Methodical Instruction No.1
For the 2\textsuperscript{d} year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

Topic: \textbf{Acquaintance to faculty. The purposes and tasks of a phantom course.}
\textbf{Ethics and deontology in a stomatology. Iatrogenic diseases.}

Subtopic:

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. Acquaintance with faculty and polyclinic will ensure(supply) more complete representation about features of an educational subject, organization and mode of operations of the given medical establishment.

2. The aims of the training course:

A=1. 1) To have general knowledge of the topic studied; to familiarize with stages of a becoming of faculty of a propedeutics of a therapeutic stomatology, its employees. To familiarize with frame and mode of operations of stomatological polyclinic.

A=2. 2) To understand, to remember and to use the knowledge received;

- Frame of stomatological polyclinic;
- Name of faculty, history of its becoming;
- Sections of a stomatology, in particular, of therapeutic stomatology;
- Purpose and tasks of a phantom course;
- Kinds of the medical documentation of stomatological reception;
- Concept of a deontology in a stomatology;
- Reason of development of iatrogenic diseases.
A=3. To form the professional experience by reviewing, training and authorizing it to be guided in frame of stomatological polyclinic, its therapeutic branch; to use deontological principles in job of the students as future stomatologists.

3. Materials for the before – class work self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
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<tbody>
<tr>
<td>Biophysics</td>
<td>features of hard tissues of a tooth</td>
<td>correctly to choose cutting toolkit depending on a tissue of a tooth, which prepare</td>
</tr>
<tr>
<td>Hygiene</td>
<td>concept about illuminating intensity (natural and artificial)</td>
<td>own concept of illuminating intensity as compound hygienic norms of stomatological study.</td>
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<tr>
<td>Propedeutics of a therapeutic stomatology</td>
<td>Stomatological equipment, stomatological toolkit.</td>
<td>use the stomatological armchair, stomatological installation and stomatological toolkit in clinic of a therapeutic stomatology.</td>
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3.2 The contents of the topic:
Stomatology (from Greek: The stoma-mouth, logos-doctrine) - medical discipline, which is engaged in study of an etiology and pathogenicity of diseases of teeth, jaws and other bodies of an oral cavity, their diagnostics, treatment and prophylaxis. Stomatology is sectioned on:

1. Therapeutic stomatology (phantom course, odontopathology, parstomatology, disease of a mucosa of an oral cavity);
2. Surgical stomatology;
3. Orthopaedic stomatology;

The phantom course is a section of a therapeutic stomatology, which studies a structure of teeth both other bodies and tissues of an oral cavity, equipment of a study, stomatological filling materials, feature of preparation and sealing of carious cavities of different classes, technique and engineering of manipulations in root canals.

The faculty of a propedeutics of a therapeutic stomatology is posed on base 4th municipal hospitals of 2nd polyclinical branch. Consists of studies head of faculties, senior lecturers, assistant room, clinical halls (601, 711), educational rooms of self-preparation of the students (№1, №2, №3).

Deontology - doctrine about duties and norms of behaviour of the medical personnel, which provide optimum quality and productivity of their job on restoration and conservation of health of the people. The deontology surveys the attitude (relation) the doctor - patient, doctor - society (community), doctor - medical personnel., for example, conversations are inadmissible at the patients that at one patient " have broken a tooth ", at second - " treated not that tooth ", at third - " have broken a needle in a tooth " etc. It is necessary to avoid the
critical remarks (at the presence of extraneous) to address the colleagues for mistakes, condemnation of those or other methods of treatment of the doctors of other medical establishments. There should not be a question "ours or not our patient ". Any man should accept in medical establishment and give the help.

The iatrogenic diseases are diseases, which arise on fault of the doctors, medical personnel because of their professional mistakes or negligent attitude(relation) to the patient. In occurrence of iatrogenic diseases result the inept collecting of an anamnesis, the careful acquaintance of the patient to results of laboratory researches etc. And is unjustified -. I . Kassirskiy gives the characteristic of the basic reasons and forms of development of iatrogenic diseases.

1. Direct traumatizing by the doctor, honey. By the personnel of the patient owing to infringement of norms of a so-called mental asepsis.
2. Indirect traumatizing which connected with reading of the medical literature.
3. Feature of the person of the patient, predisposed to psychopathic, psychasthenic reactions.
4. Technically wrong realization of tool research, erroneous introduction of medicinal substances.
5. The form of iatropathology, which arises even at the amplified(strengthened) treatment of any disease by the experts of the appropriate structure, but results in occurrence of other disease, which requires the competence of the doctor of other speciality.

Development of iatrogenic diseases - powerful disadvantage of activity of the doctors. Their prophylaxis promotes: rising of an outlook and professional skill, general(common) and personal culture of the stomatologists, possession of bases of a medical deontology and uses of its rules in the daily practical activity.

Literature recommended:

- Main Sources:
UMSA. Propedeutic of Therapeutic Stomatology Department
   - Additional ones:

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
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<tbody>
<tr>
<td>to be ready to answer the topic</td>
<td>to know a history of faculty</td>
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<tr>
<td>to teach stages of a becoming of faculty of a propedeutics of a therapeutic stomatology</td>
<td>to list the reasons of occurrence of iatrogenic diseases</td>
</tr>
<tr>
<td>to learn what reasons can to result in occurrence of iatrogenic diseases</td>
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3.5. Self-control material:

A. Questions to be answered:

1. What you know about the academy and faculty of a propedeutics of a therapeutic stomatology?

2. What scientific orientation of job of faculty of a propedeutics of a therapeutic stomatology, contribution of its employees to a theoretical and practical stomatology?

3. What role of a phantom course for formation of the expert - stomatologist?

4. Frame of stomatological polyclinic, its basic and auxiliary branches?

5. What rules and norms are adjusted mutual relation of the people in a society(community) by?
6. What the medical deontology represents? Name the basic aspects of its research?

7. What such of iatrogenic diseases? How it is possible to prevent to their occurrence?

B. Test tasks to be done:

Test task with a multiple choice.
What parts the therapeutic stomatology consists of?
1. Orthodontia.
2. Phantom course.
3. Odontopathology.
4. Parstomatology.
5. Disease of a mucosa of an oral cavity.

Test task with a multiple choice.
What studies allocate in therapeutic branch of stomatological polyclinic 3.4 levels of accreditation?
1. Study of the mixed reception
2. A parodontological study
3. Physiotherapeutic study
4. Medical studies
5. A anaesthesiological study
6. Study of functional diagnostics
7. Study of a first aid

4. Self-preparation at class.

1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
3) Ask about the problems that haven’t been found in the information given.
4) Familiarize with frame of faculty, its premises.
5) Familiarize with frame of stomatological polyclinic.
6) To know the basic aspects of a medical stomatology.
7) To know the reasons of occurrence of iatrogenic diseases.

5. Self-preparation work at home.

1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;
5) To work in library of academy, regional medical library with the recommended literature:

The methodical reference is made by the assistant Fetisova O.L.

Methodical development reconsidered and predicated on session of faculty of a propedeutics of a therapeutic stomatology, protocol No __ from __________
With additions (changes)________________________

The Head of the Chair, professor E.V. Kovalev
Methodical Instruction No. 2, 3.
For the 2nd year students’ self – preparation work
(At class and at home)
In studying Propedeutic of Therapeutic Stomatology

Topic:
Structure of a tooth: topography of tissues and formations of a tooth. Histology of enamel, dentine, cement, pulp and periodontium. And their advancing age changes.

Subtopic:

Hours: 2

4. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt; knowledge of an anatomical and histological structure of a tooth is necessary for the student for deep comprehension of the mechanism of development of different pathological processes, which pass in its hard and soft tissues.

5. The aims of the training course:
   
   A=1. To learn histology of a pulp of the tooth, its value for normal functioning of a tooth, periodontium. Its functional value.

   A=2. 2) To understand, remember and using the knowledge received;

   A=2. 3) To know:

   - Anatomical structure of tooth.

   - Histological structure of enamel.

   - Anatomical and histological structure of dentine.

   - Histological structure of cement.

   - Histological structure of pulp.

   - Concept of a periodontal cleft, its topographical and anatomical structure.

   - Changes in the structure of the pulp, which occurs with age.

   - Differences in the structure of root, crown and pulp.

   - Age changes in the periodontium.
A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to:
- To represent teeth by the anatomical and clinical formulas.
- To define the belonging of teeth to the right or left part.
- To draw a tooth schematically and to specify the anatomical and histological names of its compounds.

3. Previous materials – self class work – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topics in connection with other subjects:

<table>
<thead>
<tr>
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<th>To know</th>
<th>To be able to</th>
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<tbody>
<tr>
<td>Anatomy</td>
<td>topographical anatomy of teeth.</td>
<td>Define topographic and anatomical features of different teeth.</td>
</tr>
<tr>
<td>Therapeutic odontology</td>
<td>features of an anatomical structure of teeth.</td>
<td>Distinguish anatomical formations of teeth.</td>
</tr>
<tr>
<td>Histology</td>
<td>A histological structure of enamel, dentine.</td>
<td>distinguish histological formations of teeth.</td>
</tr>
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5.2 The contents of the topic:

**Topic:** *Structure of a tooth: topography of tissues and formations of a tooth. Histology of enamel, dentine, cement, pulp and periodontium. Age changes in them*

The enamel is the hardest tissue of an organism of the human body (is comparable to hardness of soft steel), that allows it in a course of performance by a tooth of the function and resist to influence of the large mechanical loads. At the same time, it is rather fragile and could crack at an appreciable load however it usually does not occur under it, there is a bolstering layer of more resilient dentine. Therefore destruction of a subject layer of a dentine inevitably results to enamel cleft.
The enamel contains 95% of mineral substances (mainly hydroxiapatite, carbonatapatite, fluorapatite etc.), 12 % is organic, 38 % is water, connected with crystals and organic components. Density of enamel is reduced from a surface of a crown to dentine-enamel border and from cutting edge to neck. Maximal hardness is on the cutting edge. The enamel does not contain cells and is not capable to neogenesis at damage, however it constantly has a metabolism (mainly of ions), which act on it as the part of the subject on tooth tissues (dentine, pulp), and from saliva.

Enamel columns: main functional structure units of the enamel, which are taking place by fascicles through all its mass radially (mainly to perpendicularly to dentine-enamel border) and a little bit bent as letter S. In the neck and central part of a crown of temporary teeth the columns settle down are almost horizontal (fig. 5-1, a). Near to cutting edge and edges of chewing tubercules they go in a slanting direction, and coming nearer to cutting edge and to an apex of chewing tubercule, settle down practically upright. In constant teeth a locating of enamel columns in occlusional (chewing) 2/3 of crown the same, as in a temporary teeth. In area of neck, however, course of prisms deviates from horizontal plane in apical side. (fig. 5-1, a).

![Fig. 5-1. A course of enamel columns in a crown of temporary (a) and constant (b) teeth.](image)

Э-enamel; ЭП-enamel columns; Д-dentine; Ц-cement; П-pulp.
The form of prisms on transversal section is oval or — most often at the man — arch (as a key chink) — (fig. 5-2); their diameter makes 3-5 microns. As the outside surface of enamel exceeds internal, border upon from dentine, enamel columns whence begin, consider, that the diameter of prisms is enlarged from dentine-enamel border to a surface of enamel approximately twice. The enamel columns consist of the densely stacked crystals, mainly hydroxiapatites — $\text{Ca}_x(\text{PO}_4)_y(\text{OH})_z$ and eight-calcium phosphates — $\text{Ca}_8\text{H}_2(\text{PO}_4)_6 \cdot 5\text{H}_2\text{O}$. Each crystal is covered with a hydrated environment by thickness about 1 mm. Between crystals there are microspaces filled with water (with an enamel liquid), which serves a carrier of molecules of series of substances and ions.

![Fig. 5-2. A metastructure of enamel and locating in it the crystals of hydroxiapatite.](image)

ЯП-enamel prisms; Г-head of enamel prisms; Х-tails of enamel prisms forming interprismal substance.

Locating of crystals of hydroxiapatites in enamel prisms regulated — till them length as "spruce". In the central part of each prism the crystals lay almost in parallel of its long axis; the more they are removed from this axis, the more appreciably deviate from its direction, forming with axis the increasing angle. At the arch
configuration of enamel prisms crystals of a wide part ("head" or "body"), the prisms, laying in parallel to length, in its narrow part ("tail") fan-shapedly miss, deviating from its axis on 40-65° (see fig. 5-2).

The organic matrix connected to crystals and in a course of an enamelogenesis providing processes of their body height, in process of maturing enamel almost is completely lost. It is saved as the most thin three-dimensional albuminous network, which strings settle down between crystals.

The prisms are characterized transversal striping, formed by alternating of light and dark strips with intervals in 4 microns, that corresponds to daily periodicity of formation of enamel. Assume, that the dark and light sites of an enamel prism reflect an unequal level of a mineralization of enamel. The most peripheric part of each prism represents a narrow layer (an environment of a prism), consisting from less mineralizing substance.

The interprismal substance surrounds prisms of spherical and not regular-shaped form and differentiates them. At arch frame of prisms their parts are in immediate contact with each other, and the interprismal substance as such practically is absent — its role in area of "head" of one prisms play "tails" of others.(see fig.5-4)

Fig. 5-4. Communication of lines by Retzius with pericimatiums of enamel.

a — section of a tooth; б — a site of enamel close of a neck of tooth; в — a site of enamel on a crown of a tooth. Fingers — an output of lines by Retzius on a surface of enamel; Э — enamel; Д — a dentine; П— a pulp; ЛР — a lines by Retzius; ПК — pericimatiums (on I. A. Mjor, O. Fejerskov, 1979, with changes).
The interprismal substance has smaller durability than enamel prisms, therefore at occurrence of clefts in enamel they usually pass on it, not affecting a prism. **Unprismal enamel.** The most internal layer of enamel by thickness 5-15 microns at dentine-enamel border (initial enamel) does not contain prisms, as during its formation the processes by Toms were not generated yet.

**STRIPS by Gunter-Shreger and LINE by Retzius**

Owing to changes in a direction of the course the fascicles of enamel prisms on longitudinal sections in one sites of enamel there is appear longitudinally cutting (parazones), in others — transverselly (diazones). Alternating of parazones and diazones on longitudinal sections of enamel at their study in reflected light causes occurrence of light and dark strips of width about 100 microns (10-13 enamel prisms), perpendicularly to surface of enamel (fig. 5-3). These strips are named as strips after Gunter-Shreger. The light strips revealed on sections, correspond to parazones, and dark — to diazones. Simultaneously on sections of the tooth other type of striping of enamels formed by enamel striae (by striae, or lines after Retzius) is defined. On longitudinal sections a line after Retzius look like symmetric arches going obliquely from a surface of enamel to dentine-enamel border (see a fig. 5-3, 5-4) and painted in yellow - brown colour. On transversal sections they represent concentric circles and remind rings of body height on trunks of trees. The lines after Retzius are growthal lines of enamel.

**Fig. 5-3. Strips by Gunter-Shreger and lines by Retzius of enamel.** ЛР — lines by Retzius; ПГШ — strips by Gunter-Shreger; Д — a dentine; Ц — cement; П — a pulp.
ENAMEL PLATES, FASCICLES and SPINDLES

Enamel plates and fascicles — sites of enamel containing unsufficiency calcified enamel prisms and interprismal substance, in which is taped appreciable concentration of proteins with high molecular mass, congenerous to enamelin. They arise during development of a tooth. Most clearly enamel plate and the fascicles are found out on sections of a tooth.

An enamel plate — thin foliaceous (on sections — linear) defects of a mineralization of enamel containing proteins of enamel and organic substances from an oral cavity. They are pulled from a surface deep into enamels and can reach dentine-enamel border, and sometimes proceed in a dentine. In the best way the enamel plate are visible in the neck of a tooth.

The enamel fascicles meet much more often plates. They look like small conical formations inverted by the top perpendicular to dentine-enamel border, and will penetrate into enamel on rather small distance (on 1/5-1/3 of its thickness), meeting with intervals approximately 100 microns. Externally they are similar to fascicles of a grass, whence there was their name. They the same as also of enamel plate, contain unsufficiency calcified prisms and interprismal substance.

Enamel spindles represent rather short (some micrometers) mace-shaped or spindle-shaped frames locating in an internal one third of enamel perpendicularly to dentine-enamel borders and which are not conterminous on the course to enamel prisms (see a fig. 5-5). Similarly to enamel plates and fascicles, spindles are hypomineralized sites of enamel with the rather high contents of organic components. A parentage and possible functional meaning of enamel spindles are a subject of discussion. There is an opinion, that they arise because up to a secretion of enamel the processes of separate fibrilloblasts can penetrate between enameloblasts, and further immure themself in formed enamel. The assumption is stated also, that they represent the rests of separate enameloblasts, which, as against others, did not accept participations in development of enamel and were immured in its layer.

A dentine-enamel bond. The border between enamel and dentine has a rough kind (see fig. 5-5), that promotes stronger bond of these tissues. At use of a scanning
submicroscopy on a surface of a dentine in the field of dentine-enamel bond the system of communicans crests pressing in the excavation, appropriate to them, in enamel is taped.

**SUPERFICIAL STRUCTURES OF ENAMEL**

**Pericimatiums.** If to look after lines by Retzius up to their output on a surface of a tooth, they will correspond to circular grooves, that is to sites of enamel, where it has smaller thickness (see fig. 5-4). On edges of grooves and on their bottom there are numerous fine pressing on a surface of enamel 4-6 microns by a diameter and depth 0,5-3 microns. This are fossas. They occur in a course of development and correspond to a locating of processes by Toms of enameloblasts during end of a secretion of a matrix of enamel. Between these grooves the platens of height 2-4,5 microns and width 30-160 microns termed **pericimatiums** settle down. The cuticle of enamel covers its surface as a thin environment and consists of two layers:

1) Of a primary cuticle (environment by Nasmith) — internal thin (about 0,5-1,5 microns) homogeneous layer of glycoproteins, being last secretory product of enameloblasts;

2) Of the secondary cuticle formed by outside to thicker (about 10 microns) layer of a reduced epithelium of an enamel body.

After eruption of teeth the cuticle is erased on their chewing surfaces, being partially saved on lateral.

**Pellicula, tooth plaque, odontolith.** The enamel of any cut tooth is covered outside by a layered organic film termed pellicula (from lat. pellis — a skin). The pellicula is forms, obviously, owing to a precipitation of proteins and glycoproteins of saliva and makes in thickness, on the different data, from less 1 up to 2-4 microns. After mechanical clearing of a surface of enamel it is wholly restores during several hours.

Structure of a tooth: topography of tissues and formations of a tooth. Histology of enamel and dentine.
Dentine and pulp sometimes are treated separately in textbooks on dental histology largely because dentine is a hard connective tissue and the pulp is a soft one. However, dentine and pulp are related embryologically, histologically, and functionally and therefore are described together.

**BASIC STRUCTURE OF DENTINE**

Dentine is the hard tissue portion of the pulp-dentine complex and forms the bulk of the tooth. Dentine is a bone-like matrix characterized by multiple closely packed dentinal tubules that traverse its entire thickness and contain the cytoplasmic extensions of odontoblasts that once formed the dentine and then maintain it. The cell bodies of the odontoblasts are aligned along the inner aspect of the dentine, against a layer of predentine, where they also form the peripheral boundary of the dental pulp.

The dental pulp is the soft connective tissue that occupies the central portion of the tooth. The space it occupies is the pulp cavity, which is divided into a coronal portion (or pulp chamber) and a radicular portion (the root canal). The pulp chamber conforms to the general shape of the anatomic crown. Under the cusps the chamber extends into pulp horns, which are especially prominent under the buccal cusp of premolars and the mesiobuccal cusp of molars. Their cusps are particularly significant in dental restoration, when they must be avoided to prevent exposure of pulp tissue.

The root canal (or root canal system, as it is called in multirooted teeth) terminates at the apical foramen, where the pulp and periodontal ligament meet and the main nerves and vessels enter and leave the tooth. In the developing tooth the apical foramen is large and centrally located. As the tooth completes its development, the apical foramen becomes smaller in diameter and more eccentric in position. Sizes from 0.3 to 0.6 μm, with the large diameter occurring in the palatal root of maxillary molars and the distal root of mandibular molars, are typical of the completed foramen. The foramen may be located at the very end, or anatomic apex of the root, but usually is located slightly more occlusally from the apex. If more than one
foramen is presents in a root, the largest is designated the apical foramen and the others are *accessory foramina*.

Connections between the pulp and the periodontal tissues also may occur along the lateral surface of the root through the lateral canals. Such canals, which may contain blood vessels, are not present in all teeth and occur with differing frequencies in different types of teeth. Occasionally, the lateral canals enter the floor of the pulp chamber of multirooted teeth. Because the apical foramen and the lateral canals are areas of communications between the pulp space and the periodontium, they can act as avenues for the extension of disease from one tissue to the other. Hence diseases of the dental pulp can produce changes in the periodontal tissues. More rarely do diseases of the periodontium involve the dental pulp.

**COMPOSITION, FORMATION AND STRUCTURE OF DENTINE**

Dentin is deposited as a layer of unmineralized matrix called *predentine* that varies in thickness (10 – 50 µm) and lines its innermost (pulpal) portion. Predentine consists principally of collagen and noncollagenous components. Dentine is similar to osteoid in bone and is easy to identify in hematoxylin-eosin stained sections because it stains less intensely than mineralized dentine. Predentine gradually mineralizes into dentine as various noncollagenous matrix proteins are incorporated at the *mineralization front*. Its thickness remains constant because the amount that calcifies is balanced by the addition of new unmineralized matrix.

Mature dentine is made up of approximately 70% inorganic material, 20% organic material, and 10% of water. Its inorganic component consists of substituted hydroxyapatite in the form of small plates. The organic phase is about 30% collagen with fractional inclusions of lipids and noncollagenous matrix proteins. The noncollagenous matrix proteins pack the space between collagen fibrils and accumulate along the periphery of dentinal tubules.
Dentine is slightly harder than bone and softer than enamel. This difference can be distinguished readily on radiographs, on which the dentine appears more radiolucent (darker) than enamel and more radiopaque (lighter) than pulp. Because light can readily pass through the thin, highly mineralized enamel and can be reflected by the underlying yellowish dentine, the crown of the tooth also assumes such colorations. The thicker enamel does not permit light to pass through as readily, and in such teeth the crown appears whiter. Teeth with pulp disease or without a dental pulp often show discoloration of the dentine, which causes a darkening of the clinical crown.

Physically, dentine has an elastic quality that is important for the proper functioning of the tooth because the elasticity provides flexibility and prevents fracture of the overlying brittle enamel. Dentine and enamel are bound firmly at the dentinoenamel junction that appears microscopically, as a well-defined scalloped border. In the root of the tooth the dentine is covered by cementum, and the junction between these two tissues is less distinct since, in the human, they intermingle.

**STRUCTURES of a DENTINE.**

Dentine —is a calcified tissue of a tooth forming its basic mass and determining its form. Dentine often survered as the specialized osteal tissue. The dentine has light yellow colouring, has some clasticity; he is stronger than a bone and cement, but in in 4-5 softer than enamel. The mature dentine contains 70 % of inorganic substances (mainly hydroxiapatites), 20 % of organic (in the basic collagen of 1 type) and 10 % of water.Due to the properties, the dentine interferes to clefting by harder, but fragile enamel covering it in the field of a crown.

The dentine consists of calcified intercellular substance penetrated by dentinal tubules, containing processes of odontoblasts, the bodies of which lay on periphery of a pulp. Between tubules an intertubular dentine settles down. The periodicity of body height of a dentine causes presence in it of a new growthal lines posed in parallel of its surface. The zones of a hypomineralized dentine include: 1) an interglobular
dentine and 2) granular layer by Toms; the dentine is separated from a pulp by a layer of a not calcified predentine.

Fig. 6-1. Topography of a dentine and course of dentinal tubules.
ДТ — dentinal tubules; ИГД — an interglobular dentine; ЗСТ — a granular layer by Toms; Э — enamel; Ц — cement; ПК — the pulpal chamber; РП — a horns of a pulp; КК — the canal of a root; АО — an apical aperture; ДК — the additional canal.

Fig. 6-2. The nearpulpal dentine, predentin and pulp.
Д — a dentine; ПД — a predentin; ДТ — dentinal tubules; КСФ — calcospherites; ОБЛ — odontoblasts (body of cells); П — a pulp; НЗ — an outside zone of an intermediate layer (layer by Wale); ВЗ — an internal zone of an intermediate layer; ЦС — the central layer.
1) The interglobular dentine settles down by layers in an outside one third of crown in parallel to dentine-enamel border. It is submitted by sites of the wrong form containing not calcified collagen fibrils, which lay between not merged with each other globulas of a calcified dentine (see fig. 5-5, 6-1). In the interglobular dentine a peritubular dentine is absent (see below).

2) the granular layer by Toms settles down on periphery of a root dentine and consists of fine weakly calcified sites (grains) laying as a stria lengthways of dentine-cement border.

**Predentine** is an internal (not calcified) part of a dentine, close to a layer of odontoblasts as oxifilly stained zone of width 10-50 microns penetrated by processes of odontoblasts. The predentine is formed mainly by collagen of an I type. The transition of a predentin in a mature dentine is carried out sharply on a boundary line, or front of a mineralization. On the part of a mature dentine in a predentine press a basephilial calcified globulas. A predentine is a zone of constant body growth of a dentine. In a dentine allocate two layers with a various course of collagen fibers (fig. 6-4, a):

![Fig. 6-4. A course of a collagen fibers (a) and dentinal tubulas (б) in a dentine.](image)

Э — enamel; ЭВ — enamel spindles;
ДЭГ — dentine-enamel border;
ОПД - a nearpulpal dentine;
ПЛД — a cloak dentine;
ПД — a predentine;
PB — radial fibers (by Korf);
TB — tangential fibers (by Ebner);
DT — dentinal tubules;
OBL — odontoblasts (body of cells);
П— a pulp.

