BUKHARA STATE MEDICAL INSTITUTE
NAMED AFTER ABU ALI IBN SINO

Department of Prosthodontics and Orthodontics

"Approving"
Vice-rector for academic and
educational part
Ph.D. _____ Zharilkasinova G.U.

TRAINING AND METODOLOGY COMPLEX

FOR 2nd YEAR STUDENTS

ON FIXED DENTURES

BUKHARA 2019

Ministry of Higher and Secondary Education of the Republic of Uzbekistan

Department of Prosthodontics and Orthodontics

Approved by the Ministry of Higher
and Secondary Education of the
Republic of Uzbekistan by Order
Registration No. _____ dated
No. _____ 20 ___ “____” _____
20 ___ "____" _____

Subject curriculum

ON FIXED DENTURES

Knowledge level: 700,000 - Health and special education
Knowledge industry: 720,000 - Health
Industry Sectors: 572,000 - Dentistry

This curriculum was reviewed and approved at the meeting of the educational and methodological Department-2019 The curriculum was prepared by the Tashkent medical Academy

Compilers: Nurova SH. N. - Department of Orthopedic dentistry and Orthodontics.

Reviewers: Khabibova N. N.-head of the Department of therapeutic dentistry

Anontasion.

This is a curriculum compiled for 2nd year students on the subject “Propaedeutics of Orthopedic Dentistry Diseases” aimed at teaching students skills in the methodology of analyzing dental diseases, drawing up programs for their treatment, and providing primary orthopedic dental care.

Content

Lectures

Lecture 1: Introduction to Dentistry
- The subject and tasks of orthopedic dentistry
- A brief outline of the development of orthopedic dentistry
- The history of dentistry in the ancient Uzbekistan and Abu Ali and BN Sino stanavlenii in dentistry as a clinical dis chi square and n s
- Anatomy and physiology of the maxillofacial system
- Teeth and dentition
- Chewing muscles, absolute strength of chewing muscles, chewing pressure

1.1. Teaching Technology Model _____ p.
1.2. Technological map of lectures (problem of technological map lectures) _____ p.

2 lecture: - Basic examination methods in the clinic of Orthopedic Dentistry
- Additional and special examination methods
- Psychological preparation of patients before prosthetics
- Brief information about the dental materials used in the practice of prosthetic dentistry

2.1. Teaching Technology Model _____ p.
2.2. The problem of the technological map of lectures _____ p.

Practical lessons.

1 topic: Goals and objectives of Orthopedic dentistry.
- The history of the development of orthopedic dentistry.

Technology map of practical classes _____ p.

2 topic: Anatomy and physiology of the maxillofacial region.
- teeth and dentitions
- upper and lower jaw
- alveolar processes
- Anatomical features of the structure of the oral mucosa
- difference between the sign of the crown and root of the teeth of the upper and lower jaw
- restoration of the anatomical shape of the teeth on the phantom with wax
- restoration of the equator of the tooth on gypsum models. Anatomical and clinical cervix

Technology map of practical classes _____ p.

3 topic: Chewing and facial muscles.
- absolute strength, chewing pressure of the chewing muscles
- conditions regarding the physiological rest of the lower jaw

Technology map of practical classes _____ p.

4 topic: Anatomical and physiological classification of the dentition.
- articulation, occlusion and its types
- signs of closing teeth
- bite and its types
- symptoms of physiological and pathological bites
- determination of the type of bite in students

Technology map of practical classes _____ p.

5 theme: Temporomandibular joint.
- the structure of the TMJ
- biodynamics of the lower jaw
- vertical, sagittal and transverse movements of the lower jaw

Technology map of practical classes _____ p.

6th topic: Examination of the patient in the clinic of prosthetic dentistry.
- main and additional types of examinations in the clinic of orthopedic dentistry
- survey features
- anamnesis, the appearance of the patient
- examination of the oral cavity
- examination of teeth and dentitions
- pathological tooth mobility
- examination of toothless jaws
- determination of the depth of the gingival pocket
- determination of the absolute pressure of the masticatory muscles
- methods for determining chewing pressure (Gnatodynamometry)
- methods for determining chewing effectiveness (tests)
- TMJ examination methods
- study of diagnostic models
- psychological preparation of patients before prosthetics

Technology map of practical classes _____ p.

Topic 7: The use of tools in the practice of prosthetic dentistry.
- dental drills. Preparing them for work
- tips, the principle of micromotors
- use of instruments for examining patients and preparing dentures

Technology map of practical classes _____ p.

Topic 8: Preparation for the operation of dental devices.
- safety precautions, ergonomic basis for the organization of workplaces for a dentist

Technology map of practical classes _____p.

Topic 9: Sterilization and disinfection, protective equipment for employees.
- prevention of iatrogenic and infectious diseases (HIV infection, hepatitis B)

Technology map of practical classes _____ p.

Topic 10: Dental diagnosis.
- types of dentition anomalies
- types of dentures used in practice in prosthetic dentistry
- establishing diagnosis
- Orthopedic treatment plan
- disease history
- filling out orders

Technology map of practical classes _____ p.

Topic 11: Characterization of materials used in laboratories and clinics in orthopedic dentistry
- general information about dental materials
- main properties of materials (mechanical, technological, physical, chemical and biological)

Technology map of practical classes _____ p.

Topic 12: The use of metal and its alloys in orthopedic dentistry.
- metal alloys and the technology for their preparation. Gold and its alloys
- nickel chrome and stainless steel alloy, coboltchrome alloy, types of solder and solder
- metal bleaching

Technology map of practical classes _____ p.

Topic 13: The use of plastics in practice Orthopedic dentistry.
- types of plastics
- plastic preparation technology
- polymerization process

Technology map of practical classes _____ p.

14th theme Porcelain and composite materials. Wax and its types.
- technical and medical properties of porcelain
- light hardening composite materials
- chemical structure, physical and mechanical properties
- glass crystalline materials
- use in the clinic and laboratory
- chemical, physical and mechanical properties of wax

Technology map of practical classes _____ p.

Topic 15: Cast and impression materials used to take a cast.
- characteristics of the use of materials for taking an impression
- requirement for materials used to take an impression
- medical plaster
- impression materials of thermal and silicone groups

Technology map of practical classes _____ p.

Topic 16: The requirement for spoons to take an impression and choosing them for the patient.

- stages of casting
- types of cast
- preparation of patients for casting

Technology map of practical classes _____ p.

Introduction

This program is prepared in accordance with the qualification characteristics and the new concept of training a dentist in general practice and determines the amount of theoretical and practical skills that a student should possess during the training at the Department of Orthopedic Dentistry.

This is a curriculum compiled for 2nd year students on the subject "Propaedeutics of Orthopedic Dentistry Diseases" aimed at teaching students skills in the methodology of analyzing dental diseases, drawing up programs for their treatment, and providing primary orthopedic dental care.

The program is designed for students to perform practical work and phantom work. Teaching students to perform on phantoms affecting the hard tissues of the tooth, processing dentures, working on dental devices. Knowledge training, explanations of the biomechanics of the dentofacial system, oral organs, familiarization of students with the basic and auxiliary materials used in dental work.

The purpose of training.

To study the principles of the organization of the Orthopedic department and the doctor's workplace with dental equipment, the rules of the internal routine of the department, the appointment of patients, the preparation of medical documentation. At the same time, training in the use of materials in Orthopedic Dentistry, and showing tools used by an orthopedic dentist and dental technician. To master the basics of the dentofacial system, the TMJ biomechanics and types of bites.

Objective Objectives.

1. To acquaint students with the anatomical and functional features of the tissues of the oral cavity and maxillofacial region.
2. Familiarization of students with the basic and auxiliary materials used in the clinic of prosthetic dentistry and dental laboratory.
3. Development of skills of clinical, functional and paraclinical methods of examination of patients.
4. To study the principles of the organization of the Orthopedic department and the doctor's workplace with dental equipment, the rules of the internal routine of the department, the appointment of patients, the preparation of medical documentation.
5. Familiarization of students with the clinical, legal and financial documents of the clinic of prosthetic dentistry.
6. Introduce physiological and pathological bites.
7. Studying casting, casting and difference models.

Basic principles, methods and teaching aids.

The bachelor in taking the necessary measures during the study of the subject “Propaedeutics of diseases of Orthopedic Dentistry” should know:
- what sections Orthopedic dentistry consists of,
- goals and objectives of the subject,
- equipment features of the Orthopedic Dental Laboratory,
- a list of necessary basic and auxiliary materials,
- tools used for the manufacture of teeth and dentures,
- anatomical and functional structure of the maxillofacial region.
- The concept of bites.

The student should know: anthropometric features of the maxillofacial region of a person; properties used in practice of basic and auxiliary materials; methods of their use; rules for mixing gypsum, elastic and thermoplastic masses; fundamentals of the preparation of teeth of phantom models; functional testing methods used in dental practice (gnatodynamometry, thermometry, chewing tests).

Interconnection with other sciences and order by method.

Propaedeutics of diseases Orthopedic dentistry is taught from the 3-4th semester. The training program planned in the process of implementation requires marketing and management knowledge, biochemistry, medical genetics, bioorganic chemistry, biology, biophysics (physics), human anatomy, histology and embryology, normal physiology, dentistry.

Place in the healthcare system.

The science of propaedeutics of diseases of orthopedic dentistry occupies an important place in the healthcare system, since it teaches about the procedure for working with tools and drills used in the examination of dental patients and their diagnostics, the anatomy of the dentofacial system, their physiology, and the materials used in orthopedic treatment. In addition, this science is about Orthopedic dental departments, about the construction of technical laboratories for the manufacture of teeth and prostheses, about sanitary and hygienic standards.

This science is the basis of the science of hospital and faculty dentistry.

Modern information on pedagogical technology when studying this science.

Training students in the propaedeutics of diseases of prosthetic dentistry, using innovative and modern methods, is important. In training, it is necessary to use textbooks, teaching materials, reports, computer programs, Internet data.

In presentations and practical exercises, it is necessary to use modern pedagogical technologies.

List of literature and teaching aids.

Main literature.

1	Shcherbakov A.S. Gavrilov Y.I.Trezubov V.N. Zhulev E.N.	Orthopedic Dentistry	St. Petersburg, IKF "Foliant", 1997. -565 s.
2	Gavrilov Y.I. Shcherbakov A.S.	Orthopedic Dentistry	Moscow, "Medicine", 1984 - 575 p.
3	Kopeikin V.N. Knubovets Ya.S.Kurlandsky V.Yu. Oksman I.M.	Dental technology	M., Medicine, 1978 - 431 p.
4	Miryakubov M.M.	Orthopedic Dentistry	Tashkent, 1991 - 311 s.
5	Ed. Kopeikina V.N.	Orthopedic Dentistry Guide	M., Medicine, 1998, - 495 p.
6	Bekmetov M.V. Fayzullaev F.Sh.	Orthopedic dentistry home asholari	Tashkent, 1994

Additional literature.

7	Borovsky E.V. Kopeikin V.N. Kolesov A.A. Shargorodsky A.G.	Dentistry Practice Guide	M., Medicine, 1987. - from. 309-396.
8	Gavrilov E.I.	Propaedeutics of Orthopedic Dentistry	Kemerovo, 1974
9	Bolshakov G.V.	Preparation of teeth for filling and prosthetics	M., Medicine, 1983. – 112 p.
10	Bykov V.L.	Histology and embryology of the human oral cavity	St. Petersburg, 1996. – 246 p.
eleven	Kopeikin V.N. Demner L.N.	Dental technology	M., Medicine, 1985
12	Kopeikin V.N. Ponomarenko V.A. and etc.	Orthopedic Dentistry	M., Medicine, 1988.-511s.
thirteen	Kurlandsky V.Yu.	Orthopedic Dentistry	M.Meditsina, 1978
14	Shteingard M.V. Makarova K.A.	Dentistry copolymers	M. Medicine, 1982
fifteen	Yakovleva V.I.	Diagnosis, treatment, prevention of dental diseases	Minsk, 1994. -494 p.
16	Doinikov A.I. Sinitsyn V.D.	Dental materials science	M., Medicine, 1986. -208 p.
17	Guner M.M. Napadov M.A.Karalnik D.M. and etc.	Materials Science in Dentistry	M., Medicine, 1984., - 424 p.
18	Loginova N.K.	Functional diagnostics in dentistry	Publishing House "Partner", M., 1994. – 77th.
19	Loginova N.K. Volozhin A.I.	Pathophysiology of Periodontal	Training method.allowance, M., 1996. –108 p.

20	Ponomarenko V.A. Markov B.P. Shevchenko V.I. and etc.	Methods of research, diagnosis and treatment for partial loss of teeth with fixed prostheses	M., 1986 –16 s.
21	Prokhonchukov A.A.Loginova N.K.	Functional diagnostics in dental practice	M., Medicine, 1980.
22	Konovalov A.P. Kuryakina N.V. Mitin N.E.	Phantom course Orthopedic dentistry	M., Medical Book. -2001 - 341 p.
23	Trezubov V.N. Steingart M.Z. Mishnev L.M.	Orthopedic Dentistry (Applied Materials Science)	St. Petersburg, 1999 .- 322 p.
24	Schwartz A.D.	Biomechanics and occlusion of teeth	M., Medicine, 1994. –196 p.
25	Internet sites	www . dental . md ; www . stomatolog . ru ; www . newdent . ru ;www . dentist . ru ; www . dentoday . ru	

Practical training plan for 2nd year students in subject of Fixed Dentures in 3-4 semesters. 2019 -20 20 academic year .

No.	Topic	hours	hours	Links between educational s E disciplines	Interactives e method sle	Learning tool	Recommended Reading	Independent work
1	**D ate and objectives of Prosthetic Dentistry.** History of Orthopedic Dentistry .	1	**2**	BiologistsCesky chemistry ,medetsinskaya genetics ,bioneorganiCesky x them Ia, biology ,biophysics (physics), anatomy ofhuman ,histology ,sitologiya andembryology ,the rate lnayaphysiology , marketing andmanagement in the dental and	**All-throne handle**	Computer , projector , Multimedia and razadatochn s e MathMethods and materials , test s s e issue s ,situatsionns e task	ЩerbakovA.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to Orthopedic Dentistry M. Meditsin, 1993 - 495 p.	The development oforthopedic dentistry and its history. **2 - hours**
2	**Ana tomy and physiology of maxillo-personsEve area.** - tooth s and dental s e numbers - upper and lower jaw s - alveolyarn s e processes - Anatomical features of the structure of the oral mucosa - difference between the sign of the crown and root of the teeth of the upper and lower jaw - restoration of anatomic shapes steeth in phantom at Pomeau ni and wax - restoration of the tooth equator gypsum s x models.Anatomical and clinical cervix	1	**2**	BiologistsCesky chemistry ,medetsinskaya genetics ,bioneorganiCesky x them Ia, biology ,biophysics (physics), anatomy ofhuman ,histology ,sitologiya andembryology ,the rate lnayaphysiology , marketing andmanagement in the dental and	**Round systol**	Computer , projector , Multimedia and timedatochn s e MathMethods and materials , test s s e issue s , the situationGuy Dionne's e task	ЩerbakovA.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to Orthopedic Dentistry M. Meditsin, 1993 - 495 p.	Execu smations dental instruments in the clinic and the technical laboratory. **2 - hours**

3	**Anatomy and physiologicalstructure of** TMJ **Biomechanics of the** lower jaw	1	**2**	BiologistsCesky chemistry ,medical Skye genetics ,bioneorgani cals them I a ,biology ,biophysics (physics), anatomy ofhuman ,histology ,cytology and dembryology ,the rate of l snayaphysiology , marketing andmanagement in the dental and	**Honeycomb**	Computer , projector , Multimedia and timedatoch n s e MathMethods and materials , test s s e issue s ,situationsonn s e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p.	Attaching zhevatel s n s xm s ShTs and especially in prosthetics **1 hour**
4	**Zhevatel s n s e and facial muscleAturi .** - Absolute power zhevatel spressure was zhevatel s Noah muscled s - Condition of the relative s Foot physiological mandibular rest	1	**2**	BiologistsCesky chemistry ,medits Inskaya genetics ,bioneorganiCesky x them Ia, biology , biophysics (physics), anatomy ofhuman ,histology ,cytology and dembryology ,the rate of l snayaphysiology , marketing andmanagement in the dental and	**Round 'ssecond table**	Computer , projector , Multimedia and timedatoch n s e MathMethods and materials , test s s e issue s , the situationGuy Dionne's e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p.	The distinctives n s e characteristics and physiological malocclusion. **1 hour**
5	**Anatomical and physiologicalclassification Ia dentition systemss .** - Article yatsiya, occlusion, and itkind of s - signs refer sKania teeth - bite and ego kind of s - a symptom sphysiological and malocclusion - determination of the type of bite in students	1	**2**	BiologistsCesky chemistry ,Medici nskaya genetics ,bioneorganiCesky x them Ia, biology ,biophysics (physics), anatomy ofhuman ,histology ,cytology and dembryology ,the norm n teaphysiology , marketing andmanagement in the dental and	**Blits**	Computer , projector , Multimedia and timedatoch n s e MathMethods and materials , test s s e issue s ,situationsonn s e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p.	The distinctives n s e characteristics and physiological malocclusion. **1 hour**

6	**Survey bol s Foot Clinic of Prosthetic Dentistry.** - BASIC s e views examination in the clinic of orthopedic dentistry - survey features - history, appearance bol sFoot - examination of the oral cavity - examination of the teeth and dental s - series - pathologicaltooth m obility - inspection toothless s x jaws - Determination of the depth speriodontal k armana - definition	1	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Round systol**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ІЦ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to Orthopedic Dentistry M. Meditsin, 1993 - 495 p.	The mucous membrane of the oral cavity, the histological and anatomicalstru cture of the periodontalteet h. Graphic method s stud y of the motion of the lower jaw. **1 hour**
7	**D For more survey bol s Foot Clinic of Prosthetic Dentistry.** absolute pressure zhevatel s n s x ms ShTs - method s TMJ examinations - study of diagnostic models - psychological preparation bol sn s x before prosthetics	1	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Cat**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s ,situ ationsonn s e task	ІЦ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to Orthopedic Dentistry M. Meditsin, 1993 - 495 p.	Graphic method s stud y of movement of the mandible. Instrumental s N s th oral examination teeth and dental s x rows. **1 hour**

8	determiningzhevatel spressure andzhevat el vhydrochloric efficiency - Method 'sdeterminat ion zhevatel nogo pressure (Gnatodinomometri ya) - Method 'sdeterminat ion zhevatel vhydrochlo ric efficiency (samples s) **Preparation for the operation of dental devices.** - Safety, ergonomics basess organizationa ltion jobs dentists	1	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Weak link**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to Orthopedic Dentistry M. Meditsin, 1993 - 495 p.	Instrumental s N s th oral examination teeth and dental s x rows. **1 hour**
9	**Sterilization and Disinfection tions for u ITN 's e staff means.** - prevention yatrogen n s x and infekts Guy Dionne s x diseases (HIV Ia, hepatitis B)	1	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Round systol**	Computer , projector , multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p.	Zon s security steadfast s x dental tissues. **1 hour**
1 0	**Dental diagnosis.** - kind of sanomalies of dental s -series - in and d s Tooths x prostheses, use s s to practice in prosthodontics - establishing diagnosis - orthopedic treatment plan - disease history - filling out orders	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Honeycomb**	Computer , projector , multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task .	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p.	Manufacturing toothbrush s x prostheses stamping s m method. **1 hour**

1 1	**Characterization of materials applys x, s laboRhatore in clinics and prosthetic dentistry.** - about u s information on dental materials - Key 's e material properties (mechanical, technological, physical, chemical and biological)	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Weak link**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s ,situ ationsonn s e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to OrthopedicDentistr y M. Medicina , 1993 - 495 p.	Soldering and bleaching GOLD s x alloys. Heat onbr and Botk o.Alloy s of silver-palladium, tin and their quality **1 hour**
1 2	**The use of tools in practice Aboutdent al prosthetics.** - dental drill s .Preparing them forwork - thimbles, honesty, n workss m ikromator ov - approx e nenie tools for inspection bol s ns x and n on x onreparation anddental s x prostheses	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**All-throne handle**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. Kopeikina V.N. Guide to OrthopedicDentistr y M. Medicina , 1993 - 495 p.	I fix ui ue material s . ce ment s and their view schemica l composition. **1 hour**
1 3	**The use of metal and ego alloys in orthopedic dentistry.** - Metal Alloy sand their preparation technology. Gold and ego alloy s - nickel s chrome alloy nerzhaveyuu s steel alloy cobL s throma view ssolder and pripoyka - metal bleaching	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Pen**	Computer , projector , multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	Щ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. Kopeikina V.N. Guide to OrthopedicDentistr y M. Medicina , 1993 - 495 p.	Temporal s e Locking ix material s , abrasive s e material s . **1 hour**

14	**Porcelains s e and Composite s e material s .** - technical and medical properties of porcelain - Composite s e material s , the solid ui ue to light - chemical structure, physical and mechanical properties - glass ceramic material s - application in the clinic and laboRathore - chemical, physico-mechanical properties of wax	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Round systol**	Computer , projector , multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ІЦ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to OrthopedicDentistr y M. Medicina , 1993 - 495 p.	Impression s e material sevgi nol oxide qInca. Newly s e impression s e material s .Tio dent.Predotvra u ix gag reflex and preparation bols Foot to the removal of the cast. **1 hour**
15	**The use of plastics in practice Orthopedic dentistry.** - kind of s plastics - plastics technology training s - percent esspolymeri zation uu	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Blitz**	Computer , projector , multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ІЦ erbakov A.S. Gavrilov Y. I. Trezubov V.N. Zhulev e.H . Orthopedic dentistry S. Petersburg, CF "Foliant", 1998 - 565 s. Prosthetic dentistry .- Petersburg ,2002 g . - 576 p. Kopeikina V.N. Guide to OrthopedicDentistr y M. Medicina , 1993 - 495 p.	The s boron impression s x materials.Defi ning nentral vhydro chloric occlusion and their appearance s . Making gypsum smod els . **1 hour**
16	**Application of the material s to aboutrtopedichesk oy dentistry. Wax and ego looks .**	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and	**Round systol**	Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ІЦ erbakov A. S. Gavrilov Y. I. Orthopedic dentistry S. Petersburg, Foliant Foundation, 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . Kopeikina V. N. Orthopedic Dentistry Guide	The movement of the lower jaw. Curve occlusive s x dental surfacess - series, a curve of Spee.Bennett's coalincisive and articular path of movement . **1 hour**

17	**Cast and impression s e material s , applys e for impression taking.** - characteristics of the use of materials fortaking an impression - a requirement for the materials useds m for impression taking - Meditsinsky gypsum - Mold s e material's thermal and silicones s x group n	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and		Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ЩerbakovA. S. Gavrilov Y. I. Orthopedic dentistry S. Petersburg, Foliant Foundation, 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . Kopeikina V. N. Orthopedic Dentistry Guide	
18	**Requirement spoon Impression and s boron them bol s Foot.** - stage s casting - view s cast - Preparation bol sn s x forImpres sion	2	**2**	BiologistsCesky chemistry ,Medi ci nskaya genetics ,bioneo rganiCesky x them Ia, biolo gy ,biophysics (physics), anato my ofhuman ,histol ogy ,cytology an dembryology ,th e norm n te aphysiology , m arketing andman agement in the dental and		Computer , projector , Multimedia and timedatoch n s e MathMetho ds and materials , t est s s e issue s , the situationGu y Dionne's e task	ЩerbakovA. S. Gavrilov Y. I. Orthopedic dentistry S. Petersburg, Foliant Foundation, 1998 - 565 s. In Trezubov .H . U erbakov A .With .Mishnev h . M. Prosthetic dentistry .- Petersburg ,2002 g . Kopeikina V. N. Orthopedic Dentistry Guide	
	Total	**28h**	**36**					**54 - hours**

Assessment criteria on the subject P ropedevtika diseases About dental prosthetics.

No.	Academic performance (% and score)	Rating	Student knowledge
1	96-100	Excellent "5"	Full student response for the curriculum and independent work. Student's possession of logical thinking, knowledge of biochemical processes at the organismic and cellular levels. The student distinguishes the norm and pathology, using the latest materials. Student response to situational questions and tasks. Active participation in laboratory work, laboratory work. Presentation of independent work.Student use of slides, new materials from the

			Internet, additional literature. Performing a student additional jobs.Independent work with educational material outside the classroom. Independent classes in the library.
2	91-95	Excellent "5"	Full student response for the curriculum and independent work. Student's possession of logical thinking, knowledge of biochemical processes at the organismic and cellular levels. The student is distinguished by norm and pathology, using the latest materials. Student response to situational questions and tasks. Active participation in laboratory work, laboratory work. Presentation of independent work.Student use of slides, new materials from the Internet, additional literature. Student completing additional tasks.
3	86-90	Excellent "5"	Full student response for the curriculum and independent work. Student's possession of logical thinking, knowledge of biochemical processes at the organismic and cellular levels. The student is distinguished by norm and pathology, using the latest materials. Student response to situational questions and tasks. Active participation in laboratory work, laboratory work. Presentation of independent work.Student use of slides, new materials from the Internet, additional literature.
4	81-85.9	Good "4"	Full student response for the curriculum and independent work. Student's possession of logical thinking, knowledge of biochemical processes at the organismic and cellular levels. The student is distinguished by norm and pathology, using the latest materials. Student response to situational questions and tasks. Active participation in laboratory work, laboratory work. Doing independent work. Student use of slides, new materials from the Internet, additional literature.
5	76-80	Good "4"	Full student response for the curriculum and independent work. Student's possession of logical thinking, knowledge of biochemical processes at the organismic and cellular levels. The student is distinguished by norm and pathology, using the latest materials. Doing independent work. Student response to situational questions and tasks. Active participation in laboratory work, laboratory work. The student does not use Internet data, slides, new additional literature.
6	71-75	Good "4"	Full student response for the curriculum and independent work. Knowledge of biochemical processes at the body and cellular levels. Laboratory work. The student does not use Internet data, slides, new additional literature.

7	66-70.9	satisfying ritelno "3"	Student's response to the curriculum and independent work. Knowledge of biochemical processes at the organic and cellular levels. Not doing lab work. Abstract on independent work. The student does not use Internet data, slides, new additional literature.
8	61-65	satisfying ritelno "3"	Student's response to the curriculum and independent work. Knowledge of biochemical processes at the body and cellular levels. Abstract on independent work. Notdoing lab work. Not assimilation of educational material.
9	55-60	satisfying ritelno "3"	Student's response to the curriculum and independent work. Ignorance of biochemical processes at the organismic and cellular levels. The student does not answersituational questions and tasks. Not doing lab work.Abstract on independent work. The student does not learn the teaching material.
10	0-54	Unsatisfactory "2"	The student is not responsible for the curriculum and independent work. Ignorance of biochemical processes at the organic and cellular levels. Not doing lab work. The student does not learn the teaching material.

Technology for teaching lecture classes.

1 lecture
Introduction to Dentistry. The object and purpose About rtopedicheskoy dentistry
Brief sketches of about rtopedicheskoy dentistry
The history of development of dentistry in the ancient e m Uzbekistan, and the role of Abu Ali and BN Sino in the camp of the occurrence of dentistry as a clinical dis chi square and n s
Anatomy and physiology of the maxillofacial system
Teeth and dentition
Chewing muscles, absolute strength of chewing muscles, chewing pressure

1.1. Teaching Technology Model.

Lesson time 2 hours	**Number of students: 16 - 20**
Class Form	**Introduction - Information Lecture**
Lecture Plan: 1. Introduction to Dentistry. 2. The subject and	On the teaching of students the propaedeutics of diseases On dental prosthetics at the university using new educational methods using new phantoms and models for its formation as a doctor.

tasks of orthopedic dentistry. 3. The history of development of dentistry in the ancient e m Uzbekistan . 4. The role of Abu Ali ibn Sino in the development of dentistry as a clinical discipline. 5. Anatomy and physiology of the dentition. 6. Teeth and dentition. 7. Chewing pressure.	The bachelor in taking the necessary measures during the study of the subject "Propaedeutics of diseases of Orthopedic Dentistry" should know: - what sections Orthopedic dentistry consists of, - goals and objectives of the subject, - Features of equipment About the dental pediatric laboratory, - a list of necessary basic and auxiliary materials, - tools used for the manufacture of teeth and dentures, - anatomical and functional structure of the maxillofacial region, - The concept of bites. The purpose of teaching is: - the student must have theoretical knowledge, - the student must use theoretical knowledge in practice.
Lesson purpose	To study the anatomy and physiology of the dentition. Distinguish the teeth of the upper and lower jaw. To model teeth and dentitions
Teaching methods	Lecture, survey, multimedia
Form of training	Group, collective
Subject of study	Curriculum, textbooks, lecture material, multimedia
Training	Specially trained classroom for training
Monitoring and Evaluation	Oral control, question and answer

Technological map of a lecture lesson.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training (10 minutes)	1. Prepare lecture material 2. Preparation of slides for the introduction of the lecture 3. Using literature to prepare a lecture 1. Scherbakov A.S., Gavrilov Y.I., Trezubov V.N., Zhulev E.N. "Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3.Lebedenko IY, Ericheva VV, Markov B. P. "Guide to practical training for aboutrtopedicheskoy dentistry"	Listen and record
Lecture introduction (15 minutes)	**Explanation of the purpose and objectives of the topic** **Purpose:** And the study of the anatomy and physiology of the dentition, the ability to model teeth and dentitions, the determination of the absolute strength of the masticatory muscles .	Listen and answer questions

	Tasks: To study the anatomy and physiology of the dentition, to distinguish the teeth of the upper jaw from the teeth of the lower jaw. **Questions about the lecture:** 1. Subject and problems About rtopedicheskoy dentistry 2. Short essays of about rtopedicheskoy dentistry 3. The history of development of dentistry in the ancient Uzbekistan and Abu Ali and BN Sino stanavlenii in dentistry as a clinical dis chi squareand n s 4. Anatomy and physiology of the maxillofacial system 5. Teeth and dentitions 6. Chewing muscles, absolute strength of chewing muscles, chewing pressure	
The main part of the lecture (55 minutes)	1. Explain the topic, show slides 2. Show tooth phantoms	Listen and record
The final part of the lecture (10 minutes)	1. Summarizing 2. Set independent work 3. Set homework	Listen Write down

The content of the lecture.

Topic: Introduction to Dentistry. The object and purpose About rtopedicheskoy dentistry. Brief sketches of about rtopedicheskoy dentistry.
The history of development of dentistry in the ancient e m Uzbekistan, and the role of Abu Ali and BN Sino in the camp of the occurrence of dentistry as a clinical dis chi square and n s.
Anatomy and physiology of the maxillofacial system.
Teeth and dentition.
Chewing muscles, absolute strength of chewing muscles, chewing pressure.

Modern medicine is a system of scientific disciplines that has developed as a result of a long process of development and dismemberment. Each of them has its own specific area of research and the scope of practical application, its own tasks and methods, while maintaining a connection with other medical sciences.

As knowledge is enriched, the branches of medicine differentiate. So, from surgery, orthopedics stood out as an independent discipline.

The founder of scientific orthopedics is considered to be the French surgeon Nicolas Andry (658-1742), who published in 1741 the two-volume work Orthopedics, or the Art of Prevention to Correct Body Deformations in Children. The term "orthopedics" is composed of two Greek words: orthos - direct and paideie - education. Introducing this term, Andri had in mind "the correct physical education of children" and defined orthopedics as "the art of preventing and treating deformities in children." Currently, orthopedists are engaged in the treatment of diseases of the musculoskeletal system in children and adults, using functional, instrumental, surgical methods and prosthetics.Orthopedic dentistry is a section of general

dentistry and an independent part of general orthopedics. It can be defined as the science of recognition, prevention and treatment of abnormalities, acquired defects, injuries and deformations of the organs of the masticatory apparatus. For these purposes, she has functional (myo therapy, mechanotherapy), prosthetic, hardware and equipment-surgical treatment methods.

The main place in O rthopedic therapy is occupied by prosthetics. Its task is not only to replace defects in the dentition or alveolar process, but also to prevent further destruction of the organ or relapse of the disease.

♦ Denture - a device that replaces the loss or congenital absence of tissues, organs.

♦ Dental and jaw prostheses (endo-prostheses) - artificial parts of the tooth crown, artificial teeth, artificial gums, alveolar parts, a fragment of the jaw.

♦ Facial prostheses (ectoprostheses) - artificial parts of the face - nose, eye socket (with eyeball), auricle, lip, chin, cheek.

♦ Prosthetics - the healing process, science, art and craft of designing and applying an artificial substitute for lost or missing tissues or organs. The prosthesis, therefore, is considered as a remedy, the reasonable use of which allows us to solve therapeutic and preventive tasks.

Currently, about rtopedicheskaya dentistry is a rigorous scientific discipline, consisting of general and private courses. The general course is propaedeutic, i.e., introductory. The private course includes three main sections: dental prosthetics, maxillofacial orthopedics and traumatology, orthodontics.

The propaedeutic course on oral prosthetics provides a brief anatomical and physiological outline of the masticatory and speech apparatus, general and special methods for examining the patient (diagnosis), evaluation of the signs of the disease obtained (symptomatology or semiotics), clinical materials science, and laboratory equipment (prosthetic technology and various About the orthopedic devices).

Dental prosthetics is involved in the diagnosis, prevention and replacement of defects in teeth and dentitions that have arisen as a result of any pathology.

Maxillofacial orthopedics and traumatology studies the diagnosis, prophylaxis, prosthetics, correction of deformations of the jaw and face resulting from trauma, diseases and various operations.

Orthodontics is the section of Orthopedic Dentistry that deals with the study, prevention and treatment of persistent abnormalities of teeth, dentitions and other organs of the masticatory and speech apparatus.

The history of dental prosthetics begins more than 4,500 years ago. Excavations of ancient burials convince of this. So, near the mummy of the Egyptian pharaoh Chephres, a wooden denture was discovered. More advanced tire prostheses made of gold and natural teeth (Fig. 1.1) were found in the tombs of Etruscans (IX-VI centuries BC).

In the slave period and in the Middle Ages, artisans (bath attendants, masseurs, barbers, jewelers) who did not have medical training were engaged in dental prosthetics. The famous Renaissance surgeon Ambroise Pare (510-1590) began his career as a barber. He created blocks of artificial teeth from bovine and ivory, attached to the remaining teeth with a gold wire. He first closed the defect of the hard palate with an obturator, for which he used a cufflink.

In 1710, Nikolai Bidloo published a book on general prosthetics, which the author called the restoration and replenishment of something missing in the human body. In particular, he identified four types of prosthetics:

1) compensation for any part if it is missing, for example, the creation of an artificial leg when someone does not have a natural leg;

2) restoration of function in order to preserve the activity of any part of the body. For example, when perforating the palate, speech is restored:

3) preservation of beauty and body color. The artificial eye does not restore vision, but restores beauty. Another example is artificial teeth inserted into the oral cavity;

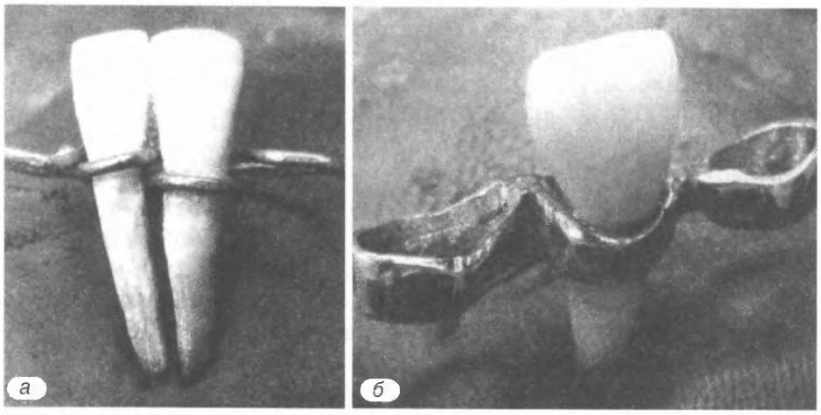

Рис. 1.1. Древние римский (*а*) и этрусский (*б*) протезы из натуральных зубов с золотыми фиксирующими кольцами

4) when the unnatural structure of any part disfigures the appearance (shortening of the leg, the beginning of the hump).

From this period and later dentistry becomes the lot of doctors. The founder of scientific dentistry is considered the French surgeon Pierre Fauchard. In 1728, his manual, "Dental Surgery, or Treatise on Teeth, " was published, where, in particular, obturators, methods of orthodontic correction of the close position of the front teeth, fixing springs for complete removable dentures and pin artificial crowns were described . Heister in 1781 proposed removable dentures with cast metal bases lined with pink enamel. In 1720 Purman, and after 36 years Pfaff began to take impressions from the jaws with wax or sealing wax. Pfaff used spoons for this. Removable prostheses were prepared from a solid piece of ivory , fitting to the obtained model (Fig. 1.2).

In the thirties of this century, dental institutes appeared in Russia, graduating from dentists, specialists with higher education.

In 1940, the first textbook on orthopedic dentistry was published (N. A. Astakhov, E. M. Gofung, and A. Ya. Katz). The publication of this textbook ended the design of Soviet orthopedic dentistry as a science, and it rightfully took its place among other medical disciplines. The Leningrad professor A. Ya. Katz has the idea to name our specialty " About orthopedic dentistry". In the 20th century, at least four schools of orthopedic dentistry took shape in Russia: Moscow, Leningrad-St. Petersburg, Kazan, Kalinin-Tver.

It is possible that soon others will be added to their number, for example, Smolenskaya, Volgograd and Perm schools. The medical school is a direction in science, connected by the unity of basic views, the commonality and continuity of principles and methods, although domestic orthopedists profess a common strategy and tactics of the specialty. The founder of the metropolitan orthopedic school should be considered Professor B. N. Bynin, one of the theorists of our specialty. He and with his participation conducted extensive scientific research from the physiology of the masticatory-speech apparatus to the introduction of new materials. In particular, together with prof. I. I. Revzin and other researchers about n introduced acrylic polymers in clinical practice.

His students were famous professors A.I. Doinikov, V.A. Ponomarev. Prof. A. I. Doinikov prepared the heads of the departments of orthopedic dentistry in Moscow (Prof. B.P. Markov) and other cities in Russia and the former USSR: Omsk (Prof. I. A. Kuznetsov), Voronezh (Prof. E. S. Kalivrajiyan) , Krasnoyarsk (prof. V.V. Parilov), Samara (prof. V.M. Zotov), Yekaterinburg (prof. S.E. Zholudev).

Professor V. Yu. Kurlyandsky, who studied in detail the pathogenesis and orthopedic treatment of periodontal functional overload in various diseases, left a noticeable mark in orthopedic dentistry. He introduced the silver-palladium alloy in the practice of dentistry. A great contribution was made by prof. V. Yu. Kurlandsky in maxillofacial orthopedics and

traumatology. Among his students and followers should be named Corr. RAMS prof. V. N. Kopeikin, professors A. T. Busygin, G. V. Sosnin, L. G. Velichko, V. Yu. Milikevich, G. V. Bolshakov, etc.

The famous professor X. A. Kalamkarov made a great contribution to the development of the Moscow school. At present, a whole group of orthopedic professors has appeared in the capital: A. I. Matveeva, G. V. Bolshakov, I. Yu. Lebedenko, B. P. Markov, V. A. Khvatov, V. N. Olesov, A. N. Ryakhovsky, S.I. Abakarov , S.D. Arutyunov, who do a lot for the further progress of the Moscow school. At the origins of the Leningrad-St. Petersburg orthopedic dental school was Professor A. Ya. Katts. He owes merit in appropriating the legal name of our specialty. He was the co-author of the first textbook on orthopedic dentistry. Prof. A. Ya. Katz is considered the initiator of the functional direction in orthopedic dentistry and, in particular, in orthodontics.

This direction was continued by his students and followers of Professor I. S. Rubinov, L. M. Perzashkevich, B. K. Kostur. For many years, professors Y. M. Zbarzh and I. S. Rubezhov worked fruitfully in the city. A great contribution to dental materials science was made by St. Petersburg professor M. 3. Steingart. In the last decade, professors V. N. Trezubov and A. V. Tsimbalistov have been at the helm of the St. Petersburg school of orthopedic dentists.

For many years, the famous scientist Honored Scientist of Tatarstan Professor I. M. Oksman worked in Kazan. He not only developed the specialty section - maxillofacial orthopedics and traumatology, but also laid the foundation for the Kazan school of orthopedic dentists. His students - professors E. I. Gavrilov, L. M. Demner, G. G. Nasibullin and M. 3. Mirgazizov with his scientific works and educational and methodical work made this school visible and famous in the country.

In 1954, a dental institute was transferred from Leningrad to Kalinin. The creative moment in this translation was that the opening of the Faculty of Dentistry in Kalinin laid the foundation for the Kalinin-Tver school of orthopedists. Professor EI Gavrilov, the founder of the local school of orthopedic dentists, has worked in Tver for more than thirty years. His students and followers are Professor A. S. Shcherbakov, Honored Scientist of the Russian Federation, Professors V. N. Trezubov, N. G. Abolmasov, E. N. Zhulev, G. L. Savvidi and others. The main direction of the school is the relationship between the prosthesis and tissues of the prosthetic bed.

The basis of the provision of highly qualified orthopedic dental care for patients is based on certain principles that were first formulated by E. I. Gavrilov and called fundamental. All of them are consistent with the principles of general medicine:

- preventive principle;
- deontological principle;
- the principle of unity of body systems',
- The principle of the need for higher medical education at an orthopedic dentist;
- The principle of providing the most effective assistance in large institute clinics, medical treatment and prophylactic institutions of public health, commercial centers that can solve complex problems, are well equipped, equipped with powerful laboratories;
- the nosological principle, preaching that prosthetics is a therapeutic and prophylactic process, based on the foundation of knowledge about the structure and function of organs both in normal and in diseases, states the need to study the etiology, pathogenesis, prevalence, clinical picture of the disease, adequate orthopedic treatment, its immediate and long-term results in determining the form of damage to the masticatory-speech apparatus;
- the principle of consideration of any orthopedic apparatus, including the prosthesis, as a therapeutic agent, which, in addition to the therapeutic one, has an undesirable side effect;
- the principle of staging - the choice of the prosthesis, the apparatus depends not only on the nature of the disease, but also on the stage of the pathological process;
- the principle of completeness of orthopedic treatment - an indicator of completion of therapy is the final adaptation of the patient's body to the device (prosthesis);

- the principle of the complexity of therapy - along with orthopedic treatment, psychotherapy, medication, physical therapy (including exercise therapy), conservative therapy, surgical aids involving doctors of other specialties (hematologists,
surgeons, endocrinologists, rheumatologists, psychoneurologists, cardiologists, etc., as well as speech therapists).

BASIC LINES OF THE CHEWING-SPEECH APPARATUS BODY, DENTAL SYSTEM, APPARATUS

♦ Organ (from gr. Organon - a tool, instrument, organ) - a phylogenetically developed complex of various tissues, united by development, general structure and function.

The structure of the organ may contain various tissues, often of all four groups, of which one or more prevail and determine its specific structure and function.

An organ is a holistic entity that has a specific, inherent only to it form, structure, function, development and position in the body. To perform a number of functions, only one organ is not enough. Therefore, there are complexes of organs - systems.

♦ System (from gr. Systema - a whole made up of parts; connection) - a set of organs similar in their general structure, function, origin and development.

The dentitions form a single functional system - the dentition, the unity and stability of which is ensured by the alveolar process of the upper and alveolar parts of the lower jaw, periodontal.

