities of premorbid personality (normal subject, without distinct expressiveness of individual features, thoughtful-anxious-distrustful, prone to doubt, demonstrative, hysterical, excitable passive, powerless, haunting, withdrawn, unsociable personality).

IV. Objective data:

A) External review.

1. Face type (conical, reverse-conical, square, rounded).

2. The condition of the skin of the person (colors, turgor, rash, spots, etc.).

3. Prominence of chin and nasolabial folds (moderately pronounced, smoothed, deepened).

4. Character of closing the lips (lips close without tension, tense).

5. The corners of the mouth (lowered, not lowered), there are nicks, there are none.

6. The position of the chin (straight, shifted to the side, protruding, falls).

7. The height of the lower third of the face (reduced, increased, unchanged).

B) Examination of the temporomandibular joint (TMJ).

1. Degree of mouth opening (free, limited).

2. The nature of the movement of the lower jaw (smooth, jerk-like).

3. The presence of confusion of the lower jaw (right, left, absent).

4. Data from palpation of the heads of the lower jaw (movable head, thrust-like).

5. Auscultation data (crunching, crepitation, clicking is determined).

b) Examination of the oral cavity.

1. General characteristics of the mucous membrane of the oral cavity (color, moisture, the presence of pathological formations: polyps, flecks, aphthae, erosions, ulcers, etc.).

2. Salivation (abundant, poor, normal).

3. State of oral hygiene (good, satisfactory, unsatisfactory).

4. Dental formula. Type of bite (orthognathic, straight, biprognathic, prognathic, progenic, cross, deep, open, fixed, unfixed, ratio of edentulous alveolar processes of the upper and lower jaws).

5. Description of the type of bite:

and) signs of occlusion relating to all teeth, signs of occlusion of front teeth,

b) signs of closing the chewing teeth in the buccal-palatal direction,

in) signs of closing teeth in the anterior-posterior direction.

6. Dental examination:

and) the shape of the tooth rows (elliptical, parabolic, trapezoidal, flattened, etc.),

b) the position of individual teeth in the dental row,

in) deformations of the tooth row (classification according to A. I. Gavrilov, Kennedy).

7. Examination of teeth (shape, color, condition of hard tissues: caries, hypoplasia, fluorosis, presence of fillings, their condition).

8. Periodontal examination:

and) condition of the gums (inflammation, atrophy),

b) evaluation of the gingival pocket (depth, suppuration),

in) prevalence of the process,

d) tooth stability,

e) the ratio of extra-alveolar and intra-alveolar parts of teeth.

9. The number of pairs of antagonistic teeth.

10. Characteristics of dentition defects (type, location, shape, size).

11. The state of the edentulous alveolar process of the upper jaw:

and) nature and degree of atrophy (uniform, uneven, greater, small, medium),

b) type of vestibular scat of the upper jaw (gentle, steep, with a canopy),

in) the presence of bone protrusions on the alveolar process after tooth extraction (localization, length, depth of undercuts, tenderness of bone protrusions when pressed),

d) the shape of the ridge of the alveolar process in the front and lateral sections (sharp, rectangular, truncated cone,

semi-oval, flattened, wide ridge, narrow ridge),

e) the presence of a ridge to overlap (localization, magnitude, degree of displacement),

is) expressiveness of the tubercles of the upper jaw (the shape of the vestibular and distal surfaces, right, left).

12. Characteristics of the relief of the solid sky:

and) the shape and height of the solid sky (high arch, low, medium, wide, narrow),

b) state of the hard palate seam (concave, convex, flat),

in) palatine torus (shape, size, localization),

d) the shape of the distal edge of the hard palate (vaulted, flat).

13. Characteristics of the mucous membrane of the prosthetic bed on the upper jaw:

and) flexibility of the mucous membrane of the hard palate,

b) distinctness of buffer zones,

in) expressiveness of the transverse palatal folds in the front part of the hard palate,

d) expressiveness of palatal blind holes, their localization (on the "A" line, in front of the "A" line, behind the "A" line),

e) incisor papilla (size, flexibility),

is) the location of the transitional fold in relation to the alveolar process (at the base, at the level of the slope, at the top),

g) degree of expressiveness, shape and place of attachment of the upper lip frenulum, front and side buccal-alveolar cords

mucous (at the base, to the slope of the hump of the upper jaw, at the top of the hump, to the aponeurosis of the soft palate muscle).

14. The condition of the bone base of the prosthetic bed on the lower jaw:

and) the nature and degree of atrophy of the alveolar process (uniform, uneven, greater, small, medium),

b) size, shape and localization of exostoses,

in) the presence of a chin-tongue torus (size, shape),

d) expressiveness of internal oblique lines, their shape (sharp, pointed round), soreness when pressed,

e) the presence of bone formations on the alveolar process after tooth extraction (localization, shape, size, sensitivity to pressure),

is) the shape of the ridge of the alveolar process in the front and lateral parts of the lower jaw (sharp, rectangular, truncated cone, semi-oval, flattened, wide ridge),

g) the presence of a dangling ridge on the lower jaw (localization, size, degree of displacement).

15. Characteristics of the mucous membrane of the prosthetic bed on the lower

jaws:

and) the location of the transitional fold in relation to the alveolar process (at the base, at the level of the slope, at the top),

b) degree of expressiveness, shape and place of attachment of the frenulum of the lower lip, tongue, front and lateral buccal-alveolar ligaments (at the base, to the slope, to the top of the alveolar process),

in) the presence of folds of the mucous membrane of the alveolar process (location, direction, spreading, not spreading),

d) mucous tubercles (shape, size, mobility, consistency, pain upon palpation).

16. The size and shape of the sublingual space (right, left).

17. The size and shape of the sublingual space in the front part of the lower jaw (large, small, in the form of a slit, triangular, trapezoidal).

18. Submandibular salivary glands (presence, their position during speech movement: protrude above the crest of the alveolar process, do not protrude).

19. Volume and tone of speech (increased, not increased, tone moderate, increased).

20. Muscle tone of the floor of the mouth, cheeks and lips (moderate, increased, decreased).

V. Data of special examination methods:

1. X-ray characteristics of teeth and peri-dental tissues

(the condition of the hard tissues of the crown and root, the dimensions and features of the tooth cavity, root canals, the width and characteristics of the periodontal fissure, the condition of the compact plate, the wall of the alveolus and the spongy substance of the alveolar process, the presence of foci of chronic inflammation, etc.)

2. Data of X-ray examination of TMJ.

3. Tomography and teleroentgenography data.

4. Data on the study of diagnostic models of the jaws.

VI. Diagnosis and differential diagnosis.

Based on the data of the patient's clinical examination, a diagnosis is made, which should consist of the main and secondary. 1. The main disease and its complications:

and) the main disease refers to what prompted the patient to contact the orthopedic clinic;

b) Complications should include those disorders that are pathogenically related to the main disease.

2. Associated diseases are those treated by dentists

other profiles. If necessary, differential diagnosis is carried out.

3. In the diagnosis "Partial loss of teeth" it is necessary to indicate the type of tooth row defect according to Kennedy, and "Complete loss of teeth" - the type of toothless jaw according to I.M. Oxman.

VII. Oral cavity preparation plan for prosthetics:

1. General rehabilitation measures (removal of dental deposits, treatment of teeth, removal of roots and teeth with mobility of the III degree, treatment of diseases of the mucous membrane of the oral cavity, etc.).

2. Special preparation of the oral cavity (depulped teeth, elimination of occlusal disorders, orthodontic preparation, alveolotomy, excision of

frenulums, transfer of the attachment site of the frenulum, tyzhivslizuavata, deepening of the vestibule of the mouth, floor of the oral cavity, etc.).

VIII. Orthopedic course plan.

Specify the type of prosthesis (immediate, proximal, remote). To justify the choice of the design of the prosthesis as a treatment tool.

IX. Diary of orthopedic treatment.

All visits to the patient are recorded, indicating the date and a detailed description of the performed clinical procedures. During repeated visits to the patient after the prosthesis is applied, complaints, objective research data, the nature of the assistance provided, and the peculiarities of the patient's getting used to the prosthesis are described. To evaluate the immediate results of prosthetics (prosthetic quality, functional properties, condition and reaction of prosthetic bed tissues, number of corrections, patient recall, etc.).

X. Epicrisis and prognosis of orthopedic treatment.

The name, age and complaints of the patient on the day of the visit to the clinic are indicated. What was the diagnosis? Beginning and end of treatment. Type of prosthetics and prosthesis construction.

Describe the patient's condition as a result of the treatment and indicate the prognosis.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and skills, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- What methods of examination of patients are used in the clinic of orthopedic dentistry?
- What methods does the subjective examination of the patient consist of?
- Name the objective methods of examining a patient in a clinic of orthopedic dentistry.
- What are the sequence and rules of examination of the oral cavity and dental rows?
- Why is the palpation of the organs and tissues of the oral cavity carried out?
- What devices are used to determine the pathological mobility of teeth?
- What methods are used to determine the depth of pathological pockets?
- What general sanitation measures are carried out in the oral cavity?
- What are the tactics of a dentist-orthopedic doctor in case of tooth root removal?
- What are the indications for tooth extraction in case of periodontal tissue diseases?
- What 3 measures are included in the special preparation of the oral cavity?

- What are the methods of surgical preparation of the oral cavity for prosthetics?

- What is the essence of plastic surgery of cellular processes and parts? - Why is the deepening of the fold of the oral cavity carried out?

- What are the methods of orthodontic preparation of the oral cavity for prosthetics?

- Why is the psychological preparation of patients before prosthetics carried out?

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukraine http://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadsky http://www.nbuv.gov.ua/

PRACTICAL LESSON No. 8

Topic: Classification of prints and print materials. Thermoplastic and crystallizing impression materials. Representatives Physico-chemical properties, indications. Methods of obtaining prints.

Goal:know the materials used to take impressions in orthopedic dentistry. To know the methods of obtaining prints.

Basic concepts:impression, impression materials, method of obtaining impressions.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform practical classes (knowledge requirements, list of didactic units);

- The concept of imprints and imprint materials.
- Thermoplastic and crystallizing impression materials.
- Physico-chemical properties of thermoplastic and crystallizing impression materials.
- Classification of prints.
- Imprint spoons.
- Methods of obtaining prints.
- Sterilization of prints.

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- To be able to choose printing material.
- To know the physical and chemical properties of thermoplastic and crystallizing impression materials.
- Carry out the method of removing the impression.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

OBTAINING MOLDS

For the manufacture of any design of the prosthesis, it is necessary to obtain an impression of the tissues of the prosthetic bed. This is achieved by removing casts. A cast is a negative (reverse) image of the hard and soft tissues of the prosthetic bed using a special material. It is obtained for casting models, according to which one or another structure of the prosthesis will be made in the future. Models are divided into diagnostic models, which are carefully studied in order to clarify the diagnosis and determine the design features of the future prosthesis, and workers, which serve as the basis for the technical manufacture of the prosthesis. There are also auxiliary models. These are models obtained from a cast taken from the opposite jaw. It serves to determine the occlusal relationships of the tooth rows.

A good cast is one of the guarantees of successful orthopedic treatment. Therefore, doctors from the very beginning of their activity should master the techniques of removing casts using various impression materials.

Depending on whether the cast is removed taking into account the functional mobility of the tissues covering the prosthetic bed or without taking into account the mobility, the casts are divided into functional and anatomical. A functional cast is removed from a toothless jaw and less often from a jaw that has preserved teeth. The use of a functional cast in the prosthetics of patients

with edentulous jaws allows to determine the optimal relationship of the edge of the prosthesis with the tissues adjacent to it, thereby ensuring better fixation of the prosthesis, more rationally distributing chewing pressure between different areas of the prosthetic bed and obtaining compression of the mucous membrane of the prosthetic bed.

Functional casts are obtained through the use of functional samples, which allow to design the edges of the cast in relation to the position of the mobile tissues of the oral cavity, which are on the border with the prosthesis. Functional casts are removed with individual spoons, that is, spoons individually made for each patient.

Anatomical casts are the most common. They are used to display the tissues of the prosthetic bed during prosthetics with inlays, crowns, bridge-like prostheses, partial removable prostheses, etc.

PRINTING SPOONS

Casts are removed with special impression spoons, which are manufactured by the factory from stainless steel. The shape and size of the impression spoon are determined by the shape of the jaw, the width of the tooth row, the topography of the defect, the height of the crowns of the remaining teeth, the severity of the edentulous alveolar process and other conditions. Standard spoons have different shapes and sizes. The larger the selection of spoons at the doctor's disposal, the more convenient it is for him to receive a cast.

A standard metal spoon for the lower jaw differs from the upper one by the presence of a cutout for the tongue.

To remove casts with elastic impression materials, use spoons with holes to hold the impression material, since the impression materials of this group have poor adhesion to metal. In the absence of such a spoon, you can use an ordinary spoon, pasting a sticky patch on its inner surface in advance.

For the manufacture of all types of prostheses, spoons for the entire dentition of the upper or lower jaw are used to remove casts.

The model cast from such a mold gives the dental technician a clear idea of the position of the teeth both in the dental row and in relation to the teeth of the antagonists.

In some cases, so-called partial spoons are used to remove casts. They are applicable only for removing casts from jaws with single teeth for making crowns on them or for removing casts from teeth that do not have antagonists.

Imprinted spoons for toothless jaws differ slightly from ordinary standard spoons in smaller sizes, the height of the sides of the spoon, and the degree of arching of the palate. This is explained by the fact that the cast should give a clear impression of the alveolar process, the transitional fold.

In addition to standard spoons, individual impression spoons are used in complete removable prosthetics, which are made individually for each patient with complete tooth loss. The individuality of the production is explained by the fact that the fixation of the prosthesis on the edentulous jaw is ensured due to

the functional suction of the prosthesis due to the creation of negative pressure under it, in order to ensure the suction of the prosthesis, it is necessary to achieve complete correspondence of its surface and the surface of the tissues of the prosthetic bed. And this is possible only with precise adjustment of the edges of the spoon to the borders of the valve area. Previously, individual spoons were prepared from wax, since the only impression material was plaster. Currently, wax spoons are practically not used, and plastic spoons are used. They are made directly on the models, where there is no place for the impression material, because the silicone, thiocol and other elastic materials used do not crumble, do not tear, therefore, the thickness of the cast can be minimal.

Selection of an impression spoon. A well-chosen spoon makes it easier to remove the cast, and the more difficult the condition of obtaining it, the more carefully you need to choose the spoon. When choosing it, it is necessary to keep the following in mind: the sides of the spoon should stand back from the teeth by at least 3-5 mm, the same distance should be between the hard palate and the palatal bulge of the spoon. When removing a cast with alginate or silicone (elastic) materials, this distance can be minimal, and when removing a cast with plaster - maximum.

You should not choose spoons with long sides that rest on the transition fold. The best will be the spoon whose edges, when placed on the tooth rows during the fitting, reach the transition fold. When removing the mold, a layer of impression material 2-3 mm thick will lie between the bottom of the spoon and the teeth, the side of the spoon will not reach the transition fold (Fig. 2).

When choosing a spoon, some anatomical features of the oral cavity should be taken into account. So, on the lower jaw, you need to pay attention to the lingual side of the spoon, which should be made longer than the outer one, in order to be able to press deep into the soft tissues of the floor of the oral cavity. The sides of the spoon can be lengthened with wax according to the individual characteristics of the sublingual space of the patient's mouth.

TECHNIQUE OF OBTAINING AN ANATOMICAL MOLD

The most difficult is the method of obtaining a plaster cast of teeth and jaws. Therefore, we will dwell on its implementation in more detail, since its development will not encounter difficulties when using elastic impression materials.

After selecting a spoon, prepare a gypsum solution. To do this, pour approximately 100 ml of a 3% aqueous solution of table salt into a rubber cup. Gypsum is poured in small portions until a small bump appears on the surface, after which it is stirred to obtain a homogeneous mass of sour cream-like consistency. The mixed mass is placed in a spoon with a spatula up to the crowns and introduced into the oral cavity. At the same time, the doctor pulls the right corner of the mouth away with an index finger or a mirror, while the

left corner is delayed with the side of a spoon. The spoon is inserted at an angle, then, unfolding it, it is placed in the center of the alveolar process. The orientation of this is the location of the handle of the spoon strictly along the middle line. After that, the spoon is pressed to the jaw, first to the back third of the hard palate. After the gypsum leaves the edge of the spoon, the pressure is transferred to the front edge. Then they begin to design the edges of the mold. For this purpose, the doctor grabs the upper lip with his thumb and forefinger and pulls it down, pressing it to the edge of the spoon.

To remove the cast from the lower jaw, the plaster must be thicker. After centering, the spoon is pressed first in the front part, and then in the region of the molar teeth. The vestibular edges are formed by drawing the lips and cheeks to the side, up and back. To form the lingual edge of the cast, the patient is asked to lift the tongue up and forward.

