

**UKRAINIAN MINISTRY OF HEALTH  
Odessa National Medical University**

**Dentistry Faculty  
Department of therapeutical dentistry**



**APPROVED**

Vice-rector for scientific and pedagogical work

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**GUIDELINES For practical lesson From the academic discipline**

**Approved:**

Meeting of the Department of Therapeutic Dentistry

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## **Practical Lessons**

### **Practical Lesson №1**

**Topic:** Stages of development of the dental and jaw apparatus in the age aspect: prenatal, postnatal. Anatomical and physiological features of the oral cavity and temporo-mandibular joint of a newborn.

Morphological and functional features of a temporary and mixed occlusion. Mixed occlusion, its morphological and functional characteristics.

**Goal:** To master the stages of development TMJ, anatomical and physiological characteristics TMJ child in different age periods. To master the material about the formation of jaw bones in different age aspects. To be able to name the morpho-functional characteristics of temporary, mixed and permanent bite.

**Basic concepts:** student of the Faculty of Dentistry must master the educational material on the stages of development of the PDA, the anatomical and physiological

features of the PDA of a child in different age periods. The student must be able to determine the risk factors for the occurrence of dental-jaw anomalies, taking into account the age of the child.

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.

#### **Plan**

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  1. Embryonic development of the dento-jaw apparatus
  2. Features of the structure of the oral cavity of the newborn
  3. What are the structural features of the temporomandibular joint in a newbornchild?
  4. The act of sucking a newborn
  5. The act of swallowing a newborn
  6. Terms of formation and eruption of milk teeth

**4. Discussion of theoretical issues:** The characteristics of the growth and development of a child largely depend on the properties and characteristics received by her from her parents. But there are some patterns of growth and development that are common to most children. According to the nature and intensity of the changes that occur in the body, it is customary to distribute human development over the appropriate periods. Among the numerous classifications of human ontogenetic development, the most common is the modified classification of M.P. Gundobin. A. Intrauterine stage:

the phase of embryonic development (II-III months);

phase of placental development (from III month to birth)

B. extrauterine stage:

neonatal period (up to 3-4 weeks);

period of infancy (from 3-4 weeks to 12 months);

Preschool (senior nursery) period (from 1 year to 3 years);

preschool period (from 3 to 6 years old);

junior school period (from 7 to 11 years old);

senior school period (from 12 to 17-18 years old) .

After birth, a person's life, according to the WHO classification, is

distributed by age as follows: Newborns - 1-10 days Breast age - 10 days - 1

year; Early childhood - 1-3 years; First childhood - 4-7 years Second childhood -

8-12 years old (boys) 8-11 years old (girls) Adolescence -13-16 (boys), 12-15

(girls) Adolescence -17-21 (boys) , 16-20 (maidens) Mature age I period 22-35 (h),

21-35 (w) II period 36-60 (h), 36-55 (w) Summer age- 61-74 (h) , 56-74 (f) Senile

age -75-90 (h and w) Long-livers - 90 years and older.

L.P. Zubkov and F. Ya. Khoroshilkina (1993) to perform the main tasks of

prevention, 10 periods of the formation of the dentoalveolar system are

determined, taking into account its physiological, morphological and functional changes

I intrauterine development of the embryo and fetus (formation of tissues and organs of the dento-maxillofacial system);

II - from birth to 6 months (before the eruption of the first temporary (milk teeth)

III - from 6 months to 3 years (the formation of a temporary bite)

IV - from 3 to 4.5 years (temporary bite is formed) 5

V - from 4.5 to 6 years (the aging period of the temporary bite)

VI - from 6 to 9 years (the first period of mixed bite)

VII - from 9 to 12 years old (second period of mixed bite)

VIII - from 12 to 15 years old (permanent bite)

IX - from 15 to 21 years (completion of the formation of a permanent bite)

X - from 21 to 40 years old (active function of the dentition);

X and - from 40 or more (decreased function of the dentition).

Since the child is constantly growing and developing and at each age stage of his life appears in a special morphological, physiological and psychological quality, a certain need arises to distinguish a number of periods or stages of development in the process of human ontogenesis. Among the stages of ontogenesis, two are important: intrauterine or antenatal development and postnatal, or childhood. The prenatal period is primarily characterized by morphogenesis, which embodies the organogenesis of various body systems, which is manifested by very sharp and significant changes in the shape and structure of organs with extremely intensive and differentiated growth. The intrauterine stage from the moment of conception to birth lasts an average of 270 days. It is customary to distinguish several periods of intrauterine development:

1. germinal, or the actual embryonic period. It begins from the moment of fertilization of the egg and ends with the implantation of a blastocyte formed in the lining of the uterus. Its duration is 1 week.

- 2 Period of implantation. Lasts about 40 hours, that is, about 2 days. These two periods are sometimes combined, since their medical and biological significance is great. At this time, 50-70% of fertilized eggs do not develop, and teratogenic factors, especially those of the strong group, cause pathology incompatible with the survival of the embryo (aplasia and hypoplasia), or form severe malformations due to chromosomal aberrations or mutant genes.

- 3 Embryonic period. It lasts 5-6 weeks. The embryo feeds from the yolk sac. Its most important feature is the establishment and organogenesis of almost all internal organs of the unborn child. Therefore, the action of teratogenic factors (exogenous and endogenous) causes embryopathies, which are the most severe anatomical and dysplastic malformations. The age of the fetus is from 3 to 7 weeks. considered to be a critical period of development .

- 4 Neo-fetal, or embryo-fetal period. Lasts 2 weeks. When the placenta is formed, it coincides with the end of the formation of most organs (except for the central nervous and endocrine systems). This period is important, since the correct formation of the placenta, and therefore the placental circulation, determines the further intensity of fetal growth.

5. Fetal period. Lasts from 9 months. before birth. It is characterized by the fact that the development of the fetus is provided by hemotrophic nutrition. In the fetal period, there are two sub-periods: early and 6 later. The early fetal period (from the

beginning of 9 weeks to the end of 28 weeks) is characterized by intensive growth and tissue differentiation of fetal organs. The action of unfavorable factors, of course, no longer leads to the formation of structural defects, but it can be manifested by a delay in the growth and differentiation (hypoplasia) of organs or a violation of tissue differentiation (dysplasia). Since the immune system is just beginning to form, the response to infection is expressed by tissue proliferative reactions, which lead to cirrhosis and fibrosis. However, the birth of an immature, premature baby is possible. The totality of fetal changes that occur during this period is called the general term - "early fetopathies".

6. The late fetal period begins after 28 weeks of gestation and continues until the onset of labor. The defeat of the fetus in this period no longer affects the processes of organ formation and tissue differentiation, but can cause premature termination of pregnancy with the birth of a small and functionally immature child. If pregnancy persists, fetal malnutrition (intrauterine malnutrition) or general underdevelopment, that is, insufficient weight and body length of the newborn, may occur. The peculiarity of the damaging effect of the infection in this period is the absolutely definite specificity of the damage, that is, the emergence of an already present infectious process with morphological and clinical signs of the disease characteristic of this type of pathogen. Finally, the late fetal period provides the process of deposition of many nutritional components that cannot be introduced to a child in sufficient quantities with breast milk. Thus, the deposition of calcium, iron, copper and vitamin B12 salts can maintain an infant's nutritional balance for several months. In addition, in the last 10-12 weeks of pregnancy, a high degree of maturity and protection of the functions of the vital organs of the fetus from possible violations of oxygenation and trauma during childbirth is achieved, and the mother's immunoglobulins accumulated during transplacental transmission provide a high level of passive immunity. In the last weeks of pregnancy, the maturation of the "surfactant" is also carried out, which ensures the normal function of the lungs and epithelial tissues of the respiratory and digestive tracts. Therefore, the birth of a child, even with a relatively low degree of prematurity, has a very significant effect on the adaptive capabilities and the risk of a wide variety of diseases. The late fetal sub-period, naturally, passes into the intrapartum stage, which is calculated from the day of the appearance of regular labor pains until the moment of cord ligation. At this time, the occurrence of injuries to the central and peripheral nervous system is possible, creates an immediate threat to life. In addition, severe cases of impaired umbilical circulation or breathing are possible. The conditions for maturation and development are of

exceptional importance, since the nutrition of the body, intensively develops, occurs at the expense of the mother. The embryo, at the same time, develops, and the fetus is very sensitive to adverse (teratogenic) factors that can cause death (abortion, stillbirth), malformations from severe, incompatible with life, in lungs developmental anomalies, as well as functional disorders that may appear immediately after birth or later (sometimes years and decades). In the embryo at the age of 12 days, a small depression of the ectoderm is formed between the anterior cerebral bladder and the heart protrusion, which is called a cavity, or oral fossa. Gradually deepening, the oral fossa reaches the blind end of the anterior intestine from which it is separated by the pharyngeal membrane. The pharyngeal membrane consists of the leaves of the ecto- and endoderm adjacent to each other. At the end of the 3rd week, the pharyngeal membrane ruptures and the anterior intestine begins to connect through the oral fossa with the external environment. At about the same time, two small depressions are formed on the sides of the main section of the embryo - the first and second external, branchial or pharyngeal slits, and by the end of the 1st month, the third and fourth branchial slits appear, which are located caudal to the first two. Between the gaps, due to the growth of the mesenchyme, thickenings are formed, which are called the branchial or pharyngeal arches. The first arch, which is located cranially from the first branchial cleft, is called the jaw. The second arch, which is located between the first and second branchial clefts, is called the sublingual. At the end of the first month, the oral fossa is limited by 5 hills, or cusps. One of them (frontal) is located above the oral fossa, two maxillary ones are on the sides of it, and two mandibular ones are slightly lower than the previous ones. These processes are elements of the first branchial arch.

In the process of further development, the mandibular processes approach and grow together along the midline and form the lower jaw and lower lip. The maxillary processes grow together with the mandibular processes in the lateral regions and form the cheeks and lateral regions of the upper jaw and upper lip; however, they do not reach the midline. The end of the frontal process descends into the space between them, from which the nasal processes depart, I limit the nasal openings, and the middle part of the frontal process forms the nasal septum followed by the incisor bone and the middle part of the upper lip.

Thus, the entire upper part of the face (forehead, eye areas and nose) is formed from the frontal process; lower - of two mandibular. In the middle part of the face, the lateral sections are formed from the maxillary processes, and the entire middle

section from the frontal process. The formation of the face, the fusion of the processes that form it, ends at the seventh week of intrauterine development. Violation of the fusion processes leads to the occurrence of congenital malformations of the face. The development of the oral cavity is associated with the development of the nasal cavity. At first, both cavities are separated from each other by the primary palate. The primary palate is formed by the medial process, which from the side of the oral cavity merged with the maxillary and lateral nasal processes, which go around the bottom of the olfactory fossa. From the tissue of the primary palate are formed: the middle part of the upper lip within the FILTRUM (philtrum) the middle part of the upper jaw, which contains the incisors and the anterior part of the hard palate (intermaxillary incisor bone) Later, at the beginning of the 2nd month of the prenatal period, the final palate develops. It is formed from lamellar outgrowths on the inner surface of the maxillary processes (they are called palatine processes), which grow towards each other and merge along the midline with each other and with the nasal septum, which descends from above. The posterior parts of the palatine processes, which have no connection with the nasal septum, merge to form the soft palate and uvula. In the process of forming the anterior part of the final palate, a part of the primary palate with the palatine papilla is included in it. The palate is separated from the lip and cheeks by a narrow arcuate groove - the primary labial groove. There is such a groove on the lower jaw. From both furrows, an epithelial plate grows into the depth, which is divided into two: external and internal - dental.

Between them, the mesenchyme grows, which forms protrusions - the alveolar process. Thus, the anterior part of the upper lip and upper alveolar process develops from the primary palate. As a result of the splitting of vestibular plastics, the labial groove deepens, and the vestibule of the oral cavity is formed between the lip and cheek on the one hand and the alveolar process on the other. At first, a very wide mouth opening gradually decreases due to the fusion in its lateral parts of the upper and lower lips. At the same time, the cheeks are formed, in which the sebaceous glands can be stored along the fusion line. The tongue comes from the first three branchial arches. At the end of the 4th week of intrauterine life on the oral surface of the first (jaw arch there are three elevations: in the middle there is an unpaired tubercle and on the sides, there are two lateral ridges. They increase in size and merge to form the tip and body of the tongue. Later, from thickenings to the second and partly to the third and branchial arch develops the root of the tongue with the epiglottis. Draining of the root with other parts of the tongue occurs at the 2nd place of drainage, a groove remains, which is called the



terminal (sulcus tenninalis). The muscles of the tongue develop from myotomes. The masseter muscles themselves are formed from the first 10 branchial arch. Development of salivary All glands of the oral cavity are derivatives of stratified squamous epithelium. Previously, everything is in the embryo: the ocular gland is laid (on the fourth week), then - the submandibular (on the sixth week) and sublingual (on the 8-9th week). glands become noticeable in the mucous membrane much later. The formation of the tonsillar apparatus of the pharynx begins at the 3<sup>rd</sup> month of embryonal period. After the completion of the formation of soft tissues, the formation of bone structures begins. The bones of the facial skull, which are directly related to the oral cavity, are integumentary (bones of connective tissue origin). The laying of future jaws begins at a relatively early stage in the formation of a face in a human embryo. For the first time, the anlage of the upper jaw appears in the pre-fetus with a length of 20 mm in the form of a skeletal accumulation of mesenchymal cells. One of the first bones of the facial skull to ossify is the upper jaw. By the end of the 2nd month of intrauterine development, when the growth of the maxillary and frontal processes, which form the middle part of the face, is completed, six ossification nuclei appear in their thickness; mineralization begins with them, first of the palatine processes and lateral sections of the upper jaw, and somewhat later of its central area in the form of an independent incisor bone, which only later grows together with the maxillary bones. The upper jaw refers to the bones that are formed on the basis of the connective tissue, bypassing the stage of cartilage. The development of the lower jaw begins with the formation of bone tissue from several points of ossification located in the tissue adjacent to the Meckel's cartilage. The cartilage itself is reduced, giving way to the body of the lower jaw, and develops. The posterior parts of the jaw, its branches, are formed independently of Meckel's cartilage from the corresponding points of ossification. Ossification of the two halves of the lower jaw ends with their fusion, that is, the lower jaw turns into an odd bone after birth until the end of the first year of life. The alveolar process of the jaw develops from the mesenchyme, which limits the tooth bud. The laying of the alveolar process of the lower jaw occurs at the 3<sup>rd</sup> week of intrauterine development, the upper jaw at the 4<sup>th</sup> week. The growth of the alveolar process with the body of the lower jaw occurs up to 1 month, on the upper jaw - up to the 3<sup>rd</sup> month. With the end of the eruption of teeth, the formation of the alveolar edge also ends, and with the end of the formation of the root, the formation of its base. In the thickness of the forming jaws, the rudiments of teeth are formed and developed. The growth and

formation of the jaws are closely related to the development and eruption of teeth. As described above, the face develops as a result of the fusion of different processes. However, their complete connection does not occur - in the 11th site of their confluence, the mesenchyme of one process is separated from the other by a groove - a zone that has a small number of cells. During development, these grooves are smoothed out, due to which the final configuration of the face is formed.

### *Teeth development.*

The following stages of development of temporary permanent teeth are distinguished: 1. The formation and formation of tooth buds.

2. Differentiation of primordial cells.
3. Histogenesis of dental tissues.
4. Mineralization.
5. Teething.

In the seventh week, when the embryo becomes human-like and the term "embryo" is changed to the term "fetus", a thickening appears along the lower and upper edges of the primary oral cavity: stratified squamous epithelium, which grows into the underlying mesenchyme and forms the dental plate. which grows in depth acquires a vertical position. On its edge, bulbous growths of the epithelium appear, which take the form of caps, they are called enamel organs. In each jaw there are 10 such growths, which correspond to the number of the following temporary teeth. The concave part of the caps is made by mesenchyme, which forms The so-called dental papillae. The mesenchyme that limits each such tooth germ, located in the form of a special layer, which is called the dental bag. The cells of the enamel organ in the process of its development acquire various shapes. The epithelium, which forms the inner surface of the cap (internal epithelium), becomes cylindrical. The outer surface of the cap is covered with small cells of the outer epithelium. Located between the outer and inner layers of the epithelium, the cells acquire a stellate appearance and are called the pulp of the enamel organ. But only those cells that are adjacent to the inner layer of the epithelium remain small, round or oblong, forming an intermediate layer of the enamel organ. The cells of the inner and partially intermediate layers of the organ form enamel and get the name adamantoblasts, or ameloblasts. The papilla gives rise to the development of dentin and pulp. Cement and periodontium develop from the mesenchyme of the dental sac. The deepening of the cap of the enamel organ determines the shape of the tooth. This applies not only to the crown, where the enamel epithelium forms the enamel, but also to the tooth root. In the place of

transition of the inner epithelium to the outer, both layers of the epithelium grow inward and form the so-called Hertwig's vagina, which seems to be a form for the formation of dentin, from which the main part of the tooth root is built. Dentin begins to form at the apex of the papilla even when the bud is small; the enamel of the tooth also develops there. Starting in the area of the apex of the papilla, the formation of the tooth gradually spreads to the lateral regions towards the next apex of the root. Even before the onset of dentin deposition outside of the tooth sac, bone tracts of the future 12 tooth cell are formed. The formation of dental crowns (mineralization) begins with the central incisors at the end of the 5th month of embryonic development, and then - the distally located tooth buds. Since the processes of formation of organic matter of teeth can be assessed only on histological preparations, the development of teeth is judged by the processes of mineralization, which begin a short period of time after the formation of the basic substance of enamel and dentin. It is possible to investigate only using X-ray studies. From the moment of birth until the age of 14-18, significant changes occur in the body, which are due to its growth. In turn, these changes determine the anatomical and physiological characteristics of the growing organism. These features are most pronounced in newborns and infants.

#### FEATURES OF THE STRUCTURE OF THE FACE AND Oral cavity of the NEWBORN

The proportions of the face of a newborn and an adult are different. This is mainly determined by the ratio of the sizes of the cerebral and facial parts of the skull. The chin of the newborn is large and is 1/4 of its body length. The skull of a newborn is

marked by the small size of the facial region compared to the brain. As a result, the facial region hardly protrudes forward. The cerebral part of the skull increases significantly less than the facial one. Another feature of the newborn's skull is the presence of fontanelles. They are located at the intersection of the sutures, where the remains of the connective tissue are preserved. Having them is important as it allows the bones of the skull to move during childbirth. All fontanelles overgrow 2-3 months after birth, except for the frontal (in the second year of life).

Air cavities (maxillary, etc.) in the bones of the skull have not yet developed. Due to the weak development of the muscles, which have not yet begun to function, various muscle tubercles, ridges and lines are poorly expressed. In a newborn, there is a disproportion between the middle and lower part of the face, due to the fact that the height of the bite is provided only by the gingival rollers.

The nose of the newborn is relatively small, the nasal passages are narrow. The

subcutaneous fat layer is located fairly evenly and gives the child's face a characteristic roundness and fullness. In the thickness of the cheeks, there are fatty pads, the so-called Bisha lumps. The fatty layer of the cheeks is an independent bag of the body, which is contained in its own capsule. Both anatomical structures facilitate sucking. The upper lip prevails over the lower lip, forming a lip rung. The lips of the newborn are soft, swollen, proboscis, transversely divided (Pfaundler-Lyushka rollers) with a sucking pad on the upper lip, due to this, the baby tightly covers the nipple.

Deep labio-chin furrow, chin sloping back. Among the factors that contribute to sucking also belongs to the physiological children of retrogenia. At the same time, the distance between the tops of the alveolar processes of the jaws in the sagittal plane reaches 5-7 mm, and the vertical slit is 2.5-2.7 mm, its absence determines the development of a deep bite. The vestibule and floor of the oral cavity are small, transitional folds are poorly expressed. The tongue is big. The upper jaw consists of 2 symmetrical halves, which are combined with a longitudinal seam. During early embryonic development, the intermaxillary bone is located between both parts. Violation of embryonic development at 2 months of pregnancy leads to malformations of the face (crevice defects of the upper lip, alveolar bone, palate). The upper jaw of the newborn is wide and short, and consists mainly of the alveolar ridge, which is located just below the palate. Flat palate with well-defined transverse folds. On average, there are 4-5 pairs of transverse folds in the palate, 2-3 pairs of which extend from the palatine sagittal suture. The transverse folds create a roughness in the mucous membrane and contribute to the retention of the nipple during feeding. Haimor's cavity is only outlined and on the roentgenogram, it looks like an oblong enlightenment. It lies medially relative to the alveolar process. The rudiments of the teeth are located almost under the orbit itself and are separated from it by a thin bone plate. The length of the upper jaw of a newborn reaches 25 mm, width - 32 mm (T.V. Sharova, I. Rogozhnikov, 1991p.).

The lower jaw consists of 2 non-fused halves, which are combined with connective tissue. The alveolar process is better developed than the basal part. This is due to the presence of rudiments of temporary and permanent teeth. F.Ya. Khoroshilkina (1982) provides data according to which the distance from the edge of the gums in a newborn to the lower edge of the jaw is 20.2 mm. The mandibular canal has an almost rectilinear shape and is located close to the edge of the lower jaw. The branch of the lower jaw is almost undeveloped, and the articular process rises above the level of the alveolar process. The angle of the lower jaw averages  $135^{\circ}$  -

140 (EN Zhulev, 1995) (Fig. 27). Each jaw has 18 follicles, including 10 temporary and 8 permanent teeth (6321 + 1236). The rudiments of the permanent teeth on both jaws are located on the labial side, the rudiments of the permanent teeth lie deeper than the temporary ones on the lingual side on the lower jaw and from the palatine on the upper. The gingival membrane is a double crest-shaped fold of the mucous membrane in the frontal area of the upper and lower jaws (Robin-Mazhit fold). It is rich in small papillary tubercles, blood vessels, as a result of which it is able to thicken. The gingival membrane has a large number of elastic fibers. This anatomical formation can be clearly seen immediately after the baby stops sucking during feeding. The sucking function is well developed in an infant. The mother's nipple irritates the reflexogenic zones of the oral cavity. Excitation is transmitted along the afferent fibers of the n.trigeminus, which innervates the oral cavity, to the sucking center in the medulla oblongata. From the center, an impulse along 18 motor fibers (3 nerves: hypoglossal, triple and facial) leads to muscle contraction (sublingual - excites the muscles of the tongue; triple - chewing, lateral pterygoid and buccal muscles; facial - excites the muscles of the lips). Thus, the muscles that push the lower jaw forward are contracted, due to the contraction of the circular muscle of the oral cavity, the nipple is tightly covered by the lips, the tongue presses the nipple to the palate.

*The temporomandibular joint (TMJ) is a complex joint, not only in terms of anatomical structure, but also in function. It belongs to paired, combined, incongruent joints. The temporomandibular joint on both sides (left and right) constitutes a closed circuit, because movement in one joint causes movement in the second. The joint is biaxial, movements in it occur in two directions: horizontal and vertical. The joint consists of the articular head of the lower jaw, the glenoid fossa of the temporal bone, the articular tubercle of the temporal bone, the articular disc, the capsule of the joint (joint capsule) and the articular ligaments. In a newborn child, the structural features of the temporomandibular joint are as follows: - the head of the articular process is almost rounded, has almost the same dimensions (transverse and anteroposterior), its forward inclination is not yet pronounced, the head is covered with a thick layer of fibrous connective tissue; - glenoid fossa, which is a receptacle for the heads of the lower jaw, rounded; it does not have an articular tubercle in front, but posteriorly there is a well-defined articular cone, which limits the movement of the lower jaw towards the middle ear and prevents the pressure of the head on the tympanic part of the middle ear; - the mandibular fossa functions completely, since the lower jaw is displaced distally (the state of physiological babies of retrogeny) - the articular head is located in the*

posterior part of the mandibular fossa; - the thickness of the bone of the arch of the fossa is not much more than 2 mm; - the depth of the mandibular fossa is slightly more than 2 mm; - the intra-articular disc is a soft layer of a rounded shape, concave from below, and convex from above, with barely noticeable sweating from the front and back; - the disc consists mainly of collagen fibers; - there are no villi of the synovial membrane of the joint capsule. Absence of articular tubercle, occipital slope of an underdeveloped branch of the lower jaw, physiological retrogenia, a wide flat fossa, an intra-articular disc and an articular cone are formed, create favorable conditions for the movements of the lower jaw in the sagittal plane, which are necessary for the full flow of the sucking function.

### **5. Topics of reports/abstracts:**

1. How many periods of physiological bite increase exist?
2. What externally facial features characterize an orthognathic bite?
3. What signs characterize the orthognathic bite in the vertical plane?
4. What features characterize the orthognathic bite in the transversal plane?
5. What features characterize orthognathic bite in the sagittal plane?

### **6. Summarizing the information received at the lesson.**

#### **7. List of recommended literature:**

##### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

##### **Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical

Orthodontics. – e-book - 2020 г.

4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.

5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)

6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.

7. RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988

8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

#### **Information resources**

1. Державний Експертний Центр МОЗ України  
<http://www.dec.gov.ua/index.php/ua/>

2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.

3. Національна наукова медична бібліотека України <http://library.gov.ua/>

4. Національна бібліотека України імені В.І. Вернадського  
<http://www.nbuv.gov.ua/>

## Practical Lesson №2

**Topic:** The main etiological factors of the occurrence of dento-alveolar anomalies in childhood. Risk factors and signs of formation of malocclusion at an early age.

**Goal:** student of the Faculty of Dentistry must master the educational material on the stages of development of the PDA, the anatomical and physiological features of the PDA of a child in different age periods. The student should be able to identify risk factors and causes of dental-jaw anomalies, taking into account the age of the child.

**Basic concepts:** in the process of mastering the material, the student must apply his knowledge about the features of the anatomy and physiology of the child's MFO, stages and timing of the development of temporary and permanent teeth. To master the topic, the student must use his knowledge and skills of methods of clinical examination of patients .

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.

### Plan

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  - Parents of a 5-year-old girl complain about a thumb sucking during sleep. What tactics should the doctor choose?
    - To recommend an ulnar fixator
    - Non-removable device for suppression of bad habit
    - Removable device for suppression of bad habit
    - To talk with a child about harm from thumb suction
    - Medical intervention is unnecessary
  - A 15-year-old boy had finished an orthodontic treatment for crowding 2 degree with braces. The doctor didn't extract teeth during treatment. What is the optimal duration of the retentive period?



- A. before eruption of the third molars
- B. Throughout life
- C. Within 2 years
- D. Within 3 years
- E. Within 4 years

3. A 16-year-old boy complains about the presence of temporary teeth. Objectively in the oral cavity: occlusal relationship is orthognathic, on the upper jaw – all teeth are permanent, on the lower – second molars are temporary. X-ray picture shows the absence of permanent second premolars. What is the doctor's tactics?

- A. Leave temporary molars and conduct dispensary observation
- B. Extract temporary molars and remove first permanent molars on the second premolars place
- C. Extract temporary molars and start the prosthetic treatment
- D. Extract temporary molars
- E. Start remineralization therapy to prevent the resorbtion of the roots of temporary molars.

4. Preventive examination of a 6-year-old girl revealed: occlusal disharmony was not found, between frontal teeth there are tremes and diastemas, canine tubera have no signs of physiological wear out. The central line between incisors doesn't match. What is the doctor's tactics?

- A. To remove unworn tubera of canines
- B. To wait for autoregulation
- C. To disconnect occlusion
- D. To administer jaw massage
- E. To make a screw plate for the upper jaw

6. External examination of a 7-year-old child revealed: thickening of nose bridge, semi-open mouth, dry lips. Mouth corners are peeling. Anamnesis data: the child sleeps with open mouth. Examination of oral cavity revealed no changes. What dispensary group will this child fall into?

- A. The second
- B. -
- C. The third
- D. The first
- E. The fourth

7. The 12, 22 teeth of an 8-year-old child are missing. There is not enough space in dentition for them. X-ray picture shows no tooth germs. The 12 tooth of the child's

father is missing and the 22 tooth is conoid. What is the reason for such pathological changes?

- A. Hereditary adentia
- B. Rickets
- C. Extraction of teeth
- D. Caries
- E. Trauma

8. A child is 2,5-year-old. The parents complain about thumb sucking during sleep. What tactics should the doctor choose?

- A. To recommend an ulnar fixator
- B. Non-removable device for suppression of bad habit
- C. Removable device for suppression of bad habit
- D. To talk with a child about harm from thumb suction
- E. Medical intervention is unnecessary

9. Preventive examination of a 5-year-old girl revealed; tubera of temporary teeth have no signs of physiological wear out, there aren't thremas and diasthems on the upper and lower dentures, straight bite. Which of the listed symptoms is a sign of future crowding?

- A. The absence of thremas and diasthems
- B. The straight bite
- C. The unworn tubera of canines
- D. -
- E. Orthognatic bite.

10. External examination of a 7 year-old-child revealed: the distal surfaces of the temporary second molars are situated in vertical plane in one line, the relationship of canine is right. Is this a symptom of?

- A. The risk factor for distal bite formation
- B. The risk factor for mesial bite formation
- C. Formation of deep bite
- D. Formation of cross bite
- E. Formation of open bite

11. A 5-year-old girl with mouth breathing was referred to an orthodontist. She has a bad habit –thumb sucking. What kind of orthodontic appliance can we use in this situation?

- A. myofunctional preorthodontic trainer
- B. Use Schwartz appliance
- C. Frankel type regulator

D. Standard Schonherrs vestibular screen

E. Rudolphs appliance

12. The examination of a 5-year-old child revealed: the upper jaw is narrowed, there is a gothic palate, the skull is berry shaped with deformation of posture. What is the most probable reason of this deformation?

A. rickets

B. bad habits

C. Nasal respiration disorder

D. Infantile swallowing

13. Preventive examination of a 9-year-old girl revealed a broad bridge of nose, narrow nasal passages, half-opened mouth, problems with lip joining, and elongated lower third of face. There is a vertical gap 4-5 mm large from the 53 to the 64 tooth in the frontal region. Relationship of the first permanent molars I class by Engle's classification. The child pronounces hissing sounds indistinctly. Specify the most likely factor of occlusion deformation:

A. Nasal respiration disorder

B. Tongue sucking

C. There is no correct answer

D. Infantile swallowing

E. Tongue parafunction

14. A 5-year-old girl with crossbite was referred to an orthodontist. Objectively: between frontal teeth there are tremes and diastemas, canine tubera have no signs of physiological wear out. The central line between incisors doesn't match. What is the doctor's tactics?

F. To remove unworn tubera of canines

G. To wait for a utoregulation

H. To disconnect occlusion

I. To administer jaw massage

J. To make a screw plate for the upper jaw

15. A 14-year-old girl complains of indistinct pronunciation that developed at the age of 14 after the

acute respiratory viral disease. The examination reveals normal face and normal teeth alignment, occlusal disharmony was not found. Palpation doesn't reveal cleft palate. Uvula doesn't move during pronunciation of sounds, its palpation does not cause gag reflex. What is the reason for indistinct pronunciation of sounds?

A. Paresis of the soft palate and uvula muscles

B. Hypertrophy of lingual tonsil

- C. Deformation of the bite
- D. Adenoid vegetations
- E. Palatal slit

16. Parents of an 8-year-old boy complain about a cosmetic defect, inability to bite off food. The child often suffers from acute viral respiratory infections.

Objectively: chin skewness, mental fold is most evident. The lower lip is everted, superior central incisor lies on it, naso-labial fold is flattened. In the oral cavity: occlusion period is early exfoliation period. The upper jaw is narrowed, there is gothic palate. Frontal teeth have protruded position. Sagittal fissure is 6 mm. In the lateral parts contact of homonymous teeth is present. What is the most probable cause of dentoalveolar deformity?

- A. Pathology of upper airways
- B. Endocrinal diseases
- C. Missing of Caelinskil edge
- D. Untimely sanitation of oral cavity
- E. Gestational toxicosis

18. Patient 12 -year-old. He has been undergoing orthodontic treatment for pseudo prognathia with Engle's fixed appliance for 10 months. What is the optimal duration of the retentive period?

- A. 20 months
- B. 12 months
- C. 6 months
- D. 10 months
- E. 3 months

#### **4. Discussion of theoretical issues:**

The development of dentoalveolar anomalies and deformities is facilitated by various factors, both local and general, but most often this is a combination of several factors. Depending on the mechanism of action, they are divided into three groups:

- hereditary;
- Acting during intrauterine development (antenatal)
- Active after the birth of the child (postnatal).

In addition to inheritance or certain diseases, a child can inherit features of the development of the skull (type of face, size of jaws and their location, number, size, shape of teeth, etc.) from parents or close relatives. the second group of factors leads to the formation of congenital dentoalveolar anomalies and

malformations, the third - acquired dentoalveolar anomalies. The first two groups of factors are not well understood.

Postnatal factors that contribute to the development of dentoalveolar anomalies and deformities include the following:

1. Improper artificial feeding.
2. Prolonged use of the nipple.
3. Diseases of early childhood - (rickets).
4. Disorders in terms of teething.
5. Adentia.
6. Supernumerary teeth. Impacted teeth.
  1. Absolute or relative (individual) macrodentia.
  2. Microdentia.
  3. Dysfunction of the dentition:
    - Sucking;
    - Closing the lips;
    - Breathing;
    - Chewing;
    - Swallowing;
    - Tongue.
  1. 4. Violation of the myodynamic balance of the muscles surrounding the dentition.
  2. 5. Violation of the constitution:  
stoop; lordosis; kyphosis; scoliosis.
  3. Multiple carious destruction of the proximal surfaces of the teeth.
  4. 1. Early loss of temporary or permanent teeth.
  5. 2. Dysfunction or diseases of the TMJ.
  6. 3. Injuries to the maxillofacial region.
  7. 4. Inflammatory and neoplastic diseases of the jaws.
  8. 5. Shortened lips (mainly upper).
  9. 6. Violation of the location and articulation of the tongue.
  10. 7. Anomalies of attachment of soft tissues of the oral cavity (frenum of the lips, tongue, small vestibule of the oral cavity).
  11. Bad habits of sucking on nipples, fingers, lips, tongue, cheeks and foreign objects.
  12. Pathological erasure of hard dental tissues.
  13. Uneven erasure of hard tissues of deciduous teeth.

14. Lack of physiological abrasion of hard tissues of temporary teeth.
15. Incorrect postural reflexes.
16. The presence of adenoid growths.
17. hypertrophy of the palatine tonsils.
18. Diseases of the upper respiratory tract.
19. Surgical interventions in the maxillofacial area.
20. General diseases.
21. Ecological features of the environment.

At this time, the concept of "norm" was based on the concept of "optimal individual norm", that is, the state of morphological, functional and aesthetic balance in the dentition and the facial skeleton as a whole, which is sufficiently guaranteed for a long time, to which it is necessary to strive in the process of orthodontic treatment (Yu.M. Malygin, 1978).

An anomaly (from the Greek. Anomalia) is understood as congenital stable, usually deviations from the normal structure and function characteristic of a given biological species (organ, etc.) do not progress. Deformation is understood as a change in the shape or size of a physical object, which progresses if the action of the force is not terminated. In other words, deformation is progressive, subsequently, changes in the size or shape of the body under the influence of external or internal factors leading to dysfunction.

An abnormal bite is a bite in which there is an abnormal position of individual teeth, deformation of the dental arches or their incorrect ratio.

A pathological bite is considered in which significant morphological abnormalities in the bite lead to persistent violations of function and aesthetics.

V.P. Okushko, in his classification, considers only those types of bad habits that lead to the development of various types of PA and distributes them into 3 groups:

I. Sucking habits (recorded motor reactions):

- 1) the habit of sucking fingers;
- 2) the habit of sucking and biting lips, cheeks, objects;
- 3) the habit of sucking and biting the tongue.

II. Function anomalies (fixed functions that are not flowing correctly):

- 1) violation of the function of chewing; incorrect kovtannya and zwichka vise on the teeth with a tongue;

1) oral type of dichannya.

2) wrong I Yazi kov I articulation me.

1.

2. I. Fixed postotonic reflexes, which determine the incorrect position of body parts at rest:

3. 1) incorrect body posture and poor posture;

4. 2) incorrect position of the lower jaw and tongue at rest. Risk groups for dental disease:

5. 1. Children born to mothers with extragenital pathology (malformations of the cardiovascular system, hypertension, nephropathy, diabetes mellitus, tuberculosis, pregnancy toxicosis, etc.).

6. 2. Children whose parents have a decompensated form of caries (III degree of activity).

3. Babies who were born prematurely. Children who underwent hemolytic disease, pneumonia, purulent-septic diseases, rickets, hypervitaminosis D during birth and during infancy, more than 4 times a year suffer from respiratory diseases

Work with young children begins at the age of 3, determining etiological factors and

preventing the development of dentoalveolar anomalies, this is done by a pediatric dentist and orthodontist.

1. TF Vinogradova proposed to distribute children subject to clinical examination into three groups depending on the number of examinations per year

2. (1 - 2 - 3 times), denoting their ID, PD, PID and five health groups (I3-V3). The composition of health groups was interpreted as follows:

3. Group I - healthy children, rarely get sick.

4. Group II - healthy children with a burdened biological and social history, (often get sick, 4 times a year or more) or have a long-term acute illness, or with the risk of chronic pathology.

Group III - children with chronic diseases or congenital pathology in a state of compensation (with rare and not severe exacerbations, without a pronounced violation of the general condition and well-being), with rare, intercurrent diseases. group - children with chronic diseases and malformations in a state of subcompensation (with frequent exacerbations of the underlying disease, with a violation of the general condition and well-being after an exacerbation) with a prolonged convalescence period after diseases, as well as with pronounced signs of immaturity.

Group I - children suffering from severe chronic diseases, with severe malformations

in the stage of decompensation, that is, with the threat of disability and disabled people.

In choosing the criteria for dividing children into dispensary groups, T.F. Vinogradova does not distinguish risk groups, which are inherently transitional forms between health and compensated pathology. The risk of a dental disease is noted with the letter " P. " NG Snagina (1978) proposed to distribute children with risk factors for dentoalveolar anomalies into two groups, different in the degree of probability of occlusion pathology.

The first group (risk of anomalies - RA) is represented by somoma factors, the presence of which is complicated by a developmental anomaly in a small number of cases, even in the absence of preventive measures:

- 1) anomalies of soft tissue attachment to the alveolar bone;
  - 2) a defect in dental privates when one tooth is removed before the start of root resorption;
  - 3) caries of posterior teeth with destruction of contact surfaces or occlusion surfaces;
  - 4) violation of the timing and sequence of changing temporary teeth; diseases of the organs of vision, which are caused by changes in the shape of the orbit (myopia), often combined with deformation of the lower jaw;
- 1) rickets (in history) and chronic somatic diseases;
  - 2) heredity.

The next group consists of children with such active causes of anomalies, the failure to eliminate which is complicated by developmental deficiencies in most cases. The presence of such factors is called "anomaly transmission" or "readiness state" for the development of an anomaly. Transmitted anomalies are designated as IA and they are as follows:

- 1) violation of the function of chewing;
  - 2) impaired swallowing function;
  - 3) impaired respiratory function;
  - 4) children's bad habits;
- slow erasure of temporary teeth after 4 years, complicated by the block of canine and molar tubercles;
- 1) early, by the time of physiological root resorption, removal (of two or more) adjacent teeth, trauma, surgery and inflammatory diseases that affected the development and growth of jaws and soft tissues;
  - 2) violation of the musculoskeletal system and posture.

There are differences between risk factors and the transmission of anomaly, which is important both for prognosis and for determining the tactics of an orthodontist. At the first, the probability of developing anomalies is low and the



function of the dentist is personal observation with the cooperation of relevant specialists, or without the need for emergency assistance. In the case of others, the development of an anomaly will be mandatory and the dentist's function is to provide active assistance - normalization of impaired functions, elimination of bad habits, teeth grinding, posture correction, preventive dental prosthetics, the appointment of preventive orthodontic appliances, etc.

Since the review of all children and the massive prevention of dentoalveolar anomalies for the orthodontist is difficult. Since the number of orthodontists is 8 times less than that of pediatric dentists, the rest can perform these functions.

Therefore, children with RA and IA are under the supervision of a pediatric dentist, and the orthodontist provides medical examination of children with PA-SHA in the direction of a pediatric dentist, conducts apparatus treatment and preventive dental prosthetics. LB Leporskiy, on the basis of studying the influence of etiological factors on the growth of the face and the formation of bite in children, developed a method for predicting the likelihood of dentoalveolar anomalies. In this case, the following two aspects stand out : Prediction of the likelihood of a dentoalveolar anomaly in a child as a result of the combined action of pathogenetic factors at the time of examination (situational forecast).

1. The prognosis of the development of the dentoalveolar system for a certain time occurs in certain conditions

#### **5. Topics of reports/abstracts:**

1. Causes of dental-jaw anomalies during intrauterine development.
2. The causes of dental-jaw anomalies in the first months after birth.
3. The role of artificial feeding in the occurrence of dento-jaw deformities.
4. Risk factors for dental-jaw anomalies in children during milk bite
5. Risk factors for the occurrence of dento-jaw anomalies in children during the mixed bite
6. The role of mouth breathing on the formation of dental-jaw anomalies and deformities .

#### **6. Summarizing the information received at the lesson.**

#### **7. List of recommended literature:**

##### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.

4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

**Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7. RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

**Information resources**

1. Державний Експертний Центр МОЗ України <http://www.dec.gov.ua/index.php/ua/>
2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського <http://www.nbuv.gov.ua/>

### **Practical Lesson №3**

**Topic:** Psychological training. Peculiarities of working with children. Adaptation to orthodontics devices.

**Goal:** Enhancing the knowledge of students regarding the psychological preparation of a child to orthodontic manipulations. Peculiarities of orthodontic treatment of children with adaptation of children with various syndromes (Down's syndrome, cerebral palsy, etc.) to orthodontics devices

**Basic concepts:** psychological support and contact with the child during orthodontic treatment, features of managing children with different syndromes, adaptation of children to orthodontic devices.

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.

#### **Plan**

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  - Phases of adaptation
  - levels of adaptation
  - characteristic of the physiological level of adaptation
  - characteristic of the psychological level of adaptation
  - characteristics of the social level of adaptation
  - the role of the orthodontist in adapting the patient to orthodontic equipment

#### **4. Discussion of theoretical issues:**

Adaptation in orthodontics is the process of getting used to orthodontic devices or children's prostheses is especially important in early treatment. The issue of adaptation to lamellar prostheses has been raised for a long time. Courland

V. Yu. in 1939 identified three phases of adaptation, which are related to mechanisms cortical inhibition:

- Irritation;
- Partial braking
- Full braking.

The irritation phase manifests itself in the first days of installing the device and characterized by increased salivation in some patients there is a vomiting reflex, impaired diction and discomfort in the amount free space for the tongue.

Partial inhibition appears in the first few days, decreases salivation and partially improved diction.

Complete braking occurs approximately from the 5th to the 33rd day of using the device, in this phase, full habituation takes place - the child feels comfortable and not perceives the device as a foreign body.

I.S. Rubinov studied the second theory, that the process of adaptation does not depend on cortical inhibition, but depends on acquired new reflexes that replace existing old ones.

Psychologists distinguish three levels of adaptation:

- physiological (biological);
- psychological;
- social.

These levels are closely interconnected and influence each other. On for each of these levels, the child needs support from the orthodontist and the child's attitude to treatment and his motivation, experiences and perception.

Objective is related to physiological processes, not conveniences with which a child meets during orthodontic treatment.

The physiological or biological level is characterized by the body's response to the stimulus, in this case to the orthodontic apparatus. The less intensity of pain sensations, the faster the process of getting used to this level. Usually in children with chronic congenital or acquired disease, the adaptation process occurs much later. Exactly the same as and children with syndromes need more time for adaptation and support from others. The child's parents have an important influence on the psychological level of adaptation orthodontist. The doctor needs to convey information to the child in an accessible manner about the treatment process, care for the device, recommendations for the regimen use, motivate her. It is necessary not to forget that in this case ours

the patient is not the child's parents, but the child himself, and pay enough attention to it and support - then adaptation will be easy and fast.

Social level of adaptation. Bullying is common in kindergartens and schools more often, which develops complexes in children and makes them withdrawn. It is important here supporting parents, explaining to the child how to behave correctly in such situations and in some cases the help of a psychologist. disease, the adaptation process occurs much later. Exactly the same as and children with syndromes need more time for adaptation and support from others. The child's parents have an important influence on the psychological level of adaptation orthodontist. The doctor needs to convey information to the child in an accessible manner about the treatment process, care for the device, recommendations for the regimen use, motivate her. It is necessary not to forget that in this case ours the patient is not the child's parents, but the child himself, and pay enough attention to it and support - then adaptation will be easy and fast.

Social level of adaptation. Bullying is common in kindergartens and schools more often, which develops complexes in children and makes them withdrawn. It is important here supporting parents, explaining to the child how to behave correctly in such situations and in some cases the help of a psychologist.

It should be noted that the social environment has a great influence on the child's condition.

Therefore, it is often possible to observe the appearance of a bad habit in children aged 6-8 years, because during this period they go through many changes, the transition from kindergarten to school, change surrounding children, perhaps bullying by classmates - all this is active affects the child's psychological state. Children with congenital and psychiatric syndromes need special attention diseases and orphans.

Each of them needs more time adaptation, possibly more visits for getting used to and finding contact with a doctor, in some cases the help of a psychologist.

## **5. Topics of reports/abstracts:**

1. In what period after installation of the orthodontic apparatus does it appear irritation phase?

A. the first day

B. the first week

C. The first month

2. What is the irritation phase characterized by?

A. increased salivation, impaired diction and discomfort  
B. reduction of salivation and partial improvement of diction.  
C. restoration of the normal amount of saliva secretion and normalization diction

3. What is the phase of partial braking characterized by?

A. increased salivation, impaired diction and discomfort  
B. reduction of salivation and partial improvement of diction.  
C. restoration of the normal amount of saliva secretion and normalization diction

4. What is the phase of full braking characterized by?

A. increased salivation, impaired diction and discomfort  
B. reduction of salivation and partial improvement of diction.  
C. restoration of the normal amount of saliva secretion and normalization diction

5. How many levels of adaptation do psychologists distinguish?

A. 3  
B. 5  
C. 4

## **6. Summarizing the information received at the lesson.**

### **7. List of recommended literature:**

#### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

#### **Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.

3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7. Ramy Ishaq. “The Orthodontic Patient: Examination and Diagnosis”. EC Dental Science 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

#### **Information resources**

1. Державний Експертний Центр МОЗ України <http://www.dec.gov.ua/index.php/ua/>
2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського <http://www.nbuv.gov.ua/>

## Practical Lesson №4

**Topic:** Methods of orthodontic patients treatment. Indications for orthodontic treatment of children. Preventive focus and complexity of orthodontic treatment. The possibility of self-regulation of maxillofacial anomalies. The choice of treatment methods according age and the severity of abnormalities. Dispensary groups. Functional orthodontics.

**Goal:** student of the Faculty of Dentistry must clearly master the basic methods used in the treatment of dental-maxillofacial anomalies and deformities, know the biological, functional method. To be able to carry out preventive measures to prevent the occurrence of orthodontic pathology and draw up a plan for orthodontic treatment.

**Basic concepts:** in the process of mastering the material, the student must apply his knowledge on the periods of development of the ABA histological structure of hard tissues of temporary and permanent teeth, anatomical signs of different groups of temporary and permanent teeth. To be able to determine the group belonging of temporary and permanent teeth.

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.  
**Plan**

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**

1. A teenager applied to an orthodontist complaining about tooth malposition. Objectively: the face is without peculiarities. Occlusion of permanent teeth is present. There are no abnormalities of jaw correlation in three planes. The 23 tooth is vestibularly over the occlusive plane; the space in the dental arch is less than  $\frac{1}{3}$  of crown size. How is it possible to make room for the malpositioned 23 tooth?