The teeth of man are part of the masticatory-speech apparatus.

♦ Apparatus (from lat. Apparatus) - an association of systems and individual organs functioning in a similar direction or having a common origin and location.

♦ Chewing and speech apparatus — a complex of interconnected and interacting systems and individual organs involved in chewing, breathing, sound formation and speech.

The masticatory system includes:

1) the facial skeleton and temporomandibular joints;
2) chewing muscles;
3) bodies designed to capture, promote
food, food lump formation , for swallowing, and also the root system: lips, cheeks with their facial muscles, palate, tongue;
4) organs of biting, crushing and grinding food
(teeth), and its enzymatic processing (salivary glands).

JAWS AND ALVEOLAR PARTS, TEMPO-MANDIBULAR JOINT

Upper jaw

The upper jaw is a paired bone. Each of the halves has a body and four processes: frontal, zygomatic, palatine and alveolar. The latter ends on the right and left by the alveolar tubercles.

♦ The alveolar process of the upper or alveolar part of the lower jaw is called the department where the roots of the teeth are located. The maxillary bones are involved in the formation of the orbits, nasal cavity, and temporal hollow.Inside the body of the jaw there is a sinus. Maxillary bones are openwork. This structure is due to the functions of respiration, speech formation and chewing. At the same time, resistance to chewing pressure (see p. 26) in the upper jaw is exerted by bone abutments (buttresses)

♦ Buttresses (fr. Opposing force, counter-resistance) - powerful thickening of the compact substance of the upper jaw, which is the transmission of chewing pressure.

The following buttresses are distinguished: frontal nasal, zygomatic, pterygopalatine, palatine.

Chewing pressure coming from the central, lateral incisors, canine and the first premolar spreads along the frontal nasal buttresses to the surface of the orbit,
nasal, lacrimal and frontal bones vertically.

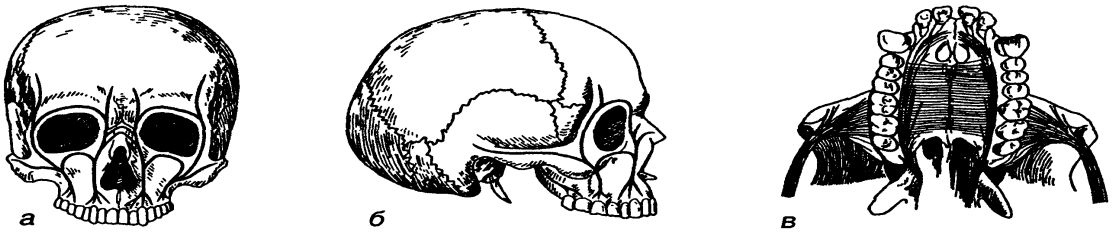

Рис. 1.3. Контрфорсы верхней челюсти (по Валькгофу):
а — вид спереди; *б* — вид сбоку; *в* — нёбные контрфорсы (череп примата)

The zygomatic alveolar ridge, the zygomatic bone with the zygomatic process form the zygomatic buttress, according to which the pressure from the lateral teeth is distributed along the lateral edge of the orbit to the frontal bone, through the zygomatic arch to the temporal bone, and also through the lower edge of the orbit to the upper part of the frontal nasal buttress.

Chewing pressure from the posterior teeth is also perceived by the pterygopalatine buttress formed by the tubercle of the upper jaw and the pterygoid process. On it it is transmitted at the base of the skull.

Palate counter force balances lateral horizontal stresses. It is formed by the palatine processes of the upper jaw that make up the hard palate.

In addition, the formations that strengthen the upper jaw and neutralize the pressure that occurs when chewing include the vomer and the medial walls of the maxillary sinuses. In clinical anatomy, a hard and soft palate is secreted. A hard palate includes the palatine processes of the upper jaw covered with a mucous membrane and submucosal layer and the horizontal plates of the palatine bone. It is used as a prosthetic bed for extensive loss of teeth in the upper jaw. In the anterior part of the palate are transverse palatal folds involved in the grinding of soft food and enhancing the taste perception of the tongue receptors. The arch of the hard palate can have various heights andconfigurations. In the region of the middle palatine suture, the palatine roller (torus palatinus) is sometimes determined. The most common outlines of the palatine roller [Trezubov V.N., 1966]: oval; lanceolate; ellipsoidal; roundedbypass; with a constriction in the form of an hourglass; irregular shape. In fig. 1.4 roller shapes are presented in order of frequency. Closer to the soft palate (palatine curtain), two palatine fossae are contoured, which are the guidelines for determining the distal border of the removable denture of the upper jaw. On the palate are mechanical and thermoreceptors. The soft palate in front borders the posterior edge of the hard palate, on the sides it is connected with the side walls of the pharynx. Dorsally, it ends with a free edge, repeating the configuration of the posterior edge of the bones of the hard palate.

The soft palate is formed by a number of muscles:

mm . uvulae - muscles of the tongue (shorten the tongue, lifting it);

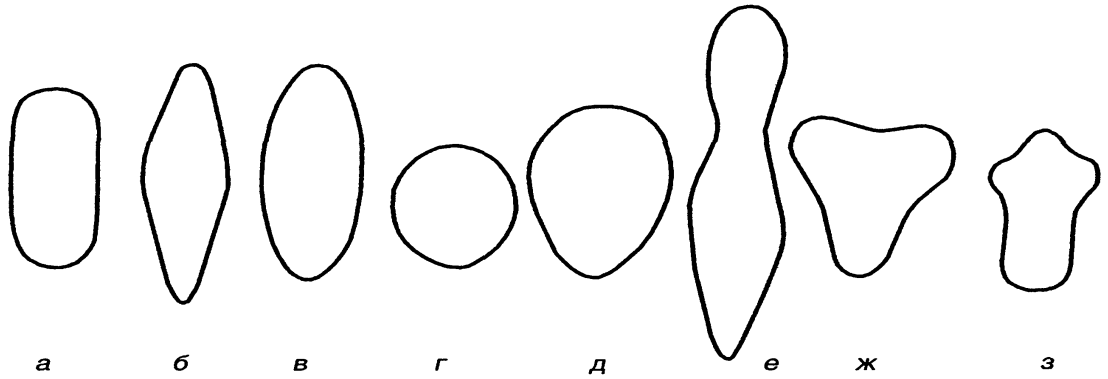

Рис. 1.4. Контуры нёбных валиков (по В. Н. Трезубову):
а — овальный; *б* — ланцетовидный; *в* — эллипсоидный; *г* — округлый;
д — овоидный; *е* — с перетяжкой, в виде песочных часов; *ж, з* — неправильной формы

stretches the front part of the soft palate and the pharyngeal part of the auditory tube);
mm . levator veli palatini - a muscle that raises the soft palate (narrows the pharyngeal opening of the auditory tube);
m . palatoglossus - palatine-lingual muscle (narrows the pharynx, bringing the anterior arch closer to the root of the tongue);
m . palatopharyngeus - palatopharyngeal muscle (brings together the palatopharyngeal arch and pulls up the lower part of the pharynx and larynx).

Of these muscles, only the muscles of the tongue end in the palate itself, and the rest, being paired, connect the soft palate to other organs, which makes it possible to change the position and shape of one or another function:
- with muscle contraction, the oral cavity is completely separated from the pharynx;
- when breathing (see p. 69) through the nose - a soft palate arches down to the back of the tongue, isolating the oral cavity from the pharynx, due to which, when chewing food, free breathing is possible;
- when breathing through the mouth, as well as during the act of swallowing - the soft palate straightens and tightly adjoins the back wall of the pharynx, separating the nasopharynx from the oral part of the pharynx and oral cavity. In this case, the muscles of the soft palate, which are part of the palatine-lingual arches, are connected to the transverse muscle of the tongue, forming a compressive pharyngeal ring.

The lower jaw is the mobile bone of the facial skeleton, consisting of a body, branch, angle.

The body passes into the alveolar part, in which the roots of the teeth are located.
The branch has two processes - the mycelium, ending in the head of the lower jaw, and the coronoid.

The ratio of the height of the branch to the length of the jaw body in adults is 6.5–7: 10. The angle of the lower jaw is normally 120 ± 5 ° (V.N. Trezubov).

The lower jaw is covered with a compact plate that also lines the walls of the dental alveoli. The most massively compact substance is present in the area of the chin, corners and at the base of the jaw. In addition, on the outer and inner surfaces of the jaw there are folds of a compact substance - respectively oblique and maxillary-hyoid lines.

Jaw-hyoid line - the place of attachment of the same muscle. It can be difficult to fix end-defects and complete loss of teeth in the lower jaw when it is represented by a sharp plate. With the pressure of the base of the removable prosthesis on this line, the mucous membrane located between them is injured. This causes acute pain. In such cases, isolation of the line is necessary, and sometimes its surgical smoothing in the distal parts.

Between the plates of the compact substance is the spongy substance of the bone, especially developed in the body and in the head of the lower jaw. It has a finer loop structure than on the upper jaw. At the same time, the sponge beams are not located randomly, but in a

certain direction, in the form of trajectories whose orientation is functionally determined (Fig. 1.5).

♦ *Траектории нижней челюсти* — строго определенные расположения балок губчатого вещества, ориентированных функциональной нагрузкой.

Внутри нижней челюсти проходят два канала, открывающиеся подбородочными и нижнечелюстными отверстиями.

На внутренней поверхности подбородка имеется подбородочная ость.

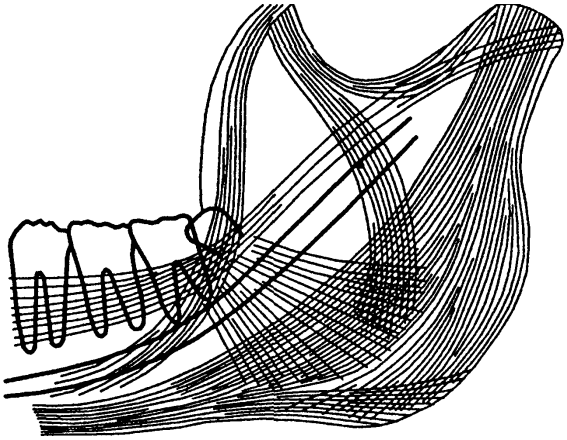

Рис. 1.5. Траектории нижней челюсти

innervation. Their free edge does not overlap the enamel-cement border of the teeth, not reaching it by 2-3 mm. Alveoli of adjacent teeth are separated by an interdental septum, the apex of which can have a different shape: spiky, domed, and truncated cone.

In the alveolar part, the outer and inner compact plates and the spongy substance between them are distinguished. The outer compact plate is located on the vestibular and oral surfaces, and the inner lines the holes.

Temporomandibular joint

The temporomandibular joint (TMJ) articulates the lower jaw with the temporal bone. In its structure, it is ellipsoidal. Its natural features are the presence of the articular disc and the mismatch of articulated surfaces (incongruence). Functionally, it is a paired joint, which in the aggregate is one combined joint. When moving in the joints, lowering and raising the lower jaw is possible, moving it forward, backward and to the side (to the right or left). In the latter case, in the joint of the opposite side, the head rotates around the vertical axis. At the same time, independent movements on only one side are impossible, although movements in each joint can occur in different directions

Форма и функция сустава обусловлены разнообразием принимаемой пищи, сложным характером движений нижней челюсти при откусывании и пережевывании пищи, участием сустава в разговорной речи человека. Функции жевания и речи оказывают свое формирующее воздействие на височно-нижнечелюстной сустав на протяжении всей жизни человека.

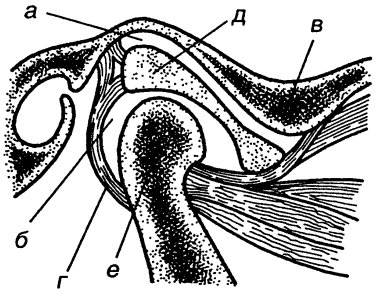

Рис. 1.6. Височно-нижнечелюстной сустав:
а — верхняя суставная щель;
б — нижняя суставная щель;
в — суставной бугорок;
г — суставная капсула;
д — суставной диск;
е — головка нижней челюсти

Сустав образован головкой нижней челюсти, нижнечелюстной ямой или, как чаще ее называют, «ямкой» и суставным бугорком височной кости. Головки нижней челюсти имеют валикообразную форму. Продольные, конвергирующие (сходящиеся) оси их своим продолжением пересекаются под тупым углом у переднего края затылочного отверстия.

jaw that provides free movement of the latter. In front, it is limited by the articular tubercle, and in the back by the tympanic part of the temporal bone.

The articular tubercle forming the anterior border of the mandibular fossa is an outgrowth of the zygomatic arch. In the joint cavity there is a biconcave oval-shaped cartilaginous plate - the articular disc. It divides the joint cavity into two sections that are not interconnected: the upper and the lower. The disk compensates for the mismatch of the relief of the articular surfaces. When opening the mouth, when the head of the lower jaw moves to the top of the articular tubercle, the articular disc moves with it, ensuring the correspondence of the articular surfaces in dynamics. This is due to the fact that the lateral pterygoid muscle, branching into two bundles, is upper woven into the joint capsule area directly connected to the front of the disk, and attached to the neck of the lower jaw by the lower bundle.

With the contraction of this muscle, the lower jaw and articular disc move synchronously.

The joint capsule is an elastic connective tissue membrane consisting of two layers: external, fibrous, and internal, synovial. In the space between the posterior wall of the capsule and the tympanic part of the temporal bone, a loose connective tissue is located, due to which the tremors of the head of the lower jaw are softened and some backward movement is allowed.

In the joint, capsular and extracapsular ligaments are distinguished.

MUSCLES, MUSCLE STRENGTH, CHEWING PRESSURE

The muscles of the head (Fig. 1.7) are divided into masticatory and facial.

Chewing muscles

Chewing muscles:

m. masseter - actually chewing;

m. temporalis - temporal

t. pterygoideus medialis - medial pterygoid;

t. pterygoideus lateralis — lateral pterygoid;

m. mylohyoideus - maxillohyoid

m. geniohyoideus - chin-hyoid;

venter anterior m. digastricus - front belly of the digastric muscle .

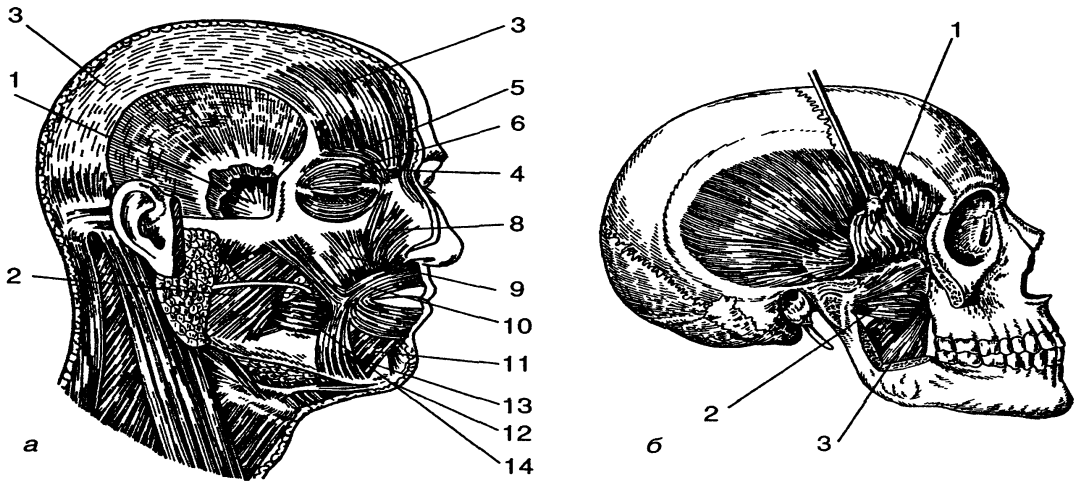

Рис. 1.7. Мышцы лица (по И. С. Кудрину):
а: *1* — m. temporalis; *2* — m. masseter; *3* — m. occipitofrontalis; *4* — v. corrugator supercilii; *5* — m. procerus; *6* — m. orbicularis oculi; *7* — m. zygomaticus major; *8* — m. nasalis; *9* — m.orbicularis oris; *10* — m. levator labii superioris; *11* — m. depressor labii inferioris; *12* — m. mentalis; *13* — m. depressor anguli oris; *14* — m.buccinator;
б: *1* — m. temporalis; *2* — m. pterygoideus lateralis; *3* — m. pterygoideus medialis.

With its contraction, the masticatory muscles move the lower jaw in various directions, thus participating in the act of chewing, swallowing, sound formation, and speech.

In accordance with the main directions of its action, the chewing muscles are divided into groups and groups:

- the first includes muscles that lower the lower jaw (m. Mylohyoideus, i.e. geniohyoideus, venter anterior m. Digastricus);
- the second group includes muscles that raise the lower jaw (m. Masseter, m. Temporalis, m. Pterygoideus medialis);
- the third group is paired lateral pterygoid muscle (m . Pterygoideus lateralis). With their simultaneous contraction, the lower jaw moves forward, with a one-sided contraction of the muscle, the lower jaw moves in the opposite direction. Thus, the muscles of the third group provide anterior and lateral movements of the lower jaw.

Muscles lowering the lower jaw. The opening of the mouth is due to the contraction of the muscles lying below the hyoid bone, when its position is fixed by the muscles lying above the specified bone.

The lower jaw muscles form the bottom of the oral cavity. Due to the fact that they have two movable attachment points, the bottom of the oral cavity formed by them is capable of large amplitude excursions, reducing or increasing the volume
the oral cavity, which is important for moving the food lump or fluid and the implementation of the act of swallowing. The basis of the bottom of the oral cavity (diaphragma oris) is composed of two the same maxillofacial muscles (m .Mylohyoideus), connected by a fibrous suture. With wide proximal ends, these muscles are attached to the inner surface of the body of the lower jaw, along the maxillary-hyoid lines, from the last molars to the middle of the chin. The distal surfaces of the muscles attach to the hyoid bone.

The chin-hyoid muscles with their proximal ends attach to the chin spine (spina mentalis) on the inner surface of the chin. Distal endings occur on the anterior surface of the hyoid bone. The anterior abdomen of the biceps muscle (venter anterior m . Digastricus) begins from the tendon bridge between the anterior and posterior abdomen, which is attached to the hyoid bone. With its proximal end, this part of the muscle is attached to the bilateral cavity located laterally from the chin spine.

The muscles that raise the lower jaw. Actually chewing muscle (m . Masseter) consists of two parts. The superficial bundles have an oblique direction, starting from the zygomatic process of the upper jaw and the zygomatic arch. The bundles of the deep part go more steeply and begin from the zygomatic bone and the deep leaf of the temporal fascia. The movable end of the chewing muscle attaches to the chewing tuberosity of the angle of the lower jaw. With bilateral contraction of both chewing muscles, the lower jaw rises upward, with unilateral contraction - outward on the side of contracted muscle.

The temporal muscle (m . Temporalis) is fixed by three beams, filling temporal fossa. The fibers of the front bundles are tilted forward, the middle ones are vertical, and the rear ones have an occipital tilt. A powerful muscle tendon extends inward from
zygomatic arch and attached to the coronoid process of the lower jaw. When all muscle bundles are contracted, the lower jaw rises, while the posterior bundles contract, the lower jaw extended forward comes back or from the central position to the back. The medial pterygoid muscle (m . Pterygoideus medialis) begins from the pterygoid fossa of the main bone, goes back and down, attaching to the pterygoid tuberosity on the inner surface of the angle of the lower jaw. With a one-sided contraction of the muscle, the lower jaw moves to the side opposite to the contraction, with a bilateral contraction - it pushes forward and raises the lowered lower jaw.

All muscles of this group are synergists, the main action of which has a resultant, directed upwards.

The muscles that extend the lower jaw. The extension of the lower jaw occurs with the tension of both lateral pterygoid muscles (m . Pterygoideus lateralis). This muscle begins with two heads - the upper and lower. The upper head of the muscle originates from the large wing of the main bone and attaches to the articular bag and interarticular cartilaginous disk of the temporomandibular joint. The lower head starts from the outer plate of the pterygoid process of the main bone and, heading back, attaches to the neck of the condylar process.

A muscle during contraction shifts the lower jaw to the opposite side of the contraction. With bilateral contraction, the muscles push the lower jaw forward. Mutual antagonism and synergism of the above muscles contributes to thepossibility of smooth rational movements of the lower jaw, necessary for chewing and speech.

Facial muscles

Here, from the so-called facial muscles, or facial muscles, those that surround the oral gap and are directly involved in chewing, in particular, the formation of a food lump, sound formation and breathing, will be considered.

Facial muscles of the lower face:

m. orbicularis oris - circular muscle of the mouth;

m. levator labii superioris - muscle that lifts the upper lip ;

t . depressor labii interioris - muscle , lowers the lower lip ;

t . buccinator - buccal muscle ;

t . zygomaticus major - great zygomatic muscle ;

t . levator anguli oris - muscle that raises the corner of the mouth ;

m . depressor anguli oris - muscle that lowers the angle of the mouth ;

m . risorius - muscle of laughter ;

t . mentalis - the chin muscle ;

t . incisivus labii superioris - incisor muscle of the upper lip ;

t . incisivus labii interioris - incisor muscle of the lower lip .

The oral fissure is bordered by the pma circular muscle (m. Orbicularis oris). Its fibers are located in the thickness of the upper and lower lips. Narrows the mouth gap and pulls the lips forward. Other muscles that form the base of the cheeks are woven into it. Among them is the muscle,

lifting the upper lip (m . levator labii superioris), which begins with three bundles: from the frontal process, the lower orbital edge of the upper jaw, the anterior surface of the zygomatic bone. Raises the upper lip and tightens the wing of the nose.

The muscle lowering the lower lip (m . Depressor labii interioris) - starts from the front surface of the lower jaw, anterior to the chin, goes up and weaves into the skin of the lower lip and chin. Pulls the lower lip down.

The buccal muscle (m . Buccinator) starts from the buccal crest of the lower jaw, the pterygo-maxillary suture, and also the outer surfaces of the upper and lower jaws in the region of the holes of the second molars. Heading forward, muscle bundles move to the upper

and lower lips, and are also woven into the skin of the lips, the corner of the mouth and the mucous membrane of the vestibule of the mouth. Pulls the corner of the mouth to the side, with bilateral reduction, stretches the mouth gap, presses the inner surface of the cheeks to the teeth.

The large zygomatic muscle (m . Zygomaticus major) starts from the outer surface of the zygomatic bone, heading downward and medially, is woven into the circular muscle of the mouth and the skin of the corner of the mouth. Pulls the corner of the mouth up and out.

Levator anguli oris (m . Levator anguli oris), starts under infraorbital bore and, heading down, woven into the skin side of his mouth and the circular muscle. Pulls the corner of the mouth up and out.

The muscle that lowers the angle of the mouth (m . Depressor anguli oris), begins with a wide base from the front surface of the lower jaw, below the chin hole. Heading up, the muscle narrows, reaches the corner of the mouth, where part of the bundles are woven into its skin, and partly into the thickness of the upper lip and pulls the corner of the mouth down and out.

The muscle of laughter (m . Risorius) is unstable, partly a continuation of the bunches of platisma . Part of the bundle muscle originates from the chewing fascia and the skin of the nasolabial fold. Heading medially, muscle bundles are woven into the skin of the corner of the mouth. Pulls the corner of the mouth laterally.

The chin muscle (m . Mentalis) starts from the dimpled elevations of the lower incisors, goes down and is woven into the skin of the chin. Pulls the skin of the chin up, pulls the lower lip.

The incisor muscle of the upper lip (m . Incisivus labii superioris) begins from the dimpled elevations of the tips of the lateral incisor and canine, goes down and weaves into the skin of the corner of the mouth and its circular muscle.Pulls the corner of the mouth up and in.
The incisor muscle of the lower lip (m . Incisivus labii inferioris) begins from the dimpled elevations of the lower lateral incisor and canine, is directed upward and woven into the circular muscle of the mouth and skin of the lower lip, and pulls the lower lip downward.
♦ Absolute strength of the masticatory muscles is the tension developed by the masticatory muscle at its maximum contraction. The value of the absolute strength of the masticatory muscles, according to various sources, is from 80 to390 kg . Undoubtedly, chewing muscles can develop pressure, much greater than that required for chewing food, but such power arises extremely rarely, in moments of danger, of intense emotional stress.
Chewing pressure is controlled and reflexively limited by periodontal baroreceptors that respond to pain to excessive contraction of the masticatory muscles and compression of the dentition. This prevents crowns from breaking.
teeth.
Absolute chewing power can be considered a muscle safety margin, a reserve that allows the performance of significant and long-term muscle work without noticeable fatigue.
♦ Chewing pressure is the force developed by the masticatory muscles and regulated by periodontal receptors, necessary for crushing, biting, crushing food. Chewing pressure on the incisors is approximately equal in women -
20-30 kg, for men - 25-40 kg, on molars, respectively - 40-60 kg and 50-80 kg .
In other words, the chewing pressure developed by the muscle does not exhaust its entire strength, but means the endurance limit of the supporting tissues of the teeth, which is determined by heredity, gender, age, the degree of periodontal fitness and some other factors.
DENTS AND DENTAL ROWS (DENTAL ARCS)
Dental organs are an integral part of the masticatory system. The latter contains 32 dental organs, 16 on the upper and lower jaws.
Each dental organ consists of:
1) tooth;
2) the hole and the adjacent part of the jaw, covered with the mucous membrane of the gum;
3) the ligament complex (periodontal) holding the tooth in the well;
4) vessels and nerves.

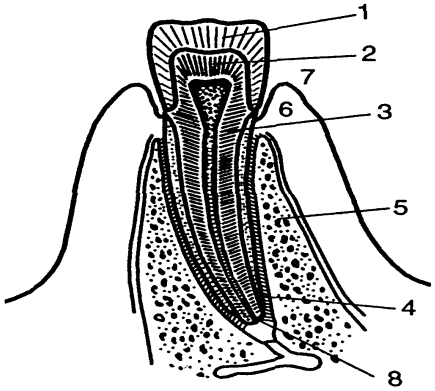

Рис. 1.8. Схема зубного органа (по И. С. Кудрину):
1 — эмаль; *2* — дентин; *3* — цемент; *4* — периодонт; *5* — альвеолярная часть; *6* — слизистая оболочка десны; *7* — десневая бороздка; *8* — отверстие верхушки корня.

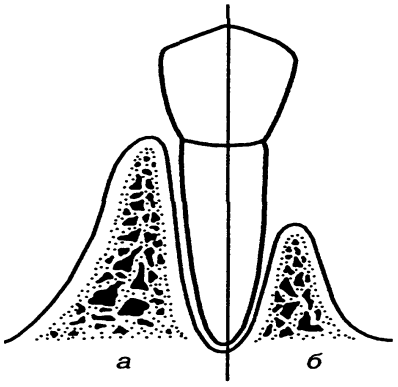

Рис. 1.9. Соотношение длины коронки и корня.
Анатомическая (*а*) и клиническая (*б*) коронки зуба

♦ Dental organ = tooth + periodontal.

♦ Tooth (Latin - dens; gr. - odus) is a very dense hollow elongated shaft that serves to bite, crush, grind and grind solid food.
In the tooth, a thickened part is distinguished - the crown, the narrowed section adjacent to it, surrounded by the gum - the neck and the part located inside the jawhole - the root. There are from one to three in different teeth.
In practical dentistry, it is customary to distinguish between anatomical and clinical crowns
♦ Anatomical crown - the part of the tooth covered with enamel.
♦ Clinical crown - part of the tooth protruding above the gum.
The anatomical crown decreases with age as a result of erasing of the tubercles or incisal edge, while the clinical one can increase due to resorption of the alveoli walls and exposure of the root. Thus, it includes, under certain circumstances, the anatomical crown and part of the root.
The following surfaces are distinguished on the tooth crown:
1) the surface facing in front of the oral cavity is called the vestibular. It is also called labial in the front teeth, and on the buccal surface in the posterior;

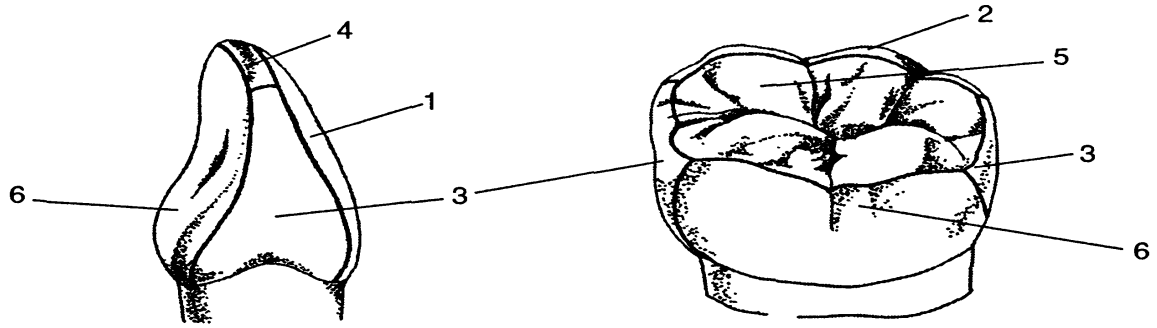

Рис. 1.10. Поверхности коронки зуба:
1 — вестибулярная поверхность резца; *2* — щечная поверхность моляра; *3*— контактные поверхности; *4* —режущий край; *5* — жевательная поверхность; *6* — язычная поверхность

2) the surface of the tooth crown facing the oral cavity is called oral or oral. On the upper jaw it is called palatine, and on the lower - lingual;
3) crown surfaces facing adjacent teeth of their row are called contact. The surfaces of the teeth facing the center of the dentition are called mesial contact, on the central incisors - medial. Surfaces directed in the opposite direction, that is, from the center of the dentition, are called distal contact surfaces;
4) the surface or edge of the tooth crown directed to the teeth of the opposite dentition is called the chewing surface or chewing (cutting) edge of the incisors and canines. It is also called the closure surface or the occlusal surface, because it is in contact with the teeth of the opposite dentition when the jaws approach.
In this regard, terms are used in practical dentistry that indicate the direction in relation to the tooth: “orally”, “vertically”, “mesial”, “distal”, “occlusally” and “apical” (to the apex of the root; apex radicis).
Tooth cavity1 —has a different shape in different teeth. Inside the crown, the tooth cavity is somewhat similar in shape to it, and in the root it continues in the form of a canal. The latter ends with a small hole at the top of the tooth root.In multi-rooted teeth, the number of root canals is usually equal to the number of roots.
The tooth cavity is filled with dental pulp - pulp. In the latter, the crown and root parts are distinguished. Vessels and * nerves enter the pulp through the opening of the apex of the root.
♦ Tooth pulp — dental pulp, loose connective tissue, rich in blood vessels and nerves, filling the tooth cavity.
Pulp performs trophic, plastic (dentine-forming) and protective functions.
The coronal pulp in the direction of the cutting edge or chewing surface of the tooth has protrusions called horns. They fill the corresponding recesses in the cavity of the tooth.

In the central part of the pulp, specialized connective tissue is located, surrounded by special stellate cells called pereupontoblasts. The latter, as they multiply, turn into cells of the peripheral layer itself
pulps adjacent to dentin, a solid tooth - odontoblasts.
In the coronal part of the pulp there is a third (intermediate cell-free) Weil layer. Odontoblasts consist of a pear-shaped body and processes. The processes extending from the central ends of the odontoblasts, connecting with each other, go into the layer of the overblast. The outer processes pass through the dentin tubes to enamel - they are called toms fibers and feed the dentin, which is separated from the pulp by the thinnest Kellik-Fleishman shell. The last goes to the dentinal
tubules in the form of Neumann shells, creating a lining in the form of a case.
The main tooth tissue - dentin - consists of the main substance saturated with lime salts, and a large number of tubules (tubules).
♦ Dentin - the hard part of the tooth, resembling bone, surrounding the cavity of the tooth and root canals.
Dentin is 5-6 times harder than bone. Its main substance includes collagen fibers and the substance that connects them. Dentin contains about 70-72% of mineral salts, and the rest is organic matter, fat and water. In the composition of salts, hydroxyapatite [Ca3 (P04J • Ca (OHJ]), as well as calcium carbonate [CaC03] and sodium [Na2C03], calcium fluoride [CaF2], etc. are the most abundant.
Collagen fibers located closer to the cavity of the tooth have a generally perpendicular direction to the walls of the tubes and parallel to the walls of the cavity. This is a near-pulp dentine, or predentin. This area is a place of constant growth of dentin, which does not stop in the teeth of an adult.
Dental rows (arches).
Dental organs in the jaws are located so that the crowns of the teeth form the dentition - upper and lower.
An adult's dentition includes 16 teeth. In the center of the dentition are teeth that bite off, and on the sides - grinding and crushing food.
The front teeth (incisors and fangs) are single-humped, single-rooted.
Lateral teeth (premolars and molars) - multi-tubercular, multirooted.
The order of the teeth is usually written in the form of a dental formula in which individual teeth or groups of teeth are usually indicated by numbers. The most common dental formula proposed by Sigmondi looks like this:
8 7 6 5 4 3 2 1
8 7 6 5 4 3 2 1
12 3 4 5 6 7 8
12 3 4 5 6 7 8
Its international counterpart is as follows:
18 17 16 15 14 13 12 11
48 47 46 45 44 43 42 41
21 22 23 24 25 26 27 28
31 32 33 34 35 36 37 38
In both formulas, there are four quadrants, meaning the right and left side of the upper and lower jaw.
Each tooth has its own number. Belonging to the jaw and its side in the Sigmondi formula is determined by using angled lines, for example:
| 1 - upper central left incisor;
6 | - lower first right molar.
In the international dental formula, a tooth is indicated by two numbers. The first indicates the localization of the tooth on a certain side of a particular jaw. The second means the tooth itself, for example:

13 - upper right canine;
21 - upper left central incisor;
34 - lower left first premolar;
47 - lower right second molar.
The order of the teeth in the formulas is presented as we see it in front of the person in front of us. Temporary or baby teeth in the formula are indicated by Roman numerals, missing teeth with the letter “O”. It is possible to introduce into the formula the conventions of non-cut teeth, artificial crowns, fillings, bridges, etc. If all the teeth of the rows are preserved, they are called full or intact dentitions.
Dental row - the concept is not actual, but figurative. Therefore, the term “dental arch” can often be found, which characterizes the contours of the dentition.
♦ Dental train - an imaginary curve running along the cutting edge and the middle of the chewing surface of the dentition.
The upper dentition of the permanent teeth has the shape of a semi-ellipse, and the lower one - the parabola of the Upper, in addition, is wider than the lower one, as a result of which the upper front teeth overlap the lower and buccal tubercles of the upper lateral teeth of the same name, located outward from the lower. This ratio of dentition increases the possibility of chewing excursions, expanding the area useful for grinding and grinding food. Factors ensuring the stability of the dentition. Dentitions are a single whole, both morphologically and functionally. The unity of the dentition is ensured by interdental contacts, the alveolar part, periodontal. Significant role in the stability of the dentition
plays the character of the location of the teeth, the direction of their crowns and roots.

Межзубные контактные пункты у передних зубов расположены вблизи режущего края, а у боковых — вблизи поверхности смыкания (жевательной). Под ними находится треугольное пространство, обращенное основанием к альвеолярной части. Это пространство заполнено десневым (межзубным) сосочком, который, таким образом, оказывается защищенным от повреждений пищей.

Межзубные контакты, обеспечивая морфологическое единство зубных рядов, придают им при жевании характер системы. Давление, падающее на какой-либо зуб, распространяется не только по его корням на альвеолярную часть, но по межзубным контактам на соседние зубы.

С возрастом контактные пункты стираются и вместо них образуются контактные площадки (рис. 1.16).

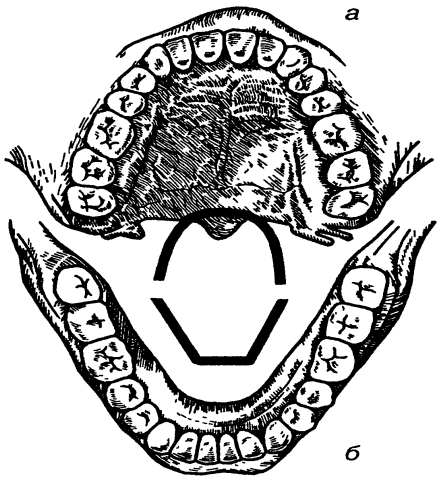

Рис. 1.15. Форма зубных рядов:
а — верхний — полуэллипсоидный;
б — нижний — параболический

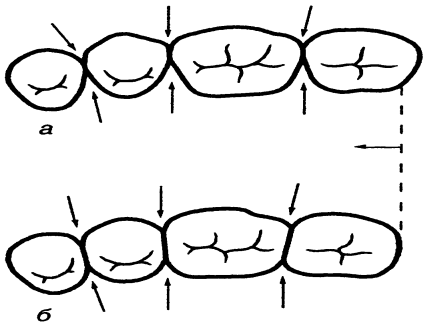

Рис. 1.16. Межзубные контактные пункты и площадки:
а — межзубные контакты (указаны стрелкой) обеспечивают непрерывность зубных рядов. Щечная выпуклость больше язычной, отчего зубы в поперечном разрезе имеют форму трапеции; *б* — образование контактных площадок приводит к укорочению зубного ряда

Стирание контактных пунктов является косвенным доказательством *физиологической подвижности зубов*, совершаемой в трех взаимно перпендикулярных направлениях: вертикальном, трансверзальном и сагиттальном. Стирание контактных пунктов не нарушает непрерывности зубной дуги. Объясняется это мезиальным сдвигом зубов, вследствие чего имеет место укорочение зубного ряда, достигающее 1 см.

Единство зубного ряда обеспечивается также пародонтом (см. с. 42) и альвеолярным гребнем. Важное значение для связи между отдельными зубами имеет межзубная связка *маргинального пародонта*. Она идет от цемента одного зуба к цементу другого над вершиной межзубной перегородки в виде мощного пучка соединительнотканных волокон. Благодаря этой связке передвижение одного зуба мезиально или дистально вызывает передвижение соседних зубов.

The lower teeth, in addition, receive additional stability due to the buccal bulge of the dental arch, the inclination and shape of the tooth crowns.

You can notice that the lingual surfaces of the lower teeth are already vestibular and therefore the contact surfaces of the crowns are not parallel, but converge (converge) in the direction of the tongue.

This feature of the shape of the teeth is not related to the bulge of the dental arches, since the upper teeth have parallel contact surfaces. In the first upper molar, these surfaces sometimes even come together in the opposite, i.e. buccal, direction.

The teeth of the lower jaw are inclined by the crowns inward and the roots outward. The bulge of the dental arch, the shape and position of the teeth of the lower jaw thus create stability for the lower dentition, similar to the strength of the arch vault, built of trapezoidal bricks. The crowns of the lower molars, in addition, are inclined forward, and the roots back. This circumstance interferes with the shift of the dentition back.

The inclination of the teeth of the upper jaw is less favorable for their stability. The teeth of the upper jaw are tilted by the crowns outward, and the roots inward. The horizontally acting forces arising during chewing can only strengthen the inclination of the tooth, which, as it deviates outward, is losing more and more support from its neighbors. This feature of the arrangement of the teeth, which makes the upper dentition less stable compared to the lower, is compensated by the large number of roots in the upper chewing teeth.

As was noted, the upper dentition resembles a semi-ellipse in shape, and the lower one - a parabola. The shape of the dental arches, the location of the teeth in them and the nature of their tilt are individual features. Therefore, along with the typical and most common form of dental arches, deviations in one direction or another are observed. This affects the nature of the closure of the dentition

(bite), which is individually different.

In orthopedic dentistry, it is customary to distinguish, in addition to dental, alveolar and basal (apical) arches.

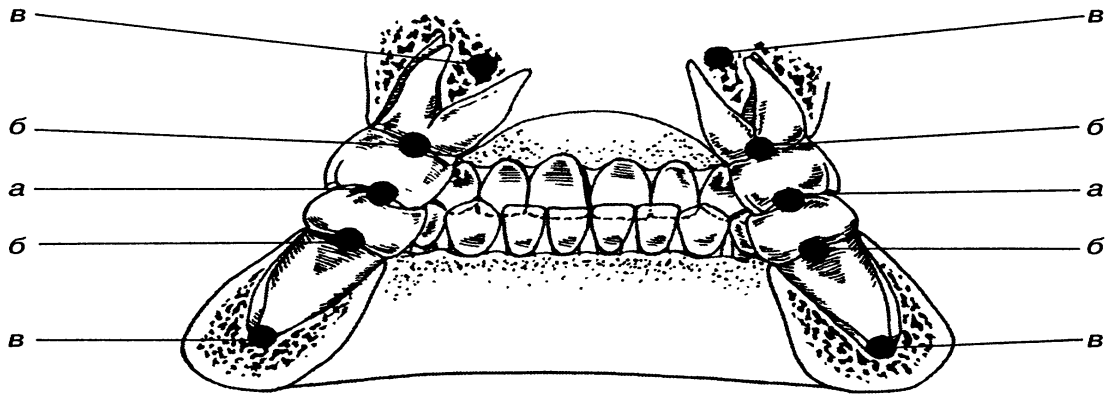

Рис. 1.17. Соотношение зубных (*а*), альвеолярных (*б*) и базальных (апикальных) (*в*) дуг

♦ Alveolar arch means an imaginary line drawn in the middle of the alveolar ridge.

♦ The basal arch is an imaginary curve that runs along the tops of the roots of the teeth. Often called apical basis.

Since the crowns on the upper jaw are tilted outward and the roots inward, its dental arch is wider than the alveolar, and the latter is wider than the basal one. The basal arch, therefore, is the place where the masticatory pressure concentrates and originates
buttresses.

On the lower jaw, on the contrary, due to the inclination of the tooth crowns inward and of the roots outward, the dental arch is already alveolar, and the latter is already basal. For this reason, with complete loss, the lower jaw protrudes forward when it approaches the upper jaw,
creating the appearance of progeny (senile progeny).

♦ Progress - chin protruding forward.

2 lecture

The main examination methods in the clinic of orthopedic dentistry.
Additional and special examination methods.
Psychological preparation of patients before prosthetics.
Brief information about the dental materials used in the practice of orthopedic dentistry.

2.1. Teaching Technology Model

Lesson time 2 hours	**Number of students: 16 - 20**
Class Form	**Introduction - Information Lecture**
Lecture Plan: 1. The main examination methods in the clinic of orthopedic dentistry. 2. Additional and special examination methods. 3. Psychological preparation of patients before	Teaching students on the propaedeutics of orthopedic dentistry at the university in new educational methods using new phantoms and models for its formation as a doctor. The bachelor in taking the necessary measures during the study of the subject "Propaedeutics of Orthopedic Dentistry" should know: - The main examination methods in the clinic of orthopedic dentistry. - Additional and special examination methods.

prosthetics. 4. Brief information about the dental materials used in the practice of orthopedic dentistry.	- How to psychologically prepare a patient for prosthetics The purpose of teaching is: - the student must have theoretical knowledge - the student must use theoretical knowledge in practice.
Lesson purpose	To study the basic examination methods in the clinic of orthopedic dentistry, additional and special examination methods. To know about the psychological preparation of patients before prosthetics. Have brief information about the dental materials used in the practice of orthopedic dentistry.
Teaching methods	Lecture, survey, multimedia
Form of training	Group, collective
Subject of study	Curriculum, textbooks, lecture material, multimedia.
Training	Specially trained classroom for training
Monitoring and Evaluation	Oral control, question and answer

2.2. Technological map of a lecture lesson.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training (10 minutes)	1. Prepare lecture material 2. Preparation of slides for the introduction of thelecture. 3. Using literature to prepare a lecture. 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N “Orthopedic dentistry” 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry"	Listen and record
Lecture introduction (15 minutes)	**Explanation of goals and objectives of the topic** **Purpose:** To study the basic examination methods in the clinic of orthopedic dentistry, additional and special examination methods. **Tasks:** To know about the psychological preparation of patients before prosthetics. Have brief information about the dental materials used in the practice of orthopedic dentistry. **Questions about the lecture:** 1. The main examination methods in the clinic of orthopedic dentistry. 2. Additional and special examination methods.	Listen and answer the questions asked.