After forming the edges, the spoon is held with the fingers until the plaster hardens completely, which is accompanied by the release of heat. The final readiness is determined by the remains of plaster in the rubber cup. After the plaster begins to break, the cast can be removed from the oral cavity. In the presence of teeth, the cast cannot be removed from the oral cavity without breaking it. The following techniques are used to remove the mold. Place your index finger on the edge of the mold and turn it up or down to break the mold.

In the second method, the doctor outlines the incision lines of the cast (Fig. 3).

Then, inserting a spatula into them, he splits off a part of the mold with lever-like movements. The incision lines are determined by the topography of the defect and the number of remaining teeth. At the same time, it should be remembered that the cuts should not pass along the supporting teeth.

All pieces of plaster are collected in a tray and thoroughly wiped. The inner surface of the spoon is also wiped.

The next stage consists in assembling and gluing the mold. This must be done by a doctor. The pieces are placed in a spoon, starting with larger ones, and then smaller pieces and glued to the edges of the spoon with melted wax. After that, the quality of the mold is evaluated. It should give an accurate impression of the prosthetic bed, as well as an impression of the tissues on its border — a transitional fold with all mobile formations located on it.

OBTAINING AN AUXILIARY MOLD

When prosthetics of the jaw with an auxiliary cast, it is necessary to obtain only impressions of the chewing surfaces and cutting edges of the teeth to the equator from the opposite jaw.

If, in order to assemble the model in the position of central occlusion, it is necessary to make bite templates for the working and auxiliary models, then impressions of not only teeth, but also alveolar processes can be obtained on the cast.

To obtain an auxiliary cast, plaster is applied to the spoon at the level of the sides. The plaster surface is smoothed with a spatula so that the teeth sink evenly to a depth equal to half the height of the crowns of the teeth. The cast is pulled out with rocking movements until the plaster has completely hardened. If the spoon separated without a mold, the removal of the mold is postponed until it hardens even more, after which it is removed in parts.

DOUBLE MOLDINGS

When performing prosthetics with plastic, porcelain crowns, cast bridge-like prostheses, metal-ceramic prostheses, for their high-quality manufacture, it is necessary to obtain an accurate representation of the stump of the prepared tooth, a clear contour of the ledge and the periodontal part (the shape, relief and depth of the periodontal pocket).

Thanks to the development of new impression materials, so-called two-layer casts are used for these purposes.

The first casting is called preliminary, the second final or refined. Dense impression materials (gypsum, acrodent, thermoplastic masses, etc.) are used for the preliminary cast. This cast serves as the basis for obtaining a second refined cast.

The simplest and most affordable method of obtaining a two-layer cast is as follows: a standard metal spoon is used to remove a plaster cast from the dentition before preparing the teeth. To do this, plaster is placed on the impression spoon and covered with a strip of gauze or bandage and inserted into the oral cavity. After the plaster has hardened, the cast is removed from the oral cavity, and the gauze is removed. Then the teeth are prepared. After that, the correcting (correcting) mass of sielast, exaflex, etc. is mixed and applied to the cast in the impressions of the teeth that have been prepared, and the plaster cast is introduced into the oral cavity, tightly pressing it to the dentition. After hardening, the casting mass is removed from the oral cavity.

The method of obtaining a two-layer cast from chemically homogeneous materials (sielast, exaflex, etc.) is more effective and accurate.

COMPLICATIONS WHEN REMOVING THE MOLD

The most frequent complication when removing a cast from the upper jaw is the appearance of a vomiting reflex. The vomiting reflex occurs when the nerve endings of the hard and soft palate, less often the root and lateral surfaces of the tongue are irritated. It can be slowed down by asking the patient to breathe deeply through the nose. In those cases when it is not possible to remove the urge to vomit, the border between the hard and soft palate is anesthetized, lubricated with a solution of cocaine or dicain, irrigated with a 10% solution of propazol.

The second complication is aspiration of pieces of plaster that fall on the root of the tongue. To prevent this complication, when removing the cast, it is necessary to place the patient in a vertical position without tilting his head.

Dental impression materials should have the following properties:

Modern impression materials must meet the following requirements:

• give an accurate impression of the topography of the mucous membrane of the oral cavity (SOPR) and teeth;

• easy to enter and exit from the oral cavity;

• do not deform after removal from the oral cavity;

• do not stick to the tissues of the prosthetic bed and firmly fix in the impression spoon;

• do not dissolve in oral fluid;

• become plastic at a temperature that does not cause a burn of SOPR;

• allow the doctor to take his time and carry out the necessary manipulations until the moment of hardening;

• easily separated from the plaster model and not connected to the plaster;

• can be stored at room temperature for a long time without being deformed;

• to be convenient for work and storage, cheap and allow to subject the impression to sterilization.

Currently, the following classification of impression materials is accepted:

1. What hardens in the oral cavity (gypsum, zinc oxide deugenol pastes).

2. Elastic:

a. Alginate;

b. Silicone;

c. Thiokolovi;

3. Thermoplastic.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

- What should be done during the delivery of a complete removable prosthesis?

- What should be paid attention to when examining a prosthesis outside the oral cavity?

- How to apply a complete removable prosthesis in the patient's oral cavity?

-. What is "fixation of a complete removable prosthesis"? What determines its quality? How to check it?

- What is "stabilization of a complete removable prosthesis"? What determines its quality? How to check it?

- What determines the "balance of a complete removable prosthesis"? What should be done in case of its violation?

- What recommendations should be given to the patient when fitting a prosthesis?

- Define "adaptation". What are the phases of adaptation to a complete removable prosthesis? Name the average period of getting used to a complete removable prosthesis.

- Application of complete removable prostheses in the oral cavity.

- Recommendations for the patient on the care of the prosthesis.

- How to remove complete removable prostheses from the cuvette after polymerization?

- What are the stages of final processing of complete removable prostheses and their purpose?

- How to grind the bases of complete removable prostheses?

- What means and tools are used for polishing the bases of removable prostheses?

- Tell us about the stagecontrol examination after handing over the prosthesis. What complaints can the patient make and how can the identified deficiencies be eliminated?

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- What is the role of auxiliary materials in the clinic of orthopedic dentistry?

- Classification of auxiliary materials.

- Name solid crystal impression materials.

- Plaster. Methods of obtaining. Modifications.

- What is the use of gypsum and the rules for working with it?

- What are the rules for storing gypsum?

- Name the representatives of zinceugenol impression materials,

their properties and applications

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukraine http://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadsky http://www.nbuv.gov.ua/

PRACTICAL LESSON No. 9

Topic: Silicone and alginate impression materials. Physico-chemical properties. Indications for use. Methods of obtaining prints. Obtaining plaster models of jaws. Fixation of models in the occluder.

Goal:know the materials used to take impressions in orthopedic dentistry. To know the methods of obtaining prints. Ability to obtain plaster models of jaws. The ability to plaster plaster models in an occluder.

Basic concepts:impression, elastic impression materials, plaster models of jaws, occluder.

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

2.1. requirements for students' theoretical readiness to perform practical classes (knowledge requirements, list of didactic units);

- The concept of imprints and imprint materials.
- Silicone and alginate impression materials.
- Physico-chemical properties of thermoplastic and crystallizing impression materials.
- Classification of prints.
- Imprint spoons.
- Methods of obtaining prints.
- Sterilization of prints.
- The method of obtaining plaster models.
- Plastering of models in the occluder.

2.2. questions (test tasks, tasks, clinical situations) to check basic knowledge on the subject of the lesson.

- To be able to choose printing material.
- To know the physical and chemical properties of thermoplastic and crystallizing impression materials.
- Carry out the method of removing the impression.
- Cast plaster models.

- Plaster the plaster models in the occluder.

3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting

laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

ELASTIC IMPRESSION MATERIALS This group includes: alginate, silicone (polysiloxanes), polysulfide (thiocol), polyester masses. The last three subgroups are combined by the term "synthetic elastomers". Alginate masses. The widespread introduction of alginate impression materials began in the early 40s of the last century. This material won a permanent place in dental practice and contributed to a significant reduction in the use of gypsum. The exceptionally rich variety of alginate materials used in clinical dentistry testifies to their great practical importance. Alginate impression materials are filled structured systems of sodium alginate, which is here a cross-linking agent. The alginate composition usually includes the following main components: monovalent cation alginate, cross-linking agent, structuring speed regulator, fillers, indicators and substances that adjust taste and color. Sodium alginate (the main component) is the sodium salt of alginic acid. Alginate-based impression materials were produced in three types, or groups. The first group was a kit consisting of viscous (5% hydrogen solution) sodium alginate and multicomponent powder. The second group of alginate materials was produced in the form of paste and powder, when mixed, an impression compound was formed that hardened at room temperature. The third group is the most common and most accurate alginate materials, which are produced in the form of a multicomponent powder to which water is added. The advantages of alginate materials include high elasticity, good reproduction of the relief of soft and hard tissues of the oral cavity, and ease of use. The main disadvantages of these materials are the lack of adhesion to the impressions of their spoons and a certain shrinkage as a result of water loss. When using alginate materials, it is necessary to strictly follow the manufacturer's instructions. Until recently, alginate material "Stomalgin" (Ukraine) was widely used in clinics of Ukraine. When it is mixed with water, a homogeneous paste is formed. Impressions from it have sufficient plasticity and elasticity, during filling with gypsum, they are almost not deformed. Stomalgin is characterized by high elastic and resilient properties: its residual deformation in the case of compression is 2.5%, tensile strength is 0.15 N/mm2. An impression made of the "Stomalgin" material is used to obtain plaster models. Immediately after removal from the oral cavity, it is mandatory to wash it with water and disinfect it. Obtaining the model must be carried out with liquid plaster, without creating significant pressure on the impression. Separation of the plaster model from the elastic impression can be carried out without the use of any tools: it is removed from the model by pulling the edges with your fingers.In recent years, Stomalgin-02 was produced, which, due to the introduction of triethanolamine into the composition, improved the homogeneity and increased elasticity of the material. Alginate mass "Ipen"

(Czech Republic) is made by mixing 10 g of green finely dispersed powder with water at room temperature (20 ml) for 30-45 seconds. The hardening time is 2.5 minutes, the working time interval is 3 minutes. "Elastic Plus" — updated alginate hydrocolloid impression mass based on sodium alginate, produced by Spof-Dental (Czech Republic). Gypsum models obtained from "Elastic Plus" impressions have a smooth, hard, non-abrasive surface with accurate tissue relief of the prosthetic bed. This material is used both for removing previous impressions from edentulous jaws (for making individual impression spoons), and in case of partial loss of teeth (for obtaining a working model and an auxiliary plaster model). "Vikoloid" is a monophasic impression material of the company "Voko" (Germany), which allows you to obtain high-precision impressions in the case of prosthetics with crowns, bridge-like prostheses and inlays. The material is in powder form, with a pleasant smell and taste, packaged in bags. After mixing with water, it allows for 3 minutes ("Vokoloid-3") or 4 minutes ("Vokoloid-4") to carry out all the necessary manipulations for making an impression. Complete hardening occurs in 5 minutes. "Alginogol" is a fast-hardening, powder-free, self-disinfecting alginate in vacuum packaging, produced by the company "Galenika" (Yugoslavia). "Alginmax" is alginate with chromium phase indicator, does not contain zinc and cadmium. Provided all the rules are followed, it has a long shelf life. Material preparation and impression making are typical for alginate impression materials. "Kromalgin" is an alginate impression material of the "Medstar" company (Great Britain) with a three-color phase indicator (class "A" alginate). It can be used to obtain impressions in the case of prosthetics with cast and stamped crowns, arched (bowl) and full removable prostheses. Light-colored powder with a pleasant vanilla aroma. The material application technique is traditional for all alginates, but is accompanied by color transformations. The kneading time is 30 seconds. The paste has a purple hue. Before the introduction into the oral cavity, the doctor has a reserve of 1.5 minutes, until the mass turns pink. The complete period from the moment of the end of kneading to the readiness of the print is equal to 1 minute. The color of the printing mass becomes white. The material is characterized by: — the possibility of visual control of working hours; — absence of dust; — the ability to adjust the consistency of mixing; — high elasticity and tensile strength (1.20 MPa); — high precision reproduction of details (50 microns); — the possibility of saving the dimensions of the print for several hours in a sealed package; — optimal compatibility with plaster casts, i.e. formation of hard, smooth surfaces of jaw models; — absence of lead and preservatives. "Algidur" is an alginate impression material of the company "Dorident" (Austria), produced with normal, fast and ultra-fast hardening. Alginate comes complete with a liquid alginate stabilizer, which makes the resulting models lighter and prevents the formation of air bubbles. "Super Paste" is an alginate impression material manufactured by Bosworth (USA), which changes color over time from mixing to hardening. Available in two tubes in the form of a paste. "Freise" (Poland) is a polychromatic alginate mass, it is a purple powder, which is mixed

in the ratio of 9 g per 17 ml of water. After 30 minutes of mixing, the color of the paste changes to pink. At this moment, the impression spoon is filled with paste. A change in color to white is a signal to introduce a spoon with mass into the oral cavity. The hardening time of the material at a temperature of 23°C is 2.5 minutes. "Kromopan" and "Kromopan-2000" (Italy) are masses that have a color indication of phases (purple, pink, white). The ratio during mixing is 9 g per 20 ml. Noticeable changes in the print do not occur, according to the manufacturer, within 48 hours after receiving it. This is due to the introduction of an integrated stabilizer into the mass. The Italian mass "Oralgin" is similar. In addition to the above, other European materials are also known: — Polish "Ortoprint" masses with an anti-emetic additive; — German "Pdrogum" masses with a rubbery effect, as well as "Alginoplast", "Xanthalgin", "Dupalflex" , "Tricoloralgin", "Palga-flex" (the last mass hardens slowly - 3 min 45 s); "Plastalgin" (France) is produced in two variants - fast and normal hardening. Among American materials, "Supergel Magic" (chromatic alginate impression material with a color indication of structuring phases from pink to white and without the formation of powder); "Geltraite Plus", "Cos Alginate". The material "Geltraite" is produced in three consistencies: normal, dense and fast-hardening. "Geltrait" of a normal and dense consistency is used in the case of a high vault of the palate and in orthodontics, fast-hardening - for obtaining impressions with an increased gag reflex. The characteristics of normal and dense "Geltrait" are: hardening time - 2.5 min, residual deformation - 2, 1%, relative compression — 13.3%, fluidity — 1.86%, for fast-hardening "Geltrait" respectively 1.75 min, 1.7%, 13.9%, 1.67%. In the clinic, "Aroma Fine" is used " of the company "JC" (Japan) normal (has a pink color) and fast hardening (green color). Its mixing time is ZO (45) s, time for making an impression in the oral cavity — 1.25 (2.25) min., hardening time — 1.75 (3.17) min. The viscosity of the material is 36 (38) mm. Silicone masses. Nowadays, impression materials based on organosilicon polymers — silicone rubbers — are increasingly used in dental practice. Today, the dental industry can master the production of silicone impression materials that could meet all the requirements of the theory and practice of orthopedic dentistry. Silicone materials are produced as a set in the form of pastes and liquid catalysts, during mixing of which, under normal conditions, vulcanization occurs within a few minutes and an elastic product is formed that does not lose its properties for a long time. There are options for mixing two pastes. Among them, impression material based on vinyl polysiloxane "ZM Express" is widely used (fig. 15, see colored inserts). "Sielast-69", "Sielast-03" impression materials are widely known in Ukraine. "Cielast-05"; "Cielast-27" (Ukraine). Its latest modification was developed at the Research Institute of Synthetic Rubber (St. Petersburg). There, a material based on filled vinyl silicone rubber, which hardens without the release of by-products, was created - "Vigalen-30" and the corrective material "Vigalen-35". In St. Petersburg, the printing mass "Silit" was also developed, in Moscow - "Eurosil". Vigalen-30 is a highly viscous impression material for