1) a nearpulpal dentine — is the internal layer amounting the most part of a dentine, is characterized by prevalence of fibers going tangentially to dentine-enamel border and perpendicularly to dentinal tubules (the tangential fiber, or fiber by Ebner);

2) a cloak dentine — is outside layer, covering a nearpulpal dentine, thickness about 150 microns. He is formed by first and is characterized by prevalence of collagen fibers going in a radial direction, in parallel to dentinal tubules (radial fibers, or fiber by Korf). Close to nearpulpal dentine these fibers are going to in cone-shapedly narrowed fascicles, which from an apex of a crown to a root change the initial radial direction for one more slanting, coming nearer to a course of tangential fibers. The cloak dentine smoothly passes in nearpulpal, and to radial fibers mix the increasing quantity of tangential. A matrix of a cloak dentine is less meniralazied, than the matrix of nearpulpal also contains rather less of collagen fibers.

**Dentinal tubules**— thin, narrowed to outside the small canales, radially penetrating a dentine from a pulp up to its periphery (dentine-enamel border in a crown and cement-dentinal border in a root) and causing its stripping. The tubules provide a trophicity of a dentine. In a nearpulpal dentine they are straight linees, and in a cloack (near their ends) — are V-figurative branch out and contacting with each other (see fig. 6-4, 6). The terminal branching of dentinal tubules is especially clearly expressed in a root dentine. From dentinal tubules on all to their length with an interval 1-2 microns thin lateral branch depart. The tubules in a crown are slightly bent and have an S-figurative course. In the field of apexes of horns of a pulp, and also of apical one third of root they are direct (see fig. 6-1). Density of a locating of
dentinal tubules is much higher on the surface of a pulp (45-76 thousand on square mm in a crown of premolars and molars), than about dentine-enamel border (15-20 thousand on square mm); relative volume, borrowed by dentinal tubules, makes about 30% and 4% of a dentine accordingly. In a root of a tooth near a crown density of a locating of the tubules approximately the same, as in a crown, however in an apical direction it is reduced almost in 5 times. Dentinal tubules can in separate sites cross dentine-enamel border and superficially penetrate into enamel as so-called enamel spindles. Last, as assume, are formed in a course of development of a tooth, when processes of some odontoblasts, reaching of enameloiblasts, immure themself in formed enamel. In dentinal tubules the processes of odontoblasts surrounded with a fabric (dentinal) liquid settle down. The dentinal liquid represents transsudate of peripheric capillaries of a pulp and on albuminous structure is similar to plasma; it contains also glycoproteins and fibronectium. This liquid fills the space between a process of an odontoblast and wall of dentinal tubules, which at pulpal edge of tubule is very narrow, and in a direction of periphery of a dentine becomes wider. This space serves the important way for carry of various substances from a pulp to dentine-enamel border. From within the wall of dentinal tubule is covered thin film of organic substance — boundary plate (membrane by Newman), which passes on all length of dentinal tubule, contains high concentration of glycosaminoglycanes.

**Peritubular And Intertubular dentine.**

Peritubular dentine represents a layer of a dentine immediately environmental each dentinal tubule and forming its wall (see fig. 6-6). As a matter of fact the peritubular dentine is necessary to be named more correctly as intratubular, as it is formed inside of tubule, reducing in due course initial diameter of its aperture. Peritubular dentine is characterized raised (on 40%) contents of mineral substances in comparison with intertubular dentine filling spaces between tubules. The contents of organic substances in peritubular dentine are minimal — at a decalcification it almost completely disappears. This circumstance has the important clinical meaning — at a demineralization of a dentine in a course of a caries peritubular dentine is exposed to destruction much faster than intertubular, that results in expansion of
tubules and augmentation of a permeability of a dentine. Intertubular dentine (see fig. 6-6) in a course of development of a tooth is formed by first both in cloack, and in a nearpulpal dentine. He is submitted basically by calcified collagen fibrils by a diameter 50-200 nm. The crystals of hydroxiapatites are posed along an axis of fibrils. The primary dentine is formed during formation and eruption, making the basic part of this tissue (fig. 6-7). It is postpones by odontoblasts with average rate 4-8 microns on a day, and the periods of their activity alternate with the periods of rest.

The secondary dentine (regular, or physiological secondary dentine) is a part of nearpulpal dentine, it is forms in the generated tooth after eruption and is continuation of a primary dentine (see fig. 6-7).

Fig.6-6. the dentinal tubules, intertubular and peritubular dentine.

The secondary dentine is formed more slowly than primary. In comparison with primary dentine the secondary is characterized by a little less regulated locating of dentinal tubules and collagen fibrils, lower degree of a mineralization. Tubules of a secondary dentine are less numerous and narrower; crossing border of a primary and secondary dentine (demarcational line), in one sites they do not change the course, and in others — are S-figuratively bent.

The adjournment of a secondary dentine occurs non-uniformly: most actively he is formed in lateral walls and in a roof of pulpal chamber, and in multirooted teeth — in its bottom. As a result of adjournment of a secondary dentine the form of the pulpal chamber changes, in particular, the horns of a pulp smooth out, and its( pulpal chamber) volume is reduced.
The tertiary dentine (irregular secondary, reparative, substitutional dentine) is formed in reply to action of the irritating factors. As against a primary and secondary dentine, which settle down along of all pulpal-dentinal borders, tertiary dentine forms more or less locally — only by cells immediately reacting to an irritation? It can be formed in any site of a wall of the pulpal chamber, most often — in the field of horns of a pulp. Quantity and frame of a tertiary dentine depend on a nature, intensity and duration of influence. It is continuation of a primary or secondary regular dentine, usually non-uniformly and weakly mineralized and is characterized by a wrong course or even by absence of dentinal tubules and various inclusions.

SCLEROTIC (TRANSPARENT) DENTINE and DEAD WAYS in DENTINE.

Sclerotic (transparent) dentine is formed as a result of progressive adjournment of peritubular dentine in dentinal tubules that causes their gradual narrowing and obliteration. These changes can be connected with natural process of aging, in particular, in a root dentine ("physiological" sclerosis) or to develop under action of various pathological processes, for example, caries, deleting ("pathological" sclerosis). Two ways of a calcification of contents of dentinal tubules are described: at the first mineralization begins in periodontoblastic space and only then grasps a process of an odontoblast, at second — its beginning is a calcification of a process with the subsequent mineralization of periodontoblastic space.

Fig. 6-9 The dead ways in dentine.

**STRUCTURE of CEMENT of a TOOTH**

![Diagram of tooth structure](image)

Fig. 7-1 Topography of the cement of a tooth (а) and its microscopic structure (б).

БКЦ — uncellular dentine; КЦ — cellular dentine; Э — enamel; Д — dentine; ДТ — dentinal tubules; ЗСТ — a granular layer by Toms; П — pulp; ЦЦ — cementocytus; ЦБЛ — cementoblasts;

**Cement** is the calcified tissue of a tooth similar with osteal, but, as against it, is deprived of vessels and is not subject to constant reorganization. The cement covers roots and neck of a tooth (fig. 7-1, a). On the data of the majority of the researchers, it partially goes on enamel at 60-70 of %, in 10 % does not reach it (fig. 7-2, a-b). The thickness of a layer of cement is minimal in area of neck (20-50 microns) and is maximal at an apex of a root (100-1500 microns and more, it is thicker in molar teeths). The cement is sectioned on uncellular - primary and cellular - secondary (see fig. 7-1, a).

**Uncellular (primary) cement** — is formed by first in a course of development. It settles down on a surface of roots of a tooth as rather thin (30-230 microns) layer, which thickness is minimal in the field of cement-enamel border and is maximal at an apex of a tooth. Uncellular cement is a unique layer of cement covering neck of a tooth, in some teeth (for example, the bottom forward incisors) it almost wholly covers a root.

As follows from the name, uncellular cement does not contain cells and consists of calcified intercellular substance including densely posed collagen fibers
and the basic substance. There are stripping, perpendicular to the surface of a root (for the bill of intertwine not calcified fibers of periodontal ligaments), and also lamination parallel to a surface of a root, owing to periodicity of its adjournment in it. The lines of body height in uncellular cement settle down closely to each other, and its border with dentine is expressed not clearly.

**Cellular (secondary) cement covers** the apical one third of root and area of a bifurcation of roots of multirooted teeth. It settles down atop of uncellular cement, however sometimes (in absence of last) is immediate closes to a dentine. The border between them is expressed clearly (tab. 7-1). The thickness of a layer of cellular cement varies over a wide range (100-1500 microns) and is most appreciable in molars. Cellular cement consists of cells (cementoctys and cementoblasts) and calcified intercellular substance (see fig. 7-1, б). Cementocytes (from lat. cementum — cement and greek. kytos — a cell) lay in the special cavities inside of cement — lacunae — and on a structure are similar to osteocytes. They are impressed cells with the moderately advanced organellas and rather large core. Their numerous (up to 30) branching out processes by a diameter about 1 micron reach in length 12-15 microns and are connected with each other by fissured bonds (necsus). The processes settle down in small canals and are focused mainly in the party of periodontal ligament (power supply). In process of adjournment of new layers of cement on a surface of a root in its deep layers, the cementocytes, leaving from the power supply, are exposed to degenerative changes and perish, owing to what lacunae remain filled by cellular detritus or become empty. Opposite, than closer to a surface of cement, than in the greater degree cementocytes save attributes of functional activity and similarity with cementoblasts.

**Cementoblasts** (from lat. cementum — cement and greek. blastos — sprout) — active cells with the well advanced synthetic device — provide rhythmic adjournment of new layers of cement and settle down on its surface — in peripheric sites of periodontal ligament around of a root of a tooth. At formation of uncellular cement the cementoblasts are removing to outside from the intercellular substance, produced by them, and at formation of cellular cement — immure themself in it. The most
peripheric layer of not calcified just formed cement is called as cementoid (precement).

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
</tr>
<tr>
<td>to learn the material</td>
<td>to use the material on(at) pages</td>
</tr>
<tr>
<td>to read and compose the plan</td>
<td>to learn the new material and be ready to write a summary</td>
</tr>
<tr>
<td>to answer the questions</td>
<td>to be ready to give an answer to the questions</td>
</tr>
<tr>
<td>to do the test on the material</td>
<td></td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td></td>
</tr>
</tbody>
</table>

The intercellular substance of cellular cement includes fibers and basic substance. The fibers section on "own", i.e. formed by cells of cement and going mainly in parallel surfaces of a root of a tooth, and "external", by which fibers carry of periodontal ligament (are focused perpendicularly to the surfaces of a root). The parity between fibers of both types varies over a wide range in various sites of cement.

Literature recommended
- Main Sources:
- Additional ones:

3.4 How to work with the literature recommended:

3.5. Self-control material:

A. Questions to be answered:
B. Test tasks to be done:

4. Self-preparation at class.
   1) Listen to the information;
   2) Work with the tables, corpse, anatomical damp preparation;
   3) Ask about the problems that haven’t been found in the information given.

5. Self-preparation work at home.
1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;
6. The subject of the research work.
Topic: **Role of saliva in an oral cavity. Concept of parodontium, its functions**

Subtopic: 

Hours: 2

1. The topic basis: the Saliva in an oral cavity carries out a number of the important functions, therefore knowledge of its structure and possible changes at different pathological processes are important for a correct estimation of a condition of bodies of an oral cavity and an organism as a whole. The saliva is the biological environment for bodies of an oral cavity, therefore its structure and properties render significant influence on a condition of teeth, tissues of parodontium and a mucous of oral cavity. Change of volume, a chemical compound and properties of saliva can promote development of stomatologic diseases.

2. The aims of the training course:

   A=1. 1) To have general knowledge of the topic studied; to define a role of a saliva in processes of demineralization enamels, maintenance of a constant level pH of oral cavity, performance protective, digestive, secretory, regulating, endocrine functions.

   A=2. 2) To understand, to remember and to use the knowledge received; To know structure and functions of a saliva, an oral liquid, concept of parodontium.

   A=2. 3) To know:
   - Distinctions in structure of saliva and an oral liquid;
   - The name and function of major and minor salivary glands in oral cavity;
   - Structure and functions of an oral liquid;
   - Definition of parodontium, a structure of its tissues in norm;

   A=3. 4) To be able (=3)
   - To represent a teeth anatomic and clinic formulas;
   - To define an accessory of a teeth to the right or left jaw, their cores a sign.

   A=3. 5) To be able to carry out laboratory and experimental work.

3. Materials for the before – class work self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>topographical anatomy of salivary glands.</td>
<td>define arrangements salivary glands</td>
</tr>
<tr>
<td>Therapeutic stomatology</td>
<td>disease of salivary glands.</td>
<td>spend adequate treatment and preventive maintenance.</td>
</tr>
<tr>
<td>Histology</td>
<td>the histologic structure of salivary glands, of parodontium.</td>
<td>distinguish histologic formation</td>
</tr>
</tbody>
</table>

5.3 The contents of the topic:

Topic: **Role of saliva in an oral cavity. Concept of parodontium, its functions**

Subtopic: 

Text

**Functions of a saliva:**

*Protective* (including immune) - it is provided with various mechanisms.

Saliva protects the oral cavity in many ways. Its fluid nature provides a washing action that flushes away nonadherent bacteria and other debris. In particular, the clearance of sugars from the mouth limits their availability to acidogenic plaque microorganisms. The mucins and others glycoproteins provide lubrication, preventing the oral tissues from adhering to one another and allowing them to slide easily over one another. The mucins also form a barrier against noxious stimuli, microbial toxins, and minor trauma.

Saliva, soaking and softening food, and also covering by film mucous membranes, *protects them from mechanical damages* by rough food and facilitates swallowing;

The direct current of saliva plays *clearing role*, also prvent from an attachment of pathogenic microorganisms to a surface of epithelium and
teeth; it promotes also to removal of the food rests, serving by a nutrient habitat for microbes;

The saliva possesses buffer properties which provide neutralization of the acids developed by pathogenic microorganisms (that prevents demineralization of enamels). Owing to these properties of saliva in an oral cavity values pH created, which prevent colonizations in an oral cavity the some pathogenic microbes. Buffer properties of saliva play the important role and for neutralization of a sour contained stomach, which can get in an oral cavity at regurgitation;

**Maintenance of tooth integrity.** The saliva is saturated by ions of calcium, magnesium, phosphate and chlorine which high concentration promote moving of ions in enamel that has especially great value during maturing of enamel after eruption a tooth and does its firm and resistant against development of caries. **Mineralizing function** of saliva is important for maintenance of normal chemical structure of enamel. At damage of enamel and development of initial stages of caries (for the lack of formation of cavities) it is possible it remineralization due to ions of a saliva;

**Tissue repair.** Presence at saliva of epidermal factor of growth (EFG) provides maintenance of a physiological level of regeneration epithelium also promotes acceleration of healing of damages mucosa environments as oral cavities, and more caudal situated sites of a digestive path.

**Digestion.** Saliva also contributes to the digestion of food. The solubilization of food substances and the action of enzymes such as amylase and lipase, begin the digestive process. The moistening and lubricative properties of saliva also allow the formation and swallowing of a food bolus. The saliva cools excessively hot food, interfering of thermical damage of a mucous membrane.

**Taste.** Saliva functions in taste by solubilizing food substances so that they can be sensed by taste receptors located in taste buds. Saliva produced by minor glands in the vicinity of the circumvallate papillae contains proteins that are
believed to bind taste substances and present them to the taste receptors. Additionally, saliva contains proteins that have a trophic effect on taste receptors.

**Antimicrobial action.** Saliva has a major ecologic influence on the microorganisms that colonize oral tissues. In addition to the barrier effect provided by mucins, saliva contains a spectrum of proteins with antimicrobial activity such as the histatins, lysozyme, lactoferrin, and peroxidase. Antibodies also are present in saliva. The major salivary immunoglobulin, secretory IgA, causes agglutination of specific microorganisms, preventing their adherence to oral tissues and forming clumps that are swallowed. Mucins, as well as specific agglutinins, also aggregate microorganisms.

**Pellicle formation.** Many of the salivary proteins bind to the surfaces of the teeth and oral mucosa, forming a thin film, the salivary pellicle. Several proteins bind calcium and help to protect the tooth surface. Others have binding sites for oral bacteria, providing the initial attachment for organisms that form plaque.

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn structure of a saliva.</td>
<td>To draw a structure of one-root and a manyrooted</td>
</tr>
<tr>
<td>To learn what salivary glands open channels in</td>
<td>To draw in a working writing-book final departments</td>
</tr>
<tr>
<td>an oral cavity?</td>
<td>and excretory ducts of salivary glands.</td>
</tr>
<tr>
<td>To learn a histologic structure of parodontium.</td>
<td>To know feature of a structure of parodontium.</td>
</tr>
<tr>
<td>To learn functions of a saliva.</td>
<td>To know what functions is carried out with saliva.</td>
</tr>
</tbody>
</table>

3.4. Self-control material:

A. Questions to be answered:

1) Name salivary glands the maxillofacial area, what secret they allocate.
2) Structure of a saliva, an oral liquid.
3) Than protective function of saliva is provided?
4) In what buffer function of saliva consists. Than it is provided?
5) What role of saliva in digestion of food?
6) How the saliva influences on function of swallowing, speech?
7) What is parodontium? What structure of its tissues in norm?

B. Test tasks to be done:
1. What speed of allocation of a saliva in rest?
   a) From 6 ml/min up to 10 ml/min;
   b) From 0,005 ml/min up to 1 ml/min;
   c) From 0,03ml/min up to 2, 4 ml/min;
2. What of more listed glands concern to small?
   a) glands by Rivinus;
   b) paratidea;
   c) buccal;
   d) hypoglossal;
4. Self-preparation at class.
   1. To draw a tooth and to define its anatomic structure.
   2. To define its histologic structure of hard and soft tissues.
   3. To draw a direction of fibres in a periodontium, their attitude to cement of a root and an internal plate of an alveolus.
5. Self-preparation work at home.
Specify all anatomic and topographical features of a structure of a single-root tooth on a phantom.
Specify anatomic and topographical features of a structure of manyrooted tooth.
To draw a single-root tooth, specify its anatomic features.
To draw manyrooted tooth, specify its anatomic features.
Methodical Instruction No. 5,6,7.
For the 2nd year students’ self-preparation work (at class and at home)
in studying Propedeutic of Therapeutic Stomatology


Subtopic:

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The knowledge of clinical and anatomical features of a constitution of teeth enables to spot their group accessories to maxilla or mandible, dextral or left-hand (party), time or constant (stationary) occlusion. Knowing a topographical and anatomical constitution of teeth, the student can prepare carious cavities with the count of depth of hard tissues of teeth on different fields, open and treat (process) caries cavities of teeth, taking into account topography of the pulpal camera and root canals.

2. The aims of the training course:

A=1. 1) To have general knowledge of the topic studied;
A=2. 2) To understand, to remember and to use the knowledge received;
A=2. 3) To learn the constitution of crowns and roots of incisors, canines, premolars, molars of both jows; an interrelation of the dimensions of crowns and roots of teeth; a locating of the pulpal camera and variants of a constitution of root canals; Tooth formulas; sign of curvature of a crown; sign of an angle of a crown; sign of a deflection of a root;
A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to: figure teeth by the anatomical and clinical formulas; define accessories of teeth to the dextral or left-hand party of a jow to their basic signes; define accessories of teeth to this or that jow, to the left-hand or dextral party of a jow.

3.Materials for the before – class work self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>topographical anatomy of the pulpal camera of different groups of teeth.</td>
<td>define (determine) accessories of teeth to particular bunch (incisors, canines, premolars, molars)</td>
</tr>
<tr>
<td>Histology</td>
<td>histological constitution of enamel, dentine.</td>
<td>distinguish histological formations of teeth.</td>
</tr>
<tr>
<td>Therapeutic odontology</td>
<td>classification of carious cavities, feature of preparing of carious cavities</td>
<td>prepare carious cavities of different classes on phantoms</td>
</tr>
</tbody>
</table>

5.4 The contents of the topic:


Text

The tooth formulas:

Anatomical (constant occlusion)
Clinical (constant occlusion)
International (on WHO)

Signes of belonging of the teeth:
1. Sign of an angle of a crown;
2. Sign of curvature of a crown (direct and revertive);
3. Sign of a deflection of a root;
4. Sign of contact surfaces.

**Clinical and anatomical features of teeth.**

<table>
<thead>
<tr>
<th>Incisors</th>
<th>Canines</th>
<th>Premolars</th>
<th>Molars</th>
</tr>
</thead>
</table>

Plan of an anatomical constitution


Maximum quantity of teeth at the person - 32, on 16 in each tooth number.

The teeth represent a crown and root bridging by nick.

The most protuberant part of a crown is equator. The protuberance in range of proximal surfaces provides contact between teeth. The contact point between teeth reference for the young people. With age the contact point transmutes in plane for account of lapping of aproximal surfaces of teeth and their medial travel.

The teeth represent a crown and root bridging by neck.

The most protuberant part of a crown is equator. The protuberance in range of proximal surfaces provides contact between teeth. The contact point between teeth reference for the young people. With age the contact point transmutes in plane for account of lapping of aproximal surfaces of teeth and their medial travel.

As neck of teeth (collum dentis) term a transition range of a crown in a root. At neck of teeth finish an enamel integument and the organic shell (pellicula) is bridged with intrinsic epithelial layer of gum edge. In result the gum sulcus is formed.

The roots of teeth (radix dentis) submersed in an alveolus of a jawbone.
By thicked part - crown (corona dentis) - the teeth act in an oral cavity. Distinguish an anatomical crown, which border (limit) passes on neck of teeth, and clinical, which finds above by gum edge. At once after an eruption height, or length, anatomical crown is peer to height of a clinical crown. With age the anatomical crown is shortened as a result of wipeout (deleting) teeth.

Anatomical (1) and clinical (2) crowns of teeth. The erased part of cutting edge (3).

The clinical crown also shortens as a result of an erasing ability, but at lack (absence) of wipeout (deleting) can and be extended owing to diseases of a periodontium and retraction of a gingiva.

The surface of a crown of teeth, versed in a vestibule of an oral cavity, is termed vestibular. At frontal teeth it still terms labial, at masticatory - buccal. Alone in an oral cavity the oral (lingual) surface of teeth is inverted.

The surfaces, versed to the next teeth, are termed contact, or aproximal. To the center of a dentition the medial surfaces guided. On forward teeth they are termed medial (medial). On inverse party of teeth are distal surfaces.

To teeth of an inverse dentition are inverted masticatory, or occlusial, surfaces (at incisors it is cutting edge, at canines - hillock).

On the establishment of general signes the teeth distinguish on accessories to the dextral or left-hand side, to maxilla or mandible, and also to particular functionly oriented bunches. Signes of the side of teeth determines by curvature of crowns, interrelation of distal and medial angles of a crown, declination of roots (Signes of curvature of a crown, angle of a crown and deflection of a root).
The sign of curvature of a crown concludes (consist) in the greater protuberance of a vestibular part of a crown posed near to its medial edge, and flat clivus at distal. The given sign is more legibly expressed by viewing teeth from the side of occlusial surface.

The sign of an angle of a crown characterizes by that made by a medial surface and cutting edge (masticatory surface) the medial angles are much sharper that distal (between distal edge of a crown and occlusial surface).

The sign of a declination of a root means, that a root or its apex are bent in a distal direction in relation to a long axis of teeth.

The accessories of teeth to maxilla or mandible are defined on the dimensions, form of a crown of teeth, quantity and locating of roots.

For notation of the dimensions of teeth will utilize the following concepts:

- **General length** includes distance from an apex of a root, up to the most salience part of a crown (cutting edge or hillock) along a vertical axis of teeth.
- **Length (height)** of a crown is defined in distance from neck of teeth up to occlusial surface.

- **Breadth of teeth** is its medial-distal dimension; **depth of teeth** is its vestibular-lingual diameter.

All teeth divide into bunches distinguishing by quantity of roots and the form a crowns: shovel-shaped (incisors), cone-shaped (canines), cylindrical double-tubercule (small radical teeth – premolars), cylindrical many - tubercule (major radical teeth - molars).

On the establishment of outward signes of the teeth can be compared to the geometrical forms: a rectangle, delta circuit, oval.

The basic geometrical forms of a crown of teeth: rectangular (1), triangular (2), oval (3).
The rectangular form: the crown of teeth have well-marked angles, breadth of a crown in the neck range approaches to cross dimension of teeth in range of cutting edge. The triangular form: crown is convergented in the neck one third with expressed medial and distal angles. The rounded angles of a crown attach teeth a view of an oval. Usually one phylum is characteristic for frontal bunch of one dentition: the lateral incisor irrespective of the dimensions under the form corresponds to central.

The form of teeth interdependents to a locating them in a tooth arc: the rectangular teeth more often settle down at lingual side, oval – at vestibular side. The rectangular form of teeth is characteristic for "a «rectangular" tooth arc, oval and the triangular teeth usually meet in a jow of the corresponding form. In one case of the former central and lateral incisors are on one direct, in second - on an arc, in third - the incisors have more or less expressed rotational displacement of distal angle in the lingual side.

Basic geometrical forms of the tooth arcs: rectangular (1), triangular (2), oval (3).

Incisors of a top and bottom jow (fig. 6, fig. 7, fig. 8)
The incisors (dentes incisivi) occupy a forward (frontal) position in the tooth series and carry out the function of biting of nutrition. Incisors only eight: 4 on maxilla and 4 on a mandible. The crowns settle down close to a frontal plane, have bit-shaped (shovel-shaped) form, and come to an end by cutting edge. The lingual (oral) surface of incisors is concave. The maximal excavation is defined in a delta circuit, restricted cutting edge, regional platens and tooth hillock.

The first (medial, central) incisors of maxilla have general length on the average 23,0 mm (height of a crown of 10,5 mm, root - 12,5 mm). The depth (vestibular-lingual dimension) on the average composed 7,6 mm.