	3. Psychological preparation of patients before prosthetics. 4. Brief information about the dental materials used in the practice of orthopedic dentistry.	
The main part of the lecture (55 minutes)	1. Explain the topic, show slides. 2. Show tooth phantoms	Listen and record
The final part of the lecture (10 minutes)	1. Summarizing 2. Set independent work 3. Set homework	Listen Write down Write down

The content of the lecture.

METHODS FOR EXAMINING A PATIENT
IN THE ORTHOPEDIC DENTAL CLINIC

The methods of examination of the patient are usually divided into clinical (used in the chair, patient's bed) and paraclinical (instrumental, laboratory, radiological, that is, conducted in the auxiliary services of the clinic).

This division of methods, as well as other methods of their classification, is rather arbitrary.

CLINICAL SURVEY METHODS

Clinical examination methods include:

a) a survey of the patient (clinical conversation);

b) external examination of the patient;

c) examination of the temporomandibular joint and chewing muscles;

g) examination of the oral cavity:

- study of the oral mucosa;
- examination of teeth and dentitions;
- periodontal examination;
- examination of the toothless alveolar part.

Interview with a patient (history)

The collection of anamnesis (from gr. Anamnesis - I recall, memory) is the first stage of the examination of a patient who is offered to reproduce the medical history from memory.

A patient survey consists of the following sections, which are sequentially outlined:

1) complaints and subjective condition of the patient;

2) the history of the disease;

3) the life story of the patient.

The range of questions that the doctor asks the patient depends on the nature of the disease. In some cases, the anamnesis is short and the doctor does not need to go into the history of life, in others, the anamnesis should be collected in detail, especially in the part that
of greatest interest for diagnosis.

For example, when contacting a patient about a traumatic defect in the incisor, the anamnesis will be short, because the etiology of the lesion is known and everything that is required for orthopedic treatment can be clarified upon examination. Another thing is when the patient complains of a burning sensation that appears in the mucous membrane under the prosthesis. Here, the history, like the entire examination, will be detailed. It is necessary to examine not only the organs of the oral cavity, but also other organ systems with the involvement of doctors of a different specialty.

Often patients present complaints that they think are the main ones, and from the point of view of the doctor are secondary.

For example, the patient pays attention to the ugly position of the front tooth, without noticing the anomalies of the dentition in the form of their narrowing. The doctor must identify both secondary and main causes of the disease, focusing on the latter. Particular attention is paid to pain complaints. Here you need to find out the severity, nature, frequency,
localization of pain.

Gathering an anamnesis, it is important, first of all, to find out the earliest manifestations of the disease, the nature and characteristics of its course, the type and extent of the treatment. It is also necessary to find out the time of tooth loss, complaints about the condition of the gastrointestinal tract.

For a number of diseases that require orthopedic treatment (for example, diseases of the temporomandibular joint), you should talk with the patient about the probable causes that, in his opinion, caused this disease.

You can not conduct a survey of the patient, limited to avaricious questions and content with the same avaricious answers. The conversation should be expanded, skillfully and carefully find out the patient's emotional state, his attitude to the disease and treatment, readiness for long-term therapy and a desire to help the doctor's efforts. This will make it possible to get an idea of his mental identity, the knowledge of which
plays a significant role in the tactics and behavior of the doctor, both during medical procedures, and during the period of getting used to the prosthesis.

When collecting an anamnesis, the place of birth and place of residence, home conditions, working conditions at work, nutrition, and past illnesses are found out. The importance of a particular item in the history of life is determined by the clinical picture of the disease. Knowing the patient's birthplace and life is important because the so-called regional pathology is possible. For example, with an excess of fluoride in drinking water in this area, a focus of endemic fluorosis occurs, in which tooth enamel is affected. When children contact about dentoalveolar anomalies, a medical history is collected from their parents. In this case, the doctor tries to get answers to the following questions: the state of the mother during pregnancy, how the birth took place, how many were there, whether this child was born full-term, with what weight, by which account, in what way was fed (breast or artificially) and to which time.

The diseases suffered by the child and their course are also clarified. The time of teething of milk teeth, the causes of premature loss of teeth, the time of the change of teeth, as well as the age when the child began to walk and talk, are clarified.

Data is collected on living conditions, eating habits, the nature of chewing (chewing fast, slow, on one, on both sides). It is important to find out the method of breathing day and night (through the mouth or through the nose, sleeps with an open or closed mouth), the child's favorite position during sleep, bad habits and which ones (sucking fingers, tongue, biting nails, pencil, etc.). It is being ascertained whether orthodontic treatment was carried out before (at what age, for how long, with what devices, with what
results), whether there were operations in the oral cavity (when, what), whether there was an injury, what inconvenience the patient feels at the moment and what he is complaining about (aesthetic, functional disorders). It is necessary to find out how the patient successfully used prostheses, and if not, then for what reason. This information is important for the planning and prognosis of orthopedic treatment.

Due to the existence of hereditary diseases with anomalies of the masticatory-speech apparatus (lower macrognathia, deep bite), one should be interested in the presence of anomalies in close relatives.

In an adult patient, unlike a child, many questions disappear when determining the history. During the conversation, the doctor determines the degree of motivation for treatment (mood) for orthopedic treatment. Some adult patients stop treatment, unable to withstand difficulties.

Despite the wide development of laboratory and instrumental studies, the use of computers in diagnostics, the role of interviewing a patient should not be diminished. It belongs to the oldest and classic methods of examination.

The famous Russian doctor G. A. Zakharyin considered the questioning of the patient to be an art. He wrote: “No matter how much you listen to the patient and tapping, you can never accurately determine the disease if you do not listen to the testimony of the patient himself, if you do not learn the difficult art of exploring the mental state of the patient.”

External examination of the face

All patients should be examined by face. This is done imperceptibly for the patient. During the survey pay attention to:

- the condition of the skin of the face (color, turgor, rash, scars, etc.);
- the severity of the chin and nasolabial folds (smoothed, moderately expressed, deepened);
- position of the corners of the mouth (raised, lowered);
- line of closing lips (presence of jams);
- the degree of exposure of the front teeth or the alveolar part when talking and smiling;
- the position of the chin (straight, protrudes, sinks, is shifted to the side);
- symmetry of the halves of the face (Fig. 2.1);
- the height of the lower part of the face (proportional, enlarged, reduced).

If necessary, the patient is asked guiding and clarifying questions. So, for example, in the presence of scars, the cause is determined (burn; consequence of injuries, diseases, operations performed; prescription, effectiveness of the treatment, ratio

patient to their appearance, etc.). At the same time, they pay attention not only to the content of the answer, but also to how the patient responds (speech purity, soundless breathing). This complements the degree of informativeness of the external examination, since with anomalies of the masticatory-speech apparatus, facial and dental signs are of significant importance.

Так, например, совокупность таких лицевых признаков, как выступание вперед средней части лица на фоне увеличения высоты его нижней части и сглаженности носогубных и подбородочной складки, зияние ротовой щели (мягкие ткани, окружающие ротовую щель, напряжены) с диастемами, тремами, выстоянием и обнажением верхних резцов, под которые подвернута нижняя губа, позволяют на данном этапе обследования больного предположить наличие такой аномалии жевательно-речевого аппарата как верхняя макрогнатия (см. с. 402).

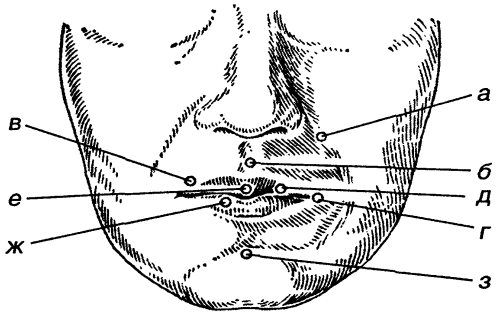

Рис. 2.1. Анатомические образования нижней части лица:
а — носогубная складка; *б* — фильтр; *в* — верхняя губа; *г* — угол рта; *д* — линия смыкания губ; *е*—*ж* — красная кайма губ; *з* — подбородочная складка

В ортопедической стоматологии широкое распространение получило деление лица на три части (рис. 2.2):

— верхнюю — расположена между границей волосистой части на лбу и линией, соединяющей брови;

— среднюю — ее границами служат линия, соединяющая брови, и линия, проходящая по основанию перегородки носа;

— нижнюю — от основания перегородки носа до нижней точки подбородка.

Вообще деление высоты лица на три части условно, поскольку положение точек, в соответствии с которыми проводится деление, весьма индивидуально и в течение жизни человека может меняться. Например, граница волосистой части на лбу у различных субъектов расположена неодинаково и с возрастом может перемещаться. То же касается и нижней части лица, высота которой непостоянна и зависит от вида смыкания и сохранности зубов. Наименее изменчива средняя треть лица. Несмотря на то, что между размерами указанных частей лица нельзя усмотреть закономерной пропорциональности, у большинства лиц они имеют относительное соответствие, что обеспечивает эстетический оптимум.

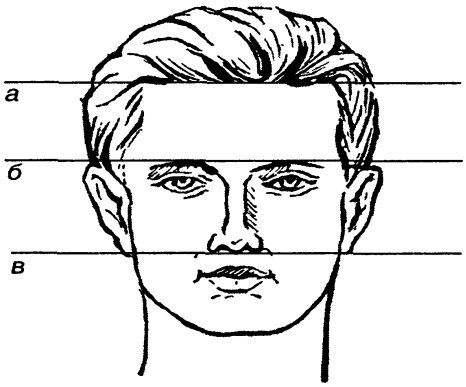

Рис. 2.2. Деление лица на три части:
а — верхняя; *б* — средняя; *в* — нижняя

A visual and metrigue assessment of the face in various dynamic states revealed (V. A. Pereverzev) that during the conversation the lower lip is more active, and therefore the lower dentition is most often exposed. With a high (long) upper lip, the upper teeth are barely exposed or completely covered by it. During a smile, the picture changes - the activity of the upper lip increases, which causes a significant exposure of the upper teeth with less pronounced lower teeth (normally 1/3 of their height).

According to V. A. Pereverzev, more than 80 signs of the beauty of a smile are known. In its formation, the leading role belongs to the dentition and teeth (the color of the teeth, their shape, size, position, relief, integrity, relative position in the dentition

relative to the edges of the lips and other parts of the face, proportionality between each other, with the whole face and its parts, the harmony of the shape of the teeth and the shape of the face, etc.).

At the same time, the following signs of a harmoniously developed person are distinguished:

- its three parts (upper, middle and lower) are approximately equal in height;
- nasolabial angle ranges from 90-100 °;
- the angle of convexity of the face is 160-170 °;
- sagittal tilt of the upper anterior teeth within 90-100 °;
- the transversal inclination of the upper front teeth varies from 5 to 10 °, and the same indicator for the lower teeth of the same name is 0 °;
- the bending angles of the upper dentition, upper lip and horizontal profiling of the palpebral fissures are the same and fluctuate within 170 °;
- the width of the filter is equal to the width of the two upper central incisors;
- the interorbital width is equal to the width (length) of one eye, and both of these parameters are identical to the width of the upper incisors;
- the height of the ear is equal to the height of every third of the face, and in the sagittal plane in harmony with the profile of the nose.

For orthopedic purposes, it is important to distinguish between two sizes of the height of the lower part of the face:

- the first is measured with dentitions closed in central occlusion; while the height of the lower part of the face is called morphological, or occlusioin;
- the second is determined in the state of functional rest of the masticatory muscles, when the lower jaw is lowered and a gap arises between the teeth, this is the functional height.

In orthodontics, various measurements are made on the patient's face (determining the type of face and the height of its parts, the values of the angles of the lower jaw, the length of its body) using compasses, goniometers and rulers with a millimeter scale.
Facial shapes in the face are most often defined as rectangular, conical or inverse conical, depending on the ratio of the width between the corners of the lower jaw and between the front sections of the tragus of the ear. It is useful to measure parts of the face (upper, middle and lower) before and after treatment. The angles of the lower jaw (right and left) are measured in patients to establish their value for various dentition. Measurements are also taken before and after treatment. Indirectly, the angle of the lower jaw is measured on a photograph, tele-roentgenogram, radiograph or tomogram of the angle of the lower jaw.
The data obtained by measuring the parts of the face and the angles of the lower jaw directly or indirectly are conditional, since it is not always possible to "establish their true value due to the thickness of the soft tissue layer, unequal severity of the angles of the lower jaw and possible projection distortions on the radiograph. Despite the relative reliability of these data, they still contribute to a more detailed study of the configuration of the face with anomalies of the masticatory-speech apparatus.

Examination of the temporomandibular joints
and chewing muscles

Diagnosis of diseases of the temporomandibular joint is based on anamnesis, clinical studies of the oral cavity and joints themselves, functional tests, and results of x-ray studies. During a conversation with the patient, it is necessary to clarify his complaints. Most often, patients complain of clicking in the joint, pain, restriction of opening the mouth, crunching, headache, hearing loss.
Many patients have no complaints, but examination of them reveals one or another joint pathology. Thus, the study of the temporomandibular joint is mandatory for patients with pathology of the dentition (abnormalities, complete or partial loss of teeth, deformation, increased abrasion, periodontal disease, etc.).
Then it should be clarified when the disorders called by the patient, for example, clicking in the joint, appeared and with what it connects them (trauma, loss of teeth, flu, wide opening of the mouth when removing teeth, etc.). An important point in the collection of anamnesis is to establish a connection between tooth loss and joint disease, and whether the patient was prosthetized and whether there was relief after that.
At the end of the survey, the patient is palpated by applying fingers to the skin, in front of the tragus of the auricle or inserting the fingers into the external auditory meatus.
♦ Palpation - the use of fingers (usually the pads of the terminal phalanges of the thumb, index, middle fingers, less often the little finger) to study the tone of the masticatory muscles, the localization of painful points in them, the study of bone
the base of the prosthetic bed, as well as the study of the mobility and compliance of the mucous membrane of the oral cavity, in particular - bridles and dangling ridges. On palpation of the joint, pain can be detected, tremors, clicking and crackling are often felt. Therefore, palpation here plays the role of auscultation, although noises, crunching, clicking can be heard by a phonendoscope. In addition, the introduction of noise in analog form into a computer (if appropriate programs are available) allows one to obtain their spectral analysis. Such a diagnostic method is called arthrophonometry (A. Ya. Vyazmin; E. A. Bulycheva). Palpation can detect smoothness or jerking
the difference, the amplitude of the movements of the heads of the lower jaw during opening and closing the mouth, the synchronism of movements of the left and right heads. At the same time, it is possible to note the clicking, crunching, their combination and synchronism with various phases of opening the mouth.
The heads of the lower jaw are characterized by two types of movement, determined by palpation, namely normal, smooth, without going beyond the top of the articular tubercle, and

movement with large amplitude, with going to the top of the articular tubercle, or to the side. Some of these excursions may be on the verge of a subluxation. Finally, there may be a habitual dislocation with the head completely leaving the articular cavity beyond the top of the tubercle.

Functional tests of the joint include checking the excursion of the lower jaw when opening and closing the mouth. In this case, the following two types of its movements can be noted. At the first, called direct (progressive, smooth), the trajectory of the incisal point on the frontal plane does not shift to the side when opening and closing the mouth. In the second - a wavy (zigzag, step) incisor point when moving the lower jaw moves to the right or left of the sagittal plane, forming a wave or zigzag, step.

When the trajectory of the incisor point combines the elements of direct and wave-like motion of the lower jaw, they speak of a combined movement. This type also includes those trajectories that, when opening the mouth, have a rectilinear direction, and when closing, they are distorted by a shift or zigzag.

Difficult opening of the mouth can occur both with narrowing of the mouth opening, and with difficulties in the movements of the lower jaw due to muscle or joint contracture. In itself, a difficulty in opening the mouth indicates a certain pathology. In addition, it interferes with many of the manipulations associated with prosthetics (the introduction of impression spoons or prosthesis). At the same time, the degree of separation of the dentition when opening the mouth is established.

On palpation of the chewing muscle itself, the thumb is placed on its front edge, the rest are located on the posterior edge. The muscle gently contracts
with your fingers. You can palpate it bimanally: with the index finger on the side of the oral cavity, with the thumb - outside. Thus determine the degree of development and severity of the muscle, its tone, areas of compaction and pain points, if any.

The temporal muscle is palpated by intraoral access and externally in the temporal region. In the oral cavity, the index finger examines the place of attachment of the muscle to the coronoid process. Outside, on the right and left, the muscle is palpated with four fingers
each arm, setting them in the temporal region.

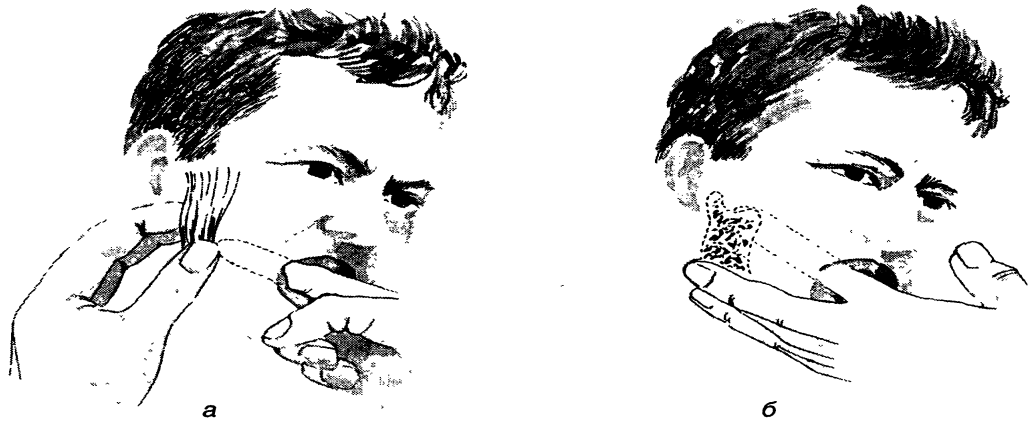

Рис. 2.3. Схема пальпации жевательной (*а*) и медиальной крыловидной (*б*) мышц

The front surface of the medial pterygoid muscle is examined with the index finger sliding upward along the pterygo-maxillary fold from the retromolar region of the lower jaw. The lower part is also palpated by intraoral access, with
lowering the index finger into the distal sublingual region, to the corner of the lower jaw. On palpation of the medial pterygoid muscle, the index finger is also directed along the mucous membrane of the vestibular surface of the alveolar process of the upper jaw distally and upward, beyond the alveolar tubercle.

Examination of teeth and dentitions is carried out in

in a certain order, starting from the upper jaw, and examine each tooth sequentially from the wisdom tooth of one side to the other of the same name.
When examining each tooth, pay attention to the following:
1) his position;
2) form;
3) color;
4) the state of hard tissues (caries, fluorosis, hypoplasia);
5) the presence of fillings, inlays, artificial crowns, their condition
6) tooth stability;
7) the ratio of the extra-alveolar and intra-alveolar parts of it;
8) position in relation to the occlusal surface of the dentition.
In addition to visual inspection, when examining teeth, probing and percussion are used.
♦ Probing and percussion are derived from palpation. The first is a study using a probe in carious cavities, gingival grooves (pockets), tab edges or artificial crowns; and the second - grinding on the crown of the tooth to determine the reaction of the periodontium to these tremors.

Затем следует установить *форму зубных рядов* (суженный симметричный: U-образный, V-образный, О-образный седловидный; асимметричный, трапециевидный).

Выясняется также характер смыкания зубных рядов (*прикус*), количество антагонирующих пар зубов. Обычно определение вида смыкания зубов не вызывает трудностей. Затруднения возникают при патологических состояниях, в частности при переломах челюстей, особенно многооскольчатых.

Большую помощь в этом могут оказать *фасетки стирания*, названные Энглем *окклюзионными площадками*. Они образуются в результате трения зубов во время их артикуляции и имеют определенное видом прикуса расположение (рис. 2.5).

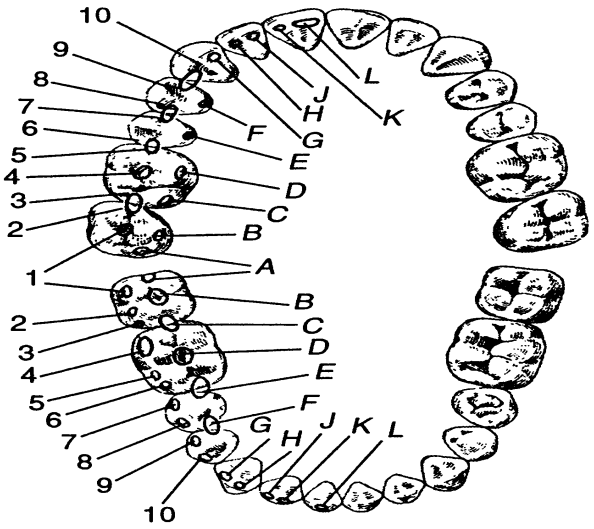

Рис. 2.5. Окклюзионные площадки (фасетки стирания) при ортогнатическом прикусе (1—10), образованы фиссурно-бугорковыми контактами щечных нижних бугорков: А—L щечно-бугорковыми и режуще-бугорковыми контактами (по Свенсону)

В переднем отделе, кроме того, следует обратить внимание на глубину резцового перекрытия. Обследование позволяет получить предварительное представление о характере окклюзионной поверхности и возможных ее деформациях (см. гл. 4).

Periodontal examination. In a clinical examination, it is important to assess, first of all, the state of marginal periodontal disease. This includes changes in the gingival margin (inflammation, atrophy), the presence of a gingival pocket; its depth, suppuration. An important detail in the characterization of periodontal conditions is the ratio of the extra- and intraalveolar part of the tooth. With gum atrophy, the clinical crown increases, and with it, the extra-alveolar part grows. Increase in external lever
entails a change in the biomechanics of the tooth with the advent of functional periodontal overload. Thus, gum atrophy, an increase in the clinical crown, the formation of a pathological pocket are symptoms of periodontal pathology and a decrease in its functionality.
The latter is expressed in the appearance of unusual in the scope and direction of tooth movements, otherwise called pathological mobility.

♦ Pathological tooth mobility is their displacement noticeable by the eye, even from the influence of a small effort, such as pressure on the tongue.
There is also a physiological (normal) tooth mobility. It is a natural, visually invisible and due to the elasticity of the periodontium. Its existence is confirmed by special complex devices or indirect
signs in the form of erasing contact points and the formation of contact pads.
Tooth mobility is a very sensitive indicator of periodontal disease. In terms of its degree and increase, it is possible, to some extent, to comprehend the state of the supporting apparatus of the teeth, the direction of development of the pathological process or its exacerbation.
Therefore, the study of the severity of pathological tooth mobility is of great importance for the diagnosis of the disease, evaluation of treatment results and for prognosis. It is very important to register the initial signs of tooth mobility.This allows you to diagnose a periodontal lesion in its initial stage.
Pathological mobility is studied both with an open mouth and with articulation of teeth. This allows in some cases to identify the cause of periodontal pathology and associated pathological mobility. Such reasons may be violations of occlusion with the formation of blocking moments in one or another phase of articulation.
Four degrees of pathological tooth mobility are distinguished (D.A. Entin):
- at the first degree there is a tooth displacement in one direction (vestibulo-oral);
- in the second degree, the tooth has apparent displacement both in the vestibulo-oral and mesio-distal directions;
- with the third degree, the tooth, in addition, shifts in the vertical direction: when pressed, it plunges into the hole, and then returns to its original position;
- with the fourth, extreme degree, possible, among other things, rotational movements of the tooth.
The third and fourth degrees of mobility indicate far-reaching and, for the most part, irreversible periodontal changes.
Pathological tooth mobility is closely associated with the presence of pathological gingival (periodontal) pockets. Their presence and depth are checked with a specially graduated probe with an oliviformly expanded tip. At the same time, the nature of the discharge and the condition of the gingival margin are clarified.

PARACLINIC SURVEY METHODS
Paraclinical include instrumental, radiological and laboratory examination methods.
Instrumental examination methods
Measurements on face photographs (photogrammetry). To study the configuration of the face, before and after orthodontic treatment, 9 x 12 cm face and profile photographs are used . Shaped photographs are of diagnostic value for narrowing of the jaws, pronounced protrusion of the anterior upper dentition, with a deep or open bite, asymmetries of the face.
Profile photographs are especially valuable when examining patients with anomalies in the size and position of the jaw.
Patients are photographed in three projections:
1) in a face with closed lips;
2) in the face with open lips, but teeth closed in central occlusion;
3) in profile.
When looking ahead, the head is set straight so that the imaginary sagittal and orbital planes are perpendicular to the floor of the photo cabinet, and the Frankfurt horizontal is parallel to it. The lips and muscles of the chin should not be strained. It is almost not always possible to give the head the described position, since with different asymmetries of the face and unequal depth and height of the temporomandibular joints, the direction of the Frankfurt horizontal changes.

To study and compare photographs, their identity is necessary. For this purpose, special devices are used - photostats, which make it possible to photograph patients at the same distance from the lens and with the same head position.
For a more detailed study of the face in profile photographs, the following lines are drawn:
- Frankfurt (eye-eye) horizontal of Iering (through infraorbtale-porion points);
- Simon's orbital plane (through infraorbitalej point;
- the nasal plane of Dreyfus (through the nasion point);
- profile vertical of Kantorovig (through the point of glabella).
The last three lines are parallel to each other and intersect at right angles with the Frankfurt horizontal. To draw these lines, it is useful to apply the indicated points on the patient's face with a pencil or mark them with paper circles before shooting. Normally, the upper lip touches the Dreyfus plane, the lower lip slightly deviates from it, and the chin is between the orbital and nasal planes.
Such a study can be carried out directly on the patient’s face using a profiloscope, which consists of two Plexiglass plates (one with divisions has two parts located perpendicular to each other, the second is movable), connected by the principle of a slide rule. The profiloscope is applied to the face so that one edge of the main plate coincides with the Frankfurt horizontal, and the other with the plane drawn through nasion or glabella.

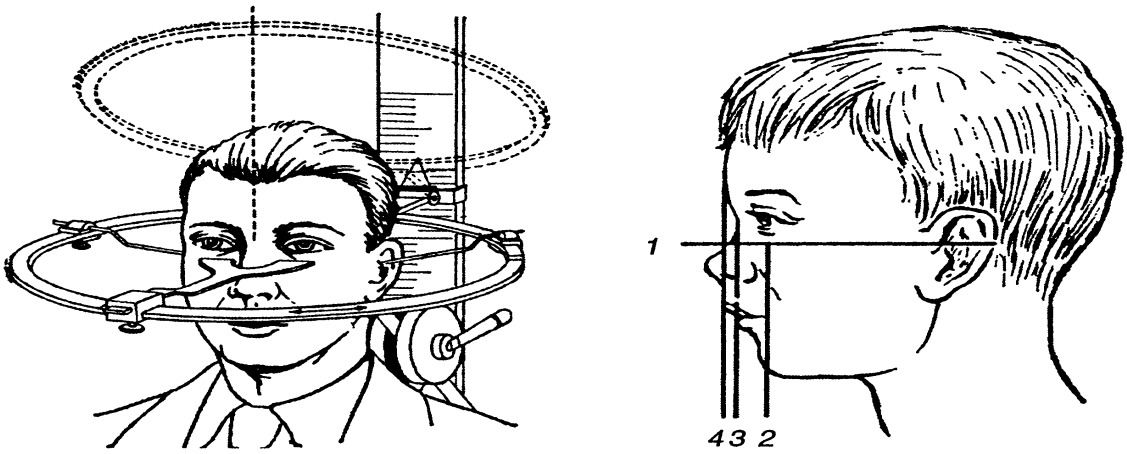

Рис. 2.13. Фотостат Коркгауза (*слева*). Кольцо передвигают вверх по шкале в зависимости от роста пациента. Отходящие от кольца отростки устанавливают на точках tragion и orbitale. Таким образом ориентируют голову к франкфуртской горизонтали. Анализ профиля лица (*справа*) соответственно франкфуртской горизонтали Иеринга (*1*), орбитальной плоскости Симона (*2*), носовой плоскости Дрейфуса (*3*), профильной вертикали Канторовича (*4*)

The movable plate is mounted on the infraorbtale point. In this way, a limited field (the location of the lips and chin) is studied, and then the configuration of the person’s face is evaluated. The technique is acceptable when there is no way to get
Photo.
The photographs also examine the shape, size of the nose, chin, forehead, the height and severity of the lips, and the profile of the mouth (along the line from the nasion to the chin). Photos in many cases facilitate the diagnosis and treatment plan. However, this method
It does not give an idea of the shape and structure of the facial skeleton and the location of bones in it, as well as the relationship of the bone base and soft tissues. Therefore, the face photograph data should be compared with the results of the analysis of tele-roentgenograms (see below).
The disadvantage of photographs is spatial distortion, as well as a flat image of the patient’s face, therefore, when comparing photographs with tele-roentgenograms, they need to be supplemented with the use of stereophotogrammetry or holography.

At present, the method of digital photogrammetry (R. A. Fadeev) is widely used, in which the image is entered into a computer, where, according to a special program, the calculations necessary for solving diagnostic problems are carried out.

Methods for determining chewing pressure. Knowledge of the periodontal endurance of certain teeth to chewing pressure allows you to navigate its allowable functional load when prosthetics.

Gnatodynamometry .

Periodontal endurance is measured using special instruments called gnathodynamometers. The device of this type was first proposed in 1893 . The attraction that created two apparatus for the study of chewing pressure: one to determine the pressure in the oral cavity, and the second to measure the force necessary to crush certain types of food outside the oral cavity.

Modifications of gnath-dynamometers are known, the sensing device of which are strain gauges (I. S. Rubinov; L. M. Perzashkevich; D. P. Konyushko and A. I. Drabkin). In recent years, new designs have been proposed - electronic gnatho-

Dynamometers "Vizir". They are devices powered by a battery with a nominal voltage of 9.6 V. This desktop device consists of a strain gauge and functional units, has digital indexing of the results of force measurements in Newtons.

The Gnatodynamometer is equipped with stainless steel interchangeable nozzles for various departments of the dentition. The main part of the sensor is an elastic element in the form of a double beam of equal resistance. At the free ends of the beam are located

bites that are placed between the antagonist teeth, perceiving the power of chewing muscles. The measured force causes the deformation of the elastic element, which leads to a change in the electrical resistance of the strain gauges.

После проверки работы гнатодинамометра (контроль нулевого показания цифрового табло) накусочные площадки датчика устанавливают между антагонирующими зубами и испытуемый максимально сжимает их. Результат фиксируется на цифровом табло.

Долгое время выносливость пародонта определялась по таблице Габера (табл. 2.2). Однако приводимые в ней цифры не отличаются точностью, дают лишь общее представление и не могут быть использованы в практике протезирования.

На основании гнатодинамометрических исследований Д. П. Конюшко составил таблицу выносли-

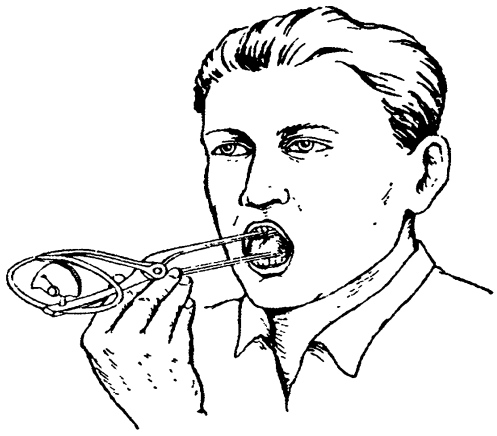

Рис. 2.14. Гнатодинамометр Тиссенбаума

Таблица 2.2

Выносливость пародонта верхней и нижней челюстей в килограммах (по Габеру)

Пол	Зубы								
	1	2	3	4	5	6	7	8	Всего
Мужчины	25	23	36	40	40	72	68	48	1408
Женщины	18	15	22	26	26	46	45	36	936

Таблица 2.3

Функциональная выносливость опорного аппарата зубов в килограммах (по Д. П. Конюшко)

Пол	Зубы								
	1	2	3	4	5	6	7	8	Всего
Мужчины:									
– верхняя челюсть	12	7	17	21	22	37	34	21	342
– нижняя челюсть	7	7	17	21	22	37	34	21	322
Женщины:									
– верхняя челюсть	8	5	12	15	16	27/25	24	14	244
– нижняя челюсть	5	5	12	15	16	27	24	15	238

вости пародонта (табл. 2.3) как для мужчин, так и для женщин. Выносливость симметрично расположенных зубов одинакова за исключением верхних премоляров у женщин (левый имеет выносливость 27 кг, а правый — 25 кг). В настоящее время результаты этих исследований имеют значимость только в учебном процессе.

Gnatodynamometry is not an accurate method, since these instruments measure periodontal resistance to pressure in only one direction (vertical or lateral). Under the action of a force, the pressure drops both on the abutment tooth and on neighboring teeth.
with him. We must not forget the fact that the chewing pressure, which characterizes the function of muscles, like any biological quantity is variable.
Myotonometry - a method for determining muscle tone. In this case, the most active (motor) point of the tensing muscle is determined by palpation. The projection of the point is marked on the skin with a felt-tip pen. A transparent plate is applied to the parotid region of the face (an x-ray film cleared of emulsion). Facial landmarks and a motor point are noted on it. If necessary, follow-up control measurements with its help at any time can determine the localization of the motor point (S. B. Fischev).
The measurement is carried out by the device with a myotonometer, which is a manometer with a probe protruding from it with a diameter of 5 mm . The probe leans against the marked point and plunges into it by 6 mm until the skin contacts the restrictive area. Wherein
measured resting tone and tension tone of the masticatory muscle. The study of masticatory effectiveness is carried out using functional (masticatory) methods, allowing to obtain a more correct idea of the violation of this function.
The first functional test was developed by Christiansen. He proposed determining chewing effectiveness by examining the degree of grinding of food of a certain consistency and mass. The subject was given 5 g of hazelnut or coconut.After 50 chewing movements, he spat out the food mass, dried it and sifted through a sieve with a hole diameter of 2.4 mm . Chewing ability was calculated by the residue on the sieve. S. E. Gelman modified the chewing test method.Instead of hazelnuts, he took 5 g of almonds, and instead of 50 movements he offered to chew for 50 s.

Further development of a functional chewing test was carried out by I. S. Rubinov. He believed that chewing 5 g of almond kernels poses a challenge for the chewing apparatus that goes beyond the normal range. Therefore, the patient was offered to chew 0.8 g of walnut, which is approximately equal to the mass of one almond kernel.

The sample is carried out as follows. The test subject is given 0.8 g of nut and is asked to chew it until the swallowing reflex appears. As soon as the subject has a desire to swallow a chewed nut, he is offered to spit out the contents in a kidney-shaped basin. The chewing time of the nut is counted by the stopwatch. As a result of a functional test, two indicators are obtained: the percentage of chewed food (chewing ability or effectiveness) and the time of chewing.

Studies have shown that with an orthognathic bite and intact dentition, 0.8 g of nut is completely chewed in 14 seconds. As tooth loss occurs, chewing time lengthens. At the same time, the residue on the sieve increases.

Other functional (chewing) tests are also known (M. M. Soloviev; A. N. Ryakhovsky). When analyzing the result of a sample, one should always consider the time of chewing and the percentage of chewed food. Evaluation on a single indicator can lead to erroneous

conclusions. For example, with a chewing test carried out in a patient with complete loss of teeth, immediately after applying prostheses, the food is chewed up to 80%. It would seem that with the help of prosthetics it was possible to almost completely compensate for the loss of natural teeth. However, if you measure the time of chewing, it will be 2-3 times more than normal.

The presence of two indicators (time in seconds and the effectiveness of chewing in grams) makes it difficult to compare the results of prosthetics even in one patient. A chewing test should be carried out for the same time or use the chewing index proposed by V. A. Kondrashov. It is obtained by dividing the mass of chewed food in grams by chewing time in seconds.

Graphic methods for studying the chewing movements of the lower jaw. Various diseases of the oral cavity and chewing muscles violate the biomechanics of the lower jaw. As the patient recovers, movements of the lower jaw may

to normalize. The normal movements of the lower jaw, their violation and the dynamics of recovery can be studied using graphical methods. Currently, the recording of chewing movements of the lower jaw is carried out on various devices: a kimograph, an oscilloscope, etc.

Masticiography. I. S. Rubinov developed a record of chewing movements of the lower jaw (mastikaciography) and deciphered the meaning of each of the components of this record. Mastication records chewing movements during

chewing time of a nut weighing 0.8 g . Instead of walnut, you can take bread. carrots, but with the condition that all studies in the same patient should always be carried out in the future with the same product. The analysis of the mastikagram shows that it consists of successive different curves, conventionally called chewing waves. In the chewing wave, an ascending (AB) and a descending (BS) knee are distinguished. The first reflects the lowering of the lower jaw, the second - its rise. Bottom loops between individual waves are called closure waves. Each wave is characterized by a height, an angle between the ascending and descending knees, the nature of the peak.

The closure loop (occlusal site) is also characteristic. It can be an even line, or it can have an additional wave (OjOj), which indicates a lateral shift of the lower jaw. In each chewing period, five phases should be distinguished.

The first of these, the resting phase, corresponds to the position of the lower jaw at rest; on the kimogram, it is recorded as a straight line (I).

The second phase is the introduction of food into the mouth. On the kimogram, the first ascending knee (II) corresponds to it, which coincides with the opening of the mouth when food is introduced there.

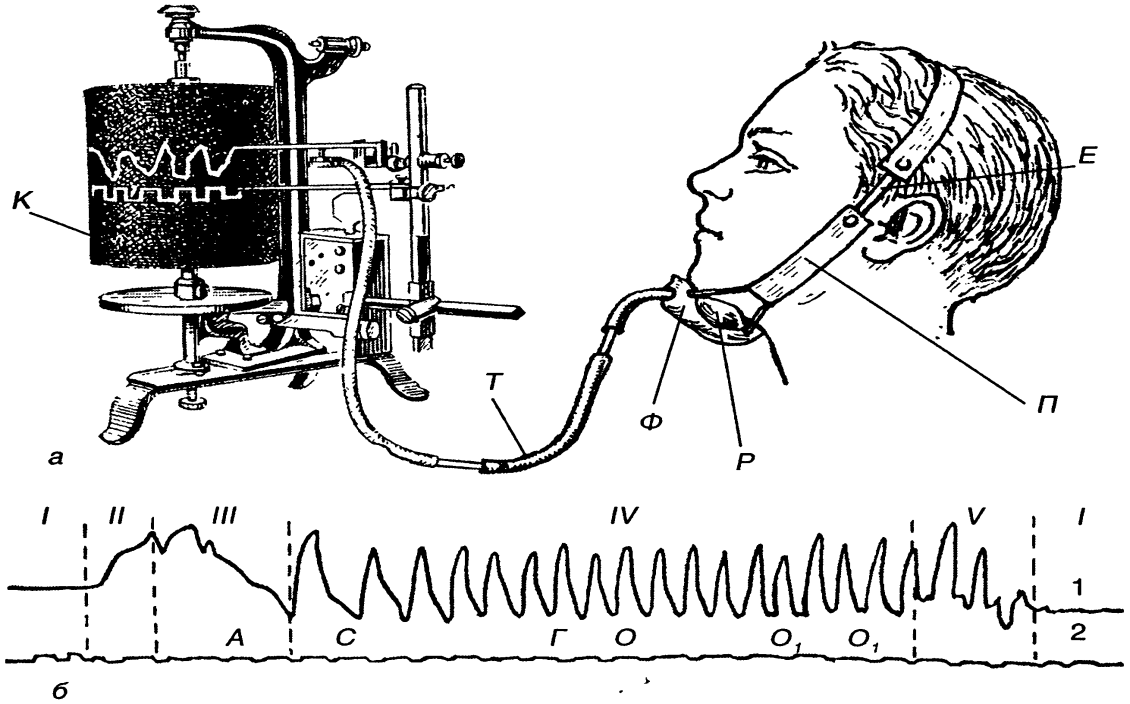

Рис. 2.15. Графическая регистрация движений нижней челюсти:
а — схема записи движений на кимографе (*К*): *Ф* — пластмассовый футляр, *Р* — резиновый баллон, *П* — пояс, *Е* — резиновая перемычка, *Т* — резиновая трубка, *М* — мареевская капсула;
б — мастикациограмма (И. С. Рубинов): *I* — фаза покоя, *II* — фаза введения пищи в рот, *III* — фаза начала жевательной функции (ориентировочная), *IV* — фаза основной жевательной функции, *V* — фаза формирования пищевого комка и его проглатывание, *АБС* — жевательная волна; *О* — петля смыкания во время раздавливания пищи; $О_1$ — петля во время размалывания пищи

The third phase is chewing. On the kimogram, it starts from the ascending knee (IV), corresponding to opening the mouth with the introduction of food. Depending on the consistency of the food record is modified. If necessary, adapt to the destruction of a piece of food and overcome its resistance on the curve characterizing the movements of the lower jaw, a series of additional undulating ups appears.

As soon as a suitable position is selected for chewing food and its resistance is overcome, a decrease in the curve is noted, and then the main chewing phase (fourth) follows. With preserved teeth and their correct closure, the rhythmicity of the waves and their equal magnitude are characteristic for it.

The fifth phase is the formation of a food lump and its ingestion. Along with recording the chewing movements of the lower jaw, the kimograph (oscilloscope) tape counts the time. This makes it possible to always determine the time of any phase of chewing.

Currently, preference is given to the method of non-contact registration of dynamic characteristics of the chewing apparatus based on an automated image processing system. At the same time, marks (markers) are set on the skin of the face, namely on the chin or projection of the head of the lower jaw, the movements of which are translated by recording and converting devices (camera or photocell) into the computer. Cutaneous infrared electronic sensors and sensory reflectors perceiving it on the front arc can be used.

In this case, colloquial and / or chewing tests are performed, which are a set of functional movements of the lower jaw. You can set the movements necessary for the doctor, their direction and amplitude, determine the level of the morphological and functional height of the face.

Electromyography is a method of studying the masticatory-speech apparatus by recording the biopotentials of the masticatory muscles. Fluctuations in the potential found in the muscle during any form of motor reaction are one of the most subtle indicators of the functional state of the muscle. The vibrations are recorded with a special device - an electromyograph. There are two

methods for diverting action currents: with cutaneous electrodes with a large lead area and needle electrodes with a small lead area, which are administered intramuscularly.