obtaining double impressions. It is used with the material of medium viscosity "Vigalen-35" in the case of prosthetics with partial and full removable plate dentures, as well as solid-cast, metal-ceramic, metal-plastic bridge prostheses and single crowns, inlays, arch (bowl), splint solid-cast prostheses, for the manufacture of orthodontic devices. In addition, the material allows rebasing of removable prostheses by the laboratory method. For mixing the material, equal ratios of the basic and catalyst paste are taken. The mixing continues for 30 seconds until a uniform, homogeneous mass is obtained. The time of hardening in the oral cavity is 4-5 minutes. Low density of the material reduces its consumption for an impression, by which you can obtain several models of high-precision jaws. Before obtaining the model, it is advisable to place the impression in a soapy solution for 3-5 minutes, and then rinse with running water. This non-shrinking material makes it possible to store the impression for a long time (up to 2-4 "Vigalen-35" is a medium-viscosity silicone corrective material for obtaining double impressions in case of partial loss of teeth, periodontal diseases with high mobility of teeth, prosthetics with bridge-like prostheses of any type. The material can be used not only with domestic impression materials "Vigalen-30" and "Cielast-21", but also with imported analogues that harden as a result of the polyaddition reaction and have minimal shrinkage. To obtain a print, equal volumes of the main and catalyst pastes are mixed for 30 seconds to obtain a homogeneous homogeneous mixture, which has a minimum working time of 5-6.5 minutes. Using an individual spoon, you can get an accurate functional impression. The time of hardening of the material in the oral cavity is 4-5 minutes. In the case of receiving a corrective impression, the mixed homogeneous mass is applied to the surface of the main impression previously dried by a flow of dry air, and it is re-introduced into the oral cavity. The material is not recommended to be combined with siloxane masses of the polycondensation type, polysulfide impression materials. "Eurosil" is a two-component impression material containing pastes of high, medium and low viscosity, it is a vinylsiloxane rubber intended for obtaining accurate impressions of dental rows, including double ones. The material has the following technical characteristics: the working time from the beginning of mixing is 5.5-7.5 minutes, the hardening time in the oral cavity is 4-5 minutes, the compression deformation is 2-15%. The linear shrinkage of the material in 24 hours is 90.2%. Mixing the impression material (in an equal proportion of pastes) is carried out with a spatula or fingers for 30 seconds until a uniform color tone is obtained. Since 1997, in Ukraine, we have been producing dental impression material of high viscosity "Sylboplast-B" and low viscosity "Sylboplast-H" from the components of the company "Rohn-Poulenc" (France), which is a two-component (main and catalyst paste) silicone elastomer that hardens at room temperature as a result of the polyaddition reaction. The material "Silboplast-B" is intended for obtaining the main impression, which, in combination with the low-viscosity material "Silboplast-H", allows you to obtain double impressions. It is used in the case of prosthetics with one-piece,

metal-ceramic, metal-plastic bridge-like prostheses, partial and full removable plate and arch prostheses (bar) prostheses, for the manufacture of orthodontic devices. "Silboplast-H" is a low-viscosity material for obtaining double impressions, it is also used for functional impressions in the complete absence of teeth. The method of using the materials is quite simple: with the help of measuring spoons, equal amounts of the main and catalyst paste is thoroughly mixed for 30 seconds, and then an impression is made. The working time is 5-6 minutes, hardening in the oral cavity lasts 3-4 minutes. Before obtaining a plaster model, it is advisable to place the impression in a soapy solution for 3-5 minutes, and then wash it before filling with plaster, the impression must be air-dried. One of the best representatives of silicone impression materials is the Japanese "Exaflex", which contains 2 main pastes (yellow and blue). Mixing them ends when the uniform green color of the material appears. There are also two pastes for obtaining a correction layer, another 2 pastes for obtaining functional prints. In addition, the set includes adhesive glue, a retarder, spatulas, and a syringe. The same mass, packaged in double cartridges for use in a dispensing gun with mixing tips, is called "Examiks". Also known are the sets of silicone pastes "Coltex" / "Koltoflex" (Switzerland) for multipurpose purposes, "Dentaflex" (Czech Republic), "Kneton"/"Citran" and "Tsafo-Hevezil" (Germany), "Condensil" and "Perfexil" (France), "Silbon" (Italy). Galenika (Yugoslavia) produces a group of "Galesyl" condensing silicone materials: — "Galesyl-P KIT" — high viscosity; — Galesil-X" green — medium viscosity; — Galesil-L" blue — low viscosity; — "Galesil" activator-paste is a universal catalyst for polycondensation silicone materials. "Akuflex" and "Akumix" have no taste and smell, they are supplied by the company "GC/America" (USA). They have high accuracy and stability in solutions for cold sterilization, have different degrees of viscosity depending on the purpose. The hydrophilic structure of the material "Akvasyl" from the company "Dentsply" (USA) contains a cross-linked polymer network with an included surfactant. The polymer network provides high tensile strength, and the included surfactant makes the wetting properties similar to those of polyesters. "Reprosil-NP is a chemically hardened silicone impression material (Dentsply, USA) for obtaining double impressions. The material consists of two separate components of different consistencies. The mass has good elasticity and does not make it difficult to release it from under the inner part of the tooth. It is used for borders of individual spoons, obtaining a preliminary impression in a double impression, as well as registering the central ratio of the jaws. The mass of low viscosity due to its hydrophilicity allows obtaining accurate impressions from wet surfaces. it is applied with a syringe, it is corrective in a double impression. In addition, the material can be used to obtain functional impressions in case of rebasing of a removable lamellar prosthesis. Before obtaining an impression, it is recommended to apply a thin layer of "Silfix" adhesive to the individual spoon. After 3 minutes, you can remove the impression using a spoon prepared in this way. Standard disinfectants, Sporicidin aerosol or Sporicidin sterilizing

composition diluted 1:16 are used to disinfect Reprosil-NF impressions. The impression can be stored for up to 7 days, but the plaster model is obtained no earlier than 1 hour after its removal from the oral cavity. The impression must be washed and dried beforehand. Before electroplating, a clean and dry print should be evenly coated with colloidal silver or graphite. The company "Voko" (Germany) offered the "Contrast" material, which, thanks to its hydrophilic properties, gives high-quality impressions, despite the humidity of the oral cavity. It has good elasticity. The two-component base material is used for a preliminary impression followed by its correction with a second layer, for the design of the edges of individual impression spoons. The set also includes a correction paste of medium viscosity in a cartridge package. It can be used both in double impressions and for obtaining functional impressions in case of partial or complete loss of teeth. "Registrado" is a silicone-based material of transparent blue color, produced by the company "Voko" (Germany) in cartridge packaging. It is used for taking impressions and fixing the central ratio of the jaws. The company "Detax" (Germany) produces silicone impression material "Detazil", which guarantees the production of several plaster models with one impression. The set of this impression material includes: • "Detazil-K" — two main high-viscosity pastes; • "Detazil-E" — two pastes of medium viscosity, produced in tubes. They are used to remove functional impressions in case of partial or complete loss of teeth. • "Detazil-L" — low-viscosity pastes produced in tubes. The material is mixed in a double cartridge with a mixer. The "Detax" company also produces "Silaplast" - a silicone impression material (base paste and catalyst liquid), used as the first layer of a double impression. For the corrective layer, the "Silasoft" material is used, which at the same time has good fluidity and accurate transfer of details of prosthetic tissues the bed has high volumetric stability and tensile strength. "Silasoft" is produced in tubes ("Silasoft normal") and in cartridge packaging ("Silasoft special"). "Medstar AV" is an impression mass of the company "Medstar" (Great Britain) based on vinylpolysiloxane, intended for obtaining double impressions in the case of prosthetics with metal-ceramic prostheses. The material is hydrophilic, easily mixed and does not stick to tools. It is produced in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal diseases. The mixing time of the main material is 45 s, and that of the corrective material is 45 s. The hardening time of the main and corrective materials is 3.5 minutes. Compression shrinkage of mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. despite the humidity of the oral cavity. It has good elasticity. The two-component base material is used for a preliminary impression followed by its correction with a second layer, for the design of the edges of individual impression spoons. The set also includes a correction paste of medium viscosity in a cartridge package. It can be used both in double impressions and for obtaining functional impressions in case of partial or complete loss of teeth. "Registrado" is a silicone-based material of transparent blue color, produced by the company "Voko" (Germany) in cartridge packaging.

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company "Medstar" (Great Britain) based on vinylpolysiloxane, intended for obtaining double impressions in the case of prosthetics with metal-ceramic prostheses. The material is hydrophilic, easily mixed and does not stick to tools. It is produced in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal diseases. The mixing time of the main material is 45 s, and that of the corrective material is 45 s. The hardening time of the main and corrective materials is 3.5 minutes. Compression shrinkage of mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. "Registrado" is a silicone-based material of transparent blue color, produced by the company "Voko" (Germany) in cartridge packaging. It is used for taking impressions and fixing the central ratio of the jaws. The company "Detax" (Germany) produces silicone impression material "Detazil", which guarantees the production of several plaster models with one impression. The set of this impression material includes: • "Detazil-K" — two main high-viscosity pastes; • "Detazil-E" — two pastes of medium viscosity, produced in tubes. They are used to remove functional impressions in case of partial or complete loss of teeth. • "Detazil-L" — low-viscosity pastes produced in tubes. The material is mixed in a double cartridge with a mixer. The "Detax" company also produces "Silaplast" - a silicone impression material (base paste and catalyst liquid), used as the first layer of a double impression. For the corrective layer, the "Silasoft" material is used, which at the same time has good fluidity and accurate transfer of details of prosthetic tissues the bed has high volumetric stability and tensile strength. "Silasoft" is produced in tubes ("Silasoft normal") and in cartridge packaging ("Silasoft special"). "Medstar AV" is an impression mass of the company "Medstar" (Great Britain) based on vinylpolysiloxane, intended for obtaining double impressions in the case of prosthetics with metal-ceramic prostheses. The material is hydrophilic, easily mixed and does not stick to tools. It is produced in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal diseases. The mixing time of the main material is 45 s, and that of the corrective material is 45 s. The hardening time of the main and corrective materials is 3.5 minutes. Compression shrinkage of mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. "Registrado" is a silicone-based material of transparent blue color, produced by the company "Voko" (Germany) in cartridge packaging. It is used for taking impressions and fixing the central ratio of the jaws. The company "Detax" (Germany) produces silicone impression material "Detazil", which guarantees the production of several plaster models with one impression. The set of this impression material includes: • "Detazil-K" — two main high-viscosity pastes; • "Detazil-E" — two pastes of medium viscosity, produced in tubes. They are used to remove functional impressions in case of partial or complete loss of teeth. • "Detazil-L" — low-viscosity pastes produced in tubes. The material is mixed in a double cartridge with a mixer. The "Detax" company also produces "Silaplast" - a silicone impression material (base paste and catalyst liquid), used as the first layer of a double impression. For the corrective layer, the "Silasoft"

material is used, which at the same time has good fluidity and accurate transfer of details of prosthetic tissues the bed has high volumetric stability and tensile strength. "Silasoft" is produced in tubes ("Silasoft normal") and in cartridge packaging ("Silasoft special"). "Medstar AV" is an impression mass of the company "Medstar" (Great Britain) based on vinylpolysiloxane, intended for obtaining double impressions in the case of prosthetics with metal-ceramic prostheses. The material is hydrophilic, easily mixed and does not stick to tools. It is produced in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal diseases. The mixing time of the main material is 45 s, and that of the corrective material is 45 s. The hardening time of the main and corrective materials is 3.5 minutes. Compression shrinkage of mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. used as the first layer of the double print. For the corrective layer, the material "Silasoft" is used, which at the same time has good fluidity and accurate transfer of details of the tissues of the prosthetic bed, and has high volumetric stability and tensile strength. "Silasoft" is produced in tubes ("Silasoft normal") and in cartridge packaging ("Silasoft special"). "Medstar AV" is an impression mass of the company "Medstar" (Great Britain) based on vinyl polysiloxane, intended for obtaining double impressions in the case of metal-ceramic prosthetics prostheses. The material is hydrophilic, easily mixed and does not stick to instruments. It is available in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal disease. Mixing time for the main material is 45 s, for the corrective material - 45 s. Hardening time for the main material and corrective materials is 3.5 min. Compression shrinkage of the mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. used as the first layer of the double print. For the corrective layer, the material "Silasoft" is used, which at the same time has good fluidity and accurate transfer of details of the tissues of the prosthetic bed, and has high volumetric stability and tensile strength. "Silasoft" is produced in tubes ("Silasoft normal") and in cartridge packaging ("Silasoft special"). "Medstar AV" is an impression mass of the company "Medstar" (Great Britain) based on vinyl polysiloxane, intended for obtaining double impressions in the case of metal-ceramic prosthetics prostheses. The material is hydrophilic, easily mixed and does not stick to instruments. It is available in two types — normal and soft. The latter is especially suitable for use in the presence of periodontal disease. Mixing time for the main material is 45 s, for the corrective material - 45 s. Hardening time for the main material and corrective materials is 3.5 min. Compression shrinkage of the mass - within 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%.

Casting of the plaster model is carried out within 30 minutes after the impression is removed from the oral cavity, and several models of the jaws can be cast from one impression. "Panasil" mass is a silicone impression system. In the case of its use, good results are obtained (Fig. 16, see the colored insert). "Kerr Extrude" is a silicone material from the company "Kerr" (USA), has 3

levels of viscosity - high, medium and low (pastes of medium and low viscosity are supplied in cartridges). The material does not shrink, is tear-resistant and has hydrophilic properties, which allows you to get an accurate impression from wet tissues of the prosthetic bed. Casting of the model is carried out 20 minutes after the impression is removed from the oral cavity.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

- Correctly select the impression material depending on the clinical case.
- To have techniques for obtaining impressions with elastic impression materials.
- To know the method of obtaining plaster models.
- Know the rules of working with an occluder.

3.3. requirements for work results, including registration;

- Classification of elastic impression materials.
- Physico-chemical properties of elastic impression materials.
- Gypsum mixing technique.

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

- What are alginate masses, rules for working with them, applications, representatives?
- Tell us about silicone masses and their chemical structure.
- What silicone masses does the stomatological industry of Ukraine produce?
- Name the representatives of silicone masses, their properties, rules of operation.
- Tell us about the method of obtaining plaster models.
- Rules for working with an occluder.
- The procedure for plastering the models in the occluder.

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.
- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.
- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukraine http://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukraine http://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua

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PRACTICAL LESSON No. 10

Topic: Modeling materials. Wax, classification, characteristics of use in orthopedic dentistry.

Goal: Familiarize yourself with modeling materials. Know the composition of modern modeling materials. Understand the importance of using modeling materials in orthopedic dentistry.

Basic concepts: Modeling materials, wax, mineral waxes, animal waxes, vegetable waxes, synthetic waxes, modifiers.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).
2. Control of the reference level of knowledge:
• classification of wax by origin, physical and chemical properties;
• the composition of wax compositions of the main modeling materials;
• methods of using various waxes for the manufacture of specific orthopedic structures;
3. Formation of professional skills, skills (mastery of skills, conducting curation, determining the treatment scheme, conducting laboratory research, etc.):
3.1. content of tasks (tasks, clinical situations, etc.);

Wax is the main working material of a dental technician. Everything that is in a finished form in metal and plastic - previously appears from the hands of a dental technician in wax. The range of capabilities of the dental technician depends on the quality of the material and the technician's knowledge of its properties and technological characteristics, and, therefore, the quality of his work.

Dental waxes can be used as modeling (main purpose), as impression material and as auxiliary materials. Dental wax is always a composition of

various wax components. Properties and characteristics of dental waxes directly depend on the composition and quantitative ratio of wax components.

Components of wax compositions.

All wax components are divided by origin and purpose in the following order.

Classification of wax.

Natural waxes Synthetic wax Modifiers

Mineral: paraffin, ozokerite, ceresite, montan wax

Polyethylene wax, hydrogenated waxes

Stearic acid, rosin, shellac, dye, rosin esters

Vegetable: Carnauba, Candelilla, Japanese wax, cocoa butter.

Insect and animal wax: beeswax, spermaceti

Natural waxes. This group of wax contains two groups of organic compounds: hydrocarbons and esters of higher fatty acids. Plant and animal waxes contain significant amounts of ethers. For example, carnauba wax contains up to 85% ethers.

Paraffin. Paraffin is a high-molecular substance obtained as a product of oil processing. It dissolves well in ether, gasoline, sparingly soluble in alcohol. Its density is 0.907-0.915 g/cm3. It melts at a temperature of 60-700C. Paraffin is slightly greasy to the touch, scrapes well with a spatula, does not drag the spatula. It is introduced as the main substance, as a filler.

Ceresin. It is also a product of oil distillation. Density 0.91-0.94 g/cm3. Ceresim can be dissolved in gasoline, cuts well, does not crumble during warm-up, does not stick to objects. It is introduced into compositions in order to increase hardness, viscosity and melting point.

Montana wax. They come out during bulking of lignite. Melting point 73-800C. These waxes are hard, brittle. Introduced into dental waxes to increase hardness and melting point.

Ozokerite. Obtained from high-boiling oil fractions, contains cycloparaffins. It has a fine crystalline structure in the form of needles and scales. The melting point is 65°C. They are added in a ratio of 5-15% to improve the properties of the wax (optimization of melting).

Carnauba wax. It is obtained by scraping off the wax coating from the leaves of the wax palm tree, which grows in Brazil. The wax has a yellow-green color and the smell of hay. It has considerable hardness (does not cut with a tool) and fragility. When the wax is scraped, it does not give shavings, but powder. Density 0.999 g/cm3. The melting point is about 900C. Dissolve in ether and boiling alcohol. Significantly increases the melting point. They are added to wax compositions in order to reduce plasticity, increase hardness, and melting point.