The crowns of teeth, as a rule, are canted to midline, have the bit-shaped (shovel-shaped) form the cutting edge is wider in neck range. Closer to neck a crown of teeth become thicker in a vestibular-lingual direction. A vestibular surface slightly protuberant. At once after eruption at cutting edge three denticles are defined, the medial is highest. With age they are erased. On a vestibular surface these denticles transferes in more or less expressed, upright posed platens. The sulcuses, parting them, can be distinctly expressed and sometimes maintain during many years after an eruption.

The lingual surface of a crown is concave in a longitudinal direction. On edges there are thickenings - platens, which gradually approach on a direction to neck and, merge, form a tooth hillock. The lateral surfaces of an incisor look like a rough wedge, wide at neck of teeth and convergent to cutting edge for score of a concave lingual surface.

From signs of the side of teeth the curvature of a crown is usually well-marked. The sign of an angle can be spotted on the not erased incisors. The sign of a deflection of a root is swept up.

The second (lateral) incisor of maxilla has the smaller dimensions in comparison with central. General length of teeth is 22,5 mm (length of a crown is 9 mm, root - 13,5 mm). Vestibular-lingual dimension is 6,57 mm. The crowns of teeth have the bit-shaped form (neck range narrower than cutting edge) with three denticles at cutting edge. A vestibular surface protuberant, the
vertical platens expressed more feeblly, than on central teeth. On a concave lingual surface the lateral platens are clearly visible which merge in a tooth hillock. In front from it there is a blind pit. The distal surface of a crown looks like an improper delta circuit or wedge. In series of cases it can transfer as curve in cutting edge. Then approximal part of an incisor reminds a canine. All signes of the side of teeth are well-marked. A reduction of lateral incisor quite often is observed. The crown can decrease down to peg-shaped.

**Inferior first (medial, central) incisor** - most small in the given bunch. General length on the average composes 21, 0 mm (length of a crown is 9, 0 mm, root - 12, 0 mm). Depth of a crown - 6, 4 mm. A crown of the bit-shaped form, narrow, vestibular surface slightly protuberant, lingual - concave. At once after eruption three denticles at cutting edge define. To pimples of cutting edge (on a vestibular surface) there small longitudinal enamel platens correspond. The signes of accessories of teeth are expressed feeblly or is absent.

**Inferior second (lateral) incisor** under the form distinguishes from medial a little. It is a little bit larger, frequently has more lengthy distal edge of a crown. Length of teeth on the average 22, 0 mm (crown - 9, 5 mm, root - 12, 5 mm). The depth composes 6, 5 mm.

The bit-shaped narrow crown has protuberance in the vestibular side, oblate in range of cutting edge. The small longitudinal platens come to an end at cutting edge by three denticles. On a lingual surface in neck range of a crown the enamel platen borders neck of teeth. The signes of accessories of teeth are expressed well, than at a central incisor.

**Canines of a top and bottom jow**

**The canines (dentes canini)** characterize by a massive clinoid crown. The protuberant vestibular surface gradually approach with lingual. Last on centerline has a thickening as the single well-marked platen. To cutting edge the platens at bond with a vestibular surface form a salience wedge. Coming nearer to neck of teeth, it transfers in a tooth hillock, incrementing volume of the establishment of a crown.
On a cutting surface of a canine two shoulders are defined: medial and distal. They descend under a blunt angle, participating in formation of a finger (hillock), through which line of the greatest protuberance upright passes. It parts a vestibular surface of a crown in the ratio 1:2. The smaller part is posed at medial side. The hillock of a canine, hence, is formed by a concurrence lingual, vestibule independence on a locating and carried out function distinguish forward teeth ensuring biting of nutrition, both lateral - pulping and pounding it.lar and proximal surfaces.

The maxilla canine has a massive crown of the lanceolated form. General length of teeth - 26,0 mm (crowns - 9,5 mm, root - 16.5 mm), depth of a crown - 8,4 mm. A vestibular surface protuberant. On the lingual side the longitudinal platen finds, parting a crown on two facings, lateral is more on the area. The longitudinal enamel platens of both surfaces transfer in a hillock. Aproximal surface, beginning from neck, gradually miss, the finger (hillock) at cutting edge is posed not in the middle, and more medial, therefore medial part of a contact surface is shorter. The teeth have well-marked signes of curvature of a crown and deflection of a root. The inferior canine is less than superior and under the form of a crown remind maxilla lateral incisor. General length of teeth - 25,0 mm (crown - 10.0 mm. A root -
15.0 mm), depth - 7,4 mm. The medial surface as though prolongs a surface of a root, forming with it a direct line. The finger at cutting edge is expressed less, settles down more medial, therefore medial part of cutting edge is shorter, than distal. Last more abruptly also is longer, owing to what a medial angle sharper and is posed further from neck of teeth. More lateral by a main hillock there is a small cutout. The distinct form of a wedge is not present. On a lingual surface the medial platen is expressed less, than lateral. It frames a general pattern of some protuberance of a surface.

**Premolars of a top and bottom jow**

Small radical teeth (dentes premolars). In total there are eight. On masticatory (occlusial) surface two masticatory hillocks are posed: vestibular and oral.

The maxilla first premolar by a vestibular surface reminds a canine of the inverse side of a dentition. General length of teeth - 21,0 mm (crown - 8,5MM, roots - 12,5 mm). Vestibular-lingual dimension - 9,4 mm. A crown has the prismatic form, buccal and lingual surfaces protuberant. On a chewing surface there are two hillocks: buccal and palatal. Buccal is much more. The sulcus, parting them, (fissura) interrupts by small platens, not reaching up to edges of a crown. On a chewing surface of a buccal hillock two clivuses are defined. The lingual surface of a crown is less also more protuberant. A chewing surface is of the oval form.

Revertive sign of curvature of a crown, signes of an angle of a crown and the deflections of a root are expressed well.
The maxilla second premolar is usual less than first. Its dimensions - 21,0 mm (crown - 8,5 mm, root - 12,5 mm), the depth in medial part composes 9,6 mm. The crown is of the prismatic form, on a cross section is oval, prolates in a buccal-lingual direction (fig. 12). The cross sulcus, restricted on edges by enamel platens, parts a chewing surface on two hillocks. Both hillocks have or identical quantity and level of a locating, or the buccal hillock is advanced better, than lingual. The buccal surface is more than lingual, however less protuberant. A revertive sign of curvature of a crown defines.

The inferior first premolar has spherical in a crosscut form of a crown. Length of teeth composes 22,0 mm (crown - 8,0 mm, root - 14,0 mm), depth - 7,8 mm. The vestibular surface is longer than lingual, a little bit protuberant, in a maxilla is considerably declined orally, finish a buccal hillock. The lingual hillock small also is much below. To it from a buccal hillock on a chewing surface stretch the platen, which intercrosses a notch parting two hillocks. The platen divides it into two holes (medial and distal), which lay on platforms, concurrent under an angle. The nonuniform locating of pimples causes a skew position of a masticatory surface,
owing to what of crowns reminds a canine. The signes of curvature and angle of a crown expressed clearly.

The inferior second premolar has length of 21.4 mm (crown - 8.0 mm, root - 13.4 mm), depth of teeth - 8.4 mm. The crown under the form reminds a ball with two pimples on a chewing surface. The buccal hillock is little bit larger than lingual, the chewing surface is posed more horizontally, than at the first premolar. The platen bridges both hillocks, forming two pits on a chewing surface: distal and medial. In series of cases the platen is interrupted at the center, then the holes merge in a horseshoe-shaped sulcus. Sometimes lingual hillock of the second inferior premolar is unsignificant bifurcating, the teeth transmute in three-hillocks form. All signes of the side of teeth are expressed clearly.

The first and second molars of maxilla and mandible.

Molar teeth of a top and bottom jow

The major radical teeth (deties molares) have a large crown with the major area of a chewing surface, more often with 4-5 hillocks. The crown of the maxilla molar has the form of a rhombus, the sulcus parting hillocks, reminds under the form the letter H.

The inferior molar have a crown slightly prolate in a direction of a dentition. The sulcuses between hillocks are posed cruciformly or remind the letter. The
hillocks are termed buccal or lingual in dependence on what surface they are prolonging. On a direction of a dentition they are termed medial or distal. Thus, the major radical teeth have medial-buccal, medial-lingual, distal-buccal and distal-lingual hillocks.

At the maxilla molars the buccal hillocks are pointed and act more, than round lingual. At the inferior molars, on the contrary, buccal hillocks low and blunt. The border of enamel at neck of molars passes more horizontally and without flexures on approximal surface, that it is noticeably on other teeth. The signes of the side of teeth are usually well-marked. The quantity of molars gradually decreases from first to third, reduce the area of a masticatory surface and quantity of roots.

The maxilla first molar has the most massive crown. Length of teeth on the average composes 20,5 mm (crown - 7,5 mm, root - 13 mm). Vestibular-lingual dimension on the average composes 11,0 mm. Three sulcuses parts surface on 4 hillocks. The medial sulcus goes by semiarc from a buccal surface to medial, abjointing a like hillock. The distal sulcus passes by semiarc in a distal part of a chewing surface and abjoints a palatal-distal hillock. Both these fissures are connected by a short skew sulcus along the greater diagonal of a rhombus abjointing buccal-distal and palatal-medial hillocks. Medial fissura goes on more direct buccal surface, distal transfers on palatal, more protuberant, the buccal hillocks are sharper than lingual, and medial more larger than distal. It render by most small usually distal-palatal hillock. On a lingual surface can be more or the padding hillock - Corabelli (tuberculum anomale Corabelli) is less expressed. It is abjointed in the establishment of a medial-lingual hillock by an arched notch transiting on a palatal surface by protuberance to masticatory. The hillock Corabelli frequently meets at the representative of European populations (more than 40 %) and at mongolians (till 15.25 of %).

The maxilla second molar is less on the dimensions, than first, and under the form of a crown rather variable. Length of teeth in the average composes 20,0 mm (crown - 7,0 mm, root - 13,0 mm), vestibular-oral dimension - 10,6 mm. Less than 50 % of the maxilla second molars (first phylum) reminds a crown of the first molars, smaller on the dimensions. Sometimes on a lingual surface it is possible to see a hillock
Corabelli. At molars of the second type the crown is extended in a distal direction, distal (buccal and palatal) the hillocks expressed feeblly. The molars of the third type are characterized by three hillocks, posed in a chain. Medial of them is as the platen. All crown in this case is narrow, flatten. The hillocks are displaced in a direction of a diagonal of a dentition or are reduced. At molars of the fourth type in result of shifts of palatal hillocks the crown has the triangular form with three hillocks on angles of a delta circuit. The molars of the first and fourth phylums most wide-spread.

The maxilla third molar - this is a “tooth of wisdom”. Its form and quantity is variable. As a rule, it is less than other molars, under the form can resemble the second maxilla molar. Frequently crown small also has three hillocks (sometimes six and even eight).

The inferior first molar has a crown, under the form coming approaching to a cube a little bit prolate on a course of a dentition and oblate on a vertical. General length of teeth - 21,0 mm (crown - 7,5, root - 13,5), depth of a crown - 10.7 mm. On a chewing surface in 95,4 % of cases 5 hillocks parted by a slightly sinuous sulcus, going in medial-distal direction with ramifications transiting between hillocks settle down. The buccal surface protuberant, is especial in distal range. Closer to a masticatory surface it is declined in the oral side and transfers in large flat and blunt buccal hillocks: buccal-medial, buccal-distal and distal. Last can miss (4,6 % of cases). Fissures as superficial notches are prolonged on a buccal surface. The sulcus between the establishment of buccal-medial and buccal-distal hillocks is well-marked, between buccal-distal and distal it is not appreciable almost. Lingual surface more sleek, almost vertical. Lingual hillocks (medial and distal) pointed and higher, than buccal. Medial more larger than distal.

The sign of an angle of a crown is expressed well. The contact surfaces widely miss from neck to a chewing surface. A distal surface more protuberant.

The inferior second molar is more less than the first. Its length of 20,0 mm (crown - 7,0 mm, root - 13,0 mm), depth of a crown 10,2 mm. A crown by more exact of the cube form. The chewing surface parts by a legible cruciform sulcus, forming 4 hillocks: 2 flat buccal and 2 more pointed and salience lingual. Medial more larger...
than distal, buccal surface more protuberant, but both surfaces more flat, than at the first molars. Longitudinal fissura on a chewing surface is posed closer to lingual edge. The cross part of fissura, parting medial and distal hillocks, frequently goes on a vestibular surface of a crown and comes to an end by a blind excavation. The signes of the side of teeth are expressed clearly.

The inferior third molar has a crown, on the dimensions smaller, than at the second molar, less variable and it is usual by exact of the cube form. The quantity of hillocks from three up to six, but is more often four - five. Reference feature - stripe of all surface by notches.

Literature recommended

1. Main Sources:
   1) Данилевский М.Ф. Практический курс терапевтической стоматологии. Фантомный курс. Львов, 1993. 87-108с.

2. Additional ones:
   2) Современная стоматология № 1 2003 с. 30-37. Луцкая А.И.

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
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<tbody>
<tr>
<td>to learn tooth formulas by constant occlusion;</td>
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</tr>
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<td>to learn the clinical and anatomical features of the incisores and canines of mandible</td>
<td>to draw in copybook incisors, canines, premolars and molars of</td>
</tr>
</tbody>
</table>
3.5. Self-control material:

A. Questions to be answered:

1. Name the surfaces of incisors of maxilla.
2. Name the surfaces of incisors of mandible.
3. Clinical and anatomical features of crown part of upper central incisors.
4. Clinical and anatomical features of crown part of upper lateral incisors.
5. Variant of the constitution of crown part of canines of maxilla and mandible.
6. Clinical and anatomical features of the crown part of the first upper and lower premolars.
7. Clinical and anatomical features of the crown part of the first upper and lower molars.
8. Clinical and anatomical features of the crown part of the second upper and lower molars.
9. Clinical and anatomical features of the crown part of the third upper and lower molars.

B. Test tasks to be done:

1. In what teeth the revertive signes of curvature of crown is scored?
   a) upper canines;
   b) the second molar of upper jaw;
   c) the first premolar of maxilla;
   d) the second premolar of maxilla;
   e) the first premolar of mandible;

2. At what teeth the presence of a hillock “Corabelli” is scored?
   a) the first molar of maxilla;
b) the second molar of mandible;
c) the second molar of maxilla.

4. Self-preparation at class.

1) Listen the information;
2) Work with fantoms, removal teeth, literature recommended;
3) Ask about the problems that haven’t been found in the information given.
4) Lead definition of a sign of curvature of a crown of canines of the maxilla jow.
5) Lead definition of a sign of a deflection of a root.
6) Lead definition of a sign of an angle of a crown.

5. Self-preparation work at home.

Educational problems:
a) The crown of teeth has the form of a rhombus with four, sometimes with five hillocks - two buccal and three palatal. What teeth have such form and specified quantity of hillocks?
b) The crown of teeth has the form of a prolate tetragon. There are two major hillock, the buccal hillock, in turn, can be parted into two - three salients. Spot teeth in a dentition.
в) The form of a crown of teeth is similar to a rectangle. On a chewing surface there are five hillocks - three buccal and two lingual. Term teeth.
г) The pulp cavity has the spindle-shaped form, which is imperceptible transfers in the root canal. In what teeth there is a such form of cavity?
d) The form of a crown is cone-shaped and crown has one tearing hillock. What teeth can have such form?
e) The crowns of teeth have the bit-shaped form. To what bunch does the teeth belong?

The methodical development is made by the assistant Fetisova O. L.
Methodical Instruction No. 8
For the 2nd year students’ self-preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

CHECK TOPIC: « Structure of a tooth: topography of tissues and formations of a tooth. Histology of enamel, dentine, cement, pulp and periodontium. Clinic and anatomic structure of all teeth of a mandible and maxilla. The tooth formulas. A signs of belonging of the tooth.

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The knowledge of clinical and anatomical features of a constitution of teeth enables to spot their group accessories to maxilla or mandible, dextral or left-hand (party), time or constant (stationary) occlusion. Knowing a topographical and anatomical constitution of teeth, the student can prepare carious cavities with the count of depth of hard tissues of teeth on different fields, open and treat (process) caries cavities of teeth, taking into account topography of the pulped camera and root canals.

2. The aims of the training course:

A=1. 1) To have general knowledge of the topic studied;

A=2. 2) To understand, to remember and to use the knowledge received;

A=2. 3) To learn the constitution of crowns and roots of incisors, canines, premolars, molars of both jaws; an interrelation of the dimensions of crowns and roots of teeth; a locating of the pulped camera and variants of a constitution of root canals; Tooth formulas; sign of curvature of a crown; sign of an angle of a crown; sign of a deflection of a root;

A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to: figure teeth by the anatomical and clinical formulas; define accessories of teeth to the dextral or left-hand party of a jaw to their basic signes; define accessories of teeth to this or that jaw, to the left-hand or dextral party of a jaw.

3. Materials for the before–class work self–preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomy</strong></td>
<td>topographical anatomy of the pulped camera of different groups of teeth.</td>
<td>define accessories of teeth to particular bunch (incisors, canines, premolars, molars)</td>
</tr>
<tr>
<td><strong>Histology</strong></td>
<td>histological constitution of enamel, dentine.</td>
<td>distinguish histological formations of teeth.</td>
</tr>
<tr>
<td><strong>Therapeutic odontology</strong></td>
<td>classification of carious cavities, feature of preparing of carious cavities</td>
<td>prepare carious cavities of different classes on phantoms</td>
</tr>
</tbody>
</table>

**Literature recommended**

1. Main Sources:


2. Additional ones:


2. Современная стоматология № 1 2003 с. 30-37. Луцкая А.И.
3.4 How to work with the literature recommended:

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<td>to draw in copybook incisors, canines, premolars and molars of maxilla and mandible.</td>
</tr>
<tr>
<td>to learn the clinical and anatomical features of the premolars of mandible and maxilla;</td>
<td></td>
</tr>
<tr>
<td>to learn the clinical and anatomical features of the molars of mandible and maxilla.</td>
<td></td>
</tr>
</tbody>
</table>

Test tasks to be done

1. What speed of allocation of a saliva in rest?
   a) From 6 ml/min up to 10 ml/min;
   b) From 0,005 ml/min up to 1 ml/min;
   c) From 0,03 ml/min up to 2, 4 ml/min;

2. What of more listed glands concern to small?
   a) glands by Rivinus;
   b) paratidea;
   c) buccal;
   d) hypoglossal;

3. In what teeth the revertive signes of curvature of crown is scored?
   a) upper canines;
   b) the second molar of upper jaw;
   c) the first premolar of maxilla;
   d) the second premolar of maxilla;
   e) the first premolar of mandible;
4. At what teeth the presence of a hillock “Corabelli” is scored?
   a) the first molar of maxilla;
   b) the second molar of mandible;
   c) the second molar of maxilla.

5. What parts the therapeutic stomatology consists of?
   1. Orthodontia.
   2. Phantom course.
   3. Odontopathology.
   4. Parstomatology.
   5. Disease of a mucosa of an oral cavity.

6. What studies allocate in therapeutic branch of stomatological polyclinic 3.4 levels of accreditation? (Test task with a multiple choice)
   1. Study of the mixed reception
   2. A parodontological study
   3. Physiotherapeutic study
   4. Medical studies
   5. A anaesthesiological study
   6. Study of functional diagnostics
   7. Study of a first aid

   a) The crown of teeth has the form of a rhombus with four, sometimes with five hillocks - two buccal and three palatal. What teeth have such form and specified quantity of hillocks?
   b) The crown of teeth has the form of a prolate tetragon. There are two major hillock, the buccal hillock, in turn, can be parted into two - three salients. Spot teeth in a dentition.
   c) The form of a crown of teeth is similar to a rectangle. On a chewing surface there are five hillocks - three buccal and two lingual. Term teeth.
   d) The pulp cavity has the spindle-shaped form, which is imperceptible transfers in the root canal. In what teeth there is a such form of cavity?
   e) The form of a crown is cone-shaped and crown has one tearing hillock.
What teeth can have such form?

f) The crowns of teeth have the bit-shaped form. To what bunch does the teeth belong?

The methodical development is made by the Marchenko Iryna Jaroslavovna
Methodical Instruction No. 9
For the 2nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

Topic:
The workplace of the student, its equipment. Kinds of drills. The safety precautions of job on a drill. Stomatological toolkit, its purpose(appointment).
Professional diseases of the doctor - stomatologist, their prophylaxis. Concept of ergonomics in an odontology.

Subtopic:
Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The knowledge of stomatological equipment and toolkit, their kinds and purpose(appointment) will enable concerning correct and their rational use, which in turn will ensure(supply) granting qualitative stomatological help in clinic of a therapeutic odontology.

2. The aims of the training course:
   A=1. 1) To have general knowledge of the topic studied;
   A=2. 1) To know hygienic norms for organization of stomatological consulting room

   2) To know stomatological equipment and basic stomatological equipment.
   3) To know stomatological toolkit for survey of the patient
   4) To know stomatological toolkit for treatment of the patient
   5) To know kinds and purpose(appointment) of stomatological handpieces
6) To know versions of cutting stomatological toolkit (on purpose (appointment), materials of manufacturing and form)

A=3. 1) To be able to use the stomatological armchair and stomatological installation

2) To be able to use toolkit and to inspect an oral cavity

3) To be able to use toolkit for treatment

4) To be able to choose and to use a handpiece correctly

5) To be able to use cutting toolkit for preparation correctly (on the phantom)

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th>Biophysics</th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>features of hard tissues of a tooth</td>
<td>choose cutting toolkit depending on a tissue of a tooth, which is prepare correctly</td>
</tr>
<tr>
<td>Hygiene</td>
<td>concept about illuminating intensity (natural and artificial)</td>
<td>own concept of illuminating intensity as compound of hygienic norms of stomatological consulting room</td>
</tr>
<tr>
<td>Propedeutics of a therapeutic odontology</td>
<td>stomatological equipment, stomatological toolkit.</td>
<td>use the stomatological armchair, stomatological installation and stomatological toolkit in clinic of a therapeutic</td>
</tr>
</tbody>
</table>
The contents of the topic:

**Topic:** The workplace of the student, its equipment. Kinds of drills. The safety precautions of job on a drill. Stomatological toolkit, its purpose (appointment). Professional diseases of the doctor - stomatologist, their prophylaxis. Concept of ergonomics in an odontology.

**Text 9,IIc**

The organization of stomatological consulting room is connected with equipment by its complex (difficult) equipment, equipment and numerous toolkit, organization of a workplace of the doctor - stomatologist and medical sister. For correct accommodation of equipment and medical furniture the area of the stomatological consulting room on one workplace should be not less than 14 $\text{m}^2$. If necessary installations of several armchairs on each of them the additional area at a rate of 7 $\text{m}^2$ is allocated.

Important there is a question of illumination of a consulting room. Each armchair is necessary for establishing opposite to a window, but it is necessary to provide and artificial illumination.

In a consulting room two conchas with cocks of cold and hot water are necessary. In one concha the processing of arms (hand), in another - instruments is spent. Stomatological consulting room is equiped with special furniture. It is necessary to be the presence of a case for a storage of materials and medicines, little table with glass for medicines and sterile toolkit, glass little table and screw chair near each workplace, table for record of a case history.

The successful job of the doctor depends on a degree of equipment of stomatological consulting room, from technical-constructive qualities of equipment, which appreciably facilitate job, promoting thus to rising of its productivity and improvement of results of treatment.
Stomatological consulting rooms are contained appreciable quantity (amount) of toolkit, complex (difficult) equipment, universal stomatological installation, by (with) high-speed and turbine drills, devices for a diathermocoagulation, EOD etc.

Universal stomatological installation are let out of different types. The majority of them are equipped by drills with the raised (increased) quantity (amount) of revolutions. The drills are may be foot, electrical, turbine, laser, ultrasonic; portable and stationary.

If the rate of a portable electrical drill does not exceed 5000 rev/min, in stationary installations she reaches (achieves) 8000-10000 rev/min and more. Last years the turbine drills are widely used, the rate of rotation of bur in these machines reaches (achieves) 100000-300000 rev/min. The turbine drills have small capacity and preparation of a tissue of a tooth is carried out at the expense of the large rate of rotation bur.

The installations are equipped with compressors, which submit coarctate air for air pistols. With their help spend irrigation of liquid medicinal substances or drying of a pulp cavity by warm air after preparation. Also there is connected to sewer system, a water syringe, in which water is warmed up to 35-400 °C, diathermocoagulator, device for EOD.

The handpieces part on two types:
Direct and angle (for a rigid sleeve and micromotor). And also - turbine handpiece.
Preparation of tissues of a tooth is spent with the help of bur, fixed in a handpiece. Depending on the sizes of a carious cavity burs of different size and form are used.
The burs are classify:
Under the form: ball-shaped, cylindrical (fissure), cone-shaped, rounds.
Behind a material: steel, diamond and tungsten carbide.
According to a handpiece: for direct, angle and turbine (with long accordingly 4,4; 2,7 and 2,2 sm).
The sizes of burs distinguish under numbers.
The diameter of bur №1 is equaled 0,85мм, №3-1,1мм, №5-1,6мм, №7-2мм, №9-2,7мм, №11-3,1мм.
Round burs are applied for the erasions of old seals, expansion of the ostium of root canals, for creation of basic items, for disclosing a carious cavity, necrectomy.

Fissure and cone-shaped burs are use for disclosing and expansion of a carious cavity, erasions of a seal, creation of «steep» walls of a cavity.

Opposite cone -for processing of bottom of a cavity, creation of basic items and erasion of seals.

Wheel-shaped are use for a trepanation of a crown of a tooth, creations of basic items on walls of a carious cavity.

For processing seals use carborundum stones, disks, burs and etc.