In this case, the biopolar cutaneous electrodes are coated with a special paste and glued with a plaster to the skin over the contracting muscle. The functional state of the masticatory muscles is examined during the period of functional rest of the lower jaw, when the teeth are closed in the anterior, lateral, posterior and central occlusions, during swallowing and during chewing. The analysis of the obtained electromyograms consists in measuring the amplitude of the biopotentials, the oscillation frequency per second, studying the shape of the curve, and the ratio of the active rhythm to the rest period. The magnitude of the amplitude of fluctuations of biopotentials allows us to judge the strength of muscle contraction. The electromyogram when chewing in people with normal dentition has a characteristic shape. A clear change in the active rhythm and rest is observed, and volleys of biopotentials have spindle-shaped outlines.There is coordination between the contraction of the muscles of the working and balancing sides, which is expressed in the fact that the amplitude of the biopotentials is high on the working side and about 2.5 times less on the balancing side (M. M. Soloviev, S. I. Vinogradov).

To facilitate the analysis of electromyograms, analyzer instruments or integrators are used that perform mathematical processing of various curves, decomposing them into components or summing them.

Electromyography finds application in the study of the function of the masticatory muscles with partial or complete loss of teeth, diseases of the temporomandibular joints and masticatory muscles, and dentoalveolar anomalies. This method also allows you to record changes in muscle function after orthopedic treatment.

Reografiya serves as a method for studying pulse fluctuations in the blood supply of blood vessels by graphically recording changes in the electrical resistance of tissues. Often in demand is reoperodontographic - rheography of periodontal tissues.

This method is used to diagnose periodontal pathology, as well as assess the effectiveness of treatment. Rheography of the alveolar part is used to monitor the postoperative condition during implantation to determine the timing of prosthetics. It is carried out using a special device - a rheograph equipped with

silver electrodes that are mounted on the vestibular and lingual or palatine slope of the alveolar part. Recording rheograms are produced on writing instruments.

Another technique used in functional diagnostics is echoosteometry, based on measuring the sound conductivity of bone tissue, which depends on its density. The transit time of the ultrasound pulse along the lower jaw bone is recorded.Due to the fact that the bones of the upper jaw are tightly spliced with the bones of the skull, studies on it are not carried out. To compare repeated individual measurement results, the ultrasound propagation velocity in bone tissue is calculated by the formula. This speed will be greater, the smaller the porosity and the denser the bone structure.

Microcirculation of the tissues of the masticatory apparatus and the state of the vascular bed are also studied using contact capillaroscopy or ultrasound dopplerography. The latter is based on a study of blood flow by registration

ultrasonic vibrations when passing it both through periodontal tissues and through hard tooth tissues. In the latter case, blood flow is examined. In addition, using this method, it is possible to measure both linear and volumetric blood flow velocity of the tooth pulp. Moreover, this is carried out non-invasively and painlessly.

Determining the degree of pathological tooth mobility is carried out using the "Periotest" - a tabletop instrument that has an electronic digital signage, a control panel and devices (nozzles) for location on the outer surface of the tooth. The results of constant pulses supplied to the tooth are recorded by an electronic device. Thus obtained depreciation (equivalent mobility) serves as the basis for assessing the degree of tooth mobility. In this case, a certain skill of recalculation of the obtained values is necessary (taking into account the size of the roots, the state of the periodontal gap and tooth alveoli). Periotest shows good results when determining the mobility

of implants, which allows depreciation to judge about osseointegration. It is believed that, compared with the manual method, the electronic method allows you to get more objective results.

Electroodontometry (EOM) is used to study the condition of the pulp and periodontium by determining the electrical excitability of the pulp nerves.

The active electrode of a special tester device exerts an electric current on the pulp. The current strength gradually increases until the appearance of the first unpleasant sensations or pain.

The excitation threshold of a healthy pulp is 2–6 μA, and that of an inflamed pulp is 20–40 μA. With coronary pulp necrosis, the threshold rises to 60 μA, with the decay of the root pulp it becomes even higher - 60–90 μA. With apical periodontitis, the threshold reaches 100-120 μA. The method is used for increased abrasion, wedge-shaped defects, after the preparation of teeth.

X-ray examination methods

X-ray of the organs of the masticatory-speech apparatus is one of the most common research methods.

This happened because the method is accessible, uncomplicated, and it can be used to obtain valuable information about the condition of the hard tissues of the crown and root, the size and characteristics of the tooth cavity, root canals, the width and nature of the periodontal gap, and the condition of the compact plate of the hole and spongy substance of the alveolar part.

On the roentgenogram, the shape, direction and location of the roots of the supporting and subject to moving teeth are clarified, the degree of resorption of the roots of milk teeth is specified, adentia, retined or supernumerary teeth are revealed, and caries of the contact surfaces of the lateral teeth is also determined.

When narrowing the upper jaw or its dental arch (if expansion is planned), as well as in the treatment of diastema, an x-ray of the sagittal palatine suture is performed to determine its structure (width and density).

Radiography of the lower jaw (axial projection) is shown in cases where it is necessary to obtain a clear image of spina mentalis (it determines the middle of the lower jaw) and establish its location in relation to the dentition with

cross bite. With pronounced asymmetries of the face associated with

unequal growth and development of its right and left halves, or as a result of the lower jaw shifting to the side, receive a direct (faceted) radiograph of the facial skeleton. In order to study the position of the jaws in the facial skeleton, as well as establish the shape

and the size of the body, the angle of the lower jaw and chin are made lateral (profile) radiographs of the 'skull.

Radiography of the temporomandibular joints is directed to those patients in whom arthropathy is suspected or noted or in which malocclusion is associated with lower jaw displacement in the sagittal or transverse direction (with

mesial, distal or cross bite). To study the shape, structure and relationship of the elements of the temporomandibular joint, panoramic and layered radiography (tomography, zonography) are used. There is a method of computed tomography, which allows to obtain an X-ray image of the cross sections of the skull in various planes. This, for example, helps in planning implantation, making it possible to obtain transverse "sections" of the alveolar parts and jaw bodies.

The basis of magnetic resonance imaging is the property of some atomic nuclei to absorb energy in the radio frequency range when placed in a magnetic field and re-emit this energy upon transition to the initial state. Method

nuclear magnetic resonance imaging allows to obtain tomograms with higher resolution than conventional or computed tomograms.

Temporomandibular joints can be investigated using the arthrography method - the introduction of a contrast medium into the joint space, followed by radiography. In addition to these methods in orthopedic dentistry are also used

panoramic pictures, orthopantomograms, tele-roentgenograms.

Laboratory examination methods

This group includes microbiological, cytological, immunological studies, the study of blood, urine, gastric juice and other biological fluids. In orthopedic dentistry are rarely used.

Skin tests (application, scarification and compression) with acrylic plastics, as indicated by L. D. Gozhaya A988), are not informative enough: in 98% of cases the results are negative, which is not consistent with the clinical picture.

An expositionally provocative test consisting in removing a removable prosthesis from the oral cavity (timed exposure) and introducing it there (provocation) does not have specificity - the test is positive for traumatic, toxic and allergic stomatitis (L. D. Gozhaya).

The differential test for allergic stomatitis caused by the base plastic of a removable prosthesis is a leukopenic test (determining the number of leukocytes after two hours of using prostheses).

To diagnose stomatitis that developed when using prostheses made of metal alloys, they carry out:

- spectral analysis of saliva, the method of atomic absorption spectrometry allows with high accuracy to determine the trace elements of saliva. At the same time, a change in the qualitative composition and an increase in microelements of iron (more than 1-10 ~ 5%), copper, manganese, chromium, nickel, lead, cadmium (more than 1-10 ~ 5%) in saliva indicate a pronounced electrochemical process;
- a clinical blood test (leukocytosis, an increase in ESR, a decrease in the content of red blood cells - are characteristic of toxic stomatitis; leukopenia, lymphocytosis,
decrease in the content of segmented white blood cells - allergic stomatitis);
- determination of enzymatic activity (a decrease in the activity of alkaline phosphatase and an increase in the activity of acid phosphatase and proteinases are characteristic of toxic stomatitis).

A provocative test of the response of the mucous membrane (epimucosis allergy test) to contact with the metal alloy is carried out using a special device that provides stable contact of the test material and the mucous membrane of the cheek for two hours [A. Tsimbalistov et al., 2000]. Carrying out this intraoral allergy test may be accompanied by the appearance of pronounced intolerance phenomena (burning of the mucous membrane, redness and itching of the skin).

In the area of contact of the investigated material with the mucous membrane with a positive reaction, hyperemia (localized or diffuse), edema, folding of the mucous membrane are observed. After that, microcirculation in the tissues of the oral mucosa is assessed using an MLK-1 microscope in combination with a color video camera and a personal computer with a viewing depth of up to 300 microns. With a positive reaction to the test material, structural (turbidity of the capillaroscopic background due to an increase in the permeability of the vessel walls, an increase in the diameter of the capillaries with signs of venous hyperemia) and rheological changes (granularity of the blood flow, aggregation of red blood cells) in the microcirculation system are revealed.

PSYCHOMEDICAL PREPARATION OF PATIENTS

Manifestations of anxiety in patients

Changes in the emotional state of outpatient dental patients are not always manifested in their behavior.

The discrepancy between the existing emotional stress and the ongoing change in homeostasis is explained by volitional masking of anxiety.

♦ Emotional stress - a non-specific neurohumoral reaction, a condition that arose in the process of activity or communication, in which the emotional component prevails. It is usually for situations where there is great danger or responsibility. It occurs in extreme conditions, but can

be expressed under ordinary conditions in people with a high degree of anxiety or little experience.

♦ Emotions - subjective reactions of a person to the effects of internal and external stimuli. However, patient complaints, behavioral, external negative signs of tension can be analyzed, shedding light on the true condition of the patient.The overall picture is complemented by registration of the main vegetative functions of the body

patients - respiratory and heart rate, blood pressure, etc. The state of emotional stress is especially characteristic for patients with adaptive and neurotic reactions, conditions such as suspiciousness, hypochondria,

eyesiness, hypersensitivity even to slight pain or inconvenience.

♦ Hypochondria - painful suspiciousness, focus on subjective painful or other unpleasant sensations, conviction of a serious illness.

To determine the state of preoperative tension, the concepts of anxiety (anxiety) and fear are most often used.

♦ Anxiety is a state of anxiety, fearfulness before and during a reception, the expectation of a vague, vague threat, an imaginary danger.

♦ Fear differs from anxiety in experiencing an immediate, real, concrete threat.

The main and most frequent cause of emotional stress in patients at the dental appointment is the expectation of pain.

The severity of the anxiety symptom depends on age, gender, personality characteristics, the structure of mental disorders. Preclinical manifestations can be divided into three degrees of severity of anxiety, namely: low, moderate, high.

In patients with a low degree of anxiety, external manifestations are not detected. However, during the survey, you can hear sayings: "I'm somehow not at ease, I'm a little worried." At the reception, these patients behave calmly, easily come into contact, their reactions are adequate and do not interfere with the manipulations of the doctor.

Low anxiety does not interfere with the patient's expedient activity, which is performed quite confidently with the external calmness of movements, posture, speech intonations. Moreover, the patient is internally prepared for admission, assembled. At the same time, a critical attitude is expressed to your fear. Assessment of low anxiety helps special psychological tests, which are described below.

In patients with moderate anxiety, the clinical picture is more diverse. The complaints are characterized by "internal anxiety" or "tension", "constraint". Thoughts about danger, about the need to be alert, come to mind. The suppression of fear requires considerable effort, the mood begins to fluctuate. Some of these patients at the doctor's appointment may seem calm, balanced. But they are given out by sweat beads on the upper lip, moisture in the palms of the hands, sometimes dilated or narrowed pupils, rapid pulse, hyper- or hyposalivation. Others show long-term anxiety, randomness of movements, variability of facial expressions, a moving, worried look. In addition, breathing quickens, electric changes

skin resistance. The timbre and speed of speech can change: hoarseness, coughing, stuttering, "swallowing" of the endings of words, trembling of the voice appear. Pauses between words and phrases increase. Speech becomes harsh, confused, with slips, hesitations or accelerated, with excessive detail, excessive emotional coloring. There is compression or biting of the lips, lowering of the corners of the mouth,

twitching of eyelids, frequent blinking. The patient frowns or vice versa - his eyes are wide open, his eyebrows are raised or frown. Some patients wrinkle their foreheads and tightly compress their jaws. The color of the skin of the face varies from pallor to diffuse hyperemia. The skin of the neck and upper chest is covered with red spots that can fuse. Sometimes "goosebumps" appear (pilomotor reaction), frequent movements of the larynx cartilage are noticeable (swallowing saliva due to "dry throat").

Very indicative of the hand movements of patients in a state of emotional stress. They become tense, constrained or harsh and erratic. The shoulders are raised, the elbows are retracted from the torso, tremor is noted, to hide which
patients hold one hand with the other, clasp them on their chests or hold them tightly by the armrests of a chair.

♦ Tremor - trembling of the fingers, eyelids, sometimes the head, arising, in particular, with emotional stress.

Sometimes the arms are clasped on the chest to push the doctor away at the slightest pain. Inadequate activity, fussiness, frequent change of posture, depression appear. The patient becomes silent with a sudden noise. In general, he can control his actions, make the right decisions.

With high anxiety, patients experiencing a strong fear of dental procedures complain of "languishing chest fading, intense fear, horror." They panic, turn pale, become covered with cold sweat, their eyes are bewildered, their expression is pained. In the chair, these patients sit tight, clutching the armrests in anticipation of pain. There may be motor manifestations: trembling, small aimless movements (tugging on the edge of clothes, sorting out a handkerchief, drumming with fingers, biting nails). In some cases, this is combined with a general slowdown, alertness. Expedient activity is disturbed, the flow of thoughts is accelerated. Confusion, fussiness, lack of assemble, fluctuations in the choice of solutions are expressed. There may be intermittent breathing, its disturbances, sharp tremor, sometimes nausea. Even after effective local anesthesia, some of these patients remain aroused, and they can suddenly make a sudden movement, as with pain, although it actually was not. These sudden movements cause serious injury to the tongue, cheeks or lips with a separation disc or bur. This includes persons with pronounced adaptive or neurotic reactions, subcompensated forms of adaptation. Most often, these are subjects with manifestations of mental maladaptation that forms during neurotic development or in psychopathic personalities. Patients of this group are not so common, but they are no exception. The number of them recently, unfortunately, is increasing. Signs of emotional stress in patients at the appointment with the enemy dentist. In the structure of adaptive
reactions in a patient in a state of psycho-emotional stress, emotional manifestations can be distinguished: a sense of fear, anxiety, anxiety in anticipation of pain, an unfavorable outcome of treatment, a decrease or fluctuation in mood,
confusion, depression or apathy, inability to mentally assemble. Due to the close relationship of the emotional and sensory components of the pain syndrome, a psychogenic increase in pain occurs.

Vegetative manifestations include changes in heart rate (tachycardia, bradycardia, extrasystole), accelerated respiration rate, change in skin electrical conductivity, hyperemia or pallor of the skin of the face and neck, hyperhidrosis (increased sweating) of the face and palms, dilated pupils, hyper- or hypofunction of some glands of external secretion (salivary, sweat).

Motor-behavioral manifestations are changes in the facial expressions, timbre and intonation of speech, speed, strength and coordination of movements, changes in behavior:

- lip tightening, lack of a smile, a pained expression on the face, tension in the masticatory muscles, a change in the expression of the eyes (sad, dull or worried look), frequent blinking;
- motor restlessness, randomness of movements, frequent change of poses or, on the contrary, lethargy of movements, passivity of posture, duration of its preservation, fingering of a handkerchief, jacket jacket floors. Violations of the activity process are manifested in two ways: with blocking activity, or with a tendency to active activity.

When establishing the level of emotional stress in a number of dental patients, there was an inconsistency between the severity of anxiety and anxiety and their external behavioral manifestations. In this regard, three
main options for patient behavior:

1) a latent reaction in which patients themselves do not complain about fear, their behavior is outwardly calm, sometimes even bravado attempts are observed. As a result of volitional effort,

they mask the emotional manifestations with restraint. The presence of anxiety and tension is detected in these patients only in the process of targeted examination. One can hardly expect such a reaction in children, since they do not hide their emotions. This type of response can be observed in shy, restrained, with unconscious anxiety, in people who are tolerant to the subjective experience of fear, "trained", as well as incapable of analyzing their mental state;
2) a mixed reaction, which is characterized by the absence of complaints with the presence of external manifestations of vegetative and behavioral signs of mental stress;
3) an obvious reaction when the patients themselves complain of fear, low mood, anxiety, and these complaints are accompanied by specific motor-behavioral and vegetative changes.
With mixed and obvious reactions, it is possible to correctly construct therapeutic tactics based on external signs of emotional disorders. The presence of latent reactions may give rise to the wrong approach of dentists to assess
mental state of patients and requires a more complete examination. Moreover, many patients exhibit just such a reaction.
Justification of the need for psychological correction and psychomedical preparation of patients
Emotional stress acts mobilizingly on the functional reserves of the human body, increasing defenses, working capacity, and is a physiologically sound non-specific response to any stimulus (exam, sports competition, medical procedures, etc.).
However, protective adaptive reactions cannot be elevated to the rank of comprehensive and unique ones. Life is more complicated than this scheme. And often the reaction, which began as a defense, goes into its opposite and itself becomes the cause of the death of the body. In itself, emotional stress is not a necessary forerunner of an approaching mental breakdown, since effectively working compensatory mechanisms, as a rule, lead to a normalization of the state.
Nevertheless, in the presence of powerful stimuli, their repeated, over a short period of time, exposure and reduced qualities of the subject, mental adaptation disorders can be observed. This, depending on the place of least resistance in a constitutionally defined type of response, leads to various disorders: the appearance of neurotic reactions, neurosis, neurotic development, diseases of the psychosomatic circle, the appearance of psychopathic traits, and the presence of interpersonal conflicts.
♦ Psychosomatic diseases - disorders of the functions of organs and systems due to exposure to traumatic factors.
Of course, it is difficult to assume that for a mentally healthy person with good adaptive abilities, the emotional stress experienced at the dental appointment will lead to a breakdown of adaptation. However, being a rather strong negative emotional stimulus, it can be a link in the pathogenetic chain of violation of the threshold of mental adaptation when the patient is ready for the specified violation. In addition, in patients with advanced psychosomatic diseases (coronary heart disease, hypertension
disease, atherosclerosis, cerebrovascular accident, diabetes) resistance to stress is reduced, and each new test can at least worsen the outcome of orthopedic treatment, and at the very least become the last one in this subject.
In addition, the occurrence of psychomotor agitation in a number of patients interferes with medical procedures. It can contribute to the occurrence of injuries of the tongue, cheek, lips with a cutting tool. The experience of orthopedic clinics confirms that
neglect of the psychological preparation of patients before prosthetics gives rise to a group of so-called difficult patients, passing from one doctor to another for years , changing them without any success in treatment (EI Gavrilov, V.N. Trezuboe). Despite applying the most modern methods
prosthetics, the best materials and the latest technologies, it is not possible to successfully complete the prosthetics, and they do not use prostheses, but only collect them. This group of patients is a source of verbal and written complaints that take away
the doctor and officials of the relevant services have a lot of time to analyze them.

All this indicates the need for psycho-medical preparation of patients with a dentist. According to literature data, soothing medicines need from 50 to 79% of patients with a dentist. Psychological training is necessary 70-100% of them.

Place of differentiated psychological preparation of patients at the dentist's appointment

♦ Psychotherapeutic measures include all the words and actions of the doctor that have a positive effect on the patient.

The use of psychotherapy by a doctor is in full accordance with the classical principle of "treating not a disease, but a patient." A holistic approach to the treatment of a sick person is aimed at correcting not only morphological and functional disorders associated with somatic pathology, but also includes the correction of mental manifestations combined with it. It should be emphasized that the level of culture of a doctor's reception is primarily determined by the extent to which psychotherapy is represented on it. The need for psychological training is dictated by increased demands on the quality of medical care and such an important factor as an increase in the prevalence of borderline mental disorders among the population.

The success of dental procedures largely depends on the patient's mood on them, the desire to cooperate with the doctor during the treatment period. In order to avoid mutual disappointment in the success of treatment, it is necessary to create an atmosphere of trust and partnership, a system of positive doctor-patient relationships. Unfortunately, in dentistry, the treatment of patients is sometimes carried out routinely, without sufficient contact between the doctor and the patient. The reasons for this are the lack of necessary training for dentists,

and sometimes - unwillingness to develop psychotherapeutic activity on their own. It should also list the time limits for outpatient admission, imperfect conditions in a number of rooms for psychotherapeutic effects on patients.

Specific prerequisites for conducting psychotherapy at the reception include, first of all, the pain that accompanies some dental manipulations (preparation of hard tissues of teeth, injections, removal of dental deposits, imprints), which cause fear and anxiety in patients. Aesthetic defects, speech disorders, and the inability to fully enjoy food are no less significant for patients. This can add the complexity of psychological restructuring during getting used to prostheses (devices), as well as the fact that patients often come to the orthopedist after several weeks of treatment by a therapist and a dental surgeon. Configured by sanitary propaganda on a "one-session" method of treatment, patients are dejected by the large number of repeat visits characteristic of the complex treatment of oral diseases.

Thus, the goals of the dentist's psychotherapeutic work are to stop anxiety and emotional stress, correct patients' incorrect attitude to dental treatment, and prevent neurotic reactions and iatrogenic conditions.

♦ Iatrogenia - adverse changes in the psyche of the patient, developed as a result of a doctor's mistake; the damaging, injuring meaning of the word doctor.

Moreover, these tasks are not assigned to a qualified professional psychotherapist, but to a dentist, who in these conditions, as a treating doctor and qualified specialist, can be the best psychotherapist for a patient, even using the methods of "small" or deontological psychotherapy available to him.

Psychotherapeutic work should be an accompaniment to the basic medical procedures of the dentist and not take a lot of time from the appointment. Although is it worth saving a few minutes at the reception in order to prevent even more significant losses of time, materials and strength in case of an adverse outcome of treatment?

As for the forms of psychotherapy, the most famous of them is a protective sparing regime in the clinic. This is not only the comfort of a medical institution, but also the maximum freedom of the patient, and the creation of a favorable climate for relations with medical and support staff.

In order to establish partnership confidential contact between the doctor and the patient, which is necessary for the success of treatment, their first conversation is important. But quite often it contains only one phrase of the doctor: "Open your mouth!". What character should the first

conversation take? At the beginning, in the first 5-10 minutes of admission, the patient is asked traditional questions to adapt to the situation. In doing so, avoid
investigative inquisitorial tone. In conversation, a doctor's facial expression can be used:
approving nod, shrug, smile, raising eyebrows, frowning. This tactic is called "silent therapy."
It should be emphasized that it is advisable to exclude from the medical vocabulary such terms as pain, needle, dead tooth, syringe. For example, instead of the question: "Does it hurt you?", You should use: "I do not bother you with anxiety?". During anesthesia, you need to quietly and casually say to your sister: "Infiltration" or "guide", without pointing her to the length or diameter of the needle. In this case, the syringe, forceps, separation discs, burs, needles should not, if possible, fall into the patient's field of vision.
Psychotherapeutic activity, like any other type of medical care, should be carried out differentially. So, for calm patients, an explanation of the basic procedures with an emphasis on their painlessness, creation
positive contact with the patient. If you allow the patient to speak, then for an anxious, stressed patient, this will be a kind of reassurance, will be a response to his emotions. At the same time, the doctor rarely enters into a conversation, his statements are friendly, gentle, unobtrusive, questions are rare. Them
it is better to ask in conclusion or at subsequent receptions, so as not to interrupt the conversation and not act restrainingly on the patient. If the patient "leaves" in the description of the symptoms of the disease, you need to tactfully switch his attention to another subject of conversation. Providing the patient to fully express themselves on the first visit, it is impossible to allow repetitions of the same complaints in the future. Gently, but adamantly, the patient is distracted from the verbose description of his sensations by counter-essential questions for the doctor. They do not ask suggestive questions that help to fixate on certain symptoms, they do not ask: "How do you feel?", In order to avoid provoking verbose outpourings. If necessary, you can even interrupt the patient: "We will no longer speak on this subject."
For a suspicious, doubting patient in need of care, frequent concise, supportive conversations are needed, conducted in a determined and confident tone. Doubtful, mistrustful patients should be advised to get in touch
with those who have successfully completed prosthetics. In order not to cause the negative consequences of such communication, this process should be managed by a doctor. It is necessary to specially select and prepare patients for such contacts.
With a frivolous, even euphoric attitude to the disease and its treatment, a directive approach to the patient is appropriate. An appeal to him can be sustained in an imperative tone. Here you need to focus on the likely complications of tooth loss, sometimes deliberately exaggerating them. However, a manifestation is necessary
a delicate sense of proportion, delicacy and caution in order to avoid the development of iatrogenic.
Especially diplomatic should be the behavior of the dentist when his patient is a hypersensitive or hypochondria-minded subject. These patients worry that they will not be able to get used to prostheses and use them. Here, the goal of the doctor is to encourage, instill confidence, but in no case - not aggravate the anxious-suspicious mood of the patient. However, unwarranted representations and impracticable advances should not be given.
A special approach is required for representatives of the exact sciences (engineering and technical workers, mathematicians, economists), who are related by type of activity with the analysis of various graphs, curves, tables, diagrams.They are waiting for convincing answers from the doctor. Particular importance is attached to laboratory indicators, various graphic recordings, radiographs.

CLASSIFICATION OF MATERIALS, APPLICABLE IN ORTHOPEDIC

DENTISTRY

Dental materials science is an applied section of science aimed at creating new and improving numerous known materials, studying their technological and clinical properties related to dental practice.

♦ Material science —- the science of the structure and properties of materials.

Dental materials are conventionally divided into main, auxiliary and clinical.

The main materials are those from which dentures, devices, fillings are made. In the literature you can find the term "structural" materials, which is synonymous with the definition of "basic". We prefer the latter as more understandable and simple.

The main materials include:

- metals and their alloys;
- ceramics (dental porcelain and ceramic);
- polymers (basic, facing, elastic, quick-hardening plastics);
- composite materials;
- filling materials.

Auxiliary materials used at various stages of prosthetic technology are called auxiliary materials:

- impression;
- modeling;
- molding;
- abrasive;
- polishing;
- insulating;
- fusible alloys;
- solders;
- fluxes;
- bleached.

Clinical refers to materials used by doctors at a clinical dental appointment. They are:

- impression materials;
- filling materials;
- waxes and wax compositions.

Such a classification is conditional, if only because the group of clinical materials is artificially created. It includes both auxiliary (impression masses) and basic (filling) materials. In addition, materials such as polymers, modeling waxes, metals, ceramics, in fact, are clinical, as an orthopedic dentist works with them in the clinic and they are designed for a long-term stay in the oral cavity. However, this group was born because of the extreme importance and the prevalence of these substances in dental clinical practice.

In fact, in orthopedic dentistry, we should talk about basic, auxiliary and impression materials.

Dental materials are highly demanding.

They are very diverse:

- toxicological - the absence of irritating, blastomogenic (i.e., contributing to the formation of a tumor), toxic-allergic effects;
- hygienic - the absence of conditions that worsen oral hygiene, in particular - retention points for food and plaque formation;
- physical and mechanical - high strength properties, wear resistance, linear volumetric constancy;
- chemical - the constancy of the chemical composition, anti-corrosion properties;
- aesthetic - the possibility of complete imitation of tissues of the oral cavity and face, the effect of naturalness;
- technological - simplicity and ease of processing, preparation, shaping and volume.

In this regard, the materials emit physical, mechanical, chemical and technological properties.

The most common concepts and definitions of material properties are as follows:

♦ Strength is the ability of a material to resist the action of external forces causing deformation without destruction.
♦ Resilience, or elasticity, is the ability of a material to restore its shape after the cessation of the action of external forces that cause a change in its shape (deformation).
♦ Plasticity is the property of a material to deform without destruction under the influence of external forces and to maintain a new shape after their termination (that is, plasticity is a property opposite to elasticity).
♦ Deformation - a change in the size and shape of the body under the action of the forces applied to it.
Deformation can be elastic and plastic (residual). The first disappears after unloading. It does not cause changes in the structure, volume and properties of the material. The second is not eliminated after removing the load and causes changes in the structure, volume, and sometimes the properties of the material.
♦ Hardness characterizes the body's ability to withstand plastic deformation when another solid enters it.
♦ Viscosity (internal friction) is the ability of gases and liquids to resist the action of external forces that cause their flow. Impact strength - this is the work spent on the shock fracture of the sample (in the reference literature refers to KS).
♦ Flowability is the ability of a material to fill a form.

Theme №1

Goals and objectives of Prosthodontics. The history of the development of Prosthodontics.

Modern medicine is a system of scientific disciplines that has developed as a result of a long process of development and dismemberment. Each of them has its own specific area of research and the scope of practical application, its own tasks and methods, while maintaining a connection with other medical sciences. As knowledge is enriched, the branches of medicine differentiate. So, from surgery, orthopedics stood out as an independent discipline.
The founder of scientific orthopedics is considered to be the French surgeon Nicolas Andry A658-1742), who published in 1741 the two-volume work Orthopedics, or the Art of Preventing and Correcting Body Deformations in Children. The term "orthopedics" is composed of two Greek words: orthos - direct and paideie - education. Introducing this term, Andri had in mind "the correct physical education of children" and defined orthopedics as "the art of preventing and treating deformities in children."
Currently, orthopedists are engaged in the treatment of diseases of the musculoskeletal system in children and adults, using functional, instrumental, surgical methods and prosthetics. Orthopedic dentistry is a section of general dentistry and an independent part of general orthopedics. It can be defined as the science of recognition, prevention and treatment of abnormalities, acquired defects, injuries and deformations of the organs of the masticatory apparatus. For these purposes, she has functional (myotherapy, mechanotherapy), prosthetic, hardware and equipment-surgical treatment methods.
The main place in orthopedic therapy is prosthetics. Its task is not only to replace defects in the dentition or alveolar process, but also to prevent further destruction of the organ or relapse of the disease.

♦ Denture - a device that replaces the loss or congenital absence of tissues, organs.
♦ Dental and jaw prostheses (endoprostheses) - artificial parts of the tooth crown, artificial teeth, artificial gums, alveolar parts, a fragment of the jaw.
♦ Facial prostheses (ectoprostheses) - artificial parts of the face — nose, eye socket (with eyeball), auricle, lip, chin, cheek.
♦ Prosthetics - the healing process, science, art and craft of designing and applying an artificial substitute for lost or missing tissues or organs. The prosthesis, therefore, is considered as a remedy, the reasonable use of which allows us to solve therapeutic and preventive tasks.
Currently, orthopedic dentistry is a rigorous scientific discipline consisting of a general and a private course. The general course is propaedeutic, i.e., introductory. The private course includes three main sections:
dental prosthetics, maxillofacial orthopedics and traumatology, orthodontics.
The propaedeutic course of orthopedic dentistry sets out a brief anatomical and physiological outline of the masticatory and speech apparatus, general and special methods for examining the patient (diagnosis), evaluation of the signs of the disease obtained (symptomatology or semiotics), clinical materials science, and laboratory equipment (prosthetic technology and various orthopedic devices). Dental prosthetics is involved in the diagnosis, prevention and replacement of defects in teeth and dentitions that have arisen as a result of any pathology. Maxillofacial orthopedics and traumatology studies the diagnosis, prophylaxis, prosthetics, correction of deformations of the jaw and face resulting from trauma, diseases and various operations.
Orthodontics is the section of orthopedic dentistry that deals with the study, prevention and treatment of persistent abnormalities of teeth, dentitions and other organs of the masticatory and speech apparatus.
The history of dental prosthetics begins more than 4,500 years ago. Excavations of ancient burials convince of this. So, near the mummy of the Egyptian pharaoh Chephres, a wooden denture was discovered. More advanced tire prostheses made of gold and natural teeth (Fig. 1.1) were found in the tombs of Etruscans (IX-VIbb. BC).
In the slave period and in the Middle Ages, artisans (bath attendants, masseurs, barbers, jewelers) who did not have medical training were engaged in dental prosthetics.
The famous Renaissance surgeon Ambroise Paret A510-1590) began his career as a barber. He created blocks of artificial teeth from bovine and ivory, attached to the remaining teeth with a gold wire. He first closed the defect of the hard palate with an obturator, for which he used a cufflink.
In 1710, Nikolai Bidloo published a book on general prosthetics, which the author called the restoration and replenishment of something missing in the human body. In particular, he identified four types of prosthetics:
1) compensation for any part if it is missing, for example, the creation of an artificial leg when someone does not have a natural leg;
2) restoration of function in order to preserve the activity of any part of the body. For example, with perforation of the palate, speech is restored;
3) preservation of beauty and body color. The artificial eye does not restore vision, but restores beauty. Another example is artificial teeth inserted into the oral cavity;
4) when the unnatural structure of any part disfigures the appearance (shortening of the leg, the beginning of the hump).
From this period and later dentistry becomes the lot of doctors. The founder of scientific dentistry is considered the French surgeon Pierre Fauchard. In 1728, his guide, “Dental Surgery, or Treatise on Teeth,” was published, which, in particular, describes
obturators, the method of orthodontic correction of the close position of the front teeth, fixing springs for complete removable dentures and pin artificial crowns. Heister in 1781 proposed removable dentures with cast metal bases lined with pink enamel.

In 1720 Purman, and after 36 years Pfaff began to take impressions from the jaws with wax or sealing wax. Pfaff used spoons for this. Removable prostheses were prepared from a solid piece of ivory, fitting to the obtained model (Fig. 1.2).

In his work “Articulation and Articulators” W. Bonville, A865) first applied the term “articulation”, referring to this as the ratio of dentition at various positions of the lower jaw. The idea of a functional impression belongs to Schrott A864), the implantation of foreign bodies into the hole of a extracted tooth is to N. N. Znamensky A891).

Throughout the 19th century, dental prosthetics in Russia did not constitute an independent section of medicine, but was a part of dentistry with its narrow practicality. The latter was characterized by the development of mainly manual techniques for creating prostheses, while ignoring the study of complex internal processes during the interaction of the prosthesis with organs and tissues of the oral cavity.

However, in these conditions a number of original works appeared.

These include the “Guide to Dental Technique” by I. I. Khrushchev A884), “Dental Technique” by Perelman A910). Valuable works by V. O. Popov “Changing the shape of bones under the influence of abnormal mechanical conditions in
environment ”A880), where the experiment on animals shows the possibility of deformation of the jaw after tooth extraction; A. I. Dementieva “Dental arch and its modification in humans” A886); A. Anichkina “Jaw joint of man and animals” A896).
In the thirties of this century, dental institutes appeared in Russia, graduating from dentists, specialists with higher education.
In 1940 g . the first textbook on orthopedic dentistry was published (N. A. Astakhov, E. M. Gofung and A. Ya. Katz). The publication of this textbook ended the design of Soviet orthopedic dentistry as a science, and it rightfully took its place among other medical disciplines. Leningrad professor A. Ya. Katz owns the idea
call our specialty “orthopedic dentistry”. In the 20th century, at least four schools of orthopedic dentistry took shape in Russia: Moscow, Leningrad-St. Petersburg, Kazan, Kalinin-Tver. It is possible that soon others will be added to their number, for example, Smolenskaya, Volgograd and Perm schools. Medical school is a related area of science
the unity of basic views, the commonality and continuity of principles and methods,
although domestic orthopedists profess a unified strategy and tactics of the specialty.
The founder of the metropolitan orthopedic school should be considered Professor B. N. Bynin, one of the theorists of our specialty. He and with his participation conducted extensive scientific research from the physiology of the masticatory-speech apparatus to the introduction of new materials. In particular, together with prof. I.I. Revzin and other researchers, he introduced acrylic polymers in clinical practice. His students were famous professors A.I. Doinikov, V.A. Ponomarev. Prof. A. I. Doinikov prepared the heads of the departments of orthopedic dentistry in Moscow (Prof. B. P.
Markov) and other cities of Russia and the former USSR: Omsk (prof. I. A. Kuznetsov), Voronezh (prof. E. S. Kalivrajiyan), Krasnoyarsk (prof. V.V. Parilov), Samara (prof. V. M Zotov), Yekaterinburg (prof. S.E. Zholudev).
Professor V. Yu. Kurlyandsky, who studied in detail the pathogenesis and orthopedic treatment of periodontal functional overload in various diseases, left a noticeable mark in orthopedic dentistry. He introduced the silver-palladium alloy in the practice of dentistry. A great contribution was made by prof. V. Yu. Kurlandsky in maxillofacial orthopedics and traumatology. Among his students and followers should be named Corr. RAMS prof. V. N. Kopeikin, professors A. T. Busygin, G. V. Sosnin, L. G. Velichko, V. Yu. Milikevich, G. V. Bolshakov, etc.
The famous professor X. A. Kalamkarov made a great contribution to the development of the Moscow school. At present, a whole group of orthopedic professors has appeared in the capital: A. I. Matveeva, G. V. Bolshakov, I. Yu. Lebedenko, B. P. Markov, V. A. Khvatov, V. N. Olesov, A. N. Ryakhovsky, S.I. Abakarov, S.D. Arutyunov, who are many
make for the further progress of the Moscow school. At the origins of the Leningrad-St. Petersburg orthopedic dental school was Professor A. Ya. Katts. He owes merit in appropriating the legal name of our specialty. He was the co-author of the first textbook on orthopedic dentistry. Prof. A. Ya. Katz is considered the initiator of the functional direction in orthopedic dentistry and, in particular, in orthodontics. This direction was continued by his students and followers.
professors I. S. Rubinov, L. M. Perzashkevich, B. K. Kostur.
For many years, professors Y. M. Zbarzh and I. S. Rubezhov worked fruitfully in the city. A great contribution to dental materials science was made by St. Petersburg professor M. 3. Steingart. In the last decade, professors V. N. Trezubov and A. V. Tsimbalistov have been at the helm of the St. Petersburg school of orthopedic dentists.
For many years, the famous scientist Honored Scientist of Tatarstan Professor I. M. Oksman worked in Kazan. He not only developed the specialty section - maxillofacial orthopedics and

traumatology, but also laid the foundation for the Kazan school of orthopedic dentists. His students - professors E. I. Gavrilov, L. M. Demner, G. G. Nasibullin and M. 3. Mirgazizov with his scientific works and educational and methodical work made this school visible and famous in the country.

In 1954 g . from Leningrad to Kalinin the dental institute was transferred. The creative moment in this translation was that the opening of the Faculty of Dentistry in Kalinin laid the foundation for the Kalinin-Tver school of orthopedists.More

Professor EI Gavrilov, the founder of the local school of orthopedic dentists, worked in Tver for thirty years in Tver. His students and followers are Honored Scientist of the Russian Federation Professor A. S. Shcherbakov,

professors V. N. Trezubov, N. G. Abolmasov, E. N. Zhulev, G. L. Savvidi and others. The main direction of the school is the relationship between the prosthesis and the tissues of the prosthetic bed.

The basis of the provision of highly qualified orthopedic dental care for patients is based on certain principles that were first formulated by E. I. Gavrilov and called fundamental. All of them are consistent with the principles of general medicine:

- preventive principle;
- deontological principle;
- the principle of unity of body systems',
- The principle of the need for higher medical education at an orthopedic dentist;
- The principle of providing the most effective assistance in large institute clinics, medical treatment and prophylactic institutions of public health, commercial centers that can solve complex problems, are well equipped, equipped with powerful laboratories;
- the nosological principle, preaching that prosthetics is a therapeutic and prophylactic process, based on the foundation of knowledge about the structure and function of organs both in normal and in diseases, states the need to study the etiology, pathogenesis, prevalence, clinical picture of the disease, adequate orthopedic treatment, its immediate and long-term results in determining the form of damage to the masticatory-speech apparatus;
- the principle of consideration of any orthopedic apparatus, including the prosthesis, as a therapeutic agent, which, in addition to the therapeutic one, has an undesirable side effect;
- the principle of staging - the choice of the prosthesis, the apparatus depends not only on the nature of the disease, but also on the stage of the pathological process;
- the principle of completeness of orthopedic treatment - an indicator of completion of therapy is the final adaptation of the patient's body to the device (prosthesis);
- the principle of the complexity of therapy - along with orthopedic treatment, psychotherapy, medication, physical therapy (including exercise therapy), conservative therapy, surgical aids involving doctors of other specialties (hematologists,

surgeons, endocrinologists, rheumatologists, psychoneurologists, cardiologists, etc., as well as speech therapists).

Tests on this topic.