Kandelilska wax. Melting point 68-75oC. Used to increase the hardness of dental waxes.

Japanese wax is a fat, sticky and elastic product with a melting point of 51°C. The material is added to the composition to increase the stickiness of the wax.

Cocoa butter. It is also a fat consisting of a number of saturated and unsaturated fatty acids. A rather fragile substance. It is used to protect against moisture loss with wax, mainly as a packing layer.

Beeswax. The most ancient and common component of wax compositions. It has a light yellow color. The melting point is 63-700C. Soluble in gasoline and other organic solvents. Improves plasticity of wax compositions. Compositions that include beeswax are easy to model.

Synthetic wax. This group of components has sufficiently (in comparison with natural wax) stable physicochemical and technological characteristics. Synthetic waxes were developed as a substitute for natural wax, but despite the efforts of industry and science, they cannot completely replace the properties of natural wax.

Rosin. Transparent vitreous, fragile mass. Many people are familiar with its counterpart. Rosin is a product of pine tree resin processing. In the warm season, this resin can be found on the trunks of fruit and pine trees. The softening temperature is 52-680C, the melting point is 112-115oC. This results in an increase in the melting point and hardness of the wax, which will include this component. Rosin also has high stickiness.

Modifiers. Various substances are called modifiers, the addition of a small amount of which dramatically changes the properties of wax compositions. Examples include gum arabic, damara, sandarak, cowrie, shellac and other substances.

Stearin. A mixture of stearic and palmitic fatty acids with a low solidification temperature of 49-56oC. Density - 0.93-0.94 g/cm3. Dissolve in gasoline and chloroform. Has low plasticity. The addition of stearin reduces the plasticity of the compositions and improves scraping.

The main groups of wax.

A huge number of dental compositions produced by different companies, which have different properties, can be grouped into four large groups according to their purpose and use. These are: modeling, base, pouring and auxiliary waxes.

Modeling wax. They are used for modeling all parts of fixed and fixed prostheses (frames, facings, intermediate parts, clasps). Requirements:

- small shrinkage (0.1%);
- excellent plastic properties;
- sufficient hardness and preservation of shape at room temperature;
- does not smear and does not warp when working with wax;
- flakes should not be released when heated (like carnauba wax);
- when burning, do not leave a noticeable dry residue;
- do not paint the plaster of the model;

• have a slight, but sufficient for fixation on plaster, stickiness.

Storage. Common components of such wax: paraffin, ceresin, candelilla and beeswax. A sample composition looks like this: paraffin - 60%, carnauba wax - 25%, ceresin - 10%, beeswax - 5%. Damar resin is used as modifiers (reduces delamination, adds a shiny, smooth surface).

Modeling waxes are characterized by shrinkage (approximately 0.6%), so any replacement of wax with metal must be carried out with compensation for this shrinkage. A wax model made of this group of compositions is prone to deformation. Deformations increase with increasing temperature and storage time of the model. This is due to residual stresses that usually appear when modeling with wax. That is why it is dangerous to overheat the wax and the high temperature of the environment in the laboratory. Long-term storage of modeled parts of prostheses is also undesirable. Uneven heating also causes internal deformations that distort the shape of the modeled structure. In modeling waxes, the greatest stresses occur during modeling in the range of 18-37oC. Examples of wax compositions: modeling wax for bridge-like prostheses, Modevax, etc.

Pouring wax. These materials are used to create a system of braces, partly in the construction of brace prostheses (especially on fire-resistant models) (Fig. 2.20). This group of wax is often called profile wax. Requirements:

• must burn out without an ash residue, leave no plaque on the forms;

• do not paint the plaster model;

• possess sufficient plasticity and have sufficient hardness at room temperature;

• fits well to the plaster model, easy to mold.

Storage. The composition of various compositions varies depending on the application in the casting process. They usually contain paraffin, ceresin, rosin, beeswax, a small amount of carnauba wax. Waxes should have a certain stickiness to facilitate the connection of summers with wax frameworks, fluidity should be minimal, flexibility should be high enough. Examples of compositions: Voskolit-1, Voskolit-2, Voskolit-3, Formodent, etc.

Basic waxes. They are used for the production of partial and complete removable prostheses. It is partially used in brace prosthetics. Base waxes are always produced in the form of plates with a thickness of 1-2 mm. Requirements:

• simple and convenient formation;

• good connection of wax parts;

• smooth surface after melting by fire;

• not to irritate the tissues of the oral cavity (the only one of the named wax that is introduced into the patient's oral cavity);

• easy to process with a cutting tool in a cold state.

Storage. The main component is paraffin or ceresin (up to 80%), beeswax, carnauba and dammar resin may also be included. The main indicator of the quality of the base wax is the absence of internal stresses. Constructions made

of base wax, as well as modeling wax, do not tolerate long-term storage. Example: Base wax-02.

Auxiliary waxes. Some dental surgeries require the use of wax with unique properties. Each of these waxes has its own unique characteristics. As an example, we will describe several such waxes.

Sticky wax. It is used for gluing metal parts in brazed structures. Has high adhesion, ashlessness (burns almost without a trace). Composition: 70% rosin, 25% beeswax, 5% beeswax.

Ironing wax-02. Wax, used as a material for spacers, when modeling the frameworks of braced prostheses. Metal parts - arches and saddles should not rest on the gums in the braced prostheses. In order to achieve the desired result on the model, a thin strip of "Byugelny-02" wax is placed in the places where the wax structure of the future byugel prosthesis will be located. It has low adhesion to wax, rolls well, but has low modeling properties, leaves traces when burned. Composition: paraffin – 77%, ceresin – 20%, damar resin – 2%.

Thus, all wax compositions are reduced to a certain class of materials, they are set, but not constant (natural waxes change their properties during processing). The characteristic disadvantages of wax are compensated by the technician's ability to prevent possible defects in wax compositions.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

• classification of wax by origin, physical and chemical properties;

• the composition of wax compositions of the main modeling materials;

• methods of using various waxes for the manufacture of specific orthopedic structures;

3.3. requirements for work results, including registration;

• classification of wax by origin, physical and chemical properties;

• the composition of wax compositions of the main modeling materials;

• methods of using various waxes for the manufacture of specific orthopedic structures;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

I. What are the requirements for modeling materials?

2. Name the properties of modeling materials.

Q. What is the classification of waxes?

4. Tell us about mineral waxes, name their representatives.

5. What are modifiers and their role?

6. Tell us about vegetable waxes, methods of obtaining them, and using them.

7. Tell us about synthetic waxes.

8. Name wax compositions, describe them.

9. Where are wax compositions used?

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.
- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.
- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.
- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukrainehttp://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 11

Topic: Plastics. Classification. Polymerization modes of plastics.

Goal: One of the urgent problems of orthopedic dentistry is prosthetics of tooth row defects with removable prostheses. The quality of prosthetics largely depends on the quality of plastics and compliance with the polymerization regime. For a doctor, knowledge of the properties of basic plastics is also important due to their ambiguous effect on the tissues of the prosthetic bed, in order to prevent prosthetic stomatitis.

Basic concepts:plastics, polymerization of plastics.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

• physiological and physico-chemical impact of plastics on the human body;

• basic rules and techniques, mode of polymerization of basic plastics;

• methods of prosthesis reconstruction, causes of their failure;

• the main stages of the final processing of prostheses and its significance for the clinic.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

A large group of materials used in orthopedic dentistry consists of polymeric materials - plastics. The bases of removable prostheses, maxillofacial and orthopedic devices, various tires, artificial teeth, coatings for metal parts of prostheses, crowns, etc. are made from them. Plastics used in orthopedic dentistry, chemical stands, light and strong, technological, harmless to the human body, have high cosmetic indicators, are monolithically connected to artificial teeth made of plastic.

Plastics are polymers obtained chemically from natural materials or by chemical synthesis - from low-molecular compounds.

A polymer is a chain of identically repeating hydrocarbon molecules. (CH-CH3)n, where n is the number of repetitions, which can be very large.

Plastics can be single-component (plexiglass, polystyrene) - containing only one repeating element, and multi-component mixtures (aminoplasts, phenoplasts, etc.) - containing several repeating elements.

Basic physicochemical and mechanical properties of polymers.

Technical properties of polymers depend on the nature, structure and purity of monomers, synthesis technology, molecular weight, etc. other things being equal, the higher the molecular weight of polymers, the higher its mechanical strength, but the more difficult it is to process it into a product.

The processing of plastics is closely related to the three states of polymers. At relatively low temperatures, they are in an elastic-solid state - vitreous, and when the temperature rises, they are in a plastic (viscous-liquid) state. The transition temperature from an elastic-hard to a highly elastic state is called the glass transition temperature (Tst). The transition from a highly elastic to a plastic state is characterized by the yield point (Ttek). Its physical and chemical properties depend on the state the polymer is in. Fluidity is the ability to deform irreversibly under the influence of its own weight (without additional effort). This is a type of plasticity. The inverse of fluidity is viscosity. The glass transition temperature is sometimes called the softening temperature. The temperature interval between Tet and Ttek is used for the manufacture of parts from materials, it can be graphically represented by the diagram:

state

vitreous highly elastic plastic

(elastic-hard) (rubber-like) (viscous-fluid)

at Tst, the thermal movement of individual chain links becomes sufficient to give it some flexibility. Tst of some polymers, C:

polyethylene - -73;

natural rubber - -17;

polyvinylidene chloride- +70;

polystyrene +80;

polybutal methacrylate - +30.

Degradation of the polymer (rupture of bonds in the polymer with the formation of initial monomers) is an irreversible process of destruction of the material.

In the glassy state, the polymer is an elastic-solid substance and its deformation under the action of external forces is small, especially at temperatures not very close to Tst, a strong increase in deformation occurs. Elastic and plastic deformation are distinguished.

Elasticity is the property of a solid body to involuntarily restore its shape and volume after the termination of an external force. Plasticity is the property of a solid body to change its shape and size (irreversibly).

Elasticity means springiness, that is, the ability of a material to reverse deformation under the action of relatively small external forces.

Polymer relaxation – relaxation of stress created by external action, is used in the formation of polymers. This refers to the slow reaction of the material to external actions. The peculiarities of such properties of polymers, such as mechanical dielectric, etc., are related to this.

Polymer creep is a process of small continuous plastic or elastic deformation that occurs under conditions of prolonged static stress. As the temperature increases, creep increases. To reduce creep, various fillers are introduced (wood shavings, mineral substances, asbestos).

Polymer plasticization - introduction of plasticizers (dibutyl phthalate, dioctyl phthalate, etc.).

When plasticizers are introduced, the glass transition temperature, relaxation time, and pour point decrease.

Swelling of the polymer is the penetration of liquid molecules into the polymer with an increase in volume.

Shrinkage, polymerization of the plastic test, is compensated by its noticeable expansion as a result of the action of the high temperature coefficient of linear expansion. Shrinkage is partially compensated when using dentures due to water absorption of up to 0.5% volume.

Depending on how heating affects the properties of plastics, they are divided into thermoplastic and thermoset.

Thermoplastic materials (reversible) soften when heated, harden when cooled without changing their composition. These include polymethyl methacrylate, polystyrene, kapron, polyethylene, fluoroplastic. From this group

of plastics, polyvinyl chloride, fluoroplastic, and polyacrylates are used in dental prosthetics.

Polychlorinated vinyl is a plastic with good mechanical strength and chemical resistance.

In orthopedic dentistry, a copolymer of vinyl chloride and butyl acrylate is used - Eloplast, which was used to make boxing tires.

Fluoroplasts have high chemical resistance to all organic, mineral acids and alkalis. At the Department of Orthopedic Dentistry of OGMU, a biologically inert coating for the bases of prostheses based on fluoroplastics was developed.

Polyacrylates - plastics of this group are polymers derived from acrylic and methacrylic acids.

Thermoreactive (irreversible) polymers.

When heated to a critical temperature (159-170 C), and in some cases even without heating, they lose the ability to soften again, while some components undergo a chemical change or are destroyed. These include Bakelite, aminoplasts, phenoplasts, etc. They are not used in dentistry.

Polymerization.

Polymerization is a reaction of mutual connection of monodimensional compounds. In the process of polymerization, through the sequential addition of many monomer molecules, some atoms or molecules are split off or isolated. As a result of the reaction, a high-molecular compound is formed, which differs from the initial one only by the size of the molecule.

There are 3 stages of this process.

The first stage is activation of monomer molecules. It is carried out under the influence of light, heat or some chemical substances - initiators. The monomer molecules break double bonds, which is a necessary condition for the formation of polymer chains.

Initiators are chemically active substances that significantly improve the activation of monomer molecules. During the reaction, polymers break down into active radicals that react with monomer molecules. As a result, free valences are released, where polymer chains grow.

The second stage is chain growth, during which the bulk of the polymer is formed. After active centers with high reactivity, depending on intramolecular vibrations or the presence of free chemical valences, have appeared in the reaction mass, the process of chain growth begins. Each active center has the ability to attach other molecules very quickly. The whole process takes place with the help of free radicals that arise at the ends of the growing polymer chain. The formation of molecules is accompanied by the release of a significant amount of energy, and the entire process is characterized by an exothermic reaction, that is, with the release of a significant amount of heat.

The third stage is the end of the polymerization process, the breaking of the polymer chain, which occurs when the factors that cause polymerization cease.

Classification of plastics

Basic plastics.

There are special requirements for these materials due to the fact that they are used to make the main parts of dental prostheses, which are tested in the oral cavity by loads of a significant magnitude and different in nature: bending, compression, stretching, torsion, etc. .

The basic materials must have the following characteristics:

1) sufficient strength and necessary elasticity;

2) high "fatigue" bending resistance;

3) high impact resistance;

4) small specific mass and low thermal conductivity;

5) sufficient hardness, low abrasion resistance;

6) indifference to the action of saliva and various food substances;

7) color resistance to light, air and other environmental factors;

8) harmlessness for tissues of the oral cavity and the body as a whole;

9) lack of adsorbing capacity for food substances and microflora of the oral cavity.

In addition, they must meet the following requirement:

1) firmly connect with porcelain, metal, plastic;

2) easy to process into a product with high precision and keep its natural shape;

3) easy to repair;

4) paint over and imitate the natural color of gums and teeth well;

5) easy to disinfect;

6) not to cause unpleasant taste sensations and not to have a smell.

"Ethacryl" is a ternary copolymer of methyl methacrylate, ethyl methacrylate and methyl acrylate. The powder is a copolymer of those complex esters: methyl and ethyl esters of methacrylic acid and methyl ester of acrylic acid.

Additives of coloring pigments and titanium dioxide make the powder opaque and give it a pleasant pink color. The liquid consists of a mixture of three monomers: methyl methacrylate, ethyl methacrylate and methyl acrylate. The liquid contains the inhibitor hydroquinone and the plasticizer dibutyl phthalate.

"Ftorax" is a fluorine-containing acrylic copolymer used in dentistry for the manufacture of removable denture bases. It consists of powder and liquid. "Ftorax" has good physical and chemical properties: increased strength, chemical resistance. It is translucent, the color most closely matches the soft tissues of the oral cavity.

Elastic plastics

They are used for the production of soft cushioning pads for the bases of removable prostheses, maxillofacial prostheses, obturators, elastic pelots, etc.

Requirements for them:

1) be harmless to the body;

2) have the ability to firmly connect with the base of the prosthesis;

3) maintain elastic properties and constancy of volume;

4) have good wettability.

Currently, flexible plastic "PM-01" is produced in Ukraine. Plastic "Pm-01" is made on the basis of a copolymer of vinyl chloride with butyl acrylate and consists of powder and liquid. In the oral cavity, a gasket made of this plastic remains soft for a long time and is quite reliably connected to the base material.

Plastics for fixed dentures

"Synma-74" is a plastic, which is a cross-linked acrylic copolymer, plasticized with dibutyl phthalate during polymerization. The material is used for the manufacture of various orthopedic structures: bridge-like prostheses, veneers, crowns, splints, etc. It consists of powder and liquid.

Recently, "Synma-m" plastic, which is used for modeling directly on the frames of fixed prostheses, has become widespread.

Self-hardening plastics.

This group includes plastics that can polymerize without external heating.

"Redont" is a plastic, a copolymer of methyl and ethylene ethers of methacrylic acid. 3 types are available: "Redont" opaque, "Redont-02" unpainted transparent, "Redont-03" pink transparent. "Redont" preparations are used for correction and repair of dental prostheses, devices made of acrylic group plastics by cold hardening method.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

• physiological and physico-chemical impact of plastics on the human body;

• basic rules and techniques, mode of polymerization of basic plastics;

• methods of prosthesis reconstruction, causes of their failure;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

1. What is the importance of polymer materials in the development of orthopedics

dentistry?