- A. To remove the 24 tooth
- B. To enlarge sagittal jaw dimensions



C. To enlarge vertical dimensions

D. To remove the 23 tooth

E. To enlarge transversal jaw dimensions

2. A 12-years-old male patient consulted an orthodontist about disposition of canine. Objectively: the face is symmetric and proportional. In the oral cavity: permanent occlusion, occlusal relationship is orthognathic in the lateral parts, the 13 tooth is located off dentition on the palate, biometric measurements show that the width of the 13 tooth is 11,4 mm, the distance between the 12 and 14 teeth is 4,6 mm, the width of the 14 tooth is 7,6 mm. Suggest the treatment plan:

A. Extract the 14 tooth and move the 13 tooth into its place

B. Extraction of the 14 tooth

C. Move the 13 tooth into its place without bite opening

D. Open the bite and move the 13 tooth into its place

E. No treatment is required

3. Examination of a 13-years-old patient allowed to make a final diagnosis: vestibular position of the 13 and 23 teeth with the total space deficit, narrowing of maxillary dental arch, tortoposition of the 12 and 22 teeth. To eliminate this pathology it was suggested to widen the dental arch and to extract some teeth. What teeth have orthodontic indication for their extraction?

A. First premolars

B. Second premolars

C. First molars

D. Canines

E. Second incisors

4. A 12-years-old patient presents with abnormal position of canine on the upper jaw. The 13 tooth is in the vestibular position, above the occlusal plane. Space between the 14 and the 12 tooth is 6,5 mm. Choose a rational treatment method:

A. Surgical and instrumental

B. Instrumental

C. Surgical and physiotherapeutic

D. Surgical and myogymnastics

E. Instrumental and myogymnastic

5. A 17-years-old patient consulted an orthodontist about improper position of an upper canine. Objectively: permanent occlusion, class I Angles relationship of the first molars, the 13 tooth has vestibular position above the occlusal line, there is a 6,5 mm gap between the 14 and 12 teeth. What period of orthodontic treatment will reduce the time of lidase phonophoresis therapy?

- A. Active period
- B. Preparatory period
- C. Retention period
- D. Passive period
- E. -

6. Parents of a 12-years-old child consulted an orthodontist about improper position of the child's upper teeth. Objectively: the face is narrow, elongated; the developing occlusion is present (temporary second molars). The 13 and 23 teeth are located beyond the dental arch, they deviate to the lips above the occlusal plane, there is a 2,5 mm gap between the 12 and 14 teeth, and a 1,5 mm gap between the 22 and 24 ones, 45 degree rotation the 33 and 43 teeth is present. Choose the most rational method of treatment:

- A. Extraction of the premolars and relocation of the canines
- B. Extraction of temporary premolars and expansion of dental arches
- C. Expansion of dental arches in the region of canine apices
- D. Compact osteotomy and expansion of dental arches
- E. All the answers are wrong

7. A child is 7 years old. He has early transitional dentition. There is overcrowding of the lower front teeth: the 42 and 32 teeth erupted orally with a complete lack of space. Make a plan of treatment:

- A. Serial consecutive extraction by Hotz's method
- B. Extraction of the 41 and 31 teeth
- C. Extraction of the 84 and 74 teeth
- D. Extraction of the 83 and 73 teeth
- E. Extraction of the 42 and 32 teeth

8. Parents with a child 12- years -old complains about the absence of tooth on the upper jaw. In anamnesis: temporary tooth was removed at the age of 4 as a result of injury. Objectively: bite of permanent teeth, the 21 tooth is absent. The gap between 11 and 22 is 4 mm. On the X-ray: 21 is located at an angle of 45 degrees to 11. Choose a rational method of treatment:

- A. Combination treatment method [surgical and apparatus]
- B. Surgical
- C. Physiotherapy
- D. Orthopedic
- E. Hardware

9. A 4-years-old child got a face trauma 2 hours ago. A dentist on duty made a

diagnosis: intrusive luxation of the 61 tooth. What is the tactics of choice?

- A. Extraction of the 61 tooth
- B. Observation
- C. Reposition of the 61 tooth
- D. Splinting of the 61 tooth
- E. Removal of pulp of the 61 tooth

10. Parents of 4-years-old child complains about the defect of the language, the wrong pronunciation of the sound "R". Objectively: the tongue is limited to movements, when pushed forward pushes downward, the lower edge of the tongue bristle is attached to the front of the streaks of the submandibular salivary glands.

The nipple is thin, clear. Specify the terms of surgery:

- A. After the diagnosis is established
- B. After the end of growth of maxillo-facial hips
- C. -
- D. After the formation of a permanent bite
- E. After eruption of permanent molars

#### **4. Discussion of theoretical issues:**

Methods for the treatment of dentoalveolar anomalies are divided into:

- Preventive
- Hardware
- Combined (physiotherapy and surgical methods of intensification)
- Surgical
- Prosthetic

In order to correct malocclusion or anomalies in the position of individual teeth, orthodontists mainly use the apparatus method of treatment. The main method is instrumental, all the rest are auxiliary. Orthodontic appliances are a source of force, applied to the tooth to be moved, and cause a certain tension in the periodontal tissues. There is a corresponding restructuring in all components of the periodontium - tissue of the alveoli, periodontal tissue, tooth cement and gums. Treatment is carried out with the help of special standard devices or devices made by a dental technician, called ortho-dontic devices.

Preventive treatments:

- Basic principles of prevention of dentoalveolar anomalies and deformities in children
- - ensuring the optimal course of pregnancy;
- - ensuring the correct technique of breastfeeding the child, timely introduction of bait, correct artificial feeding using an elastic nipple with a

small opening, the transition to feeding from a spoon, cup, as well as the consumption of solid food from 10-11 months;

- prevention of childhood and infectious diseases;
- elimination of bad habits by conducting sanitary educational work among parents, educators and children;
- normalization of the functions of sucking, swallowing, chewing, breathing;

sanitation of the oral cavity, prevention of caries and its complications;

- elimination of anomalies of the frenulum of the lips and tongue, deepening of the bottom of the oral cavity;
- prevention of inflammatory processes in the maxillofacial region;
- timely removal of milk teeth;
- identification and clinical examination of children with early signs of dentoalveolar anomalies and deformities.

Preventive measures should be taken at all times during the growth and development of the child apparatus first method of treatment

The apparatus method of treatment consists in continuous, fragmentary or alternating pressure on the teeth, alveolar processes and jaws with the help of special mechanical devices called orthodontic appliances . The devices are activated by sliding screws, a spring wire, rubber rings, ligatures or efforts of the chewing or facial muscles, as well as changes in the movements of the lower jaw using occlusal or biting pads, inclined planes, labial pads, cheek shields.

Continuous acting force - pressure on the tooth without a resting phase, as a result of which hyalinization occurs. The forces must be weak. An alternating force is characteristic of the regular onset of the resting phase, due to the fact that the equipment is not worn for a certain time during the day, but bone resorption is currently continuing. Osteoblast activity does not stop after the end of the pressure phase.

The choice of orthodontic treatment is carried out taking into account the patient's age and the severity of the anomaly. During the period of milk and early bite, removable equipment is shown. In case of late changeable and permanent occlusion, it is also possible to use non-removable mechanical devices.

Orthodontic treatment stimulation methods

Stimulation of osteoreparation processes is a set of measures aimed at resorption of bone tissue of the alveolar process and the formation of new layers of bone in places that are not subject to pressure.

The mechanisms of stimulation of the processes of osteoreparation include:

drug therapy, physiotherapy (massage, vacuum, use of various types of currents, magnetic and ultrasonic fields), surgical interventions in the area of the teeth being moved.

#### Surgical treatments

can be used both independently and in combination with the instrumental method for the treatment of tooth-jaw pathology. The main factor accelerating the remodeling of bone tissue is the intensity of enzymatic processes that develop after bone damage.

Surgical methods can be divided into the following groups:

- a) on soft tissues:

- - plastic bridle

- - move the city of attachment of the bridle

- - plastic in the area of the mucous membrane

- - deepening of the vestibule of the oral cavity

- - alignment of the supramental skin fold b) on the teeth and dentition:

- - exposure of the crown of a ratinated tooth

- The separation of I the teeth in,

- removal of supernumerary and individual complete teeth;

c) on the alveolar bone

- compactosteotomy d) on the jaws:

- osteotomy

- osteoctomy

2) a prosthetic treatment method.

If it is impossible to correct dentoalveolar pathology by orthodontic methods, prosthetics are sometimes used according to specific indications in accordance with

age and pathology .

#### Clinical examination in orthodontics

Clinical examination - the system of work of medical institutions in our country ensures the prevention of diseases, their early detection and treatment with systematic observation of patients. It is carried out by district children's dental clinics and in particular by an orthodontist, who is allocated a preventive day a week. Held in organized childcare facilities.

The first stage is registration of all children. Age, gender and general health are taken into account.

The second stage is a specialized examination of each child.

The third stage is their distribution among dispensary groups.

The fourth stage is monitoring patients, sanitizing the oral cavity, conducting hygiene lessons and other mass preventive measures.

The fifth stage is the study of the effectiveness of orthodontic medical examination.

The complex of therapeutic and prophylactic measures planned during the examination of the child is registered in the medical examination card, after which the children are assigned to dispensary groups. Osadchy identified 4 dispensary groups:

The 1st group includes children with correct closure of the lips, normal functioning of the dentoalveolar apparatus and correct bite. These are practically healthy children, they are examined once a year.

The 2nd group includes children with risk factors, that is, with functional disorders of breathing, swallowing, speech, chewing, facial expressions, bad habits, having shortened frenulum of the lips, and a shallow vestibule of the mouth. In such children, it is necessary to eliminate the causes of deviations and create favorable conditions for the normal growth of the jaws and the formation of the bite .

Sanitation of the oral cavity is carried out, methods of combating bad habits, therapeutic myogymnastics, consultation of specialists are recommended: ENT, orthopedist, pediatrician, etc. such children should be supervised by parents and educators, medical personnel of the children's institution. An orthodontist's review is half a year. The 3rd group includes children with mild morphological changes and anomalies in the position of teeth or their groups, changes in the shape of dental arches, malocclusion caused by functional changes. To assist such children, measures are taken to eliminate the cause of the development of violations, including the use of orthodontic appliances. After treatment, observation is carried out once a year.

Up to 4 dispensary groups include children with pronounced changes in the dentition. Impaired breathing, swallowing, speech, biting and chewing food. Such children need specialized help in complex therapeutic measures, leading to the normal function of the dentition and the whole organism. The choice of orthodontic apparatus for the treatment of various dentoalveolar anomalies is carried out taking into account the patient's age and the severity of the anomaly. During the period of milk and early bite, mainly removable equipment is shown. With a late changeable and permanent bite, you can also use non-removable mechanical devices, especially with pronounced anomalies.

## **5. Topics of reports/abstracts:**

1. What dispensary groups do you know?

2. What is the prevention of HSPA & D?
3. What groups can be divided into orthodontic treatment methods?

#### **6. Summarizing the information received at the lesson.**

#### **7. List of recommended literature:**

##### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

##### **Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7. RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

##### **Information resources**

1. Державний Експертний Центр МОЗ України  
<http://www.dec.gov.ua/index.php/ua/>
2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського  
<http://www.nbuv.gov.ua/>



## Practical Lesson №5

**Topic:** Instrumental method. General characteristics of the method. Indications for use in different ages. Classifications of orthodontic devices.

**Goal:** student of the Faculty of Dentistry must clearly learn the principles and become familiar with the mechanism of action of active (mechanical) orthodontic appliances, indications for their use. Explain the age-related features of the structure of hard tissues of teeth, periodontium, alveolar processes, jaw bones, TMJ in children of different veins. The student should be able to form a final diagnosis of an orthodontic patient.

**Basic concepts:** in the process of mastering the material, the student must apply his knowledge about the features of the anatomy and physiology of the child's maxillary area, the stages and timing of the development of temporary and permanent teeth, the morpho-functional characteristics of the temporary, removable and permanent bite, physiological and pathological types of bite, clinical methods of examining children with dental-maxillofacial anomalies and deformities., filling out the medical history, forming a preliminary diagnosis, the role of auxiliary research methods in the differential diagnosis of dental-maxillofacial anomalies.

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.

### Plan

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  1. An 8-year-old child is found to have convex facile profile, forced closing of lips, sagittal gap of 7 mm. Eschler-Bittner's test produces some face improvement. This abnormality can be eliminated by means of Frankel's I type regulator. What is the mechanism of action of this device?
    1. Normalization of labial, buccal and lingual pressure as well as of mandible position
    2. Normalization of upper front teeth position by means of a vestibular bar
    3. Maxillary expansion by means of a screw

4. Inhibition of maxilla growth in the sagittal direction
5. Normalization of mandible position and growth by means of intermandibular traction
2. The therapeutic efficacy of which strength is recommended in orthodontics?
  - A. 17-20 g / cm<sup>2</sup>
  - B. 30-45 g / cm<sup>2</sup>
  - C. 27-40 g / cm<sup>2</sup>
  - D. 65 g / cm<sup>2</sup>
  - E. 3-5 g / cm<sup>2</sup>
3. Patient 12 -years -old was treated in an orthodontist for a false progeny for 10 months using a permanent Engle's arch. What is the optimal duration of the retention period?
  - A. 20 months
  - B. 6 months
  - C. 12 months
  - D. 3 months
  - E. 10 months
4. At examination of children at school, dentist-orthodontic found in some of them the tension of the colonic muscle of the mouth. Which of the following appliances can be used for gymnastics of circular muscle?
  - A. Dass's appliance
  - B. Engl's appliance
  - C. Bryukl's appliance
  - D. Frenkel function controller
  - E. Andresen-Goipl's appliance
5. The orthodontist register is 3.5- years-old child with the thumb sucking and "infantile" type of swallowing. During the examination: bite of temporary teeth; cusps in direct contact. Which prophylactic device is most appropriate in this case?
  - A. Vestibula-oral Kraus's appliance
  - B. Frenkel's functionall appliance
  - C. The standart vestibular Schoncher's appliance
  - D. Bionator Jansen
  - E. Appliance with Rudolf's hinges
6. A 6-years-old child presenting in an orthodontist on a dispensary account is assigned a complex of myogymnastric exercises with a lip balancer. What muscles carries out the effect of prescribed treatment
  - A. The circular muscle of the mouth

- B. The muscles that move the lower jaw aside
  - C. Harsh muscle
  - D. Muscles that raise the lower jaw
  - E. Muscles that open the lower jaw
7. Child 5- years –old has malocclusion and treat with using an appliance with a vestibular bumper. What effects does the vestibular bumper have?
- A. Neutralizes the pressure of the circular muscle of the mouth
  - B. Normalizes swallowing function
  - C. Changes the position of the tongue
  - D. Changes the inclination of the upper frontal teeth
  - E. Stimulates the growth of the lateral areas of the jaw
8. Which elements do the Functionally-guiding appliance includes?:
- A. Sloping plane
  - B. Rubber pull
  - C. Protective shields
  - D. Screws and springs
  - E. Omega-shaped loop
9. The child 4- years- old with oral respiration came to orthodontic. In anamnesis, adenotomy has been postponed. During the examination: bite of temporary teeth; upper incisors cover the lower one correctly; distal surfaces of upper and lower temporary molars are located in one vertical plane. Which prophylactic device is most appropriate for eliminating the oral breathing?
- A. The standard vestibular Schoncher's appliance
  - B. Appliance with Rudolf's loops
  - C. Vestibular-oral Kraus appliance
  - D. Frenkel's functions appliance
  - E. Andresen-Goipl's appliance
10. What is the function of the Coffin's spring?
- A. To expand the upper dentition
  - B. To narrow the upper dentition
  - C. For the fixation of orthodontic equipment
  - D. For the narrowing of the lower dentition
  - E. Spring Coffin's springs not used in orthodontics
11. Girl 13- years-old came to orthodontic with complains about the wrong position of teeth. It is necessary to apply the vestibular arch. What is the acting of it?
- A. Mechanically active

- B. Combined action
- C. Preventive action
- D. Functionally active
- E. Functionally directing

12. The child with a bad habit - biting lower lip came to orthodontic. Which device can you choose to treat a bad habit?

- A. The vestibular shield
- B. Katz's appliance
- C. Bruckle's appliance
- D. Appliance with loops of Rudolf
- E. -

13. After preventive orthodontic examination of 9-years-old child was diagnosed mesial occlusion. The treatment of this pathology involves mechanic appliance.

What working element is applied to correct this pathology?

- A. Screw or spring
- B. Elastics and buccal shields
- C. Occlusal rest seats
- D. Inclined plane
- E. Screw and bite plate

#### **4. Discussion of theoretical issues:**

Apparatus method of treatment

Orthodontic instrumental treatment of dentoalveolar anomalies and deformities includes:

- expansion of dental arches;
- narrowing of dental arches;
- stimulation or growth retardation of the apical base of the jaws
- growth retardation of the entire jaw or a separate area;
- change in the position of incorrectly positioned teeth;
- change in the position of the lower jaw;
- correction of bite height;
- restoration of the impaired function.

Functionally-active orthodontic appliances:

The therapeutic effect is based on a directed change in the dynamic balance between the facial muscles, continuously acts on the dentition in the lingual direction and the tongue, which counteracts this pressure in the vestibular direction.

The devices are used in the period of milk and at the beginning of the first

period of mixed bite.

**The vestibular plates of Kerbitz, Schoncher, Kraus, Muehlemann, Dass, Hinz** are designed to normalize the function of facial muscles. Protect the dentition from the pressure of the lips, cheeks, fingers. Devices with a tongue grate normalize tongue position and prevent excessive pressure on the front teeth. Structural elements - cheek shields, lip pads, vestibular dumbbells, bounding bars for the tongue.

**Dr. Hintz's vestibular plates** are a preventive device for early orthodontic treatment at the age of 3-6 years. With the elimination of bad habits, they prevent the development of soft tissue dysfunctions that cause deformation of the dentition in the milk bite. The vestibular plate is standard, with a bead, with a peak, with a wire shutter .

**Pre-orthodontic Trainer** - corrects myofunctional bad habits and straightens the teeth that erupt.

**The devices proposed by Frenkel** - function regulators - are a removable two-jaw apparatus, the main parts of which are side shields and vestibular pilots. Parts of the apparatus are bound by metal arcs made of elastic wire. Three types of apparatus - the first and the second for the treatment of distal occlusion, the third - for the treatment of medial occlusion .

#### Functional-directional orthodontic appliances

The devices are inclined planes, cushions of the platform, occlusal overlays that move the teeth or the entire lower jaw in the sagittal, transversal or vertical direction.

Fixed devices - Katz crown, Schwarz crown

Removable apparatuses - **Bynin's mouthpiece, Schwarz's plate with an inclined plane, Schwarz's plate with a bite pad or occlusal pads, Katz's plate.** The founder is A.Ya. Katz - believed that the strength of functionally acting apparatus is regulated by periodontal receptors. It can act until a certain point, if it becomes excessive, then pain occurs, and muscle contraction is weakened or stopped. The source of strength is the contracture of the masticatory muscles during the period of contact of the teeth with the inclined plane, the cusp pad or occlusal pads. The dentition is separated, the devices operate intermittently.

Mechanical impact devices

They are characterized by the fact that the strength of their action lies in the design of the apparatus itself and does not depend on the contractile ability of the masticatory muscles.

The source of the force is the active part of the apparatus: elasticity of the

arc, springs, elasticity of rubber traction and ligatures, force developed by the screw.

The intensity of the apparatus is regulated by the doctor, using their active part. The force of pressure or thrust must be individual.

1) Non-removable mechanical-acting devices. Enl proposed vestibular circular arches - stationary, expansive, sliding. These devices were further developed in the arc devices of Herbst, Mershon Simon, Korkhaus-Linde, Stanton. Fixation devices with crowns or rings on non-prepared permanent premolar or molars after orthodontic separation. Angle's devices are called universal, since they can be used to treat various anomalies of the dentoalveolar apparatus.

- **Stationary Angle arch** - used for the vestibular movement of incorrectly positioned front teeth: tying teeth to the arch with ligatures, they move them. The arc is activated by pidgvinchuvannyam nuts and moving the arc forward.

- **Angle's expansive arch** - used to expand the dentition. Depending on the area in which the dentition needs to be expanded, the arch is set accordingly.

- **Angle sliding arch** - used to tilt the front teeth to the palatine or lingual side. The arc is turned into a sliding one: the nuts are removed, and in the area of the canines, medially open hooks are soldered to the arc. After the arc is inserted into the tubes, the hooks are put on rubber rings and secured to the rear end of the tube. The rubber rod displaces the arch distally.

- **Apparatus Ainsworth** - used for uneven expansion of the dentition and elimination of the close location of the incisors.

- **Simon's apparatus** - used to expand the dental arch in the area of perolaria and molars, returning molars around the axis.

- Iershon's apparatus - used to expand the dental arch.

**Apparatus Pozdnyakova** - used to remove teeth from the palatal position. Apparatus consist of crowns fixed to the first permanent molar and palatine on the tooth. A bar from the vestibular side is soldered to the crown on the molar, the second end of which rests on the tooth, which is standing. Hooks are soldered to the crown of the palatine tooth. The apparatus brings into force an elastic ligature applied to the hooks of the moved tooth and the bar.

- **The Eisenberg-Herbst apparatus** is used to move the upper frontal teeth orally, change their inclination and shorten the dental arch in the presence of gaps between the frontal teeth.

- **Vasilenko apparatus** - used to rotate teeth.

1) Removable mechanical impact devices. These include lamellar devices in combination with screws, springs, vestibular arches. Removable devices operate

intermittently, with less force.

- **Kurylenko apparatus** - for moving teeth in the mesiodistal direction.
- **Doroshenko apparatus and Roberts apparatus** - for teeth distalization.

#### Combined action apparatus

They are used for combined pathology, make up 75% of all removable equipment. Functional devices supplemented with active elements - screws, springs, which are used to accelerate the movement of individual teeth .

**The Andersen-Goipl activator** helped to restore the function of closing the mouth,

breathing, chewing, swallowing, activated the chewing muscles and stimulated growth in the mandibular joints.

- **Open Klammt activator, Bimler bite shaper, Balters bionator.**

These devices consist of upper and lower plates connected by a base material. A vestibular arch, springs, a screw can be added to them. The action of the apparatus is based on the reduction of the chewing and mimic muscles and the force of action of mechanical elements. Activators were used mainly at night. The disadvantage of activators is slow action, excludes the possibility of using activators in boys and adults .

Khurgin apparatus is used to treat prognathia and deep bite in the presence of a narrowing of the upper dentition.

- **Apparatus Bruckle** - used for palatal inclination of the anterior teeth of the upper jaw and forced progeny.

- **Bionator Balters.** There are three types of devices:

- the first - to eliminate the narrowing of the dentition, protrusion of the front teeth and deep bite;
- the second - to eliminate open bite;
- the third - to eliminate the mesial occlusion.

Three stages of orthodontic treatment:

And - the stage of displacement of the teeth from its original position;

II - stage is characterized simultaneously by the processes of resorption of the alveoli in places of pressure and the formation of new bone in places of opposite pressure; (This stage is the longest and depends on the patient's psycho-emotional state, the density of the bone structure of the alveoli, the nature of the applied pressure of the orthodontic apparatus). At the second stage, less force is needed to move the same tooth, since the trigger mechanisms have already passed at the first stage, the processes of resorption and new formation of bone tissue of the alveolar process must be maintained at the same level.

In case of insufficient effort, movement will not occur, with excessive effort, the regeneration processes will lag behind. Stimulation of the regeneration processes should be aimed at restoring the bone structure in the places of the alveolar depression on the side of the opposite pressure.

III - the stage of the fixed results of the movement of teeth and restoration of the structure of the bone tissue around the roots of the teeth. At this stage, the process of moving the ZTSBIV has already been completed.

### **5. Topics of reports/abstracts:**

1. Periods of formation of the tooth system, age-related features of the structure of hard tissues of teeth, periodontium, alveolar processes, jaw bones, TMJ in children of different ages;
2. Classification of orthodontic appliances; active (mechanical) elements of orthodontic appliances, their mechanism of action;
3. Fixing elements of removable orthodontic appliances;
4. Boundaries of bases of removable orthodontic appliances for the upper and lower jaw;
5. Basics of designing orthodontic removable devices of mechanical impact, principles of action and indications for the use of removable orthodontic devices of mechanical impact.

### **6. Summarizing the information received at the lesson.**

### **7. List of recommended literature:**

#### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

#### **Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
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7. Ramy Ishaq. “The Orthodontic Patient: Examination and Diagnosis”. EC Dental Science 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

#### **Information resources**

1. Державний Експертний Центр МОЗ України <http://www.dec.gov.ua/index.php/ua/>
2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського <http://www.nbuv.gov.ua/>

## Practical Lesson №6

**Topic:** Surgical methods of treatment

**Goal:** student of the Faculty of Dentistry should explain the types of surgical method for the treatment of dental-maxillary anomalies. To analyze age-related indication for various types of surgical treatment of dento-maxillary anomalies. Classify the main types of abnormal attachment of soft tissues to the jaws, namely: frenulum of the lower lip, tongue, small vestibule of the oral cavity. Analyze the results of the clinical assessment of various types of lip crest, tongue a, vestibule of the mouth. To interpret the features of the clinical manifestations of the short frenulum of the lips, tongue and the small vestibule of the oral cavity

**Basic concepts:** In the process of mastering the material, the student must have knowledge of the mechanisms of growth and development of the facial skeleton and muscles in the age aspect. To depict schematically the types of anomalous attachment of the frenulum of the lips, tongue and small vestibule of the oral cavity, Describe the structural features of the bones of the facial skeleton. To depict schematically the structure of the TMJ in different age periods. Determine the anatomical features of different groups of temporary and permanent teeth

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.

### Plan

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  1. What surgical methods are used in the treatment of orthodontic patients?
  2. Types of surgical interventions within the dentition?
  3. Types of surgical interventions within the alveolar bone?
  4. Types of surgical interventions within the basal parts of the jaws and other parts of the skull ?
- 4. Discussion of theoretical issues:**  
**Surgical methods of orthodontic treatment**

Surgical methods of treatment can be used both independently and in combination with the instrumental method for the treatment of dentoalveolar pathology. The main factor that accelerates the remodeling of bone tissue is the intensity of enzymatic processes that develop after the bone has been cut. With pronounced deformities or anomalies in the development of dental arches, jaws and malocclusion, it is not always possible to cure the patient only by orthodontic methods. In these cases, the surgical method can be auxiliary or leading, which allows you to achieve sustainable results.

### **Tongue frenum plasty**

Limitation of tongue mobility as a result of shortening of its frenum or attachment close to its tip is often the cause of malocclusion. Limited mobility of the tongue makes sucking movements difficult in infants.

Lack of mobility of the tongue can impair the process of swallowing and pronunciation of sounds. Under the influence of a mechanical obstacle in the form of a shortened frenum of the tongue, its atypical movements occur in the process of speech.

With a shortened frenum of the tongue, various options for the child's adaptation to this anomaly arise, characterized by certain types of movements of the tongue, its laying between the dentition during function and at rest. E tee options devices cause the occurrence of typical malocclusions. With a normal bridle in a state of physiological rest, the tip of the tongue is adjacent to the palatal surface of the upper anterior teeth. With a shortened bridle, the tongue does not rise sufficiently, and therefore does not exert the necessary pressure on the upper dentition, does not resist the pressure of the muscles of the lips and cheeks. Under the influence of the lip, the upper incisors can bend in the palatal direction; in this case, a mesial occlusion develops due to flattening of the anterior portion of the upper dentition . The pressure of the sedentary tongue is transferred to the anterior region of the lower jaw and promotes its growth. With limited mobility of the tip of the tongue, the muscles of its root hypertrophy, and can disrupt the passage of the air stream through the nasopharyngeal space. An open bite with a shortened frenum of the tongue can be both in the front and in the lateral parts of the dentition. In the anterior region, it arises as a consequence of the location of the tip of the tongue between the teeth due to the impossibility of raising it to the palatal surface of the upper incisors. In the lateral areas, an open bite develops due to the constant spreading of the tongue between the lateral teeth, preventing them from closing . Anomalies of

the occlusion, developed as a result of dysfunction of the tongue, are distinguished by significant stability.

Early plastic surgery of the frenum of the tongue prevents dysfunctions of wetting, chewing, swallowing, sound pronunciation, as well as the occurrence of dentoalveolar anomalies. Orthodontic treatment of such children is combined with remedial gymnastics. Normalization of the function of the muscles of the tongue contributes to the sustainability of the results of orthodontic treatment. Plasty of the frenum of the tongue in older age and in adults improves its function, helps to normalize the position of the tongue. Moving the frenum of the lip . Low attachment of the frenum of the upper lip is considered to be one of the causes of diastemas in the upper jaw. However, practice shows that, despite the prevalence of this anatomical feature, it is not always combined with diastema. In this regard, the importance of low attachment of the frenum of the upper lip as the main etiological factor of the diastema is not fully confirmed and, therefore, the indications for its surgical movement during the period of temporary occlusion should be limited. To clarify these indications, an X-ray examination of the alveolar process in the area of the roots of the central incisors is recommended. If a narrow strip is found on the radiograph in the anterior part of the median palatine suture between the roots of the upper central incisors, which indicates the absence of bone tissue, then this is a sign of the interweaving of the fibers of the frenum of the upper lip into the median palatine suture, which leads to a diastema. When carrying out this simple surgical intervention, the cross-section of the bridle is not enough; it is necessary to carve its fibers, weave them into the median palatine suture, otherwise the results of the operation will not be satisfactory. Indications for displacement of the insertion site of the frenum of the lower lip are chronic localized gingivitis and periodontal disease. The attachment of the frenum of the lip close to the apex of the interdental papilla, especially on the lower jaw, with a shallow transitional fold of the mucous membrane can contribute to the development of periodontal disease. Due to the tension of the soft tissues during lip function, the gingival margin is pulled away from the incisor necks. The periodontal pockets are formed, the circular tooth ligament is destroyed, tartar deposits appear, the apex of the interalveolar septum is destroyed. The development of periodontal disease in this area can also be facilitated by additional strands of the frenum of the lip, which are usually oblique. In such cases, an operation is recommended to remove additional

strands in order to deepen the transitional fold of the mucous membrane. Usually, violations progress with age, especially with anomalies in the size of the jaws (mandibular micrognathia, reduced size of the mandibular angles), close position of the lower front teeth, poor oral hygiene, chronic diseases, endocrinopathies, etc.

### **Plastic surgery of the vestibule of the oral cavity**

R.Yu. Pakalns considers low such a transitional fold, in which the distance from it to the middle of the gingival edge of the central incisors on the lower jaw with a horizontal arrangement of the lower lip is: less than 5 mm, the average - from 5 to 10 mm, in total - more than 10 mm.

Strongly expressed strands of the mucous membrane are those that attach to the interdental gingival papillae and, when the lips or cheeks are pulled, displace them.

If the vestibule of the oral cavity is shallow and the labial bands are strongly developed, then several longitudinal cuts are made along the tops of the bands. The fibers of the cord are stratified at the junction with the periosteum of the jaw. Check if the mobility of the lower lip has improved, or the vestibule of the oral cavity has deepened. Then the removable shaping orthodontic apparatus is fixed. In the formed vestibule of the oral cavity, tampons with iodoform are left, a pressure bandage is applied. On the 3-4th day, an orthodontic appliance is applied, on the 4-5th day, electrophoresis treatment is supplemented to prevent scarring. Further observation is carried out by a periodontist and an orthodontist; the latter corrects the forming apparatus.

The shallow vestibule of the oral cavity is a local traumatic factor for the gingival margin, contributes to the occurrence of periodontal diseases in the localized area or significantly accelerates their development.

### **Alignment of the supramental sulcus**

It consists in leveling the groove on the alveolar process of the lower jaw by subperiosteal introduction of a bone, cartilaginous or plastic implant. Patients are operated on in a hospital according to a technique developed for plastic surgery.

### **Outcrop crowns Retin IAOD of the tooth**

Impaction are teeth that are in the jaw after the expiration of their normal eruption and in which the formation of roots is completed. Most often, impacted are central incisors, canines, second premolars, third molars, and supernumerary teeth.

Deeply set teeth can remain in the jaw if they do not put pressure on the root of adjacent teeth, do not induce resorption, and do not cause neuralgic pain. When

a impacted tooth is located close to the surface of the alveolar ridge in the direction of eruption, its crown should be exposed and a button, onlay or bracket should be fixed on it for further withdrawal using an orthodontic appliance.

### **Grinding individual teeth**

Selectively polish the hills and approximal surfaces of individual teeth, both temporary and permanent, according to indications for such treatment.

One-step rotation of the tooth along the axis

Simultaneously, one-rooted teeth can be returned to have equal roots. After turning the tooth around the axis and placing it in the dentition

The result is recorded using orthodontic appliances.

### **Dental replantation or transplantation**

The prerequisite for conducting is the presence of sufficient space in the dental arch for the correct installation of the tooth, the possibility of creating a hole for it, taking into account the inclination and location of the roots of adjacent teeth, as well as ensuring correct supercontacts.

### **Removal of individual teeth for orthodontic indications**

It is used as an independent method of treatment, as well as in combination with other methods. To determine the indications for removal, complex diagnostics are performed, including clinical examination of patients, photometry, studies of diagnostic models, dental radiographs, orthopantomograms of the jaws and lateral TRG.

It is advisable to remove individual teeth for orthodontic indications during the period of mixed bite and in the initial period of permanent.

R. Hotz proposed a method of sequential tooth extraction. **Sequential extraction** includes the following activities:

- Removal of temporary canines in case of incorrect eruption of the lateral incisors;
- Removal of the first temporary molars when the primordia of the first premolar approaches the surface of the alveolar process, accelerates eruptions;
- Removal of the first premolars, erupted prematurely, contributes to a change in the location of the primordia of the permanent canines and their correct installation.
- Observation of the eruption of canines and second premolars and their installation in the dentition.

compactosteotomy

The principle of the operation is to remove a compact layer of bone at a

certain length, weaken the resistance of bone tissue to the mechanical effect of orthodontic appliances.

### **Osteotomy and osteoectomy**

These are osteoplastic surgical interventions, which are performed for pronounced deformities of the bite and jaws, where the possibilities of hardware treatment are limited and will not bring a positive result.

### **5. Topics of reports/abstracts:**

Classification of frenulum of lips, tongue?

Types of vestibules of the oral cavity?

Method of serial extraction of individual teeth with Hotz.

Method of corrective removal of temporary molars.

### **6. Summarizing the information received at the lesson.**

### **7. List of recommended literature:**

#### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.
4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

#### **Additional:**

1. Маланчук В.О., Борисенко А.В., Фліс П.С. та ін. Основи стоматології. - Київ: «Медицина», 2009 р.
2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)

6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics

Elsevier Ltd (2019): 138.

7. Ramy Ishaq. “The Orthodontic Patient: Examination and Diagnosis”. EC Dental Science 18.5

(2019): 975-988

8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed.

by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

### **Information resources**

1. Державний Експертний Центр МОЗ України

<http://www.dec.gov.ua/index.php/ua/>

2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.

3. Національна наукова медична бібліотека України <http://library.gov.ua/>

4. Національна бібліотека України імені В.І. Вернадського

<http://www.nbuv.gov.ua/>



## Practical Lesson №7

**Topic:** Prosthetic method of treatment. Peculiarities of retention during early orthodontic treatment

**Goal:** to be able to identify etiological factors and pathogenesis of defects of dentition, to conduct a survey of patients with dentition defects. Be able to make impressions of dentition. Choose the treatment and prevention of this disease.

**Basic concepts:** Children prosthesis prevents functional, morphological and aesthetic violation of the dentition of children and adolescents. Timely and properly conducted prosthetic teeth and jaws in children saves them from cosmetic and functional defects and thus contributes to the full development of occlusion and face of a child.

**Equipment:** cephalometric analysis, plaster models, typodonts, panoramic x-rays.  
**Plan**

- 1. Organizational measures (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).**
- 2. Control of the reference level of knowledge (written work, written test, frontal survey on basic terminology, etc.)**
- 3. Questions (test tasks) to check basic knowledge on the topic of the seminar:**
  1. Preventive examination of a 4,5-year-old child reveals an untimely missing of all the upper molars. The lower incisors contact with the mucous membrane of the palate. What is the tactics of choice?
    1. Fabrication of a removable lamellar prosthesis
    2. Half-yearly examination till cutting of the permanent teeth
    3. Medical intervention is not required
    4. Fabrication of an orthodontic appliance for deep overbite correction
    5. Annual examination till cutting of the permanent teeth
  2. A 10-year-old boy complains about missing teeth. Objectively: the face is symmetrical, disproportional because of shortening of the lower third. In the oral cavity: the 12, 14, 15, 17, 22, 24, 25, 27, 34, 35, 37, 44, 45, 47 teeth are missing. The X-ray picture shows partial adentia and absence of some tooth germs. Choose the most efficient prosthetic device:
    1. Partial removable prosthesis for both jaws

2. Clasp dental prostheses
  3. The defect should be restored by implants
  4. Cantilever dental bridges
  5. Bridge prostheses
3. Mother of a 3-year-old child complained about a total lack of the crown part of the 51 and 61 teeth. What tactics should the doctor choose?
1. Thin-walled cap
  2. Stump tooth
  3. Tooth extraction
  4. Inlay
  5. Metal-ceramic crown
4. An 11-year-old child complains about missing crown of the 12 tooth as a result of a trauma. The tooth root is well treated. What prosthetic construction is indicated for the removing of this defect?
1. Ilina-Marcosians pivot tooth
  2. Bridge-like prosthesis supported by the 13 and 11 teeth
  3. Partial removable replacing prosthesis
  4. Cantilever prosthesis supported by the 11 tooth
  5. Cantilever prosthesis supported by the 13 tooth
5. A 5-year-old child has missing upper molars. The lower incisors are in contact with the mucous membrane of the palate. Specify the doctor's tactics:
1. Fabricate a removable laminar denture
  2. Examine the child once a year until the eruption of permanent teeth
  3. Medical intervention is not needed
  4. Fabricate an orthodontic appliance for the treatment of closed bite
  5. Examine the child every six months until the eruption of permanent teeth
  6. How to prepare the teeth for the thin-walled orthodontic crowns?
    - A. With the elastic
    - B. It is not necessary to conduct
    - C. Volcanic disks
    - D. Separation discs
    - E. Diamond Heads
7. What designs of prosthetics should be chosen at multiple adentia in the early primary bite period?
- A. Partial removable dentures
  - B. Does not require prosthetics
  - C. Complete removable dentures

D. Bone-like prosthetics

E. –

8. Parents of a 5-year-old child complain about the absence of his lower lateral teeth and the slow chewing of food. From anamnesis: milk molars on the lower jaw were removed due to complicated caries at the age of 3. Objectively: the lower third of the face is shortened, and a deep supramental fold is determined. The lower lip is slightly twisted, thickened. All teeth are temporary, absent 85, 84, 74, 75. A distal bite is formed, complicated by the deep. Which of the following methods of treatment is a leading in the first stage?

A. Prosthetics

B. Hardware

C. Surgeon

D. Hardware and Surgeon

E. Biological

9. The parents of a 3.5-year-old girl complain about the child's difficulty of chewing. Objectively: defect of the dental arch on the lower jaw. The manufacture of partial removable prostheses is intended. Specify the term of the replacement of partial removable dentures in the primary period of the bite for Ilyin-Markosyan?

A. 6-8 months

B. Do not need to change the prosthesis to the physiological change in the teeth

C. 4 months

D. 1.5 years

E. 3 years

10. A 5-year-old child's 54,55,64,65 teeth were removed. What causes premature removal of these teeth?

A. Shortening of dental arches

B. There is no true answer

C. Uneven growth of the jaws

D. Extension of dental arches

E. Extension of the jaws.

#### **4. Discussion of theoretical issues:**

Causes of early loos of teeth:

1. Local

- Caries

- Trauma

- periodontal disease

- neoplasms

## 2. Systemic

- genetic defects

- \*Coffin-Lowry syndrome

- \*Papillon-Lefevre syndrome

- \*Juvenile periodontitis and related disorders

- \*Ehlers-Danlos syndrome type VIII

- neoplasms

- \*Najdu-Cheney syndrome (acro-osteolysis syndrome)

- \*Eosinophilic granuloma (Langerhans cell histiocytosis)

- Immune defects

- \*Diabetes mellitus

- \*Inflammatory bowel disease

- \*Neutropenia

- \*Monocyte defects

- \*Interleukin-I abnormalities

- \*HIV Infection and AIDS

- Collagen defects

- \*Ehlers-Danlos syndrome

- Enzyme defects

- \*Acatlasia

- \* Hypophosphatasia

- Acrodynia

Losing a baby tooth too early can cause dental health complications, and should be addressed as soon as possible via an evaluation by an orthodontist. Depending on the age of your child and the location of the prematurely lost tooth or teeth, interceptive orthodontic treatment may be necessary. When baby teeth go missing too early, it can allow the other teeth around them to shift out of position. And because the permanent teeth are guided into their proper positions by the baby teeth as they erupt, misaligned baby teeth can lead to misaligned adult teeth. And misaligned adult teeth require orthodontic intervention to fix. Premature loss of teeth in children may lead to both functional and esthetic problems. Missing teeth in both anterior and posterior regions may cause malfunctions in mastication and proper pronunciation. If the missing teeth are not replaced, further complications may occur, including adjacent tooth migration, loss of alveolar bone, and irregular occlusion. Considering the sensitive nature of children, loss of teeth may cause the development of insecurities and low self esteem problems

Premature loss of deciduous teeth in the frontal area causing delay its growth, a more significant if the loss of teeth occurred in 2-3 years, and less significant if it occurred in 4-5 years. Due to a defect in the baby's dentition occurs lingual harmful habit. At rest the tongue occupies the space between the alveolar crest and lower front teeth. Constant pressure tongue promotes growth delay frontal area of the lower jaw, leading to the formation of an open bite. Tongue pressure on the crown of the lower front teeth in sagittal direction promotes progenia bite. The loss of permanent teeth in the upper jaw in 7-9 years if untreated ends sharp growth retardation frontal area of the upper jaw, teeth shift towards the defect. Normal development of the lower jaw thus contributes overlapping top and formed progenia neutral bite. Temporary loss of incisors in the mandible leads to displacement of canines and incisors, the remaining side of the defect, to the flattening of the frontal area of the lower jaw. The child is formed prognathic neutral bite. The space that appears between the incisors of the upper and lower jaw in the sagittal plane is filled further lower lip, there is a habit of sucking the lower lip, causing the weight of the clinical picture prognathous occlusion increases. Premature loss of lower permanent incisors (usually due to injury) at 7-9 years of age with no orthopedic treatment also may result in the formation of a neutral prognathic bite.

Premature loss of first temporary molar can lead to tilting and moving the temporary canines and second molars temporary side defect. In a dramatic shortage of places to move there first premolar mesial second molars. Mesial temporal movement of the upper molars mesial lead to displacement of the first permanent molar, for this reason, the first permanent molars formed contact characteristic distal occlusion. With the loss of temporary lower first molar mesial displacement and subsequent second temporary molar on the first permanent molars mesial contact possible that promotes mesial bite.

Premature loss of temporary molars on one side ends teeth-alveolar extension on the opposite jaw.

This dramatically deformed occlusal plane.

It should also be noted that the premature loss of temporary molars often complicated by atypical (often vestibular) provisions canines. Because mesial movement of second temporary molars and permanent molars, and hence the flattening of the dental arch in this section, the first permanent molars occupy more mesial position than they should because permanent canine that cut later finds a place in dental vestibular arc and is (usually) or palate (rarely).

Adjusted us is not an exhaustive list of possible violations of bite in the early loss of teeth suggests the importance of prevention and timely treatment.

The early loss of teeth leads not only to the development of deformation bite, but also reduces the function of chewing, promotes speech disorders and occurrence of bad habits, perhaps underdevelopment, flattening the face (with the early loss of permanent incisors), pathological changes in the temporomandibular joint (with multiple loss of molars by lowering the bite, delayed dentition).

Type defect teeth of a child is determined by the classification proposed L.M.Demnerom and V.P.Lepyhynim (1985). According to this classification of dental defects due to early removal of

temporary teeth and changing bite, divided into three groups on the basis of topography, length of the defect and functional disorders.

In Group I - included included defects of the dentition, formed as a result of a premature removal of temporary tooth on one or both sides of the jaw (unilateral, bilateral).

In group II included included defects of dentition in which no two adjacent temporary teeth. The first group includes subgroup II unilateral defects, the second - bilateral.

In Group III defects attributable end, when there are two or more teeth that are located nearby. This group contains two subgroups: the first are unilateral, the second - the final bilateral defects.

This classification is advisable to resort in cases where the loss of teeth is not complicated malocclusions. If the child having significant malocclusion, he (i.e. occlusion) classified as anomalies indication of the nature of the anomaly and topography defect teeth.

Due to dynamic nature of growth in children and adolescents, prosthetic appliances must not hinder development of orofacial system, and must meet adequate esthetic and functional standards. Dental prosthetic appliances in paediatrics must be planned with respect to the special conditions that led to tooth loss or damage. Multi-disciplinary approach is needed, under constant supervision of paediatric dentist and orthodontist, as well as regular checkups with clinical and radiographical examinations.

#### Prevention

Providing your child with proper dental care, including semi-yearly appointments for professional cleanings as well as the tools to brush and floss their teeth, can prevent the periodontal disease than can lead to premature tooth loss. Children who

have diabetes and are at risk for decreasing bone density should undergo preventive care for osteoporosis and osteonecrosis of the jaw if needed; the child's endocrinologist or pediatrician will monitor bone density condition on a regular basis.

Wearing mouthguards, helmets and other protective equipment can prevent facial trauma during sports as well.

Treatment of children with acquired defects dentition and teeth by using prosthesis (group of children who did not come irreversible changes bite) or through orthodontic correction followed by prosthetic bite.

Treating children - an important means of preserving function and preventing deformities bite.

Especially large range of preventive influence prosthesis in the premature loss of teeth in the side area because it prevents abuse of the process of becoming bite height, shortening of the dental arch, the emergence teeth-alveolar elongation and bad habits, horizontal movement of teeth erupted, and intraosseous shift follicles teeth that do not erupted normalizes growth of the jaw bones.

To properly decide on what design of prosthesis indicated for children and adolescents in each case, it is necessary to know how is the growth of the dental arches and when it can be considered complete.

The development of the dental arches and alveolar processes influenced by two factors: first - growth inherent in the body as a whole; second - teething.

In pediatric practice, the following design dentures, tabs, crowns, fixed dentures, removable (partial and full), spacers between teeth and dentures with the function of stimulating growth.

#### **5. Topics of reports/abstracts:**

- The development of the dental arches and alveolar processes
- Prevention methods

#### **6. Summarizing the information received at the lesson.**

#### **7. List of recommended literature:**

##### **Main:**

1. Lectures on the relevant topic.
2. Flis P.S. et al., Orthodontics: a textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation - Kyiv, 2019, 305p.
3. Golovko N.V.-Orthodontics.-Poltava.-2015. - with. 128-132.

4. L. V. Smagliuk Basic course in orthodontics / L. V. Smagliuk, A. E. Karasyunok, A. M. Bilous. – Poltava: Blitz Style, 2019. – P.173-184.

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2. Ravindra Nanda, Flavio Andres Uribe - Atlas of Complex Orthodontics.- Elsevier Health Sciences, 2016, 424 p.
3. Charles J. Burstone, Kwangchul Choy. - The Biomechanical Foundation of Clinical Orthodontics. – e-book - 2020 г.
4. KALEY ANN.- Evidence-Based Orthodontics.- American Medical Publishers.- 2022, 225p.
5. Bhalajhi SI., et al. “Orthodontics: The art and science”. Sixth edition. Arya (Medi) Publication (2015)
6. William R Proffit., et al. “Patient Interaction in Planning”. In: Contemporary Orthodontics Elsevier Ltd (2019): 138.
7. RamyIshaq. “The Orthodontic Patient: Examination and Diagnosis”. EC DentalScience 18.5 (2019): 975-988
8. 3D Diagnosis and Treatment Planning in Orthodontics: An Atlas for the Clinician 1st Edition ed. by Jean-Marc Retrouvey (Editor), Mohamed-Nur Abdallah (Editor) 2021.