1. What is the area of the orthopedic cabinet?

$
14 m2 $ *
10 m2 $
8 m2 $
16 m2 #

2. What is the difference between an orthopedic cabinet and a therapeutic room?

$
Presence of a gypsum table $ *
Lack of a spittoon $

Difference drill $
Medical table #

3. What area is allocated for each additional chair?

$

7 m2 $ *
10 m2 $
4 m2 $
9 m2 #

4. What rooms does the dental laboratory consist of?

$

Primary and auxiliary $ *
Solder $
Harvesting and basic $
Harvesting and gypsum #

5. What is the height of the desktop of the dental technician?

$

85 cm $ *
100 cm $
95 cm $
110 cm #

6. The area of one workplace in the dental laboratory:

$

4 m2 $ *
8 m2 $
7 m2 $
10 m2 #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent	- expressing one's own opinion

	"5"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

2 topic: Anatomy and physiology of the maxillofacial region.
teeth and dentitions
- upper and lower jaws
- alveolar processes
- Anatomical features of the structure of the oral mucosa
- signs of the crown and root of the teeth of the upper and lower jaw.
- restoration of the anatomical shape of the teeth on the phantom using wax.
- restoration of the equator of the tooth on gypsum models. Anatomical and clinical neck.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**

Training	1. Preparing the audience. 2. Analysis of student preparation for class 3. Attendance check	Listen
Lectureintroduction (10 minutes)	1. Preparation of the educational complex on this topic. 2. Preparing slides for the lesson. 3. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry" 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	1. Divide the group and ask questions. 2. Use visual aid 3. Use slides, multimedia 4. Summing up the topic 5. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Anatomy and physiology of the dentition
2. Tooth structure
3. Types of dentitions
4. Anatomical features of the structure of the oral mucosa, which are of practical importance in prosthetics
5. The difference between the anatomical neck of the tooth and the clinical
6. Restoration of the anatomical shape of the tooth on phantoms
7. Restoration of the equator of a tooth on gypsum models

Methodology of the practical lesson:

FUNCTIONAL ANATOMY
CHEESE-SPEECH APPARATUS
BASIC LINKS
CHEESE-SPEECH APPARATUS
BODY, DENTAL SYSTEM, DEVICE

♦ Organ (from gr. Organon - a tool, instrument, organ) - a phylogenetically developed complex of various tissues, united by development, general structure and function.
The structure of the organ may contain various tissues, often of all four groups, of which one or more prevail and determine its specific structure and function. An organ is a holistic entity that has a specific, inherent only to it form, structure, function, development and position in the body. To perform a number of functions, only one organ is not enough. Therefore, there are complexes of organs - systems.
♦ System (from gr. Systema - a whole made up of parts; connection) - a set of organs similar in their general structure, function, origin and development.
The dentitions form a single functional system - the dentition, the unity and stability of which is ensured by the alveolar process of the upper and alveolar parts of the lower jaw, periodontal.
Human teeth are part of the masticatory system.
♦ Apparatus (from lat. Apparatus) - an association of systems and individual organs functioning in a similar direction or having a common origin and location.
♦ Chewing and speech apparatus — a complex of interconnected and interacting systems and individual organs involved in chewing, breathing, sound formation and speech.
The masticatory system includes:
1) the facial skeleton and temporomandibular joints;
2) chewing muscles;
3) organs for capturing, promoting food, forming a food lump, for swallowing, as well as the speech system: lips, cheeks with their facial muscles, palate, tongue;
4) organs of biting off, crushing and grinding food (teeth), and its enzymatic processing (salivary glands).
JAWS AND ALVEOLAR PARTS,
Temporomandibular joint

Upper jaw

The upper jaw is a paired bone. Each of the halves has a body and four processes: frontal, zygomatic, palatine and alveolar. The latter ends on the right and left by the alveolar tubercles.
♦ The alveolar process of the upper or alveolar part of the lower jaw is called the department where the roots of the teeth are located. The maxillary bones are involved in the formation of the orbits, nasal cavity, and temporal hollow.Inside the body of the jaw there is a sinus. Maxillary bones are openwork. This structure is due to the functions of respiration, speech formation and chewing. At the same time, resistance to chewing pressure (see p. 26) in the upper jaw is exerted by bone abutments (buttresses) (Fig. 13).
♦ Buttresses (fr. Opposing force, counter-resistance) - powerful thickening of the compact substance of the upper jaw, which is the transmission of chewing pressure. The following buttresses are distinguished: frontal nasal, zygomatic, pterygopalatine, palatine.
Chewing pressure coming from the central, lateral incisors, canine and the first premolar spreads along the frontal nasal buttresses to the surface of the orbit,
nasal, lacrimal and frontal bones vertically. The zygomatic alveolar ridge, the zygomatic bone with the zygomatic process form the zygomatic buttress, according to which the pressure from the lateral teeth is distributed along the lateral edge of the orbit to the frontal bone, through the zygomatic arch to the temporal bone, and also through the lower edge of the orbit to the upper part of the frontal nasal buttress.
Chewing pressure from the posterior teeth is also perceived by the pterygopalatine buttress formed by the tubercle of the upper jaw and the pterygoid process. On it it is transmitted to the base of the skull. The palatine buttress balances the lateral horizontal stresses. It is formed by the palatine processes of the upper jaw that make up the hard palate. In addition, formations that strengthen the upper jaw and neutralize the pressure that occurs during chewing include
opener and medial walls of the maxillary sinuses. In clinical anatomy, a hard and soft palate is secreted. Hard palate includes mucous membranes

and submucosal layer of the palatine processes of the upper jaw and the horizontal plate of the palatine bone. It is used as a prosthetic bed for extensive loss of teeth in the upper jaw. In the anterior section of the palate are transverse palatal folds,
participating in the grinding of soft foods and enhancing the taste perception of the receptors of the tongue. The arch of the hard palate can have various heights and configurations. In the region of the middle palatine suture, the palatine roller (torus palatinus) is sometimes determined. The most common outlines of the palatine roller [Trezubov V.N., 1966]: oval; lanceolate; ellipsoidal; rounded ovoid; with a constriction in the form of an hourglass; irregular shape. In fig.1.4 roller shapes
presented in order of frequency.
Closer to the soft palate (palatine curtain), two palatine fossae are contoured, which are landmarks in determining the distal border of a removable denture of the upper jaw. On the palate are mechanical and thermoreceptors.
The soft palate in front borders the posterior edge of the hard palate, on the sides it is connected with the side walls of the pharynx. Dorsally, it ends with a free edge, repeating the configuration of the posterior edge of the bones of the hard palate.
The soft palate is formed by a number of muscles:
mm . uvulae - muscles of the tongue (shorten the tongue, lifting it);
m . tensor veli palatini - a muscle that stretches the soft palate (stretches the front section of the soft palate and the pharyngeal part of the auditory tube);
m . levator veli palatini - a muscle that raises the soft palate (narrows the pharyngeal opening of the auditory tube);
m . palatoglossus - palatine-lingual muscle (narrows the pharynx, bringing the anterior arch closer to the root of the tongue);
m . palatopharyngeus - palatopharyngeal muscle (brings together the palatopharyngeal arch and pulls up the lower part of the pharynx and larynx).
Of these muscles, only the muscles of the tongue end in the palate itself, and the rest, being paired, connect the soft palate to other organs, which makes it possible to change the position and shape of one or another function:
- with muscle contraction, the oral cavity is completely separated from the pharynx;
- during breathing (see p. 69) through the nose - a soft palate arches down to the back of the tongue, isolating the oral cavity from the pharynx, due to which free breathing is possible when chewing food;
- when breathing through the mouth, as well as during the act of swallowing, the soft palate straightens and adheres tightly to the posterior pharyngeal wall, separating the nasopharynx from the oral part of the pharynx and oral cavity. In this case, the muscles of the soft palate, which are part of the palatine-lingual arches,
connect to the transverse muscle of the tongue, forming a compressive pharyngeal ring.

Lower jaw

The lower jaw is the mobile bone of the facial skeleton, consisting of a body, branch, angle. The body passes into the alveolar part, in which the roots of the teeth are located.
The branch has two processes - the mycelium, ending in the head of the lower jaw, and the coronoid.
The ratio of the height of the branch to the length of the jaw body in adults is 6.5–7: 10. The angle of the lower jaw is normally 120 ± 5 ° (V.N. Trezubov).
The lower jaw is covered with a compact plate that also lines the walls of the dental alveoli. The most massively compact substance is present in the area of the chin, corners and at the base of the jaw. In addition, on the outer and inner surfaces of the jaw there are folds of a compact substance - respectively oblique and maxillary-hyoid lines. Jaw-hyoid line - the place of attachment of the same muscle. It can be difficult to fix end-defects and complete loss of teeth in the lower jaw when it is represented by a sharp plate. With the pressure of the base of the

removable prosthesis on this line, the mucous membrane located between them is injured. This causes acute pain.
In such cases, isolation of the line is necessary, and sometimes its surgical smoothing in the distal parts.
Between the plates of the compact substance is the spongy substance of the bone, especially developed in the body and in the head of the lower jaw. It has a finer loop structure than on the upper jaw. At the same time, the sponge beams are not located randomly, but in a certain direction, in the form of trajectories whose orientation is functionally determined (Fig. 1.5).

Alveolar parts have a rich blood supply and innervation. Their free edge does not overlap the enamel-cement border of the teeth, not reaching it by 2-3 mm. Alveoli of adjacent teeth are separated by an interdental septum, the apex of which can have a different shape: spiky, domed, and truncated cone.
In the alveolar part, the outer and inner compact plates and the spongy substance between them are distinguished. The outer compact plate is located on the vestibular and oral surfaces, and the inner lines the holes.

Features of the structure of the mucous membrane
APPLICATIONS OF APPLICATION
The anatomical and histological features of the structure of the mucous membrane covering the alveolar process of the upper and alveolar part of the lower jaw, the hard and soft palate, and other parts of the oral cavity (Fig. 1.22) are of some importance in the choice of prosthetics method and in its success.
In dentistry, the mobile and immobile mucous membranes are distinguished (Fig. 1.23). The mobility and immobility of the oral mucosa is based on the presence or absence of a submucosa (tela submucosa) in it.
The movable mucous membrane makes excursions while reducing facial muscles. Such mobility is called active, and the mucous membrane possessing it is actively mobile.
Fixed mucous membrane does not possess this ability. It most often covers the tops of the alveolar ridges, the anterior third of the hard palate and its middle part.

zones (according to E. I. Gavrilov), which includes, in addition, the following:
- buffer zones (p. 187) on the upper jaw are located between the base of the alveolar bone and the middle zone corresponding to the palatine suture. These zones are projected onto the thick vascular fields of the hard palate;
- thanks to the dense network of anastomoses between the vessels of the mucous membrane of the hard palate and nose, the vascular bed of the prosthetic bed (see p. 88) can quickly change its volume under the influence of the prosthesis, being a hydraulic shock absorber;
- the basis of a complete removable prosthesis, regardless of the functional imprint technique, performs micro-excursions under the influence of a pulse wave;
- the provision on the buffer zones allows to reveal the mechanism of distribution of the masticatory pressure of the prosthesis between the alveolar process and the hard palate;
- taking into account the cushioning properties of the mucous membrane of the buffer zones, the advantage of the compression impression over the impression without pressure has been proved;

- the vascular factor, i.e., a violation of the blood supply to the mucous membrane of the prosthetic bed as a result of the side effect of the prosthesis, is also the basis of the pathogenesis of functional and structural changes in the tissues of the prosthetic bed.

When the mucous membrane passes from the alveolar process to the lip and cheeks, a vestibule arch is formed.

♦ An imaginary line drawn along the top of the arch of the vestibule of the oral cavity is called a transitional fold (Fig. 1.23). Sometimes the transitional fold is called the boundary of the transition of the mucosa from the bottom of the oral cavity to the oral slope of the alveolar part of the lower jaw. On the upper jaw, in front of the mouth, the frenum of the upper lip is located in the midline. One end of it merges with the transitional fold, the other is attached to the mucous membrane of the alveolar process slightly above the gingival margin. Sometimes the bridle has a low attachment, with the lower end between

incisors that can be moved apart. The bridle serves as a fixed point for the lip, due to which the range of movements of the latter is limited.

The upper buccal frenum, located in the premolar region, delimits the front of the vestibule of the mouth from its lateral parts. The function of these folds is similar to that described above.

There are also the pterygo-maxillary fold going from the hook of the pterygoid process to the distal part of the posterololar mucous tubercle of the lower jaw.

In the same place, on the lower jaw, from the vestibular side, there is a frenulum of the lower lip and lower genital frenulum in the premolar region. On the lingual side, the frenum of the tongue is attached to the alveolar part. The height of its attachment is of great importance for

language functions, as well as in determining the boundaries of the prosthesis on the lingual side.

On the hard palate, in the anterior third of it, there are transverse palatal folds, well expressed in young people and worse in older people. On the inner side of the alveolar process of the upper jaw along the midline, behind the central incisors, there is an incisal papilla. With the loss of teeth, it atrophies, but sometimes it can remain, being sensitive to the pressure of the prosthesis base.

Tests on this topic.

1. Can the lower jaw simultaneously move in different directions?

$

Yes $

No $

Depends on the position of $

Depends on training

2. How many parts does the lower jaw consist of?

$

Body and 2 branches $ *

Body and branches $

Body and 3 branches $

2 bodies and 2 branches #

3. What limits the exit of the jaw head from the capsule?

$

Joint tubercle $ *

Upper joint space $

Lower articular gap $

Joint capsule #

4. What muscle is attached to the articular disc?

$

External pterygoid muscle $ *

Lateral pterygoid $

Chewing muscle $

Temporal muscle #

5. What method allows you to catch the amplitude of the movements of the heads of the lower jaw during opening and closing the mouth?

$

Palpation $ *

X-ray method $

Medical history $

Functional Test #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked

		- can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

3 topic: Anatomy and physiological structure of the temporomandibular joint a .
- the structure of the TMJ
- biodynamics of the lower jaw
- vertical, sagittal and transverse movements of the lower jaw.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	4. Preparing the audience. 5. Analysis of student preparation for class 6. Attendance check	Listen
Lecture introduction (10 minutes)	4. Preparation of the educational complex on this topic. 5. Preparing slides for the lesson. 6. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry" 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	6. Divide the group and ask questions. 7. Use visual aid 8. Use slides, multimedia	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.

	9. Summing up the topic 10. Assessment of actively participating students.	
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. The structure of the TMJ
2. Biodynamics of the lower jaw
3. Vertical movements of the lower jaw
4. Sagittal movements of the lower jaw
5. Transversal movements of the lower jaw

Methodology of the practical lesson:

Temporomandibular joint

The temporomandibular joint (TMJ) articulates the lower jaw with the temporal bone (Fig. 1.6). In its structure, it is ellipsoidal. Its anatomical features are the presence of articular disc and discrepancy

Articulated surfaces (incongruence).

Functionally, it is a paired joint, which in the aggregate is one combined joint. When moving in the joints, lowering and raising the lower jaw is possible, moving it forward, backward and to the side (to the right or left). In the latter case, in the joint of the opposite side, the head rotates around the vertical axis. At the same time, independent movements on only one side are impossible, although movements in each joint can occur in different directions.

The mandibular fossa is 2.5-3 times larger than the head of the lower jaw, which ensures the free movement of the latter. In front, it is limited by the articular tubercle, and in the back by the tympanic part of the temporal bone.

The articular tubercle forming the anterior border of the mandibular fossa is an outgrowth of the zygomatic arch. In the joint cavity there is a biconcave oval-shaped cartilaginous plate - the articular disc. It divides the joint cavity into two departments that do not communicate with each other: the upper and lower. The disk compensates for the mismatch of the relief of the articular surfaces. When opening the mouth, when the head of the lower jaw moves to the top of the articular tubercle, the articular disc moves with it, ensuring the correspondence of the articular

surfaces in dynamics. This is due to the fact that the lateral pterygoid muscle, branching into two bundles, is upper woven into the joint capsule area directly connected to the front of the disk, and attached to the neck of the lower jaw by the lower bundle. With the contraction of this muscle, the lower jaw and articular disc move synchronously.

The joint capsule is an elastic connective tissue membrane consisting of two layers: external, fibrous, and internal, synovial. In the space between the posterior wall of the capsule and the tympanic part of the temporal bone, a loose connective tissue is located, due to which the tremors of the head of the lower jaw are softened and some backward movement is allowed.

In the joint, capsular and extracapsular ligaments are distinguished.

LOWER JAW BIOMECHANICS

♦ biomechanics - a branch of biophysics that studies, in particular, mechanical phenomena occurring in living tissues, organs and the body, including movements. The movements of the lower jaw are the result of the contraction of a particular group of masticatory muscles. The direction of these movements and their amplitude are determined by the topography of the muscles and their attachment sites, as well as the anatomical and topographic features of the temporomandibular joint and its individual elements. The shape of the dental arches and their relationships (bite) also influence the nature of the movements. All this leaves a peculiar imprint not only on the movements of the lower jaw, but also on the entire chewing apparatus, which becomes especially obvious when

comparative study of it in various groups of animals. In predators, the joint acts as a simple hinge, allowing only up and down movements, i.e., closing and opening of the jaws. The heads of the lower jaw are cylinders, the long axes of which are transverse and merge into a straight line when they continue. The mandibular fossa covers the head of the lower jaw with its entire surface. Due to the indicated structure, the joint is called block (ginglimus).

Chewing teeth have a three-tubercle structure with spiky tubercles. The latter wedge strongly between their antagonists, preventing either sagittal or transversal movements. Such a device corresponds to the main function of the masticatory apparatus in these animals, which consists only in tearing food and swallowing it.

Other features of the joint in rodents, in which sagittal movements predominate. The heads of the lower jaw * they also have a cylindrical shape with the difference that the long axes go parasagittally, without intersecting anywhere.Mandibular fossa

represent a parasagittal groove-shaped recess along which the heads glide during movements of the lower jaw.

Chewing teeth have a multi-tubercle structure, but the tubercles are very weakly expressed.

In ruminants, the entire structure of the joint and, consequently, the mechanism of movements of the lower jaw are adapted to perform reinforced lateral movements required for

chewing hard to digest plant foods. The joint surfaces of them have changed places: the heads of the lower jaw are small recesses, respectively, which have convexities on the skull that allow lateral movements of rather large amplitude.Dentitions consist mostly of chewy, tuberless, creased teeth.

In humans, there are movements that cause closure and opening of the jaws (vertical), movements of the lower jaw forward and backward (sagittal) and to the sides (transverse). In the process of evolution and functional adaptation to environmental conditions, mainly to the genus of food, the movements of the lower jaw have changed and improved. As a result of this, there have been corresponding changes in the structure of the temporomandibular joint and its functional mechanism.

Analyzing the anatomical features of the joint in humans, it is possible to note the elements characteristic of these groups of animals. So, the deepening of the mandibular fossa resembles

the joint of a predator, and the articular tubercle indicates a community with ruminants. In accordance with this, differentiation of the teeth occurred. Their division by anatomical structure into the anterior (incisors and canines) and lateral (premolars and molars)
is the result of this differentiation. The lower jaw is involved in many functions: chewing, sound formation, speech, swallowing, etc. Of all these functions, it follows
highlight movements associated with chewing.
Thus, the lower jaw of a person can make movements in several directions:
- vertical (up-down), which corresponds to opening and closing the mouth;
- sagittal (back and forth);
- transversal (right-left);
- diagonal or oblique (right-forward; left-forward).
The last direction is a combination of the first three.
Each movement of the lower jaw occurs while gliding and rotating the heads of the lower jaw. The difference lies only in the fact that in some cases hinged joints prevail in the joints, and sliding motions prevail in others.
Vertical movements of the lower jaw
The movements of the lower jaw in the vertical plane occur when opening and closing the mouth due to the active contraction of the muscles that lower (m. Mylohyoideus, m. Geniohyoideus, venter anterior t. Digastricus) and lift (t.Masseter , t. Temporalis , m . Pterygoideus medialis) lower jaw. When opening the mouth simultaneously with the rotation of the lower jaw around an axis passing through its head, the latter slide along the slope of the articular tubercle down and forward. They make this movement together with the articular disc. In the lower part of the joint, the heads rotate in the recess of the lower surface of the disk, which for it is a movable articular fossa. With maximum opening of the mouth, the heads are set at the front edge of the articular tubercle.
When lowering the lower jaw, the front teeth move along curves that, as the mouth opens, gradually move away from the joint. This is due to the fact that when opening the mouth, the extension of the lower jaw gradually occurs. It is necessary
for example, when biting off food for the subsequent establishment of the cutting edges of the upper and lower teeth butt. The trajectories of the lower teeth are concentric curves with a common center in the head of the lower jaw.They, like the axis of rotation of the head, can move in space.
Sagittal movements of the lower jaw
The movement of the lower jaw forward is carried out by bilateral contraction of the lateral pterygoid muscles. The movement of the head of the lower jaw in the joint can be conditionally divided into two phases:
- in the first - the disk together with the head glides along the surface of the articular tubercle;
- in the second phase, its articulated movement around its own transverse axis joins the head slip.
♦ The distance that the head of the lower jaw travels when it moves forward is called the sagittal articular path. This distance is on average 7-10 mm. If we divide the path traveled by the head of the lower jaw relative to the slope of the articular tubercle (articular path) into separate segments, then each segment will have its own curve. Thus, the entire path traveled by any point of the head of the lower jaw or chin protrusion is a broken line consisting of many curves.
♦ The angle formed by the intersection of the trajectory of the sagittal articular path with the occlusal plane is called the angle of the sagittal articular path.
Depending on the degree of extension of the lower jaw, the angle of the sagittal articular path changes. According to Gizi, it averages 33 ° (Fig. 1.24).
With an orthognathic bite, the extension of the lower jaw is accompanied by the sliding of the lower incisors along the palatal surface of the upper.
♦ The path made by the lower incisors when the lower jaw extends forward is called the sagittal incisor path.

♦ The angle formed by the intersection of the trajectory of the sagittal incisor path with the occlusal plane is called the angle of the sagittal incisor path.

The angle of the sagittal incisor pathway is on average 40-50 °. When the lower jaw is extended to the front occlusion position, dentition contacts are possible at only three points. One of them is located on the front teeth, and two on the distal tubercles of the second or third molars. This phenomenon was first described by Bonville and was called Bonville's three-point contact.

Transversal movements of the lower jaw

Movements of the lower jaw to the right or left side result from unilateral contraction of the lateral pterygoid muscle. So, with the movement of the jaw to the right, the left lateral pterygoid muscle contracts, while moving to the left - the right. On the side of the contracted muscle, the head of the lower jaw with the disk is shifted down, forward and somewhat inward. In this case, the head on the opposite side rotates around an axis going almost vertically through the branch of the lower jaw.

The head of the lower jaw on the side of the contracted muscle, moving inward, forms an angle with the original direction of the sagittal incisor path.

♦ The angle of the transversal articular path (Bennett angle) is formed by the direction of the sagittal articular path and the displacement of the head of the lower jaw inward with lateral movement of the lower jaw.

Until now, when studying the movement of the lower jaw, the latter were artificially decomposed into constituent elements (lowering, moving forward, to the sides). This was done for methodological reasons. In fact, excursions of the lower jaw are very difficult because they are a combination of various movements. Chewing movements have the greatest practical interest in orthopedic dentistry. Knowing them can facilitate the creation of prostheses and artificial teeth. There is no doubt that there is a closure on the working side of the same named tubercles. A different relationship of the posterior teeth would not ensure the grinding of food. On the balancing side, both the formation of contact between the opposite tubercles and their absence are possible. This, apparently, depends on the severity of the transversal occlusal curves, the ratio of the width of the dentition, the amplitude of the transverse displacements of the lower jaw. When creating dentures, the indicated biomechanics of the lower jaw are taken into account. This is done using articulators.

♦ Articulators - devices that imitate, to a certain extent, the movements of the lower jaw.

Their simplest prototype is the occluders (Fig. 1.27), which allow you to simulate the vertical articulated movements of the lower jaw.

Articulators are divided into two groups: anatomical and universal (individual).

The first design is based on average indicators ("articulators of average measurement") of the angles of the articular and incisal paths. Jaw models reinforced in such articulators may

to reproduce anteroposterior, lateral, vertical movements of the lower jaw. It should be noted that the upper frame is movable in the articulator. The disadvantage of articulators with an average installation is their standard.
Universal, or individual, devices are supplied
facial arc, with which the above
biomechanical parameters of each specific subject. These
individual indicators are transferred to the appropriate
articulator scales.
Articulators are used to form
artificial dentitions of partial and complete dentures, and
also modeling the chewing surface of the tabs,
crowns and bridges. They also study with their help.
articulation relationships of diagnostic models
jaws.

Tests on this topic.
1. How many movements does TMJ have?
$
3 $ *
2 $
1 $
4#
2. Vertical movement
$
Up and down $ *
Forward and backward $
Left and right $
Vertical movement does not exist #
3. Sagittal movement
$
Forward and backward $ *
Left and right $
Up and down $
Up and back #
4. What method allows you to catch the amplitude of the movements of the heads of the lower jaw during opening and closing the mouth?
$
Palpation $ *
X-ray method $

Medical history $
Functional Test #

5. What limits the exit of the jaw head from the capsule?
$
Joint tubercle $ *
Upper joint space $
Lower articular gap $
Joint capsule #

6. If the incisal point does not change when opening and closing the mouth, then this movement is called
$
Direct $ *
Indirect $
Lateral $
Wave #

7. What method is most often used in the examination of TMJ?
$
Palpation Method $ *
Helmon Method $
Gavrilov Method $
X-ray method #

8. TMJ is decrypted
$
Temporomandibular Joint $ *
Temporomandibular Joint $
Temporomandibular Joint $
Vertical mandibular joint #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks

86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

4 Topic: chewing and mimic muscles Atur s .
- Absolute strength, chewing pressure of the chewing muscles.
- Conditions regarding the physiological rest of the lower jaw.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	7. Preparing the audience. 8. Analysis of student preparation	Listen

	for class 9. Attendance check	
Lecture introduction (10 minutes)	7. Preparation of the educational complex on this topic. 8. Preparing slides for the lesson. 9. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry" 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	11. Divide the group and ask questions. 12. Use visual aid 13. Use slides, multimedia 14. Summing up the topic 15. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Chewing muscles
2. Facial muscles
3. The Absolute Strength of Chewing Muscles
4. Chewing pressure
5. Relative physiological rest of the lower jaw

Methodology of the practical lesson:

MUSCLES, MUSCLE STRENGTH, CHEWING PRESSURE

The muscles of the head (Fig. 1.7) are divided into masticatory and facial.

Chewing muscles:

m. masseter - actually chewing;

m. temporalis - temporal

m . pterygoideus medialis - medial pterygoid;

m . pterygoideus lateralis — lateral pterygoid;

m. mylohyoideus - maxillohyoid

m. geniohyoideus - chin-hyoid;

venter anterior m. digastricus - front belly of the digastric muscle .

With its contraction, the masticatory muscles move the lower jaw in various directions, thus participating in the act of chewing, swallowing, sound formation, and speech. In accordance with the main directions of its action, the chewing muscles are divided into groups and groups:
- the first includes muscles that lower the lower jaw (m. Mylohyoideus, i.e. geniohyoideus, venter anterior m. Digastricus);
- the second group includes muscles that raise the lower jaw (m. Masseter, m. Temporalis, m. Pterygoideus medialis);
- the third group is paired lateral pterygoid muscle (m. Pterygoideus lateralis). With their simultaneous contraction, the lower jaw is advanced, with a unilateral contraction of the muscle, the lower jaw is shifted to the opposite
side. Thus, the muscles of the third group provide anterior and lateral movements of the lower jaw.
Muscles lowering the lower jaw. The opening of the mouth is due to the contraction of the muscles lying below the hyoid bone, when its position is fixed by the muscles lying above the specified bone. The lower jaw muscles form the bottom of the oral cavity. Due to the fact that they have two movable attachment points, the bottom of the oral cavity formed by them is capable of large amplitude excursions that decrease or increase the volume of the oral cavity, which is important for moving the food lump or fluid and performing the act of swallowing.
The basis of the bottom of the oral cavity (diaphragma oris) is composed of two the same maxillary-hyoid muscles (m. Mylohyoideus), connected by a fibrous suture. With wide proximal ends, these muscles are attached to the inner surface of the body of the lower jaw, along the maxillary-hyoid lines, from the last molars to the middle of the chin. The distal surfaces of the muscles attach to the hyoid bone.
The chin-hyoid muscles with their proximal ends are attached to the chin spine (spina mentalis) on the inner surface of the chin. Distal endings occur on the anterior surface of the hyoid bone.
The anterior abdomen of the biceps muscle (venter anterior m . Digastricus) begins from the tendon bridge between the anterior and posterior abdomen, which is attached to the hyoid bone. At its proximal end, this part of the muscle is attached to
bilateral hollow located laterally from the chin spine.
The muscles that raise the lower jaw. Actually chewing muscle (m. Masseter) consists of two parts. The superficial bundles have an oblique direction, starting from the zygomatic process of the upper jaw and the zygomatic arch. The bundles of the deep part go more steeply and begin from the zygomatic bone and the deep leaf of the temporal fascia. The movable end of the chewing muscle attaches to the chewing tuberosity of the angle of the lower jaw. With bilateral

contraction of both chewing muscles, the lower jaw rises upward, with unilateral contraction - outward on the side of contracted muscle.
The temporal muscle (m. Temporalis) is fixed in three bundles, filling the temporal fossa. The fibers of the front bundles are tilted forward, the middle ones are vertical, and the rear ones have an occipital tilt. The powerful tendon of the muscle extends inward from the zygomatic arch and attaches to the coronoid process of the lower jaw. When all muscle bundles are contracted, the lower jaw rises, while the posterior bundles contract, the lower jaw extended forward comes back or from the central position to the back.
The medial pterygoid muscle (m. Pterygoideus medialis) begins from the pterygoid fossa of the main bone, goes back and down, attaching to the pterygoid tuberosity on the inner surface of the angle of the lower jaw. With a one-sided contraction of the muscle, the lower jaw moves to the side opposite to the contraction, with a bilateral contraction - it pushes forward and raises the lowered lower jaw.
All muscles of this group are synergists, the main action of which has a resultant, directed upwards. The muscles that extend the lower jaw. The extension of the lower jaw occurs with the tension of both lateral pterygoid muscles (m .Pterygoideus lateralis). This muscle begins with two heads - the upper and lower. The upper head of the muscle originates from the large wing of the main bone and is attached to the articular bag and interarticular cartilaginous disk of the temporal
mandibular joint. The lower head starts from the outer plate of the pterygoid process of the main bone and, heading back, attaches to the neck of the condylar process. A muscle during contraction shifts the lower jaw in the opposite direction to the contraction. With bilateral contraction, the muscles push the lower jaw forward. Mutual antagonism and synergism of the above muscles contributes to the possibility of smooth rational movements of the lower jaw, necessary for chewing and speech.
Facial muscles
Here, from the so-called facial muscles, or facial muscles, those that surround the oral gap and are directly involved in chewing, in particular, the formation of a food lump, sound formation and breathing, will be considered.
Facial muscles of the lower face:
m. orbicularis oris - circular muscle of the mouth;
m. levator labii superioris - muscle that lifts the upper lip ;
m. depressor labii interioris - muscle , lowers the lower lip ;
m. buccinator - buccal muscle ;
m . zygomaticus major - zygomaticus major muscle;
m . levator anguli oris — muscle that raises the corner of the mouth;
m. depressor anguli oris - muscle that lowers the angle of the mouth;
m. risorius - muscle of laughter;
m . mentalis - the chin muscle;
m . incisivus labii superioris — incisor muscle of the upper lip;
m . incisivus labii interioris - incisor muscle of the lower lip.
The oral fissure is bordered by the pma circular muscle (m. Orbicularis oris). Its fibers are located in the thickness of the upper and lower lips. Narrows the mouth gap and pulls the lips forward. Other muscles that form the base of the cheeks are woven into it. Among them is the muscle,
lifting the upper lip (m . levator labii superioris), which begins with three bundles: from the frontal process, the lower orbital edge of the upper jaw, the anterior surface of the zygomatic bone. Raises the upper lip and tightens the wing of the nose.
The muscle lowering the lower lip (m . Depressor labii interioris) - starts from the front surface of the lower jaw, anterior to the chin, goes up and weaves into the skin of the lower lip and chin. Pulls the lower lip down.

The buccal muscle (m. Buccinator) starts from the buccal crest of the lower jaw, the pterygo-maxillary suture, and also the outer surfaces of the upper and lower jaws in the region of the holes of the second molars. Heading forward, muscle bundles move to the upper
and lower lips, and are also woven into the skin of the lips, the corner of the mouth and the mucous membrane of the vestibule of the mouth. Pulls the corner of the mouth to the side, with bilateral reduction, stretches the mouth gap, presses the inner surface of the cheeks to the teeth.
The large zygomatic muscle (m. Zygomaticus major) starts from the outer surface of the zygomatic bone, heading downward and medially, is woven into the circular muscle of the mouth and the skin of the corner of the mouth. Pulls the corner of the mouth up and out.
The muscle that lifts the corner of the mouth (m. Levator anguli oris) begins under the lower orbital opening and, heading down, is woven into the skin of the corner of the mouth and its circular muscle. Pulls the corner of the mouth up and out.
The muscle that lowers the angle of the mouth (m. Depressor anguli oris), begins with a wide base from the front surface of the lower jaw, below the chin hole. Heading up, the muscle narrows, reaches the corner of the mouth, where part of the bundles are woven into its skin, and partly into the thickness of the upper lip and pulls the corner of the mouth down and out.
The muscle of laughter (m. Risorius) is unstable, partly a continuation of the bunches of platisma. Part of the bundle muscle originates from the chewing fascia and the skin of the nasolabial fold. Heading medially, muscle bundles are woven into the skin of the corner of the mouth. Pulls the corner of the mouth laterally.
The chin muscle (m. Mentalis) starts from the dimpled elevations of the lower incisors, goes down and is woven into the skin of the chin. Pulls the skin of the chin up, pulls the lower lip. Incisor muscle of the upper lip (m. Incisivus labii superioris)
starts from the dimpled elevations of the tops of the lateral incisor and canine, goes down and weaves into the skin of the corner of the mouth and its circular muscle. Pulls the corner of the mouth up and in.
The incisor muscle of the lower lip (m. Incisivus labii inferioris) begins from the dimpled elevations of the lower lateral incisor and canine, is directed upward and woven into the circular muscle of the mouth and skin of the lower lip, and pulls the lower lip downward.
The absolute strength of the masticatory muscles is the tension developed by the masticatory muscle at its maximum contraction.
The value of the absolute strength of the masticatory muscles, according to various sources, is from 80 to 390 kg . There is no doubt that chewing muscles can develop pressure, much greater than that required for chewing food, but such a force arises
extremely rare, in moments of danger, of intense emotional stress.
The chewing pressure is controlled and reflexively limited by periodontal baroreceptors (see p. 42), which responds with pain to excessive contraction of the masticatory muscles and compression of the dentition. This prevents crowns from breaking.
teeth.
Absolute chewing power can be considered a muscle safety margin, a reserve that allows the performance of significant and long-term muscle work without noticeable fatigue.
♦ Chewing pressure is the force developed by the masticatory muscles and regulated by periodontal receptors, necessary for crushing, biting, crushing food. Chewing pressure on the incisors is approximately equal in women - 20-30 kg, in men - 25-40 kg, in molars, respectively - 40-60 kg and 50-80 kg .
In other words, the chewing pressure developed by the muscle does not exhaust its entire strength, but means the endurance limit of the supporting tissues of the teeth, which is determined by heredity, gender, age, the degree of periodontal fitness and some other factors.
Tests on this topic.
1. The external pterygoid muscle:
$
two heads *

$
three heads
$
one head
$
muscle has no head
#
2. The muscle connecting to the joint bag:
$
outer pterygoid *
$
chewing
$
inner pterygoid
$
sublingual
#
3. With a bilateral reduction of the external pterygoid muscle, the lower jaw:
$
moves forward *
$
moves back
$
pushed to the right
$
remains at rest
#
4. With a unilateral contraction of the external pterygoid muscle, the lower jaw:
$
moves in the opposite direction *
$
moves forward
$
moves back
$
falls
#
5. The chin-hyoid muscle moves the lower jaw:
$
way down*
$
sideways
$
up
$
forward
#
6. With contraction of the temporal muscle, the lower jaw:
$
rises *
$
moving forward

$
coming down
$
pushed to the side
#
7. The mucous membrane of the oral cavity consists of:
$
3 layers *
$
2 layers
$
4 layers
$
single layer

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked

		- can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

5 theme: Anatomical - physiological classification of the dentofacial system
- articulation, occlusion and its types
- signs of closing teeth
- bite and its types
- symptoms of physiological and pathological bites
- determination of the type of bite in students.

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	10. Preparing the audience. 11. Analysis of student preparation for class 12. Attendance check	Listen
Lecture introduction (10 minutes)	10. Preparation of the educational complex on this topic. 11. Preparing slides for the lesson. 12. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S., Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva	Listen and record

	V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry" 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	
Main part (65 minutes)	16. Divide the group and ask questions. 17. Use visual aid 18. Use slides, multimedia 19. Summing up the topic 20. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Articulation and its types
2. Occlusion and its types
3. Bite and its types
4. Physiological bites
5. Pathological bites
6. Determining the type of bite in students

Methodology of the practical lesson:

the surface of the molars of the right and left sides in the transverse direction. More often, the transversal occlusal curve is also directed downward, although other variants may occur.

In the practice of orthopedic dentistry, the term "occlusal plane" is also used. This is a simplified concept necessary for practical purposes.

♦ Occlusal plane - an imaginary plane conducted in two ways. At the first, it passes through the middle of the overlapping of the central incisors and the middle of the overlapping of the mesial tubercles of the first (in their absence, the second) molars. In the second option, it is carried out through the tops of the buccal tubercle of the second upper premolar and the mesial buccal tubercle of the first upper molar. Formed by

prosthetics on occlusal rollers is also called a prosthetic plane (p. 358).

OCCLUSION, ARTICULATION

♦ Occlusion (from lat. Occlusus - locked) - closure of the dentition or individual groups of antagonist teeth.

♦ Articulation (from lat. Articulatio - articulation) - all kinds of positions and movements of the lower jaw with respect to the upper jaw, carried out using the masticatory muscles.

Articulation is a chain of successive occlusions.

There are five main types of occlusion:
- central;
- front;
- lateral (right and left);
- back.

Central occlusion - such a closure of the dentition, in which there is a maximum number of interdental contacts. In this case, the head of the lower jaw is located at the base of the slope of the articular tubercle, and the muscles that bring the lower dentition into contact with the upper one (temporal, chewing proper, medial pterygoid) are simultaneously and uniformly contracted. From this position, lateral shifts of the lower jaw are still possible.

With central occlusion, the lower jaw occupies a central position in the skull (in contrast to its eccentric positions with other occlusions).

♦ The central position of the lower jaw is determined by teeth closed in central occlusion, and if they are absent, by the mandibular heads, which occupy the posterior relaxed position in the articular fossa, when lateral movements of the lower jaw are still possible. At the same time, the midpoint of the chin and incisal line are in the sagittal plane, and the height of the lower part of the face is normal.

♦ The ratio of the upper and lower jaw when the latter is in the central position is also called central. Anterior occlusion is characterized by the extension of the lower jaw forward. This is achieved by bilateral reduction.

lateral pterygoid muscles. With a normal bite, the middle line of the face, as in central occlusion, coincides with the middle line passing between the incisors. The heads of the lower jaw are shifted forward and are located closer to the top of the articular tubercles.

Lateral occlusion occurs when the lower jaw moves to the right (right lateral occlusion) or to the left (left lateral occlusion). The head of the lower jaw on the displacement side, slightly rotating, remains at the base of the articular tubercle, and on the opposite side it shifts to the top of the articular tubercle. Lateral occlusion is accompanied by a unilateral contraction of the lateral pterygoid muscle, opposite the side displacement.

Rear occlusion occurs when the dorsal displacement of the lower jaw from a central position. The heads of the lower jaw are displaced distally and upward, while the posterior temporal muscle bundles are strained. From this position, lateral shifts of the lower jaw are no longer possible. In order to move the lower jaw to the right or left, you must first advance it forward - in the central or anterior occlusion. Posterior occlusion is the extreme distal position of the lower jaw during sagittal masticatory movements.

In addition to physiological or normal occlusion, pathological occlusion occurs.

♦ Pathological occlusion - closing of the teeth, in which there is a violation of the shape and function of the masticatory apparatus. This occlusion is observed with partial tooth loss, abnormalities, deformations, periodontal diseases, increased tooth abrasion. With pathological occlusion, functional overload of periodontal, chewing muscles, temporomandibular joints, blockage of the movements of the lower jaw may occur.

BITE. TYPES OF BIT

♦ Bite is the nature of the closure of the dentition in the position of central occlusion. All types of bite are divided into normal and abnormal.

(Fig. 1.21). There is no sharp boundary between them, but there are certain forms of bite that can no longer be considered normal, but they still cannot be attributed to abnormal ones. These are the so-called transitional, or borderline forms of bite.

Orthognathic (normognathic) bite is normal. It provides a full function of chewing, speech, swallowing and an aesthetic optimum.
Abnormal are such deviations in the closure of the dentition, in which the functions of chewing, speech, swallowing, and also appearance are significantly impaired. These include:
- distal bite;
- mesial bite;
- deep bite;
- an open bite;
- cross bite.
Morphological and functional changes accompanying transitional forms of bites do not lead to noticeable disturbances in the human body. There is no reason to correct such bite forms.
Transitional or borderline forms include:
- a direct bite;
- orthognathic bite with deep incisal overlap;
- orthognathic bite with protrusion of the front teeth;
- orthognathic bite with retrusion of the front teeth.
This division is to some extent arbitrary and dynamic, since a normal bite, for example, with partial loss of teeth, can become a pathological state over time (see p. 72).
♦ Protrusion - the vestibular shallow position of the crowns of the front teeth, creating their protrusion outward.
♦ Retrusion - a vertical position or oral inclination of the crowns of the front teeth.
Normal (orthognathic) bite
The orthognathic bite is considered to be the most perfect in the anatomical and functional plan form of closure of the dentition. In the modern European, he is the most common bite.

When studying the closure of dentitions in the position of central occlusion, it is necessary to consider it in three mutually perpendicular planes: horizontal, sagittal and frontal. Moreover, some signs of closure apply to all teeth, others - only to the front, and still others - only to the side.

All teeth are characterized by the following signs of closure. Each tooth comes into contact, as a rule, with two antagonists, of which one is called the main one, and the other is the side one. According to one antagonist, only the upper wisdom teeth and lower central incisors have. Each upper tooth is joined with the same lower and posterior, and each lower tooth is joined with the same upper and anterior.

This is due to the predominance in the width of the upper central incisors over the lower. For this reason, the lower teeth are displaced mesially * in relation to the teeth of the upper dentition. The upper wisdom tooth is already lower, so the mesial shortening of the lower dentition is aligned in the area of the wisdom teeth, and their distal surfaces lie in the same plane. Speaking about the signs of closure of the front teeth, first of all, one should keep in mind the features of their overlap. The upper front teeth overlap the lower ones by about 1 / ½ the height of the crown. The lower front teeth with their cutting edges are in contact with the palatine surface of the upper. This is the so-called

cutting-tubercular contact. When the dentition closes, the lines between the central incisors of the upper and lower jaws lie in the sagittal plane. This provides aesthetic harmony.

Features of the closure of the posterior teeth are as follows:

- in the transversal plane, the buccal tubercles of the upper lateral teeth are located outward from the same tubercles of the lower teeth. Due to this, palatine tubercles of the upper teeth are located in the longitudinal grooves of the upper teeth. The overlap of the upper front and side teeth of the lower due to the greater width of the upper dental arch. This feature of closing the dentition in the vestibulo-oral direction provides freedom and a large range of lateral movements of the lower jaw, expanding the occlusal field;

♦ Occlusal field - part of the occlusal surface, its useful area involved in the act of chewing.

- the closure of chewing teeth in the anteroposterior (sagittal) direction is usually studied by the characteristics of the contact of the first permanent molars. With an orthognathic bite, the mesial buccal tubercle of the first upper molar is located on the buccal surface of the lower first molar, in the transverse groove between its buccal tubercles. The relative position of the antagonizing tubercles of the lateral teeth in the sagittal plane is sometimes called their mesiodistal ratio.

Transitional (borderline) bite forms

Straight bite. With a direct bite, the front teeth of the upper and lower jaws are closed with cutting edges, and the closure of the lateral teeth either corresponds to the orthognathic bite, or is more often inter-tubercular. The cutting edges of the front teeth with a direct bite can be subjected to increased abrasion, but the resulting polished worn surfaces are highly resistant to caries, and periodontium is rarely involved in the inflammatory process.

Orthognathic bite with deep incisal overlap. With a normal bite, the overlapping of the lower teeth with the upper should not exceed 1/2 of the height of the crowns. An increase in the degree of overlap with the preservation of the cutting-tubercular contact leads to the formation of a deep incisal overlap. In the absence of such contact, we are already talking about one of the abnormal forms - a deep bite.

In a state of central occlusion, multiple contacts remain, and the relationships of the first molars correspond to an orthognathic bite.

Orthognathic bite with protrusion or retrusion of anterior teeth. In protrusion, the alveolar parts and front teeth are inclined forward, and in retrusion, the front teeth together with the alveolar parts are upright or tilted back.

In the position of central occlusion, the relationships of the first molars correspond to the orthognathic bite and multiple interdental contacts are preserved.

Abnormal bites

♦ Anomaly - (from rp. Anomalia - deviation) - a deviation from the structure and function inherent in a given biological species resulting from a violation of the development of the body. Abnormal bites are characterized by a violation of the chewing function, speech and appearance of the patient, i.e., there are not only morphological, but also functional disorders. Anomalous, as noted, include distal, mesial, deep, open and cross bites.

The distal bite is characterized by a violation of the normal ratios of the dentition, in which the mesial buccal tubercle of the first upper molar closes with the same tubercle of the first lower molar, and sometimes it falls into the groove between
second premolar and mesial buccal tubercle of the first lower molar.

A violation of the closure of teeth, typical of a distal bite, is observed with an overdevelopment or anterior position of the upper jaw in the facial skeleton, as well as underdevelopment of the lower jaw or with its distal position in the facial skeleton. At the same time, a distal bite is a symptom (see p. 71) of others
maxillofacial abnormalities:

- lower micrognathia;
- lower retrognathia;
- upper macrognathia;
- upper prognathia or a combination of the listed nosological forms.

The cause of the true distal bite, which is an independent nosological form (see p. 71), is the incorrect position of the dentition on the bases of the corresponding jaws. With a distal bite, the closure of the front teeth is also broken: between them there is a gap or a deep overlap.