2. Tell us about the chemical structure and methods of obtaining acrylics

plastics

3. Describe polymerization, copolymerization, and polycondensation reactions.

4. What are the requirements for acrylic plastics?

5. What is the classification of plastics?

6. Name the methods of forming acrylic plastics.

7. What are the modes of polymerization of acrylic resins?

8. Tell us about basic materials. Name the representatives of this group.
9. What is the purpose of elastic basic glastines?
10. What are the properties and applications of self-hardening plastics?
11. Tell us about plastics for fixed types of prostheses.
Requirements, properties.
12. Tell us about composite and photopolymer materials.
13. Tell about keromers, their properties and applications.

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukrainehttp://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 12

Topic: Metal alloys, use in orthopedic stomatology. Classification and characteristics of metal alloys. Metal casting technologies.

Goal: Know modern metal alloys used in orthopedic dentistry. Technological process of metal casting.

Basic concepts:metal alloys, structure and crystallization of metals, types of corrosion, clinical and technological requirements for alloys.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

- Requirements for metals and their alloys used in the orthopedic dentistry clinic.

- Clinical and technological requirements for alloys.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

BASIC MATERIALS. Metals and their alloys. In the clinic of orthopedic dentistry, metal alloys are widely used, since pure metals do not meet the requirements for structural materials, they are not strong enough, very expensive, and subject to corrosion. The absolute majority of chemical elements of Mendeleev's periodic system belong to metals. They differ from non-metals by characteristic metallic interatomic bonds with generalized and mobile electrons, which provides the metal with good electrical and thermal conductivity and strength. Metals are characterized by plasticity, malleability, opacity, and a characteristic metallic luster. There are high requirements for metals and their alloys used in the clinic of orthopedic dentistry. They must: 1) have high corrosion resistance in the conditions of the oral cavity; 2) have good mechanical properties; 3) have good technological properties; 4) have the necessary physical characteristics; 5) be indifferent to the tissues of the prosthetic bed and field. Structure and crystallization of metals. Metals are crystalline bodies, the atoms of which are arranged in the correct geometric order, forming crystals. In the plane, metal atoms form an atomic lattice, and in space - an atomic crystal lattice. The types of crystal lattices of metals are different. Cubic volume-centered, face-centered cubic, and hexagonal close-packed are most often observed. A real crystal has point, line, and surface structural imperfections. Spot imperfections. Atoms have the ability to oscillate in lattice nodes, and individual atoms have energy that is much higher than the average, and as a result, the amplitude of their oscillation is greater than that of other atoms. These atoms can easily change their arrangement, especially in the surface layers. As a result of vacancy formation, the crystal lattice is deformed. Vacancies play a major role in diffuse processes that occur in metals, especially under conditions of increased temperature. Linear imperfections — dislocations. The essence of a linear dislocation is the displacement of one part of the crystal relative to another along some atomic plane by one interatomic distance. In this case, the number of rows of atoms in the upper part of the crystal is one more than in the lower part. As a result of such displacements in the dislocation zone, the crystal lattice is elastically changed. In practice, dislocation formation can occur during crystallization, in the case of plastic deformation during heat

treatment. Dislocation significantly affects the mechanical properties of the metal, sharply reducing its strength. Surface imperfections appear at the boundaries of crystals. The atoms here do not have the same correct arrangement as in the volume of the crystal itself. This is explained by the fact that the crystals are disoriented and dislocations and vacancies appear at their boundaries. Depending on how densely the atoms are placed in the crystal lattices, in many cases changes in crystal directions may occur, and this, in turn, can lead to changes in the mechanical, optical, electrical properties of metals. These phenomena were called crystal anisotropy. The crystal is an anisotropic body. If the same orientation of crystals is created in the structure of the metal, then the formed polycrystalline body will be anisotropic. If the small anisotropic crystals are oriented differently, the properties are averaged and are approximately the same in all directions. Crystallization of metals. The transition from the liquid state to the solid state is associated with the formation of a crystal lattice. During this process, metal atoms occupy strictly defined positions in space. Therefore, the transition of a metal from a liquid state to a solid state, during which crystals are formed, is called crystallization. Melting of metal is a transition from a solid state to a liquid state; it is accompanied by the destruction of the crystal lattice. Crystallization of metals consists of two processes: 1) nucleation of crystalline parts - crystallization centers - in the liquid metal; 2) crystal growth from these centers. Allotropy, or polymorphism, of metals is their ability in the solid state to have a different structure of the crystal lattice and, as a result, different properties at different temperatures. Alloys In nature, few metals (gold, platinum, silver, mercury and some others) are found in their pure form. But they also found application only in the form of alloys. An alloy is a substance obtained by fusing two or more elements. An alloy that is obtained mainly from metallic elements and has metallic properties is called a metallic alloy. It is natural that the structure of an alloy is more complex than the structure of a pure metal, and depends mainly on the relationships between the components of which it is composed. The interaction of the components depends, in turn, on the conditions of the casting process. In the solid state, there may be no chemical interaction between the components and the simple substances that form the alloy. In this case, its structure is a mechanical mixture of separate parts of the crystals of both components. These are alloys of antimony and lead, cadmium and bismuth, a melot alloy. A mechanical mixture of components is formed when the latter are not capable of mutual dissolution in the solid state and do not enter into a chemical reaction with the formation of compounds. The constituent substances of the alloy can enter into a chemical reaction, forming chemical compounds, or dissolve in each other, forming solutions. In addition to the mechanical mixture and chemical compounds, it is possible to form such phases that cannot be clearly attributed to one of the listed, they are intermediate. An example can be nickel-chromium, copper-nickel alloys. 114 In the liquid state, most of the metal alloys used in technology are homogeneous liquids, that is, liquid solutions. In the case of the

transition to the solid state, in many such alloys, homogeneity is preserved, and therefore, their solubility is preserved. The solid phase formed as a result of the crystallization of such an alloy is called a solid solution. Thus, unlike a mechanical mixture, a solid solution is single-phase, consists of one type of crystal and has one crystal lattice. The structure and properties of alloys are determined by phase transformations that occur during heating and cooling of alloys. Types of corrosion. Corrosion (from the Latin corrosio - corrosion) is the destruction of solid bodies caused by chemical and electrochemical processes that develop on the surface of the body in the event of its interaction with the external environment. Corrosion resistance is the ability of materials to resist corrosion. Corrosion fatigue is a decrease in the endurance limit of a metal or alloy under the conditions of simultaneous exposure to cyclic loads and a corrosive environment. One of the main requirements that metals and alloys must meet is their chemical inertness. A number of metals and alloys (copper, silver, many grades of steel) cannot be used for the manufacture of dental prostheses due to their corrosion instability, which leads to the destruction of the metal. There are 3 phases of corrosion destruction: uniform, local and microcrystalline corrosion. Uniform corrosion destroys metal, slightly affecting its mechanical strength. It is characteristic of silver solder. Local corrosion leads to the destruction of only certain areas of the metal and manifests itself in the form of spots and point lesions of different depths. It occurs in the case of an inhomogeneous surface, in the presence of inclusions in the metal or internal stresses in the case of a rough metal structure. This type of corrosion reduces the mechanical properties of orthodontic structures and other parts. Crystalline corrosion is characterized by the destruction of the metal at the boundary of the crystals. In this case, the connection between the crystals is broken and the aggressive environment, penetrating deep, destroys the metal. This type of corrosion is particularly characteristic of stainless steel. Chemical corrosion is characterized by the interaction of metal with aggressive environments that do not conduct electric current. In the conditions of the oral cavity, metals are in the moist environment of the oral fluid. The latter is an electrolyte and creates conditions for electrochemical corrosion of metal fillings, inserts and other metal orthopedic structures. In the industry, much attention is paid to the fight against corrosion, since up to 10% of the metal that is produced is lost annually from corrosion. The development and implementation of effective means of protection against corrosion allows to expand the list of materials that can be used in the clinic of orthopedic dentistry. 115 Fundamentals of Materials Science Stainless steel, alloys based on gold, platinum, and palladium have good chemical resistance in oral conditions. The alloys listed are always covered with a thin oxide film that protects the metal from oxidation. Clinical and technological requirements for alloys. Various metal alloys used for the manufacture of orthopedic structures must have certain biological properties. The biological properties of materials mean their possible effect on the biological environments in which they are located. Yes, all basic dental

materials should not: — cause negative shifts in tissues and fluids, with whom they are in contact; — to change the microflora of the oral cavity; — disrupt the mitotic process; — affect pH; — disrupt blood circulation, sensitivity; - do not cause inflammation under any circumstances. The technological properties of the materials make it possible to make different products from them using different processing methods. Casting properties, malleability, weldability (suitability for soldering), machinability by cutting and grinding are important for dental materials. Casting properties are determined by the ability of various metals to fill casting molds and form castings. They are caused by fluidity, are accompanied by shrinkage, liquations. Malleability characterizes the property of materials, thanks to which method of pressure and stamping, products of the required shape can be obtained. Weldability (solderability) is the ability of materials to form strong joints in case of contact or with the help of special solder alloys. Soldering is widely used in dental laboratories to connect metal parts. Electric welding is used for point connection of metal parts before soldering. Machinability is the ability of materials to be processed by all types of cutting and grinding tools used in dental laboratories. ALLOYS OF PRECIOUS METALS Gold. It is a bright yellow metal with a characteristic metallic luster. It is found in nature in various states: native, in ores, chemically bound state, in the form of impurities in other ores. Gold is released: 1. From small placers by the method of mechanical processing based on the different densities of their component parts. Gold, which has a higher density, settles first. 116 2. From ore compounds using amalgamation or cyanation methods, based on the ability of gold to enter such chemical compounds, which can then be separated into a precipitate and restored to pure gold. Pure gold is a soft metal and therefore cannot be used to make dentures. However, the strength of gold is very high: a sample with a cross-section of 1 mm 2 can withstand 12 kg during stretching, and its elongation reaches 40-50%. Gold is resistant to corrosion. It is not affected by acids and bases, except for the so-called royal vodka (a mixture of 3 parts of hydrogen chloride and 1 part of nitric acid). High anti-corrosion properties are used during the extraction of pure gold from alloys. This method was called refinement. One of the common refining methods is carried out as follows: the alloy is melted and poured into water for grinding. In water, the metal forms granules (small grains), which are released and placed in a porcelain or glass vessel, where diluted nitric acid (2/3 of the volume) is poured. The dishes are slowly heated. Silver, copper and other impurities dissolve, and gold precipitates. For complete removal of impurities, the separated precipitate is re-boiled in nitric acid, and then washed in water. The sediment is melted and a bar of pure gold is obtained. gold alloys, containing a small percentage of silver, cannot be completely separated from it. Refining is possible if silver in the alloy is 3-4 times more than gold. In order to carry out refining, if the content of silver in the alloy is low, preliminary quartering is carried out, or the alloy is saturated with silver. Another means of extracting gold from the alloy is the use of regal vodka. After the alloy is granulated, it is

placed in a porcelain or glass vessel, poured with royal vodka and heated. Gold and other metals dissolve, silver precipitates in the form of AgCl. In the solution, gold is in the form of the compound AiSC (gold chloride). Pure gold is obtained by reducing AuCL3 with iron sulfate (FeSO4-7H20) or oxalic acid (C2H204). The solution is filtered, separating it from the precipitate of silver chloride, then it is heated and iron sulfate or oxalic acid is added to it. Gold in the form of a brown powder precipitates, which after melting forms an ingot. Refining of gold is sometimes carried out by combining it with zinc, and then etching its impurities with nitric acid. There is a dry refining method in which the molten alloy is treated with saltpeter (KN03) or sulfur. This method can remove traces of lead and bismuth. Oxides or sulfur compounds of metals formed in this case, which make up impurities, float out, they can be fused with borax and removed. In industry, pure gold (99.9%) is obtained by electrolysis. Impurities have a great influence on the properties of gold. Thus, in the case of a small (0.06%) content of lead or bismuth, gold loses its plasticity and is practically not amenable to stamping. In the case of manufacturing stamped crowns from gold, it is necessary to carefully 117 Fundamentals of Materials Science remove the remains of the low-melting alloy, because it includes lead and bismuth, which change the properties of gold, and sometimes the color. Gold has been used for the manufacture of dentures for a very long time. Gold prostheses discovered during excavations of Etruscan tombs date back to the IX-VI centuries. Currently, various gold-based alloys are used in orthopedic dentistry. By selecting components in certain ratios, alloys with the required properties are obtained: plastic, malleable (for the production of stamped parts), elastic (for the production of wire, elastic arcs, pins). Alloys are distinguished by the percentage of gold content. Pure gold is marked by the 1000th fine. The most common gold alloys are 900th, 750th proof and solder. In our country, until 1927, there was a spool test. Pure gold corresponded to the 96th test. In a number of countries, the fineness of gold is determined in carats. Pure gold corresponds to 24 carats. Special reagents are used to determine the gold sample. The reagents include gold chloride or acid solutions. 900th grade alloy. The developed alloy of the 900th sample contains the largest amount of gold (90%), it is of a pleasant yellow color, resistant to corrosion. It has good plasticity and viscosity, fluidity in the molten state, easily amenable to stamping, rolling, forging and other methods of mechanical processing under pressure, as well as casting. Discs with a diameter of 18, 20, 23 and 25 mm and a thickness of 0.28-0.3 mm are produced from the alloy, from which crowns and castings of 5 g each are made, and intermediate parts of bridge-like prostheses are cast from the latter. The alloy has low hardness and wears easily. Therefore, during the manufacture of stamped crowns, solder is poured into the middle of them on the chewing surface or cutting edge. During stamping or rolling, a slander is formed in the products, which occurs as a result of the shift of the crystal lattice. It is removed by sintering to a red color. If the sleeve is punched on a die made of a light-melting alloy, then before sintering it should be treated

with hydrochloric acid to remove parts of lead and bismuth, which during heating can combine with gold, make it brittle and appear in the form of dark spots. The alloy of the 900th sample has a melting point of about 1000 °C. Up to 2% of gold is lost during the drawing of disks into sleeves and the casting of parts of prostheses from the disks. To reduce these losses, measures are currently being taken to produce sleeves of four sizes. The alloy of 750th proof with platinum has a yellow color, which is less characteristic of gold. The presence of platinum and the increased, compared to the previous alloy, copper content make the alloy harder and more elastic. It has a small shrinkage during casting, so it can be used to make precise parts of prostheses, such as inlays. The alloy cannot be pressure treated. It is used for the manufacture of details or such parts of dental prostheses, which are obtained by the casting method and which must have increased elasticity: frameworks of braces, splint prostheses, clips, pins, tabs, crampons, wire. 118 If 5-10% cadmium is added to the alloy of the 750th sample, the melting temperature decreases to 800°C; this makes it possible to use it as a solder for gold alloys of high samples. Platinum. Platinum occurs in nature in the form of ores together with other metals (palladium, silver, gold, iridium, etc.) or in its native state. Platinum is a grayish-white metal that has a very high density. This property is used for the simplest separation of platinum from the rock. Crushed rock is washed with water. Due to the difference in density, platinum remains at the bottom as the heaviest. The industrial method of obtaining platinum from ores is the enrichment of platinum ores followed by a complex cycle of chemical reactions. Platinum can be obtained from alloys by refining. Platinum is harder than gold and silver, but has high plasticity and viscosity. It is well processed under pressure, has good fluidity in molten form, has high chemical resistance, dissolves only in royal vodka. Does not oxidize during heating. In industry, platinum is widely used in electrical engineering, for the manufacture of heating devices. It is part of a number of alloys, including gold. The introduction of platinum into the gold alloy leads to an increase in its mechanical properties. Platinum foil is widely used in the manufacture of porcelain crowns. Due to the low coefficient of thermal expansion, platinum is used to make crampons for porcelain teeth. Solder for platinum is an alloy of 3 parts gold and 1 part platinum or pure gold. Silver is found in nature in the form of nuggets, as well as in chemical compounds with sulfur, chlorine and other elements. The method of extracting silver from ores is based on its separation from other metals by smelting. Silver is a white metal with a blue tint. Silver is well processed by pressure due to its great plasticity. Indicators of its plasticity can be the fact that from 1 g of silver you can pull a wire 1800 mm long, get a foil up to 0.00001 mm thick. Silver is not sufficiently resistant to oxidation. It dissolves in hot sulfuric and nitric acids. Hydrochloric acid has little effect on it. Silver reacts with hydrogen sulfide, forming silver anhydride. During melting, it combines well with oxygen, which is released during cooling, which can lead to the formation of nop in the ingot. To reduce oxygen absorption, silver is melted under a layer of crushed charcoal.