**Information resources**

1. Державний Експертний Центр МОЗ України <http://www.dec.gov.ua/index.php/ua/>
2. Laura Mitchell, «An introduction to orthodontics», 2013 – 336 p.
3. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського <http://www.nbuv.gov.ua/>



# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic Dentistry

Guidelines

for practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 2**

**"Dental office. Equipment. The functions**

**And duties of medical personnel "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 28 08 2023

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Subject: Dental office. Equipment. The functions and duties of medical personnel.

2. Relevance of the topic:

Sanitary Rules hardware devices, operating outpatient dental profile institutions, health and personal care staff designed for professionals involved in the design, reconstruction and maintenance of dental health care institutions. Responsibility for compliance with the requirements of these rules rests with the chief physician of institutions and heads of dental offices, offices. In modern conditions of development of market relations, becoming increasingly widespread private dental practice, so knowledge is necessary for each dental practitioners, as the design and construction of new and reconstruction of existing dental clinics, offices, and classrooms should be in accordance with the design assignment, according to the present requirements

Regulation.3.

The aim of lesson:

3.1. Common aims: familiarize students with the requirements of the modern device stomatkabineta.

3.2. Educational aims: the formation of a professional identity; mastery of the principles of medical ethics and deontology; relevant aspects of the legal, psychological, professional liability; ability to locate confidential contact with patients; the ability to convince the patient of the need for and feasibility of further study at a dental pathology;

3.3. Specific objectives:

To Know: the device of dental office modern requirements.

Principles of dental equipment. Types of drills and dental facilities.

3.4. On the basis of theoretical knowledge on the subject to be able pick and place equipment dental office. Determine fault dental devices, Repair the dental devices.

#### 4. Materials for previous independent students' preparation:

#	Subject	To know	To be able
1.	Biophysics, Informatics and medical equipment	Principles of medical equipment, Safety precautions when working with medical equipment.	Identify and eliminate damage to medical equipment
2.	General hygiene	Sanitary norms of lighting, ventilation and water supply dental office	Calculate the number of dental units that can be placed in a given area, to determine the need for their lighting and the amount of ventilation.
3.	Social medicine, management and economy of health	The list of required dental equipment and regulatory documentation.	Maintain inventory records

#### 5. Content of the topic

Design, construction of new and reconstruction of existing dental clinics, offices, surgeries and laboratories shall be carried out in accordance with the design task, meeting the requirements of Sanitary Rules (devices, equipment, operating outpatient clinics dental profile, health and personal care staff). Responsibility for compliance with sanitary and anti-epidemic regime and safety rests with the chief physician of institutions and heads of dental offices, offices, dental laboratories.

Requirements for placement of facilities and apparatus dental clinics, offices, surgeries. Dental clinics, departments, offices are located in separate buildings, standard or, as an exception, in the adapted premises built in buildings, subject to these Rules. Placement in residential buildings dental clinics and offices, having in its composition radiology and physiotherapy units, unacceptable. Dental offices and rooms can be arranged in general clinics, hospitals, sanatoriums schools and other institutions that require the provision of dental care.

Dental offices (therapeutic, surgical, orthopedic, children, orthodontic) should be on the basic dental chair 14 square meters. square meters and 7 sq. m for each additional. In the presence of the additional seats for a universal dental unit area on an extra chair is increased to 10 square meters. m. The height of the cabinet

should be at least 3 m, and a depth in natural light should not exceed 6 m. A set of auxiliary premises and the area (sq. M) in dental offices are determined by capacity (categorical) clinics in accordance with the requirements of the SNP-69-78 "Medical institutions" (Appendix 2).to interior decoration requirements. All used for interior decoration materials should be permitted only from the number for use in construction.

Walls dental surgeries should be smooth, without cracks. All corners and places the connection of walls, ceiling and floor shall be rounded without cornices and ornaments. Wall cabinets and sterilization of surgical dentistry are faced with a height of not less than 1,8 m, and operating, at full height glazed tiles. Above the panel painting produced oil or water-based paints. Wall cabinets Prosthetic Dentistry at the height of the door, painted polyvinyl acetate, oil-based paints.. Above the panel painting produced silicate or glue paints. Ceilings dental surgeries (operating rooms, preoperative, sterilization) are painted water-based, oil-based paints or silicate adhesive in white. The floors in dental offices have rolled PVC flooring material (vinylplast , linoleum) and does not have cracks, which all seams are welded using special burners or high frequency welding. In the offices of Operative Dentistry and operating allowed ceramic tiles. The color of walls and floor in the treatment rooms should be light colored with a reflectance of not less than 40% (light green, ocher). It is advisable to use a neutral light gray color without interfering with the correct shades of color discrimination color of the mucous membranes, skin, blood, teeth (natural and artificial), filling and denture material.

Doors and windows in all the rooms are painted enamel or oil paint in white. Door and window fittings should be smooth, easy to clean. Finishing restorative dentistry offices in connection with the use of amalgam fillings has a series of features: walls and ceilings are plastered classrooms (brick) or overwritten (panel) with the addition of a solution of 5% of the sulfur powder to bind the sorbed mercury vapors in strong connection (sulfurous mercury) are not subjected to desorption and painted water-based or oil-based paints; base floor under the linoleum must be protected against the penetration of mercury in accordance with the requirements of "Sanitary rules of design, equipment, operation and maintenance of production facilities, intended for work with mercury, its compounds and mercury-filled devices" №780-69 (Annex 3) . Plates plasterboard, hardboard, unprotected wood and other porous materials should not be used as a base under the cover; Use plastic tile instead of the web material is not permitted; linoleum flooring should climb on the walls to a height of 5-10 cm and flush with

the wall be stopped; plinth must be internal (under the linoleum).to the equipment dental surgeries requirements.

Equipping dental clinics, offices, classrooms, medical equipment is carried out in accordance with the report card equipment dental institutions. In therapeutic orthopedic and dental offices should be located no more than three, but no more than two surgical chair with obligatory division doctor workplace opaque partitions up to 1.5 m. In the offices with natural light unilateral dental chairs are set in a row along the wall of the light-carrying. To work with amalgam and polymeric materials in the offices of therapeutic and orthopedic dentistry should be a hood that meets the following requirements:

a) in the open working hole 30x60 cm size cupboard autonomous mechanical thrust is to ensure air velocity of at least 0.7 m / s;

b) removal of air should come from all areas of the cabinet;

c) the inner surfaces of the cabinet should be protected from mercury;

g) the floor of the cabinet must have a slope of 1-2 cm per meter toward the chute connected to the vessel for collecting the spilled mercury drops;

d) in the cabinet should be mounted sink tap with a trap for mercury;

e) in the cabinet should be installed a safe-deposit daily stock amalgam, mercury and amalgam utensils for cooking as well as demercurization funds. Amalgamomixer eliminating manual steps in the preparation of silver amalgam, should always be in a fume hood. In areas where the work is done with amalgam, all working furniture should have legs with a minimum height of 20 cm from the floor level to ensure high-quality cleaning and ease demercurisation. Tables for work with mercury should be covered with protected from mercury (vinyl plastic, Relin, linoleum) and have bumpers on the edges that prevent rolling mercury drops to the floor under the work surface tables should be no boxes.

Dental offices must be equipped depending on the power clinic centralized compressed air system, vacuum oxygen. At Water supply to universal dental settings should include valve device to turn off the water supply. Waste water from the sinks of gypsum before descending into the sewers should be exempt from the plaster. Every dental office should be a table for sterile materials and instruments.

In areas of waiting rooms must be set with enamel or porcelain spittoon. In rooms with tiled floors in the workplace must be equipped with wooden decks for legs protection from cooling. Dental clinics, departments, offices should be

provided with first-aid kits with a set of essential drugs for emergency and first aid, as well as disinfectants. Requirements for the microclimate, heating, ventilation of industrial premises dental clinics. On permanent jobs, where doctors are more than 50% of the time or more than two hours continuously (dental offices, the main room), climate parameters are normalized in the following combinations:

Season	Temperature C	humidity, %	Air speed, m/c
Cold and transition (average outdoor temperature is 10 or lower)	18-23	60-40	0,2
the warm (average daily outdoor temperature is 10 and above)	21-25	60-40	0,2

When designing the heating, water and gas supply, ventilation and air-conditioning in buildings dental clinics is necessary to comply with the heads of building codes and regulations for the design of boiler installations, heating networks, hot and cold water, heating, ventilation and air conditioning systems and the relevant chapters of the Building Standards and Regulation II-69-78 "Medical institutions. design Standards should provide hot water heating system in the building of dental clinics. Heat transfer medium central heating system should be water temperature of + 95 ° C. When designing the heating system should provide the ability to control them. Heating devices in the system of central water heating, as a rule, should be cast iron radiators with a smooth surface, allowing easy cleaning, placed just under the windows, except for the corner rooms. In buildings dental clinics, dental offices should provide general exchange ventilation with air change rate Z times per hour stretching and 2 times per hour on the inflow. Inside a "clean" operating should only be dilution ventilation. Whether general dilution ventilation should be:

- Easy to open transoms or window leaves in all areas;
- hoods with mechanical drive for therapeutic and orthopedic offices;

Devices that removes dirt dust, vapors of mercury and other metals, the air should be equipped with appropriate filters to prevent air pollution. Air-conditioning must be provided in the bedrooms, offices and operating prosthetic dentistry.

Requirements for Natural and artificial lighting of industrial premises dental clinics, offices. All areas of dental clinics, departments must have natural lighting. In the newly organized dental clinics windows dental offices should be focused on the northern direction (C, SW, NW) in order to avoid significant differences of brightness in the workplace due to direct sunlight at other kinds of orientation, as well as overheating of premises in summer, especially in the south of the country.

In the northern areas should be targeted basic premises for Crime Prevention of overheating of premises in summer. The existing institutions that have the wrong orientation, in the summer it is recommended to resort to obscure the windows with the help of tents, awnings, blinds and so on. N. Adaptations. Light ratio (the glazed surface of windows to floor area) in all dental offices should be 1: 4-1: 5 and in other production areas - be not less than 1: 8. daylight factor (the percentage of natural light levels in the workplace to the open air at the same time light exposure) on permanent jobs in all dental offices should be at least one and a half percent. When installing dental chairs in the existing offices in two rows with unilateral natural lighting should use artificial light even in the daytime, in the second row of seats, and doctors should periodically change their jobs. All areas of dental clinics, offices should have a general artificial lighting, made fluorescent lamps or incandescent lamps. For general fluorescent lighting in all dental offices are recommended lamps with a spectrum of radiation without distorting color reproduction, for example, type: MDC (fluorescent daylight with the corrected color reproduction) or LHE (fluorescent cold natural light). Type of lamp is indicated in its basement general lighting lamps should be placed so as not to fall into the field of view of working doctor. Envisaged to install fluorescent lamps must be equipped with ballasts with very low noise. The recommended levels of horizontal illuminance of working surfaces, created a common artificial lighting:

Room names	general lighting levels, lux lamps.	
	fluorescent	incandescent
Medical doctors' offices, treatment, handling, basic premises dental laboratories.	500	200

Dental offices, in addition to the general, and must have local lighting in the form of: reflectors with universal dental units in the workplace therapists and orthopedists; Special (preferably shadowless) reflectors for each operating surgeon places; The level of illumination produced by the local source, must not exceed the ambient lighting level more than 10 times, to avoid causing tiresome to the eye doctor readaptation light when looking from different lighting surfaces local and general lighting luminaires shall have adequate protective valve that protects the body of the personnel from the glare of lamps.

## 6. Materials of methodical maintenance of employment.

### 6.1. Setting SELF initial level of knowledge - abilities.

1. Safety instructions when working with electrical equipment.
2. Safety precautions when working with chemicals.

6.2. The information necessary for the formation of knowledge - skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

1. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.3. Approximate card for independent work with literature on the subject "Dental office. Equipment. The functions and duties of medical personnel "

Basic tasks	Instructions	Replies
Learn Sanitary Regulations devices, equipment, operation of outpatient dental profile institutions, health and personal care staff .	Requirements for placement of facilities and apparatus dental clinics, offices, surgeries. to interior decoration requirements. to the equipment dental surgeries requirements. Requirements for the microclimate, heating, ventilation of industrial premises dental clinics. Requirements for Natural and artificial lighting of industrial premises dental clinics, offices.	
Know the different types of dental chairs, plants and industrial complexes	Technical characteristics of the different dental chairs, plants and industrial complexes	

7. Materials for self-control of quality of training

A Question for self-control

1. The basic requirements for placing stomatkabinetov.
2. Requirements for interior decoration stomatkabineta.
3. Describe the equipment and placing stomatkabineta stomatoborudovaniya.
4. What types of dental chairs and describe their purpose and operation.
5. List the types of drills and describe how they work.
6. Safety Regulations for the dentist.

B. Tests for self-control with the standards of the responses.

1. Area is needed for one dental unit is as follows:

A 14 m<sup>2</sup>;

B. 7 m<sup>2</sup>;

C. 10 m<sup>2</sup>;

D. 20 m<sup>2</sup>.

The air temperature in stomakabinete in the cold season and the transition should be as follows:

A. 15-20 ° C.;

B. 18-23 °

C;S. 23-28 ° C.;

D. 28-33 ° C.

3. Relative humidity in dental office in the warm season should be:

A. 40-60%;

B. 50-70%;

C.30-50% ;

D. 30-40%.

4. Walls of dental office should be faced with:

A tile

;B. nitro;

S. latex paint;

D. plastic lining.

5. The rotation speed of pneumatic drills:

A. 10000 rpm;

B. 30000 rpm;

C. 3000 rpm;

D. 300,000 rpm.

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session:

1. Pick and place equipment of dental office.

9. instructional materials for learning professional skills, skills:

9.1. Methods of work at runtime.

№	Basic tasks	Instructions	Replies
1	2	3	4
1	Plan and pick and place the dental equipment	Show cabinet plan and accommodation schematically equipment	

10. Materials for self-mastery of the knowledge and skills provided by the subject.

10.1. Tests of different levels or tests that are part of the bank to the rector's control. The data base of the department.

11. The theme of the next session: Dental handpieces, their structure, working principle. Principles damage remedies.

12. Assignment of UIRS and NIRS on the subject.

1. Draw the plan of dental office.

2. Read the medical device regulations, equipment, operating outpatient clinics dental profile, health and personal care staff to assess compliance with these rules, the basic dental clinic prepare essay on this topic.

Wrote by

Aksinorska O.I.

**Odessa National Medical University**

**Department of Therapeutic Dentistry**

Methodical recommendation for students

Academic discipline "Propaedeutics of therapeutic dentistry"

SECTION 1 "Propaedeutics of therapeutic dentistry"

**Lesson 1 "Introduction to the specialty. Purpose and tasks of preclinical course "**

Course 2 Faculty of Dentistry

Specialty (code name) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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Odessa – 2020

1. Topic of lesson: Introduction to the specialty. Purpose and tasks of preclinical course. - 2 hours

2. Relevance of the topic:

Preventive dentistry - the science of etiology, pathogenesis, clinic, dental disease is the organs and structures of the oral cavity, which can be conservative or combined treatment. Preventive dentistry is closely associated with surgical and prosthetic dentistry is not only a comprehensive approach to the treatment of major dental diseases, but also the effect on the volume of surgical and orthopedic interventions. The more and better cured teeth, the less they are removed, surgeons, orthopedists made even less premature dentures. Dental diseases affect human health, to create the preconditions of infection in the body, which could lead to common diseases. Some general and specific diseases of the body, in turn, manifest themselves in the mouth and that dentistry is intertwined with therapy and other general disciplines.

The relevance of this topic lies in the fact that the students get a clear role in improving the dental knowledge of man, the importance of having high knowledge and skills for the implementation of the main tasks. The objectives of the phantom of the course is precisely the progressive study of restorative dentistry from simple to complex, preclinical development of manual skills and clinical procedures, so as to achieve practical skills in the polyclinic.

3. Classes Aims:

3.1. Common Aims

- To familiarize with the subject of "dentistry", its main sections;
- Learn some basic objectives of the course

3.2. Educational aims:

- Preview of the stages of development of the national dentistry and contribution of Ukrainian scientists to certain problems;
- Learn the basic principles of medical ethics and deontology, patient-friendly

3.3. Practical aims:

- Definition of "dentistry", its relationship with other disciplines.
- The main tasks of the phantom course.
- The concept of ergonomics in dentistry, safety

3.4. On the basis of theoretical knowledge on the subject, the skills of:

- Use dental equipment in classrooms
- Connect and turn off the drill with safety in mind

- Prepare the workplace in terms of ergonomics
- Use dental equipment and instruments
- Be able to carry out preparation of cavities and seal them.

#### 4. Interdisciplinary integration

##### Discipline

To know:

##### 1. Preliminary disciplines to ensure the study of therapeutic dentistry

- Human anatomy

Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.

Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.

- Physiology

The physiological role of saliva against the teeth. Physiological

function of the oral cavity. Determine normogramu blood, conduct functional tests

- Histology and Embryology

Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).

Prepare histological preparations of dental hard tissues and organs of the mouth.

Determine the type of fabric, decipher drugs

##### 2. The following disciplines provided by this discipline

- Surgery

General principles

development of domestic dentistry

Determine the nature, questions of dental ergonomics, technology

security. Determine the nature of the

dental

morbidity.

- Prosthetic dentistry

General principles

development of domestic

dentistry, ergonomics issues, technology

security. Determine the nature of the

dental

morbidity.

##### 3. Internally substantive integration - integration with all topics of preclinical course.

#### 4. Interdisciplinary integration

Discipline	To Know	To be able
1. Preliminary disciplines to ensure the study of therapeutic dentistry		
- Human Anatomy	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.
- Physiology	The physiological role of saliva against the teeth. Physiological organ function полости рта.	Determine the blood count norma, conduct functional tests
Histology and Embryology	Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).	Prepare histological preparations of dental hard tissues and organs of the mouth. Determine the type of fabric, decipher drugs
2. The following disciplines provided by this discipline		
Surgery	General principles development of domestic dentistry Determine the nature, questions of dental ergonomics, technology security.	Determine the nature of the dental morbidity.
Prosthetic dentistry	General principles development of domestic dentistry, ergonomics issues, technology security.	Determine the nature of the dental morbidity.
3. Internally substantive integration - integration with all topics of preclinical course.		

## 5. The content of lessons



Preventive dentistry - it is an independent branch of dentistry, including basic dental diseases - dental disease, periodontal and oral mucosa. Preventive dentistry is the basis of dentistry, since timely treatment of teeth and periodontal tissue diseases contributes to their conservation.

The leading role in restorative dentistry occupy the problems of treatment of caries and its complications, as well as periodontal disease. The bulk of manual preparation therapist dentist connected with mastering by these sections of restorative dentistry. The main objectives of the phantom of the course:

1. To study the anatomic and topographic features of the permanent teeth and milk occlusion.
2. To study the morphological structure, physiological properties of dental tissues.
3. Examine the equipment and the equipment dental surgeries (dental chair, universal dental units). Master the technique works.
4. Examine the Dental tools: forms, functionality, methodology of work, sterilization. To study the structure, the technique of dental handpieces.
5. Master the technique of preparation of cavities.
6. Know the sealing material for stopping teeth: their types, physical and chemical, biological, medicinal properties, the appointment.
7. Master the technique of filling cavities with different localization of all groups of teeth with all kinds of filling materials.
8. Examine the methods and techniques of manipulation in the tooth cavity (endodontic treatment):
  - To study the topography of the cavities of primary and permanent teeth;
  - To learn the endodontic instruments, working equipment;
  - To master the methods of opening and disclosure of cavities of different groups of teeth;
  - Master the technique of instrumental and pharmacological treatment of root canals;
  - To study the properties and methods of preparation of filling materials for root fillings;
  - To learn the methods and master the technique of root canal filling of teeth of different groups.

Solution of these problems is the main content of the course phantom.

## 6. Materials methodological support classes

### 6.1 Materials for self-examination of the original level of knowledge

1. The crystals which make up the main apatite mineral base of the tooth?

- A) Hydroxyapatite
- B) fluorapatite
- B) chlorapatite
- D) carbonate-apatite
- D) phosphopathology

2. What is the electrolyte composition of saliva?

- A) more ions of fluorine, phosphorus and sodium
- B) more phosphorus and sodium ions
- B) more potassium ions and bicarbonate
- F) over calcium ions, potassium smaller
- E) more fluoride ion

3. What is the amino acid composition of the enamel non-collagenous protein?

- A) hydroxyproline, valine, proline
- B) valine, proline, glycine
- B) proline, hydroxyproline, lysine
- D) histidine, lysine, arginine
- D) glycine, lysine, proline

4. What is the arrangement of the fibers is characteristic of mantle dentine?

- A) radial
- B) The net-like
- B) longitudinal
- D) in the form of interlocking beams
- D) circular

5. The pellicle presented enamel?

- A) the accumulation of calcium
- B) fine network of organic fibers
- B) the precipitate formed from saliva
- D) non-structured organic film

D) gingival epithelial cells

6. What is a tooth germ tissue formed tooth enamel?

A) from epithelial tissues forming the inner layer of the enamel organ

B) from mesenchymal dental follicle

B) the front plate half epithelial

D) from epithelial tissues forming outer layer of enamel organ

D) from the mesenchyme of the dental papilla

7. Which cells provide plastic function dentin?

A) ameloblasts

B) normoblasts

B) cementoblasts

D) fibroblasts

D) dentinoblasty

8. What is the arrangement of the fibers is characteristic for dentin?

A) a longitudinal

B) The net-like

B) Circular

D) radial

D) beams successive its direction

6.2 The information necessary for the formation of knowledge, skills can be found in textbooks

Recommended literature:

Basic literature:

7. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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### 6.3. Orienting map for independent work with literature on employment

№	Main aims	Instruction	Replies
1.	To study the basic stages of development of dentistry and tasks that solves modern dentistry.	Call the main sections of therapeutic dentistry, its relationship with other disciplines.	
2.	The main objectives of the phantom course.	Create a list of basic knowledge and practical skills in the course of the phantom.	
3.	Questions of ergonomics and safety.	Examine and record Safety instructions.	

### 7. Materials for self-control of quality of training

#### A - Questions for self-control

1. Preventive dentistry as a science and basic tasks that it solves.
2. Place restorative dentistry among the relevant disciplines.
3. Connection restorative dentistry to biological, medical and other sciences.
4. List the main objectives of the course phantom.
5. Define the term "ergonomics" in dentistry.

6. Identify the main types of practical skills, which must have a student after the phantom course.

8. Instructional materials for learning professional skills, skills

8.1. List of educational practical tasks to be carried out during the practice session.

1. Write handwriting structure "The main sections of restorative dentistry."

2. Create a list of practical skills phantom course.

3. Study the instructions and rewrite the rules of safe work in the classroom in the training room.

4. Bring your workstation to a working state, taking into account safety and ergonomics.

9. instructional materials for learning professional skills, skills

9.1 Method of implementation, stages of implementation

Terms of primary instruction for the health and safety of students on employment protection at the Department of Therapeutic Dentistry ONMedU

Primary briefing conducted by teachers on the first session of the third semester, with each group of students in the workplace in the training room. A review carried out by the group in the first session of each semester on the program of primary instruction in its entirety. The students, missing the first lesson, instruction is carried out individually.

1. General information about the technical process, equipment, and equipment in the workplace.

The main objective of the course studying the preclinical development of techniques and skills of surgical treatment of dental caries and its complications. For two semesters students master the technique of preparation and filling of cavities on phantoms, endodontic treatment of complicated caries, master skills of dental instruments, study filling materials.

Dissection of the cavities is carried out using a rotary cutting tools - hog. Drive hog - electric or pneumatic drill. To transmit rotary motion from the engine to an electric drill are boron sleeves and lugs. Rotational speed burs in electric drills up to 30 000 r / min. Drills are connected to 220V power outlet using the connection cord and plug. Turning conduct foot ballast. Pneumatic prefixes are connected to

the air line, connected with a common compressor. Compressed air at a pressure of 3.5-4 kgf / cm<sup>2</sup> tip turbine rotor rotates at 300 to 000 rev / min. Turning turbine prefixes also held a foot switch.

3. The procedure of preparation for work  
The teacher explains to students the procedure for preparation of the workplace and the equipment for operation. In the workplace, the student should be only the tools and materials needed to carry out work related to the theme of the lesson. Cluttered jobs with foreign objects, personal belongings of the student is not allowed. By visual inspection to make sure the installation efficiency, the integrity of the electrical connections. Inspect and test the safety and serviceability of sockets, plugs, patch cords, grounding. Drills are connected to the network and make sure that it works. On the sleeve is fixed tip. Teacher demonstrates safe techniques and methods of preparation of cavities. Particular attention should be paid to the requirements for electro-prevention. It is strictly forbidden to use electric equipment, which has to be damaged (exposed or broken wires, broken plugs and sockets, etc.), Self-repair is prohibited. It is necessary to recall the rules of aid at electric shock.

## 2. Personal protective equipment in place worker.

To protect against harmful factors working for the dental unit must be in overalls (bathrobe, shower cap), the hair is completely removed under the headdress. To use respiratory protection masks. Body of protecting goggles or shields.

## REGULATIONS

Safe work in the classroom of students in the classroom

1. Prior to entering the training room, students must wear a dressing gown, cap.
2. Each student should work on the job assigned to him. Moving to another place without the permission of the teacher is not allowed.
3. The workplace of the student to keep clean, do not clutter up his foreign objects unnecessary at the moment reagents, materials and devices.
4. It is forbidden to visit the students working in the classroom, by outsiders, as well as the diversion of students with foreign affairs and conversations.
5. Students are not allowed to work in the classroom, in the absence of the teacher, as well as at an inopportune time.

6. It is strictly forbidden to carry out in the classroom any work unrelated to the implementation of a training workshop. Eating and drinking is prohibited in the training room.

7. For the implementation of the work the students can begin only after the briefing on safety and the permission of the teacher.

8. Getting Started necessary:

- Find out the methodology of the workshop.
- Ensure the health of the dental unit by visual inspection.
- Inspect and test the integrity and serviceability of sockets, plugs, patch cords. The use of electrical equipment, bearing visible signs of damage, is strictly prohibited.

- Check the correct installation of the assembly as a whole, performance and serviceability tip sleeves.

- Check that the combined tools, materials and medicines, equipment mentioned in the job description.

9. When working in the training room should be kept quiet, order and cleanliness, to prevent hasty, unreasonable and negligent.

10. The equipment, tools and materials are used only for their intended purpose.

11. The entire volume of practical tasks students perform only under the supervision of a teacher.

12. Works associated with sharp materials, pollination (preparation of cavities, fillings finishing treatment, etc.), usage bright light sources (including seals polymerization) carried out only in the presence of protective equipment: Goggles (shields), face masks (respirators).

13. Working on the dental unit should be no closer than 1 meter to radiators, water pipes.

14. Common devices (amalgamomixer and others) and include only be operated under the supervision of a teacher.

15. Dangerous, strong substances replaced by simulators. Working with them is carried out only laboratory under the supervision of a teacher.

16. Upon completion of the work:

- Switch off the system and disconnect it from the mains.
- Pass technician tools, materials and reagents, phantoms and dummies.



- Wipe the surface with a cloth table and wash your hands.
- 17. The training room can be left with the permission of the teacher.
- 18. If there is any problem in the equipment must immediately inform the teacher.
- 19. It is strictly forbidden to make any self-repair of the equipment.
- 20. At the beginning of each lesson the teacher conducts briefing on safety in the performance of the practical part of the lesson.
- 10. Materials for self-mastery of knowledge and skills
- 10.1 Use the tests at different levels of the cathedral test bank
  
- 11. The topic of the next classes: Dental office. Equipment. The functions and duties of medical personnel.

Wrote by

Aksinorska O.I.

# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic dentistry

Guidelines for practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 3**

**"Types of drills, dental chairs,  
principle of operation. Questions of  
ergonomics and technology  
security"**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 \_\_\_\_\_ 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Subject: Types of drills, dental chairs, operating principles. Questions of ergonomics and safety.

2. Relevance of the topic:

Sanitary Rules hardware devices, operating outpatient dental profile institutions, health and personal care staff designed for professionals involved in the design, reconstruction and maintenance of dental health care institutions. Responsibility for compliance with the requirements of these rules rests with the chief physician of institutions and heads of dental offices, offices. In modern conditions of development of market relations, becoming increasingly widespread private dental practice, so knowledge is necessary for each dental practitioners, as the design and construction of new and reconstruction of existing dental clinics, offices, and classrooms should be in accordance with the design assignment, according to the present requirements Regulation.

3. The purpose of the activity:

3.1. Common aims:

familiarize students with the requirements of the modern device stomatkabineta.

3.2. Educational aims:

the formation of a professional identity;

mastery of the principles of medical ethics and deontology;

relevant aspects of the legal, psychological, professional liability;

ability to locate confidential contact with patients;

the ability to convince the patient of the need for and feasibility of further study at a dental pathology;

3.3. Specific objectives:

To Know:

The device stomatkabineta modern requirements.

Principles of dental equipment.

Types of drills and dental facilities.

3.4. On the basis of theoretical knowledge on the subject

Master the techniques (to be able)

Pick and place equipment in dental office.

Determine fault dental equipment

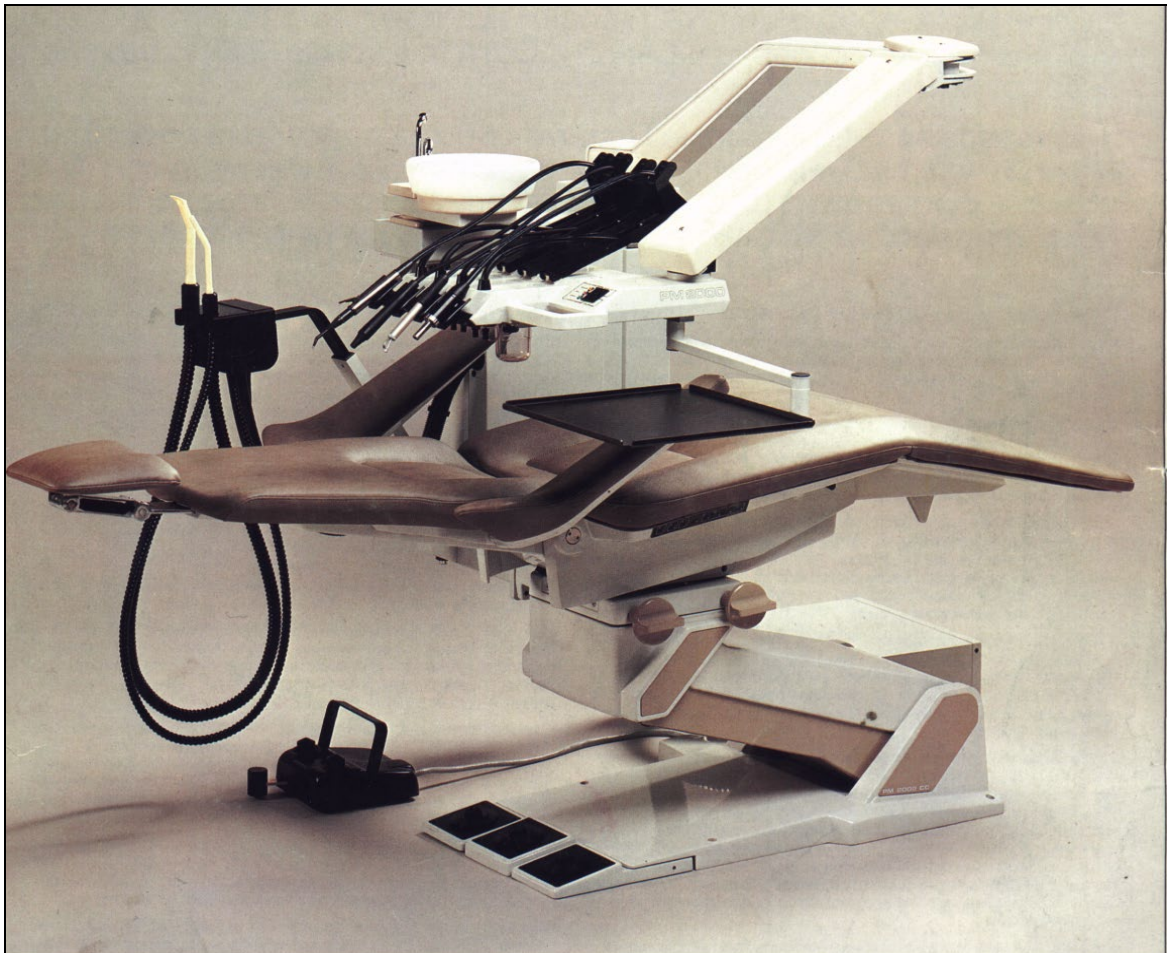
Repair the dental equipment.

4. Materials of previous independent students' preparation:

a. Main basic knowledge, skills, skills that are essential for self-study and assimilation of the topic and which are based on interdisciplinary links:

№	Topic	To Know	To be able
1.	Biophysics, Informatics and medical equipment.	Principles of medical equipment, Safety precautions when working with med/devices	Identify and eliminate damage of medical equipment
2.	General hygiene	Sanitary norms of lighting, ventilation and water supply dental office.	Calculate the number of dental chairs and units that can be placed in a given area. Determine the need for their lighting and the amount of ventilation.
3.	Social Medicine, Management of Economics Health	List of medical devices which are required and their regulatory documentation.	Maintain inventory records

5. Content of the topic:



Dental Unit 2000 As PM

In the design of dental equipment company pays special attention to ergonomics, ie the convenience and efficiency of the dentist and his assistants. The tool consists of a table drill cartridges (modules). All the tools are secured in the drawer, which are easily installed and removed. Advantages cassette drill next can list properties: Order free magazines, which is important for the doctor left-hander. Your doctor or assistant may dismantle the cassette easily.- New tools to easily fit into the cassette.- Any set of cassettes. You can choose instruments from more than twenty cassettes. Cassettes are equipped with a new type of stem "Doriot". The trunk moves the tool very easily and freely without tension, even when the lateral direction. In addition, the barrel "Doriot" noiseless and does not block the light. The barrel of the bridge tool features three joints that provides a wide range of motion. On the console instrumental bridge are signal lamp and switch, by means of which the direction is changed, switched fabric softener spittoon and a glass filled with water. Similar switches have and assistant. Switch to fill cups with water and fabric softener spittoon work on automatically . The bowl - porcelain and can be easily removed for sterilization. Aspirator unit is equipped with an autonomous system with a motor. The motor is in a single cabinet with the

compressor. In aspirator system two hoses, one for the saliva ejector and the second for a powerful suction.

Powerful suction use when operating micromotor and turbine always at work. Self-cleaning capacity of the separator separates from the air and throws it into the North. The aspirator system includes easily removable filter. Fine particles having passed through a filter, eg air in a separate container, the bottom of which vessel is made to granular amalgam. Thus, amalgam does not fall into the sewer and does not pollute the environment. The work of all instruments is governed by a foot pedal. All details of a high-quality coating. ease of maintenance taken into account in installation. Dental Chair PM 2002 CCDental Chair PM 2002 CC - the world's first seat with microprocessors.

All work steps microprocessors. The whole system is very practical. In the chair 12 programs for a single physician or 4 programs to three. Each doctor can easily program the required working positions, such as:- To remove the picture-Mouthwash- For the zero position a new patient- For the removal of teeth-Accumbency- For the treatment of the lower jaw- For the treatment of maxillary-A full horizontal position for surgery and children. Foot switches are turned by 90 °. Switching on produced by a magnetic field. The chair is very reliable in operation thanks to the new semiconductor switching off. Safety devices, sensors, signal - guarantee operational safety. Since the backrest thin "narrow, rugged and ergonomics, the doctor has the freedom of movement in all stages of the work. Compensating backrest pull up not and does not compress the patient's back while moving up and down. The strength of the back is very important in complex and precise operations. The movable headrest seats anatomically correctly performed, and the patient's head is always in a comfortable position. Chair arms raised and the patient is easy to sit down and stand up. The armrests are easy to remove. The upper part of the chair rotates on its axis by 90 ° from right to left. The position on a chair downs till 8 °, if the lever is unlocked

- .- Armchair electromechanical.
- Lifting capacity CPR. 300 kg.
- Height 86 cm, 40 cm lower level.
- All parts of die-cast aluminum frame.
- Upholstery chairs high-quality synthetic leather with microperforations.



Komsta - 13

The scope of "KOMSTA-13" includes: electric drill "ELBOR 3/40", complete with:

two turbine nozzles;

micromotor with direct and angular caps;

tool for removal of tartar; pistol water-air-spray;

in the drill used distilled water from the built-in tank;

The device is light curing "OPTRADENT - 1M";

Compressor oil-free air "Stomaki-1" ("Stomaki-2", "Stomaki-Z");

Hydraulic unit SG-3, comprising: saliva ejector "DENT - 1"; Lamp "UNILYUKS-SSM-28"; water tanks and effluent 5 liter. Electromechanical seat drive (geared motor "Bosch"); foot control chair position; two armrests for easy patient planting; system of clean water. Doctor Unit: Modules for the installation of three instruments : trifunctional gun (water, air, spray); high speed turbine; second turbine or air micromotor. Assistant Unit: spittoon with automatic cup filling function; two automatic saliva ejector; Lighting: shadowless lamp 20 000 lux;



"Prince 2" (manufactured by Olsen)

Armchair patient with anatomical backrest and head restraint; electromechanical drive chair; foot control position of the seat, auto reset to zero; system of clean water. Doctor Unit: Modules for the installation of four instruments: trifunctional gun (water, air, spray); high-speed turbine with fiber optics; air micromotor with direct and angular caps; high-speed turbine. Assistant Unit: spittoon rotated by 90 degrees and automatic filling the cup with water; two automatic saliva ejector; trifunctional gun (water, air, spray); output for the installation of air Skyler. Lighting: Dual Focus (15 000/20 000 lux); automatic return to the zero position lamp. Equipment: Doctor chair; heart monitor.



Fox (producer of R-Dent)

Dental unit with either the top or from the bottom to the suspension bearing chair Tecnodent ECO 19. The main casing doctor unit with the control panel: syringe combination trifunctional Turbine hose type MIDWEST powerful elektromikroengine "Faro" with internal cooling piezoelectric scaler scaler "Faro",



"chip-blow"10-cell unit control blood vacuum cleaner and a vacuum unit  
"Siemens" in the housinghydraulic unit with automatic washing of flushing and  
cup filling Dental halogen lamp STAR VISION



Dental units "Epilux" (manufacturer DS Dental, Denmark)

Epilux1 Sistem - thoroughly thought-out functionality provides a quiet and harmonious work. Everything within reach - up to 6 hanging tools. Comfortable armchair. Table with tools easily accommodated in a comfortable position. Electronics memorized all your preferred adjustment. Switches on the table allow you to activate frequently used processes you: filling water bowl flushing, call assistant, including an aspirator. Upholstery: 14 attractive colors. Table for tools with one or two shelves. Sterilux device instantly assembled and ready for use if required sterile water. For multiple installations, you can use one Sterilux. Holder suction hoses on the table for tools or installing the riser6. Materials of methodical maintenance of employment.

#### 6.1. Setting SELF initial level of knowledge

- To be able:.

1. Safety instructions when working with electrical equipment.
  2. Safety precautions when working with chemicals.
- #### 6.2. The information necessary for the formation of knowledge

- skills can be found in textbooks

## Recommended literature:

### Basic literature:

13. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
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8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.3. Approximate card for independent work with literature on the subject "Dental office. Equipment. The functions and duties of medical personnel "

Main tasks	Instructions	Replies
Learn Sanitary Regulations devices, equipment, operation of outpatient dental profile institutions, health and personal hygiene of staff.	Requirements for placement of facilities and apparatus dental clinics, offices, surgeries. to interior decoration requirements. to the equipment dental surgeries requirements. Requirements for the microclimate, heating, ventilation of industrial premises dental clinics. Requirements for Natural and artificial lighting of industrial premises dental clinics, offices.	
Know the different types of dental chairs, plants and industrial complexes.	Technical characteristics of the different dental chairs, devices and dental unit complexes.	

7. Materials for self-control of training quality

A Question for self-control1.

The basic requirements for placing stomatkabinetov.

2. Requirements for interior decoration stomatkabineta.
3. Describe the equipment and placing stomatkabineta stomatorudovaniya.
4. What types of dental chairs and describe their purpose and operation.
5. List the types of drills and describe how they work.
6. Safety Regulations for the dentist.

Tests for self-control with the standards of the responses.

1. stomatkabineta Area 1 dental unit is as follows:A 14 m<sup>2</sup>;B. 7 m<sup>2</sup>;C. 10 m<sup>2</sup>;D. 20 m<sup>2</sup>.
2. The air temperature in stomatkabinete in the cold season and the transition should be as follows:A. 15-20 ° C.;V. 18-23 ° C;S. 23-28 ° C;D. 28-33 ° C.

3. Relative humidity in stomatkabinete in the warm season should be:A. 40-60%;B. 50-70%;30-50% C;D. 30-40%.

4. Walls stomatkabineta should be faced with:A tile;B. nitro;S. latex paint;D. plastic lining.

5. The rotation speed of boron pneumatic drills:A. 10000 rev / min;V. 30000 rev / min;C. 3000 rev / min;D. 300,000 rev / min.

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session:

1. Pick and place equipment of dental office.

9. instructional materials for learning professional skills, skills:

9.1. Methods of work at runtime.

No	Main tasks	Instructions	Replies
1	2	3	4
1	Pick and place equipment	Make a plan of dentist office with location of devices	

10. Materials for self-mastery of the knowledge and skills provided by the subject.

10.1. Tests of different levels or tests that are part of the bank to the rector's control.

The data base of the department

11. The theme of the next session: Dental handpieces, their structure, working principle. Principles damage remedies.

12. Assignment of UIRS and NIRS on the subject.

1. Draw dental office plan.

2. Read the medical device regulations, equipment, operating outpatient clinics dental profile, health and personal care staff to assess compliance with these rules, the basic dental clinic prepare essay on this topic.

Wrote by

Aksinorska O.I.

# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic dentistry

Guidelines

for practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 4 "Dental handpieces, their structure, work principles.**

**Principles damage removal methods. Sterilization. "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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Topic: Dental handpieces, their structure, work principles.

### Principles and solutions for damage problems

#### 1. Relevance of the topic:

The level and quality of dental care depends on the used dental equipment. The present level of development of scientific and technological progress has given dentists are highly effective, but at the same time, it is difficult arranged dental complexes that require dentists to use different types of dental handpieces. Knowledge devices and principles of modern dental handpieces can improve the efficiency and safety of the dentist, as well as extend the life of the equipment they use. Widespread among the population of infections transmitted by hematogenous (HIV, hepatitis B, etc.), Requires a doctor's knowledge of the principles of aseptic and antiseptic.

Study topics should be done on the basis of theoretical knowledge gained at the Department of Medical Physics and medical equipment and microbiology.

#### 3. The purpose of the lesson

##### 3.1. Common aims:

familiarize students with the unit of dental handpieces.

3.2. Educational aims: the formation of a professional identity; mastery of the principles of medical ethics and deontology; relevant aspects of the legal, psychological, professional liability; ability to locate confidential contact with patients; the ability to convince the patient of the need for and feasibility of further study at a dental pathology;

##### 3.3. Specific objectives:

To Know:

The device of dental handpieces. Principles of dental equipment.

3.4. On the basis of theoretical knowledge on the subject Master the techniques (to be able) Prepare the dental handpieces. Define the problem of dental handpieces Define the problem of dental handpieces Repair the dental handpieces.

#### 4. Materials doauditornoy independent preparation of students:

a. Main basic knowledge, skills that are essential for self-study and assimilation of the topic and which are based on interdisciplinary links:

№	Subject	To know	To be able
1.	Biophysics, Informatics and medical equipment	Principles of medical equipment, Safety precautions when working with medical equipment.	Identify and eliminate damage to medical equipment
2.	Social medicine,	The list of required medical equipment and regulatory	Maintain inventory records

	management and economy of health	documentation.	
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## 5. Content of the topic

### Dental handpieces.

They are used to secure the cutting tools (Burs, drills, disks, etc.) and transfer them to the rotation of the drill, are available in two types: angular and straight angle handpiece. There are different designs: with fixed and swivel head that allows during a comfortable position to give the tip. The head is connected to the tip of the body with the help of gear connections, nut, or secured with a button push lever. Bohr angular swivel head is fixed by a spring or a latch, to move along the tip.

### Sequence of disassembly handpiece:

1. undoing the lock nut, or by pressing the release button (depending on the turning angle of the head), remove the swivel head.
2. From the turning angle of the head is removed, or twisting of the transfer roller unit with crown gear.
3. undoing spring screw fixing burs, remove the spring, and then by removing the nut with a wrench angle head, removed from the pinion shaft housing. Nut angle head has a left-hand thread is always to avoid loosening.
4. Having turned away the glass from the housing assembly is removed from the tiller and bearings.tip assembly in reverse order.

The tip of corner speed NSO-1. Designed for transmission of rotation of the drill at a rate of up to 30,000 rev / min. It consists of angular swivel head which can be fixed nut in different positions, giving the tip shape. Inside tip roller rotates on ball bearings and plain bearings. Through castellated transfer roller gear is in conjunction with a roller. The other end of the transfer roller has a connection to the shaft - the pinion, inside which there is a hole with a protrusion for fixing the output from the turning boron. Latch in the rearmost position fixes from forest loss. After the lead connected to the platen and the transfer roller, the rotation is transmitted from the drill sleeve pinion shaft in which the tool is secured by a latch.



handpiece. It consists of the following components: glass, sliding sleeve, spindle assembly, the collet, pressure sleeve, a push button, the clamping lever, rack transfer roller, a leash, a spring. Dismantling the tip in the following order: unscrewed and removed the glass and sliding sleeve. Firmly fixing the left hand spindle in the longitudinal slots divide the spindle with the rack. Removed from the spindle push button, the push sleeve and collet. By removing the spring from the transfer roller, it is removed from the sliding sleeve. Node clips recorded with a lead pin and therefore, if the specified node is not a problem, it remains unparsed.

Assembling tips in reverse order on the ferrule assembly with a leash put on the outside of the sliding sleeve, and put the transfer roller spring. The spindle is inserted into the collet, the sleeve is pressed, the push button and fixing the spindle in the longitudinal slot by a rack, is connected to the transfer roller assembly. The assembly is inserted into the nozzle body, wear the sliding sleeve and wrapped glass. The tip of the line high-speed NP-10. It consists of a housing, locking latches boron, glass, fixing the tip to the sleeve of a drill, a leash, transmitting the rotation of the sleeve of a drill at a speed of up to 30 000 r / min. to the forest. Microengine and lugs to it is a collector DC motor type PDM-25 with a diameter of 25mm and a length of 45.5 mm, weighing 120 g with a nominal frequency of rotation 9000 rev / min. Turbine handpieces in which by means of compressed air supplied from the compressor, boron rotation speed is reached up to 300 000-500 000 rev / min.

The turbine is connected to the tip of the drill through a rubber hose having a mouthpiece at the end with two holes: one for air and one for water, they include the corresponding tip of the tube. At the tip of the head is placed a miniature air turbine frontal action, rotating in two ball bearings, lubricated with oil mist is carried out automatically generated nipple located in the drill The turbine includes a rotor that rotates on two ball bearings which are inserted in a head tip performing the role of the turbine cone. At the wheel of the working rotor blades at a certain angle, two slotted nozzle directed. Air pressurized to 3.5 g / cm<sup>2</sup> exits the nozzle causes the impeller to rotate at high speed over 250 000 rev/ min. The rotor shaft cavity screwed plastic sleeve with a hole for boron, which is held by elasticity and its factional qualities.