Cutter is many-toothed rotating instruments giving the appropriate form to a processable subject by removal of "shaving".

During treatment of the stomatological patient the various and numerous instruments are use. However there is a constant tooling, with which help spend the review of the patient, and also subsequent treatment. Into a set enter: stomatological mirror, dental forceps, angle probe, excavator, metal spatula.

**Mirror**

The stomatological mirrors have two functions: they are used by the stomatologists and their assistants as the elementary holders of cheeks and, besides - as the
mirror, due to which is provided the review of remote sites of a oral cavity. These mirrors have the various sizes and diameter, and the very large mirrors are not convenient in job. There are two kinds of mirrors: flat, precisely enough reflecting sizes of the image, and concave mirrors enlarging a subject.

The surface of a mirror very quickly wears out and becomes matte. In such cases the mirror is unscrew from the handle and to replace. In job it is better to use thick handles, as at keeping the thin handle of a mirror of an arm(hand) quickly get tired.

**Forcepses**

The forcepses are used for withdrawal from cases of an account material, for applying in a mouth of the patient of cotton rolls and ets. Most often used forcepses termed as tooth forcepses, are a little bent ahead and have the pointed working end.

At hygienic processing of forcepses it is necessary to keep extra care, as their working ends become blunt easily. The blunt forcepses can not keep fine subjects. The straight forcepses for the best capture of a subject have the flat end corrugated surface. They named by anatomic forcepses. The surgical forcepses have on the end small tooth for the best keeping of the seized soft tissues. At their use is formed small wound.

The staining paper for the control of an occlusion and articulation (articulation paper) is inserted into self-tightening forcepses by Miller.

**Probe**

The probe happens to a straight line, or bayonet-shaped, and bent under an angle. By a probe survey fissures, carious cavities, pulp cavities, presence of hanging edges(territories) of a cavity, presence of a softened dentine. With the help of a probe find out carious cavities, research depth of gum pockets, presence of adjournment of an odontolith etc. Alongside with the direct and bent probes, are applied also unciform to the control of regional contiguity of crowns.
Excavator

Consists of the handle, on which both ends are available posed under an angle acute spoons, acute edges(territories) inverted in the opposite party. By an excavator it is possible to remove from carious cavity the rests of nutrition, softened dentine, to remove(take off) temporary seals, under- and overgum stone. The sizes of an excavator are differ under numbers from 0 up to 3.

Plastic instruments(Pluggers).

The dentists applies pluggers to sealing carious cavities. Produce with round and piriform heads of the various sizes. Them use for inspissation of filling material. The dentists applies a plastic instrument(on the one hand there is a head, with another – plate for smoothing. Plates also could be bilateral, and in these cases on one end plate is posed in horizontal in relation to the handle of a plane, and on the friend - in vertical. With the help of plate for smoothing we make sealing a carious cavity, formation of a seal etc.

Saliva ejector

There are some variants of saliva ejector.

The saliva ejector - represents thin bent plastic pipe, which is established in an oral cavity for additional suck draw of a liquid from area of a pharynx. He is applied both for relative, and for absolute drying of an oral cavity.

Dust ejector - usual suctional nozzle, has length approximately 12 см and large suctional aperture ensuring optimal suction of aerosols polluted by bacteria

Large suctional nozzles are made from plastic, and from metal. Both variants have approximately similar suctional capacity. But plastic nozzle is a little bit thicker and is not so convenient at job in a small oral cavity. At use of rotating instruments
the nozzle owes on distance approximately 1 sm from tooth constantly. This distance is necessary that cooling liquid does not deviate a tooth as a result of action of suctionsal devices and the plenty of aerosols leaving an oral cavity was not formed. The aerosols contains a plenty of bacteria, which represents danger for chair-side assistant and stomatologist and can result in a two-dimensional infection in a medical room. The suctionsal devices should not, whenever possible, to concern zones causing a vomitive reflex (of a soft palate, lingula, root of tongue). The mucosa of an oral cavity should save humidity. Therefore at back departments of an oral cavity always there is a moisture, due to which danger of an aspiration of foreign bodies (for example, surpluses of filling material), among other things, decreases during treatment. At surgical interventions thick suctionsal nozzle is not used, as there are no aerosols. The preference is given for long and thin suctionsal nozzle, with which help the blood from woundal area is pumped out more conveniently. Surgical suctionsal nozzle should be sterile. At job in an oral cavity there are concepts of relative and absolute isolation from an oral liquid.

**Instruments for relative drying of an oral cavity**

For relative drying of an oral cavity the various platens are used. The platens for parotid gland are convenient which twice longer than others and amplified (strengthened) by a wire lining. They are good adsorb a saliva selected of parotid gland. At a disadvantage of a place of an oral cavity and large tongue, the cotton rolls are fixed with the help of a holder of tongue and cheeks, cotton-holder or with the help of Haller's klammer, used at blooding of papillas.
Instruments for absolute drying of an oral cavity.

For absolute isolation of an oral cavity the rubber dam is used. Actually rubber dam is a thin rubber plate allowing completely to prevent of hit of an oral liquid in the tooth.

Instruments for mixing of cements and impression materials.

The cements, which are necessary for treatment, filling and impression materials get mixed up by spatula on a glass or paper plate. The involved materials are moved to the stomatologist on the torn off paper plates or placed on his little table. It is not necessary to clean paper plates, that is why they are more conveniently than glass.

It is impossible to get liquids (disinfectants, medicines), used at treatment, directly from phials. With this purpose uses small open phials of Dappen or phials of Kappen with a cover. Due to a protective cover the liquid do not become soiled by aerosols of an oral cavity.

The grinding instruments - have granular frame. The sizes of grains define(determine) volume of a shaving, taken out from a processable product. In stomatological practice more often the diamond grinding instruments are used. They are more preferable, as well process hard enamel of a tooth due to their high durability. The Diamond instruments are applied mainly in high-speed and turbine angle handpieces, let out of various granularity: rasping, normal, small, and very
small. The instruments with rasping granularity deletes a plenty of a tooth substance; small-grained - smooth a surface. The instruments have the appropriate colour marks: green colour - rasping granularity, red – fine (small), yellow - very fine (small) granularity of a diamond covering.

The grinding instruments are submitted also by grinding stones (at manufacturing is applied carbid of silicon, or corundum). They are used at low or average revolutions, the thickness of their handle is usual 2.35 mm. Some stones and separational disks have no handles, they are mount on special disk holders.

**Polishing instruments (polirs)** are levels and smoothes a processable surface finally. They are intended for erasion of smallest particles of a material, provide an equal glossy surface (on the polished surface does not make the bacterial plaque so quickly). In quality of polishing materials the plastic (with the additives of a grinding agent - corundum), and also rubber plate and brush with grinding pastaes are used.

At use of rotating instruments it is not necessary to exceed the maximal speed of rotation, specified by the manufacturer. For each instrument there is an optimum range of revolutions. Also it is possible to work only with qualitative instruments reliably and quickly: the blunt instruments require(demand) the application of higher pressure. In result the tooth overheats, causing danger of damage of a pulp. Chair-side assistant of the doctor - stomatologist should watch (keep up) careful clearing of rotating instruments. It is necessary to sort instruments with bended handles, blunt or damaged(injured) cutting edges, defects of a covering (if it is necessary, the instruments are examined with the help of a magnifier: acute cutting edges have dark colour, blunt - light and brilliant).

**The safety precautions of job on a drill:**

1) Drill must be earth.

2) The plug answers the socket, is well fixed in her.

3) The cord on a sleeve is dressed correctly.
4) The pedal of rate in a rheostat is switched freely and answers different quantity(amount) of revolutions.
5) Bur is well fixed in a handpiece, rotates freely.
6) The handpiece is good fixed on a sleeve of a drill.
7) At trial inclusion of the machine there are no outside sounds.

Name criteria of readiness of job of the student on the phantom:
1) The student is dressed in the form (coat, cap)
2) The mask, phantom and drill are to the right of the student.
3) At job on a mandible the phantom is at a level of the elbow of the student, on the top jaw - at a level of a brachium of the student.

Name possible(probable) occupational diseases of the doctor - stomatologist.
1) Scoliosis.
2) Varicose phlebectasia of the bottom extremities.
3) Disease of vision (myopia).
4) Intoxication by steams of Hydrargyrum.
5) Allergization by chemical substances.
6) Opportunity infection by various diseases from the patients through a saliva, blood.

What measures are necessary for applying to prophylaxis of occupational diseases?
1) The level of height of the phantom depending on job on mandible or maxilla
2) Correct bearing of the doctor.
3) Keeping of mode of operations. Alternating of job sitting and costing(standing) (Costing(standing) 40-60 %, sit - 60-40 of %). Removable footwear must be with average heels (3-4 sm).
4) Their must be good illuminating intensity of a place of job, artificial (day time) and natural, the protective eye-glasses at the job with photopolymers.
5) Manufacturing an amalgam only in the extracting case. Keeping rules of safety at job with amalgams.
6) To close phials or box with medicines densely, to use phials with fuses, which get ground, to work in gloves, masks.

**Ergonomics**, its principles and methods.
Ergonomics - (from Greek: ergo- job, nomo - the law) studies the man (or group of the people) and (him) (their) activity in conditions of modern manufacture with the purpose of optimization of instruments of job, conditions and process of job. The basic object of research of ergonomics - system "the man - machine", research reception - systemic approach.

Literature recommended

**Main Sources:**


**Additional ones:**


3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
</tr>
<tr>
<td>to learn the material:</td>
<td>to use the material on(at) pages</td>
</tr>
<tr>
<td>- teach hygienic norms of stomatological room;</td>
<td></td>
</tr>
<tr>
<td>- remember hygienic norms of</td>
<td></td>
</tr>
</tbody>
</table>
| Stomatological room;  
| - teach stomatological equipment;  
| - teach stomatological toolkit for survey of the patient;  
| - teach stomatological toolkit for treatment of the patient  
| to read and compose the plan  
| to answer the questions  
| to do the test on the material  
| to be ready to answer the topic | to learn the new material and be ready to write a summary  
| to be ready to give an answer to the questions |

3.5. Self-control material:

A. Questions to be answered:

1. Equipment of stomatological room.
2. Structure and purpose (appointment) of stomatological armchair.
3. The stomatological installation, its amounting?
4. Kinds of drills, their purpose (appointment).
5. What enters into a set for survey of an oral cavity? Purpose (appointment) of toolkit.
8. The stomatological burs: kinds, purpose (appointment)

B. Test tasks to be done:

1. What instruments are used for mixing of filling material?
   a) a probe;
   b) an excavator;
2. What does enter to the basic stomatological set for survey of an oral cavity?
   a) a plate; b) a spatula; c) an excavator; d) a probe; e) a forceps;
   f) a plugger; g) a mirror.

3. Name the kinds of burs by material of manufacturing:
   1. Steel
   2. Hard-alloy
   3. Diamond

4. Make the logically connected steams concerning use of different kinds of burs at stages of preparation:
   - fissura disclosing
   - round necrectomy
   - cone-shaped formation
   - reverse-cone-shaped creation of slant

Task 1.
In 16 tooth the carious cavity with hanging edges (territories) of enamel is revealed. Choose the bur for performance of the first stage of preparation.

4. Self-preparation at class.
1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
   1. Using knowledge of the safety precautions prepare machine to job.
   2. Check up safety of job of a drill, handpiece, burs.
   3. Remove possible (probable) breakages at job, (bur strongly vibrates, bur drops out of a handpiece, the handpiece is not fixed on a sleeve of drills, in an operating time have arisen extraneous sounds)
3) Ask about the problems that haven’t been found in the information given.
   - Lower / rise an armchair, record a headrest, cast away a backrest , previously
familiarize with technical opportunities of the given model of an armchair;
- Switch on the stomatological installation, light, use water and air chip-blowers,
  familiarize with equipment of given stomatological installation.
- Examine an oral cavity, previously teach (learn) the instructions for use by
  stomatological toolkit for survey of an oral cavity.
- Record cutting toolkit in different kinds of handpieces, teach (learn) a structure of
  handpieces, kinds of cutting toolkit and rules of bracing it.

5. Self-preparation work at home.
1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;
5) To work in library of academy, regional medical library with the recommended
   literature independently.

Educational: 1. A phantom course of a therapeutic odontology. The atlas - M.:
   2. Borovskiy E.V. and others. A therapeutic odontology. - M: Medicine,

6. The subject of the research work.

The methodical reference is made by the assistant Fetisova O.L.
Methodical Instruction No. 10,11,12,13,
For the 2nd year students’ self-preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

Topic: **Classification of carious cavities by Black. Features of preparation of carious cavities of 1-5 classes by Black.**

Subtopic: 1) Stages of preparation of carious cavities;
   2) Regimen of preparation;
   3) Feature of preparation of carious cavities of different classes.

Hours: 8

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The knowledge of classification of carious cavities by Black enables to define features of preparation of carious cavities depending on its locating and in view of features of a structure of hard tissues of a tooth.

2. The aims of the training course:
   A=1. 1) To have general knowledge of the topic studied; to know:
      - classification of carious cavities by Black;
      - stages of preparation of carious cavities;
      - regimen of preparation;
      - feature of preparation of carious cavities of different classes.
   A=2. 2) To understand, to remember and to use the knowledge received; to take possession of skills for job with a drill, of preparation of carious cavities.

   A=2. 3) To take possession of engineering of performance:
      1) Disclosing a carious cavity;
2) Necrectomy;
3) Formation of a carious cavity.

A=3. 4) To form the professional experience by reviewing, training and authorizing it;

A=3. 5) To be able: 1) to open a carious cavity;

2) To lead a necrectomy (necrotomy);

3) To generate a carious cavity;

4) To choose a correct regimen of preparation;

5) To fix a handpiece;

6) To fix a bur in a handpiece;

7) To prepare of a cavity of different classes.

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>topographical anatomy of the pulpal camera of different groups of teeth.</td>
<td>define a belonging of a tooth to the certain group (incisors, canines, premolars, molars)</td>
</tr>
<tr>
<td>Histology</td>
<td>a histological structure of enamel, dentine.</td>
<td>distinguish histological structures of teeth.</td>
</tr>
<tr>
<td>Therapeutic odontology</td>
<td>classification of carious cavities, feature of preparation of carious cavities.</td>
<td>prepare carious cavities of different classes on phantoms.</td>
</tr>
</tbody>
</table>

5.5 The contents of the topic:

Topic: **Features of preparation of carious cavities of 1-5 classes by Black.**

Text

**Classification of carious cavities by Black:**
I-st class - a cavity in natural fissures on a chewing surface of molars and premolars;
- cavity in blind fossas of incisors and molars.

II-nd class - on contact surfaces of molars and premolars: - the equators are lower;
- on equator;
- the equators are higher.

III-d class - on contact surfaces of incisors and canines without infringement of integrity of an angle and cutting edge of a crown.

IV-th class - on contact surfaces of incisors and canines with infringement of an angle and cutting edge of a crown

V-th class - carious cavities in area of neck all groups of teeth.

KINDS of CAVITIES I of the 1-st CLASS

a) on chewing surface of molar;
b) on lingual surface of incisor;
c) on buccal surface of molar.
d) On chewing and buccal surfaces of the large radical tooth at a combined defeat.

**KIND of a CAVITY of a V-th CLASS**

The form of the generated cavity of the V-th class.

**THE CIRCUIT of a REFERENCE BASIS of ACTIONS ON FEATURES of PREPARATION of CAVITIES of the I-st And V-th CLASSES.**

<table>
<thead>
<tr>
<th>Sequence of actions</th>
<th>agents of action, technique of job</th>
<th>criterion of self-control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare of caries cavity of I-st class on: - the chewing surfaces of molars and premolars at a defeat of fissure - At a defeat of fissure of</td>
<td>the fissure, wheel-shaped, conical burs form a cavity under the form of defeat of fissure (cruciate, as a swallow’s tail, oval, round) save the immune zone - two cavities form</td>
<td>(to ensure safety of</td>
</tr>
<tr>
<td>a chewing surface of the first molar of the maxillar jaw with conservation of the enamel platen;</td>
<td>the enamel platen);</td>
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<tr>
<td>- At a defeat of fissure of premolars of the maxillar jaw and second premolar of a mandible;</td>
<td>(fissures exsect completely, as they are strick and do not interrupt);</td>
<td></td>
</tr>
<tr>
<td>- At a defeat of fissure on a buccal surface of molars and the safeties of a chewing surface;</td>
<td>- provides reliable bracing of a seal;</td>
<td></td>
</tr>
<tr>
<td>- At a defeat of fissure on a buccal surface of molars and thining of a wall inverted to a chewing surface, at a superficial cavity;</td>
<td>- thining wall leaves;</td>
<td></td>
</tr>
<tr>
<td>- At a deep defeat with localization in the areas of fissure on a buccal surface of molars;</td>
<td>( for bracing of a filling material ) stepped bottom allows to ensure fastness of a seal at vertical and transversal pressure;</td>
<td></td>
</tr>
<tr>
<td>shape cavities on all fissures;</td>
<td>form the oval cavity on defeat fissure without deducing on a chewing surface;</td>
<td></td>
</tr>
<tr>
<td>form a four-coal cavity with an output on a chewing surface;</td>
<td>form a four-coal cavity with an output on a chewing surface;</td>
<td></td>
</tr>
<tr>
<td>on a chewing surface frame retension items or additional platform. Width of an additional platform corresponds to width of the basic cavity, the depth on 0,5-1 mm of below enamel-dentinal border, on length is no more 1/2 of chewing surfaces. The bottom of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generate a carious cavity of V-th class</td>
<td>the cavity as extended oval or kidney-shaped form according to the form of a carious cavity is shaped</td>
<td>The lateral walls are shaped under a direct angle to bottom, neck wall - under an acute angle. Bottom is convex, repeats curvature of neck area. It is necessary to avoid opening of a</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>- At a defeat of a blind fossa of the second incisors of the maxillary jaw;</td>
<td>basic cavity should pass in bottom of an additional platform till a direct angle;</td>
<td>(provides reliable bracing of a seal);</td>
</tr>
<tr>
<td>- At small defeats of fissure on buccal and chewing surfaces of molars and premolars.</td>
<td>shape the oval cavity within the limits of a carious defeat;</td>
<td>(sparing preparation provides conservation of the not defeat tissues).</td>
</tr>
<tr>
<td></td>
<td>shape cavities of the small sizes on chewing and separately on a buccal surface.</td>
<td></td>
</tr>
</tbody>
</table>
Check up readiness of a prepared carious cavity to sealing. to lead visual and tool check of performance of the basic demands to the generated carious cavity. the double control allows to ensure high quality of preparation.

Features of preparation of carious cavities of II-nd class by Black.

KINDS of CAVITIES of the II-nd CLASS.

| a) Form of the generated cavity II class |
| b) Form of the generated cavity at combined defeat chewing and contact surfaces. |

VARIANTS of FORMATION of CAVITIES of II-nd CLASS And TESTIMONIES To THEM
1. Formation of a carious cavity with deducing on a chewing surface without creation of an additional platform;

I. The formation of a carious cavity with deducing on a chewing surface and formation of an additional platform on a chewing surface;

II. Formation of medial-distal-occlusial cavity on both contact surfaces with a general additional platform (MOD);

III. Formation of a carious cavity on a contact surface without deducing on a chewing surface

<table>
<thead>
<tr>
<th>Description</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>there is no access to карниznой of a cavity on the part of a chewing surface</td>
<td>a carious cavity above than equator</td>
</tr>
<tr>
<td>a chewing surface is thined</td>
<td>a carious cavity reaches up to gum edge (in carious process all contact surface is involved)</td>
</tr>
<tr>
<td>the carious process grasps medial and distal contact surfaces</td>
<td>The prepaired cavity is posed on medial, distal contact and occlusial surfaces</td>
</tr>
<tr>
<td>good access to a carious cavity on the part of a contact surface. The chewing surface is saved and is strong enough</td>
<td>the carious cavity at any level</td>
</tr>
</tbody>
</table>
The forms of additional platforms (cavities) in the field of a chewing surface of molars and premolars:

Rules of preparation of an additional platform:
1. At a carious cavity posed at a level of equator or lower, width of an additional platform is peer to width of the basic cavity, or a little narrower.
2. The additional platform makes 1/2-2/3 of length of a chewing surface by extent.
3. The depth of an additional platform - 1 mm is lower enamel-dentine border.

Features of preparation of carious cavities III of a class by Black

KINDS of CAVITIES of the III-d CLASS

a) at the defeat of the contact surface;
b) at the defeat of the contact and lingual surfaces;
c) at the defeat of contact, lingual and labial surfaces.
Before the beginning of preparation it is necessary correctly to estimate a position of a tooth in relation to the next teeth and also localization of carious defect (insignificant defect only on a contact surface, defect with infringement contact and palatinal surface etc.)

The edges of a formed cavity should be well visible.

**THE CIRCUIT of a REFERENCE BASIS of ACTIONS AT PERFORMANCE of SEPARATE STAGES of PREPARATION of CARIOUS CAVITIES of III-d CLASS by Black**

<table>
<thead>
<tr>
<th>Stages of preparation</th>
<th>agents and equipment</th>
<th>criterion and ways of self-control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation of elements of the basic carious cavity:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. neck wall</td>
<td>burs: fissure (cylindrical), conical, ball-shaped;</td>
<td>in parallel to gum edge or has a small inclination to a pulp cavity</td>
</tr>
<tr>
<td>2. labial wall</td>
<td>Burs: ball-shaped, conical</td>
<td>enamel of a tooth without a supporting dentine save only in the event that the defect will be restored by a material with low aesthetic properties</td>
</tr>
<tr>
<td>3. lingual or palatinal wall</td>
<td>Burs: fissure (cylindrical), ball-shaped, conical</td>
<td>on a lingual wall the additional platform is shaped</td>
</tr>
<tr>
<td>4. Additional platform</td>
<td>burs: fissure (cylindrical), conical, wheel-shaped, ball-shaped</td>
<td>at a medial caries the bottom is flat, at deep – is roller-shaped; the depth is lower than enamel-dentine border on 1 mm</td>
</tr>
</tbody>
</table>
5. Furnish of edges of a cavity (deletion - grooving of edges of enamel, if it is necessary, under an angle 45°)

<table>
<thead>
<tr>
<th>Features of preparation of carious cavities of IV-th class by Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINDS of CAVITIES of IV-th CLASS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stages of preparation</th>
<th>Agents of action, technique of job</th>
<th>Criterion and ways of self-control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preparation of a carious cavity is spent with oral and vestibular parties (depending on a kind of filling material)</td>
<td>burs: ball-shaped, fissure (cylindrical and conical), wheel-shaped</td>
<td>the absence of a softened dentine, at the probe dentine is dense, light, the probe slips on a dentine</td>
</tr>
<tr>
<td>2. Additional platform, burs: fissure, conical,</td>
<td></td>
<td>in depends on extensiveness</td>
</tr>
<tr>
<td>its her form and locating:</td>
<td>lanceolated</td>
<td>of a defeat and condition of cutting edge</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>-----------------------------------------</td>
</tr>
<tr>
<td>- The small carious cavity and wide erased cutting edge of a crown - small defeat of a contact surface and angle of a crown - the bottom of the basic cavity can be of the convex form</td>
<td>an additional platform as a longitudinal sulcus along cutting edge; the additional platform is shaped with the lingual platen, has the form of a sulcus, triangle, or &quot;swallow`s tail&quot;; it is necessary to take into account depth of a cavity, curvature of a crown of a tooth</td>
<td>promotes the best bracing of a filling material; improves bracing a seal; danger of opening of a pulp cavity</td>
</tr>
</tbody>
</table>

The modern technologies allow to exclude creation of additional cavities (platforms) at operative treatment of a caries of teeth:

1. Modern filling materials;
2. Adhesive systems;
3. Parapulpal pins.

Literature recommended

- **Main Sources:**
  2. Магид Э.А. Мухин Н.А. Фантомный курс по терапевтической стоматологии. Г., 1981. 121-141с.

- **Additional ones:**
3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
</tr>
<tr>
<td>to learn the material</td>
<td>to use the material on(at) pages</td>
</tr>
<tr>
<td>to read and compose the plan</td>
<td>to learn the new material and be ready to</td>
</tr>
<tr>
<td>to answer the questions</td>
<td>write a summary</td>
</tr>
<tr>
<td>to do the test on the material</td>
<td>to be ready to give an answer to the questions</td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1. How it is necessary to form a carious cavity of 1-st class posed on a chewing surface of a tooth?
2. How it is necessary to form a cavity, if on the same tooth there is a carious cavity, which is localized on a chewing surface and in a sulcus on a buccal surface?
3. To list a sequence of manipulations at formation of a cavity of 2-nd class?
4. How to form carious cavities of 2-nd class at presence by series of a worth tooth?
5. What are indications to formation of an additional platform in carious cavities of 2 class?
6. What demands is additional platform should answer in carious cavities of 2 class?
7. What carious cavities are concern to cavities of 3-rd, 4-th classes?
8. How it is necessary to form carious cavities of 3-rd class, if a worth tooth is absent?
9. How it is necessary to form cavities of 3-rd class, if there is series a worth tooth?
10. What additional platforms are expedient for framing at formation of carious cavities of 4-th class?
11. What carious cavities are concern to carious cavities of 5-th class?
12. What form of a cavity is best for cavities of 5-th class?
13. In what the feature of formation of bottom of a carious cavity is consist in carious cavities 1 and 5 classes (at a deep caries)?

14. What ways of preparation are improve bracing of seals in cavities of 5-th class?

B. Test tasks to be done:

1. At the patient A. at inspection the carious cavity is posed on a chewing surface 36 teeth, with a wide inlet opening, dentine is dense, pigmented, the hanging edges are absent. What stages of preparation will you carry out?
   A) Disclosing a carious cavity;
   B) Necretomy;
   C) Formation of a carious cavity.