Silver has the highest electrical and thermal conductivity. All other metals are compared with silver in terms of these indicators. In industry, silver is widely used in radio electronics, electrochemistry, and jewelry. To improve mechanical properties, 10-23% of copper is added to silver. Due to the instability of silver to corrosion in the oral cavity, it was not used as the main material for dental techniques. However, silver is part of many alloys: gold, palladium, solders. Silver 119 Fundamentals of Materials Science is also used for the manufacture of pins for sealing canals, amalgam. Palladium. It is a silver-white metal from the platinoid group. Palladium is most often found in nature in polymetallic ores containing platinum, iridium, silver and other metals. Pure palladium is extracted from platinum concentrates by the refinement method as a result of multi-operational pyrometric and electrochemical processing. Chemically, palladium has great stability. In aggressive environments, a protective film against corrosion forms on the surface of palladium and its alloys. The reaction with oxygen takes place only during heating to 700-900°C. The property of palladium to dissolve hydrogen in large quantities (up to 800 volumes of hydrogen in 1 volume of metal) makes it indispensable for the chemical industry, where it is used as a catalyst. Palladium is harder than platinum, but is less workable under pressure. It has fairly high ductility and is good for rolling. In industry, palladium is used to make medical instruments. Alloys containing palladium, silver, gold and other metals are used for dental needs. they are used for the manufacture of fixed dentures by the method of stamping and casting. Palladium is included in alloys, which are used for the manufacture of metal-ceramic dental prostheses, since the applied porcelain mass better connects with the surface oxide film of the alloys containing it. ALLOYS BASED ON SILVER AND PALLADIUM The search for new relatively inexpensive materials with high anti-corrosion properties, mechanical strength and good technological qualities led to the creation of a number of alloys based on silver and palladium. In our country in the 1930s, M.S. Lipets suggested using silver-based alloys with 18% and 30% palladium content. He called them then Palargens. In the 60s, V.Yu. Kurlyandsky and co-authors developed Pd190 and Pd-250 alloys, which respectively contain 19% and 25% palladium and small additions of other metals. Alloys based on silver and palladium corrode in the oral cavity, change color, especially under the condition of an acidic reaction of saliva, even in the case of pH 7.2-7.4, it is undesirable to use them together with other alloys. In most of these alloys, silver is the basis, palladium gives them corrosion resistance. To improve casting properties and protect against undesirable properties of silver (oligodynamic action, corrosion), gold is added to the alloy. For the manufacture of fixed dental prostheses (bridge-like, crowns, inlays, etc.) in different countries, a very large number of different alloys based on silver and palladium are used, which are included in the following percentages: silver - 55-60, palladium - 27-30, gold - 6 -8, copper - 2-3, zinc - 0.5. An alloy containing 72% silver, 22% palladium and 6% gold is currently being studied in our country. This alloy is especially good for cast parts of

dental 120 prostheses, bridge prostheses, inlays. Such alloys have a melting point of about 1100-1200 °C, a Brinell hardness of 60-65 kgf/mm2, and a tensile strength of 30-35 kgf/mm2. The density of alloys is 11-12 g/cm3. Alloys based on silver and palladium have plasticity and are good for stamping, but they are often used to make parts of prostheses by casting. Solder with gold solder, bleach the alloy in a 10-15% solution of hydrochloric acid. STAINLESS STEEL The basis of all steels is iron, they also contain chromium, nickel and a small amount of carbon. To improve casting, strength and other properties of steels, additives are added to them. Steel for dentures contains 1% titanium. Iron is a common metal in nature. Iron ores contain chemical compounds of iron and oxygen. The most important iron ores are magnetic iron (magnetite) Fe 3 0 4 , red iron (hematite) Fe20.,, brown iron 2Fe 2 0 3 "3H2 0, iron spar (siderite), containing iron in the carbonate FeCOa. Iron is also obtained from ores that contain chromium (chromites), chromium-nickel, titanium-magnetite ores, etc. Pure iron has a bluish-silver color, is chemically unstable. It corrodes in a moist environment. It dissolves in solutions of salts and acids. Iron is very plastic metal, but it is very difficult to obtain it in its pure form and protect it from corrosion. Various iron-based alloys are widely used, of which various steels are the most common. Low-carbon steels with a carbon content of up to 0.15% are used in dental practice. A large amount of carbon makes the steel harder and less resistant to corrosion. Steel recipe for the manufacture of dental prostheses in our country in the 30s of the XX century. suggested by D.N. Citrine. Its use significantly reduced the use of gold and platinum, which was very important for the development of dental care for the country's population on a large scale. Stainless steel, which is used in orthopedic dentistry, is a multi-component alloy. It includes iron, chromium, nickel, carbon, titanium and a number of other impurities. The main component that ensures corrosion resistance of the alloy is chromium. Its content in the alloy is 17-19%. The minimum chromium content, which ensures corrosion resistance of the alloy, should be at least 12-13%. To increase the plasticity of the alloy, 8-11% nickel is added to it. The presence of nickel makes the alloy malleable, which facilitates pressure treatment. The most common in dental practice is 118N9T stainless steel. This alloy consists of 72% iron, 18% chromium, 9% nickel, 0.1 carbon and up to 1% titanium. The alloy always contains impurities of other metals, the most undesirable of which are sulfur and phosphorus. The melting point of stainless steel is 1450°C. 121 Fundamentals of Materials Science Iron and carbon in alloys can be found in various ratios: in the form of a chemical compound of iron carbide Fe3C or in the form of a solid alloy, when carbon atoms are located in a crystal lattice between iron atoms. Carbon in the alloy can be in a free state in the form of graphite. Various types of connection of iron with carbon are observed during heat treatment of steel, its crystallization from the alloy. Stainless steel is widely used in the manufacture of dental prostheses. Various types of removable dentures, metal parts of removable dentures (clips, orthodontic arches) are made from it. The dental industry produces 22 sizes of sleeves with a diameter of 6-18

mm. From the same steel, wire with a diameter of 0.6, 0.8, 1, 1, 2, 1.5 and 2 mm is made for the manufacture of various orthodontic appliances, clamps, and pins. In addition, they produce 2 types of standard paper clips with a diameter of 1 and 1.2 mm. CHROME AND COBALT ALLOYS Cobalt occurs in nature in the form of ore compounds: arsenic-cobalt, sulfur-cobalt, etc. It is isolated from ores as a result of a complex technological cycle. Cobalt is a silver-white metal with a reddish tint. It does not oxidize in air and water, it is resistant to the influence of organic acids, it does not dissolve well in their solutions. Cobalt has high mechanical properties, sufficient plasticity. It is used to obtain steel with increased strength, hard alloys for cutting tools (pobedite, stellite, etc.), alloys with high magnetic properties. Alloys based on cobalt and chromium, where cobalt provides high mechanical properties, are widely used in dental prosthetics. Chrome. Chromium iron — Fe(Cr02)2 — is the main ore for obtaining chromium. The release of metallic chromium is carried out by its recovery during melting. Chrome is a white metal with a bluish tint. It has high corrosion resistance. Nitric acid does not affect chromium. It dissolves in hydrochloric acid. Only at high temperatures does it react with oxygen, forming chromium oxide Cg20.

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

I. What are the types of structural materials?

2. What are metals and their alloys?

3. Give the physical and chemical characteristics of the main components of alloys

metals used in orthopedic dentistry.

4. What is crystallization of metals?

5. What are the types of metal corrosion?

6. Name the alloys based on noble metals. their characteristics and appointment.

7. What are the alloys based on base metals? Tell us about them properties and purpose.

8. What are ligature metals?

9. Tell about the changes in the properties of alloys at the technological stages.

10. Tell about the use of refractory metals, their properties and characteristics.

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukrainehttp://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 13

Topic: Ceramic masses and their components. Classification. Indications for use.

Goal: Get acquainted with the physical and chemical properties of ceramic masses. To study the main composition of ceramic masses, their classification and application.

Basic concepts:ceramic masses, sintering of ceramics.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

- The elasticity of ceramics
- Density of ceramics
- Volumetric changes during sintering

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

PORCELAIN AND METALOCERAMICS. The main condition for the use

of porcelain and metal ceramics is their high aesthetics. The use of porcelain in dentistry dates back more than 200 years. The first attempts were the production of removable prostheses with porcelain artificial teeth in case of complete absence of teeth, and only later — individual teeth and crowns. For a long time, the imperfection of the composition of porcelain masses and the technology of manufacturing prostheses did not allow them to be widely used in practice. As an alternative to porcelain masses in the 1930s. years, acrylic plastics were offered. But clinical observations have shown that acrylic plastics have many disadvantages: they do not provide a long-lasting functional and aesthetic effect, quickly change their color and wear out, negatively affect the tissues of the prosthetic bed and field. Therefore, they began to conduct more active searches aimed at improving porcelain masses and manufacturing technologies for fixed denture structures. In terms of chemical composition, dental porcelain masses are between hard porcelain and ordinary glass. CLASSIFICATION OF PORCELAIN MASSES Depending on the sintering temperature, dental porcelain masses are divided into high-melting (1300-1370 °C), medium-melting (870-1065 °C) and low-melting. The composition of refractory porcelain is as follows: 81% feldspar, 15% quartz, 4% kaolin. Medium-melting porcelain consists of 61% feldspar, 29% quartz, 10% various impurities. The composition of low-melting porcelain includes 60% feldspar, 12% quartz, 28% impurities. Refractory porcelain is mainly used for the production of artificial teeth for removable prostheses in an industrial way. Medium-melting and low-melting dental porcelain is used for the manufacture of crowns, inlays and bridge-like prostheses. The use of low-melting and medium-melting porcelain in orthopedic dentistry made it possible to use furnaces with nichrome heating elements for their sintering. Sintering is carried out according to the regime recommended by the factory - the manufacturer of dental porcelain. To reduce and prevent the formation of gas nop, 4 methods of porcelain sintering are proposed: 1) porcelain sintering in a vacuum; 2) sintering of porcelain in diffusion gas (helium and hydrogen); 3) porcelain sintering under a pressure of 10 atmospheres; 4) to achieve an increase in the transparency of porcelain in the case of using atmospheric pressure during sintering, coarse-grained material is used. Of the 4 proposed methods, porcelain sintering in a vacuum has become the most widely used in practice. Vacuum sintering gives transparency and color to dental porcelain. The specific color of the material can be adjusted with the addition of opacifiers and dyes. If you use aluminum oxide or zirconium crystals as a clouding agent, you can additionally increase the density of the material. Volumetric changes during sintering. During the sintering of porcelain, there is a significant shrinkage of porcelain masses (20-40%). The main reason for volumetric shrinkage is the insufficient sealing of parts of the ceramic mass, between which cavities remain. Other reasons for volumetric reductions are the loss of liquid necessary for the preparation of porcelain mass, the burning of organic additives (dextrin, sugar, starch). The direction of volumetric shrinkage is of practical importance. The greatest shrinkage of porcelain goes in the

direction of greater heat, in the direction of gravity and greater mass. In the first and second cases, it is insignificant, since even heat distribution is guaranteed in modern furnaces, and the force of gravity is small, because a small amount of porcelain is used. Shrinkage in the direction of large masses is much higher. The mass in the molten state and in the presence of surface tension tries to take the form of a drop. In this case, it is pulled from the peripheral areas to the central parts of the crown, to a larger mass of porcelain. During the manufacture of a porcelain crown, the ceramic mass, shrinking, moves from the neck of the tooth to the center of the crown, lifting the platinum matrix, as a result of which a gap may appear between the crown and the ledge of the model of the prepared tooth. Porcelain density. The main indicator of the density of porcelain is the density during stretching, compression and bending. Dental porcelain has a high density during compression (4600-8000 kg/cm2). The main characteristic of the density of dental porcelain is considered to be the value of the density during bending. The density of any porcelain depends not only on its composition and production technology, but also largely on the way it is used. The density of the application of the method of condensation of porcelain parts improves. There are four methods of condensation: grooved tool, electrochemical vibration, brush condensation, gravity (non-condensing) method. Most researchers believe that the best compaction of the porcelain mass can be achieved with a fluted instrument using filter paper to absorb the liquid. For optimal compaction of the material, it is important to dry the ceramic mass well before sintering, as well as the subsequent sintering. An ordinary dental product undergoes sintering 3-4 times. A large amount of sintering reduces the density until the formation of glassy material. Each type of porcelain has an optimal sintering temperature. Deviation from that temperature towards a decrease or increase leads to a decrease in the density of porcelain. In the first case, incomplete fusion of the material occurs, an insufficient amount of the glass phase is formed, in the second case, an increase in the glass phase occurs due to the crystalline stage. After reaching the sintering temperature, the product should be kept under vacuum for 1-2 minutes. Extending the sintering time results in a noticeable decrease in density. Porcelain firing ends with glazing. Studies of porcelain have shown that the glazed surface gives a great density to the product. Crowns sintered by the vacuum method are well ground and polished. At the same time, it is recommended to avoid polishing the glazed surface, because in this case the density decreases. In some cases, the glazed surface is polished to reduce abrasion of the opposing teeth. The opinions of researchers regarding the effect of nop on the density of the sintered product do not coincide. Most of them believe that vacuum sintering reduces the porosity and increases the density of porcelain. The density of porcelain also depends on the method of vacuum application at various stages of sintering. The beginning of sintering should coincide in time with the beginning of rarefaction of the atmosphere in the furnace. When the sintering temperature is reached, the vacuum must be full. The time of sintering in a vacuum in case of reaching the required temperature

should not exceed 2 minutes. Ceramet. Metal-ceramics refers to the technique of obtaining solid-cast metal frames lined with porcelain. The introduction of metal-ceramics is definitely a step forward in dentistry, as it provides the opportunity to use all the advantages of materials such as metal and porcelain in a single structure. Special alloys are produced for the manufacture of metal-ceramic prostheses. Alloys for metal-ceramic dentures. Currently, about 150 different alloys for metal-ceramics are widely used in dental laboratories. They are subject to the following requirements: 1. The softening temperature of the alloy must be higher than the sintering temperature of porcelain. 2. The difference in coefficients of thermal expansion of the alloy and porcelain should be minimal. 3. Availability of conditions for bonding with porcelain. 4. Availability of satisfactory casting properties. 5. Durability and stability of qualities. 6. Corrosion resistance. 7. Compatibility with tissues of the oral cavity. Available alloys for metal ceramics are divided into two main groups - noble and non-noble. Alloys based on noble metals are divided into gold, gold-palladium and silver-palladium. Alloys of metals of noble groups have better casting properties and corrosion resistance, but their density is inferior to alloys of base metals. The disadvantage of gold-based alloys is limited density. Non-noble alloys for metal ceramics are nickel-based alloys and cobalt-based alloys. They are characterized by high mechanical properties. However, the melting point of these alloys is 500 °C higher than that of gold-based alloys. To improve the casting properties of such alloys, beryllium was included in a number of foreign recipes, it is toxic, which led to toxic-allergic reactions. As a result of the conducted research, it was established the possibility of using domestic cobalt-chromium alloys (KHS) for the manufacture of metal-ceramic prostheses. This alloy has been produced for many years by the medical polymers plant ("Medpolymer", St. Petersburg). Porcelain masses for metal ceramics. The production of a metal-ceramic structure of a dental prosthesis is a complex, multi-stage process. The quality of metal-ceramic prostheses is determined by the properties of the materials used. Ceramic mass must meet a certain number of requirements, which are conditionally divided into 4 groups: physical, biological, technological and aesthetic. Physical characteristics include density during shear, compression and bending; to biological ones — 144 non-toxicity, absence of allergic components; to technological ones — no inclusions, the coefficient of casting thermal expansion must correspond to that on a metal base. Ceramic mass "Vita VMK 95". The mass set includes standard (includes 41% porcelain), laboratory and large sets. "VMK 95" paints provide reliable color rendering. An opaque dentin powder set is also available, which includes 16 porcelain powders and an additional set of 15 porcelain powders. Good results are obtained in the case of a layer-by-layer method of application, namely: opaque, dentine and enamel layers (Fig. 13, see colored insert). "Vita Interno" mass (12 colors) allows you to individualize the features of natural teeth, create the effect of depth. The chromatic effect of these porcelain masses can be enhanced by mixing with powders of dentine and transparent masses.