In the lower portion of the head two drilled holes with a diameter of 0.25 mm for the exit of the cooled mixture on a working turbine part in the inserted boron. Compressed air is supplied to the turbine from the compressor located inside the drill, to the tip on the rubber hose in a silk sheath, inside which is laid PVC pipe with a diameter of 3 mm, which were committed to the forest and the tooth

coolant mixture. The hose with one end connected to the mixer, the second end of the mouthpiece terminates with a cap nut. The turbine is connected to the tip of the mouthpiece. In the end part of his two holes of different diameters, which are connected with two tubes at the tip, and the union nut firmly presses the tip of the mouthpiece. The diameter used burs and heads must not exceed 4 mm.

## 6. Materials of methodical maintenance of employment.

### 6.1. Setting SELF initial level of knowledge - abilities.

1. 1. Name, which consists of dental complex.
2. Safety when working with electrical appliances.
3. Safety precautions when working with rotating tools.
4. Principles of aseptic and antiseptic.

6.2. The information necessary for the formation of knowledge - skills can be found in textbooks:

#### Recommended literature:

#### Basic literature:

19. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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24. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

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9. Tronstad L. Clinical endodontics. – Thime: Stuttgart ect., 1991. – 237 p.
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-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

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[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.3. Approximate card for students' self work with literature on the subject "Modern handpieces , their structure, principles of operation. Principles of damage, methods of repair "

<b>Basic tasks</b>	<b>Instructions</b>	<b>ОТВЕТЫ</b>
List the types of dental handpieces	Look at text	
Explain the principles of handpieces work	Look at text	

7. Materials for self-control of quality of training

A Question for self-control

1. List the types of dental handpieces.
2. Explain the principles of the tips.
3. The device handpiece.
4. The device handpiece.
5. Apparatus turbine handpiece

B. Tests for self-control with the standards of the responses.

1. The rotation speed handpiece burs in:

- A. 5000 - 10000 rev / min.+
- B. To 30,000 rev / min.
- C. 300,000 - 500,000 rev / min.
- D. 1000 - 3000 rev / min.
- E. Prior to 30000 rev / s

.2. The rotation speed of elections in the angular tip:

- + A. 5000 - 10000 rev / min.
- B. To 30 000 rev / min.
- C. 300 000 - 500 000 rev / min.
- D. 1000 - 3000 rev / min.
- E. To 30 000 rev / sec.

3. Rotation speed handpiece burs in:

A. 5000 - 10000 rev / min.

B. Up to 30,000 rev / min.

+ C. 300 000 - 500 000 rev / min.

D. 1000 - 3000 rev / min.

E. To 30 000 rev / sec.

B - tasks for self-control.

1. A patient 34 years appealed to the clinic with complaints of a cavity in the tooth 36. In a survey of HIV, hepatitis B, tuberculosis, venereal diseases. Diagnosed chronic middle caries. Treatment: preparation of cavities 36 tooth medical treatment, photopolymer permanent filling. Specify the method of sterilization burs and handpieces after administration of the patient.

2. When the handpiece is noted for its excessive heating. Specify the most likely cause of the overheating and corrective action.3. During presterilizing processing quality control on one of the hog positive benzidine test was marked. What is the future strategy of a dentist?

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session:

Collect dental handpiecePrepare the tip to work (lubricate, disinfect)

9. instructional materials for learning professional skills, skills:

9.1. Methods of work with handpieces."Modern handpieces, their structure, principles of operation. Principles of damage, methods of repair "

<b>Basic tasks</b>	<b>Instructions</b>	<b>Replies</b>
Collect dental handpiece	Look at text	
Prepare the handpiece to work (lubricate, disinfect)	Look at text	

10. Materials for self-control of the knowledge and skills provided by the subject.

10.1. Tests of different levels or tests that are part of the bank to the rector's control. The data base of the department.

11. The theme of the next session: Dental burs. Sterilization elections.

12. Assignment of UIRS and NIRS on the subject.1. Summary on the topic: "the use of modern dental handpieces for the preparation of dental hard tissues.

Wrote by

Aksinorska O.I.

# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic Dentistry

Guidelines

for practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 5 " Dental burs. Dental instruments for examination  
And treatment of the teeth, their appointment.  
Sterilization"**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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1 Topic: Dental burs. Dental instruments for examination and treatment of the teeth, their appointment. Sterilization.

## 2. Relevance of the topic:

In dental practice, there are various methods of preparation of hard tooth tissue. Along with mechanical dissection, also used alternative methods, which include pneumatic, mechanical, chemical, kinetic, laser dissection and removal of hard tissue with ultrasound. In this case the mechanical preparation currently remains the most widespread and efficient method for the treatment of caries. The modern market of dental instruments is constantly updated with new models, manufactured by different companies-manufacturers, which differ significantly in their properties and features of operation. Dentists often difficult to make an informed choice of a particular instrument in the performance of the various stages of preparation of cavities. It should be noted that the nature of the state of dental hard tissues, and especially enamel, depending on the type of elections that in the future may affect the quality of fillings of cavities. Widespread among the population of infections transmitted by hematogenous (HIV, hepatitis B, etc.), Requires a doctor's knowledge of the principles of aseptic and antiseptic. Study topics should be done on the basis of theoretical knowledge gained at the Department of Medical Physics and medical equipment and microbiology.

### 3. Aim of lesson:

3.1. Common aims: familiarize students with the types of dental burs.

3.2. Educational aims: the formation of a professional identity; mastery of the principles of medical ethics and deontology;

relevant aspects of the legal, psychological, professional liability; ability to locate confidential contact with patients

the ability to convince the patient of the need for and feasibility of further study at a dental pathology;

3.3. Specific objectives:

To Know:

Types of dental burs. Methods of sterilization of dental handpieces and burs.

3.4. On the basis of theoretical knowledge on the subject Master the techniques (to be able) Prepare for the dental handpieces. Carry out sterilization of dental handpieces Carry out sterilization of dental burs.

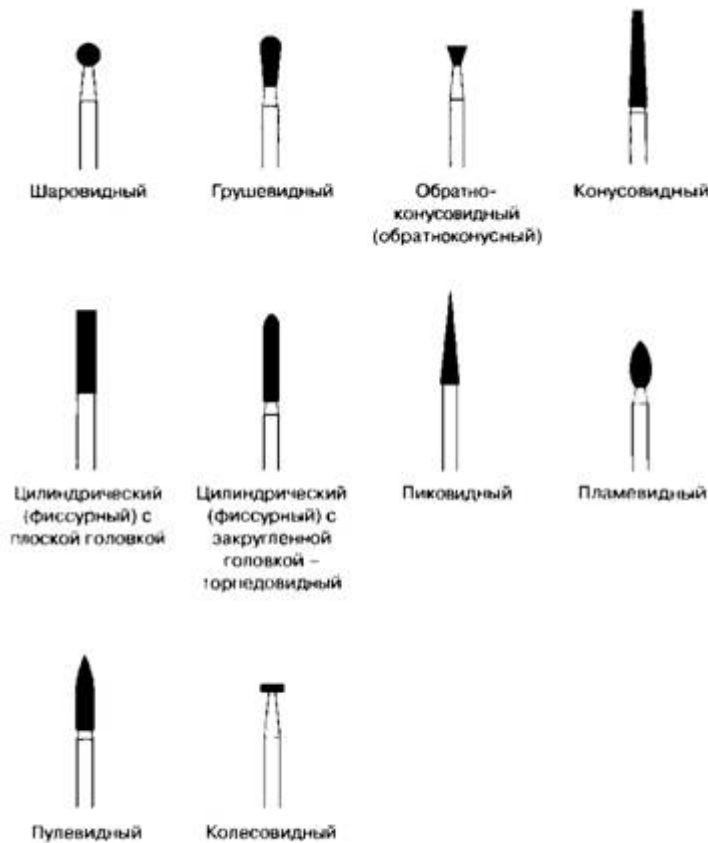
4. Materials of basic previous students' self preparation:



a. Main basic knowledge, skills, skills that are essential for self-study and assimilation of the topic and which are based on interdisciplinary links:

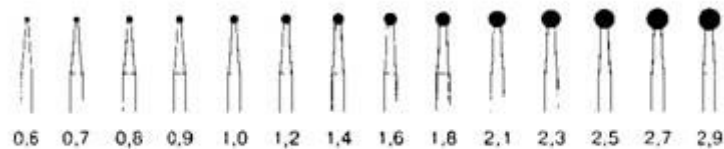
№	Subject	To know	To be able
1.	Biophysics, Informatics and medical equipment	Principles of medical equipment, Safety precautions when working with medical equipment.	Identify and eliminate damage to medical equipment
2.	Social medicine, management and economy of health	The list of required medical equipment and regulatory documentation.	Maintain inventory records

5. Content of the topic Dental burs For preparation of hard tissues of teeth, fillings, etc. processing using cutting (drills) and abrasive tools. Depending on the shape and dimensions of the rod (shank) they are designed for a corner, or direct the tip of a turbine (Table. 1). The shape of the working part of boron may be different. The most commonly used spherical, cylindrical (fissure), conical, , pear, rotate burs (Fig. 38). Bora have different size of the working part. Typically hog diameter heads used in restorative dentistry, ranges from 1 to 3 mm (Fig. 39), but the burs produced both large and smaller sizes. Depending on the material from which the working portion is made of boron, they are steel (including - Strengthening) carbide and diamond coated working part. Some drills are designed to selectively remove softer fabrics and materials made from the working part of a special plastic. For example, boron «OptiClean» (Kerr), is designed to remove from the surface of the tooth stump pollution and temporary fixing materials. Work surface of steel and carbide burs removes hard tissue due to their layered cutting (cutting working surface). It consists of boron directed respectively faces the axis of rotation - knives. The faces have a certain sharpening of the cutting surfaces with respect to the axis of rotation of boron. An effective job of removing dental hard tissue carries a knife blade. Working properties of boron are determined by the hardness of metal working parts, the number and height of the cutting edges, angle of the blades relative to the axis of boron, sharpness of blades, pitch (distance) between the blades.



**Рис. 38.** Наиболее распространенные варианты формы рабочей части боров.

The most useful shapes of dental burs



**Рис. 39.** Размеры рабочей части шаровидных боров серии HIS (NTI) (мм).

Standard steel burs (Fig. 40 a) are 6-8 cutting blades on the working part. They can effectively excise dentin only and only at low speeds. At high speeds (10-12 thousand revolutions per minute, corresponding to 2 and 3 of US-speed setting 30) and at preparing enamels boron steel cutting edges are very high temperatures, leading to their complete melting and loss of efficiency and also damage tooth tissues. Steel burs with small incisions - finishing burs (Figure 40, B), and even without cuts - polishers that are used for processing (grinding and polishing) metal seals. The working part is made of boron carbide tungsten carbide. It 6-8 cut with sharp blades operating faces. Tungsten carbide burs have a high cutting capacity, can withstand thermal overload and effectively handle the enamel, dentine, amalgam, composites and other materials at high speeds,

including the turbine drill. Cutting efficiency carbide burs more than diamond, but generally, they are less durable.

The disadvantage of the majority of carbide burs is that they work part soldered to the stainless steel rod. This ration - a weak spot carbide burs, broke off the working part of the rod can occur at the lateral loads. Therefore, when working with carbide burs should avoid strong pressure on the burs.



Рис. 41. Твердосплавный бор.



Рис. 40. Стальные боры: стандартный (а), финиш (б) и полир (в).

To avoid this drawback, manufacturing companies produce burs that are made from a single piece of tungsten carbide. An example is tungsten carbide burs-razrezateli metal, ceramic and metal-ceramic crowns series km (KgopepGgeppeg Metall-Keramik) (Fig. 42 a) and N34 (Fig. 42, b) the company «NT!». Due to the additional notches on the working part of the forests have increased cutting performance. The design of the working part of the instrument does not become clogged with sawdust, preventing it from overheating. In addition, a special configuration of the cutting edges allows the doctor to work in the patient's mouth is not only effective, but also the most atraumatic. Ory series kilometers apply when operating in conditions of high loads: for trepanation of intact enamel, removal of old fillings (including metallic and composite), cutting overage metal crowns, from the low-temperature ceramics, etc. Tungsten carbide burs N34 series is recommended for cutting metal crowns in combination with aggressive diamond burs: first diamond bur cut ceramics, boron carbide is then N34 - a metal base.

In addition to traditional types of carbide burs are available multifaceted forests, the number of faces in which varies from 10 to 32. These faces have a small height, so they are less aggressive in cutting. These burs are used for Finishing enamel edges, grinding and polishing of composite fillings and amalgam (the final or finishing), so it is usually referred to as carbide finishing burs. The spiral design of the faces finishing burs (Fig. 43) provides continuous contact with the working part of the treated surface, which reduces tool vibration and improves the quality of treatment. The more faces is finishing burs, the less cutting capacity and the higher the quality of the polishing. Currently, due to the development of direct restoration technology, has increased the need for dentists in tools for fast and efficient grinding and polishing of composites. Many dental schools is recommended to use for this purpose carbide finishing burs, in preference to diamond burs. These recommendations are based on the results of comparative

scientific research quality finishing of composite restorations using fine diamond burs and carbide finishing burs.

According to electron microscopy analysis, all other parameters are the same processing, the maximum surface roughness of the composite is marked using diamond burs. This is due to the fact that in the process of finishing diamond tools for crushing a polymer composite matrix formed on its surface is disrupted and microcracks spatial structure of the polymer matrix. The microcracks subsequently adsorbed food dyes, and most importantly, the microbial plaque is formed, which degrades in the presence of multiple seals overall hygienic situation in the oral cavity and contributes to the recurrent caries at the border of the restoration to the tooth. Furthermore, it was found that the use of diamond burs during finishing seals in the border area of the composite material with the tooth enamel can lead to edge mikrodamage enamel. This worsens marginal integrity seal, promotes delamination of the composite material thinned area and leads to the formation of the pigmented edge along the edge of the restoration. At the same time, it found that tungsten carbide finishing burs from allow to keep the structure of the polymer matrix, provide fast, accurate removal of excess composite and maximize quality processing. It provides long-term color stability and high durability of the restoration.

Tungsten carbide finishing burs with 10-12 facets used for Finishing enamel margins, competing and grinding seals of composites and amalgams. However, their use is not recommended for the treatment of ceramics. Tungsten carbide finishing burs with 20-32 facets provide even higher quality of treatment. They are used for polishing composite fillings, particularly in cases where it is necessary to achieve a high surface quality and a "dry shine" restoration. When grinding and polishing the surface of the composite restoration carbide finishing burs hand movements with the tip should be circular and counterclockwise direction. The pressure on the boron must be very small, comparable in strength to the pressure on the pen while writing. Treatment should be carried out with an adequate air-water cooling. In the composite border movement with enamel finishing burs should be directed to the restoration of the tooth enamel. One of the aspects of aesthetic dentistry is the treatment of gingival restoration area at the transition to composite dental hard tissue. The problem is, of course, is relevant, since approximately half of the patients marginal edge of the gums in the area of the front teeth visible when smiling. In addition, the overhanging edge of the gum seal a traumatic factor, causing inflammation of the marginal periodontium and the development of localized periodontitis. Therefore, high-quality processing of the site is not only an important factor in ensuring a harmonious blend of aesthetic

restoration and healthy gingival margin, but also contributes to the overall dental health of the patient.

For the treatment of gingival areas restorations requires very thin and at the same time, an effective and safe tool. In this regard, interest, in our opinion, are carbide finishing burs with non-aggressive working apex of the «TDF» (Top Defined Finishing) of "UU77". Family carbide finishing burs «TDF» consists of 4 types of elections three degrees of abrasiveness. They have a length of the working portion of from 3 to 9 mm . The length of the working part of the finishing burs «TDF» allows for grinding and polishing cover the entire surface to be treated in one motion. This prevents the formation of steps and irregularities at the site of contact with the top of the boron composite surface.

Номер по каталогу NTI	Вид рабочей части	Длина рабочей части, мм
H132		3.0
H133		4.2
H134		6.0
H135		9.0

Рис. 44. Твердосплавные фрезы «TDF» компании NTI.

An important feature of the finishing burs for dentists «TDF» is a subtle, but rounded, secure the end of the working head (see. Fig. 45). Because of this design feature, these tools allow you to safely and effectively handle a composite restoration in the subgingival area without injury marginal gingiva and tooth circular ligament (see. Fig. 46). Among the other original research in the field of improving the tungsten carbide burs should be noted fissure drills intended for diagnostic and therapeutic preparation of fissures and grooves of natural teeth.


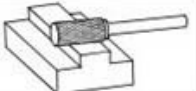

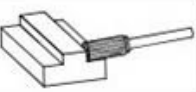

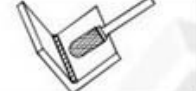




















The construction features of the hog is that their configuration corresponds to the working head size and shape posterior fissures, and provides optimal cutting efficiency as the preparation of pigmented and destructive-modified portions of enamel and dentin. The maximum stay healthy enamel and dentin, which corresponds to the principle of minimal invasive and gentle attitude toward the unaffected tooth.

The widespread the country received "diamond" burs. It should be noted that from a methodological point of view, is the name wrong. First, the working part of the tool is not made of diamond, and is covered with only a thin layer of diamond grains. Secondly, they should be called abrasive tools, as opposed to elections, they

do not cut the dental tissue and their ground off. Therefore, the most appropriate name for these instruments would be: Rotary dental abrasive tools with diamond coated working parts. However, given the traditions and professional terminology, developed in Ukrainian dentistry in the future, we will call these tools with diamond burs. Blanks for these elections are made of stainless steel. The working surface consists of diamond grains boron artificial or natural diamond, associated with the base. Diamond grains are fixed to the working portion or by electroforming using a special binder composition, or by pressing the metal grains and binder. Effective work on excision of dental hard tissues performs only diamond grit, a binder composition of the abrasive does not have.

The main performance characteristics of boron diamond is its abrasiveness, determined by: the size of the working surface, the properties of the diamond grain planting density, adhesion strength of the grains in conjunction, the orientation of the grain faces with respect to the work surface, etc. The range of diamond burs is very large and often the dentist raises the question: "What is boron choose?" Let us consider some criteria that we recommend when choosing a diamond burs.

When selecting elections should focus on "price / quality." In modern conditions of domination of market relations in dentistry, this factor is of paramount importance. . However, unfortunately, we must note that it is not always boron price corresponds to its quality. A huge number available on the market hog, a variety of types, sizes and shapes are able to mislead the dentist. A noisy advertising campaigns not only help correct choice, but rather complicate it.

Head Shape	Head Styles	DIN8033 Standard	Head Code	Application	Diagram
	Cylindrical Plain End	ZYA	A	Suitable for contour finishing	
	Cylindrical With End Cut	ZYA-S	B	Suitable for finishing contour and right angled corners	
	Cylindrical Ball Nose	WRC	C	Suitable for machining contour and circular arc surface	
	Ball	KUD	D	Suitable for rounded edge processing, end deburring and end pre-machining before welding	
	Oval	TRE	E	Suitable for rounded edge processing	
	Arch Ball Nose	RBF	F	Suitable for rounded edge processing in small places	
	Arch Pointed Nose	SPG	G	Suitable for processing small places, and acute angled contour	
	Flame	—	H	Suitable for rounded edge processing	
	60° Cone	KSJ	J	Suitable for counterboring and chamfering bores with 60° angle	
	90° Cone	KSK	K	Suitable for counterboring and chamfering bores with 90° angle	
	Conical Ball Nose	KEL	L	Suitable for rounded edge and surface processing in small places	
	Conical Pointed Nose	SKM	M	Suitable for rounded edge and surface processing in small places	
	Inverted Cone	WKN	N	Suitable for rearside chamfering	

## **Sterilization**

Most dental offices have a designated area for instrument reprocessing that is separate from the dental treatment room. This is ideal, since cleaning, sterilizing and storing instruments in the same room where the delivery of patient care is provided increases the risk of cross-contamination. The removal and disposal of single-use sharps such as needles, blades, orthodontic wires and glass must be done at the point of use, typically in the dental treatment room.

Some instruments and materials are single-use only. Single-use items should be segregated in the operatory, and those that are sharp or otherwise pose a risk of injury must be discarded into a sharps container (Figure 2). Items without risk, such as a saliva ejector, can be thrown into the trash. Finally, the tray or cassette of reusable instruments is taken to the cleaning and sterilization area for processing.

To prevent accidental injury with the contaminated instruments, special handling should be used to transport the instruments to the cleaning and sterilization area.<sup>2</sup> The Centers for Disease Control and Prevention (CDC) states that, “Contaminated instruments should be handled carefully to prevent exposure to sharp instruments that can cause percutaneous injury. Instruments should be placed in an appropriate container at the point of use to prevent percutaneous injuries during transport to the instrument processing area.” In addition, the Occupational Safety and Health Administration (OSHA) says, “The person handling the instruments through removal, cleaning, packaging and sterilization needs to use heavy-duty gloves to help prevent injury with sharp contaminated instruments.” Although heavy-duty gloves (utility gloves) may feel more awkward than examination gloves, they provide extra protection while handling instruments during the cleaning, rinsing, drying, packaging and sorting procedures that take place during instrument reprocessing.<sup>3</sup> The fine tactile sensitivity needed during dental procedures is not necessary during instrument cleaning and sterilization; therefore, heavy-duty gloves pose no problem in this regard. Additionally, nitrile utility gloves are available in a variety of sizes, allowing a more secure fit.

## **Cleaning**

Using mechanical means of instrument cleaning rather than hand scrubbing should minimize handling of instruments.<sup>4</sup> If procedures are used whereby hand scrubbing is necessary, heavy-duty (utility) gloves, mask, eyewear and gown should always be worn while cleaning.<sup>5</sup> Minimize the risk of puncture injury by scrubbing only one instrument at a time while holding it low in the sink.



Use of a system utilizing locked cassettes eliminates the need to sort, handle and hand scrub individual instruments - reducing the risk of infection from contaminated instruments - and results in savings of, on average, five minutes during instrument reprocessing, as well as fewer damaged instruments, since the instruments are locked in position during reprocessing (Figure 3). As with any standardized procedure, a standardized instrument reprocessing protocol also results in easy staff training and cross-training.

In general, three classifications of mechanical cleaning devices are available for the dental office. They are the ultrasonic cleaner, instrument washer and instrument washer/disinfector.

**Ultrasonic cleaning devices.** An ultrasonic cleaner uses sound waves, that are outside the human hearing range to form oscillating bubbles, a process called cavitation. These bubbles act on debris to remove it from the instruments. Some manufacturers also use intermittent or sweeping sound waves to help improve the device's cleaning ability and to decrease the potential for hot spots in the ultrasonic bath. Specialized detergent formulations are available for the solutions in ultrasonic machines. When selecting a cleaning agent to use in the ultrasonic cleaner, always consider the effect on materials and instruments. Household products are inappropriate because they cause pitting, corrosion, rust or other damage to instruments, and potentially to the ultrasonic chamber. Therefore, it is best to follow the manufacturer's instructions, thereby choosing a solution that is compatible with the unit and the instruments. The procedure for cleaning the instruments in the ultrasonic cleaner is as follows:

Suspend instruments in the ultrasonic bath using a rack or basket fitted to the unit.

Do not lay instruments directly on the bottom of the ultrasonic cleaner, as this can interfere with cleaning and cause damage to instruments and the ultrasonic machine.

Avoid overloading the ultrasonic device, since that could inhibit its cleaning ability.

It is important to follow the manufacturer's instructions for the ultrasonic cleaning cycle.

In general, the timer is activated for three to six minutes for loose instruments and ten to twenty minutes for instrument cassettes, and the timing is adjusted as necessary. While the ultrasonic device is running, the lid or cover

should be kept on to reduce the release of aerosol and spatter into the area from the ultrasonic cleaner. Routinely replacing the cleaning solution in the ultrasonic machine is important, and is necessary at least once a day, more often with heavy usage.

#### Instrument washers

Instrument washers use high-velocity hot water and a detergent to clean instruments. Widely used for decades in hospitals and large facilities as part of the central sterilization process, these devices have recently become available for the dental office. These devices require personnel to either place instruments in a basket or to use instrument cassettes during the cleaning and drying cycles. Instrument washers for dental offices come in two different designs. One is a counter-top model. This type does not require professional installation. The other type is built-in and resembles a kitchen dishwasher (Figure 4). It functions much the same as the counter-top model, but it has a larger capacity and requires professional installation. Some models have the ability to dry the instruments after washing, some do not.

#### Instrument washers/thermal disinfectors

These devices may look like the instrument washers described above; however, there is one important difference. The high temperature of the water and chemical additives in these devices cleans and disinfects the instruments. The significance of this lies in how personnel can handle the instruments after the process. Upon removal from a thermal disinfectant, instruments can be more safely handled, and if the dental healthcare professional were to sustain a puncture injury, it would not require the follow-up that a contaminated exposure requires.

All instrument washers and thermal disinfectors use either a detergent or a water-softening agent. It is possible for the pH of some of these chemicals to be incompatible with certain metals in dental instruments. For specific recommendations, the manufacturer of the dental instruments and the manufacturer of the instrument washer should be consulted.

Instrument washers and thermal disinfectors are approved medical devices that have been rigorously tested to meet Food and Drug Administration (FDA) requirements for safety and efficacy of medical devices; household dishwashers are not appropriate for use in a dental office.

## Instrument examination and care

Cleaning instruments, provides a good opportunity to examine, replace or remove damaged instruments; lubricate items such as handpieces<sup>6</sup>; and otherwise prepare instruments for sterilization. Instruments must be dry before packaging - if drying was not part of the cleaning process, time must be taken to dry the instruments completely. High-quality metal dental cassettes specially designed to withstand high temperatures are preferred for use with steam and chemical vapor sterilizers. Most sterilizers on the market today offer a cassette rack, which helps to prevent over-loading in the sterilizer, thereby reducing the risk of ineffective sterilization and ultimately of infection and cross-infection.

## Packaging

Packaging used for instruments and cassettes prior to sterilization includes wrap, paper pouches, plastic pouches, combination paper/plastic pouches and nylon tubing. Sterilization packaging is specifically designed to allow penetration of heat, steam or vapor and then to seal the sterilized instruments inside the package for sterile storage (Figure 5). After sterilization, instruments should remain in packages until use. Different materials are appropriate for different types of sterilizers.<sup>7, 8</sup> Unless otherwise specified, all packaging is single use only. Using tape to reseal previously used packaging material may inhibit its ability to continue to function as intended by the manufacturer.

## Sterilization

Parameters such as time, pressure and temperature vary according to the type of sterilizer, materials being sterilized and individual models within sterilizer brands. General sterilization parameters for each type of sterilizer appear in Table 1. The first step in determining the settings for the sterilizer is to refer to the manufacturer's instructions. Sterilizers are medical devices, requiring clearance by the Food and Drug Administration before manufacturers may offer them for sale. The FDA requires rigorous testing to ensure an adequate margin of safety in each cycle type described in the instructions. Failing to follow the instructions of the manufacturer is ill advised, since it may result in inadequate sterilization of the instruments or devices in the sterilizer. It is never appropriate to use a household device, such as a toaster oven, for sterilization of dental instruments, devices, or equipment.

## Steam autoclave

Steam autoclaves are the most commonly used type of heat sterilizer in dental practices. Two types of processes employ steam under pressure. The difference between the two is the manner in which the machine evacuates the air from the sterilization chamber and then introduces the steam.

Gravity displacement sterilizers rely on the forces of gravity to force air out of the chamber through air escape vents. The steam entering the chamber from the water reservoir displaces the air as it leaves the chamber. The combination of pressurization of the chamber, steam and a high temperature for a prolonged period has the ability to kill virtually all microorganisms. This is the most common type of autoclave found in dental offices in the United States. A typical cycle for wrapped instruments includes heat-up and pressurization time, followed by a 15-to-30-minute cycle during which sterilization is taking place (121°C at 15 psi). The sterilization cycle time decreases as the temperature is increased. It is important to use cycle times and temperatures described in the owner's manual, and never to interrupt the sterilization cycle to remove or add items, or for any other reason. Interruption of the cycle will result in instruments that are not sterile and therefore not safe for use on patients. After the sterilization cycle, the sterilizer must depressurize and the packs remain in the sterilizer for drying. The drying phase may take anywhere from 20-45 minutes. The unit must only be opened after completion of the drying cycle. Upon removal from the sterilizer, sterile packs must be stored in a clean, dry area. Packs that become wet, torn, contaminated, or otherwise compromised require resterilization.

Prevacuum autoclaves (also called Class B or Type B sterilizers) use a variety of technologies to remove air from the chamber before the steam enters, thus creating a vacuum. Most use a pulse vacuum to ensure elimination of air from the chamber. This is generally a more efficient means of pressurizing the chamber; therefore, the operator may notice some minor time saving in the start-up of the prevacuum sterilizers. Most prevacuum sterilizers use a temperature of 132°C-135°C for 3-10 minutes to achieve sterilization. This higher temperature may be unacceptable for some items, such as Teflon-coated instruments. Total time for pressurization, sterilization, venting and drying is generally considerably shorter than that for gravity sterilizers - about 45 minutes.

## Dry-heat sterilization (convection and static air)

Dry-heat sterilization employs high temperatures for extended periods to achieve sterilization of instruments. The method of heat circulation in dry-heat sterilizers is usually convection, which helps to ensure that the heat circulates throughout the sterilization chamber during the process. Mechanical convection is more effective; the sterilizer contains a fan or blower that continually circulates the heated air to maintain a uniform temperature throughout the chamber. Most commercially available dry-heat sterilizers on the market today are of this type.

The higher temperature of a dry-heat sterilizer means that paper will scorch and plastic will melt. Specialized packaging material is available for dry-heat sterilizers. Most handpieces will not tolerate the higher temperatures of a dry-heat sterilizer. Mechanically driven handpieces that contain turbines and bearings are susceptible to damage at higher temperatures. The manufacturer's instructions should be checked for compatibility of instruments, devices, and materials with the unit and the handpiece manufacturer's instructions should be followed for preparation of the handpiece prior to sterilization and for sterilization itself.

## Unsaturated chemical vapor sterilization

Unsaturated chemical vapor sterilization relies upon the use of a proprietary chemical that contains formaldehyde, alcohol and other inert ingredients, instead of water, to produce a vapor to promote the sterilization. Use of this proprietary chemical also results in the vapor having less humidity and therefore being less corrosive to sensitive instruments than if water were used.

## Sterility assurance

All the efforts that go into the preparation of instruments are futile if the sterilization process itself is not successful. There is no way of seeing that instruments are sterile by simply observing the sterilizers and packs, even though a chemical or mechanical indicator may have changed. An indicator such as autoclave tape may change color when exposed to heat, but there is a possibility that the heat was not present for the proper length of time or that there was inadequate pressure. Indicators that go on the outside of the packs are useful for identifying processed and unprocessed packs. Failure of sterilization can occur due to mechanical malfunction of the sterilizer or due to operator error. There are several methods to provide assurance of sterility.

## Operator error

It is common to rely upon the automated functions of the sterilizer to tell the DHCP if there is a problem with the sterilization process. Most sterilizers have a system to notify the operator of mechanical malfunction, but sterilizers cannot notify the operator whether the contents of the instrument packs or cassettes are sterile or not. Operator error in loading the sterilizer could result in failure to sterilize all the packs in spite of the proper time, temperature and/or pressure. It is important to avoid overloading the sterilizer or loading packs and cassettes on top of one another; use of a cassette system helps to reduce operator error due to overloading. The heat and/or steam must be able to circulate throughout the chamber and between the packs or cassettes for successful sterilization.

## Chemical indicators

Chemical indicators indicate the presence of certain conditions during the sterilization cycle, such as the presence of heat and steam.<sup>10</sup> There are five classifications of indicators recognized by the FDA, and it is important to note that it is now recommended that all packs or cassettes include internal and external indicators.

Class 1 - Process Indicators. These are placed on the outside of packs and are useful in determining which packs have been properly processed versus those that have not. Class 1 process indicators include autoclave tape and the color change indicators embedded on the outside of sterilization packaging materials.

Class 2 - Bowie-Dick Indicators. These show the pass/fail in prevacuum sterilizers. This test is conducted daily with the chamber empty, during the first cycle of the sterilizer, and is available as a kit from commercial sterilization monitoring companies.

Temperature-Specific Indicators. These react to one of the critical parameters of sterilization and indicate exposure to a specific value such as temperature or psi.

Class 4 - Multi-parameter Indicators. These react to two or more of the critical parameters in the same manner as Class 3 indicators.

Class 5 - Integrating indicators. These are designed to react to all critical parameters of sterilization cycles. When used properly, integrating indicators may serve as the basis for the release of processed items, excluding implants. It is important to follow the manufacturer's specific instructions for use regarding a test challenge pack.

## Biological monitoring

The use of biological monitors (spore tests) is the most reliable method to validate that the sterilizer is functioning and that the sterilization of instruments is effective. These monitors consist of paper strips or vials impregnated with bacterial spores that are specifically resistant to the sterilization process. New spore tests have been developed that enable completion of biological monitoring in-office and yield results in as little as 24 hours. These tests allow quick remediation and validate proper infection control procedures without a long lag time during which the sterilization procedure may have become ineffective but is not known. It is recommended that biological monitoring be conducted at least weekly<sup>11</sup> and with every load that includes an implantable device.

### 6. Materials of methodical maintenance of employment.

#### 6.1. Setting SELF initial level of knowledge - abilities.

1. Name, which consists of dental complex.
2. Safety when working with electrical appliances.
3. Safety precautions when working with rotating tools.
4. Principles of aseptic and antiseptic.

### Recommended literature:

#### Basic literature:

25. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: 'ASMI', 2016.-2016.-191p.
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30. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatic dentistry”. – V.D. Sounders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

- <http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>
- <http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>
- [http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).
- <http://www.stomatkniga.ru/index.php?start=48>.
- [http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).
- <http://www.mosdental.ru/Pages/Page28.1.html>.



[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.3. Approximate card for students' self work with literature on the subject Dental burs. Dental instruments for examination and treatment of the teeth, their appointment. Sterilization.

Basic tasks	Instructions	Отвѣты
List the types of dental burs	Look at text	
Explain the principles of different shapes of burs work	Look at text	

7. Materials for self-control of quality of training  
 A Question for self-control  
 1. Types of dental burs.  
 2. The rules of sterilization tips.  
 3. Terms of elections sterilization.  
 B. Tests for self-control with the standards of the responses.  
 1. fissure burs are used for:  
 A. opening cavity, necrotomy. removal of old fillings, extension-of the mouths of the root canal, the creation in the tissues supporting the teeth points.  
 + B. disclosing and expanding the cavity to remove the seal to make the walls of the cavity forms yaschikoobraznoy  
 C. for opening and expansion cavity, the removal of the seals, wall treatments.  
 D. It is used for the treatment of the side walls of the cavities, leveling the bottom cavity, creating opor-nyh items and remove the seals.  
 E. creation opor-nyh points in the walls of carious po-losti (in the form of cuts), for prohozhde-niya layer of hard enamel during tooth trepa-natsii  
 2. Pryamousechennye burs are used for:  
 A. opening cavity, necrotomy. removal of old fillings, extension-of the mouths of the root canal, the creation in the tissues supporting the teeth points.  
 B. Disclosure and expanding cavity to remove the seal to make the walls of the cavity forms yaschikoobraznoy  
 + C. for opening and expansion cavity, the removal of the seals, wall treatments.  
 D. It is used for the treatment of the side walls of the cavities, leveling the bottom cavity, creating opor-nyh items and remove the seals.  
 E. creation opor-nyh points in the walls of carious po-losti (in the form of cuts), for prohozhde-niya layer of hard enamel during tooth trepa-natsii  
 3. Obratnous  
 4. rotate burs are used for:

A. opening cavity, necrotomy. removal of old fillings, extension-of the mouths of the root canal, the creation in the tissues supporting the teeth points.

B. Disclosure and expanding cavity to remove the seal to make the walls of the cavity like a box

C. for opening and expansion cavity, the removal of the seals, wall treatments.

D. It is used for the treatment of the side walls of the cavities, leveling the bottom cavity, creating opor-nyh items and remove the seals.

+ E. creating fixing points in carious po-losti walls (in the form of notches) to move to hard enamel layer of the tooth during trepa-natsii

5. Sterilization of dental instruments is carried out by dry air:

+ A. at 180° C for 20 min.

B. at 180° C for 40 min.

C. at 180° C for 10 min.

D. at a temperature of 120° C for 20 min.

E. at 120° C for 10 min.

B - tasks for self-control.

1. A patient 34 years appealed to the clinic with complaints of a cavity in the tooth 36. In a survey of HIV, hepatitis B, tuberculosis. Diagnosed chronic middle caries. Treatment: preparation of cavities 36 tooth medical treatment, photopolymer permanent filling. Specify the method of sterilization burs and handpieces after administration of the patient. 2. When the handpiece is noted for its excessive heating. Specify the most likely cause of the overheating and corrective action. 3. During presterilizing processing quality control on one of the hog positive benzidine test was marked. What is the future strategy of a dentist?

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session: Sterilization of dental burs

9. instructional materials for learning professional skills, skills:

9.1. Methods of work at runtime. "Sterilization of dental burs"

<b>Basic tasks</b>	<b>Instructions</b>	<b>Replies</b>
Cleaning	Look at text	

Sterilization	Look at text	
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10. Materials for self-mastery of the knowledge and skills provided by the subject.

10.1. Tests of different levels or tests that are part of the bank to the rector's control. The data base of the department.

11. The theme of the next session: Topographic anatomy of permanent and temporary teeth. Histology of dental hard tissues

12. Assignment of UIRS and NIRS on the subject.

1. Summary on the topic: " Topographic anatomy permanent and temporary teeth. Histology hard tissues.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 6 "Topographic anatomy of permanent and temporary  
teeth. Histology of dental hard tissues "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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1. Topic: Topographic anatomy of permanent and temporary teeth. Histology of dental hard tissues

2. Relevance:

Knowledge of anatomical and histological and topographic features of the tooth structure lays the foundation of professional knowledge and skills of a dentist and an integral part of his practical training.

3. Lesson aims:

3.1. Basic aims:

- Introduce the anatomical and topographical and histological features of the structure of permanent and temporary teeth

3.2. Educational goals:-

To get acquainted with Ukrainian scientists and research staff of the Department of Therapeutic Dentistry ONMedU in the development of the diagnosis, treatment and prevention of oral mucosa diseases;

- The ability to learn how to explain to the patient about the need for timely rehabilitation of the oral cavity;

- Master the principles of medical ethics and deontology.

3.3. Specific aims:

To Know:

- Anatomical and topographical features of the structure and features of the permanent teeth, depending on their group membership

- The difference of the structure of temporary and permanent teeth-  
Histological structure of the enamel and the clinical significance

- Histological structure and clinical significance of dentin

- Histological structure and clinical significance of cement

- Histological structure and clinical importance of the pulp

3.4. On the basis of theoretical knowledge on the subject:

To be able to:

- Draw a schematic histological structure of enamel, dentin, cementum, and dental pulp

- Determine the membership of permanent teeth, indicate its main features and functions

- Determine the type of permanent tooth tissue

- Distinguish between temporary and permanent teeth

4. Materials previous self-training (Interdisciplinary integration).

Subject	To know	To be able
1. Preliminary disciplines to ensure the study of therapeutic dentistry		
- Human anatomy	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.
- Physiology	The physiological role of saliva against the teeth. Physiological function of the oral cavity.	Determine normogramu blood, conduct functional tests
- Histology and Embryology	Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).	Prepare histological preparations of dental hard tissues and organs of the mouth. Determine the type of fabric, decipher preparations
2. The following disciplines provided by this discipline		
Surgery, prosthodontics, pediatric dentistry	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula
3. Internally substantive integration - integration with all topics of preclinical cours		

5. Content of the topic.

Anatomical features of tooth structure. Teeth are located in the oral cavity and occupy about 20% of its surface. The distinction tooth crown, root, part of which is placed in the hole (alveoli) of the jaw and the neck of the tooth crown - location transition to the root. Inside the tooth has a cavity, which is divided into the coronal portion and root canals, and the top end portion of the apical (apical) hole. Place the transition of the crown in the mouth of the channel is called a root canal. The pulp cavity of the tooth pulp is placed.

Dental crowns are 5 surfaces:

1. Vestibular, which turned to lips. At the front of the teeth, it is also called the lip, at the side of the teeth - the cheek.

2. The oral that faces the oral cavity itself. In the lower jaw, it is also called the language, in the upper jaw - palatine.

3. Interproximal contact, or - a side surface of the teeth. The front surface facing to the midline is called the medial and posterior - distal or lateral.

4. Chewing Depending on the form and function of teeth are 4 groups: Cutters 1. - front teeth 4 on each jaw. Their function is biting food. Canines 2 - 2 on each jaw, are used for the separation of food.3. Premolar - 4 in each jaw in a constant bite, dairy not. They are used for crushing, coarse grind food.4. Molar - 6 teeth on each jaw in permanent occlusion and 4 in the milk. Designed for crushing and grinding food. The order of arrangement of the teeth shows the dentition formula. The clinic is the formula of permanent teeth bite written in Arabic, and milk - in Roman numerals:

The formula of permanent teeth:

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

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

The formula of temporary teeth:

$$\frac{V \text{ IV III II I } \quad \text{ I II III IV V}}{V \text{ IV III II I } \quad \text{ I II III IV V}}$$

The horizontal line indicates the tooth belonging to the upper or lower jaw, and the vertical - the right or left side. World Health Organization (WHO) offered a slightly different form of the dental formula. In addition, each tooth has a numerical designation, the numbers indicated and the sides of the upper and lower

jaw. When recording in this way does not include an icon that specifies one or the other half of the jaw, and applies only to the figure.

The formula of permanent teeth by the WHO:

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

The formula of temporary teeth by the WHO:

55 54 53 52 51 61 62 63 64 65  
85 84 83 82 81 71 72 73 74 75

Teeth that have erupted, occupying a specific position in the jaw, have a number of features that you can set them as belonging to the respective jaw and side (right or left). Basic features three: 1) indication of the angle of the crown; 2) sign of the curvature of the crown; 3) indication of the root deviation the crown angle characteristic is that the crown angle formed by the medial-approximal surface and the cutting edge is sharper than the angle formed by the distal-approximal surface and cutting edge. Especially clearly marked with a sign is in the central and lateral incisors and maxillary premolar. Symptom crown curvature is expressed in the fact that the most convex part of the vestibular (labial, buccal) surface of the tooth crown is closer to the medial-approximal surface. This feature is more clearly when considering the tooth by the chewing surface or cutting edge. Symptom root of rejection is the root of all curvature or apex relative to the longitudinal axis of the tooth: incisors and canines in the lateral direction, and the premolars and molars - the rear.

Anatomical differences TIME AND PERMANENT TEETH

1. Teeth 20 in the temporary occlusion in a constant - 32.
2. The permanent occlusion have incisors, canines, premolars and molars, in a time - incisors, canines, molars and premolars not.
3. Baby teeth have a bluish-white color, and permanent yellow.
4. The magnitude of the crown and root of the milk tooth is always less than the eponymous constant.
5. The width of the primary teeth crowns more pronounced compared to their height.
6. The form of the crown of deciduous teeth is more convex than the constant through that crown baby tooth sharply dissociates itself from the root.



7. The neck of a milk tooth area has thickened enamel - enamel roller. Due to this, the maximum diameter of the crown baby tooth has a neck in the area, and permanent - in the area of the equator.

8. The thickness of the hard tissues of the tooth milk less than permanent.

9. Solid tissue of milk teeth is less mineralized than permanent, because less hard.

10. Oral extensive deciduous teeth pulp cavity of the permanent teeth.

11. Root canals and apical opening temporary teeth are wider and freely communicating than regular, especially during the formation of roots.

12. The roots of deciduous teeth less rounded compared to the constant, and shorter lines.

13. It is widely diverge in hand, since between them lies the germ of the permanent tooth.

Permanent teeth of the upper jaw. The central incisor. Tooth chisel. The vestibular surface of the crown is slightly convex. In the middle line has longitudinal ridges. The cutting edge of several slanted lateral and medial has a sharp angle. There are three humps on the cutting edge. The root of the one, well developed, tapering. On cross-cutting oval. In general, the shape of the tooth cavity matches the external outlines of the crown and root of the tooth. Side Cutter. Crown chisel, a cutting edge as a result of a pronounced medial angle is somewhat reminiscent of the hill. The vestibular surface of the crown is convex. The concavity of the language is limited to the surface of the crown facets. The side bolsters are often converge in the cervical area, forming a triangle, which is located on the top recess (blind pit). Root has expressed flattened in the mediolateral direction. tooth cavity corresponds to a decrease in the amount of the form of crown and root. Like the central incisor, humps cutting surface of the tooth cavity with three horns pulp correspond, of which the medial expressed better. Fang. Zub takes the angular position in the jaw. The vestibular surface of the crown is convex. On the surface of the language passes a longitudinal roller that separates the crown into two facets, of which lateral larger area. Longitudinal enamel ridges on both surfaces of the crown pass to the cutting hump. The side edges of the crown form with the cutting edge of the two angles from which the medial more blunt. The cone-shaped fangs one direct root. At the root of the transverse cutting round or slightly oval. canine root lightly compressed laterally, whereby zvuzhene mouth of the root canal. tooth cavity follows the contours of the crown and root.

The dentin of the tooth crown, according to the projection of the cutting hump is the horn of the pulp.

The first premolar. Crown prismatic, buccal and lingual surfaces of which are convex. On two humps chewing surface - buccal and lingual, the first of which is much greater. Between the humps in perednozadnem direction are grooves that are not reaching the edges are interrupted by small enamel rollers. The crown of the tooth on the lateral cutting is in the form of an elongated oval with the greatest cross-sectional dimension in the bucco-linguistic direction. flattened root, often divided into buccal and lingual (the latter expressed better), and contains the relevant root canals. The second premolar. Crown prismatic. On chewing surfaces have two tuber from which the buccal better developed. The mounds are separated by a transverse groove that runs along the center of the chewing surface and separated from the crown facets small enamel rollers. The buccal surface of the crown of a large language. The root often alone, tapered, straight, compressed in the anterior-posterior direction, contains 1 root canal. Occasionally (15% of cases) is closer to the top notes of root. In split 25% of the tooth root canal comprising two (lingual and buccal). The first molar. The crown is shaped like a rectangle, the rhomboid on the chewing surfaces of the hill 4: two lingual and two more developed cheek. Humps are separated H-like fissure. The site before tongue hump arcuate sulcus separates small, that does not extend to the chewing surface of the additional protuberance. In accordance with the humps on the chewing surface of the tooth cavity has four recesses for the pulp horns. The recesses of the buccal side expressed more. Three roots. Palatine massive, round and straight; Two other, more short - buccal (front and rear), flattened on the sides, bent to the bottom. Anterior-inferior is better developed root. The second molar. Crown looks like a cube on occlusional surface 4 hump divided X-like fissures. Cheek mounds developed better language. The number of humps, and fissures location can be in various forms. A tooth has three roots. Palatine largest, direct, good passing. Both buccal - front and rear - flattened, with broad-based, rejected in the anterior-posterior direction. Anterior roots can have multiple channels and apical holes. The third molar. For the structure of the third molar and second molar recalls can have multiple options like size, shape and number of crown roots. The number and location of the humps fissure on the chewing surface is different. The tooth has a tendency to reduction, in connection with which it rudiment sometimes otsutstvuet. Korni often fused together into one massive short barrel. The shape of the cavity of the tooth and the number of root canals can not meet the external contours of the tooth.