2. At the patient O. at inspection the carious cavity of 1-st class by Black was revealed, dentine is pigmented, softened. By what instruments will you carry out of 2-nd stage of preparation?
   A) Probe;
   B) Excavator;
   C) Diamond bur.

3. Specify, to what carious cavities on classification by Black the below specified cavities are concern:
   - a carious cavity on chewing surfaces of a molars
   - a carious cavity on contact surfaces of an incisor without infringement of cutting edge a carious cavity on contact surfaces of a premolar
   - the carious cavity is posed in the neck area of the top canine
   - the carious cavity is posed on contact surfaces of an incisor with infringement of cutting edge.

4. Self-preparation at class.
1) Listen to the information;
2) It is necessary:  
  1) To open a carious cavity; 
  2) To lead a necrotomy; 
  3) To generate a carious cavity; 
  4) To choose a correct regimen of preparation. 
  5) To fix a handpiece on a sleeve; 
  6) To fix the bur in a handpiece; 
  7) To prepare of a cavity of different classes 

3) Ask about the problems that haven’t been found in the information given.

5. Self-preparation work at home. 
  1) Review the material learnt at class; 
  2) Compose the plan of your answer; 
  3) Answer the questions to this topic; 
  4) Do the test given above;

The methodical instruction is made by assistant Fetisova O.L.
Methodical Instruction  No. 14
For the 2-nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of therapeutic Stomatology

Topic: **Features of preparation of carious cavities for composite materials; engineering of MI-therapy, ART-technique, engineering of tunnel preparation.**

Subtopic:

**Hours: 2**

The topic basis: The knowledge of classification of carious cavities by Black enables to define features preparation of carious cavities depending on a site, in view of features of a structure of enamel and dentine.

The study of stages of preparation and their sequence enables to prepare a carious cavity correctly and qualitatively and by that to warn premature abaissement of a seal and development of a secondary caries.

The choice of a regimen of preparation warns occurrence of a pain sign at the patient, and also overheating of a tooth and occurrence of combustion of a pulp, which further can result in its inflammation.

1. The aims of the training course:
   A=1. 1) To have general knowledge of the topic studied;

   A=2. 2) To understand, to remember and to use the knowledge received;

   A=2. 3) To learn the classification, structure, functions of the carious cavities by Black, stages of preparation of carious cavities, regimen of preparation.

   A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to carry out laboratory and experimental work. To take possession of engineering of action:

1) Disclosing of a carious cavity;
2) Necrectomy;
3) Formation of a carious cavity.

2. Materials for the before–independing work– preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>topographical anatomy of the pulpal camera of different groups of teeth.</td>
<td>define an accessory of a tooth to certain group</td>
</tr>
<tr>
<td>Biophysics</td>
<td>features of job of electrodevices, safety precautions.</td>
<td></td>
</tr>
<tr>
<td>Histology</td>
<td>a histological structure of hard tissues of a tooth.</td>
<td>define topography of hard tissues and pulp of a tooth.</td>
</tr>
<tr>
<td>Therapeutic odontology</td>
<td>possible (probable) complications at wrong preparation of carious cavities.</td>
<td>diagnose complications, using stomatological toolkit.</td>
</tr>
<tr>
<td>Propedeutics of a</td>
<td>stomatological toolkit: kinds, purpose (appointment), kinds of handpieces, burs, safety precautions regulation at job with them.</td>
<td>work different stomatological instruments carefully</td>
</tr>
<tr>
<td>therapeutic odontology</td>
<td>(phantom course)</td>
<td></td>
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<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

5.6 The contents of the topic:
Now with occurrence of glass-ionomer cements having anti caries action, in series of cases the opportunity has appeared to reduce volume of exsected tissues of a tooth. Interesting in this plan the approach termed micro-preparation or **M.I.-therapy** (Minimal intervention treatment) is represented.

At minimal (minimally) invasional treatment, if the cavity settles down on a chewing surface, exsect only demineralizational enamel, leaving an inlet opening as it is possible of the smaller size. Then in a cavity enter a round bur or excavator and carefully delete all softened dentine. Thus save enamel on edges of a cavity at all not having of a subject dentine. In result the cavity of the piriform form with a small inlet opening turns out. Glass-ionomer cement brings in to a cavity by small plastic instrument. At first carefully fill all deepest parts, and then cement fill in a cavity. Thus the cement is brought in with small excess, with it cover also of an excavation and fissures.

The less inlet opening of a cavity, the will stand longer seal. The glass-ionomer cement in this case not only warns development of a secondary caries, but also carries out a role of a leg for sites of enamel which is not having subject dentine.

The efficiency of a method consists that the adamantine substance of tooth still remains by the most proof and longevous substance, which can be saved tens years in aggressive surroundings of an oral cavity. The healthy enamel not effectively be replaced by any modern restoration material yet.

**The method «of preventive sealing «was** developed after occurrence of composites and glass-ionomer cements - filling materials with essentially new properties. The method «of preventive sealing " assumes minimal carving of healthy tissues of a tooth and sealing up to " of immune zones ". The method combines operative treatment of a caries, sealing of a cavity, preventive sealing up of fissures and local fluorizing of enamel of teeth. Thus the features of used filling materials and condition individual cariesresistens of the patient are taken into account.
The properties of composites and glass-ionomer cements allow to seal up by them cavities of the "not classical" form - with rounded or stepped bottom.

**ART-technique** - one of variants of preventive sealing. Provides sealing a cavity without a preparation by materials, simple in application and having anticaries action, first of all by glass-ionomer cements.

The engineering of performance is reduced to the following. The carious cavity is cleared by an excavator, is dried up and is sealed up by glass-ionomer cement. If the treatment is spent at early stages of development of caries, it allows completely to stop the progressing of process of destruction of hard tissues of a tooth.

For performance of this technique it is enough to the stomatologist to have all some instruments, which freely are located in a bag. It is important at realization of treatment in the remote districts, by the ships and in other places, where no of special stomatological equipment. Besides this method does not require of high qualification of the expert and is simple enough. Besides technical benefit the atraumatic restorative treatment causes a minimum of pain sensations in the patient, practically excludes a psychic strain. Now ART-technique is surveyed as the simplified variant of minimal intervention treatment of caries of teeth.

In conditions of the stomatological consulting room the technique can be applied in the following cases:

- At rendering of the stomatological help to the patients tasting insuperable pavor before a drill;
- At treatment of the physically and mentally retarded people;
- At treatment of the patients of senile age;
- At treatment of a caries at the patients with a serious somatic pathology;
- At treatment of children.

**KINDS of RESTORATIONS.**

With reference to new principles of free preparation and design of cavities in engineering of the minimal intervention the new kinds of restorations have appeared. The minimal access, enamel without support of a dentine, softened dentine at the
bottom of the cavities became characteristic attributes of such restorations, as **tunnel** restoration, chinklike restoration, restoration "Bat cave".

The tunnel restoration assumes internal access to a cavity on contact surfaces through a triangular fossa or vestibular surface with conservation of contact enamel and regional platen. For preparation are applied mainly burs of the small sizes.

The chinklike restoration assumes outside access to the centers of a demineralization on contact surfaces through vestibular or oral surfaces. For preparation of a cavity the ultrasonic instruments and finishing burs are apply mainly. For engineering of the minimal intervention have appeared new instruments for the bringing of flow materials, small doses of usual restorative materials and modelling of restoration in conditions of small space: narrow and thin pluggers and plastic instruments, probes with a globule bent instruments, which form enables to manipulate in difficultly accessible places.

**Features of preparation of carious cavities under composite materials.**

- sparing preparation with possible formation of cavities of the wrong form;
- erosion of all changed in colour enamel, and in carious cavities of 3-d and 4-th classes and pigmented dentine;
- a rounding off of edges of a cavity in order to prevent an abruption of a material at polymerization;
- creation volumetric groove - chamfer of enamel under an angle 450, instead of an additional platform with the purpose of augmentation of the area of contact of a composite with enamel, masking of a line of transition an enamel - composite; (in carious cavities of 2-nd and 4-th classes at the small area of a gingival wall additional retentional items are necessary).

**Nonconventional techniques of preparation.**
1. Tunnel preparation is an operative access through a chewing surface in a carious cavity on a contact surface with conservation of regional enamel.

The indications: carious cavities of 2-nd class by Black of middle depth with the minimal defeat of proximal enamels, posed on- and below contact item.

The disclosing of a carious cavity is carried out through interhillock fissura (triangular fossa) on a chewing surface and form reminds a tunnel. The necretomy is necessary for not only demineralized dentine, but also enamel in area of "entrance hiluses". It is necessary to aspire to leave enough of a dentine under regional enamel for resistance to masticatory stresses.

Disadvantages:
1) restriction of the indications by the minimal size of the enamel which has stayed after tunnel preparation;
2) danger of casual opening of a pulp cavity;
3) formation of cracks in proximal enamel.

Advantages:
1) conservation of intact regional enamel;
2) reduction of duration of restoration (1-st class instead of 2-nd class);
3) decrease of risk of a regional stratification of restoration.

Literature recommended

- Main Sources:

- Additional ones:

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
### 3.5. Self-control material:

**A. Questions to be answered:**

1. Classification of carious cavities by Black
2. Stages of preparation of carious cavities.
3. Feature of 1-st stage of preparation:
   a) In what cases these stages do not spend?
   b) What direction of movement of bur at realization of this stage is?
4. Name the 2-nd stage of preparation and what instruments he is carried out?
5. Name 3-rd stage of preparation and its essence?

**B. Test tasks to be done:**
a) The patient M. at inspection had revealed carious cavity posed on the palatinal surface of 12 teeth in a blind fossa.
To what class by Black does this carious cavity concern?
b) The carious cavity is posed in the top molar tooth on the vestibular surface above than equator.
To what class by Black does she concern?
c) Name a sequence of actions at the preparation of a carious cavity of 1-st class by Black:
- smoothing out of the edges of enamel;
- disclosing of a carious cavity;
- expansion of a carious cavity;
- formation of a carious cavity;
- a necrectomy.
d) To what carious cavities on classification by Black do the below specified cavities concern?
- carious cavity on chewing surface of a molar;
- carious cavity on contact surface of an incisor without infringement of cutting edge;
- carious cavity on contact surfaces of a premolar;
- the carious cavity is posed in the neck area of the top canine;
- the carious cavity is posed on contact surface of an incisor with infringement of cutting edge.

4. Self-preparation at class.
To take possession of a technique of preparation; to carry out in such sequence:
1. The preparation is necessary to carry out at good illumination;
2. Burs should be acute, fixed in a handpiece without vibration, under the form and size to answer a carried out stage;
3. The size of bur should be less size of an inlet opening of a carious cavity;
4. It is necessary to prepare at high rate of revolutions of bur and intermittent movements;
5. The hand of the doctor holding a handpiece, should be reliably fixed;
6. The preparation of carious cavities is necessary to carry out in view of topographical features of a pulp cavity. To supervise movements of bur, force of the application of bur to the hard tissues.

Tests
1. The patient C. at inspection had revealed carious cavity posed on a chewing surface of 36 teeth, with a wide inlet opening, dentine is dense, pigmented, and there are no hanging edges. What stages of preparation will you carry out?
   - disclosing of a carious cavity;
   - a necrectomy;
   - expansion of a carious cavity;
   - formation of a carious cavity;
2. The patient B. at inspection the carious cavity of 1-st class by Black was diagnosed, dentine is pigmented, softened. What instruments will you carry out the 2-nd stage of preparation by?
   - a probe;
   - an excavator;
   - diamond bur.
5. Self-preparation work at home.

The methodical reference is made by the assistant Fetisova O. L.
Methodical Instruction No.16
For the 2nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

Topic: **Filling materials. Classification. Requirements to them. Temporal filling, medical and insulating lining: determination, composition, properties, testimonies to application. Method of imposition of medical lining and temporal filling.**

Subtopic:

**Hours: 2**

The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. Application in therapeutic stomatology of modern filling materials requires the high level of preparation from future specialists. Knowledge of classification of filling materials, composition, properties and direct use at filling of carious cavities of different classes by Black will provide of high quality preparation of future stomatologists.

6. The aims of the training course:
   A=1. 1) To have general knowledge of topic studied;
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn the classification, structure, functions of the variety of dental filling materials
   A=3. 4) To form the professional experience by reviewing, training and authorizing it;
   A=3. 5) To be able to carry out laboratory and experimental work.

7. Materials for the before – class work self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th>Subject</th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>anatomy</td>
<td>anatomic properties of structure of teeth of mandibular and maxillar jaws</td>
<td>define belonging of tooth to the definite group (incisors, canines, pre- molars, molars)</td>
</tr>
<tr>
<td>inorganic chemistry</td>
<td>properties of inorganic acids, their influence on the organism of man</td>
<td>define influencing all of its constituents on the organism of man on composition of acid</td>
</tr>
<tr>
<td>histology</td>
<td>histological structure of enamel, dentine, cement, pulp of tooth</td>
<td>define the topography of hard tissues and pulp of tooth</td>
</tr>
<tr>
<td>therapeutic stomatology</td>
<td>Possible complications at wrong imposition of filling and insulating linings from a phosphate-cement in carious cavities of different classes of Black. Tool for mixing, preparations and bringing of material for insulating linings and cement filling.</td>
<td>diagnose complications, to conduct deleting of filling and insulating lining, to use a stomatology tool.</td>
</tr>
</tbody>
</table>

7.2 The contents of the topic:

**Topic:** Filling materials. Classification. Requirements to them. Temporal filling, medical and insulating lining: determination, composition, properties,
testimonies to application. Method of imposition of medical lining and temporal filling.

Subtopic:
Classification of filling materials;
Requirements to filling to materials;
Determination of notion the »temporal filling»;
Determination of notion a «medical lining»;
Determination of notion an «insulating lining»;
Composition, properties, requirements to the temporal filling;
Composition, properties, requirements to the medical lining;
Composition, properties, requirements to the insulating lining;
Testimonies to application of the temporal filling;
Testimonies to application of insulating lining;
Testimonies to application of medical lining.
COMMON REQUIREMENTS TO FILLING MATERIALS

- Chemical firmness (insolubility under action of saliva, liquid food, mouth liquid, dentin liquid);
- Mechanical firmness to the masticatory loading;
- Firmness to elimination;

Materials for temporal filling and germetic bandage
- Zinc-oxid-eugenol cement, zinc-sulphate cement, polycarboxylate cement, light-polymerise cement

For linings
- Zinc-phosphate, polycarboxylate, glass ionomer cement, insulating varnish
- For linings insulating
- Insulating

Medical
- Based on calcium hydroxid, zinc-oxid-eugenol cement, combined pastes

Filling materials for filling of root canales
- For temporal filling

For permanent filling
- Based on antibiotics, corticosteroida, metronidazolum, antiseptics of long time action, based on hydroxid calcium

Hard-jointpines
- Zinc-phosphate, zinc-oxid-eugenol cement, based on epoxid resin, with calcium hydroxid, glass ionomer cement, based on resorcin-formalin

Silver, gutta-percha, termafill

UMSA. Propedeutic of Therapeutic Stomatology Department
- Closeness of contact with the walls of tooth (mikro mechanical retention, chemical communication with fabrics of tooth, adhesion);
- The long-time saving of form and volume, not to give shrinkage;
- Not to absorb moisture during feeling, harding;
- Not toxic for fabrics of tooth, mucous membrane, organism in whole (biosovmestimost);
- To imitate hard tissues of tooth (color, brilliance);
- To have low heat conductivity;
- To have the coefficient of thermal expansion equal with hard tissues of tooth;
- To be plastic, easy brought in a carious cavity, not to stick to the instruments;
- To be X-ray contrasting;
- To render anti-caries action;
- The long-time term of storage;
- Relative cheapness.

<table>
<thead>
<tr>
<th>FILLING</th>
<th>USES</th>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalgam for lining</td>
<td>Permanent filling for back teeth</td>
<td>1. simple technique 2. rapid set required 3. strength</td>
<td>Lining usually required</td>
</tr>
<tr>
<td>lining usually</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gold inlay</td>
<td>Permanent filling for back teeth</td>
<td>Much stronger than amalgam</td>
<td>Involves far more time and expense than amalgam or any other filling</td>
</tr>
<tr>
<td>Silicate cement</td>
<td>Permanent filling for front teeth</td>
<td>Simple technique</td>
<td>1. Highly irritant-lining essential 2. Ruined by saliva-rubber dam essential</td>
</tr>
<tr>
<td>Acrylic</td>
<td>Permanent filling</td>
<td>1. Simple technique</td>
<td>Ruined by</td>
</tr>
</tbody>
</table>
Conservative treatment of caries, when the pulp is vital and unexposed, is by filling. If the pulp is exposed or dead, root canal therapy is usually necessary before the filling is done. Fillings are inserted in teeth to replace the part destroyed by caries. The normal function of the tooth is thereby restored, pain is prevented, and the viality of the pulp is preserved. In front teeth, filling restore normal appearance; whilst in back teeth, the stagnation areas are eradicated and further caries prevented. Temporary fillings are inserted as a temporary measure only. They are too soft to use as permanent filling. The temporary fillings are:

- zinc oxide and eugenol cement,
- zinc phosphate cement,
- gutta-percha.

The temporary filling materials most commonly used are zinc oxide and eugenol cement, zinc phosphate cement, zink polyacrylate cement and gutta-percha. They are not used as permanent filling as they are too soft and would not remain intact for long periods. Temporary fillings are used:

1. As a first-aid measure to relieve pain.
2. When there is insufficient time to complete the cavity and insert a permanent filling in one visit.
3. For permanent fillings requiring more than one visit, e.g. inlays and crowns, a temporary restoration is necessary between visits.
Zinc oxide and eugenol cement is non-irritant to the pulp and can be safely used in the very deepest cavities.

*It is too soft and slow-setting to use as a foundation for a permanent filling in one visit. But this can be overcome by using a quick-setting proprietary brand which hardens rapidly enough to make a satisfactory lining for permanent fillings. It cannot be used as a lining for acrylic fillings.*

Before a permanent filling is inserted the cavity may need to be lined. A lining is an insulating layer or cement which protects the pulp against conduction of heat or cold through metal fillings; or against the irritant effect of certain other fillings, such as silicates and acrylic. Pain, and possibly death of the tooth, may occur through failure to insert an adequate lining. The technique of inserting a filling varies with the type of cavity and filling material used.

**Requirements to materials for the temporal filling:**

- Air-tight closing of cavity of tooth, carious cavity;
- Durability on the compression;
- Indifference to the pulp of tooth, to the tissues of tooth, to the medicaments;
- It is easily to be brought in and deleted;
- Not to dissolve in a mouth liquid, saliva;
- Not to have the matters which worsen adhesion and harding of filling materials.

1. **Testimonies to using**
   - Treatment of deepest tooth decay; of pulpitis by biology method; of casual trauma of pulp
   - Anti-inflammatory, anti-septical, reparation effect

**Medicine lining**
Literature recommended

Main Sources:

1. Магид Е.М., Мухин Н.А. Фантомный курс терапевтической стоматологии. Атлас. М. Медицина, 1987 – 304 с.

Additional ones:


3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties</td>
<td>1-3 days anti-inflammatory effect-based on antibiotics, hormones, sulfanilamids</td>
</tr>
<tr>
<td>The period of action</td>
<td>More than 14 days-reparation effect-based on eugenol and calcium</td>
</tr>
<tr>
<td>requirements</td>
<td>Do not irritant of pulp of the tooth; should to ensure hole air-tight of dentin; should to be compatible with materials for permanent filling</td>
</tr>
</tbody>
</table>
3.5. Self-control material:

A. Questions to be answered:

1. Transfer the groups of filling materials.
2. What are the requirements to filling materials?
3. Determination of notion the «temporal filling».
4. What materials are used for the temporal filling?
5. Requirements to materials for the temporal filling.
6. Composition of materials for the temporal filling (dentine-paste, artificial dentine).
7. Governed imposition of the temporal filling in the carious cavities of different classes by Black.
9. Determination of notion a «medical lining», «insulating lining».
10. What materials are used for insulating and medical linings.
11. What are the requirements to materials for medical linings?

B. Test tasks to be done:

*Test problem №1. \( x = 2 \).*
How correctly to prepare an artificial dentine for imposition of the temporal filling?

**Test problem №2. ?=2.**
What stomatology instruments used for impositions of the temporal filling from a water dentine?

**Test problem №3. ?=2.**
What thickness a medical lining must be?

4. Self-preparation at class.

1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
3) Ask about the problems that haven’t been found in the information given.
4) To capture the technique of preparation (involvements) of artificial dentine for the temporal filling;
5) To capture the technique of preparation (involvements) of zinc-oxid and eugenol medical lining;
6) To conduct impositions of the temporal filling from dentine-paste and artificial dentine in the carious cavities of different classes by Black;
7) To conduct impositions of medical lining in the carious cavities of different classes by Black;

5. Self-preparation work at home.
1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;

**Task №1. ?=3.**
During involvement of artificial dentine for the temporal filling material became frail, left off to hold a form. What happened? What a reason is in?

**Task №2. ?=3.**

After imposition of zinc-oxid and eugenol medical lining and permanent filling from composite material of chemical -cure in the carious cavity of the III class by Black in 11 filling did not harden. Name an error which resulted in such phenomenon.

**Task №3. ?=3.**

After imposition in the deep carious cavity of medical lining from paste, based on calcium, insulating gasket from a phosphate-cement and composite filling at a patient sharp sudden pain in 3 days appeared in a tooth. What the reason of such displays is in? What happened?

5) To work in the library of academy, in the regional medical library with the recommended literature.

6. The subject of the research work.

«Review of filling materials for medical linings and temporal filling».

The methodical instruction is made by assistant Fetisova O.L.

Methodical Instruction No.17
For the 2nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology
Topic: **Stomatological cements. Phosphate cements: composition, properties, positive and negative qualities. A testimony and rules of application. Imposition of insulating lining in carious cavities of different classes by Black.**

Subtopic:

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The wide use in therapeutic stomatology of cements requires knowledge of their properties, qualities, methods of the use. Application of these materials for the permanent stopping, insulating linings, as materials for stopping of root channels, fixing of orthopaedic and orthodontic constructions requires from stomatologist of knowledge about the technique of preparation, bringing of material, and also about positive sides and lacks of stomatological cements. Simplicity of preparation, technological, low prime price prove the rightness of choice of these cements in work of stomatologist.

2. The aims of the training course:
   
   A=1. 1) To have general knowledge of the topic studied;
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn the classification, structure, functions of the stomatological cements
   A=3. 4) To form the professional experience by reviewing, training and authorizing it;
   A=3. 5) To be able to carry out laboratory and experimental work.
   A=3. 6) **To capture** skills of preparation of phosphate-cement for insulating linings,
   stopping of root channels.
A=3. 7) To lay on insulating linings from a phosphate-cement in the carious cavities of different classes by Black.

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomy</strong></td>
<td>anatomic properties of structure of teeth of mandibular and maxillar jaw</td>
<td>define belonging of tooth to the definite group (chisels, canines, premolars, molars)</td>
</tr>
<tr>
<td><strong>Inorganic chemistry</strong></td>
<td>properties of nonorganic acids, their influence on the organism of man</td>
<td>define influence of any from its component on the organism of man on composition of acid</td>
</tr>
<tr>
<td><strong>Histology</strong></td>
<td>histological structure of enamel, dentine, cement, pulp of the tooth</td>
<td>define the topography of hard tissues and pulp of the tooth</td>
</tr>
<tr>
<td><strong>Therapeutic stomatology</strong></td>
<td>possible complications at wrong imposition of filling and insulating linings from a phosphate-cement in the carious cavities of different classes by Black. tool for mixing, preparations and bringing of material for insulating linings and cement filling.</td>
<td>diagnose complications, to conduct deleting of filling and insulating lining, to use a stomatological tools.</td>
</tr>
</tbody>
</table>
3.2 The contents of the topic:

Topic:

Stomatological cements. Phosphate cements: composition, properties, positive and negative qualities. A testimony and rules of application. Imposition of insulating lining in carious cavities of different classes by Black.

Subtopic:
1. testimony to application of phosphate-cement;
2. composition and properties of phosphate-cement;
3. component parts of powder and liquid of phosphate-cement;
4. method of involvement of phosphate-cement;
5. rules of imposition of insulating linings in the carious cavities of different classes by Black.

Text

Stomatological cements presently are widely used in therapeutic stomatology. Except for application of them for the permanent filling (baby teeth), temporal filling (in the second teeth within 6 months) use a phosphate-cement for fixing of different unremovable orthopaedic and orthodontic constructions, inlays, for filling of root channels, for insulating linings in the carious cavities of different classes by Black.

Along with such wide application of phosphate-cement, simplicity its preparation (mixing of powder and liquid) this material has a lot of failing to which it follows to deliver solubility in a mouth liquid, bad physical and mechanical properties (fragility), bad adhesion to the enamel and to the dentine, quick hardening.

A phosphate cement consists of powder (oxide of zinc – 80-83%, oxide of magnesium – 6-10%, quartz and pigmental additions) and liquid (solution of orthophosphate acid with addition of zinc and hydroxid aluminium). The liquid of phosphate-cement contains of 85% orthophosphate acid and 1/3 water. The surplus of the last in the liquid of phosphate-cement diminishes time of hardening of material, and failing leads its to acceleration of reaction between powder and liquid. On this account a small bottle with a liquid must be saved to densely closed.
At mixing of powder and liquid there is the chemical reaction which partial neutralization of liquid with the selection of heat goes in the process of (exothermic reaction). Than quick there is involvement, the more active neutralization and selection of heat passes. Therefore involving of phosphate-cement is needed on the chilled glass slowly. The observance of rules of preparation of phosphate-cement will settle enough high-quality and without errors to prepare a tooth to raising of the permanent filling.