"Interno" masses can also be used to create the effect of depth in case of insufficient thickness of the dentine layer. To determine the color of metal-ceramic crowns, universal "Vitapan" coloring is used (Fig. 14, see color insert). Ceramic mass "Vita Accent" includes a set of fine-grained porcelains (20 colors) with a uniform distribution of coloring pigments, which allows the dental technician to accurately imitate the natural color of the teeth at the final stage of denture manufacturing. "Karat" mass is the material of the latest generation of the company "Dentsply" (USA). Using it, you can easily reproduce the color of natural teeth with the help of "Biodent" and "Vita" shades. "Duceram-LFC" mass is a low-melting dental ceramic made by "Ducera" (Germany). According to its chemical properties, structure, workability and performance qualities, it is the best of all dental ceramics. Low-fusing porcelain LFC (Low-Fusing Ceramic) is a crystalline structure with particles ranging in size from 5 to 15 microns. Its hardness is 420 NU (according to Vickers). Since the low-fusing ceramic is made from the common Duceram material, the two materials are compatible, so they can be used for two-layer technology in the manufacture of metal-ceramic dentures. In the clinic of orthopedic dentistry, ceramic masses of the company "Ivoklar" (Liechtenstein) have become widely used. The mass "IPS-Classic" contains the following components: 1) opaque powder (ground mass) for filling the hollow framework of the intermediate part of the bridge-like prosthesis; 2) 20 pastes of different shades of opaque and dentine masses; 3) a set (5 color options) of paste-like intensively colored, opaque (soil) mass; 4) a set (9 colors) of paste-like, intensely colored dentine mass, which is applied, if necessary, before the second sintering of the dentine mass; 145 Fundamentals of Materials Science 5) a set of transparent masses (4 colors) for achieving different effects, as well as creating a cutting edge (15 colors), which makes it possible to imitate natural tooth enamel; 6) pasty glaze mass to give the facing a natural shine. In addition, the company "Ivoklar" produces additional materials, in particular, for insulating plaster - "Model separator", modeling fluids, etc. MK mass is used for lining metal frameworks of fixed dentures made of cobalt-chromium alloys and is a finely ground powder. It is produced in a set of 11 colors of soil and dentine masses and 2 transparent masses. The first sintering is carried out at a temperature of 1080 °C, the second and third at a temperature of 920 °C. Products made of MK mass do not irritate the tissues of the mucous membrane of the oral cavity.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

1. Where and when did artificial teeth from porcelain begin to be made?

2. The essence of technological techniques during the production of

porcelain

artificial teeth

Q. What are the advantages and disadvantages of artificial porcelain teeth?

4. Classification of porcelain masses.

5. Physical and mechanical properties of porcelain.

6. What is the term "metal ceramics"?

7. What alloys are used for the production of metal ceramics prostheses?

8. Masses for metal ceramics. Requirements Representatives

9. Technology of manufacturing artificial teeth from acrylic plastics.

10. History of the use of metal and combined artificial teeth.

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukrainehttp://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 14

Topic: Tabs, classifications. Indications for use. Pin teeth. Constructions. Indications for use. Artificial crowns, classifications. Indications for use.

Goal: Prosthetics with tabs is of great importance in the professional activity of an orthopedic dentist. It will allow a qualified approach to the

problem of studying the etiology, pathogenesis and clinic of the pathology of hard tissues of the teeth and its treatment with the use of inlays, pin teeth, and will also reveal the features of the use of basic and auxiliary materials for their manufacture.

Basic concepts: Inlay, pin teeth, artificial crown.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

• etiology and pathogenesis, classification of defects of hard tissues of the tooth;

• types of artificial crowns, indications for use;

• clinical and laboratory stages of manufacturing artificial crowns;

• main and auxiliary materials used in the manufacture of artificial crowns.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

Inlays are divided according to the material of manufacture into: metal, porcelain, plastic and combined (metal-ceramic, metal-plastic), according to the method of manufacture - into made by a direct method (modeling is carried out in the patient's oral cavity) and made by an indirect method (the tab is modeled on a model).

A tab is, as it were, an improved version of a tooth filling. This is a micro prosthesis of high strength, which is fixed in the carious cavity with the help of cements. The main difference between an inlay and a filling is that when making a filling, the material itself must be fixed to the hard tissues of the tooth and at the same time have very high strength. The insert is only modeled in the oral cavity, and the formation of the metal or plastic insert takes place outside the oral cavity, which allows to achieve high strength, and during fixation, the insert is held in the cavity not only thanks to its own retention, but also due to the properties of fixation cements.

Contraindications to making a tab are:

• Thin walls of the tooth surrounding the cavity - the tab can break off these walls;

• Small cavities in the tooth - the tab requires additional preparation.

Since the direct method of manufacturing tabs is performed without the participation of a dental technician, we do not provide materials for this method in this help.

Clinical and laboratory stages of making a tab by an indirect method from metal.

CLINICAL LABORATORY

1. Anesthesia. Preparation of the tooth cavity•. Removal of a two-layer impression (removed in a special way with a reflection of the tooth cavity) from the working jaw, auxiliary impression and occlusal impression. It is better to remove the occlusal impression with silicone. 1. Casting of a collapsible combined model.

2. Making a wax composition.
3. Replacing wax with metal.
4. Design processing and polishing.

II. She fitted tabs in the oral cavity, fixation on cement.

Upon receiving the impression and casting of the model, the technician evaluates the prepared cavity. It must meet the following criteria:

• The vertical walls of the cavity should be parallel to each other and slightly diverge.

• The bottom of the cavity should be parallel to the roof of the pulp chamber.

• At the edges of the cavity, a fold should be made, that is, the edges of the enamel are cut at an angle of 45o in relation to the walls of the cavity.

If the cavity meets these criteria, the bottom of the cavity on the model is covered with one or two layers of compensation varnish. Next, they proceed to model the tab from soft wax. To do this, the wax is softened in a water bath, rolled into a column with a diameter slightly smaller than the cavity of the tooth. A column of wax is injected under pressure into the prepared cavity. Excess wax is cut off with a modeling spatula, and the chewing surface is modeled taking into account the anatomical features of the surface of this tooth. Modeling must be carried out only in the occluder and constantly monitor the occlusal contact. The modeled wax composition is pulled out of the cavity with the help of one or more pins that are glued to the already hardened tab.

Cast metal tabs from various alloys used in dentistry. More accurate and indifferent to the tissues of the oral cavity are tabs made of precious metals - gold 750 proof or silver.

The main disadvantage of such tabs is their non-cosmetic nature. That is why in the last 10-20 years, the most popular materials for the manufacture of tabs have become ultra-strong plastics.

Clinical and laboratory stages of making porcelain inlays.

CLINICAL LABORATORY

1. Anesthesia. Preparation of the tooth cavity. Removal of a two-layer impression (removed in a special way with a reflection of the tooth cavity) from the working jaw, auxiliary impression and occlusal impression. It is better to remove the occlusal impression with silicone. 1. Casting of a refractory model.

2. Special preparation of the cavity on the model.
3. Layer-by-layer application of plastic.
4. Polymerization.
5. Processing and polishing.

II. She fitted tabs in the oral cavity, fixation on cement.

Porcelain inlays are used to repair defects in the crowns of both front and side teeth. There must be clearly defined indications for the use of porcelain inlays. The preparation of hard tissues of the prosthetic field is somewhat different: the depth of the cavity should be at least 1/2 of the width. It should be taken into account that when planning a porcelain insert, you cannot make an enamel bevel (fold) due to the fragility of porcelain. A certain laboratory technology is used in the manufacture of a porcelain inlay, and the inlay is prepared in an indirect way. After removing the two-layer impression, a fire-resistant model is obtained, on which porcelain masses are applied layer by layer, taking into account volumetric shrinkage. First, a ground layer of porcelain mass is applied to the bottom and walls of the cavity, and after firing, a frame is obtained, as it were. Then the remaining layers of porcelain mass are applied and fired until the finished prosthesis is obtained.

Porcelain inlays are much stronger than hard tooth tissues and more aesthetic than plastic inlays. In addition, they do not cause allergic reactions and do not have a negative effect on the tissues of the oral cavity.

According to the material, from|from| of which crowns can be made, they are divided into: plastic, metal, porcelain and combined (metal plastic | and metal-ceramic).

Plastic crown.

This is a type of fixed prostheses, which is made to achieve a temporary cosmetic effect during prosthetics with highly aesthetic types of prostheses (metal-plastic, metal-ceramic).

Advantages of such a crown:

- Fast manufacturing (usually made in the presence of the patient).
- Enough|enough| high aesthetics.
- Cheapness, ease of manufacture.

To the main shortcomings|lack| should include:

- Low strength (the service life of such crowns is no more than 1 month).
- Poor color fastness (plastic is a porous substance capable of absorbing dyes from the oral cavity).
- The edge of the crown is|appears, appears| very thick, so it pushes out it is clear that with long-term use it can lead to gum ulcers.

There are four most widely used methods of manufacturing plastic crowns:

1. Classic – the method of hot polymerization of the crown in the cuvette.

2. The baking method differs from the classic method of plastic polymerization.

3. The method of photopolymerization is the most modern method of manufacturing plastic crowns.

4. The clinical method is a method that allows a doctor to make plastic crowns himself, without the involvement of a technician.

Stamped metal crown.

This is a type of permanent fixed prostheses, which is made for the purpose of preservation hard tissues of the teeth and restoration of defects of the crown part|lobe| tooth

Advantages of a stamped crown over other types of crowns:

- Allows you to polish| the minimum amount of hard tooth tissue (no more1 mm);
- Strength;
- Cheapness|cheapness|.

To the main shortcomings|lack| should include:

- Unaesthetic;
- Poor tightness;
- Bad marginal|marginal| fit of the crown.

Clinical and laboratory stages of manufacturing a stamped metal crown.

CLINICAL	LABORATORY
1. Anesthesia. Tooth preparation. Plaster impression removal (only the working impression is removed, without antagonists, at least one tooth surrounding the future crown should be reflected in the impression).	1. Gluing impression. 2. Casting ordinary|usual|gypsum model. 3. Modeling of the crown from|from| wax (the anatomical shape of the tooth is restored) 4. Cutting a plaster column. 5. Production of gypsum block. 6. Casting metal |(their) stamp|(s|). 7. Preliminary punching of the sleeve 8. Final punching of the sleeve. 9. Trimming the crown.
II. Crown fitting in the oral cavity.	1. Processing of the crown 2. Crown polishing 3. Application of

	coatings.
III. Fixation of the crown in the oral cavity on zinc-phosphate|cements| ("Visfat", "Unifas", etc.)	

Solid metal crown.

This is a type of permanent fixed prostheses, which is made for the purpose of preservation hard tissues of the teeth and restoration of defects of the crown part|lobe| teeth in the lateral|lateral| areas Usually, such crowns are made for depulped teeth.

Advantages of a solid crown:

- Easier manufacturing (compared to stamped);
- High accuracy;
- Perfect marginal|marginal| fit of the crown and tightness;
- High strength (the thickness of the chewing surface is greater0.5 mm);
- Ability|ability| manufacturing from|from| any alloy (gold, SPS|, cobalt chrome alloy).

To the main shortcomings|lack| should include:

- Non-cosmetic;
- The need to remove a significant amount of hard tooth tissue;
- The need for high-precision casting|casting|.

Clinical and laboratory stages of production of a solid metal crown.

CLINICAL (performed by a doctor)	LABORATORY (does|does| technician)
1. Anesthesia. Tooth preparation. Silicone impression removal (the working impression is removed) and alginate| material (auxiliary print of antagonists). They usually shoot complete|complete| depressing of the jaws or at least half of the jaw. The central occlusion is fixed either with wax or silicone material.	1. Casting usual|usual| of a plaster model from|from| alginate|auxiliary impression. 2. Production of a collapsible combined model from a working impression. Model preparation for simulation. 3. Plastering of models in the occluder. 4. Modeling of the crown from|from| wax (the anatomical shape of the tooth is restored under the control of antagonistic teeth). 5. Lithuania|casting| crowns 6. Removal|removal|

	errors of precise casting|casting|.
II. Crown fitting in the oral cavity.	Processing and polishing of the crown.
III. Fixation of the crown in the oral cavity on zinc-phosphate|cements| ("Visfat", "Unifas", etc.)	

Combined solid cast (metal plastic\|) crown.

This is a type of permanent fixed prostheses, which is made for the purpose of preservation hard tissues of teeth and cosmetic restoration of defects of the crown part teeth in the frontal areas. Usually, such crowns are made for depulped teeth.

Advantages of this crown:

- High accuracy;
- Perfect marginal\|marginal\| fit of the crown and tightness;
- Sufficient cosmeticity crowns;

To the main shortcomings\|lack\| should include:

- The need to remove a significant amount of hard tooth tissue;
- The need for high-precision casting\|casting\|;
- Ability\|ability\| color changes plastic (when using a photo of polymer plastic, this deficiency is eliminated), its swelling over time and in connection with this, inflammatory processes in the marginal\|marginal\| periodontics

Clinical and laboratory stages of manufacturing a combined cast crown.

CLINICAL	LABORATORY
1. Anesthesia. Tooth preparation. Silicone impression removal (the working impression is removed) and alginate| material (auxiliary impression of antagonists). Fixation of central occlusion.	1. Casting usual|usual| of a plaster model from|from| alginate|auxiliary impression. 2. Production of a collapsible combined model from a working impression. Model preparation for simulation. 3. Plastering of models in the occluder. 4. Modeling the cap from|from| wax 5. Lithuania|casting| crowns 6. Removal|removal| errors of precise casting|casting|.

II. Trying on the cap in the oral cavity.	II. Polishing of metal parts crowns Application of notches on the cap. Covering the vestibular surface with insulating varnish. Plastic modeling and polymerization. Preliminary polishing of plastic.
III. Metal-plastic fitting crowns	III. Final polishing of the crown.
IY. Fixation of the crown in the oral cavity.	

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

1. Tell about the etiology and pathogenesis of lesions of the hard tissues of the teeth

carious process.

2. What is the role and place of microprosthetics in the treatment of hard defects

tooth tissue?

Q. What is the classification of cavities according to Black?

4. What are the principles of forming cavities for tabs?

5. What are the peculiarities of formation of the bottom and walls of opposing cavities

chewing pressure?

6. What is preventive (preventive) expansion for?

cavities?

7. What are the ways to ensure tightness in the fit of the tab to

tooth tissue?

8. What methods of manufacturing tabs are used in the clinic

orthopedic dentistry?

9. What are the advantages of modern tab manufacturing technologies?

I. What are the clinical and laboratory stages of manufacturing complete metal

stamped crowns?

2. Name the features of the restoration of the anatomical structure

prepared teeth.

3. What are the crown stamping methods?

4. What is the essence of the combined method of stamping crowns according to MMSI?

5. What bleaches are used to whiten crowns?

6. What are the indications and contraindications for the use of porcelain crowns?

7. What are the clinical and laboratory stages of manufacturing porcelain crowns?

8. Plastic crowns. What is their manufacturing technology, advantages and disadvantages?

9. What are the types of combined crowns, features of their production and application?

10. Tell about equatorial crowns, their use, advantages and disadvantages

11. Telescopic crowns. What are the indications for their use, methods production?

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukrainehttp://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 15

Topic: Bridge-like prostheses. Constructions. Defects of tooth rows according to Betelman and Kennedy. Indications for the use of bridge prostheses.

Goal:to acquaint applicants with the construction of a bridge-like prosthesis. To be able to restore dentition defects with bridge prostheses according to the indications for their use.

Basic concepts: Bridge-like prosthesis, dentition defect.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

• etiology and pathogenesis, classification of dentition defects;

• types of bridge prostheses, indications for use;

• clinical and laboratory stages of manufacturing bridge prostheses;

• basic and auxiliary materials,which are used in the manufacture of bridge-like prostheses.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

Bridge-like prostheses.

Bridge-like prostheses are the most common category of prostheses for partially included defects of the dentition.

The dental arch consists of two symmetrical halves, and if one of them is lost, the other can take over its function. Based on this, it is believed that the periodontium of each tooth, thanks to special reserve capabilities, is able to withstand a double chewing load. The construction of any bridge-like prosthesis is based on this principle, when two or more crowns carry an intermediate part, a body that compensates for the defect of a missing tooth or teeth. If the load on the teeth, i.e. the width of the intermediate part, is greater than the reserve capacity of the periodontium of the teeth on which the supporting crowns are located, physiological irritation and trauma will occur, which will lead to loosening of the teeth.

The loss of teeth on one of the jaws often leads to the rearrangement of the bone tissues of the alveolar processes, the protrusion of antagonistic teeth on the opposite jaw, contributing to the formation of a block in the sagittal direction (Popov-Godon phenomenon). To prevent these phenomena, it is necessary to make bridge-like prostheses as soon as possible to restore the lost function of the tooth rows.

All bridge prostheses can be divided according to the material of

manufacture into: plastic, metal, combined. We also divide metal and combined ones into: soldered (first the supporting crowns are made, then the intermediate part, then all the elements are soldered) and solid cast (all parts of the prosthesis are first made of wax, then the wax is replaced by metal by precision casting). Brazed bridge prostheses are becoming a thing of the past, retaining the main advantages - cheapness, ease of manufacture, polishing of a small amount of hard tooth tissue. One-piece prostheses with a wide distribution of precision casting and its significant improvement are gaining great popularity among doctors and dental technicians.

Based on this, the indications for bridge-like prosthetics are:

1. Absence of one or more front teeth on one or both jaws.
2. Absence of less than two lateral teeth on one or both sides of the jaw in the presence of medial and distal support.

Contraindications are:

1. The presence of changes in periapical (around the apex) tissues.
2. Inflammatory periodontal diseases.
3. Malignant neoplasms of oral cavity organs.
4. Absence of one molar or premolar, if the supporting teeth are not depulped and there is no protrusion of the tooth to the side or in height (Popov-Godon phenomenon).