Permanent teeth of the lower jaw. Central cutter - this is the most big tooth. Chisel, narrow crown is relatively high, the vestibular (labial), its surface is slightly convex, and language, on the other hand, concave, with weak enamel edge roller. The medial and lateral angles of the crown a little different. In general, the tooth cavity meets its external form. The root is relatively short, flattened medialateralnom in the direction transverse to the sawing has the shape of an elongated oval with the largest size in the vestibular-linguistic direction. Side Cutter. This tooth is longer tsentralyny cutter. Chisel, narrow crown on the vestibular surface has a small longitudinal ridges. The cutting edge has two angles from which lateral - dull and considerably favor the side teeth and medial - sharper. On the surface of language vprishechnom crown portion has an enamel bead, which is well contoured neck. The root of the one, straight, flattened on the sides; for transverse cutting has the shape of an elongated oval. The cavity of the tooth crown is like a fissure shaped, root canal narrow. Fang. For the similar structure with the corresponding teeth of the upper jaw, but somewhat smaller. Crown stores partially rhombic shape is more narrow, extended with a convex vestibular surface. On the cutting edge of the cutting head stands the central hill, in the area which faces converge crowns. The medial portion of the cutting edge is shorter than the lateral. Last steeper and longer. The medial part of the vestibular surface of the crown more steeply goes into contact, and lateral - more hollow. From the main bump in premolar side is a small notch that separates the medial tubercle. Hollow spindle, with the greatest expansion in the neck of the tooth area. Root slightly flattened on the sides for the transverse cutting oval. The first premolar. The crown on the cross-cutting circular shape on the vestibular surface has a longitudinal roller. Chewing surface has two humps: buccal, more massive, heavily tilted inward, the language is much less inclined. Humps chewing surfaces of interconnected roller on each side contains small holes (holes). The root of a straight, slightly flattened on the sides. tooth cavity meets its external outline. The cavity of the crown without a clear boundary moves into the root canal.

The second premolar. Crown partially resembles the shape of the canine, but less cross-cutting round. The second premolar is larger than the first due to the almost identical development of both humps chewing surface. Humps are separated by enamel roller on either side of which there are small depressions (pits). From tooth faces of the roller separated horseshoe fissures. The root is usually a slightly flattened, the side surface is almost devoid of longitudinal grooves. Root contains a root canal. The first molar. Crown cubic form on the chewing surface of the 5 hills; three buccal and two more developed language. From the buccal hillocks better pronounced rear. The mounds of chewing surfaces

separated by fissures M-like shape. Rear root a little shorter from the front, straight and has one channel. Front root flattened, curved arch has two channels – antero-inferior and forelingual. The second molar. It is second in size to the first, has a similar shape of the crown with him, and the same number of roots. Cubic slightly elongated in the anteroposterior direction of the crown on the chewing surface of the tuber has a 4: two buccal and two languages, of which the latter raised. The longitudinal fissure is located closer to the edge of the lingual. Transverse part fissure separates the front and rear hills, often goes to the vestibular surface of the crown and ends at her blind recesses. The tooth has two roots - the front and rear. Rear root is massive, right on the cross-cutting rounded or slightly oval. Front root flattened in the anteroposterior direction. Buccal and lingual root canals front arched, rugged, often anastomose with each other at the top of the root isolated open holes.

The third molar. Often it has a similar structure to the second molars. Crown cubic form on the chewing surfaces can be a lot of mounds separated longitudinal and transverse fissures. Two roots - front and back (sometimes more) closely located near each other and can now connects one relatively short and thick roots. The tooth tends to reduction, and therefore it is different structure diversity.

## 6. Materials of methodical maintenance.

### 6.1. SELF-ASSESSMENT initial level of knowledge, skills.

1. Which of these teeth there are two root canal?
  - A. The second premolar of the upper jaw
  - B. The first premolar of the mandible
  - C. The first premolar of the upper jaw
  - D. The second premolar of the mandible
2. On the occlusal surface of the tooth revealed 5 bumps - two oral and buccal
3. Indicate which is the tooth?
  - A. First lower molar
  - B. The second upper molar
  - C. The second lower molar
  - D. First upper molar

3. Dental crowns are chisel shape. Which group of teeth belong to the teeth:

A lower second molars

B lower premolars

C upper premolars

D Upper molars

E The central and lateral incisors of the upper jaw?

4. The tooth has a massive conical-shaped crown, the cutting edge forms a pronounced tooth. Which tooth can be shaped:

A top canine

B The lower first premolar

C The second upper premolar

D top of the second cutter

E The lower second premolar

5. The crown of the tooth has a rounded shape of an elongated quadrangle, some narrowing in the buccal direction. There are two tubercles - large and smaller buccal - lingual. Lingual lobe can be divided into two or three tubercle. Determine the tooth in the dentition:

A upper central incisor

B upper lateral incisor

C second lower premolar

D The upper first molar

E The lower second molar.

6. tooth crown has a rhombic shape elongated in the anterior-posterior direction. On chewing surfaces has four, sometimes five bumps - two buccal and two (three) palatine. Which tooth is shaped, and the specified number of bumps:

A upper third molar

B The lower first premolar

C upper first molar

D The upper second molar

E The lower second molar

7. The shape of the tooth crown approaches a cube somewhat elongated along the dentition and slightly flattened vertically. On chewing surfaces placed five cusps: two well defined lingual and one located distally and two cheek. What tooth:

A lower first premolar

B The lower first molar

C upper first molar

D The upper second molar

E The lower second molar.

8. The tooth has a crown diamond shape elongated in the anterior-posterior direction. On chewing surfaces of four tubercles placed: two buccal and two lingual, separated by an H-shaped groove. On the front-lingual hill from the lingual surface of an additional hump (Carabelli). What tooth:

A lower first molar

B The lower first premolar

C upper first molar

D The upper second molar

E The lower second molar.

9. tooth cavity has doloto- or spindle-shaped, gradually gradually transformed into a circular shape of the root canal. Which teeth cavity has a form:

A lower incisors

B lower premolars

C upper premolar

D of the upper first premolars

E upper canines and incisors

10. The tooth cavity has a slit-like shape elongated in the bucco-palatal direction, passing in two relatively narrow channels. The tooth has a cavity of this form:

- A lower premolars
- B First upper premolar
- C Upper canine
- D top of the second cutter
- E The lower second premolar

11. The tooth cavity is shaped like a cube, slightly narrowing towards the neck of the tooth. The bottom has the shape of a triangle in which two angles of medial mouth has two root canals medial, distal and - the distal root. What is a tooth has a cavity of this form:

- A second upper premolar
- B The lower second premolar
- C upper first molar
- D The upper second molar
- E The lower first molar

12. The tooth cavity in cross section has a triangular shape tapering slightly towards the cervix. The bottom has the shape of a triangle, which are located at the vertices of the mouth of the root canal: palatal and two buccal - medial and distal. The tooth has a cavity of this form:

- A upper third molar
- B The lower second molar
- C upper first molar
- D The upper second molar
- E The lower second molar?

13. Topographic and anatomic features of the pulp chamber 15 and 16 teeth to reveal:

- A. The curvature of the palatal wall

- B. Speaking at the vestibular wall
- C. Form of the medial wall
- D. Form distal wall
- E. Number of the pulp horns on the roof of the pulp chamber

14. After the opening of the cavity in the tooth 24 during inspection and probing discovered the mouth of two root canals - palatal and buccal. Location of the channel should still install?

- A. medial
- B. buccal (medial or distal)
- C. palatal (second row)
- D. distal
- E. correct answer is no, because the two 24 tooth root canal

15. The success of the treatment of inflammation of the tooth pulp is largely dependent on the knowledge of its anatomical and histological structure. A cross section of the pulp histologically there are several layers. Select the layer that is not characteristic of the tooth pulp.

- A. subendothelial
- B. Peripheral
- C. Subodontoblast
- D. A layer of stellate cells
- E. The central layer

16. Which of the pulp layer is formed odontoblasts?

- A. Central
- B. Peripheral
- C. Subodontoblast
- D. cambium
- E. Upper



6. Materials of methodical maintenance of the lesson.
- 6.1. Setting SELF initial level of knowledge - abilities.
  1. Teeth Names, terms of dental eruption.
  2. Differences between enamel and dentin
  3. Chemical content of enamel and dentin

Recommended literature:

Recommended literature:

Basic literature:

31. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkham I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theodore M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.2. The information necessary for the formation of knowledge, skills can be found in textbooks

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To learn the anatomy of the permanent teeth of the upper and lower jaw	Draw in your notebook permanent teeth of the upper and lower jaw	
2.	Learn the differences between permanent teeth by the time	Write out in your notebook the main differences from the time the permanent teeth	
3.	To learn histological structure of tooth tissue	Create handwriting structure "Histological structure of the tooth tissues"	

### 7. Materials for self-control of quality of training.

#### I - Questions for self-control:

1. Write the anatomical, clinical and WHO formula for constant teeth.
2. Describe the anatomy of the permanent incisors upper and lower jaws.
3. Describe the anatomy of the permanent premolars upper and lower jaws.
4. Describe the anatomy of the permanent molars of the upper and lower jaws.
5. Describe the structure of the chewing surfaces of upper and lower permanent molars.
6. Describe the histology and clinical significance of the enamel.
7. Describe the chemical structure of the enamel.
8. Name and describe the structural and functional unit of the enamel.
9. Describe the histology and clinical significance of dentin.
10. Describe the chemical structure of dentin.
11. Describe the histology and clinical significance of cement.
12. Describe the chemical structure of cement.

13. Describe the histology and clinical significance of the pulp.

II - Tests for self-control:

1. What tissue has crown:

A. Enamel

B Dentin

C dentine and cement

D enamel and dentin

E From the enamel, dentin and cement?

2. In the form of compounds which are minerals in tooth enamel:

A different form of phosphate in calcium salts

B calcium phosphate, calcium carbonate

C hydroxyapatite karbonapatity, chlorapatite, fluorapatite

D in the form of various salts of calcium carbonate

E Karbonapatity, chlorapatite, fluorapatite?

3. What is the mineralization of tooth enamel:

A mineral concentration is the same in all layers of the enamel

B The concentration of minerals more than in the inner layers of enamel

C concentration of mineral substances greater in the outer layers of enamel

D and calcium salts of fluorine is uniformly distributed throughout the thicker enamel

E fluorine salts uniformly distributed throughout the thickness of the enamel?

4. What kind of apatite is in the tooth enamel:

A in the surface layers relatively more fluorapatite, deep – karbonapatit

B in the outer layer of enamel over hydroxyapatite

C apatite whole uniformly distributed in the tooth enamel

D in the outer layer of enamel over carbonate-apatite

E In the inner layer of the enamel hydroxyapatite longer?

5.

What is the organic matter in tooth enamel:

A greater concentration of organic matter in the outer layers of enamel

B evenly as network structures throughout the thickness of the enamel

C greater concentration of organic substances in the inner layers of enamel  
Organic substance

D enamel absent

E is 20% of the enamel structure, more on the surface?

6. Where is mainly containing the organic matter of enamel:

A in the netting structure of the enamel prisms

B mainly enamel substance in mezhprizmennom

C greater concentration of organic substances in the inner layers of enamel

D enamel absent

E Mainly slats and spindles beams enamel

7. What is the structure of the enamel:

A homogeneous high level of mineralization substance which contains up to 95% of inorganic substances

B high level of mineralization crystal-structure that consists only of mineral substances  
Ordered

C as prisms complex apatite crystals and 3.2% organic matter

D high level of mineralization substance which consists of crystals of calcium salts

E crystals of apatite and amorphous calcium salt between them?

8. As a result, formed the band-Gunter Shregera:

As a result, non-uniformity of accommodation of enamel tufts

B As a result of the alternation of the longitudinal and transverse sections of enamel prisms

C As a result, non-uniformity of mineralization of enamel prisms

D As a result of mineralization intervals between prisms

E As a result, the homogeneity of mineralization of enamel prisms?

9. What is the Retzius lines of the enamel:

A Lack of mineralization intervals between prisms

B accommodation enamel tufts

C Alternation of longitudinal and transverse sections of enamel prisms

D boundaries between layers of enamel with different levels of salinity

E Optical crossing ground joint effect of cross-sectional beams enamel prisms?

10. What is enamel plates (lamellae)

A Retzius lines with the least amount of mineral substances

B boundaries between layers of enamel with different levels of salinity

C collected in bundles of enamel prisms

D sheet-like structures are not mineralized enamel substance between prisms

E The most seen lines of Gunter-Shreger?

11. What is Thomas's fiber:

A long process odontoblast

B Long processes adamantoblast

C Long processes cementoblasts

D Long processes ganoblast

E Long processes odontoblasts?

12. On the basis of what is isolated and mantle vasodentin:

- A Whipcord dentin adjacent to the enamel and dentin around the pulp
- B Based on the varying degrees of mineralization of dentine layer
- C, depending on the direction of the collagen fibers of the basic substance dentin
- D content of various organic materials in these layers dentin
- E based on a different number of dentin tubules in the dentin layer of the?

13. What is the secondary dentin:

- A primary insufficiently mineralized dentin organic matrix in which the deposition of mineral salts occurs when the dentin mineralization
- B dentin with a somewhat different structure, which occurs after the teeth erupt
- C rich in organic matter dentin of the teeth that have not erupted
- D dentin areas, which are directly adjacent to the enamel-dentine border
- E primary deepest facing the enamel substance not calcified vasodentin?

14. What is denticle:

- A cluster of organic matter dentin that resemble globules
- B accumulation of minerals in the ground pulp injury
- C dentin areas with high mineral content of the basic substance and tubes
- D sections of dentin, in which the contents of the dentinal tubules tested disintegration
- E, which consists of dentin and dentinopodobnoy tissue and located in a pulp?

15. Does the tooth enamel permeation:

- A permeable, but only for organic substances ions
- B penetration, but only for the ions of inorganic substances
- C permeability to many organic and inorganic substances
- D highly mineralized tooth enamel impervious to minerals





B) determine the number of bumps and the pattern formed by the fissures on the chewing surfaces	
2. Inspect the root part of the permanent teeth:  A) to determine the number of roots and give them a name  B) determine the sign of the root curvature	The roots of the incisors and canines deflected laterally relative to the longitudinal axis of the tooth, and the roots of molars and premolars - rearward relative to the longitudinal axis of the tooth
3. Сделать заключение о принадлежности зуба к верхней или нижней челюсти, правой или левой стороне	

Professional algorithm for mastering practical skills and professional skills

Learning activity	The sequence of execution	Control of the correct implementation
Draw the longitudinal grinding of the tooth	Show band Gunther-Shregera	The lines of Gunther-Shreger's appear as dark and light stripes, alternating between them and go from the enamel-dentine connection to the enamel surface
	Draw the lines of Retzius's	The lines of Retzius' Are crossing the Gunther-Shreger's lines at an acute angle.

	Draw the mantle dentine	Fibres Korf's located perpendicular to enamel-dentine connection.
	Draw the dentine around the pulp	Collagen fibers (Ebner) located not parallel to the walls of the dentinal tubules, but more tangentially.
Draw transverse tooth grinding.	Draw the Retzius' lines	They have look of concentric rings

10. Materials for self-preparation of knowledge and skills provided by this work.

10.1. Use the test at different levels from the department test bank.

11. The theme of the next session: practical skills on phantoms.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 7**

**" Classification caries cavities by Black.**

**Principles of preparation. Stages of preparation  
cavities. The purpose of the instruments."**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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## 1 The topic of lesson:

Classification of caries cavities by Black. The preparation principles.

## 2. Relevance of topic:

The study of the principles of the preparation of cavities allows to form these cavities correctly, provide a secure fit seals and prevent the occurrence of secondary caries.

### 3. Lesson aims:

#### 3.1. Common aims:

- Have a basic understanding of the carious process and describe the mechanism of its development
- Know the classification of caries on different grounds.
- Know the classification of cavities by Black
- Learn the basic principles of the preparation of cavities

#### 3.2. Educational objectives are related to:-

The need to form a student of the principles of medical ethics and deontology- The need for timely dental health

- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional the doctor responsible for the patient's share and its performance

#### 3.3. particular goals

- Know the principles of preparation cavities
- Know the classification of cavities by Black
- Know the classification of dental caries on different grounds.

#### 3.4. On the basis of theoretical knowledge on the subject:

- Apply the principles of preparation, depending on the individual case.

#### 4. Interdisciplinary integration.

Subject	To know	To be able
1. Preliminary disciplines to ensure the study of therapeutic dentistry		
- Human anatomy	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.
- Physiology	The physiological role of saliva against the teeth. Physiological function of the oral cavity.	Determine normogramu blood, conduct functional tests
- Histology and Embryology	Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).	Prepare histological preparations of dental hard tissues and organs of the mouth. Determine the type of fabric, decipher preparations
2. The following disciplines provided by this discipline		
Surgery, prosthodontics, pediatric dentistry	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula
3. Internally substantive integration - integration with all topics of preclinical cours		

5. The content of lessons G.V. Black proposed a classification of the five classes of cavities depending on their location on the various surfaces of teeth crowns. It is of great practical importance in the case of surgical treatment of dental caries by the preparation and further seal the cavities.

For Class I include cavities, located in the natural fissures and pits on the occlusal (chewing), buccal and lingual (palatal) surfaces of molars and premolars and the lingual (palatal) surface of the incisors;

class II - cavities on the contact surfaces of molars and premolars;

class III - located on the contact surfaces of incisors and canines;

Class IV - Class III cavities in violation of the integrity of the angle and the cutting edge;

Class V - located in the necks of the teeth groups.

Classification of dental caries

## I. Clinical

1. Initial caries (acute, chronic).
2. Surface caries (acute, chronic).
3. Average caries (acute, chronic).
4. Deep caries (acute, chronic).

## II. localization

1. fissure caries.
2. Contact (approximal) caries.
3. Cervical caries.
4. Circular caries.

## III. With the flow

1. Acute caries.
2. Chronic caries.
3. The acute caries.
4. Blooming caries.
5. Recurrent (secondary) caries.

## IV. According to the intensity of destruction

1. Single lesion.
2. Multiple lesions.

## V. Anatomical classification (WHO)

1. Dental caries enamel.
2. Caries of dentin.
3. cement caries.4.

Suspend caries.

5. Odontoclasia.

6. Other.

7. Unspecified.

VI. In the presence of complications

1. A simple (uncomplicated) caries.

2. Complicated caries.

During the preparation of the cavity completely remove all infected carious process hard tissue of teeth. Sometimes the preparation of so-called expanded to immune zones (for example, hillocks occlusal surface), i.e. to areas which rarely develop cavities. Recommended at the time Mr. Black prophylactic extension of the prepared cavity with the inclusion of all the fissures of the chewing surface is now rarely used. More rational is proposed Lukomsky I. (1948) The principle of biological expediency, when, during the preparation remove only carious dental hard tissue. According to this method, the maximum retain healthy tooth tissue.

The main method of treatment of caries is the removal of diseased dental hard tissues (enamel and dentin), is cavity preparation, followed by reduction of the anatomical shape of the tooth filling materials.

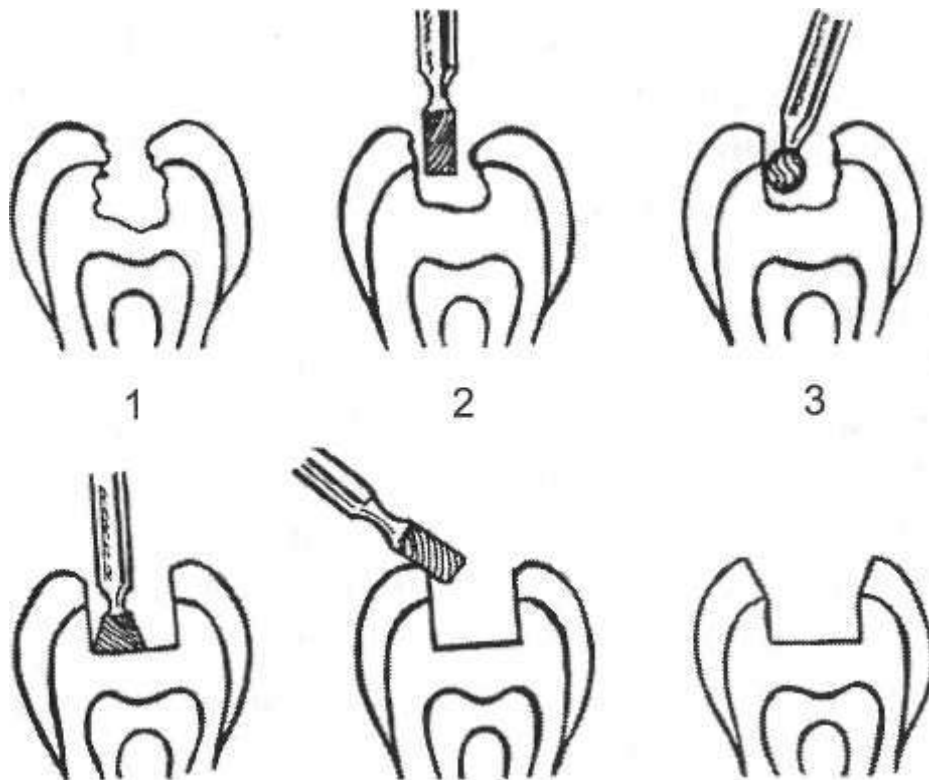
The preparation is carried out in accordance with the class of cavities by G. Black, current nature and depth of the caries process, a kind of filling material to be used. Preparation is aimed at complete excision of abnormal dental hard tissue to stop further progression of caries process, the creation of conditions to secure the seal. Filling materials have certain disadvantages: insufficient joining strength to the hard tissues of the teeth, the lack of overall strength, fragility, sometimes considerable polymerization shrinkage, lack of fit, etc. Therefore, you must strictly adhere to the rules of preparation cavities and the formation of some form. This is the primary condition for the fixing of the filling material in the tooth and the long term existence of high-grade seals. No matter what class (according to G. Black) include a cavity, preparation consists of a number of mandatory and consecutive stages.

1. Opening and expansion cavity.

2. Necrotomy (removal of devitalized tissue).

3. Forming of the cavity.

4. Processing of the cavity edges.



Stages of cavity preparation:

1 - cavity before preparation; 2 - Disclosure and expansion cavity; 3 - necrotomy; 4 - the forming of a cavity; 5 – Processing of the enamel edges; 6 – Prepared cavity

## 6. Materials of methodical maintenance of employment

### 6.1 Tasks for self source of knowledge1.

What are the classification of dental caries used?

2. The classification of dental caries is characterized by Black?

3. What are the main principles of the preparation of cavities and their essence?

Recommended literature:

Recommended literature:

Basic literature:

37. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign



- students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: 'ASMI', 2016.-2016.-191p.
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-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

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-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

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6.2. The information necessary for the formation of knowledge, skills can be found in textbooks

6.3. Orienting card for self work with literature on the topic

№	Basic tasks	Instructions	Replies
1.	Update knowledge of safety when working with dental units	Know the types of dental units, methods of their work	
2.	Learn the classes of caries cavities by Black	Draw in your notebook cavities of the classes by Black	
3.	To learn the basic principles of preparation of hard tissues	Define each class by Black, preparation principles - the principle of Black, Lukomsky principle.	

7. Materials for self-control of quality of training

A. Questions for self-control 1.

What is tooth decay, its classification localization, depth and flow?

2. Which cavities are cavities of class 1?
  3. Which cavities are cavities of 2 class?
  4. Which cavities are cavities of Class 3?
  5. Which cavities are cavities 4 class?
  6. Which cavities are cavities 5 class?
- B. Tests for self-control1.

During the examination of patient you have found the caries cavity on the palatal surface of 12 tooth. What class by Black this cavity is?

- A. 1 class
- B. class 2
- C. class 3
- D. class 4
- E. class 5

2. On examination the patient 27 years you have found the caries defect on the necks of 45,44,34,35 teeth, sharply painful when probing. What class by Black these cavities are?

- A. 1 class
- B. class 2
- C. class 3
- D. class 4
- E. class 5

3. The modern dental units as a drive to the mechanical tip is usually equipped with microengine. What is the working tool speed range micromotors provide?

- A. 0 - 3000 rev / min
- B. 1000 - 30000 rev / min
- C. 10000 - 100000 / min

D. 100,000 - 500,000 rev / min

E. 0 - 10000 rev / min

4. One of the tools that are often used in the treatment of teeth is ironing spatule. What stage of filling cavities performed with this tool?

A. Mixing of the filling material.

B. Adding material into the cavity.

C. Simulation seals.

D. Adding insulating gasket.

E. Formation of the insulating gasket.

5. Describing the possibility of the dental unit, the manufacturers often use the term "turbine trio". What are the required elements necessarily include in this concept?

A. Three turbine handpiece various capacities.

B. The turbine handpiece, Puster air gun for water.

C. Air Puster, saliva ejector, turbine handpiece.

D. The turbine, mechanical, angle and straight handpieces.

E. Air Puster, mechanical and turbine handpieces.

6. You have to prepare tools for cavity preparation 3 class. The proposed set has several elections with marking rings of different colors. Select from the offered diamond bur with the very coarse-coated:

A. White.

B. Red.

C. Black.

D. Blue.

E. Green.

7. In preparation for the practical part of the lesson you find little fault of electrical connecting plug. What will you do in this situation?

A. continue.

- B. I will try to remedy the problem.
- C. I will try to include in the plug socket and continue to work.
- D. Report faults teacher.
- E. Discard the performance of the practical task.

8. The common clinical dental formula proposed by the WHO formula. How digital index in this formula denotes the third right molar in the lower jaw?

- A. 53.
- B. 33
- C. 18
- D. 48.
- E. 26.

9. Patients underwent surgical treatment cavity of 3 class. What is the difference between cavities 2 and 3 class?

- A deep lesions
- B. affected surface
- S. The functional group of teeth.
- D. Distance to the pulp chamber.
- E defeat layers of dentin.

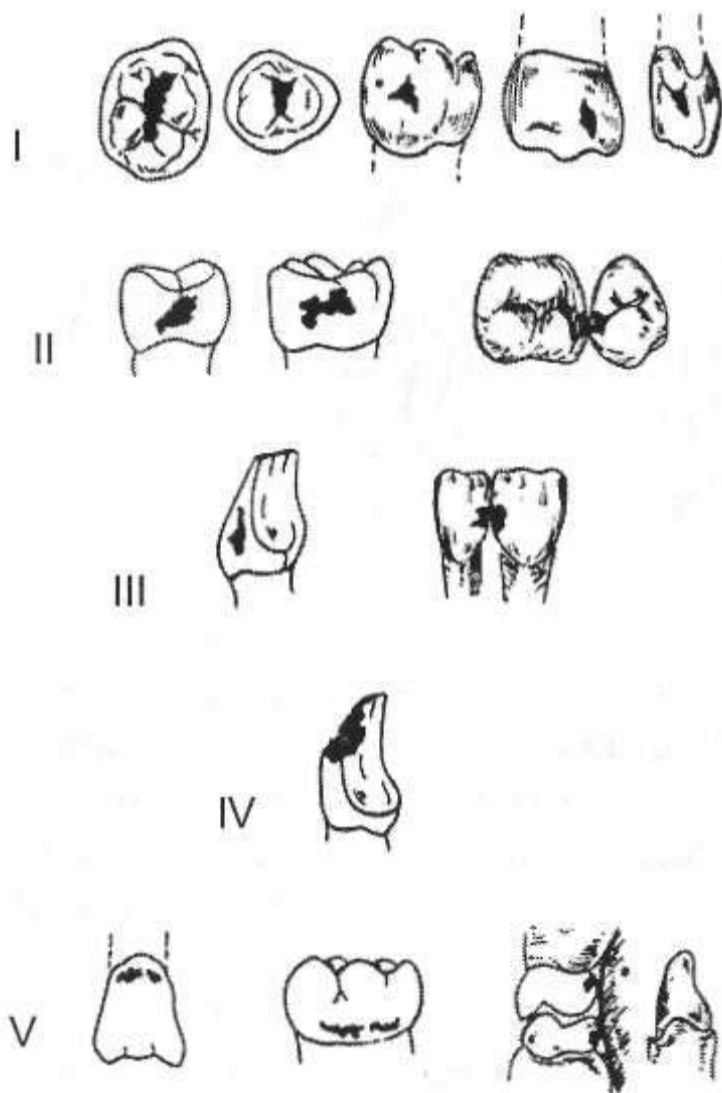
8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session:

Determine the class of cavities by Black on phantoms

9. Instructional materials for learning skills

9.1. Methods of work, execution steps



10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used cathedral databank tests)

11. The topic of the next session:

Stages of preparation (dissection) of caries cavities. The aim of preparation.  
Instruments.

Wrote by

Aksinorska O.I.

# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic dentistry

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 8**

**"Preparation of caries cavities of 1<sup>st</sup> and 5<sup>th</sup>  
class by Black "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: Preparation of caries cavities of 1<sup>st</sup> and 5<sup>th</sup> class by Black

2. Relevance of topic:

Intact enamel - a reliable barrier that protects the tooth from decay. Caries spreads deep into the tissues of the tooth, the direction of the enamel prisms. prisms different direction - on the chewing surface, deep fissures and approximal surface of the tooth. The study of the principles of the preparation of cavities I and V class Black allows you to create the cavity properly ensure a secure fit seals and prevent the occurrence of secondary caries.

3. Lesson aims:

3.1. Common aims

- Read the anatomical and topographical features of the tooth
- Learn the basic principles of the preparation of cavities- Read the dissection cavities 1 and Class V, forming, depending on the depth of the defeat of the different types of cavities

3.2. educational aims

- To familiarize with the knowledge of oral hygiene in order to prevent caries
- Read the necessity of timely dental health
- Formation of students deontological skills

3.3. Particular aims

- Know the stages of preparation of the teeth
- To know the techniques of preparation of cavities I and Class V

3.4. On the basis of theoretical knowledge topics

- Master the techniques of preparation of cavities I and Class V
- Master the steps of the preparation of cavities
- To be able to use a variety of drills during the various stages of preparation
- Read the anatomical and topographical features of the tooth
- Learn the basic principles of the preparation of cavities



- Read the dissection cavities 1 and Class V, forming, depending on the depth of the defeat of the different types of cavities

#### 4. Interdisciplinary integration.

Subject	To know	To be able
1. Preliminary disciplines to ensure the study of therapeutic dentistry		
- Human anatomy	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.
- Physiology	The physiological role of saliva against the teeth. Physiological function of the oral cavity.	Determine normogramu blood, conduct functional tests
- Histology and Embryology	Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).	Prepare histological preparations of dental hard tissues and organs of the mouth. Determine the type of fabric, decipher preparations
2. The following disciplines provided by this discipline		
Surgery, prosthodontics, pediatric dentistry	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula
3. Internally substantive integration - integration with all topics of preclinical cours		

#### 5. Content of the topic.

When dissection cavities 1 class, depending on the location and extent of the process to form these types of cavities: rectangular, diamond-shaped, cross-shaped, oval. Cavities located on the chewing surface of the tooth in the fissures, called the center. In Class 1 cavities, which are formed in the pits language and vestibular surfaces of the teeth, when dissection should be aware of the close proximity of the pulp. Creating a cylindrical cavity or a rectangular shape. Class V cavities dissected in the cervical portion of any tooth in the buccal or labial surfaces. The lower boundary of the cavity extends beyond the gingival margin, the upper reaches of the equator of the tooth crown. Cervical caries develops, spreads in the medial-distal direction. The cavity is typically formed of a cylindrical or oval-cylindrical shape or conical fissure burs, boron is set perpendicular to the treated surface. In some cases, a cavity "transferred" to the contact surface of the tooth.

## 6. Materials of methodical maintenance.

### 6.1. SELF-ASSESSMENT initial level of knowledge, skills.

#### Task 1

On the occlusal surface of the tooth 16 in the fissure identified closely spaced cavities. As the cavity 1 class.

#### Task 2

As to form a cavity, if one tooth carious lesions localized on the chewing surface of the groove and the buccal surface?

#### Task 3

At the bottom of the treatment cavity class V cone boron installed perpendicular to the chewing surface of a tooth, and in the processing wall sloping towards the workpiece. Correct whether these actions?

#### Task 4

Cavities are located on the gum and the buccal surface of the tooth 46, the crown above the equator, have the common wall facing the occlusal surface. What is the strategy of forming of cavities in this case?

6.2. The information necessary for the formation of knowledge, skills can be found in textbooks

Recommended literature:

Recommended literature:

Basic literature:

43. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
44. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
45. Harty F.J. Endodontics in clinic practice. -1994. – 366 p.

46. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
47. Peter Heasman. Restorative Dentistry, Pediatric Dentistry and Orthodontics.- Churchill Livingstone. – 2003. – P.378.
48. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Imprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
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4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambridge, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

- <http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>
- <http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To learn the topographic anatomy of tooth	List all features of tooth	
2.	Histology of dental hard tissues. Dissection of cavities I and V classes.	Write all histologically structure of tooth To write the scheme of cavity preparation for I and V class.	

### 7. Materials for self-control of training quality

1. What are the options cavities occur in 1 class in Black?
2. What are the features of preparation cavities are at different variants of cavities?
3. What are the features of the processing and the formation of cavities class V?
4. Which burs are used for necrotomy and formation of cavities class I and V?

#### B. Tasks:

1. Caries is located on the two surfaces simultaneously – occlusional and buccal. In the 6 tooth holds a thin layer of enamel and dentin between the cavities, and in the thick layer of the tooth 7th. Which option is the formation of cavities and in the second case, justify.
2. Caries in 6 tooth struck simultaneously chewing, oral and buccal surface above the equator. Which option, its rationale, and what kind of cavity is formed?

3. A carious cavity by buccal, and the other in the tooth 7 is located in the cervical region and the other in the pit blind. Between these cavities thin bridge of enamel and dentin. Which feature of the preparation of these cavities. Which version is used in this situation?

4. 6 one tooth carious cavity located in the cervical region, the other in a blind fossa. between these cavities thick partition of enamel and dentin. Cervical cavity partially covered by gingival margin. Which feature of the preparation of these cavities. Which option is used at the same time?

5. In the cervical area of the tooth 3 carious cavity has the form of demi-alveolus. In which direction produces the formation of cavities. What is its depth and in what way ensures a secure fit of filling material? Cavities in the tooth 1 is annular. How formed this cavity?

8. Materials for the classroom self-study:

8.1 List of educational practical tasks which must be carried out during the practice session:

1 Draw a cavity 1 class after preparation, noting its elements.

2. Draw cavities class V to preparation.

3. Draw the basic shape of the cavities made by a boar

9. Instructional materials for learning professionally abilities, skills:

9.1 Methods of work, stages of implementation:

Take the contra-angle handpiece.

Take Fissure boron and uncover cavity class I and V.

Take the spherical boron expanding cavity.

Take Fissure and tapered boron and form a cavity.

Take the finishing burs and smooths the edges of the cavity.

10. Materials for self-control of knowledge and skills set out in this work.

10.1 Tests of different levels (used department's databank tests)

11. The topic of the next lesson "Preparation of caries cavities class II by Black."

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 10 "Preparation of the caries cavity of 3d 4<sup>th</sup> class by  
Black"**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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1. Topic: Preparation of the caries cavity of 3d an 4<sup>th</sup> class by Black

2. Relevance of topic:

Due to the difference of development and the formation of different types of cavities all kinds of cavities can be divided into five classes according to Black. This separation is dictated by the fact that each of these cavities has its own characteristics in processing and forming the cavity.

The front teeth (incisors and canines), except for the important functional purpose, are of great aesthetic value, but because at preparing these teeth should be especially careful to avoid all sorts of complications (breaking off of the crown, etc.).

3. Lesson aims:

3.1. Common aims:

- Learn the art of preparation of cavities 3-4 class

3.2. Educational aims are related to:

- The need to form a student of the principles of medical ethics and deontology

- The need for timely dental health

- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries

- Formation of students' psychological and legal professional doctor responsible for the patient's share and its performance

3.3. Specific objectives:

- Know:

1. Classification of cavities by Black

2. Stages of preparation cavities

3. Features of the preparation of cavities 3 class Black, depending on the clinical situation

4. Tools used for the preparation of cavities

3.4. On the basis of theoretical knowledge on the subject:

- Be able to:

dissect cavities class III, IV and the various options of various localization

4. Interdisciplinary integration.

Topic	To know	To be able
1. Preliminary disciplines to ensure the study of therapeutic dentistry		
- Human anatomy	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula.
- Physiology	The physiological role of saliva against the teeth. Physiological function of the oral cavity.	Determine normogramu blood, conduct functional tests
- Histology and Embryology	Histological structure of hard dental tissues (enamel, dentin, cementum), tooth development (embryogenesis).	Prepare histological preparations of dental hard tissues and organs of the mouth. Determine the type of fabric, decipher preparations
2. The following disciplines provided by this discipline		
Surgery, prosthodontics, pediatric dentistry	Anatomy of maxillofacial region. Anatomy of the teeth and the oral cavity.	Identify the different groups of teeth in the upper and lower jaw. Record the teeth formula
3. Internally substantive integration - integration with all topics of preclinical cours		

5. Content of the topic.

Caries in incisors and canines often develops in the joints of the two adjacent teeth, ie, on the interproximal surfaces. Class III cavities are localized on the approximal surface or apply to the lip, palate or lingual surface localized on the two contact surfaces of the crown or simultaneously hit the side surfaces and the cervical area. Such a diverse localization of caries process determines the modification of forming cavities. Interproximal surfaces of anterior teeth are triangular in shape. Therefore, the physician forms a cavity in the shape of a triangle. The incisors and canines cavity triangular shape created so that the base of the triangle was at the papilla, and the top - facing the cutting edge of the tooth. Such a cavity having the gingival, labial and lingual walls and bottom faces to pulp extend only in cases where the labial and lingual walls rather thick and strong. A



prerequisite for the formation of cavities in these teeth would be of sufficient size interdental slit - natural or created by means of a separator. If you can not push the teeth or the enamel on the lingual surface of the tooth dentine has the basics, then it creates a cavity of triangular shape, with the "output" it on the lingual surface. Just do when carious cavity is shallow and has a large area on the terminal, and hence the opportunity to fix it seals minimal. Cavity dimensions depend on the degree of damage to the walls of the pathological process and their availability. Prepare a trepanation cavity to unaffected areas of the palatal enamel surface of the tooth for aesthetic reasons than on the labial surface of the crown to the junction with the cone-shaped cavities or kolesopodobnym burs small sizes (№ 1 and № 3). Nekroektomiyu carry sharp excavator. Particular attention in this operation is paid to the removal of pigmented dentin, so as not to "viewed" through the enamel of the labial surface of the tooth crown.

Formation of cavities class III. When struck by the contact surfaces or canine incisor and thus have good access to the affected area, a cavity is formed as a triangle or oval. With extensive cavities class III for the purpose of better fixation seal cavity to provide additional lingual or palatal surfaces of the teeth. The bottom of the cavity in the surface and middle class III caries are formed flat by a cone-shaped or fissure bur elections enshrined in the angular tip. Tapered bur dissected in the interdental spaces and fissure bur - on the lingual surface; the same burs formed cavity walls - gingival, labial and lingual and extra pad on the lingual surface. When dissecting the gingival wall of the conical burr set parallel to the axis of the tooth and moved in labio-lingual direction when dissecting the labial and lingual walls of the cone or fissure forests moved from the gingival wall to the cutting edge of the tooth. With deep cavities class III, to prevent the disclosure of the pulp, is allowed the formation as a wave shape bottom. For better fixation of the filling material in such cavities it is advisable to create additional recesses - bearing holes in the direction of the cutting edge and cuts on the gingival, labial and lingual walls of the cavity via wheel looking bur or small globular burs. In shallow and wide cavities for better fixation of the seal is necessary to create strong points - pits and cuts. With a significant destruction of the gingival wall when the carious process has spread to the root cement, should fully disclose the gingival edge of the cavity, and then create a flat gingival wall of the general principle. Often caries interproximal surfaces of incisors and canines accompanied by the growth of the gingival papilla and by growing it in a cavity of the tooth, making it difficult to access the oral cavity and the correct preparation. In this case, you must first remove the cavity soft cloth slowly and gently push the gum gutta percha or semi dentin. Radical excision of manipulation is

hypertrophied papilla or diathermocoagulation to full disclosure of the gingival margin cavity.

Cavities 4Class by Black localized on the approximal surfaces of incisors and canines with violation of the cutting edge. Most carious process also affects the vestibular, oral surface of the tooth, the cervical area, a variety of localization of caries process requires careful and qualitative formation of a cavity for a good fixation of the seal. In cases where the tooth is located and access to tight cavity missing first portion carried removal of enamel and dentin surfaces according oral lesion, and then expanded and formed it. The bottom of the cavity in shallow lesions are formed flat, with deep cavities, to prevent disclosure of the pulp, it is permissible to do like a wave to avoid the pulp horns. Attention is focused on the careful removal of pigmented dentin on the buccal enamel to prevent raying it through enamel. When lesions formed shallow cavity has a triangular shape in extensive lesions of the oral surface to provide additional space, which, depending on the spread of caries process may be in the form of an oval, rectangle, etc. at right angles to the main cavity within the mantle dentin in length and have at least  $1/4 - 2/3$  of the width of the oral surface of the tooth.

6. Materials of methodical maintenance of lesson.

6.1 Specifying source for self-control knowledge

1. What are the tools used for inspection of the oral cavity?

2. What tools are used for the preparation of cavities?

3. What are the stages of preparation of cavities?

4. What are the elements of the cavity?

5. What are the requirements for the establishment of the bottom and walls of cavities?

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

49. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
50. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
51. Harty F.J. Endodontics in clinic practice. -1994. – 366 p.
52. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
53. Peter Heasman. Restorative Dentistry, Pediatric Dentistry and Orthodontics.- Churchill Livingstone. – 2003. – P.378.
54. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Sounders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.

10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

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-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskikhzabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskikh-zabolevaniy-skorikova.html>

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-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

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6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To learn the topographic anatomy of tooth To learn the mechanism of appearing of cavities of 3d class	To substantiate the principle of preparation of approximal cavities	
2.	Explore features of the preparation of cavities 3class	Write principles and methods of treatment cavities 3 classes, depending on the clinical conditions	

7. Materials for self-control of training quality

A. Questions for self-control.

A. Questions for self-control

1. Which cavities are 3 class according to Black classification?

2. What are the features of the preparation of cavities 3 class in the absence of a neighboring tooth?

3. What are the features of the preparation of cavities 3 class in the presence of the adjacent teeth?

4. What form should have formed carious cavity 3 class Black?

5. Which burs are used for dissection cavities Class 3?

B. Tests for self-control

1. Types of cavities 4 class.

2. Features of the formation of cavities 4 class.

3. Features of the formation of the bottom cavity 4 class.

4. Which burs are used during the preparation of cavities class 4?

5. Possible formation of additional platforms.

6. What are the elements you can create additional cavity for good fixation of filling material?

B. Tests for self-control:

1. cavities located on the contact and the chewing surfaces of teeth 34 include (by Black) to:

a) class 4;

b) 3 class;

+ B) Class 2;

g) class 1;

d) 5 class.

2. Cavities located on the approximal surface of the tooth 21 in violation of the integrity of the angle include (by Black) to:

+ A) class 4;

b) 3 class;

c) Class 2;

g) class 1;

d) 5 class.

3. The cavities in the tooth 13, located on the approximal surfaces in the cervical region include (by Black) to:

a) class 1;

b) Class 2;

+ c) 3 class;

g) class 4;

d) 5 class.

4. The third phase of the preparation of cavities include:

a) The opening and expansion of the cavity;

+ B) forming the bottom of the cavity;

c) necrotomy;

g) forming a wall;

d) forming a cavity edges.

5. Expansion cavity 4 class by Black through:

a) the vestibular surface,

b) chewing surface; c

) a contact surface;

+ R) oral surface;

d) gingival surface.

1. Cavities located on the chewing surface of the tooth 36 include (by Black)

A. class 4

B. 3 class

C. 1 class

D. Class 2

E. 5th class

2. Cavities located on the contact surface 24 of the tooth include (by Black)

A. class 4

B. 3 class

C. 1 class

D. Class 2

E. 5th class

3. Cavities located on the contact surface 12 of the tooth in violation of the corner safely carry (by Black)

A. class 4

B. 3 class

C. 1 class

D. Class 2

E. 5th class

4. Cavities, located in the neck of the tooth 24 include (by Black)

A. class 4

B. 3 class

C. 1 class

D. Class 2

E. 5th class

5. The second stage of the preparation of cavities include:

A. Disclosure and expansion cavity

B. Formation of the bottom cavity

C. Necrosectomy

D. Formation of cavity walls

E. Formation of the cavity edges

6. Access to the cavity 3 class by Black through:

A. vestibular surface

B. palatal surface

C. chewing surface

D. contact surface

E. gingival surface

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be carried out during the practice session:

1. Master the technique of preparation of cavities 3 class Black, depending on the clinical situation

9. Instructional materials for learning skills

9.1. Methods of work, execution steps. The circuit-oriented basis of action at preparing cavities class III

Stage of work	Devices and conditions for working	Criteria of self-control
1. Take a phantom lock it in the occlude 2. Take the tray with a dental tool 3. Pick up tips 4. Take the set of burs 5. Check the grounding drill 6. Connect the tip with the sleeve and turn the rheostat 7. Place the bur in handpiece in the tip and check its fit, turn on the machine, check the	phantom in occludator, mirror, tweezers, probe, excavator,  angled burs: fissure, spherical, back-cone bur dental unit	Strong fixation of bur is fixed, lack of vibration a sleeve, the tip is securely connected with the sleeve (not falling, rotated around its axis) . Bur rotates clockwise and does not fall, does not vibrate The cavity on the side Turn the front teeth, without destruction of the cutting edge



<p>direction of movement of bur</p> <p>8. Identify the location of cavities</p> <p>9. Open a cavity</p> <p>10. Make necrotomy</p> <p>11. Forming cavity</p> <p>12. Process corners and edges of the cavity</p>	<p>Fissure Bur, excavator, Spherical bur, Fissure bur, back-cone diamond and carborundum head</p>	<p>Formed on-line access to the walls and bottom of the cavity</p> <p>Solid walls and bottom of the cavity</p> <p>Formed carious cavity has the form of a triangle, its base turned towards the tooth neck, and the top - to the cutting edge</p> <p>Smooth the edge of the cavity, without chipping</p>
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10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used department's databank of tests)

11. The topic of the next lesson, " Filling materials. Classification. Temporary filling materials. The composition, properties, method of use."

12. Targets for UDRS and IDRC on this topic: Draw in the Workbook options cavities 1,2,3,5 classes and draw the cavities after preparation. Paint tools in the order they will be used.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 11**

**" Filling materials. Classification. Temporary filling materials. The composition, properties, method of use."**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: Filling materials. Classification. Temporary filling materials. The composition, properties, method of use.

2. Relevance of topic:

Knowledge of chemical and physico-chemical properties of filling materials and requirements to facilitate them the correct choice of material for filling cavities depending on the class of cavities by Black, the restoration of the anatomic form and function of the tooth.

3. Lesson aims:

3.1 General objectives:

- To learn the classification of filling materials- To study the physical and chemical properties of filling materials

3.2 Educational aims:

- The need to form a student of the principles of medical ethics and deontology

- The need for timely dental health

- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications

- Formation of students' psychological and legal professional the doctor responsible for the patient's share and its performance

3.3. Specific aims:

- Know:

1. The classification of filling materials for other purposes

2. The requirements for filling materials

3. physical and chemical properties of filling materials

4. The description of temporary filling materials

5. The indications for the use of temporary filling materials

3.4. On the basis of theoretical knowledge on the subject:

- Be able to:

- Prepare the necessary filling material
- Filling cavities to hold the different filling materials

#### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic:</p> <p>Department of medical chemistry</p> <p>Department of Biophysics, Informatics and medical equipment histology</p> <p>Department Of embryology</p> <p>1. The following discipline that provided this discipline: Dentistry of child of</p> <p>2. Intra integration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues</p> <p>principles of adhesion</p> <p>Relations filling materials and hard dental tissues and histological structure</p> <p>chemical solid structure dental tissues</p> <p>Filling material for filling cavities of deciduous teeth</p>	

#### 5. Content of the topic:

The final stage in the treatment of caries and its complications is a tooth filling, tooth cavity filling of the filling material to restore the anatomical shape and the physiological function of the tooth. In modern dental practice using a wide variety of filling materials, which, however, have positive and negative properties.