Begin involvement and conclude by introduction of two-bit of powder: the first portion, to get slow neutralization of liquid, and last, to attain necessary consistency of material. Involve a phosphate-cement in correlation the powder to the liquid, as 2:1 on the smooth surface of glass by a metallic spatula. Time of involvement must not be exceeded by 1-1,5 minutes. The taken portion of powder is divided into 4 parts, 1/4 part is divided in half, and 1/8 again in half. Powder is added to the liquid in such sequence: at first to the liquid add 1/4 well mixing part of powder for the receipt of homogeneous mass; then add still 1/4, farther eighth and sixteenth parts of powder.

The correctly prepared phosphate-cement for an insulating lining must be homogeneous, not to stretch after a spatula, and to be torn off, forming indents not large 1 mm in a height. A phosphate-cement in a cavity is brought in by 1-2 portions by plastic instruments and condensed by shtopfer.

An insulating lining in a carious cavity closes a dentine, is laid on a bottom walls of the formed carious cavity to enamel –dentine border, repeats the form of cavity and has a thickness 0,5-0,7 mm. That phosphate-cement not bores to shtopfer, it is useful to process an instrument by an alcohol. Before imposition of the permanent filling it is necessary to delete tailings of phosphate-cement, which close an enamel or go out on the edges of the formed cavity.

Literature recommended:

- **Main Sources:**

2. Ribakov A.I., Ivanov V.S., Karalnik D.M. Filling materials.–

- Additional ones:


3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
</tr>
<tr>
<td>to learn the material</td>
<td>to use the material on(at) pages</td>
</tr>
<tr>
<td>to read and compose the plan</td>
<td>to learn the new material and be ready to write a summary</td>
</tr>
<tr>
<td>to answer the questions</td>
<td>to be ready to give an answer to the questions</td>
</tr>
<tr>
<td>to do the test on the material</td>
<td>to name stomatological cements, which behave to every group (to give the names)</td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td>to give the list of basic testimonies</td>
</tr>
<tr>
<td>to learn classification of stomatological cements</td>
<td>to name the basic components of powder and liquid</td>
</tr>
<tr>
<td>to learn the testimony to application of phosphate-cement</td>
<td></td>
</tr>
<tr>
<td>to know the composition of phosphate-cement</td>
<td></td>
</tr>
<tr>
<td>to learn the positive and negative qualities</td>
<td></td>
</tr>
</tbody>
</table>
of phosphate-cement
to learn the method of preparation of
phosphate-cement and raising of insulating
lining

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>to make the typical chart of preparation of phosphate-cement and</td>
<td>chart of raising of insulating lining</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1. What are the testimonies to application of phosphate-cement?
2. What are positive and negative qualities of phosphate-cement?
3. How is possible to prepare a phosphate-cement for imposition of insulating lining correctly?
4. How is an insulating lining laid on?

B. Test tasks to be done:

**Test problem №1.**

How is the fitness of phosphate-cement for imposition of insulating lining defined?

**Test problem №2.**

Name the sequence of stages of imposition of insulating lining:

1. Medicinal treatment of carious cavity by a 3% solution of peroxide of hydrogen.
2. Drying of carious cavity by warm air.
4. Preparation of liquid and powder of phosphate-cement for involvement of insulating lining.
5. Pressing of mass by shtopfer on a bottom and walls of carious cavity.
6. To delete the surpluses of insulating lining, which block an enamel.
**Test problem №3.**
What are the stomatological instruments the impositions of insulating lining conducted by?
1. probe
2. shtopfer
3. stomatological mirror
4. plastic instrument
5. spatula
6. excavator

**Test problem №4.**
What thickness an insulating lining from a phosphate-cement must be?
1. 1,5-1,7 mm.
2. 0,1-0,3 mm.
3. 1-1,5 mm.
4. 0,5-0,7 mm.
5. 2 mm.

5. Self-preparation at class.

1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
3) Ask about the problems that haven’t been found in the information given.

**Task №1.**
During imposition of insulating lining from a phosphate-cement, its condensations in the formed carious cavity material began to stretch after shtopfer, stuck to him and take out from a cavity. What a reason is in? What further tactic of doctor?

**Task №2.**
After imposition of insulating lining from a phosphate-cement and permanent filling in the carious cavity of the III class by Black in 11 a clear white line between filling and tooth appeared on a vestibular surface. Name an error which resulted in such phenomenon.

**Task №3.**

After imposition in the deep carious cavity of insulating lining from a phosphate-cement and filling from kompozita at a patient sharp spontaneous pain in 3 days appeared in a tooth. What the reason of such displays is in? What has happened?

4) To capture the technique of preparation (involvements) of phosphate-cement for insulating linings;

5) To conduct impositions of insulating lining from a phosphate-cement in the carious cavities of different classes by Black

**Professional algorithms in relation to the capture by habits and abilities:**

<table>
<thead>
<tr>
<th>Task</th>
<th>Pointing</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>To capture the method of involvement of phosphate-cement for insulating linings</td>
<td>To execute in such sequence: 1. on glass by a spatula to inflict a liquid and powder in the correlation 1:4. 2. to divide powder on 4 parts, 1/4 still on 4 parts. 3. to add the powder to liquid in such sequence: 1/4&gt;1/8&gt;16. 4. to mix till the reception of homogeneous mass</td>
<td>To pay attention to the care of involvement Time of preparation of 1-1,5 mines.</td>
</tr>
<tr>
<td>To conduct imposition of</td>
<td>During imposition of insulating lining the prepared phosphate-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cement</td>
<td></td>
</tr>
</tbody>
</table>

UMSA. Propedeutic of Therapeutic Stomatology Department
An insulating lining must not close an enamel, or go out on the edges of cavity.


1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;
5) To work in the library of academy, to the regional medical library with the recommended literature:

6. The subject of the research work.

«Application of cements in modern stomatology» «Insulating lining: necessity or tradition?»

The methodical instruction is made by assistant Fetisova O.L.

Methodical Instruction No. 18
For the 2\textsuperscript{d} year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology
Topic: Cilicate and cilicate-phosphate cements: structure, property, positive and negative qualities, indication and applications. Glass-ionomer cements. Structure, property, positive and negative qualities, indication to application.

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt.

2. The aims of the training course:

A=1. 1) To have general knowledge of the topic studied;
A=2. 2) To understand, to remember and to use the knowledge received;
A=2. 3) To learn the classification, structure, functions of the
A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to carry out laboratory and experimental work.

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
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<tbody>
<tr>
<td>Anatomy</td>
<td>anatomic properties of structure of teeth of</td>
<td>define belonging of tooth to the definite group (incisors, canines, pre-</td>
</tr>
<tr>
<td></td>
<td>mandibular and maxillar jaws</td>
<td>molars, molars)</td>
</tr>
<tr>
<td>inorganic chemistry</td>
<td>properties of inorganic acids, their influence</td>
<td>define influencing all of its constituents on the organism of man on</td>
</tr>
<tr>
<td></td>
<td>on the organism of man</td>
<td>composition of acid</td>
</tr>
</tbody>
</table>
3.2 The contents of the topic:

Topic: Cilicate and cilicate-phosphate cements: structure, property, positive and negative qualities, indication and applications. Glass-ionomer cements. Structure, property, positive and negative qualities, indication to application.

Text

Cilicate cements (“Cilicin”)

Cilicate cements represent by system "a powder - liquid". The powder - is thin crushed aluminium-cilicate glass (oxydes of silicium, aluminium, calcium,ftorid of a natrium - up to 15 %, there is no of zincum oxyde in it ). A liquid - admixture of phosphoric acids.

The application of cilicate cements requires strict keeping of advisable time of mixing and sealing. At the moment of entering cement into the prepared carious cavity it pH = 1,6. neutral pH becomes only after 24 hours. At the expense of it cilicate cements have the expressed irritating action on a pulp.

<table>
<thead>
<tr>
<th>Histology</th>
<th>histological structure of enamel, dentine, cement, pulp of tooth</th>
<th>define the topography of hard tissues and pulp of tooth</th>
</tr>
</thead>
<tbody>
<tr>
<td>therapeutic stomatology</td>
<td>Possible complications at wrong imposition of filling from a cilicate and cilicate-phosphate cement in carious cavities of different classes of Blek. Tool for mixing, preparations and bringing of material for cement filling.</td>
<td>diagnose complications, to conduct deleting of filling , to use a stomatology tool.</td>
</tr>
</tbody>
</table>
Positive properties of cilicate cements:

1. Satisfactory aesthetic qualities;
2. Anticarious action, which ftorids provide;
3. Factor of thermal expansion of cement is approximately peer to factor of thermal expansion of tissues of a tooth;
4. Simplicity of application;
5. Cheapness and availability.

Negative properties:

1. The high toxicity for a pulp (an insulating lining is obligatory!)
2. Unsufficient mechanical durability;
3. Solubility in an oral liquid;
4. Absence of an adhesion to tissues of a tooth;
5. Appreciable shrinkage at the harding.

The indications to use:

1. Cavities of 3-d and 4-th classes.
2. Cavities of 5-th class.
3. Cavities of 2-nd class in premolars (seen surfaces). In this case additional platform is not shaped.

Now release of cilicate cements in the world was considerably reduced.

Cilicate-phosphate cements (the "stone" cements) ("Cilidont") represent by combination of powders zincum - phosphate and cilicate cements. The powder contains approximately 80 % of cilicate and 20 % of phosphate cements. A liquid - admixture of phosphoric acids.

Positive properties:
1. Larger, than at "Cilicin" and phosphate cement, mechanical durability;
2. Smaller, than at "Cilicin", irritating action on a pulp (at the expense of the contents of Zincum oxyde);
3. Best, than at "Cilicin", adhesion to tissues of a tooth;
4. Simplicity of application;
5. Cheapness and availability.

Negative properties:

1. Unsatisfactory aesthetic qualities;
2. Unsufficient durability;
3. Unsufficient fastness to surrounding of an oral cavity;
4. Toxicity for a pulp of a tooth.

The indications to application:

1. Cavities of 1-st class (on incisors - in the field of a blind fossa);
2. Cavities of 3-d class (on a lingual surface of a tooth at conservation of enamel in the vestibular surface);
3. Filling teeth, which is planned to cover with artificial crowns.

The ciliate-phosphate cements should be preferred at circumscribed financial opportunities of the patient. Now these materials are superseded from stomatological practice by glass-ionomer cements.

**Glass-ionomer cement**

Glass-ionomer cements are combined in themselves a hypotoxicity, high durability with the satisfactory aesthetic characteristics, show anticarious activity. GIC can be used at applying base and liner insulating linings, constant seals, to bracing fixed orthopedic constructions etc.
The "Classical" glass-ionomer cement represents a system of powder-liquid. A powder - calcium-aluminium-cilicate glass with addition of fluorids (up to 23 %). A liquid - solution of polycarbonic acids: polyacrilic, polyitaconic and polymaleinic. In process of harding of cement occurs transversal connection of molecules of polymeric acids by ions of aluminium and calcium. Thus the spatial frame of polymer is formed. The final frame of the hardened cement represents particles of the glasses surrounded by cilicagel and posed in a polymeric matrix from transversal connected polycarbonic acids.

The basic positive properties of GIC:

1. The chemical adhesion to tissues of the tooth. Chemical linkage GIC with enamel and dentine occurs at the expense of bond of carboxilate groups of a polymeric molecule of an acid with calcium of hard tissues of a tooth. Thus it is not required acid etching and absolute dryness of a surface. Besides at a final stage of harding there is a small augmentation of volume of glass-ionomer mass, that provides more dense regional closing of filling. Strength of an adhesion of GIC to enamel and dentine rather low (2-7 MPa). Therefore presence of chemical connection with hard tissues of a tooth matters not only for durability of bond, but also for maintenance of tightness on a line of contact of a filling material with hard tissues of a tooth. Glass-ionomer cements are formed a chemical adhesion to composites, corrosion-proof steel, alloys of gold, with platinums, to materials containing eugenol, etc.

2. Anticarious activity is provided at the expense of prolonged allocation of flor. This process begins at once after sealing and proceeds not less than one year. The diffusion of flor in environmental tissues causes intensifying their mineralization, formation of florapatits in enamel and dentine, closing to a seal. Besides prescribed, that GIC have "accumulator" effect. They are capable to adsorb ions of flor at contact with flor-containing tooth paste and elixirs, products of a nourishment and agents of exogenous prophylaxis.

3. Sufficient mechanical durability and elastance.

4. Satisfactory aesthetic properties.
5. High biological compatibility, nontoxicity and absence of irritating action on a pulp of a tooth
6. Simplicity of application.
7. Relative cheapness

Disadvantages of "classical" GIC:

1. Duration of "maturing" of cement mass. Primary hardening of a material occurs within 3-6 minutes, the final "maturing" lasts within day. Therefore within the first day after applying GIC has series of weak places:
   a) Sensitivity to excess or disadvantage of a moisture of process of hardening;
   b) Sensitivity to external mechanical influences during "maturing";
   c) Probability of infringement of chemical structure and process of hardening at etching of "not ripened " cement mass by a phosphoric acid;
   d) Danger of irritating action on a pulp at deep cavities.
2. Lower, than at composite materials, mechanical characteristics
3. Unsufficient esthetics (in comparison with composite materials)

Classification of modern glass-ionomer cements
I type - GIC for bracing.
II types - GIC restorative (for constant seals)
   a) Aesthetic;
   b) consolidative;
   c) condensative.
III types - rapid-setting GIC
   a) For linings
   b) fissura hermetics
IV types - GIC for sealing of root canals.

The indications to clinical use of glass-ionomer cements:
- Bracing of orthopedic designs;
- Applying of base and lander linings under composite and metal seals;
- Hermetic sealing of fissuras;
- Sealing carious cavities in dairy and constant teeth, including a caries of a root;
- Sealing not carious defeats of teeth;
- ART-technique of treatment of a caries;
- Restoration of a stump of a tooth.

Aesthetic GIC - in their structure are entered disperse glass parts, the parity between oxyd of silicon and aluminium is changed in the side of oxyd of silicon (the transparency of a material) is increased. Due to this the aesthetic properties are improved, but the durability is reduced, the time of hardening is increased, the sensitivity to surplus or lack of water on the initial stages of maturing of cement weight raises.

Fortified GIC - receive by increase of a parity a powder - liquid, in structure special fibres, metal additives (powder of silver amalgam) entered.

Kondensable (packed) - have the increased durability. The increased durability on compression, insignificant abradability, long allocation of fluorides.

Technique of work with GIC:

1. Conditioning of walls of a carious cavity by 10-25 % water solution polyacrilic acid will be carried out during 30 seconds, is washed off by a plenty of water and is dried by a jet of air (to not overdry!)

2. The material in the ratio 1:2 gets mixed up. Prepared weight should have thin paste-like consistence and brilliant surface. At loss of shine use of cement is not admitted.

3. The tooth should be isolated from a saliva. Hardening of a seal should occur in conditions of absolute dryness and under pressure.

4. Primary processing and modeling of a seal will carry out by sharp scalpel in 4-7 minutes after the beginning of mixing.

5. A seal from GIC isolate from the saliva on 24 hours by special varnish.
6. Final processing of a seal from GIC will carry out not earlier than in 24 hours by carborund stones, diamond burs, polishing disks.

Literature recommended

- Main Sources:

- Additional ones:

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
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<tr>
<td>to do the test on the material</td>
<td></td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1. List versions of stomatological cements.
2. Silicin: structure of a liquid and powder.
4. Silicin: negative qualities.
5. Silicin: the indication to application.
7. Silidont: positive qualities.
8. Silidont: negative qualities.
9. Silidont: the indication to application.
10. GIC: structure of a liquid and powder.
11. GIC: positive qualities.
12. GIC: negative qualities.
13. GIC: the indication to application.
14. Definition of concept: “a constant seal”, requirement to constant seals.
15. Rules of preparation of carious cavities of different classes by Black for imposing a constant seal from silicin, silidont, GIC.
16. Rules of imposing of constant seals from silicin, silidont, GIC in carious cavity of different classes by Black.
20. A technique of imposing of a constant seal from silicin, silidont, GIC.

B. Tests for self-checking:

Test task №1.
How to define readiness of silicin for statement of a constant seal?

Test task №2.
Name a sequence of stages of imposing of a constant seal from silidont in deep carious cavity.

The answer:
1. Mixing of silidont;
2. Entering by small portions in carious cavity and condensation;
3. Medicamental processing of a carious cavity by a 3% solution peroxyd of hydrogen;

4. Preparation of a powder and liquid of silidont for mixing;

5. Imposing isolating lining from phosphate-cement;

6. Drying of a carious cavity by warm air;

7. Isolation of a seal from a saliva by hydroxyl;

8. Modeling a surface of a seal.

**Test task №3.**

With what stomatological tools mixing of silicin carry out?

1. Probe;
2. Shtopfer;
3. Plastic double-pointed instrument;
4. Plastic spatula;
5. Metal spatula

4. Self-preparation at class.
   1) Listen to the information;
   2) Work with the tables, corpse, anatomical damp preparation;
   3) Ask about the problems that haven’t been found in the information given.

5. Self-preparation work at home.
   1) Review the material learnt at class;
   2) Compose the plan of your answer;
   3) Answer the questions to this topic;
   4) Do the test given above.

The methodical instruction is made by assistant Fetisova O.L.

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**Methodical Instruction No.19**

For the 2 year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology
Topic: **Notion of contact point, its importance in pathology of parodont.**

**Methods of it restoration. Grinding and polishing of filling: instruments, means, methods.**

Subtopic:

**Hours: 2**

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. The functional state of interdental papilla relies on the state of adjoining and surrounding him fabrics. Clear picture of topography of fabrics which formed interdental interval (gum papilla) and restoration of these correlations at remoal of defects of teeth 2, 3, 4 classes by Black gives possibility to attain valuable masticatory efficiency and prevent development of papillit, marginal periodontit and formation of deep gum or bone pocket.

2. The aims of the training course:

   A=1. 1) To have general knowledge of the topic studied;
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn the classification, structure, functions of the contact point and necessity of its renewal;
   A=3. 4) To form the professional experience by reviewing, training and authorizing it;
   A=3. 5) To be able to carry out laboratory and experimental work.

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:
<table>
<thead>
<tr>
<th>Anatomy</th>
<th>anatomical features of structure of the teeth of mandibular and maxillar jaws</th>
<th>define topographically an equator, crown, neck and root of tooth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histology</td>
<td>histological structure of enamel, dentine, cement, pulp of tooth</td>
<td>define the topography of hard tissues and pulp of tooth</td>
</tr>
<tr>
<td>Therapeutic stomatology</td>
<td>possible complications at incorrect setting of feeling material in carious cavities 2,3,4 classes by Black, at incorrect restoration of contact point. Tools for raising of feeling, for restoration of contact point, for grinding and polishing of feeling.</td>
<td>diagnoses complications, to conduct deleting of feeling, to use a dental tools for feeling, restoration of contact point, grinding and polishing of feeling.</td>
</tr>
</tbody>
</table>

3.3 The contents of the topic:

**Topic:** Notion of contact point, its importance in pathology of parodont.

**Methods of it restoration. Grinding and polishing of filling:**

*instruments, means, methods.*

Subtopic: types of contact **point**;

- instruments for restoration of contact point;
- methods of restoration of contact point;
- method of grinding and polishing of feeling;
- instruments for grinding and polishing of feeling;
- means for grinding and polishing of feeling

**Text**

Under a contact point understand the points of most protuberant and such, that contact between itself, areas of mesial and distal surfaces of the alongside placed
teeth. A high-quality contact point answers such requirements: firmness of type, minimal size of ground which contact in one point, streamlining of form of crown. Types of contact point: point, flat. Violation of contact point creates unfavorable terms for the normal function of interdental papilla and in the future results on its inflammation. In every private case a contact point must be restored taking into account the anatomic features of all dental row, forms of crown and other. For the bite of young man the point contact is normal. Micro-movements of teeth on a vertical axis during long time result in grinding of teeth, elimination of contact points and formation of grounds, that is there is transition from the point contact to flat one. Restoration of such contact points must be strict to individual.

However restoration of contact point not always is needed. If between teeth there are diastems, diaereses, restoration of contact point contra-indicated. At violation of occlusion at periodontosis, after deleting of tooth it is undesirable of restoration of contact point also.

Methods of restoration of contact point:

- The use of the matrix systems;
- The use of the instrument Contact Pro;
- Directed shrinkage on Bertolotti;
- The two-stage combined method of feeling by Lukomskiy;

By the matrix systems of different kinds the artificial wall of tooth which enables to translate the lateral placed cavity in central is created, simplifying the technique of feeling. Metallic ribbons or celluloid plates are the most simple adaptation for restoration of lateral cavities. If the gum wall of carious cavity takes place deeply under gum, in a plate a ledge, which moves down under gum is cut out. At restoration of contact point, on the bottom of carious cavity an insulating lining which is covered by the thin layer of feeling material is laid on, and in an interdental interval, wadding tampon is entered. A plate is covered by vaseline and entered between teeth and fixed by a wedge. After feeling a matrix is wrung out to the lateral surface of neighbouring tooth and stretched from an interdental interval. But plates badly adjoin to the gum
edge of tooth, and at the considerably blasted crown part of tooth it is impossible to fix them.

To perfect the method of feeling of lateral cavities, the improvement of matrices and matrix-holder was conducted.

**The matrix of Vudvord and Ayvori.** The Vudvord’s matrix – it is a plate with two screws which during feeling abut against a neighbouring tooth, a matrix is fixed between teeth. The Ayvori’s matrix does not provide dense contact plates at the near-neck region of tooth and at the matrix-holder of Ayvori application it is impossible to control articulation during feeling.

**The matrix of Miller** consists of two parallel plates which are drawn together one to one in a center and a bit gone away on periphery.

**The Berri’s matrix** – it is a semicircle matrix as a falcate plate to the ends of which a wire registers by a diameter 0,3-0,4 mm and long 5-6 sm. Fixing of matrix is conducted in general way of impositions of ligatures. The offered matrix can be leaved in the cavity of mouth on one day. Also there is a plenty of semicircular and circular matrices which are used for restoration of lateral defects (see a picture).

Method of restoration of lateral cavities by Lukomskiy I.G.: two-stage combined method of feeling. On the first stage the foundation of feeling is created, on the second – by a matrix the contour of tooth is erected and designed contact point. This method expelled hang edges of feeling above a gum papilla and interdental partition. But the two-stage feeling is multiplied by the quantity of visits, creates stratified between feeling materials.

Restoration of contact point by the instrument Contact Pro. This instrument is used for restoration of contact point of premolars and molars. Working part of instrument arcuated under the corner of 90° and 45° for restoration of distal and mesial contacts. The ends of these instruments are modelled so that to take place in the prepared carious cavity 2 kl. on Black, by the protuberant side of directed aside matrix. The tag of instrument pushes off from an aksial wall, operating as a lever and creating burst open efforts which are passed through a matrix, at the level of the most optimum contact.
The method of directed shrinkage of Bertolotti foresees the preliminary use of chemical composite on a gum wall, and from above covered by fotopolymerise komposite. It is assumed, that a lightpolymerise composite gives shrinkage in the direction of light, and it can result in tearing off of material in area of gum wall. Chemical komposite gives even shrinkage, attracted to fabric of tooth, that warns appearance of tearing off and provides the prophylaxis of development of the second caries.

Literature recommended


3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of contact points</td>
<td>To name what defects of hard tissues of tooth it is necessary to restore a contact point at</td>
</tr>
<tr>
<td>Means and accessories for restoration of contact point</td>
<td>To name the positive and negative sides of application of instruments for restoration of contact point</td>
</tr>
<tr>
<td>Methods of restoration of contact point</td>
<td>To make the algorithm of conducting</td>
</tr>
<tr>
<td>Of restoration of contact point at feeling of carious cavities 2,3,4 cl. by Black</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Means and accessories for final treatment of feeling after restoration of contact point</td>
<td>To specify the criteria of the correctly recovered contact point</td>
</tr>
<tr>
<td>Possible complications which arise up at the wrong recovered contact point</td>
<td>To make the algorithm of removal of possible complications</td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1. Give determination of notion «interdental interval»;
2. Give determination of notion «contact point»;
3. Name the types of contact point;
4. Testimony to restoration of contact point;
5. Criteria of correct restoration of contact point;
6. Name the methods of restoration of contact point;
7. The rules of restoration of contact point on a method:
   - The use of the matrix systems;
   - The use of the instrument Contact Pro;
   - Directed shrinkage on Bertolotti;
   - The two-stage combined method of feeling on Lukomskiy;
8. Name complications which can arise up at wrong restoration of contact point.

B. Test tasks to be done:

**Test problem №1. ?=2.**

How to define the rightness of restoration of contact point?

**Test problem №2. ?=2.**

Name the sequence of stages of restoration of the contact point for 2 cl. by Black.
1. Preparation of carious cavity
2. Raising of celluloid matrix
3. Fixing of matrix by a wedge in a gum area
4. To wedge teeth by a wedge.

**Test problem №3. ?=2.**

What stomatological instruments and accessories are used at restoration of contact point?

1. Plastic instruments for manipulating, packing and trimming of feeling
2. Shtopfer
3. A matrix «metallic ribbon»
4. Wooden and light-permeable wedges
5. Probe
6. Excavator
7. A different form of burs
8. Metallic ribbon for grinding and polishing of feeling

5. Self-preparation at class.

1) Listen to the information;
2) Work with the tables.