The main requirements for bridge prostheses are:

1. Restoring the function of the chewing apparatus.
2. Restoration of the damaged occlusal surface.

A more generalized formulation of the indications for bridge prosthetics is the following postulate: partial defects of the tooth rows, provided that the sum of the Agapov masticatory efficiency coefficients of the supporting teeth is greater than or equal to the sum of the masticatory efficiency coefficients of the missing teeth.

Coefficients of chewing efficiency according to Agapov:

teeth 1 2 3 4 5 6 7 everything
upper 2 1 3 4 4 6 5
jaw 25 units
lower 2 1 3 4 4 6 5
jaw 25 units

according to Oxman
teeth 1 2 3 4 5 6 7 8 everything
upper 2 1 2 3 3 6 5 3
jaw 25 units

lower 1 1 2 3 3 6 5 4
jaw 25 units

Kennedy and Kulazhenko classification.

Kennedy's classification by classes:

1. Bilateral terminal defect of the dentition.
2. Unilateral terminal defect of the dentition.
3. Intermediate defect in the lateral parts of the tooth row.
4. An intermediate defect in the area of the front department.

CLASSIFICATION KULAZHENKO V.I.

/ class. The dentition defect is limited to one tooth — a continuous shortened dentition without a distal support (Kennedy class II).

// class. Two defects limited to two teeth — a shortened dentition with bilateral defects without distal support (Kennedy class I).

III class. Two defects limited to three teeth — bilateral defects limited to three teeth, one defect without distal support (according to Kennedy — class II, subclass I).

IV class. Two defects limited to four teeth - bilateral defects with distal supports (according to Kennedy - class III, subclass I).

If, in addition to the main, additional defects are present, these cases constitute a subclass of the main class. The absence of front teeth in the presence of lateral teeth is also class II, but with a distal support, and therefore the design of the prosthesis will be different.

All proposed classifications characterize only the topography of the tooth rows.

Local and general impact of defects on the body. This pathologyleads to a violation of the chewing function and is the cause of cosmetic defects, causes a change in a person's appearance, and the loss of the last pair of antagonists gives a person features of old age. The loss of even one tooth leads to changes in the entire dentition: the teeth that limit the defect are displaced, having no antagonists, rise from the alveoli. (V.O. Popov, 1862, Godon, 1865).

With an intact dental arch and a healthy periodontium, there is no shifting of the teeth, there is a so-called balance, "articulations". Shifting of the teeth interferes with the protection of each tooth by its neighbor.

Partial defects of the dentition lead to the emergence of various forms of pathology of the maxillofacial system, which are manifested not only in changes in the position of individual teeth and dentitions, but also in an incorrect bite, changes in the alveolar processes and the mucous membrane.

Alveolar processes atrophy in the place of missing teeth and hypertrophy in a separate part with teeth that have antagonists. As a result of increased attrition over a large area, there are changes in the height of the bite.

Teeth that do not have antagonists can cause trauma and inflammation of the mucous membrane of the alveolar processes of the opposite jaw. Complete or partial adentia is reflected in both functional and morphological changes in the temporomandibular joint. Atrophic-degenerative processes occur, changes occur in the gastrointestinal tract.

Violation of the act of chewing leads to changes in the functional activity of the salivary glands. Thus, the prosthetics of tooth row defects is a preventive measure to prevent various changes of a local or general nature.

3.2. recommendations (instructions) for performing tasks (professional algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

1.3a what criteria are used for clinical assessment of pons prostheses?

2. What is the side effect of bridge-like prostheses on supporting teeth?

Q. What is the effect of plastic cladding on the mucous membrane oral cavity?

4. What is the process of "amalgamation" of gold?

5. What are the tools for cutting gold and metal crowns?

b. What are the tools for knocking down crowns?

7. What mistakes are made during cutting and beating of crowns?

5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/

- National Scientific Medical Library of Ukrainehttp://library.gov.ua/

- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/

PRACTICAL LESSON No. 16

Topic: Removable dentures. Constructions. Groups of dentition defects. Indications for the use of various types of removable prostheses.

Goal: One of the urgent problems of orthopedic dentistry is prosthetics of tooth row defects with removable prostheses. The quality of prosthetics largely depends on the quality of plastics and compliance with the polymerization regime. For a doctor, knowledge of the properties of basic plastics is also important due to their ambiguous effect on the tissues of the prosthetic bed, in order to prevent prosthetic stomatitis.

Basic concepts: Removable denture, dental defects.

Equipment: Computer, multimedia projector, phantoms

Plan:

1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).

2. Control of the reference level of knowledge:

• physiological and physico-chemical impact of plastics on the human body;

• basic rules and techniques, mode of polymerization of basic plastics;

• methods of prosthesis reconstruction, causes of their failure;

• the main stages of the final processing of prostheses and its significance for the clinic.

3. Formation of professional abilities and skills (mastery of skills, curation, determination of treatment regimen, laboratory research, etc.):

3.1. content of tasks (tasks, clinical situations, etc.);

A large group of materials used in orthopedic dentistry consists of polymeric materials - plastics. The bases of removable prostheses, maxillofacial and orthopedic devices, various tires, artificial teeth, coatings for metal parts of prostheses, crowns, etc. are made from them. Plastics used in orthopedic dentistry, chemical stands, light and strong, technological, harmless to the human body, have high cosmetic indicators, are monolithically connected to artificial teeth made of plastic.

Plastics are polymers obtained chemically from natural materials or by chemical synthesis - from low-molecular compounds.

A polymer is a chain of identically repeating hydrocarbon molecules. (CH-CH3)n, where n is the number of repetitions, which can be very large.

Plastics can be single-component (plexiglass, polystyrene) - containing only one repeating element, and multi-component mixtures (aminoplasts, phenoplasts, etc.) - containing several repeating elements.

Basic physicochemical and mechanical properties of polymers.

Technical properties of polymers depend on the nature, structure and purity of monomers, synthesis technology, molecular weight, etc. other things being

equal, the higher the molecular weight of polymers, the higher its mechanical strength, but the more difficult it is to process it into a product.

The processing of plastics is closely related to the three states of polymers. At relatively low temperatures, they are in an elastic-solid state - vitreous, and when the temperature rises, they are in a plastic (viscous-liquid) state. The transition temperature from an elastic-hard to a highly elastic state is called the glass transition temperature (Tst). The transition from a highly elastic to a plastic state is characterized by the yield point (Ttek). Its physical and chemical properties depend on the state the polymer is in. Fluidity is the ability to deform irreversibly under the influence of its own weight (without additional effort). This is a type of plasticity. The inverse of fluidity is viscosity. The glass transition temperature is sometimes called the softening temperature. The temperature interval between Tet and Ttek is used for the manufacture of parts from materials, it can be graphically represented by the diagram:

state

vitreous highly elastic plastic
(elastic-hard) (rubber-like) (viscous-fluid)

at Tst, the thermal movement of individual chain links becomes sufficient to give it some flexibility. Tst of some polymers, C:

polyethylene - -73;
natural rubber - -17;
polyvinylidene chloride- +70;
polystyrene- +80;
polybutal methacrylate - +30.

Degradation of the polymer (rupture of bonds in the polymer with the formation of initial monomers) is an irreversible process of destruction of the material.

In the glassy state, the polymer is an elastic-solid substance and its deformation under the action of external forces is small, especially at temperatures not very close to Tst, a strong increase in deformation occurs. Elastic and plastic deformation are distinguished.

Elasticity is the property of a solid body to involuntarily restore its shape and volume after the termination of an external force. Plasticity is the property of a solid body to change its shape and size (irreversibly).

Elasticity means springiness, that is, the ability of a material to reverse deformation under the action of relatively small external forces.

Polymer relaxation – relaxation of stress created by external action, is used in the formation of polymers. This refers to the slow reaction of the material to external actions. The peculiarities of such properties of polymers, such as mechanical dielectric, etc., are related to this.

Polymer creep is a process of small continuous plastic or elastic deformation that occurs under conditions of prolonged static stress. As the

temperature increases, creep increases. To reduce creep, various fillers are introduced (wood shavings, mineral substances, asbestos).

Polymer plasticization - introduction of plasticizers (dibutyl phthalate, dioctyl phthalate, etc.).

When plasticizers are introduced, the glass transition temperature, relaxation time, and pour point decrease.

Swelling of the polymer is the penetration of liquid molecules into the polymer with an increase in volume.

Shrinkage, polymerization of the plastic test, is compensated by its noticeable expansion as a result of the action of the high temperature coefficient of linear expansion. Shrinkage is partially compensated when using dentures due to water absorption of up to 0.5% volume.

Depending on how heating affects the properties of plastics, they are divided into thermoplastic and thermoset.

Thermoplastic materials (reversible) soften when heated, harden when cooled without changing their composition. These include poly methyl methacrylate, polystyrene, kapron, polyethylene, fluoroplastic. From this group of plastics, polyvinyl chloride, fluoroplastic, and polyacrylates are used in dental prosthetics.

Polychlorinated vinyl is a plastic with good mechanical strength and chemical resistance.

In orthopedic dentistry, a copolymer of vinyl chloride and butyl acrylate is used - Eloplast, which was used to make boxing tires.

Fluoroplasts have high chemical resistance to all organic, mineral acids and alkalis. The Department of Orthopedic Dentistry of OGMU has developed a biologically inert coating for the bases of prostheses based on fluoroplastics.

Polyacrylates - plastics of this group are polymers derived from acrylic and methacrylic acids.

Thermoreactive (irreversible) polymers.

When heated to a critical temperature (159-170 C), and in some cases even without heating, they lose the ability to soften again, while some components undergo a chemical change or are destroyed. These include Bakelite, aminoplasts, phenoplasts, etc. They are not used in dentistry.

Polymerization.

Polymerization is a reaction of mutual connection of monomeric compounds. In the process of polymerization, through the sequential addition of many monomer molecules, some atoms or molecules are split off or isolated. As a result of the reaction, a high-molecular compound is formed, which differs from the initial one only by the size of the molecule.

There are 3 stages of this process.

The first stage is activation of monomer molecules. It is carried out under the influence of light, heat or some chemical substances - initiators. The monomer molecules break double bonds, which is a necessary condition for the formation of polymer chains.

Initiators are chemically active substances that significantly improve the activation of monomer molecules. During the reaction, polymers break down into active radicals that react with monomer molecules. As a result, free valences are released, where polymer chains grow.

The second stage is chain growth, during which the bulk of the polymer is formed. After active centers with high reactivity, depending on intramolecular vibrations or the presence of free chemical valences, have appeared in the reaction mass, the process of chain growth begins. Each active center has the ability to attach other molecules very quickly. The whole process takes place with the help of free radicals that arise at the ends of the growing polymer chain. The formation of molecules is accompanied by the release of a significant amount of energy, and the entire process is characterized by an exothermic reaction, that is, with the release of a significant amount of heat.

The third stage is the end of the polymerization process, the breaking of the polymer chain, which occurs when the factors that cause polymerization cease.

Classification of plastics

Basic plastics.

There are special requirements for these materials due to the fact that they are used to make the main parts of dental prostheses, which are tested in the oral cavity by loads of a significant magnitude and different in nature: bending, compression, stretching, torsion, etc. .

The basic materials must have the following characteristics:

1) sufficient strength and necessary elasticity;

2) high "fatigue" bending resistance;

3) high impact resistance;

4) small specific mass and low thermal conductivity;

5) sufficient hardness, low abrasion resistance;

6) indifference to the action of saliva and various food substances;

7) color resistance to light, air and other environmental factors;

8) harmlessness for tissues of the oral cavity and the body as a whole;

9) lack of adsorbing capacity for food substances and microflora of the oral cavity.

In addition, they must meet the following requirement:

1) firmly connect with porcelain, metal, plastic;

2) easy to process into a product with high precision and keep its natural shape;

3) easy to repair;

4) paint over and imitate the natural color of gums and teeth well;

5) easy to disinfect;

6) not to cause unpleasant taste sensations and not to have a smell.

"Ethacryl" is a ternary copolymer of methyl methacrylate, ethyl methacrylate and methyl acrylate. The powder is a copolymer of those complex esters: methyl and ethyl esters of methacrylic acid and methyl ester of acrylic acid.

Additives of coloring pigments and titanium dioxide make the powder opaque and give it a pleasant pink color. The liquid consists of a mixture of three monomers: methyl methacrylate, ethyl methacrylate and methyl acrylate. The liquid contains the inhibitor hydroquinone and the plasticizer dibutyl phthalate.

"Ftorax" is a fluorine-containing acrylic copolymer used in dentistry for the manufacture of removable denture bases. It consists of powder and liquid. "Ftorax" has good physical and chemical properties: increased strength, chemical resistance. It is translucent, the color most closely matches the soft tissues of the oral cavity.

Elastic plastics

They are used for the production of soft cushioning pads for the bases of removable prostheses, maxillofacial prostheses, obturators, elastic pelots, etc.

Requirements for them:

1) be harmless to the body;

2) have the ability to firmly connect with the base of the prosthesis;

3) maintain elastic properties and constancy of volume;

4) have good wetting.

Currently, flexible plastic "PM-01" is produced in Ukraine. Plastic "Pm-01" is made on the basis of a copolymer of vinyl chloride with butyl acrylate and consists of powder and liquid. In the oral cavity, a gasket made of this plastic remains soft for a long time and is quite reliably connected to the base material.

Self-hardening plastics.

This group includes plastics that can polymerize without external heating.

"Redont" is a plastic, a copolymer of methyl and ethylene ethers of methacrylic acid. 3 types are available: "Redont" opaque, "Redont-02" unpainted transparent, "Redont-03" pink transparent. "Redont" preparations are used for correction and repair of dental prostheses, devices made of acrylic group plastics by cold hardening method.

Stainless steel wire. It is used for the manufacture of staplers, orthodontic appliances with a diameter of 0.6-1.5 mm. Stainless steel softens at a temperature of 700°C, its soldering at such a temperature leads to fracture, loss of elasticity and is often accompanied by chromium loss. Long-term soldering significantly worsens the properties of the wire.

Nichrome wire (an alloy of 80% chromium and 20% nickel) has the best performance, which does not undergo such pronounced changes when heated. Since the recrystallization temperature of nichrome exceeds the melting point of silver solder, slight changes in its properties occur during soldering.

Gold alloy wire (three-component) contains 28% gold, 45% platinum and 27% palladium, does not change its properties; properties during heating and cooling. Its melting point is somewhat higher than that of most gold rain alloys.

3.2. recommendations (instructions) for performing tasks (professional

algorithms, orientation maps for the formation of practical skills and abilities, etc.);

3.3. requirements for work results, including registration;

3.4. control materials for the final stage of the lesson: tasks, assignments, tests, etc. (if necessary).

4. Summary:

I. What are the structural features of partial removable prostheses?

2. What is the mechanism of transmission of chewing pressure in case of use

partial removable prostheses?

Q. What designs of modern partial removable prostheses do you know?

4. What is the dependence of the size of the base plate on the size of the defect

tooth row?

5. What artificial teeth are used in the case of making partials

removable prostheses?

6. Name the methods of fixing partial removable prostheses.

7. Tell about the essence and importance of anatomical retention for fixation

partial removable prostheses.

8. What are the mechanical means of fixing removable prostheses?

I. What are the indications and contraindications for the use of partial removable

prostheses with a metal base?

2. What are the clinical and laboratory stages of manufacturing partial removables

prostheses with a metal base?

Q. What are the methods of manufacturing cast bases?

4. What are the advantages of cast bases over acrylic ones?

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5. List of recommended literature (main, additional, electronic information resources):

Main:

- Orthopedic dentistry: textbook / Rozhko M.M., Nespryadko V.P., I.V. Paliychuk and others; under the editorship M.M. Rozhka, V.P. Nespryadka. - K.: Medical Center "Medicine"; 2020. - 720 p.

- Rozhko M.M., Nespryadko V.P., Mykhaylenko T.M. and others. Dentoprosthetic technique. K.: Book plus; 2016. 604 p.

- Rozhko M.M., Popovych Z.B., Kuroyedova V.D. Dentistry. Textbook. K.: Medical University "Medicine"; 2018. 872 p.

Additional:

- Dentistry: in 2 books. : textbook. Book 2 / M.M. Rozhko, I.I. Kirylenko, O.G. Denisenko and others. ; under the editorship M.M. Horn — 2nd edition. — K.: VSV "Medicine", 2018. — 992 p. ; color kind.

- Material science in dentistry: a study guide / [Korol D.M., Korol M.D., Ojubeiska O.D. etc.]; in general ed. King D.M. – Vinnytsia: New book, 2019. – 400 p.

Electronic information resources:

- State Expert Center of the Ministry of Health of Ukrainehttp://www.dec.gov.ua/index.php/ua/
- National Scientific Medical Library of Ukrainehttp://library.gov.ua/
- National Library of Ukraine named after V.I. Vernadskyihttp://www.nbuv.gov.ua/