For optimal clinical effect when filling tooth doctor should know the basic parameters of filling materials - their chemical nature, physical and mechanical properties, to know the reaction of the tooth and periodontal tissues in the filling

material, as well as the changes that occur in the filling material in the process of filling.

Filling materials are classified:

1) to the destination:

- permanent
- time
- therapeutic
- sealants
- For root canal obturation

2) Chemical and physical properties:

- Cement
- Plastics
- Amalgam
- Composites

Dental filling materials must meet the following basic medical and technical requirements:

- Do not dissolve in saliva
- Have the required "viability"
- Coefficient of thermal expansion in its meaning must approach the thermal expansion coefficient of the enamel and dentin
- Hardens in water or saliva
- Having a low thermal conductivity and minimal water absorption
- Have color stability
- Good to simulate tooth tissue after solidification
- Be indifferent to the tooth
- Non-toxic
- Do not give shrinkage

- Have a hardness close to the hardness of tooth enamel

It is clear that to create a filling material, which would meet all the above requirements, it is practically impossible. Therefore, the correct choice of materials, meticulous preparation cavity and precise observance of technology of use of the material allows obtaining a high clinical effect.

The quality of filling materials determines their technological, operational and biological properties. By the technological properties include material flow, solidification and the end of solidification, easy to mix; performance - strength, durability, aesthetics; in the biological properties - the degree of indifference to the tooth and mouth.

Each filling material has its own standard consistency, or normal density kneading the molding material. Knead filling material should be exactly according to instructions, which indicates the ratio of powder and liquid, essential for normal density kneading, mixing time and hardening in the tooth cavity for 15-30 minutes

As practice shows, kneading the molding material density influences the mechanical strength of the seal, its chemical resistance and duration of curing. To prolong the preservation of the seal is very important the duration of the plastic state (viability) of the molding composition. Plastic state duration time is measured, and it should be sufficient for introducing the sealing mass into the cavity of a tooth, its condensation and the formation of the seal.

However, this plastic state should not be long - reducing the risk of saliva contact with the seal. Formation and processing of seals complete with a plastic state molding material - it helps to increase the mechanical strength and chemical resistance of the seal, the mechanical strength and chemical resistance of seals also significantly affects the room temperature, which should be no higher than 20 C.

Improper mixing of the cement mass violation of powder and liquid ratio, the preparation of non-homogeneous mass, lack of condensation seals are broken and chemical and physical processes, and this implies a linear shrinkage of seals, the deterioration of fit fillings and secondary caries. Formed a sealed cavity - is the most important requirement for filling materials. Filling material, which does not provide a hermetic seal of fit, is not conducive to the restoration of the protective function and cannot prevent the development of secondary caries.

Marginal integrity is dependent on three main factors:

- Shrinkage values of the filling material in structuring;

- Coefficient of expansion;
- The adhesion of the filling material to the tooth.

The clinical condition of the seal can be estimated on the following criteria:

- Anatomically shaped
- Of fit
- color stability
- Change the color on the periphery of the seal
- The incidence of recurrent caries sealing quality significantly affects tooth function restores disturbed act of chewing, eliminates aesthetic defects of the dentition.

Depending on the location of cavities, tooth Group supplies sealing perform one or the other filling material. Thus, the cavities in the molars and premolars experiencing heavy loads during mastication, filled with filling materials, able to withstand it. In this case we can neglect the aesthetic properties of seals, since these teeth are located in side portions of the dentition. Given this, the cavities in molars often seal up amalgam. To fill the cavities using filling materials having high cosmetic properties, often composite materials in the frontal teeth.

Filling cavity consists of the following steps:

- 1) isolation of the tooth from saliva;
- 2) Antiseptic cavity;
- 3) degreasing and drying of cavities;
- 4) The imposition of an insulating or medical pads
- 5) entering into a cavity of sealing mass and condensation;
- 6) Simulation fillings;
- 7) insulation seals from the action of saliva;
- 8) grinding and polishing fillings.

Most of the filling materials irritate the pulp, so they must be isolated from it in some more indifferent material. Most often used to this end of the insulating

gasket phosphate cement, cement glass ionomer. The thickness of the gasket and depend on the type boundary permanent filling material.

Sealing of composite materials has its own characteristics, due to their structure and the type of polymerization. The presence in their composition of mineral filler leads to a lack of fit of the material to the hard dental tissues. To overcome this drawback, certain techniques are used during filling composites. In order to increase the surface of the filling material compound with enamel held its pre-etching acid. Depending on the characteristics of the adhesive composite system produced only acid etching of enamel and dentin and also for 20-60 seconds. As a result of the dissolution of enamel mineral acid components are formed in it micro pores into which penetrates the filling material. This increase in area allows for connection of the composite adhesion force to enamel and 20 MPa. Etching dentin surface results in dissolution of the contaminated layer and disclosure dentinal tubules. On the etched surface of hard dental tissue adhesive is applied to a system that provides a very strong connection with their composite material. The processing system in the thickness of the adhesive and form a hybrid dentin zone on its surface that is applied to the composite material. Adhesive composites chemical polymerization systems do not form a hybrid zone and the contaminated layer is modified.

When you are using these materials coated with an insulating gasket dentin and acid etching is conducted only enamel. Cavities are washed with clean water and dried (oral saliva contamination is not allowed). Knead adhesive and applied it to the enamel, after which the hole is immediately filled implicated to pasty consistence composite. The material is made of one or two portions with some excess. In the future conduct final processing and polishing of fillings. The composite light curing make a cavity in layers of no more than 2 mm thick.

One of the most important moments in the manufacture of amalgams is an effective seal, or condensation in the amalgam cavity. To make the amalgam in a cavity should be used amalgamtreyer. The first portion of the amalgam introduced into a cavity and carefully grind it to the bottom and walls, filling the angles between them. Subsequently, the filling material is made in small portions, carefully grind and condensed each. After filling the cavity surface of the seal model trowel according to the anatomical shape of the tooth. It is more expedient for modeling smooth seal from its middle to the edges of the cavity, trying to seal the edges of the cavity and merged with each other. This ensures a snug fit of the filling material to the walls of cavity.



Temporary filling materials intended for temporary (from a few days to 2-3 weeks) filling the cavities in the teeth during the treatment of uncomplicated and complicated caries. They are widely used to hermetically seal the cavity to insulate medicinal substances in the pulp cavity and root canals. Temporary filling materials can be used as insulating strips for permanent fillings.

Filling materials for temporary fillings should be harmless to the tissues of the teeth, the pulp and the whole body, have good ductility when introduced into the cavity to be insoluble in saliva, have sufficient strength to provide a sealed cavity and be impervious to saliva and therapeutic agents, with respect to easily deduced from the cavity after curing.

Most often, these materials are used for temporary fillings:

- 1) zinc-sulphate cement (artificial dentin)
- 2) zinc-eugenol cements
- 3) zinc-phosphate cements
- 4) polycarboxylate cements.

All of them meet the above requirements.

6. Materials of methodical maintenance of lesson.

6.1 Specifying source for self-control knowledge

1. What are the tools used for inspection of the oral cavity?
2. What tools are used for the preparation of cavities?
3. What are the stages of preparation of cavities?
4. What are the elements of the cavity?
5. What are the requirements for the establishment of the bottom and walls of cavities?

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

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Additional literature:

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2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990 Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Sounders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
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9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.

10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskikhzabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskikh-zabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the qualitative characteristics of modern filling materials	Create a table of modern filling materials	

### 7. Materials for self-control of training quality

#### A. Questions for self-control

1. The classification of filling materials for other purposes.
2. What are the requirements for the permanent filling materials?
3. Which group can be divided filling materials for permanent fillings?
4. Which filling materials are used for temporary fillings?
5. What requirements must meet the temporary filling materials?

B. Tests for self-control

1. What cavities by Black we can fill with acrylic filling materials?

A. III, IV, V

B. I, II

C. I, III, V

D. V, IV

E. II, III, IV

2. The first step in working with composites is photopolimer:

A. Provide dry cavity by use koferdam

B. Mechanical cleaning of the tooth surface of the soft plaque

C. Selection of color shade material

D. Ensuring the purity of the operational field

E. Preparation of cavities

3. What is the optimal time required for exposure of the etching gel with the use of modern adhesive systems?

A. 15 - 20 seconds.

B. 30 - 35 seconds.

C. 50 - 60 sec.

D. 60 - 90 seconds.

E. 40 - 50 seconds.

4. What is the effect on the seal of composite materials containing eugenol?

A. Violate adhesion to hard tissues of the tooth

B. change the color of fillings

C. inhibits the polymerization process

D. Violate mechanical strength

E. Raise shrink seals.

5. What are the requirements to the photopolymer lamps?

- A. The wavelength of 400-500 nm, light intensity 300-400 mW / cm
- B. The wavelength of 400-500 nm, light intensity 200-300 mW / cm
- C. The wavelength of 300-400 nm, light intensity 200-300 mW / cm
- D. The wavelength of 300-400 nm, light intensity 300-400 mW / cm
- E. The wavelength and light intensity values are not for work

6. What is the advantage macrofilled composites compared to the micro-filled?

- A short curing time
- B. Better polished and polished
- C. Stronger
- D. Do not require adhesive systems
- E. color stability

7. Which generation systems include one-component adhesive, which have properties of both the primer and the adhesive?

- A. I generation
- B. II Generation
- C. generation IV
- D. V generation
- E. III generation

8. Materials for the classroom self-study.

8.1 List of educational practical tasks which must be carried out during the practice session:

8.1. List of educational practical tasks which must be carried out during the practice session

- 1. To capture the method of closing the temporary seal cavity

9. Instructional materials for learning skills.

## 9.1. Methods of work, execution steps

### Algorithm closing cavity temporary filling

Required tools and materials:

- A set of dental tools for dental examination and treatment;
- Cotton or paper rolls, rubber dam;
- Artificial dentine;
- The glass plate for mixing.

Procedure:

1. Isolate tooth from the effects of the saliva with a cotton or paper rolls, rubber dam.
2. A dry cotton ball to remove the remnants of oral fluid from the tooth surface and the cavity.
3. Dry the carious cavity air.
4. On the glass plate cause the required amount of powder and water in dentin ratio of 2: 1.
5. Gradually add the powder in water and rubbing movement spatula to bring to a thick creamy consistency.
6. The prepared mass trowel to make a portion of the prepared cavities.
7. Conduct a simulation using tweezers with a ball of wool.
8. Hardening of temporary fillings lasts 3-5 minutes tooth cavity is sealed closed

## 10. Materials for self-mastery of knowledge

### 10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next session: Isolating and curing liners. Composition, properties.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 12**

**" Isolating and treatment liners. Composition,  
properties, method of preparation "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: "Isolating and treatment liners. Composition, properties, method of preparation."

2. Relevance of topic:

The final stage of the treatment of dental caries is tooth filling, ie filling the cavity filling material to restore the anatomical shape and the physiological function of the tooth. In modern dental practice using a wide variety of filling materials which have both positive and negative characteristics. Most of them have a toxic effect and adversely affect the pulp, causing inflammation and in some cases necrosis of the pulp. In order to prevent negative effects on the part of the pulp is necessary, according to the testimony, use isolating and or medical liners. Study materials for liners, their properties, the justification indications for their use is extremely important, as it will allow a more professional work and to avoid complications in the future.

3. Lesson aims:

3.1 General objectives:

- To learn the classification of filling materials
- To study the physical and chemical properties of filling materials
- Know the types of isolating and medical liners, their properties and the need for
- To learn the advantages of various medical and isolating liners
- Master the skills to impose medical and isolating liners in the treatment of dental caries

3.2 Educational aims:

- The need to form a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications



- Formation of students' psychological and legal professional the doctor responsible for the patient's share and its performance

### 3.3. Specific aims:

- Know:

1. The classification of filling materials for other purposes
2. The requirements for filling materials
3. physical and chemical properties of filling materials
4. The description of temporary filling materials
5. The indications for the use of temporary filling materials
6. To familiarize with different types of isolating and medical liners and their properties.
7. To learn the advantages of various medical and isolating liners.

### 3.4. On the basis of theoretical knowledge on the subject:

- Be able to:

- Prepare the necessary filling material, liner
- Filling cavities to hold the different filling materials
- Apply medical dental liner
- Apply an isolating liner according to the filling material

### 4. Interdisciplinary integration

Topic	To know	To be able
1. Previous discipline that provide the study the topic: Department of medical chemistry Department of Biophysics, Informatics and medical equipment histology	Principles of Inorganic and inter action organic acids, binders with dental hard tissues principles of adhesion  Relations filling materials and hard dental tissues and histological structure	

Department Of embryology 1. The following discipline that provided this discipline: Dentistry of child of 2. Intraintegration: It is the base for the subsequent	chemical solid structure dental tissues  Filling material for filling cavities of deciduous teeth	
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5. Content of the topic.

Filling materials for dental liners. All sealing materials used for liners, divided into 2 groups: 1-st - medical, 2nd isolating. Medical liners. All pads stacked on the bottom cavity, not more than 0.5 mm thick to achieve odontoplastic, anti-inflammatory and analgesic effect. Special materials are used for the treatment by liners.

Calcemin. This therapeutic lining consists of 2 components: a powder containing calcium hydroxide, zinc oxide, sulfacetamide, dry blood plasma and fluid, which is a solution of carboxymethylcellulose. Lining anti-inflammatory effect and stimulates the reparative dental pulp function, however, due to the expressed alkaline environment (pH 12-14), in some cases impossible to apply Calcemin as therapeutic liner. When applying it to open the pulp chamber or thin dentin bridge bottom cavity surface may occur total necrosis of the pulp. From foreign products containing calcium hydroxide, which may be mentioned:

- Dycal (Dentsply company)
- Calcipulpe (Septodont company)
- Life (Kerr firm)
- Calcimol (Voco company)
- Reocap (Vivadent company).

Calcemin with a 30% solution of Dimexidum. Therapeutic lining consists of two components: a powder kalmetsin and 30% Dimexidum solution. Dimexidum able to penetrate deep into biological membranes and to enhance the activity of a number of hospital compounds, it has anti-inflammatory, antiseptic, analgesic and fibrinolytic activities. Adding Dimexidum Calcemin contributes to, on the one hand, reduce the pH to 7-8, on the other - to potentiate the activity of all components Calcemin and promotes their penetration into the pulp chamber. Lining is mixed before use.

Biodent. Medical plastic paste containing eugenol and special curative component immunocorrector that stimulates regeneration processes in periodontal, restores the immune reactivity in the dental pulp. Liner has antiseptic properties, analgesic and sedative action of light.

The material has been used successfully for the treatment of deep caries, acute pulpitis limited by biological methods, as well as for filling root canals of teeth with apical openings emerging. Dental Material lining. Official medical paste, made from calcium hydroxide and zinc oxide on vaseline, glycerinbase with the addition of plasticizer. It has a local anti-inflammatory effect, stimulates reparative function of the pulp. Zinc-eugenol cement. The paste which is prepared prior to use of two separately stored components, eugenol and zinc oxide. It can be mixed to the consistency of a thick paste. This material has a lot of popularity in the practice of restorative dentistry, it is used as a therapeutic and lining material for filling tooth root canals. Sedative, antiseptic, analgesic effect, a beneficial effect on pulp regeneration processes, stimulates reparative function. From foreign preparations containing eugenol may be mentioned:- Salvitec (Kerr firm)- Kalsogen (Dentsply company)- Eugespad (SPAD company) "Elmek" Gel. The fluoride-containing mass of gelatinous consistency, combines the properties of solids and liquids. How solid is in the form and a certain concentration (NaF 2.21%), as a fluid diffusion properties, allowing it to be used successfully in dentistry for prophylaxis and treatment of deep caries.

The drug is bactericidal, analgesic effects, stimulates the reparative function of the pulp. The gel is applied to the bottom wall of the cavity and a thin layer, then air-dried. Lysozyme-vitamin paste. It consists of three separately stored components: lysozyme solution of vitamin A and zinc oxide. Being prepared before use, kneading is performed to a consistency of thick paste: -0.01 lysozyme, vitamin A oil - 1.0, and zinc oxide to a paste consistency. Pasta has a strong bactericidal and bacteriostatic effect, stimulates reparative function and non-specific reactivity of the dental pulp. Lysozyme - an enzyme from the class of hydrolases has antimicrobial, anti-inflammatory properties, accelerates tissue repair processes. I.A.Denisova (1981), exploring the activity of this enzyme in some toothpastes, came to the conclusion that the most active it keeps the paste, made on vitamin A, which is due to the ability to amplify the latter oxidation-repair processes and contact with intracellular lysozyme formations. Musculo-heparin paste. It consists of two separately stored components, bone meal and 0.5% heparin ointment. Being prepared before use, to a consistency of paste is mixed in a ratio of 10: 1. The clinic has a good therapeutic dentistry efekt like lining therapeutic for the treatment of acute deep caries and pulpitis limited.

It is known that bone meal is a depot of organic and inorganic substrates and is successfully used in medicine for accelerating bone regeneration, and in dentistry - to stimulate dentinobrazovaniya. Heparin has anti-inflammatory properties. The paste of the two components gives a positive effect in 92% of the pulp electroexcitability normalization occurs after 3 months, whereas in the treatment of deep caries kalmetsinom positive effect was observed in 57.9% of patients within 6 months and 82.6% of patients at 12 months. (Ershov N., 1984).

Polycarboxylate cement with potassium nitrate. This therapeutic insulating gasket comprises a polycarboxylate cement, to which liquid (40% solution of polyacrylic acid) was added 1 drop of a saturated solution of potassium nitrate and kneaded dough to a thick consistency. The resulting material is introduced into a cavity well dried, rubbed to the bottom and walls of the prepared cavity. This filling material is able to form chemical compounds with the tooth enamel and dentin by the presence of carboxylate groups, does not irritate the dental pulp. At the expense of potassium nitrate, this lining has odontotropnim, stimulates reparative function of the tooth pulp.

Combined therapeutic paste. They contain a variety of therapeutic compounds that define the main therapeutic effect made past All combined therapeutic paste made up of three components: fat base is any oil (olive, apricot, peach, clove, sea buckthorn), or oil solution of vitamin A, eugenol or karotolin; fillers, which acts as zinc oxide or white clay, and active compounds (which may be fat-soluble vitamins A, E, D, calcium and fluoride, analgesics, hormones, sulfonamides, enzymes, compounds of the furan series) that define the main therapeutic effect pastes.

Kneading physiotherapy paste before applying to a thick consistency of the dough. Therapeutic pads are used together with insulating, as the former do not possess considerable mechanical strength, have a long drying time, which requires isolation lining therapeutic some material, namely an artificial dentin. Next superimposed insulating gasket-phosphate cement to the enamel-dentine border. And the last layer - is a permanent seal of a material that can withstand chewing load as well as in deep caries, we are dealing with large defects, almost all killed when the dentine and enamel, without reliance on dentin becomes brittle and breaks off. Today ideal materials which can be used in the treatment of deep caries, there composite filling materials.

Isolation pads. This group acts as a gasket layer between the tooth and the filling material, with the purpose of protection of the dental pulp from the toxic effects of the filling material. The insulating lining must have a number of positive properties that meet medical and technical requirements:

1. Do not irritate the pulp of the tooth
2. To be impervious to acids and monomers
3. To have a low thermal conductivity
4. Do not disturb the geometry correctly shaped cavity
5. Have good adhesion.
6. Have a coefficient of thermal expansion close

to the hard tissues of the tooth. 7. To improve the fixation of marginal adaptation and permanent filling 8. Carry a static load associated with the redistribution of chewing pressure. 9. To be radiopaque. 10. Do not change the color of the tooth.

Phosphate Cement. Comprising a separately stored liquid and powder, the powder is 90% of zinc oxide, 6% of silica and 4% of calcium oxide. Liquid - a 35% aqueous solution of phosphoric acid, which entered into the zinc phosphate, aluminum magnesium to reduce the rate of liquid chemical interactions with the powder. Kneading on a smooth glass surface with a metal spatula, the optimal ratio of powder to liquid of 1: 4. The consistency of the mass is considered normal, if divorced from the masses spatula she reaches for him, and cut off, teeth height is 1mm. If the mass of a thick, then adjust its consistency by adding liquid, can not be. The optimal time for hardening of the material 4-8 minutes. Phosphate cement can also be used for filling of milk teeth, prosthetic fixation and sealing of the root-canal. Communication with tooth tissues, filling materials and metals due to surface roughness.

Positive properties of phosphate cement:

1. Does not irritate the pulp of the tooth, ie chemically toxic material. However, when deep caries can cause necrosis of the neurovascular bundle, this material is not recommended for use in the treatment of pulpitis and biological method of treatment of deep caries without pads.
2. It has a low thermal conductivity.
3. Impervious to acids and monomers
4. Do not change the geometry of the well-formed cavity.
5. Rengenkontrastny.
6. It has a thermal expansion coefficient close to the tooth.

Negative properties phosphate cement:

1. The low mechanical strength of the material does not allow to use it as a permanent filling material for dental restorations.
2. It does not anticaries and antiseptic action.
3. absorbable by contact with oral fluid.
4. Not suitable in color to the hard tissues of the tooth.

Glass ionomer cements, insulating gaskets  
The most common glass ionomer cements are used for applying insulating gaskets. The main requirement in this case - high biocompatibility, reliable isolation of the pulp from the potential adverse effects of a permanent filling material or components of the adhesive system. JRC can be used as a thin layer (laynernoy) gaskets, and for applying the base gasket, reducing tooth dentin. At present, the application of insulating gaskets JRC gradually replacing zinc phosphate and polycarboxylate cements. Available in a large number of glass ionomer cements for the insulating spacers as a chemical or dual-cure

From the "classical" JRC gasket can note "Glass-ionomer cement" (Heraeus Kulzer and "Ionobond" (Voco). They have high mechanical strength, chemical adhesion to enamel and dentin, is isolated fluoride ions into the surrounding tooth tissues do not require light curing .One popular JRC insulating gasket is "BaseLine" (De Trey / Dentsply). It allows for the adequate protection of the pulp and hard tissues by chemical, thermal, galvanic stimuli and bacterial invasion. The original structure of the material it provides a strong bond not only with the dentin, but also with the composite without etching glass ionomer. High adhesion "BaseLine" combined with the strength and satisfactory working qualities.

The use of this material is shown when applying basic and laynernih insulating spacers, and also for fixation crown and pin designs (although for this purpose a suitable special ICS)."BaseLine" is available in two colors, is mixed with distilled water. "BaseLine Dentin (B2)" intended for use in cases where important aesthetic effect. On transparency and it is close to the color of dentin. Along with this, it radiopaque, contains no metal ions. "BaseLine Contrast" - is a solid light gray, radiopaque material. It is intended for use in cases when it is necessary to see well and seal the border between the tooth structure.In addition to traditional packaging "BaseLine" is available in capsules for direct application. Activation of the material and its application in a cavity is carried out using a special tool - a gun for application.The lack of "classic", and hydraulically settable JRC gasket.It is known that maturation of the cement mass and the formation of a strong bond to the tooth they occur approximately within a day, so if we impose the composite during the same visit, then due to the rapid and durable bonding composite with glass ionomer, and also due to the polymerization shrinkage of the composite increases sharply the likelihood of separation pads on the bottom of the cavity and as a consequence - the pain in the tooth from thermal stimuli, pain when biting on a seal, inflammation and necrosis of the pulp.

A number of foreign and domestic dental schools recommend to make filling composites in conjunction with the "classic" or hydraulically settable JRC in two visits:I visit - the whole cavity is sealed glass ionomer cement;Active II - 24-48 hours performed the removal of the glass ionomer fillings corresponding enamel and composite filling with pre-etching the surface of the JRC and the application of the adhesive system.This technique, of course, justified from a medical standpoint. However, in our country due to economic, organizational and psychological factors is the spread has not yet received. I say apparently, and lack of awareness of dentists.Apply in one visit to a pad of glass ionomer and composite seal allows the use of dual-cure hybrid JRC.The most famous and popular in our country, the material of this group is "Vitrebond" (3M). It - a two-component system "powder -

. Liquid After mixing the ingredients, it has a long enough work "time and quickly hardens when exposed to light, which distinguishes it from the conventional glass ionomer material cures in 30 seconds (exposure time) and does not crack upon drying chamber. . He immediately formed a strong bond to dentin and is able to compensate for the polymerization shrinkage of the composite when using it under amalgam "Vitrebond" helps prevent "recurrent" caries -.. the main cause of loss of amalgam fillings it also allows you to fix the ceramic lining and tabs.

"Vitrebond" and other JRC for gaskets is not recommended to be used as materials for permanent sealing, because they have a low ratio of "powder - liquid". The liquid mixture, easy to overlay pads prevents quality seal the entire cavity. Furthermore, sealing JRC not have strength required for permanent fillings. Note that when a large amount of overlay pads and dual-cure svetoobluchenie JRC should be done in layers to achieve the greatest degree of polymerization and reduce the possible shrinkage.

## 6. Materials of methodical maintenance

### 6.1 Assignment to check the source of knowledge

1. Give the classification of filling materials for different purposes.
2. Requirements for filling materials
3. Histological structure of hard dental tissues.
4. Features of the structure of secondary dentine and transparent.
5. What materials are used for temporary fillings and requirements.

Clarification of the current knowledge of the material.

1. What is the purpose of using insulating gaskets or therapeutic in the treatment of dental caries?
2. What are the requirements for isolating and medical liners?
3. What are the benefits and the mechanism of action for the treatment of liners which are based on calcium hydroxide?
4. Give the name of the isolating and medical liners and give them a description.

5. Method of putting of isolating and medical liners depending on the type of filling material.

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Main literature:

61. Dentistry Workshop (phantom course) / AV Borisenko LF Sidelnikova, M. Yu Antonenko, G.. - Kyiv, 2011. - 512 p.2. Therapeutic dentistry: textbook; at 4 m -. Vol.1.
62. Propaedeutic Therapeutic dentistry / MF Danilevsky, A. Borisenko, LF Sidelnikova that in .; of Ed. AV Borisenko. - 2nd Vidanov, remade and added."Medicine", 2011. - 360 p.3.
63. NF Danilevsky, Borisenko AV, Politun AM, Sidelnikov LF, AF Nesin Therapeutic dentistry: Tutorial; The 4 m -. Propaedeutic of therapeutic dentistry. - Kiev: Health, 2011. - 400 p.4
64. Therapeutic dentistry: Textbook for students of dental faculties / For Ed. Anatoliya Nikolishina. - View. 2nd remade and added. - Vinnitsa: Nova Book, 2012 - 680 p.

Lecture Summary Additional literature:

1. Nikolaev AI, Tsepov LM Phantom course of restorative dentistry. - M .: MEDpress-Inform, 2010. - 432 p.
2. AI Nikolaev, Tsepov LM Practical dentistry. - M .: MEDpress-Inform, 2013. - 928 p.3.
3. Nikolaev AI, Tsepov LM, Mikheev EA Sanitary-hygienic regimen for therapeutic dental offices (branches). - M .: MEDpress-Inform, 2010. - 240 p.

6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	Learn: - Classification of filling materials and their main characteristics - Laying therapeutic composition and	- Distribute filling materials into groups and determine which ones have a negative impact on the pulp - Draw up a list of	



	<p>mechanism of action</p> <p>- Isolating liners, the composition and properties</p>	<p>medicinal pastes depending on their efficiency</p> <p>- To determine the indications for the use of isolating liners depending on the type of filling material</p>	
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## 7. Materials for self-control of training quality

### A. Questions for self-control

1. Identify the indications for the isolating and medical liners
2. Classification of medical liners
3. Requirements for isolating and medical liners
4. The basic principles of the use of therapeutic isolating and medical liners and method of their application
5. Indications for use isolating liners
6. Requirements for the isolating liners
7. Method of imposition of isolating and medical liners

### B. Tests for self-control

1. What requirements must comply with medical liners?

- A- not to irritate the pulp of the tooth
- B - show anti-inflammatory effects on pulp
- C - have a bactericidal effect
- D - have a mass of plastic
- E - all of the above named

2. isolating liners must have the following qualities:

- A - biocompatible with the pulp
- B - do not change the color of the tooth

C - have good adhesion

D - have a low thermal conductivity

E - all of the above mentioned qualities

3. For the filling of deep cavities with the selected composite material "Degufil", laying the material from which it is advisable to apply the most?

A – glass ionomer cement

B - phosphate cement with silver

C - dentin paste

D - zinc-eugenol paste

E - eugenol, thymol paste

4. Which of the following medical liners should be used in the treatment of acute deep caries?

A - pulpanres

B - kalmetsin

C – Biodent

D - kaltsesil

E - heparin-bone paste

5. The polycarboxylate cement as isolating liners has positive qualities:

A - high biocompatibility with the tooth

B - impermeability to acids, and monomers that are formed during solidification seals

C - good adhesion to hard tissues of the tooth

D - almost does not irritate pulp

E - all of the above qualities

8. Materials for the classroom self-study.

8.1 List of educational practical tasks which must be carried out during the practice session:

1. Prepare cavities of different classes according by Black
2. Demonstrate the technique of preparation and blending of the isolating liner
3. Demonstrate the technique of preparation and blending medical liner
9. Instructional materials for learning skills.

9.1. Methods of work, execution steps

Required tools and materials

:- A set of dental tools for dental examination and treatment;

- Cotton or paper rolls, rubber dam;

- Calcium-medical liner "Dycal"

Procedure:

1. Isolate tooth from saliva with cotton or paper rolls, the cofferdam.
2. A dry cotton ball to remove the remnants of an oral liquid from the surface cavity.
3. Dry the carious cavity air.
4. In the mixing pad to put in the same number of basic and catalytic paste.
5. Mixing hold a plastic spatula for 15-20 seconds.
6. Use spherical plugger cushioning material in one motion to distribute the bottom cavity. Liner thickness not exceeding 0.3 mm.

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next session: Types of Dental Cements, their types, properties. Indications for use, methods of preparation and techniques of sealing.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 13**

**" Dental Cements, their types, properties.**

**Indications for use, methods of preparation and  
techniques of sealing"**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: Dental Cements, their types, properties. Indications for use, methods of preparation and techniques of sealing

2. Relevance of topic:

Treatment of dental hard tissue disease completed the restoration of the anatomic form and function using different filling materials. Knowledge of species, the properties of cement and machinery sealing doctor and student cavities allows to choose the one or the other kind of cement to seal. In general cements are among the oldest and most widespread group of dental filling materials.

Cement in accordance with the growing demands constantly improved. The combination of properties of silicate and polyacrylic systems new cements, glass ionomer, which have significant advantages in adhesion to tooth structure have been created, non-toxic, isolated fluorine not require considerable preparation, have a long "operation" time and the possibility of using "hard" field and "adverse" conditions. Compliance with all rules of work with cement helps to restore the anatomical shape of the tooth, its physiological function and prolongs the term "service" seal.

3. Lesson aims:

3.1 General objectives:

- Preview of the major groups of cements. - Preview of the positive and negative cement properties. - Read the instructions for use of cements. - To familiarize with the methods of sealing cement.

3.2 Educational aims:

- The need to form a student of the principles of medical ethics and deontology

- The need for timely dental health

- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications

- Formation of students' psychological and legal professional the doctor responsible for the patient's share and its performance

3.3. Specific aims:

- Know:
- The classification of cement;
- Requirements for filling materials;
- Rules of the preparation of cavities of different classes;
- The technique of filling cavities of different classes

3.4. On the basis of theoretical knowledge on the subject:

- Master the techniques / able /:
- Dissect cavities of different classes and rationally choose the filling material;
- Technical preparation of cement, including light curing;
- Methodology for filling cavities with cement depending on different classes by Black

4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic:            Department of medical chemistry            Department of Biophysics,            Informatics and medical equipment histology            Department Of embryology</p> <p>1. The following discipline that provided this discipline: Dentistry of child of</p> <p>2. Intra integration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues            principles of adhesion</p> <p>Relations filling materials and hard dental tissues and histological structure            chemical solid structure            dental tissues</p> <p>Filling material for filling cavities of deciduous teeth</p>	

5. Content of the topic.

Depending on the chemical composition, cement is divided into a zinc-phosphate, silicate, silikofosfat, polycarboxylate, glass ionomer. Zinc phosphate cements Representatives of the "phosphate", "Visfat", "Adhesor", "Argil". Indications: mainly as insulating gaskets, sealing permanent teeth in the case of subsequent coating with artificial crowns.-like temporary seals (long term)Features:-After mixing the mass has a very high acidity (ph = 1-2), after 24 hours ph becomes neutral; The mass of a relatively high solubility in water;-during solidification gives greater shrinkage;-good Ductility and adhesion

- Thermal conductivity, is not harmful to the pulp;

- Significant porosity, low strength, the difference in color from the enamel changes in volume during curing; silicate cement Representatives: "Silitsin", "Fritex" (Czech Republic)Indications: filling the front teeth cavities Class V in the lateral teeth; Features:-Large solubility in water;-good Ductility easily introduced into the cavity of the teeth; Non-small thermal conductivity, sufficient hardness after crystallization; less pronounced adhesion to the walls of the teeth (in comparison with zinc phosphate), toxic effect on the pulp, sensitive to moisture;

Silico-phosphate cement:Representatives silidont cement;On the basic properties of the intermediate space between the zinc phosphate and silicate cement.Indications for sealing the permanent posterior teeth and milk teeth in children.Polycarboxylate cements: Representative: Adhesor Carbofine (Czech Republic)Indications: as a lining under the seal of the silicate cements, amalgams.For the filling of deciduous teeth.Features:Do not irritate the dental pulp,good adhesion to the hard tissues;-Rugged.Glass ionomer cements:Traditionally, glass ionomer cements are divided into three types according to their clinical applications:And type - for fixing;AI type - Restoration:1 subtype - for aesthetic restorations2 subtype - for loaded restorationsIES Type - Lining (layningovye) cements.

Also, there are now additives glass ionomers with metal (silver amalgams) and obturation of root canals, glass ionomers and light curing mechanism.Indications for use:1. cavities class III and V in permanent teeth, including cavities, root dentin exciting.2. cavities of all classes in temporary teeth.3. The non-carious lesions of teeth in the cervical region (erosion, wedge-shaped defects).4. Root caries (cavities including Class II with adequate access to them).5. Delayed (1-2 years), temporary fillings in permanent teeth.6. Treatment of dental caries using ART-technique.7. Tunneling Equipment caries treatment.8. To lock the tabs, such as crowns, bridges, orthodontic appliances.9. intracanal metallic fixation pins.10. Filling marginal defects crowns with gingival recession.11. As the

gasket material under the composite materials: amalgam, ceramic inlays.12. Substitution of dentin using closed and open version of "Sandwich" - Technology.13. Reconstruction of the tooth stump.14. Root canal filling gutta-percha pins.15. Sealing of fissures.

Use of glass ionomer cements is preferred in such circumstances (e.g., as compared to composites):- Poor oral hygiene;- Multiple and recurrent caries;- Lesions of hard tissue of the tooth below the gum level;- Inability to technically perform the restoration of composite (high salivation, lack of necessary conditions)Glass ionomer cements have been created by combining the properties of silicate and polyacrylic systems. they usually belong to content type "powder-liquid." cement powder is a finely divided aluminosilicate glass consisting of finely ground calcium fluorosilicate glass and aluminum with a particle size of about 25-40 microns. Furthermore it has to increase the strength can be incorporated zinc oxide, silver powder and the like. The liquid is a 50% aqueous solution of polycarboxylic acid copolymer containing about 5% tartaric acid.

When mixing the powder and liquid polyacrylic and tartaric acid in the presence of water interact with the glass by acid-base type reaction. In this case, the polycarboxylic acid acts as a donor, and silicate glass - proton acceptor. In the initial phase of dissociated protons disrupt polycarboxylic acid and the surface of glass particles release fluoride and metal cations: sodium, calcium and aluminum. These molecules diffuse to the anionic polymer acid and the primary solidification phase begins, in which calcium ions combine with a carboxylic acid and elements forming cross-linking molecule is converted into a gel polyacid. Begins to increase the pH value of the cement and in the last stage with the help of aluminum ions formed by the three-dimensional mesh. alumina reacts with polyacrylic acid to form the structure of a zinc polyacrylate. Tartaric acid serves to increase the working time, it contributes to the rapid solidification of the material forming complexes with metal ions.

The compound cement with hard tooth tissue due to mechanical and chemical mechanisms - chemical compound copolymer acids with hydroxyapatite. Simultaneously with the formation of hydrogen bonding of the polar structural elements constituting the monomer occurs hellatinizatsiya calcium ions of hard tooth tissue. Thus, the adhesive bonding with surfaces clean enamel and dentine occurs hellatnyh by forming bonds with calcium.Glass ionomers have sufficiently good mechanical properties, the tensile strength gradually increases and reaches 24 hours after kneading 90-180 MPa and tensile - 6.8 MPa. The elastic modulus of the material is about 7 MPa, the cement is water-soluble and fairly well preserved in



the oral cavity. However, when exposed to air it dries, cracks, so to prevent damage in the oral cavity surface it is recommended to cover special varnish. Glass ionomer cements are not irritating to the pulp and have good adhesion (to 08.12 MPa) to the cavity walls. Long-term (about a year), the diffusion of fluoride leaching of glass and cement his assimilation enamel and dentin they have protkarioznoe action. This led to the widespread use of glass ionomer as insulating spacers under the permanent seals made of other materials.

Further improvement of glass ionomer materials has been associated with the use, in addition to the acid-base and other mechanisms of solidification. By modifying the molecular end of polyacrylic acid and the introduction of the initiators and activators cement (kamfarohinon) approval could create light materials (for example, «Vitrebond», «Vitremer», «3M»), wherein further the polymerization reaction took place polyacrylic acid. This has greatly improved the strength of the material. For a more complete polymerization was introduced and catalyzing chemical system in the composition of the glass ionomer. Thus, the materials have been established which have triple curing mechanism: the acid-base as well as all glass ionomers, quick light-curing and chemically activated polymerization. This greatly increased the strength of glass ionomer cements, and made it possible to incorporate it into the cavity of thick layers. Created under the scheme glass ionomer cements are widely used and well-deserved recognition - «Vitrebond», «Vitremer» ( «3M»), cimeystvo cements «Fuji» ( «GC»), «Ionoseal» ( «VOCO»), «Photac-Fil » (« ESPE ») and many others.

Advantages of glass ionomer cements: High chemical adhesion (8-12 MPa) to the hard tissues of the teeth and filling materials (composites, cements, amalgams and others.); sustained release of fluorine (anticaries action). They are not toxic to the pulp and require no acid etching dental hard tissues. These qualities and determined the widespread use of glass ionomer as insulating gaskets to seal the cavities and non-carious defects, to form the bulk of the restorations made of composites ( «Sandwich» -Technology), for fixing the fixed prosthetic and orthodontic appliances and the like. The method of application of glass ionomer cements It depends on the curing mechanism - chemical curing are mixed with distilled water or special liquid (solution of polyacrylic acid, for example). Mixing is carried out for 1-2 minutes on a special paper (plastic) plates after which cement is introduced with some excess in a cavity. Solidification of the material occurs over the next 2-3 minutes, after which the surface is treated, polished and coated with a special varnish. When working with glass ionomer chemical curing is necessary to observe a number of rules: Keep bottle tightly closed with the powder

owing to its hygroscopic properties, can not violate the recommended ratio of "powder-liquid" during kneading.

Glass ionomers light curing lamps require special - fotopolimerizatorov (ie almost as fotokompozity). First they 1-1.5 minutes are mixed in a specific ratio of powder and liquid on a paper plate, dough introduced into a cavity to fill it with a certain excess. After that the light-curing material for 40-60 seconds. In the future, the seal is betrayed anatomical shape; its surface is processed, polished and coated with a special varnish. Special attention is required the use of glass ionomer cements as insulating spacers under the photopolymer composites. Glass ionomers acquire sufficient strength and adhesion to dentin sufficiently slowly for about 24 hours. Therefore, when applied to freshly with such cement insulating gasket composite with light-curing between the composite and glass ionomer arises a stronger bond than that between the glass ionomer and dentin. This leads to the fact that the polymerization shrinkage composite gasket detaches from the surface of the dentin. To prevent such complications are recommended as shims under photocomposite glass ionomers a light cured or compomers.

Compomers - are materials that combine the properties of composites and glass ionomer. These are composite materials with composite materials typical polymerization reaction. The filler is glass particles for amonosilikatnogo with various additives. The organic matrix is a monomer composition in which a polymerizable group are composite resins, and acid (carboxyl) groups of glass-polymer. Initial curing reaction takes place as in composites by photoinitiation polymerization monomer. After water absorption photopolymerization phase comes in contact with the oral fluid. In the presence of water the reaction occurs between the glass particles and the acid groups with metal ions leaching, by crosslinking polymer chains and carboxyl groups of glass leaching of fluoride ions. However, the properties of glass ionomer compomer expressed in slightly due to the low content of acid groups. Physical and mechanical properties of compomers approach the properties of micro-filled composite materials.

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

65. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
66. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
67. Harty F.J. Endodontics in clinic practice. -1994. – 366 p.
68. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
69. Peter Heasman. Restorative Dentistry, Pediatric Dentistry and Orthodontics.- Churchill Livingstone. – 2003. – P.378.
70. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990 Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Sounders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.

10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the qualitative characteristics of cements	Create a table of different cements	

7. Materials for self-control of training quality

A. Questions for self-control

1. Which groups of dental cements, you know?
2. What are the properties of (positive and negative) of the zinc-phosphate cements?
3. Name the members of the group of silicate cements?
4. What is the composition of the glass ionomer cements?

Tests:

1. As of the above groups can be sealed cement a cavity class I?

- A) zinc phosphate
- B) silicate
- C) silico-phosphate
- D) polycarboxylate

The standard answer:

In2.

Which of the following groups of cements can be used as isolation pads?

- A) glass ionomer
- B) silico-phosphate
- C) silicate
- D) polycarboxylate

Standard answer:

A);

A task:

Patient K. complains of the existence of class V cavity in the tooth 33, which is within dentin. What cements filling material group may be used in this case?

- A) zinc phosphate
- B) polycarboxylate
- C) glass ionomer
- D) Silicate
- E) silico-phosphate

The standard answer: c) d)

8.1. List of educational practical tasks which must be carried out during the practice session

1. To capture the method of using cements

9. Instructional materials for learning skills.

9.1. Methods of work, execution steps

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next lesson: Dental amalgam, types, properties. Indications for use. Preparation and sealing machinery.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 14 " Amalgams. Method of use. Preparing, filling  
technique. "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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1. Topic: Amalgams. Method of use. Preparing, filling technique.

2. Relevance of topic:

Amalgam - a mercury alloy with one or more metals and is one of the best dental filling materials; an amalgam of the most complete (except for aesthetic) meets the requirements for materials for permanent fillings.

To familiarize with the indications for the use of metal amalgams.

- Explore the methods of preparation of metal amalgams.

2.2 The educational objectives of the session:

- The need to clarify the need for the patient to sealing metal seals.

- The need for timely rehabilitation of the oral cavity.

- The need to establish close contact with the patient.

2.3 Specific objectives know:

1. The classification of filling materials for the manufacture of metal seals.

2. The composition and properties of dental amalgam On the basis of theoretical knowledge on the subject:

- To capture the method of preparation and production of seals of metal amalgams.

3. Lesson aims:

Topic	To know	To be able
1. Previous discipline that provide the study the topic:  Department of Biophysics,  the following disciplines, which are provided by this discipline: pediatric dentistry	The physical properties of metal seals          Indications for use of dental amalgams	



<p>3. Internal integration objective, with some objects and integrates that study: a) the method of preparation silver amalgam b) the method of preparation of copper amalgam c) the method of preparation galodenta M</p>	<p>Indications</p>	
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### 3.2 Educational aims:

- The need to form a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional the doctor responsible for the patient's share and its performance

### 3.3. Specific aims:

- Know:
- The classification of amalgam;
- Requirements for filling materials;
- Rules of the preparation of cavities of different classes;
- The technique of filling cavities using amalgam

### 3.4. On the basis of theoretical knowledge on the subject:

- Master the techniques / able /:
- Dissect cavities of different classes and rationally choose the filling material;
- Technical preparation for amalgam;

### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic:            Department of medical chemistry            Department of Biophysics,            Informatics and medical equipment histology</p> <p>Department Of embryology</p> <p>1. The following discipline that provided this discipline: Dentistry of child of</p> <p>2. Intraintegration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues            principles of adhesion</p> <p>Relations filling materials and hard dental tissues and histological structure            chemical solid structure dental tissues</p> <p>Filling material for filling cavities of deciduous teeth</p>	

### 5. Content of the topic.

The use of amalgam in dentistry has a long tradition.

The first reports on the use of silver-tin paste known from ancient Chinese manuscripts. In Europe, the amalgam used for dental fillings in the 17th century. However, only the French Tagueap in the first half of the 19th century. He introduced a silver amalgam in dental practice while developing. From the filling material that is kneading the doctor himself, the amalgam into a product manufactured by a special technology. It called amalgam alloy of one or more metals with mercury.

Dental amalgam - a special kind of amalgam used as a restorative material. As used alloy components silver, copper, tin, sometimes, in smaller quantities, zinc, palladium, platinum, indium, selenium. Classically, in accordance with the requirements of ISO it believed that silver amalgam must contain at least 65% silver, 30% tin and 5% copper. The hardened amalgam is composed of three intermetallic compounds or phases: initial particles of tin-silver alloy - gamma phase, silver- mercury compounds - gamma 1, tin-mercury - gamma 2.

The value of these phases differently. The most robust and stable is the gamma-phase and phase gamma-1. Phase gamma 2 - alloy weak spot in the

structure. It not only reduces the mechanical strength of the overall structure, but also reduces the corrosion resistance of the alloy because of the high tin content. Corrosion material containing gamma-2 phase, occurs not only on the surface, but is accompanied by other phenomena which make the material with gamma-2 phase unsuitable for clinical use because of the so-called mercury expansion. When corrosion that begins in the gap between the tooth and the seal, tin gamma-2 phase is oxidized and metallic mercury remains. It diffuses into and reacts with the amalgam unmodified gamma-1 phase ( $\text{Ag}_3\text{Sn}$ ). Due to this diffusion of mercury in most areas of corrosion, i.e. seals in contact with the tooth structure, there is an extension which is called mercury. The consequence of it is to reduce the amount of fillings.

As a result, this may cause cracks and broken off in the area of the edges of the seal, which leads to negative clinical consequences. Functions amalgam alloy components:

- Silver provides strength and resistance to corrosion, cause expansion at hardening.

- Tin causes shrinkage during hardening, reduce the strength and corrosion resistance and increases the curing.

- Copper at a content of less than 6% plays the same role as that of silver. Such alloys are called conventional or low copper content.

- Zinc amalgam in the manufacturing process reduces the oxidation of other alloy metals. Amalgam with zinc content of more than 0.01% is called zinc-containing. Zinc gives the durability of the seal.

- Other metals are added in an amount not exceeding a few percent that does not fundamentally alter the properties of the amalgam. There are several types of amalgam on the size and shape of alloy particles: 1 type - particles or needle-traditional (conventional) forms. This alloy powder is obtained by grinding the amalgam alloy ingot on a lathe to produce chips. It is characterized by stiffness of the package. Type 2 - spherical particles - has the best ultimate physical properties and softness. When packing, it is not always convenient. 3 type obtained by mixing powders of the first two types. Amalgam is controlled by varying the proportions of these components. There is also a 4 type - the so-called spherical powder. It is made by spraying the alloy. The result is a powder consisting of spherical particles and longitudinal. Amalgam paste is made on the basis of morphology, comparable in their properties with the amalgam particles that are spherical shape with the addition of chips.

According to the content of copper amalgam divided:

1. Amalgam alloys with low copper (silver) are composed of at least 6% copper. Prior to 1960, all amalgams were of this type.