<p>| It is necessary to insulate a tooth with a prepared carious cavity from saliva | From the side of threshold of cavity of mouth (for the teeth of mandibular and maxillar jaw), on the bottom of cavity of mouth under a language (for a mandibular jaw) by stomatology pincers to bring in and inlay wadding rollers | It is conducted directly in the cavity of mouth |
| Carious cavity by the wadding marble fixed in pincers, process by solution of antiseptics | The peroxide of hydrogen, 3% gipohlorid |</p>
<table>
<thead>
<tr>
<th>Process</th>
<th>Action</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>To conduct drying of the formed carious cavity</td>
<td>By chip-blower, pressing on the button, a blast is sent in a carious cavity</td>
<td>Conduct by warm air</td>
</tr>
<tr>
<td>To conduct wedging of teeth by a wedge</td>
<td>In a gum area in an interdental interval a wedge is entered</td>
<td>A wedge is entered from the side of threshold of cavity of mouth by a smooth surface to the interdental papilla</td>
</tr>
<tr>
<td>To conduct imposition of matrix in an interdental interval</td>
<td>The set wedge is taken out, in an interdental interval a matrix is entered and again fixed by a wedge</td>
<td>A matrix is entered so that its lower edge densely adjoined to the neck of tooth, driving back a papilla from gum walls of carious cavity</td>
</tr>
<tr>
<td>To conduct raising of feeling and restoration of the</td>
<td>To use plastic instruments and shtopfer; an insulating lining by a rule is laid on; The first portion of material is brought in on the</td>
<td></td>
</tr>
</tbody>
</table>
contact point 2 cl. by Black
bottom of carious cavity and under a matrix, restoring an absent wall; the second portion fills all carious cavity, restoring the anatomic form of tooth.

To conduct deleting of matrix
A wedge is deleted at first, a matrix is wrung out to the neighbouring tooth and taken out from an interdental interval.

To conduct treatment of feeling and control of quality of its setting and restoration of contact point
Feeling must not overhang on an interdental papilla, to be smooth.

Treatment is conducted by metallic ribbons. Control of quality of restoration of contact point – by floss.

3) Ask about the problems that haven’t been found on practical employment.

**Task №1. ?=3.**
After raising of feeling in a carious cavity 2 cl. by Black in 3 months a patient complained on pain in area of treatmented tooth. What the possible reason of origin of pain is in? What further tactic of stomatologist?

**Task №2. ?=3.**
After establishment of matrix and fixing by its wedge a stomatologist restored the defect of hard tissues of tooth by light-polymerised material. After deleting of wedge and matrix feeling turned out soft and fell out. What was an error in? What must be done?

1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Work in the library of academy, in the regional medical library with the recommended literature
5) Do the test given above;
6. The subject of the research work.
   “Contact point, as one of factors of prophylaxis of development of pathology of parodont “
   The methodical instruction is made by assistant Fetisova O.L.
in studying Propedeutic of Therapeutic Stomatology

Topic: **Silver and copper amalgam, “Galodent”: structure, property, positive and negative qualities, indication and rules of application. Features of grinding and polishing of a filling.**

Subtopic: 

Hours: 2

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt.

2. The aims of the training course:
   A=1. 1) To have general knowledge of the topic studied;
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn the classification, structure, properties of the stomatological amalgams
   A=3. 4) To form the professional experience by reviewing, training and authorizing it;
   A=3. 5) To be able to carry out laboratory and experimental work.

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th></th>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomy</strong></td>
<td>anatomic properties of structure of teeth of mandibular and maxillar jaws</td>
<td>define belonging of tooth to the definite group (incisors, canines, pre-molars, molars)</td>
</tr>
<tr>
<td><strong>inorganic chemistry</strong></td>
<td>properties of different metals, their influence on</td>
<td>define influencing all of its constituents on the</td>
</tr>
<tr>
<td>the organism of man</td>
<td>organism of man on composition of Mercurium</td>
<td></td>
</tr>
<tr>
<td>Histology</td>
<td>histological structure of enamel, dentine, cement, pulp of tooth</td>
<td>define the topography of hard tissues and pulp of tooth</td>
</tr>
<tr>
<td>therapeutic stomatology</td>
<td>Possible complications at wrong imposition of filling of a stomatological amalgams in carious cavities of different classes of Blek. Tool for mixing, preparations and bringing of material for filling.</td>
<td>diagnose complications, to conduct deleting of filling, to use a stomatological tool.</td>
</tr>
</tbody>
</table>

The contents of the topic:

Topic: Silver and copper amalgam, “Galodent”: structure, property, positive and negative qualities, indication and rules of application. Features of grinding and polishing of a filling.

Subtopic:

Text
As amalgam the alloy of Hydrargyrum (mercury) with one or several metals is called. At mixing Hydrargyrum with particles of metals plastic rapid-setting alloys are formed. This process wears the name of amalgamating. In stomatological practice now are used a silver and copper amalgam.

Silver amalgams.
The "classical" silver amalgam represents an alloy consisting of silver (65-66 %), tin (29-32 %), copper (2-6 %) and zinc (up to 1 %). This alloy is admixed with Hydrargyrum.

Each of components of an amalgam betrays to it certain "positive" and / or "negative" properties:
- The silver provides to a seal durability, reduces flowability of an amalgam, promotes expansion it in a cavity, raises corrosive resistance;
- The tin slows down process of harding, enlarges shrinkage, reduces durability and hardness, accelerates process of amalgamating of an alloy;
- copper raises durability, provides good closing of a seal to edges of a cavity, promotes reception of more homogeneous mass at preparation of an amalgam;
- Zinc improves manipulating property, prevents formation of oxydes, makes an amalgam stronger, more plastic, at the presence of a moisture causes excessively high volumetric expansion of an amalgam.

Amalgamating is reached by grinding in mortar of sawdust with Hydrargyrum or hashing them in capsules of amalgam-mixer.

Positive properties of a silver amalgam as constant filling material:
- High durability and hardness;
- Plasticity;
- Stability (fastness) in an oral liquid;
- Absence of a discoloration of hard tissues of a tooth;
- Good manipulative quality;
- Relative cheapness;
- Good buffing.

Negative properties of a silver amalgam:
- Absence of an adhesion to hard tissues of a tooth;
- Irritating action on a pulp at the expense of high heat conductivity of a seal;
- Change of volume at the harding (shrinkage);
- Disharmony of colour of a seal from an amalgam to colour of enamel of a tooth;
Toxicity of steams of Hydrargyrum for the personnel working in stomatological consulting room.

The indication to application of silver amalgams is sealing carious cavities, when the high durability of a seal is necessary and the aesthetic effect is not important, i.e. cavity of I, II, and V classes (on molars).

Contradications to application of silver amalgams:
1. Hypersensibility or allergy on an amalgam.
2. Chronic mercurial intoxication (merculialism) at the patient. Which works in conditions of professional harmfulnesses.
3. The presence in an oral cavity of prostheses from gold, steel and other metals, is especial at their immediate contact to a seal from an amalgam.
4. The refusal of the patient (as a rule, is connected with the fear of a mercurial intoxication or with high aesthetic demands of the patient).
5. Absence in medical establishment of conditions for job with an amalgam.

The sealing by an amalgam develops of the following stages:
- Preparation of a carious cavity.
- Applying of an insulating lining.
- Preparation of an amalgam.
- Imposition an amalgam into a cavity and condensation it.
- Modeling of a plastic amalgam (carving).
- Smoothing down of a surface of a seal.
- Grinding and buffing of a seal.

After grinding and buffing the seal should restore the anatomic form of a crown of a tooth, have mirror shine and smooth surface.

Copper amalgams
They consist from copper and Hydrargyrum with the small additives of silver and tin.

Advantages:
- Plasticity;
- Good regional closing;
- Small shrinkage and small flowability;
- Bactericidal action.

Disadvantages:
- Are exposed to corrosion in a mouth;
- Paint tissues of a tooth in black colour.

Engineering of sealing and safety measure at job with them - are the same, as at job with silver amalgams.

**Alloys of gallium**

Toxicity of Hydrargyrum, necessity of the special conditions for job with it have resulted in an idea on creation of metal filling materials deprived toxic components. In result a material on a basis of gallium was created. Gallium, as well as Hydrargyrum, is capable to cooperate with powders of metals at room temperature and to form hardening pastes. On the properties the materials on a basis of gallium are close to amalgams.

Advantages:
- Do not demand special conditions for job;
- Sufficient durability;
- Good adhesive properties, that provides good regional closing;
- High plasticity.

Disadvantages:
- The corrosion stability is lower, than at amalgams;
- Soil an arm at job with them;
- Are not combined with gold prostheses;
- Have the large fragility, than amalgam.

The material prepares by mixing in capsules in amalgam-mixer. A technique of applying of seals from materials on a basis of gallium is the same, as at use of amalgams.
Literature recommended
- Main Sources:
  1. Магид Е.М., Мухин Н.А. Фантомный курс терапевтической стоматологии. Атлас. М. Медицина, 1987 – 304 с.
- Additional ones:

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn:</td>
<td>To list kinds of stomatologic materials, to give an example names of material</td>
</tr>
<tr>
<td>1. Classification of stomatologic materials for constant seals</td>
<td>To name positive and negative qualities of materials</td>
</tr>
<tr>
<td>2. Structure of a silver, copper amalgam, Gallodent-M</td>
<td>To make algorithm of carrying out of a constant sealing</td>
</tr>
<tr>
<td>3. Technique of preparing of silver, copper amalgam, Gallodent-M</td>
<td>To name possible complications at infringement of the safety precautions</td>
</tr>
<tr>
<td>4. The Safety precautions at work with amalgams and Gallodent-M</td>
<td>To know specifications on equipment of stomatologic cabinets at work with an amalgam</td>
</tr>
<tr>
<td>5. Requirements to work with amalgams (concerning equipment of a cabinet)</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:
A. Questions to be answered:
1. Define concept "amalgam";
2. Define concept "amalgamation";
3. Silver amalgam: structure, positive and negative qualities, the indication to application, properties which are provided with silver, zinc, copper, tin, mercury;
4. Copper amalgam: structure, positive and negative qualities, the indication to application;
5. Gallodent-M: structure, positive and negative qualities, the indication to application;
6. Rules of preparation of carious cavities to constant sealing by an amalgam and Gallodent-M;
7. Rules of imposing of constant seals by a copper, silver amalgam, Gallodent-M;
8. The Technique of statement of seals by a copper, silver amalgam and Gallodent-M.

B. Test tasks to be done:

Test problem №1.
How to define readiness of an amalgam for statement of a constant seal?

Test problem №2.
Name sequence of stages of preparing of Gallodent-M.
1. To place a powder in a capsule;
2. To close a capsule and to fix it in the amalgamator;
3. To include the amalgamator for 20-30 seconds;
4. To place a liquid in a capsule;
5. By measuring spoon to measure a portion of a powder;
6. Imposing an isolating lining;
7. In measuring spoon to bring a drop of a liquid, surpluses it to remove by plastic plate;

Test problem №3.
What stomatologic tools spend imposing a seal by an amalgam?
1. A probe;
2. shtopfer;
3. Amalgams-treger;
4. The Stomatologic mirror;
5. spatula;
6. excavator.

Test problem №4.

What parity should be between a powder and a liquid (metal sawdust: mercury) for preparing silver amalgam?

1. 3:1;
2. 5:2;
3. 2:2;
4. 4:1;
5. 1:4

The list of educational practical problems which are necessary for executing on practical employment:

- To take possession a technique of a manual and mechanical way of preparation of a silver amalgam;
- To take possession a technique of a manual way of preparation of a copper amalgam;
- To take possession a technique of a mechanical way of preparation of Gallodent-M;
- To lead statement of a constant seal in carious cavities of 1,2,5 classes by Black by a silver, copper amalgam and Gallodent-M.

Professional algorithms concerning mastering by habits and skills:

<table>
<thead>
<tr>
<th>Problem{Task}</th>
<th>Instructions{Indications}</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is necessary to isolate a</td>
<td>From a vestibulum of an oral cavity (for a teeth of the top and bottom jaw), on a bottom of an oral</td>
<td>It is spent directly to oral</td>
</tr>
<tr>
<td>Action</td>
<td>Description</td>
<td>Material</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Prepare</td>
<td>Tooth with a prepared carious cavity from saliva.</td>
<td>Cavities</td>
</tr>
<tr>
<td>Medicamentous Processing</td>
<td>Carious cavity by means of the wadded ball fixed in a tweezers, process a solution antiseptics</td>
<td>Use peroxide of hydrogen, 3% hypochloridum sodium, spirit</td>
</tr>
<tr>
<td>Drying</td>
<td>By chip-blower, pressing the button, direct a stream of air in carious cavity</td>
<td>Spend warm air</td>
</tr>
<tr>
<td>Isolation</td>
<td>To use two-ended plastic instruments and shtopfer</td>
<td>To use two-ended plastic instruments and shtopfer</td>
</tr>
<tr>
<td>Correctness</td>
<td>The Isolating lining should repeat the form of a cavity, to be carefully ground in to a bottom and walls of a cavity. To close a bottom of a cavity, on walls to reach up to dentin-enamel junction</td>
<td>The Isolating lining should close dentin, from enamel it is necessary to remove carefully</td>
</tr>
<tr>
<td>Mixing</td>
<td>To a mortar-1 part of mercury, 4 parts of a powder. Carefully to mix before reception of</td>
<td>Time of mixing of 40-</td>
</tr>
<tr>
<td><strong>amalgam</strong></td>
<td><strong>plastic homogeneous weight</strong></td>
<td><strong>50 seconds</strong></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------</td>
<td>---------------</td>
</tr>
</tbody>
</table>

To not wash out, and surplus of mercury carefully to wring out through a gauze

**To lead mixing of a copper amalgam**

Briquette to warm up above a spirit-lamp before occurrence of drops of mercury on its surface, to carry a briquette to a mortar and to pound before formation of homogeneous plastic mass.

Surplus of mercury to wring out through a gauze, an amalgam to wash out in a weak alkaline solution.

**To lead mixing of Gallodent-M**

By measuring tube to measure a powder, in measuring spoon with a deepening to bring a liquid, and surplus it to remove a plastic plate.

Both of a component to carry to a capsule, to fix a capsule in the amalgamator, to include the amalgamator.

**Time of mixing of 20-30 seconds**

**To lead imposing a seal by an amalgam and Gallodent-M**

To bring in the prepared cavity a portion of a material by means of amalgams-treger, to condense by shtopfer, to repeat manipulation (surplus of mercury on a surface every portion to delete by means of an excavator) of a cavity, strongly pressing portions of a material.

**Condensation spend from the center to walls**

**To lead modelling a seal**

By means of carborundum heads, finirs, polirs, brushes and polishing paste.

**Spend by means of two-ended plastic instrument**

**To lead final processing a seal**

Final processing spend in 24
4. Self-preparation at class.

Task №1.

After imposing a constant seal by a silver amalgam in carious cavity the patient began to disturb a pain in a tooth during reception of hot and cold food. In what is the reason, what further tactics of the doctor?

Task №2.

In 1,5 years after imposing a seal by Gallodent-M the patient had a pain from irritants which quickly passed after their elimination, in a tooth the food was stick, the tooth has changed in colour. What has happened? What further actions of the doctor?

1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
3) Ask about the problems that haven’t been found in the information given.

5. Self-preparation work at home.

1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;

The methodical instruction is made by assistant Fetisova O.L.

Methodical Instruction No.27

For the 2nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology
Anatomic and topographical features of a pulp cavity and root canals of incisors, canines and premolars. Medical processing of root canals. Toolkit and medical agents for processing. Manufacturing of turundas for processing the canal.

The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. Knowledge of anatomical and topographical features of cavity of tooth and root channels of molars is given by more of confidence and jurisdiction in the capture by different manipulations in stomatological practice. Modern endodontical tools, and also medicamental agents enables effective treatment of pulpit and periodontit with most less of complications, as in the process of treatment so after him. Therefore to know an endodontical tools, and also right to use him it is very important for stomatologist.

1. The aims of the training course:

   A=1. 1) To have general knowledge of the topic studied; To learn the anatomical and topographical features of cavity of tooth and root channels of teeth. To familiarize with stages sequence, by a tool for tooling of root channels
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn features of anatomical and topographical structure of cavity of tooth and root channels of each tooth of maxillar and mandibular jaw;
   - stages of endodontical treatment of root channels;
   - structure, setting, classification of endodontical instruments of home
production and on the ISO 3630 standards;
- medicamental agents and their action

A=3.  4) To form the professional experience by reviewing, training and authorizing it;
A=3.  5) To be able to choose endodontical instruments depending on the stage of tooling of root channels; to use the chemical matters for facilitation of instrumental treatment of root channels;

6) To seize by the step-back method of extension of root channel; crown-down method of extension of root channel;

2. Materials for the before – class work self – preparation work:
3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>anatomic features of structure of incisors, canines and premolars of maxillar and mandibular jaw.</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>composition of metters for medicamental processing of root channels</td>
</tr>
<tr>
<td>surgical stomatology.</td>
<td>possible complications at tooling of root channels. Testimonies to the surgical</td>
</tr>
<tr>
<td>Methods of treatment in case of beginning of complication.</td>
<td>Complications arising up.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Phantom course of propedeutic of therapeutic stomatology</strong></td>
<td>Clinical and anatomic features of a structure of a tooth. The endodontic tools: setting, features of work with him. Technique of medical processing. Conduct opening of cavity of a tooth, and determine the location of ostiums of root channels on remote teeth. To use an endodontic tools for medical processing of root channels on phantoms.</td>
</tr>
</tbody>
</table>

3.3 The contents of the topic:

**Topic:** **Anatomical and topographical features of a pulp cavity and root canals of incisors, canines and premolars. Medical processing of root canals. Toolkit and medical agents for processing. Manufacturing of turundas for processing the canal.**

**Text**

*Cavity of incisors of maxilla and mandible:*
The pulp cavity in incisors of top and bottom jaws is formed by vestibular, lingual and two lateral walls having the triangular form. The widest part of a cavity is posed at a level of neck of a tooth, being gradually narrowed, she passes in the canal. In lateral incisors the canals a little narrower, than in central, coarctate from sides. In the central incisors of the top jaw in 100% of cases there is one root and one root canal. In lateral incisors - in 98% of cases one root, in 2% of cases - two roots. Root canals: 98% - one, 2% - two. In the central incisors of the bottom jaw in 100% of cases there is one root, in 70% of cases - one, and in 30% - two canals. In lateral incisors of a mandible: in 56% - one, in 44% - two canals.

Cavity of canines.

Cavities of canines top and bottom jaws are wide, spindle-shaped form. The crown part of a cavity immediately passes in the canal. In canines of the top jaw in 100% of cases there is one root and one root canal. In canines of a mandible sometimes there are two canals (in 6% of cases) - labial and lingual.

Cavity of premolars

The crown part of a pulp cavity of premolars of top and bottom jaws coarctates in a medial-distal direction, has the form of a cleft (rima) with two prominences accordingly by tuberculums of a crown. In the first premolar tooth of the top jaw in 85% of cases there are two canals, in 6% - three and in 9% of cases - one canal. In the second premolars of the top jaw in 75% of cases there is one canal, in 24% - two and in 1% of cases - three canals. In the first premolars of a mandible in 74% of cases there is one and in 26% - two canals. Can meet and three canals (one - lingual and two -vestibular canals).

Liquids for medicamental processing of root canals.

In endodontology for medicamental processing and the lavages of root canals usually use strong antiseptics. These substances should have the following properties:
1. To have bactericidal action on association of microorganisms which are taking place in root canals;
2. To be harmless to periapical tissues;
3. To not have sensitizing action on an organism;
4. To not cause occurrence of the refractory forms of microorganisms;
5. To render fast action and deeply penetrate in dentinal tubulas;
6. To not have an unpleasant smell and taste;
7. To clear a gap of the canal of organic rests, to promote evacuation them from the canal;
8. To be chemically proof and to not lose the activity at a long storage.

There are many ways of medicamental processing of root canals. The lavage of the root canal by a solution of medicinal substance from a syringe through special endodontical needle is most effective.

-Chlorine-contain preparations
The mechanism of action: at contact with tissues occurs allocation of aeriform chlorine, which works and in a gap of the canal, and in dentinal tubulas, decontaminating their contents and blasting organic rests. They are active in relation to the majority of bacteria, funguses and viruses. The most effective and wide-spread preparation is hypochlorit of a natrium (NaOCl).

Is applied hypochlorit of a natrium as aqueous solutions by concentration from 1 up to 5 %. The repeated lavage of the canal is made through a syringe with endodontical needle. For processing one canal it is required 5-10 ml of a solution.

-Peroxide of Hydrogenium
In endodontology 3 % an aqueous solution of a peroxide of Hydrogenium (H2O2) is applied to medicamental processing.

-Preparations of Iodum
- Carbamidum
- Proteolytic enzymes and ets.

Technique of a lavage of the canal through a syringe with endodontical by a needle
1. A tooth subject to processing, put round by platens, series place a salivary ejector, which quickly will remove of wash solution together with products of disintegration.
2. The lavage of the canal is made through endodontical a needle, which has blunt tip and lateral aperture. To reduce risk of deducing(removing) of a solution for an apex, tip of a needle should settle down on 3-5 mm from apical of an aperture.

3. The solution of an antiseptic is entered in the canal under small pressure. For a lavage of one canal it is necessary 10-20 ml of an antiseptic solution.

4. Before sealing for erasion of the rests of an antiseptic solution the canal is recommended to be washed out by distilled water, and then to dry up by paper pegs.

Literature recommended
- Main Sources:
  2. Терапевтическая стоматология под руководством Боровского Е. В.. М. – 2002.

Methodical:

  1. Милериян В. С. Методические основы подготовки и проведения занятий в медицинских институтах (мануальные навыки) – Киев, - 2003.

- Additional ones:

3.4 How to work with the literature recommended:

<table>
<thead>
<tr>
<th>Main tasks</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>to review the material</td>
<td>to use the material studied</td>
</tr>
<tr>
<td>to learn the material</td>
<td>to use the material on(at) pages</td>
</tr>
<tr>
<td>to read and compose the plan</td>
<td>to learn the new material and be ready to write a summary</td>
</tr>
<tr>
<td>to answer the questions</td>
<td>to be ready to give an answer to the questions</td>
</tr>
<tr>
<td>to do the test on the material</td>
<td></td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1). Anatomical and topographical features of cavity of tooth and root channels:
   - central incisor of maxillar jaw;
   - lateral incisor of maxillar jaw;
   - canine of maxillar jaw;
   - first premolar of maxilla;
   - second premolar of maxilla;
   - central incisor of mandibular jaw;
   - lateral incisor of mandibular jaw;
   - canine of mandibular jaw;
   - first and second premolar of mandibular jaw.

2). Purpose of medical processing of root channels.

3). The endodontic tools for tooling of root channels (home, according to the ISO standards).

Typical task №1

At treatment of chronic apical periodontit of 16 bad ability of exploitation of root channels due to obliteration of their road clearance is exposed.

What medicinal facilities must be used for facilitation of instrumental treatment of root channels?

Typical task №2
During work with root channels the breakage of file in mouth of medial-lingual channel happened in 46.

What possible reasons of such complication?

4. Self-preparation at class:
   1) Listen to the information;
   2) Work with the tables, corpse, anatomical damp preparation;
   3) Ask about the problems that haven’t been found in the information given.

5. Self-preparation work at home:
   1) Review the material learnt at class;
      2. Терапевтическая стоматология под руководством Боровского Е. В.. М. – 2002.

Methodical:
1. Милерян В. С. Методические основы подготовки и проведения занятий в медицинских институтах (мануальные навыки) – Киев, - 2003.
- Additional ones:

2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;

The methodical instruction is made by assistant Fetisova O.L.

Methodical Instruction No.28,29
For the 2nd year students’ self – preparation work
(at class and at home)
in studying Propedeutic of Therapeutic Stomatology

Topic:

Subtopic:
Hours: 4

The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt. Knowledge of anatomical and topographical features of cavity of tooth and root channels of molars is given by more of confidence and jurisdiction in the capture by different manipulations in stomatological practice. Modern endodontical tools, and also step-back and crown-down technique enables effective treatment of pulpit and periodontit with most less of complications, as in the process of treatment so after him. Therefore to know an endodontical tools, and also right to use him it is very important for stomatologist.

1. The aims of the training course:
   A=1. 1) To have general knowledge of the topic studied; To learn the anatomical and topographical features of cavity of tooth and root channels of molars. To familiarize with stages sequence, by a tool for tooling of root channels
   A=2. 2) To understand, to remember and to use the knowledge received;
   A=2. 3) To learn features of anatomical and topographical structure of cavity of tooth and root channels of each molars of maxillar and mandibular jaw;
   -stages of endodontical treatment of root channels;
   -structure, setting, classification of endodontical instruments of home production and on the ISO 3630 standards;
   -technique of apex-coronal extension of root channel of step–back;
-technique of crown –apical extension of root channel of crown-down;
-chemical matters and method of extension of root channels at their help;
-reasons and prophylaxis of breakage endodontical tools in a root channel;

A=3. 4) To form the professional experience by reviewing, training and authorizing it;
A=3. 5) To be able to choose endodontical instrumets depending on the stage of tooling of root channels; to use the chemical matters for facilitation of instrumental treatment of root channels;

6) To seize by the step-back method of extension of root channel; crown-down method of extension of root channel;

2. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>anatomic features of structure of molars maxillar and mandibular jaw.</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>composition of metters for chemical extension of root channels</td>
</tr>
<tr>
<td>surgical stomatology.</td>
<td>possible complications at tooling of root channels. Testimonies to the surgical methods of treatment in case of beginning of complication.</td>
</tr>
<tr>
<td>Phantom course of propedeutic of therapeutic stomatology</td>
<td>clinical and anatomic features of structure of cavity of teeth. The endodontic tools: setting, features of work with him. Technique of extension of root channels.</td>
</tr>
</tbody>
</table>
7.3 The contents of the topic:

Topic:

Subtopic:
features of anatomical and topographical structure of cavity of tooth and root channels of each molars maxillar and mandibular jaw;
- stages of endodontic treatment of root channels;
- structure, setting, classification of endodontic instruments of home production and on the ISO 3630 standards;
- technique of apex-coronal extension of root channel of step – back;
- technique of crown – apical extension of root channel of crown-down;
- chemical matters and method of extension of root channels at their help; reasons and prophylaxis of breakage endodontical tools in a root channel;

Text

Anatomical and topographical features of cavity of tooth and root channels of molars.