With pronounced upper prognathism, the cutting edges of the lower incisors slip past the dental tubercles of the upper anterior teeth, and, as a rule, plunge into the mucous membrane lying behind the necks of the upper incisors (deep traumatic bite). The teeth of the upper jaw protrude strongly forward, pushing the upper lip, from under which the cutting edges of the teeth are exposed. The lower lip, on the contrary, sinks, penetrating under the upper incisors. An anomaly, as a rule, is accompanied by a violation of aesthetics, the function of chewing and speech.

The mesial bite is characterized by a violation of the ratio of both anterior and posterior teeth. The lower front teeth are advanced forward, overlapping the upper teeth of the same name. Violation of the relationship of the posterior teeth is characterized by the following symptoms:

- the mesial buccal tubercle of the upper first molar comes into contact with the distal buccal tubercle of the same lower molar or enters the groove between the first and second molars;
- due to the predominance of the width of the lower dental arch over the upper buccal tubercles of the lower lateral teeth lie outside and overlap the upper ones of the same name. This bite occurs when the upper jaw is overdeveloped, the upper jaw is shifted forward, the upper jaw is underdeveloped or its distal position in the facial skeleton.

In this case, the mesial bite is a symptom of other dentofacial anomalies:

- upper micrognathia;
- upper retrognathia;
- lower macrognathia;
- lower prognathia or a combination of the listed nosological forms.

The reason for the true mesial bite, which is an independent nosological form, is the incorrect position of the dentition on the bases of the corresponding jaws. The most severe forms of mesial bite are observed
with simultaneous multidirectional development of the upper and lower jaws. In this case, a gap forms between the front teeth, biting off food is difficult and partially transferred to the fangs and premolars.

Occasionally, with a mesial bite, a deep traumatic bite can be observed, characterized by the inverse ratio of the front teeth. In this case, the cutting edges of the lower teeth injure the gingival margin at the vestibular surface of the upper teeth.

With a mesial bite, the appearance of the patient is impaired. Against the background of the protruding chin and lower lip, the upper lip appears sunken, especially in areas adjacent to the wings of the nose.
Deep bite is characterized by an extreme degree of overlapping of the front teeth, with the absence of cutting-tubercular contact. At the same time, an interdental sagittal fissure or a deep traumatic bite is formed (see distal and mesial bite). With the vertical position of the front teeth, in addition, the gingival margin on the vestibular surface of the alveolar part of the lower jaw can be injured. This injury is caused by the cutting edges of the upper front teeth. A deep bite is accompanied in most cases by serious functional disorders: in addition to an injury to the mucous membrane of the front teeth, the periodontium of the latter is located in
due to excessive overlap in a state of functional overload, the chewing function and the appearance of the patient are impaired. Lateral teeth may close as in an orthognathic bite (an independent anomaly) or have a mesial or distal relationship (mesial or distal occlusion syndrome). Facial signs are more often characteristic of the distal bite, less often - of the mesial.
Open bite. In this type of bite, there is no closure of the front teeth, and sometimes premolars (front open bite). Significantly less common is the separation of the posterior teeth. This form is designated as a distal or lateral open bite.
The upper lip with a front open bite is shortened, and only in some patients who seek to hide the gap between the teeth, it becomes tense and elongated. The gap between the front teeth disrupts speech, the appearance of the patient, and
biting food is transferred to the posterior teeth. Cross bite is accompanied by a ratio of dentition in which the buccal tubercles of the lower posterior teeth
are located outward from the same upper with normal incisal overlap or lower lateral teeth are displaced relative to the upper in the lingual side with the opposite ratio of incisors. Moreover, in the position of central occlusion with one or
on both sides there is an intersection (crossing) of the upper and lower dentition.
In this regard, the cross bite can be either single or double-sided. This type of bite is formed for various reasons. It may be a consequence of:
- narrowing of the upper or lower dentition;
- displacement of the lower jaw to the side;
- asymmetric position of the upper jaw in the facial skeleton;
- a combination of narrowing of the dentition with a disturbed position of the jaw in the skull.

Tests on this topic.
1. Show the anatomical formula of the dentition:
$
2 1 2 3 *
$
1 3 2 3
$
1 2 3 4 5 6 7 8
$
3 2 1 3
#
2. Show the clinical formula of the dentition:
$
1 2 3 4 5 6 7 8 *
$
2 1 2 3
$
2 2 1 3
$

3 2 1 3
#
3. In the permanent bite, the number of large molars:
$
8-12 *
$
8
$
4
$
6-8
#
4. The number of fangs in the permanent bite
$
4*
$
4-6
$
6
$
8
#
5. The number of premolars in the permanent bite:
$
8*
$
6
$
4
$
3-6
#
6. The central teeth of the upper jaw have the form:
$
trapezium *
$
square
$
conical
$
screw-shaped
#
7. The cutting surface of the fangs has the form:
$
chisel-like *
$
vague
$
trapeze
$
rounded
#

8. The first premolars of the upper jaw contain:
$
2 tubercle *
$
1 tubercle
$
3 tubercle
$
5 tubercle
#
9. The first molar of the upper jaw contains:
$
4 tubercle *
$
2 tubercle
$
5 tubercles
$
3 tubercle
#
10. The number of tubercles in the first premolar of the lower jaw:
$
2 *
$
3
$
4
$
5
#
11. The number of tubercles in the first molar of the lower jaw:
$
5*
$
4
$
7
$
3
#
12. The total number of frontal teeth:
$
12*
$
8
$
6
$
28-32
#
13. The chewing surface of the first molar of the upper jaw has the form:
$

diamond-shaped *
$
square
$
cuboid
$
prismatic
#
14. The ratio of the length of the crown of the tooth and the length of the root in the normal state of the periodontium:
$
coronal part 2 times shorter than root *
$
crown longer than root
$
the root is slightly longer than the crown
$
the ratio depends on the tooth group
#
15. The concept of periodontium includes:
$
gum, periodontium, tooth cement, alveolar bone *
$
the space between the wall of the tooth alveoli and the root surface
$
tooth root and patterns surrounding the tooth
$
pulp, gums and patterns surrounding the tooth
#
16. A device that determines the ability of a tooth to withstand pressure:
$
gnatodynamometer *
$
periodometer
$
electrodontometer
$
myotonometer
#
17. Types of physiological bite:
$
orthognathic, direct, biprognathy, physiological progeny *
$
physiological progeny, progenia, bipognathia, deep
$
progeny, prognathy, discovery, deep
$
bipognathia, cross, orthognathic
#
18. In the orthognathic bite, the dental arch is larger:
$
top *

$
depends on the structure of the face
$
lower
$
lonely
#
19. In the orthognathic bite, the apical arch is larger:
$
on the lower jaw *
$
on the upper jaw
$
depends on the structure of the face
$
depends on personal properties
#
20. In the orthognathic bite, the alveolar arch is larger
$
on the lower jaw *
$
on the upper jaw
$
both are the same
$
depends on age
#
21. In the orthognathic bite, among the basal arches there are more:
$
lower *
$
top
$
depends on age
$
both are lonely
#
22. In the orthognathic bite among the arches of the lower jaw, the smallest is:
$
dental arch *
$
anikal
$
basal
$
alveolar
#
23. The sagittal occlusal curve of the upper jaw has the form:
$
along curvature *
$
along the triangle

$
along the alveolar
$
basal

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good	- can make the right decision in extreme

	"4"	situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

6th topic: Examination of the patient in the clinic of prosthetic dentistry.

- main and additional types of examinations in the clinic of orthopedic dentistry
- survey features
- anamnesis, the appearance of the patient
- examination of the oral cavity
- examination of teeth and dentitions
- pathological tooth mobility
- examination of toothless jaws
- determination of the depth of the gingival pocket
- determination of the absolute pressure of the masticatory muscles
- methods for determining chewing pressure (Gnatodynamometry)
- methods for determining chewing effectiveness (tests)
- TMJ examination methods
- study of diagnostic models
- psychological preparation of patients before prosthetics

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	1. Preparing the audience. 2. Analysis of student preparation for class 3. Attendance check	Listen
Lecture introduction (10 minutes)	1. Preparation of the educational complex on this topic. 2. Preparing slides for the lesson. 3. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2.Kopeikin V.N., Knubovets Y.S.,	Listen and record

	Kurlyandsky V.Yu., Oksman I.M. "Dental prosthetics" 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. "A Guide to Practical Classes in Orthopedic Dentistry" 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	
Main part (65 minutes)	1. Divide the group and ask questions. 2. Use visual aid 3. Use slides, multimedia 4. Summing up the topic 5. Assessment of actively participatingstudents.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Examination of the patient in the clinic of orthopedic dentistry
2. The main and additional types of examination of the patient
3. Anamnesis
4. Patient examination
5. Interrogation and identification of complaints
6. Oral examination
7. Examination of the oral mucosa
8. Examination of teeth and dentitions
9. Pathological tooth mobility
10. Determining the depth of the gingival pocket
11. Chewing Pressure Methods
12. Gnatodynamometry
13. Methods for determining chewing effectiveness
14. TMJ examination methods
15. The study of diagnostic models
16. Psychological preparation of patients before prosthetics

Methodology of the practical lesson:

The methods of examination of the patient are usually divided into clinical (used in the chair, patient's bed) and paraclinical (instrumental, laboratory, radiological, that is, conducted in the auxiliary services of the clinic).
This division of methods, as well as other methods of their classification, is rather arbitrary.
CLINICAL SURVEY METHODS
Clinical examination methods include:
a) a survey of the patient (clinical conversation);
b) external examination of the patient;
c) examination of the temporomandibular joint and chewing muscles;
g) examination of the oral cavity:
- study of the oral mucosa;
- examination of teeth and dentitions;
- periodontal examination;

- examination of the toothless alveolar part.

Interview with a patient (history)

The collection of anamnesis (from gr. Anamnesis - I recall, memory) is the first stage of the examination of a patient who is offered to reproduce the medical history from memory.

A patient survey consists of the following sections, which are sequentially outlined:

1) complaints and subjective condition of the patient;

2) the history of the disease;

3) the life story of the patient.

The range of questions that the doctor asks the patient depends on the nature of the disease. In some cases, the anamnesis is short and the doctor does not need to go into the history of life, in others, the anamnesis should be collected in detail, especially in the part that is of the greatest interest for making a diagnosis. For example, when contacting a patient about a traumatic defect in the incisor, the anamnesis will be short, because the etiology of the lesion is known and everything that is required for orthopedic treatment can be clarified upon examination. Another thing is when the patient complains of a burning sensation that appears in the mucous membrane under the prosthesis. Here, the history, like the entire examination, will be detailed. It is necessary to examine not only the organs of the oral cavity, but also other organ systems with the involvement of doctors of a different specialty.

Often patients present complaints that they think are the main ones, and from the point of view of the doctor are secondary. For example, the patient pays attention to the ugly position of the front tooth, without noticing the anomalies of the dentition in the form of their narrowing. The doctor must identify both secondary and main causes of the disease, focusing on the latter. Particular attention is paid to pain complaints. Here you need to find out the severity, nature, frequency,

localization of pain. When collecting an anamnesis, it is important, first of all, to find out the earliest

manifestations of the disease, the nature and characteristics of its course, type and extent of treatment. It is also necessary to find out the time of tooth loss, complaints about the condition of the gastrointestinal tract. With a number of diseases that need orthopedic

treatment (for example, diseases of the temporomandibular joint), you should talk with the patient about the probable causes that, in his opinion, caused this disease.

You can not conduct a survey of the patient, limited to avaricious questions and content with the same avaricious answers. The conversation should be expanded, skillfully and carefully find out the patient's emotional state, his attitude to the disease and treatment, readiness for long-term therapy and a desire to help the doctor's efforts. This will make it possible to gain an idea of his mental identity, the knowledge of which plays a significant role in the tactics and behavior of the doctor, both during medical manipulations and during the period of getting used to the prosthesis. When collecting an anamnesis, the place of birth and place of residence, home conditions, working conditions at work, nutrition, and past illnesses are found out. The importance of a particular item in the history of life is determined by the clinical picture of the disease. Knowing the patient's birthplace and life is important because

possible so-called regional pathology. For example, with an excess of fluoride in drinking water in this area, a focus of endemic fluorosis occurs, in which tooth enamel is affected.

When children contact about dentoalveolar anomalies, a medical history is collected from their parents. In this case, the doctor tries to get answers to the following questions: the state of the mother during pregnancy, how the birth took place, how many were there, whether this child was born full-term, with what weight, by which account, in what way was fed (breast or artificially) and to which time.

The diseases suffered by the child and their course are also clarified. The time of teething of milk teeth, the causes of premature loss of teeth, the time of the change of teeth, as well as the age when the child began to walk and talk, are clarified.

Data is collected on living conditions, eating habits, the nature of chewing (chewing fast, slow, on one, on both sides). It is important to find out the method of breathing day and night (through the mouth or through the nose, sleeps with an open or closed mouth), the child's favorite position during sleep, bad habits and which ones (sucking fingers, tongue, biting nails, pencil, etc.). It is being ascertained whether orthodontic treatment was carried out before (at what age, for how long, with what devices, with what
results), whether there were operations in the oral cavity (when, what), whether there was an injury, what inconvenience the patient feels at the moment and what he complains about (aesthetic, functional disorders). It is necessary to find out how the patient successfully used prostheses, and if not, then for what reason. This information is important for the planning and prognosis of orthopedic treatment. In connection with the existence of hereditary diseases with anomalies of the masticatory-speech apparatus (lower macrognathia, deep bite), one should be interested in the presence of anomalies in relatives
relatives.
In an adult patient, unlike a child, many questions disappear when determining the history. During the conversation, the doctor determines the degree of motivation for treatment (mood) for orthopedic treatment. Some adult patients stop treatment, unable to withstand difficulties. Despite the wide development of laboratory and instrumental studies, the use of computers in diagnostics, the role of interviewing a patient should not be diminished. It belongs to the oldest and classic methods of examination.
The famous Russian doctor G. A. Zakharyin considered the questioning of the patient to be an art. He wrote: "No matter how much you listen to the patient and tapping, you can never accurately determine the disease if you do not listen to the testimony of the patient himself, if you do not learn the difficult art of exploring the mental state of the patient."

External examination of the face
All patients should be examined by face. This is done imperceptibly for the patient. During the survey pay attention to:
- the condition of the skin of the face (color, turgor, rash, scars, etc.);
- the severity of the chin and nasolabial folds (smoothed, moderately expressed, deepened);
- position of the corners of the mouth (raised, lowered);
- line of closing lips (presence of jams);
- the degree of exposure of the front teeth or the alveolar part when talking and smiling;
- the position of the chin (straight, protrudes, sinks, is shifted to the side);
- symmetry of the halves of the face (Fig. 2.1);
- the height of the lower part of the face (proportional, enlarged, reduced).
If necessary, the patient is asked guiding and clarifying questions. So, for example, in the presence of scars, the cause is determined (burn; consequence of injuries, diseases, operations performed; prescription, effectiveness of the treatment, ratio
patient to their appearance, etc.). At the same time, they pay attention not only to the content of the answer, but also to how the patient responds (speech purity, soundless breathing). This complements the degree of informativeness of the external examination, since with anomalies of the masticatory-speech apparatus, facial and dental signs are of significant importance.

In orthopedic dentistry, the division of the face into sodium parts is widespread (Fig. 2.2):
- upper — located between the border of the scalp on the forehead and the line,
connecting eyebrows;

- middle - its borders are the line connecting the eyebrows, and the line that runs along the base of the septum of the nose;
- lower - from the base of the nasal septum to the lower point of the chin.

In general, the division of the height of the face into three parts is conditional, since the position of the points according to which the division is carried out is very individual and during human life can change. For example, the border of the scalp on the forehead in various The subjects are located differently and can move with age. The same applies to the lower part of the face, the height of which is variable and depends on the type of closure and the preservation of the teeth. The least variable is the middle third of the face. Despite the fact that between the sizes of the indicated parts of the face it is impossible to discern a natural proportionality, in most individuals they have a relative correspondence, which provides an aesthetic optimum.

Examination of the temporomandibular joints and chewing muscles

Diagnosis of diseases of the temporomandibular joint based on medical history, clinical examination of the oral cavity and joints themselves, functional tests, results of x-ray studies.

During a conversation with the patient, it is necessary to clarify his complaints. Most often, patients complain of clicking in the joint, pain, restriction of opening the mouth, crunching, headache, hearing loss. Many patients do not complain, but when examining them this or that pathology of the joint is revealed. Thus, the study of the temporomandibular joint is mandatory for patients with pathology of the dentition (abnormalities, complete or partial loss of teeth, deformation, increased abrasion, periodontal disease, etc.). Then it should be clarified when the disorders called by the patient, for example, clicking in the joint, appeared and with what it connects them (trauma, loss of teeth, flu, wide opening of the mouth when removing teeth, etc.). An important point in the collection of anamnesis is to establish a connection between tooth loss and joint disease, and whether the patient was prosthetized and whether there was relief after that.

At the end of the survey, the patient is palpated by applying fingers to the skin, in front of the tragus of the auricle or inserting the fingers into the external auditory meatus.

♦ Palpation - the use of fingers (usually the pads of the terminal phalanges of the thumb, forefinger, middle finger, less often the little finger) to study the tone of the masticatory muscles, localize painful points in them, examine the bone base of the prosthetic bed, and also study the mobility and compliance of the mucous membrane of the cavity mouth, in particular - bridles and dangling ridges. On palpation of the joint, pain can be detected, tremors, clicking and crackling are often felt. Therefore, palpation here plays the role of auscultation, although noises, crunching, clicking can be heard by a phonendoscope.

In addition, the introduction of noise in analog form into a computer (if appropriate programs are available) allows one to obtain their spectral analysis. Such a diagnostic method is called

arthrophonometry (A. Ya. Vyazmin; E. A. Bulycheva). Palpation allows you to detect smoothness or jerking, the amplitude of the movements of the heads of the lower jaw during opening and closing of the mouth, the synchronism of movements of the left and
right heads. At the same time, it is possible to note the clicking, crunching, their combination and synchronism with various phases of opening the mouth.
The heads of the lower jaw are characterized by two types of movement, determined by palpation, namely normal, smooth, without going beyond the top of the articular tubercle, and movement with large amplitude, with going to the top of the articular tubercle, or to the side. Some of these excursions may be on the verge of a subluxation. Finally, there may be a habitual dislocation with the head completely leaving the articular cavity beyond the top of the tubercle.
Functional tests of the joint include checking the excursion of the lower jaw when opening and closing the mouth. In this case, the following two types of its movements can be noted. At the first, called direct (progressive, smooth), the trajectory
incisal point on the frontal plane when opening and closing the mouth does not shift to the side. In the second - a wavy (zigzag, step) incisor point when moving the lower jaw moves to the right or left of the sagittal plane, forming a wave or zigzag, step. When the trajectory of the incisor point combines the elements of direct and wave-like motion of the lower jaw, they speak of a combined movement. This type also includes those trajectories that, when opening the mouth, have a rectilinear direction, and when closing, they are distorted by a shift or zigzag. Difficult opening of the mouth can occur both with narrowing of the mouth opening, and with difficulties in the movements of the lower jaw due to muscle or joint contracture. In itself, a difficulty in opening the mouth indicates a certain pathology. In addition, it interferes with many manipulations associated with prosthetics (the introduction of impression spoons or prosthesis). At the same time, the degree of separation of the dentition when opening the mouth is established.
On palpation of the chewing muscle itself (Fig. 2.3), the thumb is placed on its front edge, the rest are located on the posterior edge. The muscle is gently compressed with your fingers. You can palpate it bimanally: with the index finger on the side of the oral cavity, with the thumb - outside. Thus determine the degree of development and severity of the muscle, its tone, areas of compaction and pain points, if any. The temporal muscle is palpated by intraoral access and externally in the temporal region. In the oral cavity, the index finger examines the place of attachment of the muscle to the coronoid process. Outside, on the right and on the left, the muscle is palpated with four fingers of each hand, placing them in the temporal region. The front surface of the medial pterygoid muscle is examined with the index finger sliding up the pterygo-maxillary fold from the retromolar region of the lower jaw. The lower part is also palpated by intraoral access, when lowering the index finger into the distal sublingual region, to the corner of the lower jaw. On palpation of the medial pterygoid muscle, the index finger is also directed along the mucous membrane of the vestibular surface of the alveolar process of the upper jaw distally and upward, beyond the alveolar tubercle.

Oral examination

When examining the oral cavity, the doctor uses a dental mirror, which can be provided with a light bulb to illuminate the distal parts of the oral cavity. In addition to it, the tool kit (Fig. 2.4) includes dental tweezers with curved ends and curved probes - pointed and with an olive-shaped tip and notches. The first is designed to study the marginal fit of fixed prostheses, the second - to determine the depth of the gingival pockets.
An examination of the oral cavity should be carried out in a certain sequence:
- study of the oral mucosa;
- examination of teeth and dentitions;
- periodontal examination;
- examination of the toothless alveolar part.

The study of the oral mucosa. With general clinical characteristics
the state of the mucous membrane of the upper and lower jaw, in addition to morphological features of practical importance (see Ch. 1.), it should be noted
color, humidity, the presence of scars, polyps, aphthae, erosion, ulcers, petechiae, hemangiomas, papules,
vesicles and other pathological manifestations (leukoplakia, lichen planus).
In the presence of certain changes in the mucous membrane, the doctor in the medical history makes
corresponding record, which reflects the localization of changes, their qualitative and quantitative characteristics. It should be noted that there is a large group of diseases of the oral mucosa. At the same time there are quite a lot
somatic diseases, one of the manifestations of which are changes in the mucous membrane. Therefore, when identifying certain changes in the mucous membrane, an additional examination by doctors of other specialties is often required.
Normally, the mucous membrane is pale pink or pink, moist, shiny. However, it must be remembered that violations of salivation and salivation (scanty, profuse) distort the perception of color and humidity of the mucous membrane. In addition, when
it can become inflamed in a number of diseases, becoming edematous, loosened and bleeds, its hyperemia, sometimes combined with cyanosis, is noted.
In addition to studying the mucous membrane of the transitional fold, cheeks, hard and soft palate, they examine the mucous membrane of the tonsils, posterior pharyngeal wall, and tongue. In this case, children need to check nasal breathing, which may be difficult in
connection with hypertrophy of the pharyngeal tonsils, as well as with the presence of adenoids. Attention should be paid to the method of swallowing (with proper swallowing, the lips are calmly folded, the teeth are compressed and the tip of the tongue rests against the hard palate behind the upper incisors),
the position of the tongue and lips during a conversation, to cleanliness
pronunciation of speech sounds.
In those cases when difficulty breathing is detected, it is necessary to refer patients to the otolaryngologist, in case of speech impairment - to a speech therapist, and if bad schoolchildren are identified, to a neurologist or psychiatrist, as this may be a symptom of a neurosis.

Examination of teeth and dentitions is carried out in a certain order, starting from the upper jaw, and each tooth is examined sequentially from a wisdom tooth of one side to the other of the same name.
When examining each tooth, pay attention to the following:
1) his position;
2) form;
3) color;
4) the state of hard tissues (caries, fluorosis, hypoplasia);
5) the presence of fillings, inlays, artificial crowns, their condition
6) tooth stability;
7) the ratio of the extra-alveolar and intra-alveolar parts of it;
8) position in relation to the occlusal surface of the dentition.
In addition to visual inspection, when examining teeth, probing and percussion are used.
♦ Probing and percussion are derived from palpation. The first is a study using a probe in carious cavities, gingival grooves (pockets), tab edges or artificial crowns; and the second - grinding on the crown of the tooth to determine the reaction of the periodontium to these tremors.
Then, the shape of the dentition should be established (narrowed symmetrical: U-shaped,
V-shaped, O-shaped saddle; asymmetric, trapezoidal).
The nature of the closure of the dentition (bite), the amount of antagonizing
pairs of teeth. Usually determining the type of closure of the teeth does not cause difficulties.

Difficulties arise in pathological conditions, in particular with jaw fractures, especially multi-fragmented ones. The erase facets called Engle's occlusal sites can be of great help in this . They are formed as a result of the friction of the teeth during their articulation and have a location defined by the type of bite. In addition, you should pay attention to the front section
attention to the depth of the incisal overlap. The examination allows you to get a preliminary idea of the nature of the occlusal surface and its possible deformations.

Examination of the toothless alveolar part as part of the prosthetic bed is carried out by examination, palpation. On examination, first of all, attention is paid to the moisture and color of the mucous membrane (pale pink, bright red for hyperemia, cyanotic for congestion), integrity (ulceration, pressure sores, strangulation grooves from pressure, most often located on the borders of the prosthesis, near the mucous membrane tubercle on the lower and alveolar tuber on the upper jaw),
excess mucous membrane in the form of a dangling "cock's crest".
It is easy to determine the size, shape (rounded, pointed) of the alveolar ridge, the shape of its slopes (gentle, vertical, with a niche), degree (moderate, medium, pronounced) and the nature of atrophy (uniform, uneven), the presence of sharp protrusions that appear after tooth extraction with poor processing of bone wounds, exostoses, overhanging edges with undercuts. In the upper jaw, it is important to pay attention to the alveolar tubercle, its size, the thickness of the mucous membrane that covers it, and sometimes an excess of it, and in the lower jaw the mucous tubercle that appears after removal of the third molar. On examination, it is also possible to notice folds of the mucous membrane extending longitudinally along the top of the ridge or on its slopes. There may also be strands, scars of the mucous membrane formed after an injury, gross tooth extraction or burns. One should always examine the places of attachment of the lingual, buccal and labial frenum (at the base, on the slope or on top of the alveolar part) and their mobility. Palpation determines the relief of the alveolar ridge (smooth, tuberous), malleability of the mucous membrane (supple, dense, thinned, loose), the mobility of the folds running along the alveolar part or its slopes, especially on the lingual side, their expansion with the corresponding finger effort. Palpation will reveal hidden bone protrusions, painful
with a little pressure, which subsequently will cause pain and make it difficult to use the prosthesis.
Based on the assessment of the condition of the teeth (the presence or absence of teeth, mobility of one degree or another, the presence of atrophy of the wall of the well), as well as the results of instrumental examination methods, in particular gnatodynamometry (see below),
(Duchange, Wustrow, Mamlock, etc.) static methods for determining masticatory effectiveness, which, on a formal basis, should be considered clinical.
The so-called static methods of accounting for the state of the supporting apparatus of the teeth (N. I. Agapov; I. M. Oksman; V. Yu. Kurlyandsky), due to their mechanistic approach to the shock-absorbing ability of the periodontium, retained a certain significance only in the educational process.

Periodontal examination. In a clinical examination, it is important to assess, first of all, the state of marginal periodontal disease. This includes changes in the gingival margin (inflammation, atrophy), the presence of a gingival pocket; its depth, suppuration.
An important detail in the characterization of periodontal conditions is the ratio of the extra- and intraalveolar part of the tooth. With gum atrophy, the clinical crown increases, and with it, the extra-alveolar part grows. An increase in the external lever entails a change in the biomechanics of the tooth with the appearance of functional periodontal overload.
Thus, gum atrophy, an increase in the clinical crown, the formation of a pathological pocket are symptoms of periodontal pathology and a decrease in its functionality. The latter is expressed in the appearance of unusual in the scope and direction of tooth movements, otherwise called pathological mobility.

♦ Pathological tooth mobility is their displacement noticeable by the eye, even from the influence of a small effort, such as pressure on the tongue.
There is also physiological (normal) tooth mobility. It is a natural, visually invisible and due to the elasticity of the periodontium. Its existence is confirmed by special complex devices or indirect
signs in the form of erasing contact points and the formation of contact pads.
Tooth mobility is a very sensitive indicator of periodontal disease. In terms of its degree and increase, it is possible, to some extent, to comprehend the state of the supporting apparatus of the teeth, the direction of development of the pathological process or its exacerbation.
Therefore, the study of the severity of pathological tooth mobility is of great importance for the diagnosis of the disease, evaluation of treatment results and for prognosis. It is very important to register the initial signs of tooth mobility.This allows you to diagnose a periodontal lesion in its initial stage.
Pathological mobility is studied both with an open mouth and with articulation of teeth. This allows in some cases to identify the cause of periodontal pathology and associated pathological mobility. Such causes may be impaired occlusion.
with the formation of blocking moments in one or another phase of articulation.
Four degrees of pathological tooth mobility are distinguished.
(D.A. Entin):
- at the first degree there is a tooth displacement in one direction (vestibulo-oral);
- in the second degree, the tooth has apparent displacement both in the vestibulo-oral and mesio-distal directions;
- with the third degree, the tooth, in addition, shifts in the vertical direction: when pressed, it plunges into the hole, and then returns to its original position;
- with the fourth, extreme degree, possible, among other things, rotational movements of the tooth.
The third and fourth degrees of mobility indicate far-reaching and, for the most part, irreversible periodontal changes.
Pathological tooth mobility is closely related to the presence of pathological gingival (periodontal) pockets. Their presence and depth are checked with a specially graduated probe with an olive-shaped tip. At the same time, the nature of the discharge and the condition of the gingival margin are clarified.
A common method for determining the degree of pathological tooth mobility is to use tweezers for this. For this purpose, special devices are also used. However, both methods are very indicative.

Tests on this topic.

1. The anatomical neck of the tooth corresponds to:
$
enamel transition to root cement; *
$
the border of the supra- and subgingival parts of the tooth;
$
equator of a tooth;
$
a gingival pocket.
#

2. When filling out medical history doctor stoma Tologoi orthopedist in the column and transferred ities stvuyuschih diseases pay attention primarily on the pathology: 1) the

gastrointestinal tract; 2) endocrine system; 3) infectious diseases; 4) the cardiovascular system; 5) neuropsychiatric diseases .
$
1 + 2 + 3 + 4 + 5 *
$
1 + 2 + 4 + 5
$
1 + 3 + 4 + 5
$
2 + 3 + 4 + 5
#

3. Additional methods of research in clinic of orthopedic dentistry is are: 1) X-ray; 2) electrodontometry; 3) thermal diagnostics; 4) masticiography; 5) myography.
$
1 + 2 + 3 + 4 + 5 *
$
2 + 3 + 4 + 5
$
1 + 2 + 4 + 5
$
1 + 3 + 4 + 5
#

4. For the degree of atrophy of the tooth socket, the size obtained by probing the tooth of the gingival pocket in the region of:
$
vestibular surface; *
$
distal side;
$
medial side;
$
oral surface;
#

5. F functional- Methods in op topedicheskoy dentistry: 1) inspection; 2) palpation; 3) rheography; 4) chewing tests .
$
1 + 3 + 4 *
$
2+ 3
$
1+ 4
$
2 +4
#

6. Methods for determining the degree of atrophy of the bone tissue of the alveoli of the tooth: 1) **radiological; 2) sounding; 3) palpation; 4) electrodontodiagnosis**
$
1 + 2 *

$
3 + 4
$
1 + 3
$
1 + 4
#

7. Objective research patient starting out with:

$
external inspection *
$
examination of the mucous membrane;
$
filling in the dental formula;
$
studying diagnostic models;
#

8. When collecting an anamnesis in the clinic of orthopedic dentistry from past illnesses, it is necessary to take into account: 1 and allergic status; 2 flu, tonsillitis, childhood infections; 3 cardiovascular, endocrine andrvnoy systems; 4 blood diseases; 5 hepatitis, HIV infection, syphilis.

$
1 + 2 + 3 + 5 *
$
1 + 2 + 3 + 4
$
2 + 3 + 4 + 5
$
1 + 3 + 4 + 5
#

9. The condition of the tooth is determined by analysis of: form; mobility; colors; position in the dentition; quality of filling.

$
1 + 2 + 3 + 4 + 5 *
$
2 + 3 + 4+ 5
$
1 + 3 + 4 + 5
$
1 + 2 + 4 + 5
#

10. The objective methods of examination of the patient in the clinic of orthopedic dentistry including The chaet: inspection; palpation; 3) a survey; instrumental examination of the oral cavity; filling in the passport part of the medical history.

$
1 + 2 + 4 *
$
1 + 2 + 3 + 4
$
1 + 2+ 3+ 4+ 5

$
2 +3+ 4+ 5
#

11. Laboratory Methods in ortho pedicheskoy dentistry: percussion; radiography; myography; myotonometry; obtaining diagnostic models .
$
2 +3+ 4 *
$
1 + 2+ 3
$
2 +3+ 5
$
3 + 4+ 5
#

12. The main parameters of functional prices Nosta tooth:
$
bone atrophy and tooth mobility; *
$
tooth color and size;
$
gum disease and tooth color;
$
tooth mobility and dental deposits;
#

13. The functional methods of examination include: masticography; electromyography; method of N.I. Agapov; method of I. M. Oxman; chewing test S.I. Rubinova .
$
1 + 2+ 5 *
$
1 + 2+ 3
$
2 +3+ 4
$
3 +4 +5
#

14. If your doctor during the inspection appeared on the mere suspicion for the presence of syphilis in a patient, he should:
$
complete the examination and refer the patient for a blood test. *
$
tell the patient about his suspicion and stop taking it;
$
refuse a patient for providing dental power;
$
further examination and treat dental surg whom the disease;
#

15. Tooling for the initial examination of the patient in the clinic orthopedic stomatitis ogy includes:
$
probe, mirror; tweezers;*
$
probe, mirror,
$
probe, mirror, tweezers, excavator;
$
probe, mirror, tweezers, excavator, iron;
#

16. The second degree of tooth mobility along Entin is characterized by tooth movements in the direction of :
$
vestibulooral and medial distal; *
$
medial distal;
$
vestibular-oral;
$
vestibulooral and medial distal, including vertical;
#

17. A gnatodynamometer measures:
$
periodontal endurance to load; *
$
absolute strength of the masticatory muscles;
$
chewing effectiveness;
$
pain sensitivity.
#

18. Chewing coefficients proposed NI Agapov, and based on ana lease:
$
tooth mobility and its location; *
$
atrophy of bone tissue and tooth mobility;
$
the location of the tooth and its structure;
$
tooth structure and atrophy of bone tissue.
#

19. Chewing test S. E. Gelman shows:
$
chopping degree 5 g of walnut after 50 chewing movements; *
$
time required to complete 50 chewing movements;

$
Shade grinding 5 g almond after chewing those chenie 50c;
$
fineness 0.8g nut after chewing Nia until swallowing reflex;
#

20. The absolute strength of the masticatory muscles according to Vera during their bilateral contraction is (kg):

$
390. *
$
195;
$
300;
$
100;
#

21. III degree of mobility of the teeth Entin ha acterized tooth movements in the direction SRI:

$
vestibulooral and medial distal, including vertical; *
$
vestibulooral;
$
medial distal;
$
vestibulooral and medial distal;
#

22. IM Oxman proposed in addition to Meto dy determining the chewing efficiency of NI Agapov analysis:

$
tooth mobility; *
$
discoloration of the tooth;
$
condition of the tooth crown;
$
atrophy of the bone tissue of the jaw.
#

23. endurance coefficients periodontal zu ERD proposed VY Courland, half are finite at the basis of these studies:

$
gnatodynamometry; *
$
anatomical features of the structure of the teeth;
$
tooth mobility;
$
chewing samples.

#

24. The size of the chewing coefficient according to N. I. Agapov depends on: tooth mobility; number of roots; values of the crown of the tooth; tooth locations.
$
2 +3+ 4 *
$
1 + 2+ 4
$
1 +3+ 4
$
1 + 2+ 3
#

25. Chewing sample JS Rubinova indicating is: 1. fineness of 5 g of nut 50 after chewing movements; 2. the time, the need and mine to make 50 chewing movements; 3. The degree of milling of 5 g almond after chewing those chenie 50; 4. fineness 0.8g nut after chewing Nia until swallowing reflex; 5. time to chew food.
$
4 + 5 *
$
1 + 2
$
3 + 4
$
2 + 3
#

26. IV degree of mobility of the teeth Entin ha acterized tooth movements in the direction SRI:
$
in all directions, including rotation *
$
medial distal
$
vestibulooral and medial distal;
$
vestibulooral and medial distal, including vertical;
#

27. In chewing samples of S. E. Gelman, S. I. Rubinov, the chewed particles are sieved through a sieve with holes with a diameter (mm):
$
2.4 *
$
1,2;
$
0.5
$
3.6.
#

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy	- understands the meaning of the questions asked

	completely "3"	- cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 7: Additional methods for examining a patient in an orthopedic dentistry clinic.
- determination of chewing pressure and chewing effectiveness
- methods for determining chewing pressure (Gnatodynaminometry)
- methods for determining chewing effectiveness (tests)

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	4. Preparing the audience. 5. Analysis of student preparation for class 6. Attendance check	Listen
Lecture introduction (10 minutes)	4. Preparation of the educational complex on this topic. 5. Preparing slides for the lesson. 6. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	6. Divide the group and ask questions. 7. Use visual aid 8. Use slides, multimedia 9. Summing up the topic 10. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work	Listen Write down

	3. Set homework	Write down

Gnatodynamometry. Periodontal endurance is measured using special instruments called gnatodynamometers (Fig. 2.14). The device of this type was first proposed in 1893 . The attraction that created two apparatus for the study of chewing pressure: one to determine the pressure in the oral cavity, and the second to measure the force necessary to crush certain types of food outside the oral cavity.

Modifications of gnath-dynamometers are known, the sensing device of which are strain gauges (I. S. Rubinov; L. M. Perzashkevich; D. P. Konyushko and A. I. Drabkin). In recent years, new designs have been proposed - electronic gnato dynamometers "Vizir". They are devices powered by a battery with a nominal voltage of 9.6 V. This desktop device consists of a strain gauge and functional units, has digital indexing of the results of force measurements in Newtons.

The Gnatodynamometer is equipped with stainless steel interchangeable nozzles for various departments of the dentition. The main part of the sensor is an elastic element in the form of a double beam of equal resistance. At the free ends of the beam are located

bites that are placed between the antagonist teeth, perceiving the power of chewing muscles. The measured force causes the deformation of the elastic element, which leads to a change in the electrical resistance of the strain gauges.

After checking the operation of the gnatodynamometer (control of the zero reading of the digital display), the bite pads of the sensor are installed between the antagonizing teeth and the subject compresses them to the maximum. The result is recorded on a digital display.

For a long time, periodontal endurance was determined according to the Haber table (table. 2.2). However, the figures given in it do not differ in accuracy, give only a general idea and cannot be used in prosthetics practice.

Based on gnath-dynamometric studies, D. P. Konyushko compiled a periodontal endurance table (Table 2.3) for both men and women. The stamina of symmetrically located teeth is the same with the exception of the upper premolar in women (the left has endurance of 27 kg and the right has 25 kg). Currently, the results of these studies are significant only in the educational process.

The study of masticatory effectiveness is carried out using functional (masticatory) methods, allowing to obtain a more correct idea of the violation of this function. The first functional test was developed by Christiansen.He suggested chewing effectiveness.
by examining the degree of grinding food of a certain consistency and mass. The subject was given 5 g of hazelnut or coconut. After 50 chewing movements, he spat out the food mass, dried it and sifted through a sieve with a diameter
holes in 2.4 mm . Chewing ability was calculated by the residue on the sieve.
S. E. Gelman modified the chewing test method. Instead of hazelnuts, he took 5 g of almonds, and instead of 50 movements he offered to chew for 50 s.
Further development of a functional chewing test was carried out by I. S. Rubinov. He believed that chewing 5 g of almond kernels poses a challenge for the chewing apparatus that goes beyond the normal range. Therefore, the patient was invited to chew
0.8 g of walnut, which is approximately equal to the mass of one almond kernel.
The sample is carried out as follows. The test subject is given 0.8 g of nut and is asked to chew it until the swallowing reflex appears. As soon as the subject has a desire to swallow a chewed nut, he is offered to spit out the contents in a kidney-shaped basin. The chewing time of the nut is counted by the stopwatch. As a result of a functional test, two indicators are obtained: the percentage of chewed food (chewing ability or effectiveness) and the time of chewing.
Studies have shown that with an orthognathic bite and intact dentition, 0.8 g of nut is completely chewed in 14 seconds. As tooth loss occurs, chewing time lengthens. At the same time, the residue on the sieve increases. Other functional (chewing) tests are also known (M. M. Soloviev; A. N. Ryakhovsky). When analyzing the result of a sample, you should always consider the time of chewing and the percentage of chewed
food. Evaluation on a single indicator may lead to erroneous conclusions. For example, with a chewing test carried out in a patient with complete loss of teeth, immediately after applying prostheses, the food is chewed up to 80%. It would seem using
prosthetics managed to almost completely compensate for the loss of natural teeth. However, if you measure the time of chewing, it will be 2-3 times more than normal.
The presence of two indicators (time in seconds and the effectiveness of chewing in grams) makes it difficult to compare the results of prosthetics even in one patient. A chewing test should

be carried out for the same time or use the chewing index proposed by V. A. Kondrashov. It is obtained by dividing the mass of chewed food in grams by chewing time in seconds.

The study of diagnostic models of the jaw

♦ The jaw model is an accurate reproduction of the surface of hard and soft tissues located on the prosthetic bed and its borders.

♦ The term prosthetic bed combines organs and tissues that are in direct contact with the prosthesis (E. I. Gavrilov).

Information about closing teeth can be obtained directly by examining the dentition in the oral cavity. At the same time, this method has drawbacks, because it does not allow you to see the closure of the palatine and lingual tubercles.For this, as well as for a better overview, diagnostic models of the jaws are convenient, which are obtained from high-strength gypsum from imprints of the upper and lower jaw.

The base of the models is made out using special apparatuses, rubber molds. You can fix the model in the apparatus (Fig. 2.6), which reproduces the movements of the lower jaw (occluder, articulator). It studies all kinds of movements

the lower jaw, which is sometimes difficult to identify in the oral cavity, and also the characteristics of the occlusal relationships, premature occlusal contacts and blocking moments are determined.

On the models mark the number of the medical history, last name, first name, patronymic of the patient, as well as the date of receipt of the print. Such models are both diagnostic and control and. They facilitate the diagnosis, development of a treatment plan and help to judge its results.

On diagnostic models, one can study the shape of the dentition, their deformation, compare the teeth of the same name on the right and left halves of the jaw, occlusal contacts of the palatine and lingual tubercles, the degree of overlap of the lower front teeth with the upper,

occlusal curve root, occlusal deformity

surfaces of dentitions, etc.

You can also study the position of the teeth that limit the defect, their displacement, tilt.

Using diagnostic models, it is possible to clarify the surface relief of the alveolar part (smooth, tuberous), the degree of atrophy (moderate, medium, pronounced) and its nature (uniform, uneven), hypertrophy, deformation after tooth loss or injury.

Diagnostic models also make it possible to get an idea of the position of the toothless alveolar part in relation to a similar, but located on the opposite jaw, or natural teeth. Thus, in essence, examination of diagnostic models is a continuation of the clinical examination of the patient.

On the diagnostic models of the jaws, it is possible to carry out measurements and draw the profile of the cross section of the alveolar ridge in various departments with special instruments.