2. Amalgam alloys with a high copper content (copper) typically are composed of 10-30% copper. This is the part of the majority of modern amalgams. They differ from the first, that is formed during the reaction and the weakest corrodible gamma 2 phase. In addition, copper replaces the silver, which reduces the amalgam. Amalgam may be described as comprising two phase gamma or not containing it. Amalgam low copper in its composition are tin-mercury phase (gamma 2), which deteriorates their physical properties. All amalgam with a high copper content within a few hours after mixing does not contain gamma-2 phase. In the late '70s and '80s created a whole generation of so-called mnogomednyh and maloserebryanyh amalgams: Luxalloy (USA), Durrallloy (Germany), Apa-2000 (Sweden), and others, increasing the copper content of which (due to silver) results in the complete exclusion of tin binding and gamma-2 phase.

Compared to conventional amalgam such materials have a number of advantages:

- High corrosion resistance;
- Resistant forms with functional load;
- Enhanced transparency in compression;
- Low levels of mercury discharges from seals;
- Have a smooth and shiny surface of a year after the imposition of the seal.

Also currently known such NON GAMMA-2 amalgam as Artalloy (Germany), and Tytin Contour (Kerr, USA), Amalkap Plus (Ivoclar, Germany). Our domestic industry currently produces mnogomednuyu amalgam SDAT-43, which in their properties are not inferior to foreign analogues. Amalgam zinc concentration greater than 0.01% zinc containing call («Dispersallou», Dentsplay). Such amalgams clinically have high strength, durability, and good accuracy of fit.

However, contact with moisture such an amalgam to its condensation in the mouth causes a significant (several hundred micrometers per centimeter) expanding for several days. This is due to the formation of hydrogen in the structure of the amalgam of zinc in the presence of moisture, which causes dimensional change. This problem can be avoided by using amalgam without containing zinc.

All amalgam characterized by good mechanical properties. The greatest strength of different spherical amalgam with high copper content. Shrinkage amalgam insignificant. However, the seal of the zinc-containing amalgam may increase in volume in the first week to 400 microns. This is due to exposure to moisture in the tooth cavity before filling setting and can cause severe pain and even tooth split. The strength of the recovered chips older amalgam fillings will be lower than the original 50%. Adding a portion of amalgam fillings in one visit gives a 75% strength solid seal. The coefficient of thermal expansion of the amalgam is ten times greater than that of the tooth. Reduce the temperature sensitivity of the tooth after setting amalgam fillings can strip of cement and insulating varnish. Amalgams, despite the presence of mercury amalgams in all, do no harm patient health, except in rare cases of hypersensitivity, and the emergence of phenomena of galvanism in the presence of the mouth of dissimilar metals in the crowns or bridges. Based on the toxicological effects of mercury on the body, can be seen three of its forms: - Elemental mercury. Liquid mercury is poorly absorbed through the skin and mucous membranes in the body is ionized and easily excreted by the kidneys or in the faeces, if the particles are swallowed. the mercury vapor released into the bloodstream via the lungs, in a few minutes remaining non-ionized form, which penetrates the blood-brain barrier and in high concentrations, affects the nervous system.- Inorganic mercury compounds have a low or very low toxicity are poorly absorbed, does not accumulate in the body and displayed well, and some of its products are used as an antibacterial agent.- Organic mercury compounds are highly toxic, but none of these compounds in the dental amalgam is not included. All amalgam corrosion – electromechanical destruction metal in contact with the environment. On the one hand, gradually corrosion leads to deterioration of the properties of the amalgam, the other - the microcracks filled with corrosion products between the tooth and the wall of the seal. Amalgams with high copper content do not contain gamma-2 phase, less subject to corrosion than with low copper content. Accelerate corrosion facilitated by the presence in the oral cavity of various metals and alloys, especially in the immediate vicinity. The same effect has a contacting seal with the new old. Clinical and laboratory tests set high reliability of amalgam as a filling material.

## 6. Materials of methodical maintenance of lesson

Tasks for self initial level of knowledge.

1. The classification of the filling materials.
2. The requirements for filling materials.

3. The rules of preparation cavities I, II and V class.
4. The contact point and recovery tools.
5. Requirements to the dental office for filling of carious cavities with amalgam.

Tasks:1.

On the third day after treatment, the patient came to the doctor and complained that amalgam fillings collapsed and fell. What mistakes were made when filling and manufacture of seals?

2. There is no hood and ventilation, wooden floor in the dental office. You can prepare the amalgam and amalgam materials be sealed in such a study?

3. One year after filling a tooth darkened amalgam material. How to explain such a phenomenon?

4. After making the seal with galodent M after a while the golden crown of the neighboring teeth were white spots. What is the reason for this phenomenon?

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

71. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
72. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
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Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

- <http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>
- <http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>
- [http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).
- <http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the composition and properties of metal amalgams.  Describe the method of preparation of the seal material enforcement of amalgam.	Create a table of different amalgams, their advantages and disadvantages	

### 7. Materials for self-control of training quality

#### A. Questions for self-control

1. What is the composition of metal amalgams?
2. What are the physical and chemical properties of amalgam?
3. What are the indications and contraindications for clinical use.
4. What is the procedure for preparing and filling a metal amalgam?

#### B. Tasks for self-control:

1. To apply the insulating pads under silver amalgam was implicated zinc-eugenol cement. What is mistake?
2. On the surface 6 tooth carious cavity of medium size. Which filling material you choose?
3. There is a defect of silver amalgam fillings in the oral surface 1d Class by Black, 7 tooth. Your tactics?
4. 7 years child in need of treatment 54 and 45 teeth on the upper jaw, 45 and 54 on the bottom. There cavity 1 and class 2. Which filling material do you prefer?



5. On the front surface of the tooth 5 carious cavity extends to the chewing surface. No 4 and 3 teeth. How do you spend the preparation and filling of the cavity?

6. The patient complains of tooth discoloration 6, which connects with the treatment of the tooth a few years ago, and filling in some material. What is your opinion of the material has been used and whether it was possible to avoid such phenomena?

7. What advice do you give to the patient, which you put in the 8,7,6 dental amalgam fillings of silver?

8. After the opening and expansion of cavity 2 Class 4 held necrotomy tooth and forming a bottom. Whether carious cavity for sealing ready?

9. In preparation for the patient to an orthopedic prosthetic gold found 2 cavities 1 Class 6 right tooth in the upper jaw and 7 left on the bottom, and recommended to put the most durable seal. What would you do on-site dental therapist?

10. In the formation of cavities on the chewing surfaces of the anterior teeth 7 creates additional ground 0.5-1 mm below the enamel-dentine border. Before filling in the primary and secondary site superimposed insulating gasket, reaching to the enamel. Rate the doctor actions, point to errors, if any?

8.1. List of educational practical tasks which must be carried out during the practice session

Methods of work stages:

1. Take a tray with dental instruments.

2. Take the mortar and pestle, put in a mortar dust silver amalgam and mercury.

3. Carefully rub the contents until a homogeneous mass.

4. Take the cooked mass and repeatedly wash in soapy water.

5. Rinse several times amalgam ammonia.

6. Again wash amalgam ammonia.

7. Take the gauze and a spatula put her amalgam. Press through cloth mercury.

8. Take a small portion of the prepared amalgam and make it into a cavity, amalgam treger condensed and held her tightly against the walls and the bottom of the cavity.

9. Take a small cotton swab and from the center to the periphery, remove the excess mercury and move the residues in a container of water.

10. If there is a mass of filling amalgam mixer cook in the unit. Full hardening of the amalgam fillings occurs within 2-3 hours.

9. Instructional materials for learning skills.

9.1. Methods of work, execution steps

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next lesson: Polymeric filling materials. Composites. Types, properties. Indications.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 15 " Polymeric filling materials. Composites. Types, properties. Indications. Grinding and polishing of fillings. Insulation seals saliva exposure "**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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1. Topic: Polymeric filling materials. Composites. Types, properties. Indications. Grinding and polishing of fillings. Insulation seals saliva exposure

2. Relevance of topic:

The professional activities of a dentist the problem of restoration of dental hard tissue, restoring its beauty and functional properties is very important. The emergence of a significant number of new tools and materials requires specialist new knowledge and skills to use them. Consequently, the study of the properties and methods of using composite filling materials in restorative dentistry is an extremely important issue. To familiarize with the indications for the use of metal amalgams.

3.1 The educational aims of the lesson:

- To familiarize students with the classification and properties of composite filling materials;
- Master the techniques of preparation and filling with composite materials;
- To teach students to apply composite filling materials of various classes to restore the front and molars.

3.2 Specific aims

To know:

On the basis of theoretical knowledge on the subject to be able to:

- Identify in the diagram, below the structure of composite materials with different degrees of filling, indications for their use;
- Hold on a phantom restoration of hard tissue of teeth with composite materials of chemical and light curing.

Lesson aims:

Topic	To know	To be able
1. Previous discipline that provide the study the topic:  Department of	The physical properties of polymeric filling materials	

<p>Biophysics, the following disciplines, which are provided by this discipline: pediatric dentistry</p>	<p>Indications for use</p>	
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3.4. On the basis of theoretical knowledge on the subject:

- Master the techniques / able /:
- Dissect cavities of different classes and rationally choose the filling material;
- Technical preparation for amalgam;

4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic: Department of medical chemistry Department of Biophysics, Informatics and medical equipment histology  Department Of embryology 1. The following discipline that provided this discipline: Dentistry of child of 2. Intra integration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues principles of adhesion  Relations filling materials and hard dental tissues and histological structure chemical solid structure dental tissues  Filling material for filling cavities of deciduous teeth</p>	

5. Content of the topic.

It consists of mastering cooking techniques and the use of composite filling materials. To do this, it is advisable to use the algorithms perform practical actions (collection of practical skills and knowledge of algorithms to practically-oriented state exam in the specialty 7.110106 "Dentistry", Odessa, 2004, pp. 220-230).

Application filling photopolymer material when filling cavity 5 class in Black (in Direct IP example compomer) Required tools and materials:- A set of dental tools for dental examination and treatment;- Cotton or paper rolls, rubber dam;- A set of photopolymer filling Direct IP material;- Photo-polymerization lamp;- Phantom;- Retraction cord with vasoconstrictor "Chemal Pack".Procedure:1 displacing a portion of the material on a plastic plate.2. Isolate tooth from saliva with cotton rolls, cofferdam.3. Cut a piece (about 2 cm) gingival retraction cord "Chemal Pack" and enter it into the interdental space with a trowel.4. Promote retraction cord in the tooth-gingival groove and firmly place it along the neck of the tooth.5. trowel to pay a small portion of the material in the cavities.6. plugger or trowel spend condensating material. The first material layer may be not more than 2 mm thick.

Filling of cavities class 2 Black composite chemical polymerization ("Evikrol")

Required tools and materials:

- A set of dental instruments for examination and treatment teeth;
- Cotton or paper rolls, rubber dam;
- Set the filling material "Evikrol";
- The die matrix.Procedure:

1. Isolate tooth from saliva with cotton or paper rolls, cofferdam, drain.

2. Fix the matrix by means of the die.3. mixing pad material powder and apply liquid material in the ratio 1: 1. To do this, use the dipstick and bottle-dropper.

4. Mixing hold a plastic spatula for 30-40 seconds.

5. The consistency of the mixture should be like a paste, its surface - matt, when touched lightly blend reaches for a spatula.

6. Filling the cavity lasts no more than 1 minute. It is not allowed to simulate the metal seal instrumentami.Tverdenie seal lasts 2 minutes.

7. Remove the matrix from interdental spaces.
8. Fully restored anatomical shape of the tooth and the planar contact point.

## 6. Materials of methodical maintenance of lesson

Tasks for self initial level of knowledge.

1. What types of dental cements do you know?
2. What is the difference composite filling materials 1 and Type 2?
3. What are the components of the powder and liquid zinc phosphate cement?
4. What are the positive and negative properties of silicate cements?
5. What is "compomers", which correspond to this class of materials filling materials?
6. What is included in the bonding system of composite filling materials?
7. Due to what is done etching hard tissue of teeth in preparation for composite fillings?
8. What are the pros and cons of glass ionomer cements?

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

77. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: 'ASMI', 2016.-2016.-191p.
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80. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
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1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
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7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
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9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

- <http://nasbol.com/2011041354397/propedevtica-stomatologicheskihazbolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>
- <http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskihazbolevaniy-skorikova.html>



-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

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[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the composition and properties of polymeric .  Describe the method of preparation for polymeric fillings	Create a table of different polymeric materials, their advantages and disadvantages	

### 7. Materials for self-control of training quality

#### A. Questions for self-control

1. Specify which main groups of composites allocate the size of the filler particles.
2. Name the wavelength devices for light polymerization.
3. What are the generation of adhesive systems are part of the advanced composite materials?

#### B. Tests for self-control:

1. The most optimal concentration of acid to etch enamel is:

- A. 5-10%
- B. 15-25%
- C. 30-40%
- D. 45-50%
- E. 55-60%

2. The duration of etching enamel in preparation for composite fillings is:

A. 15-25

B. 30

C. 120-150

D. 60

E. 45

3. The bond strength of adhesives fourth or fifth generation dentin reaches:

A. 27-31 MPaB

B. 10-15 MPa

C. 50-60 MPaG.

D. 13-16 MPaD.

E. 6 - 9 MPa

4. The microfilled composite materials include parts of an inorganic filler size:

A. 1-5 microns

B. 8-12 microns

C. 0,04-0,1 microns

D. 2-30 microns

E. 3-5 microns

5. Light sources with the most optimal wavelengths are used for the polymerization of photopolymer:

A 370 nm

B. 300-400 nm

C. 500-550 nm

D. 570 nm

E. 470 nm

6. The glass ionomer cement that can be used for filling molars and contains silver:

- A. Chemfil Superior
- B. Ketac-Fil Plus
- C. Argion Molar
- D. Mr. Fuji II
- E. Ionofil Plus

8.1. List of educational practical tasks which must be carried out during the practice session

1. Perform the preparation and filling of cavities composite chemical polymerization.

2. To prepare and filling cavity light curing composite.

9. Instructional materials for learning skills.

9.1. Methods of work, execution steps

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next lesson: Grinding and polishing of fillings. Isolating seals from saliva exposure.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 16**

**"Endodontic as a science and as an art.  
Anatomy and topography of the tooth cavity»**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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Odessa – 2020

1. Topic: "Endodontics as a science and as an art. Anatomy and topography of the tooth cavity "
2. Relevance of topic:

The specificity of this section of modern dentistry is primarily due to the significant prevalence of pulp and periodontal diseases. In this connection, in addition to the anatomy of each group of human teeth knowledge, you must take into account the structural features of the age of the crown of the tooth cavity and root canals, as well as the influence of the pathological process in their state. Without this condition, it is impossible to guarantee the successful treatment of pulpitis and periodontitis.

### 3.1 The educational aims of the lesson:

Focus on the development of theoretical and clinical knowledge in the art and to show by example that the specifics of this section of modern dentistry is primarily due to the significant prevalence of pulp and periodontal diseases, especially their flow, influenced by odontogenic infection foci on individual organs, systems and organism as a whole.

### 3.2 Specific aims

To know: Master the knowledge of topographic anatomy pulp cavity and root canals. Know the features of the structure of the cavity, depending on the group affiliation of the teeth and jaws.

### 3.3 On the basis of theoretical knowledge on the subject to be able to:

to know the structure of the tooth cavity and root canals in the teeth of the upper and lower jaw:

1. incisors and canines
2. premolars and molars

### 3.4 Lesson aims:

Topic	To know	To be able
1. Previous discipline that provide the study the	- The correlation of dental hard tissue and anatomical structures in	

<p>topic:</p> <p>Department of Hystology,</p> <p>the following disciplines, which are provided by this discipline: pediatric dentistry</p>	<p>order in preparation for the prosthesis to maintain the viability of hard and soft tissues of the tooth,</p> <ul style="list-style-type: none"> <li>- The distinctive features of the anatomical structure of permanent and temporary teeth.</li> <li>- Structural features of the occlusal surfaces and crowns;</li> <li>- Especially the roots of the structure, the number and size</li> </ul>	
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#### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic:</p> <p>Department of medical chemistry</p> <p>Department of Biophysics, Informatics and medical equipment histology</p> <p>Department Of embryology</p> <p>1. The following discipline that provided this discipline: Dentistry of child of</p> <p>2. Intraintegration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues</p> <p>principles of adhesion</p> <p>Relations filling materials and hard dental tissues and histological structure chemical solid structure dental tissues</p> <p>Filling material for filling cavities of deciduous teeth and treatment of root canals</p>	

#### 5. Content of the topic.

Tooth cavity consists of a chamber located in the crown and the channel (s) to the root of the tooth.

Each distinction tooth cavity bottom wall and the roof. Roof (vault) of the tooth cavity is called that part, which is composed of the chewing surface and cutting edge.

Called bottom panel facing to the top and side walls that are called tooth surface to which adjoins the cavity.

Tooth cavity and channels are filled tissue rich in nerves and blood vessels, - the pulp. In this connection, the coronal part of the tooth cavity is called the pulp chamber. The coronal pulp extends through the mouth of the channel and moves to the root extending to the apical hole.

As in the coronal and root part of the tooth cavity is not constant throughout life. Plastic operation of the pulp cells - odontoblasts - leads to a gradual change in the shape and size reduction of dental cavities as a result of deposition of new layers of dentin, called secondary dentin. This process continues throughout a person's life.

Therefore, in the teeth of older people, and in the teeth with a significantly worn chewing surface of the tooth cavity in the coronal part of it sometimes disappears, and the mouth of the root canals and channels themselves are narrowed or completely obliterating.

Thus, along with the knowledge of the anatomy of human teeth each group must take into account age-related structural features of the coronal part of the pulp cavity and root canals, as well as the influence of the pathological process in their state.

## 6. Materials of methodical maintenance of lesson

6.1 Materials for the control of knowledge of the preparatory phase: questions, tasks and tests.

1. Specify the number of cusps on the occlusion surface of the tooth 46?

- 1) 5
- 2) 4
- 3) 3
- 4) 2
- 5) 1

2. Specify the number of cusps on the occlusion surface of the tooth 24?

- 1) 3
- 2) 2
- 3) 5
- 4) 1
- 5) 6

3. How many roots and root canals in 37 tooth?

- 1) 2 root canal 2

- 2) 2 root canal 3
- 3) 3 root canal 3
- 4) 2 root, canal 4
- 5) 3 root, canal 4

4. How many roots and many canals of 16 tooth?

- 1) 2 root canal 2
- 2) 2 root canal 3
- 3) 3 root canal 2
- 4) 3 canal 3
- 5) 3 root, canal 4

5. Write in what teeth of the above, the crown can be in three versions?

- 1) 16
- 2) 37
- 3) 27
- 4) 47
- 5) 33

6. Is it true that the enamel prisms are arranged at right angles to dentin-enamel junction on the side surfaces of the tooth, and in the area of mounds or cutting edge parallel to the axis of the tooth?

- 1) True
- 2) is not true

7. Where are the fiber Ebner?

- 1) In the mantle layer of dentin
- 2) In okoloiluparnom sdoe dentin
- 3) And there, and there
- 4) Neither here nor there

8. Where are the fiber Korf?

- 1) In the mantle layer of dentin
- 2) The dentin layer near pulp
- 3) And there, and there
- 4) Neither here nor there

9. Is it true that interglobular dentin differs from the usual dentin only absence in its composition of calcium?

- 1) True
- 2) Not true

10 Is it true that the calcification of dentin even in intact teeth are not quite evenly?

- 1) True
- 2) Not true



6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

83. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	Explore topography cavities of anterior and posterior teeth of the upper and lower jaws	To know: Depending on the group affiliation of the tooth and jaw: 1) the number of horns: 2) the number of mouths of root canals; 3) the number of roots; 4) the form of a tooth cavity	

## 7. Materials for self-control of training quality

### A. Questions for self-control

#### A. Questions for self-control:

1. Endodontics - a key section of restorative dentistry. What studies endodontics?

- 1) Histology dental hard tissues
- 2) Stages of preparation cavities
- 3) Timing teeth eruption
- 4) techniques and methods of manipulation in the pulp chamber, root canals
- 5) techniques and methods in the pulp out mashtulyaschiy chamber

2. Specify which form cavities 11,12, 21 and 22 teeth?

- 1) the tooth cavity has the form of cracks in the cutting edge and is lined in the direction mediiodistalnom
- 2) has the form of a tooth cavity with the apex of the wedge toward the cutting edge
- 3) has the form slits that were located in the buccal-palatal direction
- 4) has the shape of an inverted cone with vertex position towards the top
- 5) The shape of an elongated trapezoid

3. How many horns has a set of cavities 11, 12, 21 and 22 teeth?

- 1) 3
- 2) 2
- 3) 5
- 4) 0

4. What is the shape of the pulp chamber at 11, 12, 21 and 22 teeth?

- 1) Saddle
- 2) Truncated cone with vertex at the cutting edge
- 3) Triangle
- 4) Repeat the tooth shape and is gradually moving into the root canal
- 5) In the form of a slot

5. How many mouths 11, 12, 21 and 22 teeth?

- 1) 2
- 2) 1
- 14
- 20
- 3) 3

6. What form does the tooth cavity in 31, 32, 41 and 42 teeth?

- 1) of the tooth cavity has a wedge-shaped
- 2) Triangle
- 3) Truncated cylinder

- 4) an oval shape
- 5) The square
- 7. How many horns has a set of cavity 31, 32, 41 and 42 teeth?
  - 1) 1
  - 2) 3
  - 3) 2
  - 4) 4
  - 5) About

8. What is the shape of the tooth cavity in 31, 32, 41 and 42 teeth?

- 1) two-humped
- 2) follows the shape of the tooth crown and without clear boundary goes into the tooth canal
- 3) Cone
- 4) Triangular
- 5) The trapezoidal

8 Materials for self-classroom training.

8.1 The list of skills, practical knowledge, which must be carried out during the practical (lab) classes:

- 1) Arrange the teeth of the upper and lower jaws, depending on the group membership.
- 2) Arrange the teeth, depending on the characteristics of the tooth belonging,

9. instructional materials of the day mastering skills and abilities.

9.1 Method of implementation of the work at runtime.

10. Materials for self-mastery of knowledge and skills provided by this work

10.1 Tests of different levels (used departments' databank tests)

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

**Lesson number 17 " Method of horn dissecting of the pulp and  
blending devital paste."**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved  
at the methodical meeting of the Department  
" 27 " 08 2020  
Protocol № 1  
Head of the Department  
Professor Skyba V.Y.

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2. Topic: "Methods of pulp horn opening and overlay the devitalizing paste "

2. Relevance of topic:

Endodontic treatment success is largely depending on the knowledge of a dentist topographic anatomy of the pulp chamber and root canals. Knowledge of the general topography of the laws of the pulp chamber and root canals allows the doctor confidently conduct endodontic treatment. Endodontic treatment success kalso depends on the ability to make use of endodontic instruments, knowledge, techniques tooth cavity opening, the art of surgical and medical treatment of root canals

3. The educational aims of the lesson:

3.1 the common aims:

To capture the method of opening the pulp horns and overlay the devitalizing paste there

3.2 Educational aims:

- The necessity of forming a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional medical responsibility for the fate of the patient and its performance

3.3 Specific aims

To know:

- Master the knowledge of topographic anatomy pulp cavity and root canals. Know the features of the structure of the cavity, depending on the group affiliation of the teeth and jaws.
- On the basis of theoretical knowledge on the subject to be able to:
- the structure of the tooth cavity and root canals in the teeth of the upper and lower jaw:

3. incisors and canines
4. premolars and molars

### 3.4 Lesson aims:

To be able:

To use the method of pulp chamber opening and overlay the devitalizing paste.

### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic: medical chemistry</p> <p>- Biophysics, Informatics and medical equipment</p> <p>2. The following disciplines, which are provided by this discipline:</p> <p>- Surgery:</p> <p>3. Intra Integration: Diagnosis and treatment of pulpitis and periodontitis</p>	<p>- The composition and function of chelating agents, enzymes and acids in the dental hard tissue;</p> <p>The physical properties of metals</p> <p>Causes and nature of complications that arise when poor quality endodontic treatment</p> <p>Etiology and classification of pulpitis and periodontitis</p>	<p>Apply antiseptic agents for the treatment of caries complications.</p> <p>Conduct pre-treatment stages: preparation of cavities, opening and development of the pulp chamber, etc ..</p>

## 5. Content of the topic.

Pulp horns opening. Due to the sharp pain all manipulations on the cavity dissection using intraoral anesthesia, spend most carefully, without causing pain to the patient.

After the cavity opening softened dentin is removed in stages, beginning with an acute cavity wall excavator or round bur and then from the bottom cavity, the applicator periodically using anesthetic. In cases of acute diffuse pulpitis must always reveal the tooth cavity in at least one point. This connection with carious tooth cavity removes or reduces intra chamber pressure, creates the conditions for the release of fluid from the pulp. It also provides insight into the pulp devitalizing agent. This is best done in the projection of large pulp horns round bur not to fall into the tooth cavity and not to injure the pulp. Then, a cavity gently washed with warm antiseptic solution and dried with a cotton ball. Overlay devitalizing paste. The most frequently used drugs that can devitalization pulp arsenous acid and paraformaldehyde. Arsenic trioxide ( $\text{As}_2\text{O}_3$ ) for the first time for the devitalization of the pulp was proposed in 1836 Spooner (Spooner). It is a white, poorly water-soluble powder with a slightly acid reaction.

Easily soluble in hydrochloric acid, and caustic alkalis. The mechanism of arsenious acid on the pulp versatile. As a protoplasmic poison arsenious anhydride primarily affects pulp oxidative enzymes leads to disruption of local phenomena and respiratory tissue hypoxia. Under the influence of small amounts of arsenic oxidase loses its specific functions as an enzyme oxidation. In addition, arsenic blocking the thiol compounds that act as respiratory coenzymes. In response to the initial irritation is marked dilation of blood vessels, especially capillaries, thrombosis, hemorrhage occur, depending on changes in the vessel walls. Swelling leads to compression of the pulp tissue. Nerve fiber pulp undergo granular disintegration of the myelin sheath, nodular swelling and disintegration of axons. Varicose nerve fibers is replaced by his death. Changes in all groups pulp cell elements are reduced to karyorrhexis phenomena and cell death primarily odontoblasts.

The depth of the defeat of the pulp is in close connection with the expiry date and the dose of arsenous acid. In place of the arsenous acid applications observed pattern of destruction of all elements of the coronal pulp. Prolonged exposure to the arsenous acid can cause toxic changes in the periodontium and necrosis of surrounding tissues.

Arsenious acid (anhydride) used for the devitalization of slurry as a paste. For the preparation of the paste is added to the acid medication substances with



anesthetic, antiseptic properties, as well as means of slowing down the diffusion of arsenic in the pulp tissue and thereby weaken its toxic effect. For this purpose, procaine, carbolic acid, tannin, iodoform, clove, camphor oil, glycerol. Given that arsenic acid is a strong protoplasmic poison, you must adhere strictly to the dosage of paste, depending on the size of the tooth, the pulp condition, age of the patient and to choose the method of treatment of pulpitis.

For pulp devitalization enough 0,0002-0,0004 arsenous acid, the recommended duration of a single rooted teeth - 24 h, multirooted - 48 hours. Currently, arsenic paste is available in doses, in the form of granules of different colors depending on the required dates paste overlay (green, blue, etc.). Sometimes arsenous paste composition is administered as a filler threads of different colors (or wadding) to facilitate the dosage (Pulparsen, Causticin et al.). Less toxic properties has paraformaldehyde paste. Its structure as the main active agent include paraformaldehyde - product of formaldehyde polymerization. It has a strong bactericidal effect, which is associated with release of gaseous formaldehyde. High concentrations of paraformaldehyde with prolonged action it causes tissue necrosis. The mechanism of action of formaldehyde is its effect on the endothelium of the capillaries, blood vessels expand, blood stasis in them and the gradual mummification of the pulp tissue, which turns into a dry gray cord. The drug has less toxic effects on periodontal tissue. The paste composition except paraformaldehyde include anesthetic (benzocaine, trimekain), clove oil (eugenol).

Currently available in various pastes using paraformaldehyde: «Parapasta» (Chema, Polfa), «Depulpin» (VOCO), «Devipulp», «Toxovit», «Necronerv» et al. Under the influence of pastes containing paraformaldehyde, pulp devitalization occurs within 6-7 days in a single rooted teeth, and after 10-14 days - multirooted. Under the influence of pastes containing paraformaldehyde, pulp devitalization occurs within 6-7 days in a single rooted teeth, and after 10-14 days - multirooted. Gaining the necessary amount of paste devitalizing: arsenous generally - is the volume of a pinhead (approximately 0,0006-0,0008 g arsenic anhydride); paraformaldehyde - twice. Placing a selected quantity of the paste on the tip of the probe or excavator, it is administered in a cavity placed on the bottom and around the projection pulp horn. If the perforation is made, the paste is applied next to him and gently move the cotton ball on the open horn pulp. Acting on pulp devitalizing paste it annoying, it increases exudation, increasing the feeling of pain. To decrease the pasta is coated with a dry cotton ball, which absorbs the excess fluid from the pulp and thus reduces pressure intra chamber.

With the same purpose, a cotton ball can be further slightly moistened with a local anesthetic.

Cariou cavity was sealed with a paste made of an aqueous artificial dentin. It must have consistence alike with a paste. Then we carefully without pressure we are applying it into the cavity. Dentin-paste use is inappropriate, since in the case of its introduction, it puts pressure on the pulp creates compression, thereby causing pain attack. In some cases, such as in the presence of a large cavity IV, V class, which penetrates deep beneath the gingival margin, the dressing of artificial dentin does not provide sufficient sealing the cavity. There is a risk of leakage of arsenic anhydride from the cavity and the emergence of necrosis near the soft tissue (gums, cheeks, tongue). In this case, it is recommended to close a cavity with arsenous paste liquid implicated phosphate cementum or bring it to the chewing surface and the cervical dentin cavity close to the anesthetic

Must notify the patient that may experience pain in the tooth, which will continue for several hours after application devitalizing paste. To reduce sensitivity to pain the patient is prescribed inside painkillers. Arsenious paste as a devitalizing agent is applied in single rooted teeth for 24 hours in multiroot - 48 hours paraformaldehyde - paste - 7-10 days. Be sure to warn the patient of the need for further treatment of the tooth at the appointed time, since the neglect of the scheme and the time of treatment to the patient can cause a variety of complications and lead to tooth loss.

Tooth cavity consists of a chamber located in the crown and the channel (s) to the root of the tooth.

Each distinction tooth cavity bottom wall and the roof. Roof (vault) of the tooth cavity is called that part, which is composed of the chewing surface and cutting edge.

Called bottom panel facing to the top and side walls that are called tooth surface to which adjoins the cavity.

Tooth cavity and channels are filled tissue rich in nerves and blood vessels, - the pulp. In this connection, the coronal part of the tooth cavity is called the pulp chamber. The coronal pulp extends through the mouth of the channel and moves to the root extending to the apical hole.

As in the coronal and root part of the tooth cavity is not constant throughout life. Plastic operation of the pulp cells - odontoblasts - leads to a gradual change in the shape and size reduction of dental cavities as a result of deposition of new layers of dentin, called secondary dentin. This process continues throughout a person's life.

Therefore, in the teeth of older people, and in the teeth with a significantly worn chewing surface of the tooth cavity in the coronal part of it sometimes

disappears, and the mouth of the root canals and channels themselves are narrowed or completely obliterating.

Thus, along with the knowledge of the anatomy of human teeth each group must take into account age-related structural features of the coronal part of the pulp cavity and root canals, as well as the influence of the pathological process in their state.

## 6. Materials of methodical maintenance of lesson

### 6.1 Materials for the control of knowledge of the preparatory phase: questions, tasks and tests.

1. Features of the structure of the incisor cavity.
2. Features of the structure of the canines tooth chamber.
3. Features of premolar tooth chamber.
4. Features of the structure of molars' tooth chamber.
5. What is the difference between the anatomical and physiological apical foramen?
6. What is the deltoid branch (additional) root canal?
7. What is the basic principles of cavity preparation ?
8. Stages of cavity preparation.
9. What are the instruments required for the of cavity preparation ?
10. What is Endodontic?

#### Tasks:

1. Which of these teeth have two root canals?
  - A. The second premolar of the upper jaw
  - B. The first premolar of the mandible
  - C. The first premolar of the upper jaw
  - D. The second premolar of the mandible
2. On the occlusal surface of the tooth revealed 5 bumps - two oral and buccal 3. Indicate what is this tooth?
  - A. First lower molar
  - B. The second upper molar
  - C. The second lower molar
  - D. First upper molar
3. Topographic anatomic of pulp chambers of 15 and 16 teeth to reveal:
  - A. The curvature of the palatal wall
  - B. Speaking at the vestibular wall
  - C. Form of the medial wall
  - D. Form distal wall
  - E. Number of the pulp horns on the roof of the pulp chamber

4. After opening the tooth chamber of 24 during inspection and probing discovered two root canals - palatal and buccal. Location of the canals should still install?

- A. medial
- B. buccal (medial or distal)
- C. palatal (second row)
- D. distal
- E. correct answer is no, because the two 24 tooth root canal

5. The success of the treatment of inflammation of the tooth pulp is largely dependent on the knowledge of its anatomical and histological structure. A cross section of the pulp histologically there are several layers. Select the layer that is not characteristic of the tooth pulp.

- A. Subendothelial
- B. Peripheral
- C. Subodontoblastic
- D. A layer of stellate cells
- E. The central layer

6. Which of the pulp layer is formed by odontoblasts?

- A. Central
- B. Peripheral
- C. Subodontoblastic
- D. Cambium
- E. Upper

7. You have to prepare instruments for cavity preparation of the 3rd class by Black. The proposed choosing there are some hog with marking rings of different colors. Select one with the diamond bur coarse spraying:

- A. Black
- B. Red
- C. White
- D. Blue
- E. Green

8. A tooth in a dental formula indicated at 56?

- A. The first permanent molars of the upper jaw to the right
- B. There is no right answer
- C. The second primary molars left mandible
- D. The first molars of the upper jaw to the right
- E. The third permanent molars on the left mandible

9. Tooth chamber is:
- A. Place the tooth pulp location
  - B. The location of the tooth dentin
  - C. Location periodontal

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Recommended literature:

Basic literature:

- 89. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	Learn the tools used for the opening of the pulp horns and overlay devitalizing paste		
2.			

	Learn the method of the opening of the pulp horns and overlay devitalizing paste		
3.	To be able to use method of the opening of the pulp horns and overlay devitalizing paste		

## 7. Materials for self-control of training quality

### A. Questions for self-control

1. What are the tools used for the dissection of the pulp horns?
2. What are the tools used for applying the paste devitalizing?
3. What drugs are used for pulp devitalization?
4. The mechanism of action of arsenic anhydride?
5. The mechanism of action of paraformaldehyde?
6. Validity of arsenious paste in one-root teeth?
7. Validity of arsenious paste in multi-rooted teeth?
8. What is airtight bandage?
9. Methods of opening the pulp horns.
10. Method of imposing devitalizing paste.

### B. Tests for self-control with the standards of the responses.

1. Specify the defining characteristic element cavity, called a bottom:
  - A. A wall perpendicular to the longitudinal axis of the tooth.
  - B. The wall facing the alveolar bone.
  - C. The wall facing the pulp chamber.
  - D. wall parallel to the longitudinal axis of the tooth.
  - E. The bottom wall of the cavity.
  
2. An examination of the patient for diagnosis is necessary to determine the consistency of dentin at the bottom of cavities, which revealed 36 tooth. Select a tool to determine the degree of softening of the dentin on the walls and bottom of the cavity in the tooth 36:
  - A. Excavator
  - B. Dental Mirror
  - C. Probe Dental corner
  - D. Dental Forceps
  - E. Probe Dental bayonet
3. In the treatment of non-vital pulpitis method, after the imposition of arsenious

paste, you should apply a sealed bandage made of artificial dentin. What kind of liquid you use to prepare the artificial dentin?

- A. A solution of phosphoric acid
- B. Water distillate
- C. A solution of polyacrylic acid
- D. Monometilmetakrilat
- E. Alcohol eugenol solution

4. What are the two components form the basis of zinc powder artificial dentin?

- A. Chloride and oxide.
- B. oxide and sulfate
- C. nitrate and oxide
- D. Chloride and nitrate .
- E. Difluoride and sulfate

5. From hog listed below, select the most preferable for the opening of the pulp horns through a cavity:

- A. Diamond back - tapered small
- B. Spherical carbide maximum size
- S. Steel back - tapered maximum size
- D. A cylindrical steel small
- E. Diamond cylindrical minimum size

6. From the list of hand tools check tool that can be used for opening the horns of the pulp through a cavity.

- A. Enamel knife
- B. Probe corner
- C. Probe bayonet
- D. trowel 2 -sides
- E. Excavator

7. What is the mechanism of action of arsenic anhydride devitalizing?

- A. Binding of SH groups of cytochrome oxidase
- B. Lock SS groups of the respiratory enzymes
- C. Both as a chain reaction.
- D. protein coagulation.
- E. Violation of the lipid layer of the cell membrane, followed by the collapse of the cell.

8. Which substance is introduced into the devitalizing pastes without arsenic as a valid basis?

- A. Formaldehyde
- B. Trikrezolformaldegid
- S. Kamforofenol



- D. Paraphormaldehyde
- E. Thymol iodide

9. At the arsenous paste at autopsy pulp horn usually impose a cotton swab moistened with the drug substance. For what purpose?

- A. In order to absorb exudates discharged from the pulp
- B. For potentiation devitalizing action arsenic anhydride
- C. For better seal disclosed the pulp horns
- D. To accelerate hardening airtight bandage
- E. None of the proposed

10. The most accessible point for the opening of the pulp chamber pulp horn is considered. How much of the pulp horns in 53 tooth?

- A 4
- B. 2
- C. 3
- D. 1
- E. correct answer is no.

11. What kind of mistakes could cause pain in the causal tooth immediately after the imposition of arsenious paste?

- A. For an airtight bandage used very thick temporary material
- B. Lack of sealing cavity
- C. Both
- D. Overdose arsenous paste
- E. sensation of pain is usually accompanied by a process of devitalizing pulp.

12. With the help of a tool applied arsenious paste?

- B. A. Smoothers
- Probe
- SA tweezers
- D. spatula
- E. Directly from a syringe with an injection needle

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be performed in the practical (lab) classes:

**Algorithm "Determination on phantoms topography cavities in permanent teeth "**

- Determine the topography of the tooth chamber
- To master the technique of opening the pulp horns and overlay devitalizing paste

## Mandibular First Molar

Mesiobuccal orifice is under the mesiobuccal cusp. Mesiolingual orifice is located in a depression formed by mesial and the lingual walls. The distal orifice is oval in shape with largest diameter buccolingually, located distal to the buccal groove. Orifices of all the canals are usually located in the mesial two third of the crown. Cases have also been reported with an extramesial canal, i.e. middle mesial canal (1-15%) lying in the developmental groove between mesiobuccal and mesiolingual canals. Distal root has also shown to have more than one orifices, i.e. distobuccal, distolingual and middle distal. These orifices are usually joined by the developmental grooves. The shape of access cavity is usually trapezoidal or rhomboid irrespective of number of canals present. The mesial wall is straight, the distal wall is round. The buccal and lingual walls converge to meet the mesial and distal walls.

## Mandibular Second Molar

Access opening of mandibular second molar is similar to that of first molar except for few differences. In mandibular second molar:

- i. Pulp chamber is smaller in size.
- ii. One, two or more canals may be present.
- iii. Mesiobuccal and mesiolingual canal orifices are usually located closer together.
- iv. When three canals are present, shape of access cavity is almost similar to mandibular first molar, but it is more triangular and less of rhomboid shape.

## Maxillary Second Molar

Basic technique is similar to that of first molar but with following differences:

- i. Three roots are found closer which may even fuse to form a single root.
- ii. MB2 is less likely to be present in second molar.
- iii. The three canals form a rounded triangle with base to buccal.
- iv. Mesiobuccal orifice is located more towards mesial and buccal than in first molar.

## Maxillary Central Incisor

The outline form of access cavity of maxillary central incisor is a rounded triangular shape with base facing the incisal aspect. The width of base depends upon the distance between mesial and distal pulp horns. Shape may change from triangular to slightly oval in mature tooth because of less prominence of mesial and distal pulp horns.

## Maxillary Lateral Incisor

The shape of access cavity is almost similar to that of maxillary central incisor except that:

- i. It is smaller in size.

- ii. When pulp horns are present, shape of access cavity is rounded triangle.
- iii. Generally the pulp horns are missing so shape of access cavity which results is oval.

### Maxillary Canine

Shape of access cavity of canine though is quite similar to incisors with following differences:

- i. Canine does not have pulp horns.
- ii. Access cavity is oval in shape with greater diameter labiopalatally

### Mandibular Incisors

Mandibular central and lateral incisors are similar in shape of access cavity and the root canal system. Shape of access cavity of mandibular incisors is different from maxillary incisors in following aspects:

- i. It is smaller in shape.
- ii. Shape is long oval with greatest dimensions directed incisogingivally.

### Mandibular Canine

The shape of access opening of mandibular canine is similar to that maxillary of canine except that:

- i. It is smaller in size.
- ii. Root canal outline is narrower in mesiodistal dimension
- iii. Generally two canals are present in mandibular canine.

### Maxillary First Premolar

Shape of access cavity is ovoid in first premolar in which boundaries should not exceed beyond half the lingual incline of buccal cusp and half the buccal incline of lingual cusp.

### Maxillary Second Premolar

It is similar to that of maxillary first premolar and varies only by anatomic structure of the pulp chamber.

Mandibular First Premolar Following differences are seen in case of mandibular first premolar from the maxillary premolars:

- i. There is presence of 30° lingual inclination of the crown to the root, hence the starting point of bur penetration should be halfway up the lingual incline of the buccal cusp on a line connecting the cusp tips.
- ii. Shape of access cavity is oval which is wider mesiodistally when compared with its maxillary counterpart.

### Mandibular Second Premolar

The access cavity preparation is similar to mandibular first premolar except that in mandibular second premolar:

- i. Enamel penetration is initiated in the central groove because its crown has smaller lingual tilt.

- ii. Because of better developed lingual half, the lingual boundary of access opening extends halfway up to the lingual cusp incline, i.e. pulp chamber is wider buccolingually.
- iii. Root canals are more often oval than round.
- iv. Ovoid access opening is wider mesiodistally.

## 9. Instructional materials for learning skills.

### 9.1. Methods of work, execution steps

The algorithm of formation of professional skills on phantoms "Overlay devitalizing paste in the surgical method of treatment of pulpitis"

Required tools and materials:

- A set of tools for examination and treatment of the teeth;
- Devitalizing paste (arsenic);
- Camphor-phenol;
- Dentin for dressings;
- Distilled water;
- Pipette;
- The glass plate.

Procedure:

1. The previous stages of treatment: preparation of cavities, cut horns pulp chamber.
2. On a glass plate for mixing placed 2-3 water drop by pipetting and dentin powder dressings.
3. Use the probe to separate the right amount of arsenous paste (size of the head of boron number 1-3) and place it on a glass plate.
4. A small cotton swab dampen camphor-phenol, extra paste remove liquid from the swab with a dry cotton swab.
5. Sick tooth isolated from the oral fluid. Cavities dry.

6. arsenic paste transferred from the glass plate in the cavity and place on autopsy horn pulp chamber.
7. The tampon with camphor-phenol tweezers to make a cavity and displace arsenious paste in the direction of the horns of the pulp chamber, to make sure that the swab has not played for the cavity edge.
8. The tampon with camphor-phenol cover with a dry cotton swab.
9. A few movements spatula to mix the powder with water artificial dentin and a wide trowel to make the material in the cavities. It is necessary to make a bandage tightness, to prevent displacement of the tampon and increasing the pressure in the cavity.
10. Materials for self-mastery of knowledge
- 10.1 Tests of different levels (used departments' databank tests)
11. The theme of the next lesson: Opening of the pulp chamber. Pulpotomy and pulpectomy.

Wrote by

Aksinorska O.I.

**ODESSA NATIONAL MEDICAL UNIVERSITY**

**Department of Therapeutic Dentistry**

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 18**

**"The pulp chamber opening. Pulptomy  
and Pulpectomy."**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: "The pulp chamber opening. Pulpotomy and Pulpectomy."

2. Relevance of topic:

The success of endodontic treatment depends on the knowledge of topographic and anatomical features of teeth cavities of different groups; the ability to use endodontic instruments, knowledge of methods of tooth cavity opening, the art of surgical and medical treatment of root canals.

3.1 The educational aims of the lesson:

Master the techniques of tooth cavity disclosure of pulpotomy and pulpectomy

3.2 Specific aims

- The need to form a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional medical responsibility for the fate of the patient and its performance

3.3 On the basis of theoretical knowledge on the subject to be able to:

to know the structure of the tooth cavity and root canals in the teeth of the upper and lower jaw:

5. incisors and canines
6. premolars and molars

3.4 Lesson aims:

- Features of the structure of the tooth cavity, depending on the group affiliation of the teeth and jaws
- The stages of tooth cavity opening
- Methodology for pulpotomy and pulpectomy

3.4. On the basis of theoretical knowledge on the subject:

- Master the techniques / able /:

1. Carry out the disclosure of the tooth cavity in incisors and canines on phantoms

2. To disclose tooth cavities in premolars and molars on phantoms

3. Carry out the amputation of pulp (pulpotomy)

4. Carry out the pulp extirpation (pulpectomy)

4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic:            Department of medical chemistry            Department of Biophysics,            Informatics and medical equipment histology            Department Of embryology</p> <p>1. The following discipline that provided this discipline: Dentistry of child of            2. Intraintegration: It is the base for the subsequent</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues            principles of adhesion</p> <p>Relations filling materials and hard dental tissues and histological structure            chemical            solid            structure            dental tissues</p> <p>Filling material for filling cavities of deciduous teeth and treatment of root canals</p>	

5. Content of the topic.

Tooth cavity consists of a chamber located in the crown and the channel (s) to the root of the tooth.

Each distinction tooth cavity bottom wall and the roof. Roof (vault) of the tooth cavity is called that part, which is composed of the chewing surface and cutting edge.

Called bottom panel facing to the top and side walls that are called tooth surface to which adjoins the cavity.

Tooth cavity and channels are filled tissue rich in nerves and blood vessels, - the pulp. In this connection, the coronal part of the tooth cavity is called the pulp



chamber. The coronal pulp extends through the mouth of the channel and moves to the root extending to the apical hole.

As in the coronal and root part of the tooth cavity is not constant throughout life. Plastic operation of the pulp cells - odontoblasts - leads to a gradual change in the shape and size reduction of dental cavities as a result of deposition of new layers of dentin, called secondary dentin. This process continues throughout a person's life.

Therefore, in the teeth of older people, and in the teeth with a significantly worn chewing surface of the tooth cavity in the coronal part of it sometimes disappears, and the mouth of the root canals and channels themselves are narrowed or completely obliterating.

Thus, along with the knowledge of the anatomy of human teeth each group must take into account age-related structural features of the coronal part of the pulp cavity and root canals, as well as the influence of the pathological process in their state.