1, Cavities of the first molar of maxillar jaw.
The cavity of the tooth has the form of wrong quadrangle. The vault of cavity is designed near the neck of tooth. Four deepening of horns of pulp answer masticatory tubercles. The form of cavity approaches a triangle in the corner of which the mouths of root channels are located. A palatal root channel is wide, by a line, a bit declined to the palate, on transversal saw cut round or oval, ends with
one or a few apex opening. In cheek roots the channels are narrowed, distorted, often ramified and have a few opening.

2. Cavity of the second molar of maxillar jaw.
Cavity of crown of the tooth of cubiform form, on transversal saw cut approaches the outlines of wrong quadrangle. In the vault of cavity four deepening, the most expressed is medial-buccal. The vault of cavity is designed at the level of neck of tooth. On the bottom of cavity there are three mouths of root channels. Bottom of cavity - at the level of neck of tooth. A palatal root channel is wide, on transversal saw cut oval, it is well passable. Buccal channels can have a few forks and to two or three opening.

3. Cavity of the third molar of maxillar jaw.
In connection with the considerable individual features of structure of tooth, a cavity can have a different form, root channels can be some (more than three). The cavity of crown and channels of roots can answer not original appearance of crown and root.

The bottom of crown cavity has the appearance of rectangle with three mouths of root channels from which two located in a front root, and one – in back. Between the mouths of channels a bulge is determined. On a masticatory surface in a vault, deepening answers every tubercle (the back lingual is better expressed). In a front root there are two channels, a common mouth is sometimes had. The root channels of front root (medial-buccal, medial-lingual) partly have the additional forks. In a back root one, well treating direct channel. Opening of apex of root of tooth is often located directly near a mandibular channel.

5. Cavity of the second molar of mandibular jaw.
On transversal saw cut has the form of rectangle. In the vault of cavity there is deepening, which answer tubercles on a masticatory surface. The bottom of crown cavity is protuberant, with three mouths of root channels. Two channels located in a
front root, one – in back. Channel of back root is well accessible for instrumental treatment.

6. Cavity of the third molar of mandibular jaw.

It is marked by the individual features of structure, which answer the form of crown of the tooth. The crown cavity on the structure is sometimes similar to the cavity of second molar. On the bottom of cavity there are three mouths of root channels. In a front root – two arcuated channels with the common apex opening.

ENGINEERING "STEP BACK"

This engineering - the most popular technology of machining of root canals by manual instruments now. We advisable to begin development endodontic of manipulations from mastering by this technique.

The complete set K-files and instruments for expansion of ostiums of the root canals (for example, « Gates glidden ») is necessary for realization of tool processing (expansion) of the root canal by a method « step back ».

The stages of realization of a technique of expansion of root canals on a method “Step back” are those:

The first stage - passage of the root canal and definition of working length.

The root canal pass up to a physiological apical aperture thin K-reamers or pathfinders. For definition of working length do(make) a "measuring" roentgenogram with the instrument, entered into the canal. Working length is fixed on instruments by lock disks.

The second stage - formation of an apical emphasis.

The purpose of the given stage - creation in the field of a physiological apex ledge, being an emphasis preventing an output(exit) gutta percha and endohermetic for an apical aperture during sealing.

The performance of the given stage begins with a K - file of that number(room), which managed to pass the canal up to apical aperture and which is got jammed in the canal on apical level. The instrument enter in the canal by rotary movements on working length, and then sawing movements downwards - upwards process walls of
the canal on working length. After extraction of the instrument the canal wash out by a solution of an antiseptic. Then similarly canal process on same length by a K - file of following number(room). Thus, consistently enlarging thickness of instruments, apical part of the canal dilate to a physiological apex on 3-4 numbers(rooms) more initial instrument (but not less, than up to № 25 on ISO). The permeability of an apical aperture is periodically monitored by files or reamers of the small sizes - № 06 or 08. Thus jamming of instruments in apical narrowing tactilely should be felt.

As a result of such processing an apical part of the canal the pencil-point form gives which appropriate of cone of standard endodontic instrument and in the field of physiological apical aperture frames ledge - an apical emphasis. The canal in apical one-third is recommended to dilate on two - three numbers(rooms) of endodontic instruments, but it is not less, than up to № 25. The smaller size does not allow carefully to clear, to wash out and to seal up the canal.

The file, with which the processing of an apical part of the root canal on working length was completed, is called basic (« Master file «).

The third stage - tool processing of the apical one-third of root canal.
The purpose of the given stage - giving to the canal of the cone-shaped form.

Expansion of the root canal continue by a K - file, which size on number(room) is more than a master - file. This instrument is entered on 1 mm less than working length, and then sawing movements walls of the canal upwards - downwards are processed. The following file is entered on 2 mm less than working length, following - on 3 mm.

After each new instrument come back to the basic file to make sure, that the apical part of the canal is not blocked by dentinal sawdust. Simultaneously by master- file smooth the stepes, formed on walls of the canal during realization of this stage. After application of each instrument the canal is washed out by a solution of an antiseptic.

The fourth stage - formation of average and top parts of the root canal.
The purpose of the given stage - to give of a mouth part of the canal the funnel-shaped form for simplification of the subsequent medicamental processing and sealing.
This stage is recommended to be spent by instruments such as « Gates glidden », consistently applying them from the smaller size to greater. The precise rules concerning that, what instruments of the size should thus be used, do not exist. The all depends on individual features: width, curvature of the canal, thickness of a root and ets. Usually consistently apply instruments of an enlarged diameter according to principles « Step-back of engineering »: № 1, № 2, № 3. Thus process only rectilinear part of the canal, as in a flexure « Gates glidden » is got jammed and is fractured. This stage by restoration of permeability of the canal by a master-file comes to an end.

**The fifth stage - final alignment of walls of the canal.**

The purpose of the given stage - delection and alignment of walls of the canal, giving to its of the cone-shaped form from an apical emphasis up to an ostium. 

At this stage the final machining of the root canal on all length by a Hedstroem-file, on the size appropriate to a master-file is made. Thus the instrument makes reciprocating sawing movements, the canal is plentifully washed out by solutions of antiseptics.

**ENGINEERING " CROWN DOWN "**

The engineering " Crown Down " provides processing of the canal from an ostium to an apex by stages with consecutive change of instruments from the greater size to smaller. The wall dentine thus leaves only by an apical part of the instrument, that improves the tactile control and reduces risk of jamming and fracture of the instrument.

The machining of the canal according to engineering " Crown Down " is made as follows:

**The first stage - introduction in the root canal of a K-file № 35 on depth of 16 mm.**

At first in the root canal try to enter a K-file № 35 on ISO on depth of 16 mm. If to enter this file on such depth it fails, do(make) a x-ray film of a tooth with the instrument, entered into the canal. The purpose of this operation - to find out, that
was by the reason of jamming of the instrument: a curvature of the root canal or narrowing of its lumen.

If the reason - narrowing of the root canal, its dilate by more thin K-files on depth of 16 mm so long as on 16 mm the K-file № 35 will not be entered.

If the reason of jamming of a K-file № 35 - curvature of the root canal, the canal is processed up to a site of a curvature.

If the K-file managed at once to be entered on depth of 16 mm or more, the machining of this part of the canal is made.

**The second stage – definition "of temporary working length ".**

With this purpose the "measuring" roentgenogram with a K-file in the canal which has been not lead up to a physiological apex approximately on 3 mm is done(made). Length of the canal pays off. The parameter received at the analysis of such roentgenogram, is called as" temporary working length ".

For definition of" temporary working length " it is possible to use diagnostic roentgenogram, if it was done(made) at the first stage of tool processing of the canal.

**The third stage - passage of an apical part of the canal on " temporary working length ".**

Begin realization of this stage from introduction in the canal till emphasis of K-file № 35, then without apical pressing do(make) two complete revolutions of the instrument clockwise and lead out it from the canal. Further take a K-file № 30, enter in the canal till emphasis and rotate without pressing clockwise before the maximal progress in an apical direction and take from the canal. Then similar operation spend by a K-file № 25, then № 20 and ets. before achievement of " temporary working length ".

**The fourth stage - definition "of final working length ".**

The "measuring" roentgenogram with the endodontic instrument entered into the canal on " temporary working length " is done(made). "Final working length " is defined(determined).

**The fifth stage - expansion of the root canal.**
Begin realization of this stage from introduction in the canal till emphasis of K-file № 40, then without apical pressing do (make) two complete revolutions clockwise and lead out a file from the canal. Further take a K-file № 35, enter in the canal till emphasis and rotate without pressing clockwise before the maximal progress of the instrument in an apical direction and take from the canal. Then similar operation spend by a K-file № 30, then - № 25, № 20, № 15 and ets. Up to achievement of working length.

After that repeat the same manipulations, since a K-file № 45, then - with № 50. Each time aspire to deeper penetration of files.

Machining of the canal continue so long as an apical part of its will not be extended to a desirable diameter, but it is not less, than up to № 25

Use of this engineering allows to save the initial form and direction of the canal, however this method rather labour-consuming. Therefore most often it apply at expansion of root canals by rotating Ni-Ti instruments: profiles, protapers, GT-files.

Thus at first for expansion of an ostium part of the canal the files of large cone apply, and as approaching an apex of a root the cone of files reduce.

Literature recommended
- Main Sources:
  2. Терапевтическая стоматология под руководством Боровского Е. В.. М. – 2002.

Methodical:

1. Милерян В. С. Методические основы подготовки и проведения занятий в медицинских институтах (мануальные навыки) – Киев, - 2003.

- Additional ones:

3.4 How to work with the literature recommended:

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<th>Recommendations</th>
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<td></td>
</tr>
<tr>
<td>to be ready to answer the topic</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Self-control material:

A. Questions to be answered:

1). Anatomical and topographical features of cavity of tooth and root channels:
- first molar of maxillar jaw;
- second molar of maxillar jaw;
- third molar of maxillar jaw;
- first molar of mandibular jaw;
- second molar of mandibular jaw;
- third molar of mandibular jaw;

2). Purpose of tooling of root channels.
3). The endodontic tools for tooling of root channels (home, according to the ISO standards).
4). Sequence of the use of endodontic tools at tooling of root channel.
5). Extension of root channel by the chemical matters.
6). The Step-back technique of extension of root channel: positive, negative sides, tools, method.
7). The Crown-down technique of extension of root channel: positive, negative sides, tools, method.
8). Possible complications which arise up at mechanical extension of root channel: reasons, prophylaxis.

B. Test tasks to be done:

**Typical task №1**

In second molar on a mandibular jaw medial-buccal and medial-lingual roots turned out difficultly passable.

What method of extension of root channels must be used in this case?

**Typical task №2**

At treatment of chronic apical periodontitis of 16 bad ability of exploitation of root channels due to obliteration of their road clearance is exposed.

What medicinal facilities must be used for facilitation of instrumental treatment of root channels?

**Typical task №3**

During work with root channels the breakage of file in mouth of medial-lingual channel happened in 46.

What possible reasons of such complication?

**Test problem №1**

What endodonticall instruments riming is conducted by?

2. H-file;
3. K-rimer;
4. K-file;
5. by the coniferous bur of the Getts-Glidden type;
6. by rotary machine profile;

**Test problem № 2**

What motions are conducted by endodontic instruments during filing of root channels?
1. scrolling on 180-360°;
2. vertical (scraping away) motions without scrolling;
3. scrolling on 90 - 180°;
4. recurrent-forward motions.

**Test problem № 3** (on substitution)

During conducting of extension of root channel by a step-back technique use instruments by a size from ___________ to _____________.
During conducting of extension of root channel by crown-down technique use instruments by a size from __________  to _______. After instrumental treatment a channel must have ______________ form with _____________ by a diameter in area of the apikal opening, and ______________ – in area of mouth of root channel.

4. Self-preparation at class:
1) Listen to the information;
2) Work with the tables, corpse, anatomical damp preparation;
3) Ask about the problems that haven’t been found in the information given.
   1. To be able to trepan the cavity of tooth.
   2. To be able to find the mouths of root channels.
   3. To learn to extend the mouths of root channels.
   4. To be able to use an endodontical tools on purpose:
      - for expansion of root channels;
      - for passing of root channels;
      - for filling of root channels.
5. To capture the method of expansion of root channels by Step–back and crown down technique.

5. Self-preparation work at home:

1) Review the material learnt at class;
2) Compose the plan of your answer;
3) Answer the questions to this topic;
4) Do the test given above;

**Task №1**

During expansion of root channels in molar after work by the file of a 20 size a following after a size instrument (25) left off to be included in a channel on working length.

What the reason of such phenomenon is in?

What further tactic of doctor?

**Task № 2**

During instrumental treatment of root channel by a step-back technique in a channel sharp pain and bleeding at introduction of instrument on 2/3 appeared his depths.

Name complication which arose up in the process of treatment and its reason.

The methodical instruction is made by assistant Fetisova O.L.

Methodical Instruction No.33-35

For the 2-nd year students’ self – preparation work

(at class and at home)
in studying Propedeutic of therapeutic Stomatology

Topic: Materials for the filling of root canals. Classification, the demands to them.
Not hardening materials: anti-microbial and anti-inflammatory pastes, indication to application, technique and stages of filling canal. Hardening filling materials for root canals. Positive and negative qualities, indication to application, technique of filling. Hard materials (posts) for filling of root canals, their versions, positive and negative qualities. Modern technologies, their general characteristic.

Subtopic:

Hours: 6

1. The topic basis: the topic is very important for future doctors in their professional activity, positively influences the students in their attitude to the future profession, forms professional skills and experience as well as taking as a principle the knowledge of the subject learnt.

2. The aims of the training course:

A=1. 1) To have general knowledge of the topic studied;
- Anatomic and topographical features of a structure of a pulp cavity and root canals of all groups of teeth
- The instruments, which are applied to a trepanation of a pulp cavity, ablation and extirpation of a pulp
- Feature of ablation and extirpation of a pulp
- The complications, which can arise at each stage of endodontical treatment

A=2. 2) To understand, to remember and to use the knowledge received;

A=2. 3) To learn - Indication to erosion of a seal from a carious cavity
- Indication to a trepanation of intact teeth
- Stages of erosion of a pulp and its disintegration, and also complication in process of endodontical treatment
A=3. 4) To form the professional experience by reviewing, training and authorizing it;

A=3. 5) To be able - To trephine an intact tooth
   - To impose of devitalizing Pasta
   - To impose hermetic and quaggy bandages
   - To open a pulp cavity
   - To amputate a pulp
   - To extirpate a pulp
   - To seal root canal

3. Materials for the before – class work self – preparation work:

3.1 Basic knowledge, experience, skills necessary for studying the topic in connection with other subjects:

<table>
<thead>
<tr>
<th>To know</th>
<th>To be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>make trepanation of intact teeth, opening of pulp cavity, according to ATF of different groups of teeth</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>substances, from which sealers consists and mechanism of its action</td>
</tr>
<tr>
<td>Therapeutic stomatology</td>
<td>Indications to using of sealers and fillers</td>
</tr>
</tbody>
</table>

3.2 The contents of the topic:

Topic:
Subtopic:
Text

According to modern classification, the materials for sealing canals are divided into the following groups:

1. Plastic
- Not hardening
- Hardening

2. Hard

According to other classification, the materials for filling canals are sectioned into two kinds:
1. sealler
2. filler

Not hardening Pastas dissolve in the canal, do not provide a long reliable obturation of apical aperture, therefore now to constant sealing of canals them do not apply. However they are effective enough as agents for temporary sealing of canals.

The plastic not hardening materials are divided on some groups:
1. Pasta on the basis of antibiotics and corticosteroid preparations
2. Pasta on the basis of Metronidazolum
3. Pasta on the basis of an admixture of antiseptics of long action
4. Pasta on a basis of hydroxid calcium

The materials used for sealing of root canals, should answer such demands:
- To not cause a boring of tissues of a periodontium
- To not have toxic, allergenic and carcinogenic action
- To have antiseptic and antimflammatve properties, to promote neogenesis of pathologicaly changed periapical tissues
- It is easy to be entered into the root canal
- To have slow hardening
- To be radiopaque
- Not dissolve in a lumen of the root canal and dissolve in case of deducing(removing) for an apex
- After hardening of the material should form dense homogeneous mass
- If necessary it is easy to be taken from the canal
- To not paint a tissue of a tooth
- To not break an adhesion and hardening of constant of a filling materials

**Pastas on the basis of antibiotics and corticosteroid preparations.**
Usually in structure of these preparations include 2-3 antibiotics with a wide range of antibacterial and antifungal action. Other component of Pasta - corticosteroid, is more often Dexamethazonum, - is applied in such dosage, that, reducing the inflammatory and allergic phenomena, does not influence thus protective reactions of a periodontium and organism as a whole. The third component - radiopaque excipient - allows to estimate quality of filling of the canal. These Pastas have strong, but short action, are brought into the canal for 3-7 days.

**Pastas on the basis of Metronidazol.**

They are intended for temporary sealing strongly infective canals of roots of teeth, is especial when it is possible to expect prevalence in them of an unaerobic microflora (at a gangrenous pulpitis, acute and chronic periodontitis). They allow even acute periodontitis to treat at the tightly closed pulp cavity.

Pasta on the basis of Metronidazol is entered in the canal with the help of root filler, on an ostium of the canal the sterile wadded globule is imposed, and the tooth is tightly closed by a bandage. It is necessary to mean, that Pastas are intended for active treatment, therefore it change in the canal daily, before complete disappearance of all signs of disease.

**Pastas on the basis of antiseptics of long action**

In structure of preparations of this group, as a rule, include strong antiseptics: Thymolum, creosote, Iodoformium, Camphora, Menthol etc.

These Pastas radiopaque, do not harden, are slowly dissolved in canals. They are applied to temporary sealing of canals at the adult at treatment of pulpites and periodontites, at the endodontical treatment of dairy teeth, including with resorbive roots.

**Pastas on a basis of Calcium hydroxidum**

Thanking of alkaline reaction (pH about 12) Calcium hydroxidum at filling by it of the root canal renders bactericidal action, blasts of a necrotic tissue, stimulates of osteo-, dentino-, and cementogenesis. The application of these Pastas is shown at treatment of the destructive forms of periodontitis and radicular cysts.
Pasta in the canal is replaced with a new portion in 6 weeks after the first introduction, and then once per 2 months up to achievement of desirable result.

Plastic hardening materials name as endohermetics, or sealers. They are divided on some groups:
1. Zincum - phosphate cements
2. Preparations on a basis of Zincum oxidum and eugenol
3. Materials on a basis of epoxid pitches
4. Polymeric materials containing hydroxid calcium
5. Glass ionomer cements
6. Preparations on a basis of Resorcinum formalin admixture
7. Materials on the basis of Calcium phosphas

**Zinc- phosphate cements**
To positive properties of this material carried:
Ease of introduction, low solubility in a fabric liquid, good closing to walls of the canal, X-ray contrasting, antimicrobial activity in first two day. However this material has very serious disadvantages:
- Fast hardening (4-6 minutes) result in impossibility of supplementary filling of the canal in case of necessity;
- The high probability of irritating action on periapical tissues at the expense of the raised(increased) contents in cement mass of a free phosphoric acid (for sealing root canals he gets mixed up of more liquid consistence, than is stipulated by the instruction);
- The material is not dissolved at casual deducing(removing) for an apex of a root;
- Impossibility of removing of cement mass from the canal in case of necessity.

**Preparations on a basis of Zincum oxydum and eugenol.**
Pasta hardens in the canal within 12-24 hours. More often as the additives for improvement of therapeutic effect use antiseptics of short-term and long action, corticosteroids.
Positive properties:
- Are easily entered in the root canal, and if necessary easily leave from the canal;
- X-ray contrasting;
- Optimum time of hardening in the root canal;
- Good closing to walls of root canals;
- Formation in the canal of insoluble mass which is not giving of shrinkage;
- Pasta deduced(removed) for an apex, is dissolved;
- Antiseptic, antiinflammatory action gradually weakening on a measure of hardening of Pastas. Stiffened Pasta in the root canal is biologically neutral.

Negative properties:
- Opportunity of toxic and allergenic action on a tissue of an organism of components of Pasta: eugenol, formic aldehyde.
- Probability of dissolution of Pasta in the root canal;
- Probability of a staining of a crown of a tooth;
- Probability of infringement of process of hardening of a composite at the subsequent filling for the bill of eugenol.

**Materials on a basis of epoxid pitches.**

Hardening of Pasta occurs at temperature of a body within 8-36 hours.
The materials of this group should be applied only in a combination to hard materials - posts.

Positive properties:
- Good manipulating property (plastic, are easily entered in the canal);
- Long time of hardening;
- Inactivity in relation to tissues of a periodontium;
- Stability in the canal, fastness to a moisture;
- termostability, that enables to use these materials at job with hot gutta-percha;
- X-ray contrasting.

Negative properties:
- polymerizating shrinkage (about 2 % on volume);
- Opportunity of infringement regional closing and hermetizm of a root seal at unsufficient drying of the canal;
- Rather high cost.

**Polymeric materials containing of Calcium hydroxidum.**

It is considered, that the medical action of a preparation stops after hardening of Pasta. It is necessary to have in view of, that the gradual washing away well soluble of Calcium hydroxidum results in occurrence of pores in a material and can become the reason of infringement of tightness of a root seal. The materials of this group also should be applied only in a combination with posts. In whole, these materials have the same positive and negative properties, as materials on a basis of epoxid pitches. Features them are:

- Ability to stimulate processes of neogenesis in tissues of parodontium at the expense of medical action of Calcium hydroxidum;
- A little bit large solubility and high probability of washing away of a material from the canal.

**Glass-ionomer cements** for sealing of root canals are characterized by longer time of hardening (1,5-3 hours), higher radiopaque, raised(increased) biological compatibility and stability. They have a chemical adhesion to a dentine, that provides a dense and longevoous obturation of the canal. The high durability of Glass-ionomer cements makes them by more preferable in cases, when it is necessary to strengthen of a thin walls of a root for decrease of danger of its fracture. Other positive properties of Glass-ionomer cements are: good manipulating property, minimal adsorption of a moisture, high biocompatibility, absence of shrinkage.

The basic disadvantage of Glass-ionomer for sealing of root canals - difficulty of deducing(removing) from the root canal in case of necessity. Therefore at use of these materials it is necessary to apply even one gutta-percha post. In case of necessity of removing from the root canal it is necessary to mean, that the branch of a material from walls is promoted by ultrasonic processing of the canal in a combination to Chloroformium.

**Preparations on a basis of Resorcinum - formaldehyde pitch.**

In a basis of preparations of this group Resorcinum - formaldehyde Pasta lays. It prepares "ex tempore" by addition for 2-3 drops of Formalininum of crystalline
Resorcinum before saturation. Then add the catalyst. For reception of Pasta add 
Zincum oxidum.

The materials have the following properties:
- strong antiseptic action;
- a decontamination of contents of dentinal tubules, deltoid branches, rests of a 
pulp in an impassable part of the canal;
- good manipulating property;
- radiopaque;
- a biological neutrality after hardening.

At the same time:
- a high toxicity of components;
- irritating action on a tissue of a periodontium;
- a staining of a crown of a tooth in pink colour.

Therefore preference should be given by ready preparations made factory way and 
having an optimum parity(ratio) of components, and also substances reducing 
danger of occurrence of undesirable by-effects.

**Materials on the basis of Calcii phosphas.**

From the chemical point of view the materials represent of two phosphate bond of 
Calcium: one of an acid nature, another - alkaline. At mixing between these 
substances there is a chemical reaction with formation of hydroxiapatite.

Properties of preparations of this group:
- a good adhesion to walls of the canal;
- low solubility in water, saliva and blood;
- radiopaque same, as well as at a dentine and bone;
- good solubility in strong acids (in case of necessity of erasion of Pasta from 
the canal);
- high biological compatibility.

**Hard materials for filling of root canals.**

The hard materials are fillers. They are applied only in a combination with plastic 
hardening Pastas and serve for filling a lumen of the root canal and rising of
reliability of sealing. This group includes various posts. Depending on a material, of which they are made, the posts may be metal (silver, titanic), plastic, gutta-percha. **Gutta-percha** more than 100 years are used in a stomatology already. Chemically pure(clean) gutta-percha exists in two forms -\(\alpha\) And \(\beta\), which can turn each other. For manufacturing of gutta-percha posts use \(\beta\)-gutta-percha. It has good flexibility and plasticity, low stick and concerning high temperature of melting (+64\(^\circ\)C ). They are made under such prescription:

- \(\beta\)- gutta-percha - about 20 \%
- Zincum oxidum - 60-75 \%
- wax or pitch for maintenance of a pliability and best condensation - 1-4 \%
- Sulfases of metals for radiopaque - 1,5-17,3 \%
- biological stains, antioxidants.

Gutta-percha posts can be basic and auxiliary. Basic (standard) are made in strict conformity with the standards ISO, auxiliary (non-standard) - is shorter, have more expressed pencil-point form and sharped tip. Are designated by the letters depending on thickness: XXF, XF, F, M and L.

Advantages of gutta-percha posts:

- a plasticity;
- absence of toxic and irritating action;
- chemical inactivity;
- radiopaque;
- does not burst, does not give shrinkage;
- provides a long and reliable obturation of the canal.

**Metal posts.**

The silver posts are used already about 50 years. Advantage them is radiopaque. Negative properties - corrosion in liquid conditions with formation toxiferous for tissues of an organism of oxides of silver, discoloration of a tooth after an obturation, impossibility of adaptation to the form of the canal because of hardness, rigid rounded tip, which does not repeat the form of an apical aperture. The silver posts apply to filling of small direct canals with round section. **Titanic** posts are applied
about 20 years. They are not exposed to corrosion, however have all other disadvantages of silver posts. Literature recommended

- Main Sources:
- Additional ones:

3.4 How to work with the literature recommended:

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<td>1. To know groups of materials</td>
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The methodical reference is made by the assistant Fetisova O.L.