Separately, on the models of the upper and lower jaws, transversal, sagittal and vertical deviations are determined, respectively, to three mutually perpendicular planes (Fig. 2.7):
1) the sagittal plane running in the middle of the palatine suture. Individual teeth or groups of teeth may be too close to this plane or separated from it. By
the transversal deviations, in particular the one-sided narrowing of the dental arches, are established relative to the sagittal plane;
2) the occlusal plane, which is perpendicular to the sagittal plane and touches the mesial-buccal tubercles of the first molars and buccal tubercles of the second premolar. This
an imaginary plane is used to determine vertical deviations;
3) a tubular plane perpendicular to the two planes mentioned above
and passing behind the most pronounced alveolar tuber of the upper jaw. With her
help establish shifts of teeth or their groups in the sagittal direction.
Measurements on models are carried out using compasses of various designs
(Fig. 2.8, c, d), symmetroscopes (Fig. 2.8, a, b), symmetrographs (Fig. 2.8, e) and other devices. The basis of transverse measurements is the premise that the sum of the width of the four incisors corresponds to a certain width of the dental arch. Based on this anthropometric principle, the Pop index is built. Author studying normal dental
rows, established the presence of proportionality between the width of the dental arch in the region of the first premolar and first molars and the sum of the transverse dimensions of the upper four incisors. Based on this pattern, he calculated the indices: premolar — 72–82
(average 80) and molar - 60–65 (average 64). In other words, the sum of the width of the incisors is 80% of the distance between the first premolars or 64% of the distance between the first molars.
Measuring points according to Pont in the upper jaw are the middle of the longitudinal fissures of the first premolars and the anterior intersection point of the longitudinal and transverse fissures of the first molars. On the lower jaw - the point between the premolars and the midpoint on the vestibular surface of the first molar (Fig. 2.9, a).
In cases where not all upper incisors have been cut (or missing), the width of the dental arch can be determined by the sum of the transverse dimensions of the lower incisors (the ratio of the width of the four upper incisors to the lower incisors is 1: 0.74 Tonne
or 4: 3 Eckel).
Measurements carried out by the Pont method are informative when narrowing the dental arches. However, the data obtained in determining their width are only indicative and not absolute indicators of the anomaly. Therefore, the index must be individualized depending on gender, racial and constitutional characteristics.

PSYCHOMEDICAL PREPARATION OF PATIENTS

Manifestations of anxiety in patients

Changes in the emotional state of outpatient dental patients are not always manifested in their behavior. The discrepancy between the existing emotional stress and the ongoing change in homeostasis is explained by volitional masking of anxiety.

♦ Emotional stress - a non-specific neurohumoral reaction, a condition that arose in the process of activity or communication, in which the emotional component prevails. It is usually for situations where there is great danger or responsibility. It occurs in extreme conditions, but can be expressed
and under normal conditions in people with a high degree of anxiety or little experience.

♦ Emotions - subjective reactions of a person to the effects of internal and external stimuli.

However, patient complaints, behavioral, outwardly negative signs of tension can be analyzed, shedding light on the true condition of the patient. The general picture is supplemented by registration of the main vegetative functions of the patient's body - respiratory and heart rate, blood pressure, etc. The state of emotional stress is especially characteristic for patients with adaptive and neurotic
reactions, conditions, such traits as suspiciousness, hypochondria, hypersensitivity even to slight pain or inconvenience.

♦ Hypochondria - painful suspiciousness, focus on subjective painful or other unpleasant sensations, conviction of a serious illness.

To determine the state of preoperative tension, the concepts of anxiety (anxiety) and fear are most often used.

♦ Anxiety is a state of anxiety, fearfulness before and during a reception, the expectation of a vague, vague threat, an imaginary danger.

♦ Fear differs from anxiety in experiencing an immediate, real, concrete threat.

The main and most frequent cause of emotional stress in patients at the dental appointment is the expectation of pain.

The severity of the anxiety symptom depends on age, gender, personality characteristics, the structure of mental disorders. According to clinical manifestations, three degrees of severity of anxiety can be distinguished, namely: low, moderate, high.

In patients with a low degree of anxiety, external manifestations are not detected. However, during the survey, you can hear sayings: "I'm somehow not at ease, I'm a little worried." At the reception, these patients behave calmly, easily come into contact, their reactions are adequate and do not interfere with the manipulations of the doctor. Low anxiety does not interfere with the patient's expedient activity, which is performed quite confidently with the external calmness of movements, posture, speech intonations. Moreover, the patient is internally prepared for admission, assembled. At the same time, a critical attitude is expressed to your fear. Assessment of low anxiety helps special psychological tests, which are described below.

In patients with moderate anxiety, the clinical picture is more diverse. The complaints are characterized by "internal anxiety" or "tension", "constraint". Thoughts about danger, about the need to be alert, come to mind. The suppression of fear requires considerable effort, the mood begins to fluctuate. Some of these patients at the doctor's appointment may seem calm, balanced. But they are given out by sweat beads on the upper lip, moisture in the palms of the hands, sometimes dilated or narrowed pupils, rapid pulse, hyper- or hyposalivation. Others show long-term anxiety, randomness of movements, variability of facial expressions, a moving, worried look. In addition, breathing quickens, electric changes

skin resistance. The timbre and speed of speech can change: hoarseness, coughing, stuttering, "swallowing" of the endings of words, trembling of the voice appear. Pauses between words and phrases increase. Speech becomes harsh, confused, with slips, hesitations or accelerated, with excessive detail, excessive emotional coloring.

There is compression or biting of the lips, lowering of the corners of the mouth, twitching of the eyelids, frequent blinking. The patient frowns or vice versa - his eyes are wide open, his eyebrows are raised or frown. Some patients wrinkle their foreheads and tightly compress their jaws.

The color of the skin of the face varies from pallor to diffuse hyperemia. The skin of the neck and upper chest is covered with red spots that can fuse. Sometimes "goosebumps" appear (pilomotor reaction), frequent movements of the larynx cartilage are noticeable (swallowing saliva due to "dry throat").

Very indicative of the hand movements of patients in a state of emotional stress. They become tense, constrained or harsh and erratic. The shoulders are raised, the elbows are retracted from the torso, tremor is noted, to hide which

patients hold one hand with the other, clasp them on their chests or hold them tightly by the armrests of a chair.

♦ Tremor - trembling of the fingers, eyelids, sometimes the head, arising, in particular, with emotional stress.

Sometimes the arms are clasped on the chest to push the doctor away at the slightest pain. Inadequate activity, fussiness, frequent change of posture, depression appear. The patient becomes silent with a sudden noise. In general, he can control his actions, make the right decisions.

With high anxiety, patients experiencing a strong fear of dental procedures complain of "languishing chest fading, intense fear, horror." They panic, turn pale, become covered with cold sweat, their eyes are bewildered, their expression is pained. In the chair, these patients are sitting tightly clutching the armrests in anticipation of pain. There may be motor manifestations: trembling, small aimless movements (tugging on the edge of clothes, sorting out a handkerchief, drumming with fingers, biting nails).

In some cases, this is combined with a general slowdown, alertness. Expedient activity is disturbed, the flow of thoughts is accelerated. Confusion, fussiness, lack of assemble, fluctuations in the choice of solutions are expressed. May be

intermittent breathing, its disturbances, sharp tremor, sometimes nausea.

Even after effective local anesthesia, some of these patients remain aroused, and they can suddenly make a sudden movement, as with pain, although it actually was not. These sudden movements cause serious injury to the tongue, cheeks or lips with a separation disc or bur. This includes persons with pronounced adaptive or neurotic reactions, subcompensated forms of adaptation. Most often, these are subjects with manifestations of mental maladaptation that forms during neurotic development or in psychopathic personalities. Patients of this group are not so common, but they are no exception. The number of them recently, unfortunately, is increasing.

Signs of emotional stress in patients at the appointment with the enemy dentist. In the structure of adaptive reactions in a patient who is in a state of psychoemotional stress, emotional manifestations can be distinguished: feeling

fear, anxiety, anxiety in anticipation of pain, an unfavorable outcome of treatment, decreased or fluctuating moods, confusion, depression or apathy, inability to mentally gather. Due to the close relationship of emotional and

the sensory components of the pain syndrome there is a psychogenic increase in pain.

Vegetative manifestations include changes in heart rate (tachycardia, bradycardia, extrasystole), accelerated respiration rate, change in skin electrical conductivity, hyperemia or pallor of the skin of the face and neck, hyperhidrosis (increased sweating) of the face and palms, dilated pupils, hyper- or hypofunction of some glands of external secretion (salivary, sweat).

Motor-behavioral manifestations are changes in the facial expressions, timbre and intonation of speech, speed, strength and coordination of movements, changes in behavior:

- lip tightening, lack of a smile, a pained expression on the face, tension in the masticatory muscles, a change in the expression of the eyes (sad, dull or worried look), frequent blinking;
- motor restlessness, randomness of movements, frequent change of poses or, on the contrary, lethargy of movements, passivity of posture, duration of its preservation, fingering of a handkerchief, jacket jacket floors. Violations of the activity process are manifested in two ways: with blocking activity, or with a tendency to active activity.

When establishing the level of emotional stress in a number of dental patients, there was an inconsistency between the severity of anxiety and anxiety and their external behavioral manifestations. In this regard, three main variants of patient behavior should be distinguished:

1) a latent reaction in which patients themselves do not complain about fear, their behavior is outwardly calm, sometimes even bravado attempts are observed. As a result of volitional effort, they mask the emotional manifestations made

restraint. The presence of anxiety and tension is detected in these patients only in the process of targeted examination. One can hardly expect such a reaction in children, since they do not hide their emotions. This type of response can be observed in shy, restrained, with unconscious anxiety, in people who are tolerant to subjective fear, “trained,” as well as incapable of analyzing their mental state;

2) a mixed reaction, which is characterized by the absence of complaints with the presence of external manifestations of vegetative and behavioral signs of mental stress;

3) an obvious reaction when the patients themselves complain of fear, low mood, anxiety, and these complaints are accompanied by specific motor-behavioral and vegetative changes.

With mixed and obvious reactions, it is possible to correctly construct therapeutic tactics based on external signs of emotional disorders. The presence of latent reactions may give rise to the wrong approach of dentists to assess

mental state of patients and requires a more complete examination. Moreover, many patients exhibit just such a reaction.

Justification of the need for psychological correction and psychomedical preparation of patients

Emotional stress acts mobilizingly on the functional reserves of the human body, increasing defenses, working capacity, and is a physiologically substantiated non-specific response to any stimulus
(exam, sports competition, medical procedures, etc.).
However, protective adaptive reactions cannot be elevated to the rank of comprehensive and unique ones. Life is more complicated than this scheme. And often the reaction, which began as a defense, goes into its opposite and itself becomes the cause of the death of the body.
In itself, emotional stress is not a necessary forerunner of an approaching mental breakdown, since effectively working compensatory mechanisms, as a rule, lead to a normalization of the state. Nevertheless, in the presence of powerful stimuli, their repeated, over a short period of time, exposure and reduced qualities of the subject, mental adaptation disorders can be observed. This, depending on the place of least resistance in a constitutionally prescribed type of response, leads to various disorders: the appearance of neurotic reactions, neurosis, neurotic development, diseases
psychosomatic circle, the appearance of psychopathic traits, the presence of interpersonal conflicts.
♦ Psychosomatic diseases - disorders of the functions of organs and systems due to exposure to traumatic factors.
Of course, it is difficult to assume that for a mentally healthy person with good adaptive abilities, the emotional stress experienced at the dental appointment will lead to a breakdown of adaptation. However, being a rather strong negative emotional stimulus, it can be a link in the pathogenetic chain of violation of the threshold of mental adaptation when the patient is ready for the specified violation.
In addition, patients with advanced psychosomatic diseases (coronary heart disease, hypertension, atherosclerosis, cerebrovascular accidents, diabetes) have reduced resistance to stress, and each new test can at least worsen the outcome of orthopedic treatment, and at the very least become the last in this subject.
In addition, the occurrence of psychomotor agitation in a number of patients interferes with medical procedures. It can contribute to the occurrence of injuries of the tongue, cheek, lips with a cutting tool. The experience of orthopedic clinics confirms that
neglect of the psychological preparation of patients before prosthetics gives rise to a group of so-called difficult patients, passing from one doctor to another for years, changing them without any success in treatment (E.I. Gavrilov, V.N. Trezuboe). Despite applying the most modern methods prosthetics, the best materials and the latest technologies, it is not possible to successfully complete the prosthetics, and they do not use prostheses, but only collect them. This group of patients is a source of verbal and written complaints that take away
the doctor and officials of the relevant services have a lot of time to analyze them.
All this indicates the need for psycho-medical preparation of patients with a dentist. According to literature data, soothing medicines need from 50 to 79% of patients with a dentist. Psychological training is necessary 70-100%
of them.

Place of differentiated psychological preparation patients at the dentist's appointment

♦ Psychotherapeutic measures include all the words and actions of the doctor that have a positive effect on the patient.
The use of psychotherapy by a doctor is in full accordance with the classical principle of "treating not a disease, but a patient." A holistic approach to treating a sick person aims to correct not only morphofunctional disorders associated with somatic pathology, but also includes the correction of mental manifestations associated with it. It should be emphasized that the level of culture of a doctor's reception is primarily determined by the extent to which psychotherapy is represented on it.

The need for psychological training is dictated by increased demands on the quality of medical care and such an important factor as an increase in the prevalence of borderline mental disorders among the population. The success of dental procedures largely depends on the patient's mood on them, the desire to cooperate with the doctor during the treatment period. In order to avoid mutual disappointment in the success of treatment, it is necessary to create an atmosphere of trust and partnership,
a positive doctor-patient relationship. Unfortunately, in dentistry, the treatment of patients is sometimes carried out routinely, without sufficient contact between the doctor and the patient. The reasons for this are the lack of necessary training for dentists,
and sometimes - unwillingness to develop psychotherapeutic activity on their own. It should also list the time limits for outpatient admission, imperfect conditions in a number of rooms for psychotherapeutic effects on patients.
The specific prerequisites for conducting psychotherapy at the reception include, first of all, the pain that accompanies some dental manipulations (preparation of hard tissues of the teeth, injections, removal of dental deposits, imprints), which cause fear and anxiety in patients. Aesthetic defects, speech disorders, and the inability to fully enjoy food are no less significant for patients . This can add the complexity of psychological restructuring while getting used to prostheses (devices), as well as the fact that patients often come to the orthopedist after several weeks of treatment by a general practitioner and a dental surgeon. Configured by sanitary propaganda on a "one-session" method of treatment, patients are dejected by the large number of repeat visits characteristic of the complex treatment of oral diseases.
Thus, the goals of the dentist's psychotherapeutic work are to alleviate anxiety and emotional stress, correct patients' incorrect attitude to dental treatment, and prevent neurotic
reactions and iatrogenic states.
♦ Iatrogenia - adverse changes in the psyche of the patient, developed as a result of a doctor's mistake; the damaging, injuring meaning of the word doctor.
Moreover, these tasks are not assigned to a qualified professional psychotherapist, but to a dentist, who in these conditions, as a treating doctor and qualified specialist, can be the best psychotherapist for a patient, even using the methods of "small" or deontological psychotherapy available to him.

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations

		- understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 8: Preparation for the operation of dental devices.
- safety precautions, ergonomic basis for the organization of workplaces for a dentist

Stages and time of work	Teacher Responsibilities	Student Responsibilities
Training	7. Preparing the audience. 8. Analysis of student preparation for class 9. Attendance check	Listen
Lecture introduction (10 minutes)	7. Preparation of the educational complex on this topic. 8. Preparing slides for the lesson. 9. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	11. Divide the group and ask questions. 12. Use visual aid 13. Use slides, multimedia 14. Summing up the topic 15. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Safety precautions
2. Workplace of a dentist
3. Ergonomic fundamentals of dentist jobs
4. Dental Instrument Preparation

Methodology of the practical lesson:

Preparation of hard tooth tissues. This medical manipulation is one of the most commonly used in clinical practice and requires the preparation of a doctor and workplace to receive a patient. It is necessary to check:

- operating condition of equipment (dental unit, chair, handpieces);
- the presence on the instrument table of the necessary sterile dental instruments (dental mirror, dental tweezers, angle probe) and cutting tools (see Fig. 3.9-3.12);
- the availability of tools and devices for anesthesia and expendable disposable protective equipment for the patient's clothing (see Chapter 5), the doctor and his assistant.

It should be noted on the safety of manipulating the enemy with cutting tools when preparing teeth:

1) the preparation is preceded by the psychomedical preparation of the patient and anesthesia (see Ch. 5);
2) the tool should be well centered;
3) the drill should be turned on only after inserting the tip with the cutting tool into the patient's oral cavity (the patient's head is rigidly fixed on
head restraint) and fixing the hand with a tip. It is better to press the working hand to the upper jaw of the patient, less often to the lower, since it is mobile (Fig. 3.15);
4) it is necessary to remove the tool from the oral cavity only after the drill stops completely;
5) the simultaneous work of the doctor with two hands (Fig. 3.15) allows you to hold the tip with the cutting tool in your right hand, and in the left - the dental mirror, which soft tissues are moved and protected (cheeks or lips - when preparing the tooth on the upper jaw, tongue or lip - when preparing
tooth on the lower jaw). Moving the cutting tool must be carried out with hand movements in the shoulder and elbow joints with a fixed wrist and interphalangeal joints. This ensures that the cutting parallelism is maintained.
tool originally chosen direction. During movements in the interphalangeal and wrist joints, the cutting tool deviates from the chosen direction. So do changing the angle of preparation;
6) there should be good coverage of the surgical field;
7) the position of the doctor in the chair (Fig. 3.16) when preparing hard tooth tissues depends on the group of teeth, access and review of the surgical field:
- the doctor is located to the right and front of the patient (Fig. 3.16, a) when preparing teeth on the right half of the upper and lower jaws. In the sitting position, it is more advisable to dissect the vestibular, palatine and chewing surfaces. In standing position - contact surfaces of the upper and lower and lingual surface
lower teeth;
- the preparation of teeth on the left half of the dentition of the upper and lower jaws requires the doctor to move around the chair. So, for example, the preparation of the palatine (patient's head turned left), buccal (patient's head turned right), chewing surface of the upper and lingual lower posterior teeth is performed in a sitting position, in front of the patient. To separate the contact surfaces of the right lateral teeth, the doctor is located behind and to the right of the patient. For separation of the contact surfaces of the left lateral teeth - behind the patient (Fig. 3.16, b);
8) the preparation should be carried out with air-water cooling of the surgical field in a gentle mode, without prolonged and strong pressure of the cutting tool on the prepared tooth.

WORKPLACE OF ORTHOPEDIC AND DENTISTRY

♦ Dentist's workplace is a conditional concept, which implies the presence of a special room (or part thereof) with specific equipment, tools and materials necessary for solving professional tasks.
In fig. 3.1 presents the interior elements of the dental office, with equipment placed (see below) and furniture . The main purpose of furniture is the storage of consumables and tools.
Currently, standard furniture sets for equipping cabinets are made in a modular configuration, usually from strong and lightweight metal-polymer materials of the corresponding colors.

Modules in appearance resemble bedside tables of the same size. Each module is equipped with a different number of boxes where certain tools and materials are placed in a specific order (Fig. 3.2).

As a rule, each box is designed for specific medical procedures, for example, for obtaining impressions, etc. At the same time, it contains various impression materials, sets of impression spoons, adhesives for them, adhesive tape, devices for mixing material, etc. The presence of wheels on the module allows the doctor's assistant or nurse to move it around the office, depending on

performed by the doctor manipulations. After receiving the patient, the nurse or doctor's assistant replenishes the supply of supplies and tools.

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice

		- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
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76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 9 : Sterilization and disinfection, protective equipment for employees.
- prevention of iatrogenic and infectious diseases (HIV infection, hepatitis B)

Stages and time of work	Teacher Responsibilities	Student Responsibilities
Training	10. Preparing the audience. 11. Analysis of student preparation for class 12. Attendance check	Listen
Lecture introduction (10 minutes)	10. Preparation of the educational complex on this topic. 11. Preparing slides for the lesson. 12. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	16. Divide the group and ask questions. 17. Use visual aid 18. Use slides, multimedia 19. Summing up the topic 20. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Room sterilization
2. Disinfection
3. Iatrogenic and infectious diseases
4. Prevention of iatrogenic and infectious diseases
5. HIV infection and hepatitis B
6. Protective equipment for workers

Methodology of the practical lesson:

ASEPTICS, ANTISEPTICS AND DISINFECTION

The main measures that limit the spread of infection at the dental appointment are asepsis and disinfection. Antiseptics are closely related to them. We give the definitions of these concepts.

♦ Aseptic is a method of preventing infection by preventing the penetration of microorganisms into a wound, tissue or body cavity during medical and diagnostic manipulations.

♦ Antiseptics - a method of treating bacterially contaminated and infected wounds, purulent, anaerobic and putrefactive processes by combating infectious agents that invade a wound or tissue.

♦ Disinfection - the destruction in the external environment of pathogens of infectious diseases (bacteria, viruses, rickettsia, protozoa, fungi).

The need for strict adherence to the rules of asepsis and antiseptics, disinfection at the dental appointment is undeniable. It is due to several reasons. Firstly, the dental clinic, especially its orthopedic section, due to its specific characteristics, is a place with a high risk of infection of medical staff and patients with bacterial, viral and fungal
diseases.

Secondly, the global trend towards a progressive increase in the number of people infected with the human immunodeficiency virus further aggravates the risk of infection for medical personnel and patients.

And, finally, the third reason is the irresponsibility of a number of dentists, due to their low general and medical culture, leading to neglect of sanitary-hygienic and anti-epidemic measures at the reception.

The main subjects and at the same time the objects of infection in orthopedic dentistry are, on the one hand, patients, on the other hand, the medical staff participating in the treatment of the patient (doctor, nurse or doctor's assistant,
dental technician, nurse).

Institutional clinics occupy a special place, in which, in addition to the persons indicated above, hundreds of dental students are also exposed and at risk of infection. The upper respiratory tract, conjunctiva, and damaged skin on the hands and face are the entry gates of infection. The infection gets with saliva, blood, and airborne droplets. Bleeding occurs or spontaneously in patients with
loosened edematous gingival margin, or when it is damaged by a separation disc, shaped head when preparing the tooth. The gum can be damaged by the probe when examining the depth of the gingival pockets or the edge of the crown when checking it. During dental treatment, various deodorizing and antiseptic drugs are used to rinse the oral cavity. So, for example, are issued
instant antiseptic tablets, which include sodium benzoate, peppermint oil, thymol, menthol, cinnamon oil, methyl salicylate, saccharin and an effervescent base to accelerate dissolution. The method of application is quite simple: the tablet dissolves in a glass of warm water immediately before rinsing
the oral cavity.

The infection can also invade manicure, under the rings, rings and under the doctor's nails. Then it is distributed by the doctor, getting into the body of other patients, as well as relatives and relatives of the doctor himself. An orthopedic dentist brings an infection to his family if he is not protected by a cap.

At the reception, there are a number of devices, tools that are replaced or subjected to antiseptic treatment in accordance with obsolete instructions or contrary to instructions. This is, first of all, the staff uniform,
bibs and towels, which should be disposable, as they are
saliva and blood of the patient gets.

It should be noted that the anti-infection protection of the enemy during the reception of patients is largely determined by the correct use of disposable and reusable workwear: hats, glasses and shields to protect the face and upper respiratory tract,
gloves, including hygienic hand care products (creams, lotions, alcohol-containing gels, liquid soap), etc., which have bactericidal, fungicidal and antiviral effects. Various types of respirator masks are also produced (waterproof, soft, elastic), which guarantee
air filtration efficiency of 99.5% of particles per 1 micron. Very often in practice, after hasty washing and treatment with alcohol or chloramine from patient to patient, drill tips and a crown picker are used.

One-time plastic spoons should, as is the case throughout the world, remain one-time. For this purpose, they were introduced into dental practice. They are not sterilized, but discarded after use.

During the reception, the lamp moved by the doctor's contaminated hands, the installation keyboard, the pusher, the water cannon, etc. are infected. Spatulas for mixing gypsum and other impression materials are also infected by the doctor's hands, covered with the patient's saliva. They are used to introduce impression material into inaccessible areas of the oral cavity. In addition, with these spatulas, the doctor removes excess impression material from the spoon, which has already been in the patient's oral cavity during examination. This spindle forms the base of the model upon receipt. Here, the contact of the spindle with infected gypsum, a spoon, and impression material is also made.

Removable crown pick-up tips, anvil, trowels for mixing impression material, dental trowels must be sterilized. The working plateau of the dental unit, all its parts and accessories, housing crown, polymerization agent for plastic must be disinfected after each patient. For disinfection of any hard surfaces, including dental chairs, work tables, tools, etc., both ready-made solutions and their concentrates, as well as aerosol disinfectants are used. For these purposes, various disposable wipes or special protective coatings are used. So, for example, a wide selection of disposable materials has been proposed to protect those items of equipment of the dental office that are not subject to autoclaving:

- to protect the handles of light devices and objects of the dental office, control panels and switches, as well as other small surfaces that are usually touched during clinical admission;
- to cover a water-air gun and air motor;
- to protect the hose of an air turbine, tip head and saliva ejector;
- for the headrest of the chair and the tube of the X-ray machine.

Such a device as a dental anvil and the malleus attached to it, which are available in each office, are a dangerous way of transmitting infection. With their help, the edges and contours of stamped crowns are corrected. At the same time, the working surface of the malleus and the anvil punches are covered with blood, saliva and plaque, and their disinfection is carried out at best at the end of the working day, after taking many patients. Another hotbed of infection is the heating apparatus for the formation of the prosthetic plane of the occlusal ridges. Here, infection and reinfection takes place due to the saliva of patients falling on the working surface of the device along with wax bases and rollers extracted from the mouth. It is necessary to say about the dental spades, which saliva gets when modeling wax occlusal rollers with their help. At the same time, wax plates cut off by the specified spindle are also infected.

A rubber cup for mixing impression material should be included in the list of transmission routes of infection. The fact is that it is sometimes used as a reservoir for hot water, accelerating the polymerization of quick-hardening plastic during the simultaneous restoration of the bases of removable prostheses. Filling it with cold water, some doctors drop alginate prints into a cup. Both the prosthesis and the impression taken from the patient's mouth infect a cup that cannot be sterilized, and after washing
used for other patients. By the way, water polymerizers used after a one-session restoration, where quick-hardening plastic hardens under pressure in hot water, are also not always disinfected.

The same can be said about prints. On the way to the dental laboratory, the prints infect the tray in which they are transferred. On the way back, prostheses and their semi-finished products coming from the laboratory to the office are infected in the tray. At the same time, many doctors do not bother to disinfect them and inject them into the patient's oral cavity, at best, rinsing them slightly in cold water, although standard disinfectants have been developed for clinical use.

The main criterion for the use of such products is the dimensional stability of prints during and after disinfection. Impressions extracted from the patient's oral cavity after rinsing with a stream of running water for 1 min. must be immersed in a disinfectant solution, depending on the type of disinfectant and impression material.

As a rule, disinfection of prints is carried out in enameled or glassware, closed with a lid (can be in a desiccator) when the prints are completely immersed in solution. In this case, the level of the solution above the print should be at least1 cm . At the end of the procedure, the prints are

removed from the solution and washed with a stream of running water for 1 min. for washing off disinfectant residues. During this procedure, measures are taken
precautions. Ready dentures and their semi-finished products (wax patterns, wax bases with artificial teeth, individual spoons, mouth guards, crowns, bridges and other prostheses) are washed in running water for two minutes. For disinfection, they are immersed in a 3% hydrogen peroxide solution for 30 minutes. The disinfected prosthesis is rinsed with water before being introduced into the oral cavity.
For the disinfection of alginate, silicone, thiocol prints and semi-finished prostheses, ready-to-use solutions are proposed in which the active substances are quaternary ammonium compounds and aldehydes. Solutions
have bactericidal, fungicidal and antiviral effects. To do this, imprints for 5-10 minutes are immersed in a special jar with a solution using devices (clamps-clamps). Disinfection of impressions and semi-finished prostheses can be carried out in special chambers, where disinfecting aerosols are supplied under pressure.
The pre-sterilization treatment of instruments by a nurse or doctor's assistant involves the mechanical (most often manual) removal of the remains of certain materials from their surface. For example, there are solvents for cleaning surfaces of gypsum or wax residues. The most progressive is the method of ultrasonic washing in a bath with a cleaning solution. In addition, special packaging machines have been developed that allow pre-
sterilization packaging of the instrument in protective disposable bags, which makes it possible to maintain sterility of instruments for a long time and at no additional cost. For sterilization of dental instruments in clinics
they use various autoclaves, where all phases of the sterilization process are controlled automatically. For folding and protecting sterile instruments when
In clinical dentistry, sterile disposable paper towels can be used. In connection with the above, it becomes clear that the responsibility of the orthopedic dentist is not only personal
compliance with the rules of asepsis and antiseptics while working with patients, but also control over the conduct of these measures after each patient is received by paramedical personnel.

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked

		- can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 10: Dental diagnosis.
- types of dentition anomalies
- types of dentures used in practice in prosthetic dentistry
- establishing diagnosis
- Orthopedic treatment plan
- disease history
- filling out orders

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	13. Preparing the audience. 14. Analysis of student preparation for class 15. Attendance check	Listen
Lecture introduction (10 minutes)	13. Preparation of the educational complex on this topic. 14. Preparing slides for the lesson. 15. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	21. Divide the group and ask questions. 22. Use visual aid 23. Use slides, multimedia 24. Summing up the topic 25. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Types of dentition anomalies
2. Dental Diagnosis
3. Orthopedic treatment plan
4. Disease history
5. Filling out an order

Methodology of the practical lesson:

Classifications of dentitions with defects.

With partial tooth loss, a variety of dentition defects occur, the number of combinations of which is huge. According to Skinner, their number is more than 131 thousand, according to E. I. Gavrilov - more than 4 billion. This diversity revealed the need to classify dentitions with defects. These classifications are built on various principles. So, for example: Kammer subdivided defects according to the number and location of direct prosthesis fixators; Kennedy - in relation to flaws in the supporting teeth; Beilin, Vekett - according to the type of supporting tissue of the prosthesis; Skinner - in terms of quality and degree of support from supporting tissues; Godfrey - by the number, extent and position of defects,

the number and location of the remaining teeth; Lerintsi-Feldvari - by a combination of the listed features.
Romanian dentist Costa proposed a classification that does not require memorization of rules, memory stress, imagination. The author recommends the following rules:
1) use the initial letters of the three key expressions (included front, included side, end);
2) consider the dentition from right to left;
3) if there are several defects in the front section or on one side, then the figure corresponding to their number is applied;
4) before the letter characterization of the defect is written “upper” or “mandibular”.
The most popular in our country are the classifications of E. Kennedy and E.I. Gavrilov.

According to Kennedy, all dentitions with defects are divided into four classes (Fig. 2.22).

The first class includes dentitions with bilateral end defects, the second class includes dentitions with one-side end defects, the third class includes defects in the lateral section, and the fourth class includes defects in the anterior arch region. Every class except the last has subclasses. When there are several defects in the dentition that belong to different classes, then it should be attributed to a lesser class. For example, a dentition with bilateral end defects and an anterior defect included is one of the subclasses of the first class.
According to the classification of E. K Gavrilov, four groups of dentitions with defects are distinguished (Fig. 2.23.):
1) end (unilateral and bilateral);
2) included (lateral unilateral, lateral bilateral and front);
3) combined;
4) jaws with individually preserved teeth.

DIAGNOSIS AND FORECAST

Examination of the patient ends with a diagnosis.

♦ Diagnosis (from gr. Diagnosis - recognition) - a medical opinion on the nature and individual manifestation of a disease or pathological condition, expressed in terms adopted in modern medical nomenclatures and classifications.

In accordance with the nosological principle, the diagnosis should contain:

- name of a specific disease;
- if possible - its nature (etiological component);
- the mechanism of the main manifestations (pathogenetic component);
- pathological expression (morphological component);
- the nature and extent of violations of certain functional systems (functional component).

The etiological component of the diagnosis characterizes the peculiarity of the nosological form associated with its cause. This in some cases is necessary, since it can largely determine the doctor's tactics.

The etiology of many diseases of the masticatory and speech apparatus in need of treatment is known or adequately studied. Most often it is caries, periodontal disease, trauma. Along with this, there are diseases, the causes of which remain unknown. For example, much remains unclear in explaining the causes of anomalies, congenital absence of teeth (adentia), their retention or difficult eruption, increased abrasion of hard tooth tissues.

However, knowledge of the cause of the disease is also insufficient for the successful treatment of the patient. So, bad habits (sucking fingers,
foreign objects) that contribute to the appearance of an open bite, but the latter does not develop in all, but only in some children. Therefore, in addition to the causes of the anomaly, one must also know the conditions and pathological mechanisms that underlie its development.

The pathogenetic component of the diagnosis characterizes the features of the pathological mechanism (pathogenesis) of the disease and its complications. The morphological component of the diagnosis reflects the essence and localization of the main pathological changes in organs and tissues. In addition to the anatomical nature of the pathological process, the morphological component of the diagnosis can characterize the qualitative features of the course of the disease associated with morphogenesis (for example, "abscessed granuloma"), reflect the prevalence and depth of pathological changes (for example, "localized marginal periodontitis"), or indicate the morphological basis of functional disorders (for example, "rheumatoid arthritis of the temporomandibular joints").

The functional component of the diagnosis provides information on the functional impairment associated with the disease. It determines the treatment plan to a large extent and is crucial for assessing the prognosis of the disease.

The formation of a clinical diagnosis is carried out according to uniform rules, according to which the diagnosis consistently indicates:

1) underlying disease;

2) complication of the underlying disease;

3) concomitant diseases and their complications.

♦ The main disease is considered to be the disease, which in itself or through its complication was the reason for seeking medical help and for which treatment the doctor focused.

♦ Complication of the underlying disease is called pathological processes and conditions pathogenetically associated with the underlying disease, but forming clinical syndromes that are qualitatively different from its main manifestations, morphological and
functional changes. Complications may be caused by diagnostic
or medical procedures (excluding medical errors).

♦ Concomitant diseases are considered to be the patient's diseases that are not associated with the underlying disease etiologically, pathogenetically and have a different nomenclature classification.

Here are a few examples of the diagnosis formula:

1. Partial tooth loss (end defects of the upper and lower dentition), complicated by a distal shift of the lower jaw, deformation of the occlusal surface of the dentition with articulation disorders (blockage of the lower jaw);

2. An open bite (rickety) with the separation of all the front teeth, the saddle-like narrowing of the upper and flattening of the lower dentition, the close position of the upper and lower front teeth;

3. Partial tooth loss (combined defects of the upper and lower dentition), complicated by secondary traumatic occlusion (functional periodontal overload); periodontal disease, pathological mobility of the front teeth of the I - II degree.

Diagnostics includes three main sections:

1) symptomatology (semiotics) - the doctrine of the symptoms of the disease;

2) methods of examination of the patient;

3) methodological foundations that determine the theory and methods of diagnosis.

Conventionally, we can distinguish the stages of the diagnostic process:

1) collection and identification of all symptoms of the disease during clinical and paraclinical examination;
2) reflection, comparison, analysis and differentiation of the information received;
3) the formulation of the diagnosis of the disease based on the identified signs, combining them into a logical whole (integration and synthesis).
In real practice, it is difficult to distinguish between the various phases of the diagnostic process, since it is continuous, limited in time. There are no clearly defined periods and a gradual transition of the thought process, since the latter occurs during the study of the patient.
Thus, the diagnosis is formulated on the basis of the erudition, intuition and clinical thinking of the doctor.
♦ Clinical thinking is a specific mental conscious and subconscious activity of a doctor, which allows the effective use of the data of science, logic and experience to solve diagnostic and therapeutic tasks for a specific patient.
The main forms of clinical thinking are carried out through analysis and synthesis.
♦ Prediction of the disease (from gr. Prognosis - knowledge in advance, foresight) - prediction of the occurrence, development and outcome of the disease, based on knowledge of the laws of pathological processes and the course of diseases.
As for the prognosis of the disease, in orthopedic dentistry, it can be favorable (good), doubtful and unfavorable (bad). In its form, it is a prognosis of the course of the disease, the dynamics of the diagnosis for the future.
HISTORY OF THE DISEASE (Outpatient Card)
A medical history, or an outpatient record, is a mandatory document of a medical outpatient appointment, including passport data about the patient, medical history, dental status and other results of the patient's examination, diagnosis, treatment plan and treatment diary. The latter reflects the dynamics of the development and involution of the disease, the method of treatment used and its result.
The card should be filled out completely enough, accurately and correctly by the doctor so that anyone who reads it can understand the contents of the notes. The young doctor should remember that this document, reflecting the dynamics of the development of the disease, treatment methods and its results, indicates the level of clinical maturity of the doctor.
The medical history, in addition, is a legal document considered in various conflict situations, including in judicial instances.
Based on the encoding of the information contained in the relevant documentation, it is possible to create an automated system for collecting, storing and processing data (M. 3. Mirgazizov; V. N. Trezubov; S. I. Volvach; L. M. Mishnev; R. A. Fadeev)
Such systems should have a set of language software and organizational tools that allow you to accumulate the main information array on computer media. They allow you to enter patient information into the computer's memory, replenish
accumulated information, change the internal structure of the main
array, just search for information. Moreover,
they provide mathematical and statistical processing
accumulated material, issue processing results in the form of documents,
convenient for subsequent analysis.

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking

		- expressing one’s own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one’s own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one’s own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely	- gives the wrong answer to some questions - has a partial view of the topic

	"3"	
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 11: Characterization of materials used in laboratories and clinics About dental prosthetics
- general information about dental materials
- main properties of materials (mechanical, technological, physical, chemical and biological)

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	16. Preparing the audience. 17. Analysis of student preparation for class 18. Attendance check	Listen
Lecture introduction (10 minutes)	16. Preparation of the educational complex on this topic. 17. Preparing slides for the lesson. 18. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	26. Divide the group and ask questions. 27. Use visual aid 28. Use slides, multimedia 29. Summing up the topic 30. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Materials used in orthopedic dentistry
2. Classification of dental materials
3. The main properties of materials
4. Mechanical and technological properties of materials
5. Physical and chemical properties of materials

Methodology of the practical lesson:

CLASSIFICATION OF MATERIALS,
APPLICABLE IN ORTHOPEDIC
DENTISTRY

Dental materials science is an applied section of science aimed at creating new and improving numerous known materials, studying their technological and clinical properties related to dental practice.

♦ Material science —- the science of the structure and properties of materials.

Dental materials are conventionally divided into main, auxiliary and clinical.

The main materials are those from which dentures, devices, fillings are made. In the literature you can find the term "structural" materials, which is synonymous with the definition of "basic". We prefer the latter as more understandable and simple.

The main materials include:

- metals and their alloys;
- ceramics (dental porcelain and ceramic);
- polymers (basic, facing, elastic, quick-hardening plastics);
- composite materials;
- filling materials.

Auxiliary materials used at various stages of prosthetic technology are called auxiliary materials:

- impression;
- modeling;
- molding;
- abrasive;
- polishing;
- insulating;
- fusible alloys;
- solders;
- fluxes;
- bleached.

Clinical refers to materials used by doctors at a clinical dental appointment. They are:

- impression materials;
- filling materials;
- waxes and wax compositions.

Such a classification is conditional, if only because the group of clinical materials is artificially created. It includes both auxiliary (impression masses) and basic (filling) materials. In addition, materials such as polymers,
fine waxes, metals, ceramics, in fact, are clinical, as an orthopedic dentist works with them in the clinic and they are designed for a long-term stay in the oral cavity. However, this group was born because of the extreme importance

and the prevalence of these substances in dental clinical practice.
In fact, in orthopedic dentistry, we should talk about basic, auxiliary and impression materials.
Dental materials are highly demanding.
They are very diverse:
- toxicological - the absence of irritating, blastomogenic (i.e., contributing to the formation of a tumor), toxic-allergic effects;
- hygienic - the absence of conditions that worsen oral hygiene, in particular - retention points for food and plaque formation;
- physical and mechanical - high strength properties, wear resistance, linear volumetric constancy;
- chemical - the constancy of the chemical composition, anti-corrosion properties;
- aesthetic - the possibility of complete imitation of tissues of the oral cavity and face, the effect of naturalness;
- technological - simplicity and ease of processing, preparation, shaping and volume.
In this regard, the materials emit physical, mechanical, chemical and technological properties.
The most common concepts and definitions of material properties are as follows:
♦ Strength is the ability of a material to resist the action of external forces causing deformation without destruction.
♦ Resilience, or elasticity, is the ability of a material to restore its shape after the cessation of the action of external forces that cause a change in its shape (deformation).
♦ Plasticity is the property of a material to deform without destruction under the influence of external forces and to maintain a new shape after their termination (that is, plasticity is a property opposite to elasticity).
♦ Deformation - a change in the size and shape of the body under the action of the forces applied to it. Deformation can be elastic and plastic (residual). The first disappears after unloading. It does not cause changes in the structure, volume and properties of the material. The second is not eliminated after removing the load and causes changes in the structure, volume, and sometimes the properties of the material.
♦ Hardness characterizes the body's ability to withstand plastic deformation when another solid enters it.
♦ Viscosity (internal friction) is the ability of gases and liquids to resist the action of external forces that cause their flow. Impact strength - this is the work spent on the shock fracture of the sample (in the reference literature refers to KS).
♦ Flowability is the ability of a material to fill a form.

Tests on this topic.
1. The ratio of body weight to its volume is
$
Density $ *
Strength $
Elasticity $
Viscosity #
2. Which element lowers the melting point of the alloy?
$
Cadmium $ *
Fluoride $
Nitrogen $
Hydrogen #
3. The ability of a substance to conduct heat is
$
Thermal Conductivity $ *
Strength $

Viscosity $
Density #
4. Do all bodies change their volume and linear dimensions when heated and cooled?
$
Yes $ *
No $
Only solid $
There is no right answer #
5. Hardness determines
$
Material Quality $ *
Size $
Ability $
Resistance #
6. How many types of corrosion?
$
3 $ *
4 $
6 $
2 #
7. How many times the coefficient of thermal expansion of acrylic plastics is more than tooth tissues?
$
10 times $ *
6 times $
4 times $
2 times #
8. What is corrosion?
$
Complicated process $ *
Simple process $
Easy process $
Short process #
9. What samples do gold alloys have?
$
900, $ 750 *
400 $
500 $
600 #
10. What types of materials are used in the OS?
$
Primary, auxiliary $ *
Basic $
Helper $
The correct answer is no #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent	- statement of conclusion and completion

	"5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy	- gives the wrong answer to some questions

	completely "3"	- has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 12 : Application of tools in the practice of prosthetic dentistry.
- dental drills. Preparing them for work
- tips, the principle of micromotors
- use of instruments for examining patients and preparing dentures

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	19. Preparing the audience. 20. Analysis of student preparation for class 21. Attendance check	Listen
Lecture introduction (10 minutes)	19. Preparation of the educational complex on this topic. 20. Preparing slides for the lesson. 21. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	31. Divide the group and ask questions. 32. Use visual aid 33. Use slides, multimedia 34. Summing up the topic 35. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Instruments in the practice of orthopedic dentistry
2. Tips
3. Micromotors and principle of operation
4. The use of denture preparation tools
5. The use of instruments for examining patients

Methodology of the practical lesson:

FOR CLINICAL RECEPTION OF PATIENTS
DENTAL INSTALLATION

♦ Dental unit is a complex of equipment designed to perform dental tasks.

The main component of the workplace (office) is a dental unit, which, in some cases, occupies an area of 4 m2 and can be used for:

- preparation of hard tissues of teeth in therapeutic and orthopedic dentistry;
- endodontic dentistry;
- conducting a number of outpatient and inpatient surgical dental operations;
- when prosthetics of patients with removable and fixed prostheses;
- for the implementation of orthodontic manipulations.