## 6. Materials of methodical maintenance of lesson

6.1 Materials for the control of knowledge of the preparatory phase: questions, tasks and tests.

1. Specify the number of cusps on the occlusion surface of the tooth 46?

- 1) 5
- 2) 4
- 3) 3
- 4) 2
- 5) 1

2. Specify the number of cusps on the occlusion surface of the tooth 24?

- 1) 3
- 2) 2
- 3) 5
- 4) 1
- 5) 6

3. How many roots and root canals in 37 tooth?

- 1) 2 root canal 2
- 2) 2 root canal 3
- 3) 3 root canal 3
- 4) 2 root, Channel 4
- 5) 3 root, Channel 4

4. How many roots and many channels of 16 tooth?

- 1) 2 root canal 2
- 2) 2 root canal 3
- 3) 3 root canal 2
- 4) Korn 3, 3 channel

- 5) 3 root, Channel 4
5. Indicate in which the teeth of the above, the crown found in three versions?
- 1) 16
  - 2) 37
  - 3) 27
  - 4) 47
  - 5) 33
6. Is it true that the enamel prisms are arranged at right angles to dentinoenamel border on the side surfaces of the tooth, and in the area of mounds or cutting edge parallel to the axis of the tooth?
- 1) True
  - 2) is not true
7. Where are the fiber Ebner?
- 1) In the mantle layer of dentin
  - 2) In okoloisulparnom sdoe dentin
  - 3) And there, and there
  - 4) Neither here nor there
8. Where are the fiber Korf?
- 1) In the mantle layer of dentin
  - 2) The dentin layer okolotsulparnom
  - 3) And there, and there
  - 4) Neither here nor there
9. Is it true that interglobular dentin differs from the usual dentin only absence in its composition of calcium?
- 1) True
  - 2) Not true
- 10 Is it true that the calcification of dentin even in intact teeth are not quite evenly?
- 1) True
  - 2) Not true

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Basic literature:

95. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
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Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
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9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskihazbolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskikh-zabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the composition and properties of polymeric .  Describe the method of preparation for polymeric fillings	Create a table of different polymeric materials, their advantages and disadvantages	

## 7. Materials for self-control of training quality

### A. Questions for self-control

1. Specify which main groups of composites allocate the size of the filler particles.
2. Name the wavelength devices for light polymerization.
3. What are the generation of adhesive systems are part of the advanced composite materials?

### B. Tests for self-control:

1. The most optimal concentration of acid to etch enamel is:

A. 5-10%

B. 15-25%

- C. 30-40%
- D. 45-50%
- E. 55-60%

2. The duration of etching enamel in preparation for composite fillings is:

- A. 15-25
- B. 30
- C. 120-150
- D. 60
- E. 45

3. The bond strength of adhesives fourth or fifth generation dentin reaches:

- A. 27-31 MPaB
- B. 10-15 MPa
- C. 50-60 MPaG.
- D. 13-16 MPaD.
- E. 6 - 9 MPa

4. The microfilled composite materials include parts of an inorganic filler size:

- A. 1-5 microns
- B. 8-12 microns
- C. 0,04-0,1 microns
- D. 2-30 microns
- E. 3-5 microns

5. Light sources with the most optimal wavelengths are used for the polymerization of photopolymer:

- A 370 nm
- B. 300-400 nm

C. 500-550 nm

D. 570 nm

E. 470 nm

6. The glass ionomer cement that can be used for filling molars and contains silver:

A. Chemfil Superior

B. Ketac-Fil Plus

C. Argion Molar

D. Mr. Fuji II

E. Ionofil Plus

8.1. List of educational practical tasks which must be carried out during the practice session

1. Perform the preparation and filling of cavities composite chemical polymerization.

2. To prepare and filling cavity light curing composite.

9. Instructional materials for learning skills.

9.1. Methods of work, execution steps

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

Wrote by

Aksinorska O.I.

# ODESSA NATIONAL MEDICAL UNIVERSITY

## Department of Therapeutic dentistry

Methodical recommendation

of practical training for students

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1

"Propaedeutic of therapeutic dentistry"

**Lesson number 19**

**“Endodontic instruments.**

**Classification, construction and purpose.”**

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the Department

" 27 " 08 2020

Protocol № 1

Head of the Department

Professor Skyba V.Y.

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1. Topic: " Endodontic instruments. Classification, construction and purpose "

2. Relevance of topic:

Current approaches to the treatment of pulp and periodontal diseases allow to restore tooth function and prevent complications. This makes it necessary to know the characteristics of different endodontic instruments, their purpose and methods of usage.

3.1 The educational aims of the lesson:

- To teach students with the endodontic instruments and requirements for their use;
- Master the techniques of using endodontic instruments according to their purpose;
- To teach students to apply different endodontic instruments in the treatment of complicated caries

3.2 Specific aims

- The need to form a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional medical responsibility for the life of the patient and his destiny.

3.3 On the basis of theoretical knowledge on the subject to be able to:

- Classification of endodontic instruments as intended
- Structure of the endodontic instruments
- Options of endodontic instruments, regulated by ISO 3630

3.4 Lesson aims:

- Master the techniques / able /:
- Define the basic characteristics of endodontic instruments;
- Identify the purpose of endodontic instruments;



- Choose from modern endodontic equipment tools necessary for carrying out manipulations in a specific situation;

- Master the technique of robots endodontic instruments.

#### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic: Department of medical chemistry</p> <p>Department of Biophysics,</p> <p>- Surgery:</p> <p>Intra Integration: Diagnosis and treatment of pulpitis and periodontitis</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues principles of adhesion</p> <p>The physical properties of metals</p> <p>Causes of complications that arise when quality of endodontic treatment is unsatisfied.</p> <p>Etiology and classification of pulpitis and periodontitis</p>	<p>Conduct pre-treatment stages: preparation of cavities, opening and development of the pulp chamber, etc .</p>

#### 5. Content of the topic.

Modern endodontic instruments can be divided into several groups:

1. Tools to expand the orifice of the root canal.
2. Tools to remove the root canal content.
3. Tools to undergo root canal.
4. Tools for expansion of root canals.

## 5. Tools for root canal filling.

Main characteristics of endodontic instruments defined by the ISO 3630 standard.

The standard provides:

- Working part of the taper, it is 0.02 mm or 2%. This means that for every millimeter of working of the tool diameter is increased to 2%; - Graphic symbol tool types;

- The total length of the metal rod (L2) can be 21, 25, 28 and 31 mm (the most common tools with 25 mm rod length), the length of the working part (L1)- always 16 mm .;

- Color coding tools.

Tools to expand the mouth of the root canal.

In root canal mouth has a physiological narrowing that is often difficult to insertion of the endodontic instruments and subsequent mechanical and pharmacological treatment channel. For ease of operation it is recommended to expand the mouth of the channel, and the upper third, giving it the shape of a funnel. For this purpose, use Gates Glidden, Largo, Orifice Opener, Orifice Opener MB.

Tools to expand the mouth of the root canal.

In root canal mouth has a physiological narrowing that is often difficult to insertion of the endodontic instruments and subsequent mechanical and pharmacological treatment channel. For ease of operation it is recommended to expand the mouth of the channel, and the upper third, giving it the shape of a funnel. For this purpose, use Gates Glidden, Largo, Orifice Opener, Orifice Opener MB.

Tools for the passage of the root canal.

K-Reamer - tool for passage of root canals. The word "Example" is derived from the English expression - gnawing motion. The letter "K" indicates the instrument type, buyout are made by twisting - the tools to "K-type". The tool has a triangular profile, which gives the flexibility instrument. When working in the root canal perform movements that resemble winding watch clock. The maximum permissible angle of rotation - 180°.

K-Flexoreamer - different from the K-Reamer increased flexibility, which is achieved by a triangular cross-section of the working part, a decrease in pitch of the helix, high quality steel. It is intended for the passage of the thin and curved canals.

K-Flexoreamer golden mediums is a K-Flexoreamer intermediate sizes (12,17, 22, 27, 32, 37). Designed in those cases where there is difficulty moving from one instrument to the next size.

K-Reamer Farside - a set of K-Reamer reduced length (15-18 mm) and small diameter) 06, 08, 10 and 15 to ISO standard). The kit is intended for the initial roasshireniya narrow root canals, especially in chewing teeth when opening the mouth is difficult.

K-Reamer Deepstar - a set of tools for unsealing the root canal. It includes a set of truncated K-Reamer (15 and 18 mm) with a sharp aggressive tip. The kit includes 18 tools and two tool type Orifice Opener.

Tools to expand the root canal.

These tools are known as "drill" or "file". Their name comes from the English expression - "sawing motion."

K-file - in appearance similar to K-Reamer, but differs from it by a large number of turns on the working part. K-file to №25 made of square-section wire, thus reducing the risk of "unwinding" and tool fracture. Since the number 30 is used blank triangular cross-section that allows you to get more sharp cutting edges and greater flexibility instrument. K-file is a versatile tool and can also be used for playing, and to expand the root canal. With the passage of the channel K-file commit rotational motion as in-winding watch clock (at 90° in the one and the other side). Expanding channel K-file is made sawing motions by repeated alternately promotion tool in the direction of the apical foramen and removing it from the channel. File in deriving pressed against the wall of the channel.

K-flexofile - a flexible auger. Unlike conventional K-file, in the manufacture of the tool applies a flexible steel wire using a triangular cross-section which increases its flexibility. Greater flexibility is also achieved by reducing the cutting stroke at the working part of the tool. They are used for machining curved channels. They should make sawing motion.

K-flexofile golden mediums - is a flexible intermediate file sizes to ease the transition from one instrument to the next during the expansion of root canals.

K-file Nitiflex - Instruments manufactured by vytachivaniya, they have gibkotyu, 5 times greater than the flexibility of conventional steel tools. These tools take the form of even the curved channel and after removal from the channel remains flat. Tools designed to expand strongly curved canals. When working with these tools is recommended to perform only reciprocating (sawing) movement.

Hedstroem file - drill Hedstrema, machined from a steel wire of circular cross section (cutting method). Thus running helically formed cutting edges, this tool provides high cutting ability, but also brittle. The instrument may only be sawing motion. The tool is used for alignment of the root canal walls, especially if it has an oval or slit-shaped skylight. When machining of the root canal K-file or K-Reamer combined with Hedstroem file, it is recommended to take the N-file one size smaller than the previously used tool.

Rasp - Rasp (rat tail) has 50 small sharp teeth, arranged at right angles to the axis instrumenta. Oni form spiral rows encircling round tapered rod of the working part. The length of the teeth is one-third the diameter of the rod. Rasp teeth have a very strong, they do not bend and do not break off. the tool tip is rounded and has no teeth. Rasp for enlargement of the root canal and for removing soft content thereof. Canal Expansion is performed rotational and sawing (scraping) movements. After processing, the channel walls must be smooth rasp Hedstroem file or K-file.

Tools for removal of soft content of the root canal.

To delete the contents of the root canal using broach. It is a tool in the working parts of which are located in different planes about 40 teeth. The size of teeth equal to half the diameter of the rod. The teeth are oblique direction, the edge facing the handle of the tool and have little mobility.

Broach for removal from the root canal soft tissue only. When the broach inserted into the root canal to the required depth, carefully (without effort) is rotated by about 2-3 turns and recovered together with root canal contents.

Instruments for root canal filling.

Currently, for root canal filling used:

Endodontic files and reamers (Lentulo) - is a conical spiral wire with a handle or a holder for fixing the tip. The turns of the spiral wound counterclockwise. When you rotate the injection occurs endodontic files and reamers paste into the channel. The recommended speed of rotation - 100-200 rev / min. Available in four sizes endodontic files and reamers.

Spreader - (lateral seal, a condenser) is a rod-cone-shaped tool circular cross-section. By the size of its working part corresponds to the working of the tools for machining the root canal and the parameters of standardized gutta pins. The tool tip is sharpened. Suitable tools for lateral condensation gutta pins.

Plagger - (vertical condenser) has a cylindrical or conical shape of the working part and the flattened top of instrument like a shtopfer. Designed for vertical condensation of gutta-percha in root canals.

## 6. Materials of methodical maintenance of employment.

### 6.1. Tasks for self-examination of the original level of knowledge, skills

1. What is Endodontics?
2. Name the number of roots and root canals in different groups of teeth.
3. What are the average length of the roots of various teeth.
4. What are the stages of endodontic treatment.
5. What are the tools used for pulpotomy?
6. Which drugs are used for pulp devitalization?
7. What are the stages of tooth cavity opening.
8. What are the criteria for qualitative preparation of the coronal tooth cavity to perform subsequent endodontic procedures.
9. What instruments are used to remove the soft tissue of the tooth?
  1. Disclosure cavity performed with boron:
    - A. Cylinder
    - B. Nodular
    - C. Backcone
    - D. rotate
    - E. Pear shape
  2. How can control the accuracy and completeness of the disclosure of the cavity of the tooth?

- A visually and with a probe
- B. The color of hard tissues
- C. In the presence of bleeding from the pulp of a tooth
- D. There is no right answer
- E. All answers are correct

3. Signs of the correct and full disclosure of the tooth cavity:

- A. On examination, you can see all the mouth of the root canal
- B. The walls of cavity smoothly into the tooth cavity wall
- S. Endodontic instruments come in all canals without bending
- D. There is no right answer
- E. All answers are correct

4. At what angle to the vertical axis of the tooth should be the direction of boron at the opening of the pulp horns?

- A. 10 °
- 45 ° C.
- 25 ° C.
- 30 ° D.
- 60 ° E.

5. In endodontic treatment of a tooth on the bottom of the pulp chamber should be identified mouth of three root canals?

- A. 44
- V. 25
- S. 67
- D. 56
- E. None of the above.

6. What action broach during pulpectomy can be called correct?

A. After the injection at a predetermined depth broach turning it 180 ° and extract with pulp.

B. must be turned by 360 ° and pull at a given depth broach.

C. In order to avoid damage to the instrument must be removed without rotational movement.

D. After introduction instrument into the channel, it must be rotated clockwise by 720 ° (two rotations) and remove.

E. Rotary movement should make a broach during advancement into the channel, and the extraction.

7. Select the correct action broach during pulpectomy:

A. Work tool only in the straight part of the channel.

V. pushes the instrument into the canal with an effort.

S. Tool promote more than 2/3 the length of the channel.

D. Use the tool in the channels to the R-logically apparent obliteration.

E. All of these actions are wrong.

8. Enter the correct action broach with extirpation of the pulp:

A. Enter broach into the root canal and advance to the apical opening.

B. Enter the broach into the root canal for about 2/3 of its length.

S. The curved root canal broach be sure to promote Curvature.

D. Enter broach approximately  $\frac{3}{4}$  of the length of the root canal regardless of its form.

E. broach enter no deeper than the mouth of a root canal regardless of its form.

9. Specify the agent for hemostasis after pulpectomy:

A 40% alcohol solution metakrezolsulfonovoy acid.

B. 20% solution of ethylenediaminetetraacetic acid.

C. 4% lactic acid solution.

D. 5% solution epsilonaminokapronovoy acid.

E. 37% phosphoric acid solution.

10. During the pulpotomy to remove a wellhead slurry is considered to be the most appropriate one of these tools below:

A. Buran root.

B. broach.

C. Cylindrical boron carbide small.

D. The root boron Gates Glidden.

E. Scan root.

11. amputation method of treatment of pulpitis excised:

A. coronal pulp over the mouths of the root canal.

B. coronal and root in the passable part of the channel.

C. 1/4 crown and root pulp.

D. coronal pulp and wellhead

E. coronal and root pulp 1/2.

12. amputation treatment pulpitis shows:

A. The canines of the upper jaw.

B. The molars of the upper jaw.

C. maxillary incisors.

D. The canines of the lower jaw.

E. premolars of the mandible.

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Basic literature:

101. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment /



- Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: 'ASMI', 2016.-2016.-191p.
102. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
  103. Harty F.J. Endodontics in clinic practice. -1994. – 366 p.
  104. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
  105. Peter Heasman. Restorative Dentistry, Pediatric Dentistry and Orthodontics.- Churchill Livingstone. – 2003. – P.378.
  106. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskikhzabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskikh-zabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the basic endodontic instruments	Disassemble the classification, properties, purpose of endodontic instruments	

## 7. Materials for self-control of training quality

### A. Questions for self-control

1. What are the classification of endodontic instruments for other purposes.
2. The structure and basic characteristics of endodontic instruments.
3. Options of endodontic instruments, regulated by ISO 3630.
4. What are the tools to expand the mouth of the root canal.
5. Tools to remove the root canal content.
6. Tools to undergo a root canal.
7. Tools to expand the root canal.
8. Tools for measuring root canal length.

9. Tools for root canal filling.

B. Tests for self-control with the standards of the responses.

1. endodontic instruments for pulpoectomy is:

A. To file

B. N-file

B. Pulpextractor

G. K-Reamer

D. endodontic files and reamers

2. Endodontic instruments size 15 (ISO) are marked with this color:

A. red

B. White

Golubev

Mr. Yellow

D. Green

3. Tools for machining root canals, the working of which in cross section may take the form of a triangle is:

A. Pulpekstraktor

B. N-file

VK file

G. Fleksofayl

D. endodontic files and reamers

4. A tool for machining the root canal, the working part which in cross section may have a square shape are:

A. endodontic files and reamers

B. Flex-file

C K file

D N file

E. Broach

5. What tool is used to expand the mouth of the root canal?

A. R-file

B. Ni-Ti flex file

B. K-file

G. K-reamer

D. Gates Glidden

6. Tool K-file is done by tightening the workpiece. How many revolutions does it work surface?

A. 17

B. 21

V. 27

G. 31

D. 34

7. The size of the main endodontic instruments (files and reamers) is determined on the basis of:

A length of the working part of the tool.

B. diameter of the base of the rod tool.

C. None of these criteria is not determinative.

D. The overall length of the entire web tool.

E. diameter of the tool tip.

8. Which of the following pairs of tools designed for soft tissue removal from the root canal?

A. K-file and H-file

B. Rasp root and K - Reamer.

S. K - reamer and broach

D. Profile and fleksofayl.

E. Rasp root and broach.

9. What is the difference between K-reamer by K-file?

A. The length of the working part.

B. The sectional shape.

C. Vertical tool diameter from the base to the tip.

D. cutting face angle of inclination to the longitudinal axis of the tool

E. The total length of the bar tool.

10. What is the main difference between K-file and nitifleksom, which determines the quality of work last?

A cross-sectional shape of the working part.

B. The length of the working part.

C. The total length of the rod tool

D. The material for the tool rod.

E. The material for the tool handle.

11. Specify the tool, which has the lowest strength of the working part:

A. By-Example.

B. K-file.

C. N file.

D. Flex-file.

E. Flex-reamer

12. What type (ISO 3630 standard) corresponds to the tool, followed by the symbols: a shaft for contra-angle handpiece marked red ring symbol - a triangle.

A K-Reamer machine for corner number 25 tip.

B. To file a machine for corner number 25 tip.

S. K-Reamer machine for handpiece number 40

D. endodontic files and reamers for the angular tip number 30.

E. H-file number 35 for the handpiece.

13. Which of the following instruments can be coded in green?

A K-Reamer machine with 3 annular grooves on the shank; H - file number 30.

VK - file number 35; By-Example number 65.

SN - file number 40; K - file number 35.

D. By-Example 5 machine with annular grooves on the shank, H-file number 20.

EK - Example number 20; K - file number 60.

14. Endodonticheskie tools size 25 (ISO) are marked with this color:

A. Blue

B. White

V. red

Mr. Yellow

D. Green

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be performed in the practical (lab) classes:

- Define the basic characteristics of endodontic instruments;

- Identify the purpose of endodontic instruments;

- Choose from modern endodontic equipment tools necessary for carrying out manipulations in a specific situation;

- Master the technique of robots endodontic instruments.

9. Instructional materials for learning professional skills, skills:

9.1. Methods of work at runtime.

### Classification scheme of endodontic instruments as intended.

Stage of endodontic treatment	Instruments	Definition
1. Expansion of the mouths of the root canal	Burs Gates-Glidden.	<p>It has a working part of a spear-shaped tip with a non-aggressive on the long thin rod. The length of the working part of the rod 15 -19 mm. The tool is available in 6 sizes. Work «Gates-Glidden» tip at low revs. The recommended speed of rotation - 450-800 rev / min.</p>
	<p>Special types of reamers «Peeso Reamer» («Largo»)</p>	<p>It has an elongated working part of the rod tip and non-aggressive. It is intended for the passage of direct channels of single rooted teeth and the palatal canal of upper molars and the distal canal of lower molars. Available in 6 sizes tool that marked on the adapter ring. Recommended small rotational speed - 700-1200 / min.</p>
	The oral canal expander:	<p>It has a bullet-working part of the coated diamond powder. This is a handheld instrument.</p>

	Orifice Opener	
2. Extracting the soft tissues from dental canals	Nerve broaches	An instrument that has the working parts which are located in different planes teeth having oblique direction, pointing to the handle of the instrument. When diving into the canal teeth are pressed against the tapered rod, when removed from the channel teeth pulp tissue capture and remove it. Is introduced into the root canal is not more than 2/3 of its length, carefully make 2-3 passes and recovered.
3. Passing the root canal	«K-Reamer» (Reamer, Dril Kerr; drillbor)	Made of high-quality non-rusting stainless steel and has the flexibility and high cutting capacity, which is achieved by cutting face elongated step. When working in the root canal K-reamer committed motion resembling sub-winding of hours. The maximum permissible angle of rotation - 180 °.



	<p>«K-Flexoreamer»</p> <p>«Pathfinder»</p>	<p>Differs from K-Reamer increased flexibility, which is achieved by a triangular cross-section</p> <p>The working part decreasing helical pitch, high-quality steel. This tool is designed for the passage of the thin and curved root canals.</p> <p>Thin instrument with a sharp tip, for the passage of obliterated canals.</p>
4. Expansion	<p>«K-file» Kerr file</p> <p>«K-flexofile»</p> <p>«Hedstroem file» (H-file,</p>	<p>In appearance similar to K-Reamer, but difference from it is finely twisted form the working part, the number of turns per unit length has more. It is made from a wire of square section. The instrument canal to move in a vertical direction.</p> <p>More flexible files (made of a flexible stainless steel). Used for the treatment of curved canals, they make sawing movements.</p> <p>Instrument that is manufactured by honing of a circular workpiece. These Gimlets cut significantly stronger than K-files. However, when working with them should be very careful to avoid broken off the instrument or</p>

	<p>«Safety Hedstroem»)</p> <p>«S-File»,SET-H-File)</p>	<p>uneven expansion of the canal lumen. Hedstrom files may only sawing movement.</p> <p>The Hedstrom file is one of the parties is smooth. With this design, the instrument can handle curved root canals, without changing their shape, are not thinned the wall of the root in small curvature.</p> <p>Made of cone workpiece by milling and differs from conventional Hedstrom file that has a double helical cutting edge and slice reminds «S» the letter. In addition, the spiral grooves on the working part of the tool is not so deep, however it is significantly stronger and symmetrically.</p>
5. Irrigation of root canals	<p>Miller`s needle (root canal needles)</p> <p>Endodontic syringe</p>	<p>They are divided into smooth and faceted. Designed for fixing cotton turundas for washing the root canals.</p> <p>Used for rinsing a root canal during its instrumentation. Used with a blunt needle or blind end and side holes</p>
6. Obturation of root canals	Pasta-carrier, pasta - filler	<p>It is a machine or hand instruments with working part in the form of a centered conical spiral. Designed for introducing pasty filling materials into the channel. The optimum rotational</p>

		speed of 100-200 rev / min.
	Spreader	Side sealing of gutta-percha. Tool with a smooth tapered working portion. It refers to the size of other endodontic instruments.
	Plagger	Vertical sealing of gutta-percha. The tool with a working portion in the form of a smooth truncated rod.
	Gutta-condenser	Rod stainless steel instrument, similar to an inverted Hedstrom file. Designed to work with the contra-angle handpiece and for thermomechanical condensation of gutta-percha.

### "Standardization of endodontic instruments"

Instrument options	Specification
- <b>The total length of the metal rod</b> -	- May be 21,25, 28 or 31 mm (most common tools) - rod length 25 mm, working length - always 16 mm;
the diameter of the tip of the working part of the instrument	Count the projection cone of the working part of a plane passing through the top of the instrument and perpendicular its middle axis. The diameter of the working part (thickness) is one of the characteristics of an important endodontic instrument looked in hundredths

	<p>of a millimeter and is denoted by the ISO number. For example, № 35 means that the diameter of the tool tip working portion is 0.35 mm. Additionally, color coding standard includes:</p> <p>Pink - № 06</p> <p>gray - № 08</p> <p>Purple - №10</p> <p>White -№15, 45, 90</p> <p>yellow - № 20, 50, 100</p> <p>-№ Red 25, 55, 110</p> <p>Blue - № 30, 60, 120</p> <p>Green - № 35, 70, 130</p> <p>Black - № 40, 80, 140.</p>
<p><b>Taper of working part</b></p>	<p>according to the ISO standard, it should be constant. It is 0.02 mm / mm or 2%. This means that for every millimeter of the working part of the tool length increases its diameter by 0.02 mm.</p> <p>Currently, there are tools with a taper 04,</p> <p>06 (Instruments for very narrow and / or curved canals)</p> <p>08 (used in lower incisors, upper lateral incisors, premolars multirooted, the front channels of the lower molars, upper molars buccal canals)</p> <p>10 (in the palatal canals of upper molars, lower molars rear canals, single rooted premolars, canines, upper central incisors), 12 (in the wide canals).</p>
<p><b>Graphical symbols for types of</b></p>	<p>To facilitate the selection instruments in</p>

<b>endodontic instruments.</b>	endodontic treatment on its arm marked to characterizing the instrument belongs to one of the groups (Example - a triangle, the square of the K-file, H-file - a circle, etc.)
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## 10. Materials for self-mastery of knowledge

### 10.1 Tests of different levels (used departments' databank tests)

11. The theme of the next lesson: Passage of the root canal. Instruments. Determining the working length of the tooth.

Wrote by

Aksinorska O.I.

1. Topic: " Passage of the root canal. Instruments. Determination of the working length of the tooth "

2. Relevance of topic:

In the treatment of pulpitis or periodontitis doctors have to perform a number of endodontic procedures. From the ability to competently perform these manipulations determines the final outcome. Mistakes, and then complications are mainly associated with the lack of knowledge of the topography of the pulp chamber doctor, as well as the inability to perform endodontic manipulation, especially in impassable channels, when it is necessary to carry out chemical and instrumental channel processing to its passage and expansion. The dentist must be able to measure the working length of the root canal, choose the right size tool and observing the rules and techniques to carry out the processing root canal.

3.1 The educational aims of the lesson:

- To familiarize students with the endodontic instruments and requirements for their use;
- Master the techniques of using endodontic instruments according to their destination;
- To capture the methods of determining the working length of the tooth
- To capture the method of passage of root canal

3.2 Specific aims

- The need to form a student of the principles of medical ethics and deontology
- The need for timely dental health
- The need to clarify the role of the individual patient oral hygiene with the purpose of prevention of dental caries and its complications
- Formation of students' psychological and legal professional medical responsibility for the life of the patient and his destiny.

3.3 On the basis of theoretical knowledge on the subject to be able to:

- Know:
- Endodontic instruments for the passage of the root canal

- Methods for the determination of the working length of the tooth

### 3.4 Lesson aims:

- Master the methods / able /:
- Apply different methods for determining the working length of the tooth
- Choose from the modern equipment of the endodontic instruments for passage of the root canal
- To master the technique of working with endodontic instruments for the passage of the root canal

### 4. Interdisciplinary integration

Topic	To know	To be able
<p>1. Previous discipline that provide the study the topic: Department of medical chemistry</p> <p>Department of Biophysics,</p> <p>- Surgery:</p> <p>Intra Integration: Diagnosis and treatment of pulpitis and periodontitis</p>	<p>Principles of Inorganic and inter action organic acids, binders with dental hard tissues principles of adhesion</p> <p>The physical properties of metals</p> <p>Causes of complications that arise when quality of endodontic treatment is unsatisfied.</p> <p>Etiology and classification of pulpitis and periodontitis</p>	<p>Conduct pre-treatment stages: preparation of cavities, opening and development of the pulp chamber, etc .</p>

## 5. Content of the topic.

K-Reamer - instrument for passage of root canals. The word "Example" is derived from the English expression - gnawing motion. The letter "K" indicates the instrument type, buyouts are made by twisting - the tools to "K-type". The tool has a triangular profile, which gives the flexibility instrument. When working in the root canal perform movements that resemble winding watch clock. The maximum permissible angle of rotation - 180°.

K-Flexoreamer - different from the K-Reamer increased flexibility, which is achieved by a triangular cross-section of the working part, a decrease in pitch of the helix, high quality steel. It is intended for the passage of the thin and curved canals.

K-Flexoreamer golden mediums is a K-Flexoreamer intermediate sizes (12, 17, 22, 27, 32, 37). Designed in those cases where there is difficulty moving from one instrument to the next size.

K-Reamer Farside - a set of K-Reamer reduced length (15-18 mm) and small diameter) 06, 08, 10 and 15 to ISO standard). The kit is intended for the initial roasshireniya narrow root canals, especially in chewing teeth when opening the mouth is difficult.

K-Reamer Deepstar - a set of instruments for unsealing the root canal. It includes a set of truncated K-Reamer (15 and 18 mm) with a sharp aggressive tip. The kit includes 18 tools and two tool type Orifice Opener.

Instruments to expand the root canal.

These instruments are known as "drill" or "file". Their name comes from the English expression - "sawing motion."

K-file - in appearance similar to K-Reamer, but differs from it by a large number of turns on the working part. K-file to №25 made of square-section wire, thus reducing the risk of "unwinding" and instrument fracture. Since the number 30 is used blank triangular cross-section that allows you to get more sharp cutting edges and greater flexibility instrument. K-file is a versatile instrument and can also be used for playing, and to expand the root canal. With the passage of the channel K-file commit rotational motion as in-winding watch clock (at 90° in the one and the other side). Expanding channel K-file is made sawing motions by repeated alternately promotion tool in the direction of the apical foramen and removing it from the channel. File in deriving pressed against the wall of the channel.



K-flexofile - a flexible auger. Unlike conventional K-file, in the manufacture of the tool applies a flexible steel wire using a triangular cross-section which increases its flexibility. Greater flexibility is also achieved by reducing the cutting stroke at the working part of the tool. They are used for machining curved channels. They should make sawing motion.

K-flexofile golden mediums - is a flexible intermediate file sizes to ease the transition from one instrument to the next during the expansion of root canals.

K-file Nitiflex - Instruments manufactured by sawing, they have flexibility, 5 times greater than the flexibility of conventional steel instruments. These instruments take the form of even the curved channel and after removal from the channel remains flat. Tools designed to expand strongly curved canals. When working with these tools is recommended to perform only reciprocating (sawing) movement.

Hedstrem file - drill Hedstrem's, machined from a steel wire of circular cross section (cutting method). Thus running helically formed cutting edges, this tool provides high cutting ability, but also brittle. The instrument may only be sawing motion. The tool is used for alignment of the root canal walls, especially if it has an oval or slit-shaped skylight. When machining of the root canal K-file or K-Reamer combined with Hedstrem file, it is recommended to take the N-file one size smaller than the previously used instrument.

Rasp - Rasp (rat tail) has 50 small sharp teeth, arranged at right angles to the axis instrument. They form spiral rows encircling round tapered rod of the working part. The length of the teeth is one-third the diameter. The instrument tip is rounded and has no teeth. Rasp for enlargement of the root canal and for removing soft content thereof. Canal Expansion is performed rotational and sawing (scraping) movements. After processing, the channel walls must be smooth rasp Hedstrem file or K-file.

Tools for removal of soft content of the root canal.

To delete the contents of the root canal using broach. It is a instrument in the working parts of which are located in different planes about 40 teeth. The size of teeth equal to half the diameter of the rod. The teeth are oblique direction, the edge facing the handle of the tool and have little mobility.

Broach for removal from the root canal soft tissue only. When the broach inserted into the root canal to the required depth, carefully (without effort) is rotated by about 2-3 turns and recovered together with root canal contents.

Instruments for root canal filling.

Currently, for root canal filling used:

Endodontic files and reamers (Lentulo) - is a conical spiral wire with a handle or a holder for fixing the tip. The turns of the spiral wound counterclockwise. When you rotate the injection occurs endodontic files and reamers paste into the channel. The recommended speed of rotation - 100-200 rev / min. Available in four sizes endodontic files and reamers.

Spreader - (lateral seal, a condenser) is a rod-cone-shaped instrument circular cross-section. By the size of its working part corresponds to the working of the tools for machining the root canal and the parameters of standardized gutta pins. The tool tip is sharpened. Suitable tools for lateral condensation gutta pins.

Plagger - (vertical condenser) has a cylindrical or conical shape of the working part and the flattened top of instrument like a shtopfer. Designed for vertical condensation of gutta-percha in root canals.

1. Calculation method is based on the average performance of anatomic tooth root length, taking into account the minimum and maximum deviations. Numerous measurements have established a tooth root mean value of length for each group of teeth and their maximum or minimum deviations (Table 1). It is clear that the value of these figures can be taken as indicative.

Table 1. Length of teeth

Upper jaw	13,3	12,9	18,1	14	14,6	14,5	13,8	13,5
Max	27,5	25	29,7	23	24	24	23	20
Midi	25	23	27	21	22	22	21	18
Min	22,5	21	24	19	20	20	19	16
	1	2	3	4	5	6	7	8
Max	23	24	28,5	24	24	24	23	20
Midi	21	22	26	22	22	22	21	18
Min	19	20	23,5	20	20	20	19	16
Lower jaw	12,0	13,9	14,9	14,7	15,6	14,8	14,3	14,0

With endodontic line and stop at the endodontic instruments establish an average length. Instrument (root borer) file is introduced into the root canal. If the position of the stop coincides with the cutting edge or buccal tubercles lateral teeth, the working length of the canal of the tooth corresponds to the average values in the case of stop placement above mentioned anatomical landmarks channel passage continues.

## 2. X-ray method.

Based on X-ray image receiving with the introduction into the root canal endodontic instrument with a rubber stopper. This is the most reliable method. However, its use is contraindicated in many cases impossible either due to lack of X-ray systems in a number of classrooms.

Recently received widespread RAY. The virtue of it is a substantial reduction of radiation dose, as well as the ability to express the depth of the digital transmission and obturation of the root canal.

## 3. Electrometric method.

The method allows to accurately determine the extent of passage of root canal. Devices created for this purpose, are called apex locators. It should be noted that currently produced apex locators provide accurate readings (with certainty 95 - 98%), regardless of the channel in the blood, saliva or tissue fluid. The advantage of the method lies in the possibility of multiple repetition, as well as conducting research in the workplace in the course of treatment.

## 6. Materials of methodical maintenance of employment.

### 6.1. Tasks for self-examination of the original level of knowledge, skills

1. What are the stages of endodontic treatment.
2. Stages disclosure tooth cavity.
3. What are the criteria for qualitative preparation of the coronal tooth cavity to the following endodontic treatment.
4. What medications are used for pulp devitalization?

5. What are the tools used for pulpotomy?
6. Classification of endodontic instruments according to their destination.
7. Options of endodontic instruments, which are regulated by ISO 3630.
8. What are the tools for the transmission and the expansion of the root canal.
9. What are the tools for the removal of the soft tissues of the tooth.
10. What are the tools for root canal filling.

1. The size of the main endodontic instruments (files and reamers) is determined on the basis of:

- A length of the working part of the instrument.
- B. diameter of the base of the rod instrument.
- C. None of these criteria is not determinative.
- D. The overall length of the entire web instrument.
- E. Diameter of the instrument tip.

2. Which of the following pairs of instruments designed for soft tissue removal from the root canal?

- A. K-file and H-file
- B. Rasp root and K - Reamer.
- C. K - reamer and broach
- D. Profile and flex-file.
- E. Rasp root and broach.

3. By what defining characteristics can be distinguished K-reamer by K-file?

- A. The length of the working part.
- B. The sectional shape.
- C. Vertical instrument diameter from the base to the tip.
- D. Cutting face angle of inclination to the longitudinal axis of the tool

E. The total length of the bar instrument.

4. What is the main difference between K-file and nitifleks defines workers as the last?

A cross-sectional shape of the working part.

B. The length of the working part.

C. The total length of the rod instrument

D. The material for the instrument rod.

E. The material for the instrument handle.

5. Specify the instrument, which has the lowest strength of the working part:

A. By-Example.

B. K-file.

C N- file.

D. Flex-file.

E. Flex-rimer

6. Which type (ISO 3630 standard) corresponds to a tool with subsequent symbols: shaft for contra-angle handpiece is marked red ring symbol - a triangle.

A K-Reamer machine for handpiece №25.

B. To file a machine for handpiece №25.

C. K-Reamer machine for handpiece №40

D. endodontic files and reamers for the angular tip number 30.

E. H-file number 35 for the handpiece.

7. Which of the following instruments can be coded in green?

A. machine reamer with 3 annular grooves on the shank; H - file number 30.

B. file number 35; By-Example number 65.

C. file number 40; K - file number 35.

D. Rimer machine of 5 annular groove on the shank; H file number 20.

E Example number 20; K - file number 60.

8. Select the endodontic instrument for pulpectomy:

A. To file

B. N-file

C. endodontic files and reamers

D. K-Reamer

E. Broach

9. Endodontic instruments size 25 (ISO) are marked with this color:

A. Blue

B. White

C. red

D. Yellow

E. Green

6.2 The information necessary for the formation of knowledge and skills can be found in textbooks:

Recommended literature:

Basic literature:

107. Marchenko I.Ya., Tkachenko I.M., Nazarenko Z.Yu. Propaedeutics of Therapeutic Stomatology (Module 1): Teaching manual for foreign students of dentistry faculties medical educational establishment / Marchenko I.Ya., Tkachenko I.M. Nazarenko Z.Yu.; 'UMSA'. – Poltava: "ASMI", 2016.-2016.-191p.
108. Mithell D. Oxford handbook of clinical dentistry /D. Mithell., L. Mithell. – Oxford University Press, 1999.-804 p.
109. Harty F.J. Endodontics in clinic practice. -1994. – 366 p.
110. Propaedeutics of Pedodontics./ L.F. Kaskova, I. Yu. Vashchenko.// Methodical recommendation – Poltava, 2007. – P.156.
111. Peter Heasman. Restorative Dentistry, Pediatric Dentistry and Orthodontics.- Churchill Livingstone. – 2003. – P.378.

112. Stock C.J.R., Nexammer C.F. Endodontics in practice //British Dental Association. – London, 1990.

Additional literature:

1. Cohen : Pathways of the pulp, 9<sup>th</sup> ed., 2006. – Mosby, An Inprim of Elsevier. – 632p.
2. Ingle J., Backland L. Endodontics. – Hamilton: BC Decker Inc, 2002. – 1004p.
3. Guldener P.H., Langeland K. Endodontologie. Diagnostic and Therapie. Thieme. Stuttgart, New York, 1987. – 192p.
4. Harty F.J. Endodontics in clinical practice. – 3<sup>rd</sup> edition. – Cambrige, 1990  
Rosen S.L. Fundamentals and Principles of polymeric material/ s.L. Rosen. – New York, 1982. – 187p.
5. Pahomov P.V. „Primary Dental Diseases Prevention”. – M.:Medicine, 1982. – 238 p.
6. Pinkbam I.R., D.D.S., M.S. „Pediatric dentistry”. – V.D. Saunders company. – 1999. – 566p.
7. Roshchina P., Maksimovskaya L.N. „Treatment preparation in stomatology”. – Medicine. – 1989. – 206p.
8. The art and Science of Operative dentistry/ Clifford M. Studevant, Theorede M. Roberson, Harald O. Hiwmann, John R. Sturdevant. – Sant Louis, Mosby Years Book. – 1995. – 854 p.
9. Tronstad L. Clinical endodonticis. – Thime: Stuttgart ect., 1991. – 237 p.
10. Weine F.S. Endodontic therapy. – 5<sup>th</sup> edn. – St Louis: Mosby, 1996.

Information resources on the Internet:

-<http://nasbol.com/2011041354397/propedevtica-stomatologicheskizabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html>

-<http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskizabolevaniy-skorikova.html>

-[http://dental-ss.org.ua/load/kniga\\_stomatologia/terapevticheskaja/8](http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8).

-<http://www.stomatkniga.ru/index.php?start=48>.

-[http://stomatbook.blogspot.com/p/blog-page\\_14.html](http://stomatbook.blogspot.com/p/blog-page_14.html).

-<http://www.mosdental.ru/Pages/Page28.1.html>.

[http://mirknig.com/knigi/nauka\\_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html](http://mirknig.com/knigi/nauka_ucheba/1181309066-terapevticheskaya-stomatologiya-uchebnik.html)

### 6.3. Orienting card for self work with literature on the topic.

№	Basic tasks	Instructions	Replies
1.	To study the basic endodontic instruments	Disassemble the classification, properties, purpose of endodontic instruments	

## 7. Materials for self-control of training quality

### A. Questions for self-control

1. What is the working length of the tooth?
2. What is the physiological, anatomical, radiographic apex of the tooth?
3. What are the methods used to determine the working length of the root canal?
4. What endodontic instruments used to determine the working length of the tooth?
5. What endodontic instruments used for the passage of a root canal?

### B. Tests for self-control with the standards of the responses.

1. The increased flexibility due to K-File nitiflex?

A. Form of the working part

B. Nickel-titanium alloy

C. nonaggressive tip

D. The length of the working part

E. Method of production cuts



2. Which instrument is used for the passage of the root canal at the stage of machining?

A. Lentulo

B. Reamers

B. Hedstrom files

G. Rasps

D. spreaders

3. Which instrument should be used for the introduction of sealer into the root canal?

A. Files

B. Reamer

B. Lentulo

G. Rasps

D. Hedstrom files

4. What instruments are used only in rotary mode by canal treatment?

A. Hedstrom files

B. Profiles

B. Rasp

G. Niti flexfile

D. Reamer

5. What does the letter K in front of the name of the instruments K-reamers and K-files?

A Instrument manufactured by slicing

B. The instrument is intended for the expansion of the root canal

C. The instrument, which is produced by spot welding

D. instrument to determine the length of the channel

E. Instrument, manufactured by twisting

Standards of answers: № 1 - B; Number 2 - A; Number 3 - B; Number 4 - B; Number 5 - D

8. Materials for the classroom self-study:

8.1. List of educational practical tasks which must be performed in the practical (lab) classes:

- Define the basic characteristics of endodontic instruments;
- Identify the purpose of endodontic instruments;
- Choose from modern endodontic equipment tools necessary for carrying out manipulations in a specific situation;
- Master the technique of robots endodontic instruments.

9. Instructional materials for learning professional skills, skills:

9.1. Methods of work at runtime.

**Classification scheme of endodontic instruments as intended.**

Stage of endodontic treatment	Instruments	Definition
1. Expansion of the mouths of the root canal	<p>Burs Gates-Glidden.</p> <p>Special types of reamers</p> <p>«Peeso Reamer» («Largo»)</p>	<p>It has a working part of a spear-shaped tip with a non-aggressive on the long thin rod. The length of the working part of the rod 15 -19 mm. The tool is available in 6 sizes. Work «Gates-Glidden» tip at low revs. The recommended speed of rotation - 450-800 rev / min.</p> <p>It has an elongated working part of the rod tip and non-aggressive. It is intended for the passage of direct channels of single rooted teeth and the palatal canal of upper</p>

	<p>The oral canal expander: Orifice Opener</p>	<p>molars and the distal canal of lower molars. Available in 6 sizes tool that marked on the adapter ring. Recommended small rotational speed - 700-1200 / min.</p> <p>It has a bullet-working part of the coated diamond powder. This is a handheld instrument.</p>
<p>2. Extracting the soft tissues from dental canals</p>	<p>Nerve broaches</p>	<p>An instrument that has the working parts which are located in different planes teeth having oblique direction, pointing to the handle of the instrument. When diving into the canal teeth are pressed against the tapered rod, when removed from the channel teeth pulp tissue capture and remove it. Is introduced into the root canal is not more than 2/3 of its length, carefully make 2-3 passes and recovered.</p>
<p>3. Passing the root canal</p>	<p>«K-Reamer» (Reamer, Dril Kerr; drilbor)</p>	<p>Made of high-quality non-rusting stainless steel and has the flexibility and high cutting capacity, which is achieved by cutting face elongated step. When working in the root canal K-reamer committed motion resembling sub-winding of hours. The maximum permissible angle of rotation - 180 °.</p>



	<p>«Safety Hedstroem»)</p> <p>«S-File»,SET-H-File)</p>	<p>them should be very careful to avoid broken off the instrument or uneven expansion of the canal lumen. Hedstrom files may only sawing movement.</p> <p>The Hedstrom file is one of the parties is smooth. With this design, the instrument can handle curved root canals, without changing their shape, are not thinned the wall of the root in small curvature.</p> <p>Made of cone workpiece by milling and differs from conventional Hedstrom file that has a double helical cutting edge and slice reminds «S» the letter. In addition, the spiral grooves on the working part of the tool is not so deep, however it is significantly stronger and symmetrically.</p>
5. Irrigation of root canals	<p>Miller`s needle (root canal needles)</p> <p>Endodontic syringe</p>	<p>They are divided into smooth and faceted. Designed for fixing cotton turundas for washing the root canals.</p> <p>Used for rinsing a root canal during its instrumentation. Used with a blunt needle or blind end and side holes</p>
6. Obturation of root canals	Pasta-carrier, pasta - filler	It is a machine or hand instruments with working part in the form of a centered conical spiral. Designed for introducing

		<p>pastly filling materials into the channel. The optimum rotational speed of 100-200 rev / min.</p>
	Spreder	<p>Side sealing of gutta-percha. Tool with a smooth tapered working portion. It refers to the size of other endodontic instruments.</p>
	Plagger	<p>Vertical sealing of gutta-percha. The tool with a working portion in the form of a smooth truncated rod.</p>
	Gutta-condenser	<p>Rod stainless steel instrument, similar to an inverted Hedstrom file. Designed to work with the contra-angle handpiece and for thermomechanical condensation of gutta-percha.</p>

### "Standardization of endodontic instruments"

Instrument options	Specification
<p>- <b>The total length of the metal rod</b> -</p>	<p>- May be 21,25, 28 or 31 mm (most common tools - rod length 25 mm, working length - always 16 mm;</p>
<p>the diameter of the tip of the working part of the instrument</p>	<p>Count the projection cone of the working part of a plane passing through the top of the instrument and perpendicular its middle axis. The diameter of the working part (thickness)</p>

	<p>is one of the characteristics of an important endodontic instrument looked in hundredths of a millimeter and is denoted by the ISO number. For example, № 35 means that the diameter of the tool tip working portion is 0.35 mm. Additionally, color coding standard includes:</p> <p>Pink - № 06</p> <p>gray - № 08</p> <p>Purple - №10</p> <p>White -№15, 45, 90</p> <p>yellow - № 20, 50, 100</p> <p>-№ Red 25, 55, 110</p> <p>Blue - № 30, 60, 120</p> <p>Green - № 35, 70, 130</p> <p>Black - № 40, 80, 140.</p>
<p><b>Taper of working part</b></p>	<p>according to the ISO standard, it should be constant. It is 0.02 mm / mm or 2%. This means that for every millimeter of the working part of the tool length increases its diameter by 0.02 mm.</p> <p>Currently, there are tools with a taper 04,</p> <p>06 (Instruments for very narrow and / or curved canals)</p> <p>08 (used in lower incisors, upper lateral incisors, premolars multirooted, the front channels of the lower molars, upper molars buccal canals)</p> <p>10 (in the palatal canals of upper molars, lower molars rear canals, single rooted premolars, canines, upper central incisors), 12</p>

	(in the wide canals).
<b>Graphical symbols for types of endodontic instruments.</b>	To facilitate the selection instruments in endodontic treatment on its arm marked to characterizing the instrument belongs to one of the groups (Example - a triangle, the square of the K-file, H-file - a circle, etc.)

Methods of determining the working length of the mandible premolar calculation method

Required tools and materials:

- Instrument kit for examination of the oral cavity;
- Table of topographic anatomy of the average dental cavities;
- Instrument for the passage of the root canal - K file number 10, with silicone stopper;
- Endodontic line.

Procedure:

1. Using the table indicators of topographic anatomy of the teeth, found in column 1 of the lower premolar.
2. Column 3 to find the average instrument length in millimeters (20-24 mm).
3. With a ruler endodontic found to exhibit stopper length (22 mm).
4. Enter the tool into the root canal prior to contact with the stopper buccal protuberance (control tooth length).
5. Mark the length found in all the working instrument.

10. Materials for self-mastery of knowledge

10.1 Tests of different levels (used departments' databank tests)

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