In dental drills, three types of drives are used to transmit rotation from the engine to the tip:

1) rigid multi-link gears with cords ("hard sleeves");
2) gears with flexible wire shafts (flexible hoses);
3) sleeveless gears using pneumatic or electric micromotors that are directly attached to or built into the dental handpiece.

A modern dental unit (Fig. 3.3) is equipped with a turbine drill, an electric drill, a pneumatic drill, has a daylight lamp with adjustable working field illumination from 8000 to 28000 lux and other devices that allow the doctor to work at a modern level. Air and turbine drill tools are air-water cooled.

Currently, in orthopedic dentistry, various drills are used with an adjustable rotation speed, which is commonly considered (V. N. Kopeikin):

- low (up to 10,000 rpm);
- average (from 25,000 to 50,000 rpm);
- high (from 50,000 to 100,000 rpm);
- very high (from 100,000 to 300,000 rpm);
- ultra-high (over 300,000 rpm).

The experience of using air turbines revealed their positive and negative sides [P. Schletter, V. M. Durov, 1999]. These mechanisms carry serious problems that are related:

- with the imperfection of the rotor mechanism and the cooling system of the turbine of the old design (create a noise hazard of 99 decibels);
- with the danger of excessive removal of hard tissues at high speeds;
- with high (up to 245 ° C) and temperature detrimental to tooth tissues in the preparation zone;
- with the formation of a turbine tip of an aerosol cloud containing, in addition to water, microflora, fragments of hard tooth tissues and cutting tools, mucus and soft tissue scraps;
- with the possible retraction of this cloud into the mechanism at the time of its shutdown and, accordingly, its release in the operating mode to another patient.

The doctor must know about these shortcomings and either avoid their manifestations or minimize them. It should be noted that turbine devices have advantages that distinguish them from other plants:
- there is no need to exert a great effort, which significantly reduces the side effect on the pulp and periodontal tissue;
- the small size of the abrasive tools prevents overheating of hard fabrics by reducing the area of the contacting surfaces, which ensures the wear resistance of the tool;
- reduction of unpleasant sensations in comparison with those noted when using old tools;
- reducing the time of preparation while improving its quality through the use of automated cooling systems (air or air-water).

Dental units can be classified:

1. By the method of location in the office - on stationary (see. Fig. 3.3), rigidly fixed to the floor of the office, and portable (Fig. 3.4, a), moved around the office.
2. By the number of staff (only for the doctor, for the simultaneous work of the doctor and his assistant, that is, the so-called “four hands” operating principle).

3. By the method of arrangement of the tool block, as a rule, three main options are distinguished:
1) mobile consoles-carts moved on roller casters;
2) cabinet built-in brackets;
3) the tool block fixed on installation.
4. According to the method of fastening hoses for the tips (upper and lower feed).

The dental chair (see. Fig. 3.1 and 3.3) is designed to perform all types of interventions and operations in dental practice. The chair can be raised, while it is possible to change the tilt of its back and adjust the headrest.
The back of the chair has a comfortable anatomical shape. A simple but appropriate design of the chair facilitates the work of the doctor in any position.
The seat and backrest is adjusted using a hydraulic or electromechanical drive controlled by:
- panels with buttons for manual control located on the backrest support, its lateral surface on the right on the extension table (Fig. 3.5, a). In this case, the movement of the footboard is associated with a change in the position of the back;
- an external (foot) pedal (Fig. 3.5, d, e);

- using the touch membrane-keypad for the doctor and his assistant (Fig. 3.5, b, c). In this case, the remote control, as a rule, is placed on the tip holder and is protected by a strong transparent film that allows disinfection of the surface.The built-in memory unit allows you to program the parameters of the instruments or the position of the dental chair and use them effectively while working with the patient.
The chair for the dentist (see. Fig. 3.1.) Is installed on 3-4-5 wheels, which provides easy movement of the chair on the floor in any direction.
In addition, the seat and back of the chair provide 360 ° rotation around the axis. Seat height is individually adjustable. The movable back of the chair in a semicircle covers the lower back, while creating good support for the back during work, which reduces the fatigue of the doctor, the load on the lumbar spine, preventing the development of some occupational diseases.
To carry out manipulations in the horizontal position of the patient, when the doctor can be located behind or on the side of the patient, special types of chairs are used.
TIPS, THEIR VARIETIES
♦ Tip - part of the dental unit in which the cutting tools are mounted.
As mentioned above, the tips can be turbine or equipped with pneumatic or electric micromotors. Depending on the ratio of the axes of the tip and the tool attached to them, straight and angular structures are distinguished. Functionally, tips can be used either for clinical or for dental manipulations (Fig. 3.6).
The use of special adapters for handpieces (Fig. 3.6, d) allows us to solve the problem of their compatibility with flexible arms of imported dental units
production. Turbine tips owe their name to a turbine located in the body of the tip. They can give the cutting tool high speed: from 300,000 to 500,000 rpm.

The turbine tips have an air-water cooling system for the instrument (Fig. 3.7), and in some of them an autonomous illumination of the surgical field.

To increase the life of the turbine tip,
however, like other tips, it is necessary in a timely manner
carry out lubrication, and after taking each patient - disinfection
(Fig. 3.8).

When using a turbine tip, the following conditions must be observed [SchletterP., Durov V.M., 1999]:
- Do not use turbines at maximum speed;
- the speed of preparation should be compensated by work with high-quality and sharp tools;
- preparation using a turbine is intended for tooth enamel, removal of filling material, it is undesirable to use it in peri-pulp dentine;
- the surgical field should always be under visual control;
- the preparation should be carried out under air-water cooling;
- in parallel with the turbine, a system for evacuating the liquid with a saliva ejector and an aerosol cloud with a vacuum cleaner must be functioning;
- staff must wear a mask and goggles.

Angled tips are also used, driven by an electric motor or a pneumatic motor. Rotational speed

the tool in these tips ranges from 20,000 to 70,000 rpm. The angled tip is used to prepare the vestibular, lingual and contact surfaces of the teeth with the help of shaped heads, for preparation in
teeth using carbide and diamond burs of cavities for inlays, grooves for half crowns, parapulpar canals for pins, for opening the root canals in the teeth of the lower jaw.
Direct nipples have the same speed indicators as angular ones, but due to design features they can exert great efforts on the boron. They are also driven by an electric motor or air motor. Straight tip
it is used for the preparation of teeth with an abrasive stone, a shaped carborundum head, separation discs, for opening the root canals on the upper front teeth using various burs. Angled and straight tips are equipped with gears that can change the speed of rotation of the tool. They may also have a water cooling system.

CUTTING TOOLS
IN ORTHOPEDIC DENTISTRY

♦ Cutting tool - a type of tool of a certain shape, area and size, which, with appropriate force at the moment of plane or point contact with the hard surface of the workpiece, exhibits its inherent cutting or abrasive property.
The cutting tool in orthopedic dentistry serves two purposes: the preparation of hard dental tissues and the finishing of dental and maxillary dentures and devices.

Cutting tools consist of two parts: a shaped working tool and a shaft, which serves for fixing in the dental tip. Among them, one should list the burs (Fig. 3.9, a, b), polyes (Fig. 3.9, c), finishes (Fig. 3.9, d), heads and circles (Fig. 3.10), separation discs (Fig. 3.11), milling cutters (Fig. 3.12).

According to the shape of the working surface, the tools are divided into spherical, cylindrical, conical, reverse conical, oval, wheel-shaped, dish-shaped, flame-shaped, pear-shaped, needle-shaped, etc.

The working surface can be metal (steel, hard alloys: chrome-tungsten, chrome-vanadium, titanium), artificial (carborundum, electrocorundum), natural (emery, diamond chips), elastic (rubber, silicone).

The notch of hogs, milling cutters is longitudinal, angular, end, transverse or combined.

The rods of instruments intended for use with an angled tip have a groove and flat for fixation at the free end. The diameter of the cutting tool rod for the straight tip is 2.35 mm , for the turbine - 1.6 mm .

The burrs for the straight tip have a fixed length of 44.5 mm , for angled tips - 17.22 and 26 mm and for turbine ones - from 16 to 24 mm .

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked

		- can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 13: The use of metal and its alloys in orthopedic dentistry.
- metal alloys and the technology for their preparation. Gold and its alloys
- nickel chrome and stainless steel alloy, coboltchrome alloy, types of solder and solder - metal bleaching

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	22. Preparing the audience. 23. Analysis of student preparation for class 24. Attendance check	Listen
Lecture introduction (10 minutes)	22. Preparation of the educational complex on this topic. 23. Preparing slides for the lesson. 24. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	36. Divide the group and ask questions. 37. Use visual aid 38. Use slides, multimedia 39. Summing up the topic 40. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. The use of metals and their alloys in orthopedic dentistry
2. The technology of preparation of metal alloys
3. Gold and its alloys
4. Gold samples used in orthopedic dentistry
5. KHS, NHS and their methods of preparation
6. Solder and its types
7. Silver and Palladium Alloys
8. Alloys of gold, platinum and palladium
9. Stainless steel

Methodology of the practical lesson:

GENERAL INFORMATION ON METALS, METAL ALLOYS AND THEIR PROPERTIES

♦ Metals are substances characterized in ordinary conditions by high electrical and thermal conductivity, ductility, metallic luster, opacity, and other properties due to the presence in their crystal lattice of a large number of mobile conduction electrons not connected with atomic nuclei.

In technology, metals are usually divided into ferrous (iron and alloys based on it) and non-ferrous (all others).

The properties of metals are explained by the features of their structure:

- the location and nature of the motion of electrons in atoms;
- the arrangement of atoms, ions and molecules in space;
- the size, shape and nature of crystalline formations.

Features of the atomic structure determine the nature of the interaction of metals, their ability to give various kinds of compounds, which include several metals, metals with non-metals, etc.

At different temperatures, some chemical elements have 2 or more stable types of crystal lattices. The existence of one metal in various crystalline forms (modifications) at different temperatures is called polymorphism, or allotropy, and the transition from one structure to another is called polymorphic (allotropic) transformation. Allotropic forms resulting from a polymorphic transformation are usually denoted by the initial letters of the Greek alphabet a, p, y, 8.

Such polymorphic metals include, for example, cobalt (Co), tin (Sn), manganese (Mn), iron (Fe). In turn, a change in the structure of the crystal lattice

causes a change in properties - mechanical, chemical and magnetic, electrical conductivity, thermal conductivity, heat capacity, etc.

Metals that have only one type of crystal lattice and are called isomorphic include aluminum (A1), copper (Cu), nickel (Ni), chromium (Cr), vanadium (W), etc.

The most complete information about the structure and properties of metals is obtained using a complex of research methods:

- structural (based on direct observation of the structure of a metal or alloy: macroscopic analysis, microscopic analysis, etc.);
- physical (based on the measurement of various physical properties: thermal, magnetic, etc.).

So, for example, the method of elemental microanalysis of changes in the surface of dental alloys in the oral cavity is used by many researchers [Hani H. et al., 1989].

♦ Metallic alloys are macroscopically homogeneous systems consisting of two or more metals with characteristic metallic properties. In a broad sense, alloys are any homogeneous system obtained by the alloying of metals, non-metals, oxides, organic substances. The structure and properties of pure metals (see table. 21) differ significantly from the structure and properties of alloys (see table. 22), consisting of two or more metals.

The number of elements (alloy components) distinguish between two-, three- or multicomponent alloys

The formation of new homogeneous substances during the mutual penetration of atoms is called alloy phases.

In the molten state, all components are usually in an atomic state, forming an unlimited liquid homogeneous solution, at any point of which the chemical composition is statistically the same. When the melt solidifies, the atoms of the components are stacked in the order of the crystal lattice, forming a solid crystalline substance - an alloy.

There are three types of relationships between alloy components:

1) the formation of a mechanical mixture, when each element crystallizes independently, while the properties of the alloy will be the averaged properties of the elements that form it;

2) the formation of a solid solution, when the atoms of the components form the crystal lattice of one of the elements, which is a solvent, while the type of lattice of the base metal is preserved;

3) the formation of chemical compounds, when during crystallization dissimilar atoms can join in a certain proportion to form a new type of lattice,
different from alloy metal gratings. The formation of a chemical compound is a complex process in which a new substance with new qualities is created, while the lattice has a more complex structure. The compound loses the main property of the metal - the ability to plastic deformation, becomes brittle.
Accordingly, the properties of the alloys will depend on what phases are formed in them: solid solutions, chemical compounds or mixtures of pure metals. If the atomic volumes of two metals and their melting points differ sharply, then in the liquid state such elements usually have limited solubility.
At the same time, unlimited solubility, or the ability to form solid solutions in any proportions, have only metals with a crystal lattice of the same type.
Metals located close to each other in the periodic table (Cu29 and Ni28; Fe26 and Ni28; Fe26 and Cr24; Fe26 and Co27; Co27 and Ni28) or located in the same group (As33 and Sb51; Au79 and Ag47; Au79 and Cu29; Bi83 and Sb51) have unlimited solubility.
Thus, the interaction of elements in alloys and the nature of the structure formed are determined by the position of the elements in the periodic table, the type of crystal lattice, atom sizes, i.e., the physical nature of the elements.
Dependence of properties on alloy composition:
1) in alloys having the structure of mechanical mixtures, the properties change mainly rectilinearly. Some properties of mechanical mixtures, primarily hardness and strength, depend on the size of the particles (on the degree of dispersion) - significantly increase during grinding;
2) in alloys - solid solutions, the properties change in a curved manner;
3) during the formation of chemical compounds, the properties change stepwise.
Many physical and mechanical properties of alloys clearly depend on the structure, but some technological properties, such as casting (the ability to provide good casting quality) or weldability, depend not so much on the structure,
how much on what temperature conditions the alloys solidified.
So, for example, dental gold alloys molded and quickly cooled in water will have the form of a solid solution characterized by characteristic softness, malleability & lower strength than alloys with ordered
the arrangement of atoms [Kopeikin V.N., 1995]. However, if the same casting is cooled slowly to room temperature, then the solid solution prevailing at a temperature of more than 424 ° C completely passes into the AuCu phase by redistributing the atoms in the spatial crystal lattice into a more ordered structure. This leads to an increase in strength and hardness with loss of ductility of the alloy. Alloys with a high gold content (above 88%) do not form an ordered phase.
Therefore, the dependence of the mechanical and physical properties of single-phase alloys (a and p) is indicated by the following points, known from the course of metal science:
- the hardness, strength and electrical resistance of solid solutions is higher than that of pure metals;
- electrical conductivity and temperature coefficient of electrical resistance of solid solutions is lower than that of pure metals;
- the electrochemical potential in this case changes along a smooth curve.
In addition to the properties of a metal matrix having a certain crystal lattice and thereby determining the main parameters of mechanical properties, the latter can be affected by additional alloying with elements such as molybdenum, tungsten, niobium, carbon, nitrogen, etc. Their presence in alloys, even in small amounts, is significant increases strength, wear resistance, heat resistance and other properties required during the operation of structures.
The addition of small amounts of @, 005%) iridium and ruthenium turns the coarse granular structure of gold alloys into fine-grained, which makes it possible to improve the tensile strength and tensile strength by elongation by 30%, without affecting the hardness and yield strength. The strength is especially effective when alloying cobalt-chrome alloys with 4-6% molybdenum and

an additional 1-2% niobium in the presence of 0.3% carbon. In metal alloys, various chemical compounds are formed both between two or more metals (they are called intermetallic compounds), and between metal and non-metal (carbides, oxides, etc.).
The presence of non-metallic inclusions in the alloy structure leads to the formation of fatigue, cracks, internal pores and cavities, corrosion cracking of castings, which ultimately leads to failure. Non-metallic inclusions play a significant role in the process of viscous and fatigue failure. The basis of non-metallic inclusions in the Vitallium alloy is manganese and silicon. The cobalt-chrome alloy (KHS) contains inclusions of titanium nitrides and silicates.
As a result of cyclic stresses, the metal "gets tired", its strength decreases and the destruction of the sample (prosthesis) occurs. This phenomenon is called fatigue, and fatigue resistance is called endurance. Fatigue failure always occurs suddenly due to the accumulation of irreversible changes by the metal, which lead to the appearance of microscopic cracks - fatigue cracks that occur in the surface zones of the sample. Moreover, the more scratches, potholes and other defects causing stress concentration on the surface, the faster the formation of fatigue cracks. Due to the fatigue of the metal, microcracks appear at the boundary of non-metallic inclusions, metal grains, which during cyclic loading increase their sizes, forming a main crack, leading to the destruction of the metal.
♦ The main characteristic determined during a material fatigue test is the endurance limit - the highest stress that a material can withstand without breaking with an arbitrarily large number of load changes (cycles).
The maximum stress that does not cause destruction corresponds to the endurance limit.
In addition to mechanical tests, metal materials are subjected to technological tests (bending, bending, etc.) in order to determine their suitability for various technological operations in the process of use. Applying stress to a specimen during mechanical testing leads to deformation.

Physico-mechanical properties of metals
and metal alloys

Metals have different color shades of almost all speckle, however, as a rule, for base metals it is gray, bluish, bluish of varying degrees of severity and different combinations. For precious metals, yellow-oran-
Chewing gamma and whitish-silver tint, these substances have a fairly high density (see table. 21). So, the density of gold-containing alloys (see table. 30) is 15.2–15.5 g / cm3, the density of cobalt-chrome alloys (see table 38,
41-42) is equal to 8.0-8.4 g / cm3, the density of nickel-chrome alloys (see Table 38) is 8.2 g / cm3. As already indicated, they are thermally conductive and electrically conductive, and also expand and contract, respectively, when heated and cooled. The melting point of metals (see table. 21) varies widely. In this regard, low-melting metals with a melting point lower than that of pure tin B32 ° C), as well as refractory metals, the melting temperature of which is higher than that of iron A535 ° C) are isolated. Between these poles are the average melting temperatures characteristic of
most metals and alloys. The melting temperature and solidification temperature of pure metals are always constant, and until one phase disappears - the solid part melts when heated or the liquid part solidifies when cooled - the temperature remains unchanged.
Plastic deformation leads to a change in the physical properties of the metal, namely:
- increase of electrical resistance;
- decrease in density;
- change in magnetic properties.

All internal changes that occur during plastic deformation cause hardening of the metal. Strength characteristics (tensile strength, yield strength, hardness) increase, and plastic - decrease.
♦ Metal hardening under the action of plastic deformation is called hardening.

Carbonated (hardened) metals are more prone to corrosion failure during operation. To completely remove hardening, metals are subjected to recrystallization annealing (see p. 70).

♦ Recrystallization is the process of the emergence and growth of new undeformed crystalline grains of a polycrystal due to other grains.

Recrystallization is used in practice to give the material the greatest ductility. Moreover, it proceeds especially intensively in plastically deformed materials at higher temperatures. The recrystallization temperature is of great practical importance. To restore the structure and properties of the riveted (caked) metal (for example, when continuing to stamp the crown under the press after pumping the sleeve on the chalk model), it must be heated above the recrystallization temperature.

♦ The set of properties characterizing the resistance of a metal and alloy to the action of external mechanical forces (loads) applied to it is commonly called mechanical properties.

CHARACTERISTIC OF ALLOYS USED
IN ORTHOPEDIC DENTISTRY

Currently, over 500 alloys are used in dentistry.

International standards (ISO, 1989) all metal alloys are divided into groups:

1. Alloys of noble metals based on gold.
2. Alloys of precious metals containing 25-50% of gold or platinum or other precious metals *.
3. Base metal alloys.
4. Alloys for cermet structures:

a) with a high content of gold (> 75%);
b) with a high content of noble metals (gold and platinum or gold and palladium -> 75%);
c) based on palladium (more than 50%);
g) based on base metals:
- cobalt (+ chromium> 25%, molybdenum> 2%);
- nickel (+ chromium> 11%, molybdenum> 2%).

The classical division into noble and base alloys looks more simplified.

Alloys based on noble metals are divided into:
- gold;
- gold-palladium;
- silver-palladium.

Alloys of metals of noble groups have better casting properties and corrosion resistance, however, they are inferior in strength to alloys of base metals.

Base metal alloys include:
- chromium-nickel (stainless) steel;
- cobalt-chrome alloy;
- nickel-chromium alloy;
- cobalt-chromium-molybdenum alloy;
- titanium alloys;
- auxiliary alloys of aluminum and bronze for temporary use. In addition, an alloy based on lead and tin is used, characterized by fusibility

Alloys of gold, platinum and palladium

These alloys have good technological properties, corrosion resistance, durable, toxicologically inert. To them less often than to other metals, idiosyncrasy appears (see Chap. 14).

Pure gold is a soft metal. To increase elasticity and hardness, so-called ligature metals are added to its composition - copper, silver, platinum.

Gold alloys differ in percentage of its content. Pure gold in the metric assay system is indicated by the 1000th breakdown. In Russia, until 1927 g . there was a spool assay system. The highest test in it corresponded to 96 spools.

The English carat system is also known, in which 24 carats are the highest breakdown (see Table 29). The 900th gold alloy is used for prosthetics
crowns and bridges. Available in the form of disks with a diameter of 18, 20, 23, 25 mm and blocks of 5 g . Contains 90% gold, 6% copper and 4% silver. The melting point is 1063 ° C. It has plasticity and viscosity, and can be easilystamped, rolled, forged, and cast. Gold alloy of the 750th test is used for arches (clasp) prostheses, clasps, inlays. Contains 75% Gold
8% copper and silver, 9% platinum. It has high elasticity and low shrinkage during casting. These qualities are acquired by adding platinum and increasing the amount of copper. The gold alloy of the 750th sample serves as solder (see p. 267) when 5-12% cadmium is added to it (see table 106). The latter reduces the melting point of the solder to 800 ° C. This makes it possible to melt it without melting the main parts of the prosthesis. The bleaching for gold is hydrochloric acid A0-15%).
Super-TK is “hard gold”, a heat-hardening, wear-resistant alloy that contains 75% gold and has a beautiful yellow color. It is universal and technological - it can be used for stamped and cast dental
designs: crowns and bridges. The main characteristics of the alloy are presented in table 30. Golden needles for acupuncture are also made from this type of alloy.
For the first time in Russia, the production of a gold-palladium alloy for Supercep metal-ceramic dentures has begun. The composition of the alloy F0% palladium, 10% gold) is protected by Russian patent, meets international standards and has good
properties (see table. 37). Abroad for the needs of orthopedic dentistry
alloys of precious metals with different contents of gold and precious metals are produced (see table 32), which therefore have different mechanical properties (see table 33). Yugoslavs recommend using for fixed prostheses
M-Palador - an alloy of gold, palladium and silver. It is resistant to chemical elements, does not enter into chemical reactions in the oral cavity, does not contain nickel, beryllium and cadmium. The melting point is 1090 ° C, the density is 11.5 g / cm3. In Switzerland, the superhard alloy V-Classic with
high in gold. It does not contain gallium, cobalt, chromium, nickel and beryllium. The proportion of base metals in the alloy does not exceed 2%. It is intended primarily for cermet prostheses. Due to the good coefficient of thermal expansion, it is compatible with ceramic materials such as Biodent, Ceramico, Duceram, Vita, Vivadent, etc. Reliable superhard gold-palladium alloys Stabilor-G and Stabilor-GL (USA) have been developed for crowns and bridges with a reduced content gold. They are stable in the oral cavity, have high strength and are easily processed, including in the apparatus for electrolytic polishing.
An alternative to noble metal alloys for cast crowns and bridges, in which the gold content is 60%, is the beryllium and nickel-free alloy of base metals Sunburst (USA). This alloy, in addition to good casting properties, is fully consistent with the color and physical properties of 60% gold alloy. Also known is the alloy of base metals Komend (USA) for creating skeletons of metal-ceramic prostheses. This alloy with 220 Vickers hardness has good casting properties and after polishing acquires a light gray color.

Silver and Palladium Alloys

In addition to silver and palladium, alloys contain small amounts of alloying elements (zinc, copper), and to improve the casting qualities, gold is added to the alloy.
In physical and mechanical properties (see table. 34) they resemble gold alloys, but they are inferior to them in corrosion resistance and darken in the oral cavity, especially with an acid reaction of saliva. These alloys are plastic, malleable. They are used for prosthetics with tabs, crowns and bridges. The soldering of silver-palladium alloys is carried out with gold solder (see table. 106). Bleaching is a 10-15% hydrochloric acid solution. Alloy PD-250 contains 24.5% palladium, 72.1% silver.
Available in the form of disks with a diameter of 18, 20, 23, 25 mm and strips 0.3 mm thick .

PD-190 alloy includes 18.5% palladium, 78% silver. Available in the form of discs with a thickness of 1 mm with a diameter of 8 and 12 mm and tapes with a thickness of 0.5; 1.0 and 1.2 mm . Alloy PD-150 contains 14.5% palladium and 84.1% silver, & alloy PD-140 contains 13.5 and 53.9%, respectively.
In the United States, the production of standard Iso-Form temporary crowns for the protection of molars and premolars after their preparation has been mastered from an elastic alloy of silver and tin. Such crowns are not only easy to process, but also easily stretched and change their shape while maintaining strength.

Stainless steel
All alloys of iron with carbon, which as a result of primary crystallization under equilibrium conditions acquire an austenitic (single-phase) structure, are called steels. Widespread in industry and at home is steel grade
X18H9. Two types of stainless steel are used for the manufacture of dentures - 20X18H9T and 25X18H102C.
By international standards (ISO), alloys containing more than 1% nickel are recognized as toxic. It is known that most special dental alloys and stainless steels contain more than 1% nickel. So, the KHS casting alloy contains 3-4% nickel, Viron (Bego firm, Germany) - about 30%, Butygent - 4%, stainless steels - up to 10%. An example of a modern nickel-free alloy is Heraneum CE and EH from Heereus Kulzer (Germany). At present, the employees of the Moscow Institute of Mathematics and Design [Markov B.P. et al., 1998] and the Russian Academy of Sciences have experimentally developed nickel-free nitrogen-containing steel RS-1 for cast bridges and arches (clasp) prostheses.Manganese, which is part of the steel, can increase strength, improve fluidity. Steel contains 0.2% nitrogen, which increases corrosion resistance, hardness (HV 210), stabilizes austenite and provides great potential for strain hardening.Nitrogen in a solid solution improves properties, compensates for the absence of nickel, and improves toxicological properties.
The presence of nitrogen significantly improves the elasticity characteristics, which ensures the stability of shape retention in thin openwork designs.
Steel gives low shrinkage (less than 2%), which also ensures the accuracy and quality of castings. Chromium is the main alloying element of corrosion-resistant steel, as well as a nitrogen solvent and in combination with manganese provides its necessary
concentration in steel [Markov B.P. et al., 1998]. The melting point of stainless steel is 1460 - 1500 ° C. Silver solder is used to solder steel
From stainless steel 20X18H9T in a factory way are made:
- standard sleeves for the production of stamped crowns of twelve options: 7 x 12 (diameter-height); 8 x 12; 9 x 11; 10 x 11; 11 x 11; 12 x 10; 12.5 x 10; 13.5 x 10; 14.5 x 9; 15.5 x 9; 16 x 9; 17 x 10 mm ;
- Clasps made of round wire (for fixing partial removable laminar dentures in the oral cavity) of the following main dimensions: 1 x 25 (diameter-length); 1 x 32; 1.2 x 25; 1.2 x 32 mm ;
- elastic stainless matrices for contour EN fillings of the following sizes: 35 x 6 x 0.06 mm ; 35 x 7.5 x x 0.06 mm and 35 x 8 x 0.06 mm , as well as strips E0 x 7 x 0.06 mm) metal separation, which are made by cold stamping from stainless steel heat-treated tape, easily bend and do not break when bent to 120 ° C.
From stainless steel 25X18H102C in a factory way prepare:
- steel teeth (lateral upper and lower) for soldered fixed dentures;
- steel frames for bridges with their subsequent polymer lining.
In addition, a wire with a diameter of 0.6 to 2.0 mm is made of this steel .
In the USA, standard stainless steel crowns for permanent molars are produced. There are 6 sizes of crowns (from 10.7 to 12.8 mm in 0.4 mm increments). The set contains 24 or 96 crowns.

Cobaltochrome alloys

The basis of the cobalt-chrome alloy (KHS) is cobalt F6-67%), which has high mechanical properties, as well as chromium B6-30%), which is introduced to give the alloy hardness and increase corrosion resistance. With a chromium content of more than 30%, a brittle phase forms in the alloy, which impairs the mechanical properties and casting properties of the alloy. Nickel C-5%) increases the ductility, toughness, malleability of the alloy, thereby improving its technological properties.

According to the requirements of the international standard, the content of chromium, cobalt and nickel in the alloys must be in the amount of not less than 85%. These elements form the main phase - the alloy matrix. Molybdenum D-5.5%) is of great importance for increasing

strength of the alloy due to giving it a fine grain. Manganese @, 5%) increases strength, casting quality, lowers the melting point, and helps remove toxic sulfur compounds from the alloy.

Many US firms carry out doping with beryllium and gallium B%), but because of their toxicity in Europe do not produce alloys of these metals [Skokov AD, 1998].

♦ Alloying (German - legieren, lat. Ligare - to bind, connect) - the introduction of another element into the metal or metal alloy to improve the physical, chemical or physico-chemical properties of the base metal. For example, the introduction of chromium, tungsten, vanadium, molybdenum, etc. into steel (alloy steel).

♦ Ligature (lat. Ligatura, ligare — bind) —1) auxiliary alloys added in smelting furnaces to the main alloy (metal) when it is deoxidized or when alloying components are introduced into it; 2) metals introduced into the composition of noble alloys

metals (for example, copper or silver in an alloy with gold) to give the alloy greater hardness. The presence of carbon in cobalt-chrome alloys lowers the melting point and improves the fluidity of the alloy. Silicon and nitrogen have a similar effect, while an increase in silicon over 1% and nitrogen over 0.1% affects the ductility of the alloy. At high firing temperatures, ceramic masses can

carbon is released from the alloy, which, when introduced into ceramics, entails the appearance of bubbles in the latter, which leads to a weakening of the cermet bond.

At present, the carbon-free domestic cobalt-chrome alloys KX-Dentp and Cellity-K, similar to the classic Vitallium alloy, are widely used in prosthetics with ceramic-metal prostheses.

The melting point of the CHC is 1458 ° C. The mechanical viscosity of the alloys of chromium and cobalt is 2 times higher than that of gold alloys. The minimum tensile strength allowed by the specification is 61.7 kN / cm2 F300kgf / cm2). Due to its good casting and anticorrosion properties, the alloy is used not only in orthopedic dentistry for cast crowns, bridges and arches (arch), removable dentures with cast bases, but also in maxillofacial surgery during osteosynthesis.

KHS alloy is produced in the form of cylindrical billets. The experience of its application gave certain positive results and allowed us to begin work on its improvement. Recently, new alloys have been developed and put into serial production, including for solid cast fixed prostheses.

The production of an alloy based on cobalt - Cellite-K (mainly Co; 24% Cr; 5% Mo; C, Si, V, Nb) - has been mastered in Ukraine. JSC "Supermetal" (Russia) all manufactured alloys

divides metals for orthopedic dentistry into four main groups:

1) alloys for cast removable dentures - Budent;
2) alloys for cermet prostheses - KX-Dent;
3) nickel-chromium alloys for cermet prostheses - HX-Dent;
4) nickel-iron alloys for dentures - Dentan.

CCS vac (soft) is identical to the main chemical composition of the domestic alloy KHS F3% cobalt, 28% chromium, 5% molybdenum). In contrast to KHS, it is melted on pure charge materials in high vacuum with narrow limits

deviations of the constituent components. The CCN vac binder (normal) contains 65% cobalt, 28% chromium and 5% molybdenum, as well as high carbon content

and does not include nickel. Fully compliant with the medical standards of European countries. Strength parameters are high.

The basis of the alloy is Bulentant CCH vac (solid) is cobalt F3%), chromium C0%) and molybdenum E%). The alloy has a maximum carbon content of 0.5%, is additionally doped with niobium B%) and does not contain nickel. It has extremely high elastic and strength parameters.
The basis of the alloy Buggent CCC vac (copper) is cobalt F3%), chromium C0%), molybdenum E%). The chemical composition of the alloy includes copper and a high carbon content of 0.4%. As a result, the alloy has high elastic and strength properties. The presence of copper in the alloy facilitates polishing, as well as other mechanical processing of prostheses from it.
Borubent CCL vac (liquid), in addition to cobalt F5%), chromium B8%) and molybdenum E%), introduced boron and silicon. This alloy has high fluidity,
balanced properties that significantly exceed the requirements of the German standard DIN 13912. Conforms to the medical standards of European countries.
KX-Dent alloys are intended for cast metal frames with porcelain cladding (see p. 101). The oxide film formed on the surface of the alloys allows the application of ceramic or ceramic glass coatings with a coefficient
thermal expansion (in the temperature range 25-500 ° C) 13.5-14.2 x 10.
KX-Dent CN vac (normal) contains 67% cobalt, 27% chromium and 4.5% molybdenum. The chemical composition of the CN vac modification is similar to the composition of the CCS modification, but does not contain carbon and nickel. This significantly improves its plastic characteristics and reduces hardness. Fully compliant with the medical standards of European countries. KX-Dent CB vac (Bondy) alloy has the following composition: 66.5% cobalt, 27% chromium, 5% molybdenum. The alloy has a good combination of casting and mechanical properties. Analogue of Bondilla alloy (Germany).
Stomix is a cobalt-chrome alloy resistant to corrosion, designed for arches (clasp) prostheses and for facing with ceramics. The alloy has good casting properties (increased fluidity, minimal shrinkage), is well processed by dental abrasives, is technologically advanced at all stages of prosthetics, Stomix has a stable oxide film and a thermal coefficient of linear expansion of 14.2 x 10 ~ 6 ° C ~ 1 in the temperature range 25- 500 ° C, close to that of porcelain masses, which ensures reliable connection of the alloy with porcelain masses. The alloy under consideration has sufficient strength (limit
strengths> 700 N / mm2; yield strength> 500 N / mm2), which excludes its deformation and makes it possible to create thinner, openwork prosthetic frames.

Nickel Chromium Alloys

Nickel-chromium alloys, unlike carbon-chromium-nickel steels, are widely used in the technology of ceramic-metal dentures. Its main elements include nickel F0-65%), chromium B3-26%), molybdenum F-11%) and silicon A, 5-2%).Alloys have good casting properties - low shrinkage (see p. 34) and good fluidity. Very malleable in machining. Alloys based on iron, nickel and chromium are used for cast single crowns, cast crowns with plastic lining. The most popular of these alloys is Viron-88 (Germany). Non-beryllium and gallium-free nickel-chromium-based alloys NH-Dent for high-quality cermet crowns and small bridges are of high hardness and strength. The prosthetic frames of them are easily polished and polished.
Alloys have good casting properties, have refining additives in their composition, which allows not only to obtain a high-quality product when casting in high-frequency induction melting machines, but also to use up to 30%
sprues repeatedly in new swimming trunks. The main components of the alloy NH-Dent NS vac (soft) are nickel F2%), chromium B5%) and molybdenum A0%). It has high mold stability and minimal shrinkage, which allows casting of bridges of great length in one go. It is an analog of Viron-88 alloy (Germany). Alloy modification NH-Dent NS vac has the trade name
HX-Dent is NL vac (liquid) and contains 61% nickel, 25% chromium and 9.5% molybdenum. This alloy has good casting properties, allowing to obtain castings with thin, openwork walls.

Modern alloys of the Dentan type are developed instead of foundry stainless steels 12X18H9C and 20X18H9C2. These alloys have significantly higher ductility and corrosion resistance due to the fact that their composition is almost 3 times more than nickel and 5% more chromium. The role of the oxide film, which determines the chemical bond between the metal and ceramic, is well known. However, for some nickel-chromium alloys, the presence of an oxide film can be negative, since at high firing temperatures, nickel and chromium oxides dissolve in porcelain, staining it. An increase in the amount of chromium oxide in porcelain leads to a decrease in its coefficient of thermal expansion, which may
cause ceramic to break away from metal. Dentane D alloy contains 52% iron, 21% nickel, 23% chromium. It has high ductility and corrosion.
resistant and has good casting properties - small shrinkage and good fluidity.
The basis of the Dentane DM alloy is 44% iron, 27% nickel, 23% chromium and 2% molybdenum. The composition of the alloy was additionally introduced 2% molybdenum, which increased its strength in comparison with previous alloys, while maintaining the same level of machinability, fluidity and other technological properties. In addition, Komochrome (Yugoslavia) is known - an alloy of cobalt, chromium and molybdenum for frames of removable dentures.This alloy does not contain nickel and beryllium, has good physicochemical properties. Its melting temperature is 1535 ° C, the density of the alloy reaches 8.26 g / cm3. Good technological properties are characterized by the alloy of base metals Good Fit. The material does not provoke electrochemical disturbances in the oral cavity.

Tests on this topic.

1. The metal, which is the main component of the alloy and providing its hardness and low shrinkage:

$
tin*
$
bismuth
$
zinc
$
manganese
#

2. The melting point of alloy alloy:

$
63-93 degrees *
$
150 deg
$
190 deg
$
160 deg
#

3. The melting point of gold 900 samples:

$
1064 degrees *
$
920-960 degrees
$
900-920 degrees
$
850-930 degrees

#
4. Gold alloys used in orthopedic dentistry:
$
900, 750 with platinum, 750 solder *
$
900, 750 with platinum
$
750 solder, 583 solder
$
830 test
#
5. From a gold alloy 900 samples are made:
$
crowns, bridges *
$
half tabs
$
arch prosthesis
$
tab
#
6. Of the gold alloy 750 samples are made:
$
tabs, half crowns, pin teeth *
$
arcs, clasps, tabs, pin teeth, half crowns
$
half tabs
$
crowns and bridges
#
7. 5-6% cadmium is added to the composition of the gold alloy for:
$
melting point reduction *
$
melting point increase
$
giving strength
$
imparting
#
8. Melting temperature of gold solder 750 samples:
$
722-740 degrees *
$
700 hail
$
791-810 degrees
$
650-690 degrees
#
9. The composition of stainless steel:

$
iron (base), chromium, nickel, titanium, silicon, manganese, carbon *
$
iron (base), chromium, nickel, silicon, manganese, carbon
$
iron (base), chromium, nickel, titanium, silicon, carbon
$
iron, chrome, nickel, aluminum
#
10. The melting point of stainless steel:
$
1400 degrees *
$
1473 degrees
$
1663 hail
$
1560 degrees
#
11. Materials used in orthopedic dentistry are divided into:
$
main and auxiliary *
$
the main
$
auxiliary
$
cast
#
12. To whiten a gold alloy, use:
$
hydrochloric acid*
$
hydrochloric and sulfuric acids
$
sulfuric and nitric acid
$
hydrochloric and nitric acid
#

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme

		situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

14th theme Porcelain and composite materials. Wax and its types.
- technical and medical properties of porcelain
- light hardening composite materials
- chemical structure, physical and mechanical properties
- glass crystalline materials
- use in the clinic and laboratory
- chemical, physical and mechanical properties of wax

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	25. Preparing the audience. 26. Analysis of student preparation for class 27. Attendance check	Listen
Lecture introduction (10 minutes)	25. Preparation of the educational complex on this topic. 26. Preparing slides for the lesson. 27. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	41. Divide the group and ask questions. 42. Use visual aid 43. Use slides, multimedia 44. Summing up the topic 45. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Porcelain and its use in orthopedic dentistry
2. Technical and medical properties of porcelain
3. Light hardening composite materials
4. Glass Crystal Materials
5. Composites used in orthopedic dentistry
6. Wax used in orthopedic dentistry
7. Types of Wax
8. Application of wax in a clinic and laboratory

9. Physical, chemical and mechanical properties of wax

Methodology of the practical lesson:

Porcelain is a ceramic product obtained by firing a porcelain mass prepared from the main components - kaolin, feldspar, quartz and dyes.

The properties of porcelain depend on many factors. The main ones are the chemical composition of the components, the degree of their grinding (dispersion), temperature and duration of firing. Porcelain belongs to the group of materials that are a mixture,

containing clay substances (the word "ceramic" comes from zpez. keramos - pottery clay). In this mixture, kaolin as a clay material plays the main role of a binder that holds together particles of a quartz filler. Both of these substances form a solid porcelain base, individual grains of which are cemented during firing by the third element - feldspar.

Modern dental porcelain is the result of improving solid, that is, household, decorative porcelain. The data in table 44 show a significant difference in the chemical composition of both types of porcelain.

The chemical composition of dental porcelain is between solid porcelain and ordinary glass.

According to their purpose, porcelain masses are the starting material for:

1) factory creation of standard artificial teeth;
2) factory production of standard porcelain crowns and blanks for porcelain inlays;
3) the individual creation of porcelain crowns in the conditions of a dental laboratory;
4) individual receipt of tabs in a dental laboratory;
5) lining of solid cast frames of metal fixed dentures (crowns, bridges).

CHARACTERISTICS OF PORCELAIN MASS COMPONENTS

Kaolin - white or light-colored clay, which is contained in a porcelain mass from 3 to 65%. Moreover, the more kaolin in the mixture, the lower the transparency and the higher the firing temperature of the porcelain mass. The main part of kaolin (99%) is aluminosilicate - kaolinite (Al203 x 2Si02 x 2H20).

Its melting temperature is 1800 ° C. Kaolin affects the mechanical strength and thermal resistance of porcelain.

Feldspar is anhydrous aluminosilicates of potassium, sodium or calcium. Its melting temperature is 1180-1200 ° C. At high temperature, feldspar provides the development of a vitreous phase in which other components (quartz, kaolin) dissolve. The vitreous phases give plasticity to the mass during firing and bind the components. Feldspar creates a shiny, glazed tooth surface after firing.

When melted, it turns into a viscous amorphous glass-like mass. The more feldspar (and quartz) in the mixture, the more transparent the porcelain mass after firing. When firing (see p. 70) porcelain feldspar, as a more fusible component, lowers the melting point of the mixture. In this regard, it is considered as flux (flux). The content of feldspar in the porcelain mixture reaches 60-70%. Feldspar, often potassium, is called a microcline or orthoclase - depending on the structure. Orthoclase (K20 x A1203 x 6Si02) is the main material for obtaining dental porcelain. Sodium feldspar is called albite, calcium - anorthite.

Quartz (Si02) is a mineral, silicic anhydride. Quartz is a refractory, its melting point is 1710 ° C. It strengthens the ceramic product, gives it greater hardness and chemical resistance. Quartz reduces shrinkage and relieves

fragility of the product. The hardness of quartz on the Mohs scale is 7. During the firing process, quartz (silica) increases the viscosity of the molten feldspar. At a temperature of 870-1470 ° C, quartz increases in volume by 15.7%, resulting in a decrease in shrinkage

porcelain mass. The composition of the porcelain mass for artificial teeth, quartz is introduced in an amount of 25-32%. Dyes stain porcelain masses in various colors characteristic of natural teeth. Typically, the dyes are metal oxides.

Despite the one and a half-century period of using porcelain as a material for artificial teeth, attention to it does not wane.

BASIC PROPERTIES

DENTAL PORCELAIN

The physical properties of dental porcelain are close to glasses, their structure is isotropic. They are supercooled liquids and, due to their high viscosity, can retain a glassy isotropic state when cooled without
noticeable crystallization. Dental porcelain can undergo softening or hardening from solid to liquid (and vice versa) without the formation of a new phase. Glasses do not have their own melting point, and
characterized by a softening interval. Porcelain is formed as a result of a complex physicochemical process of interaction of components of a porcelain mass at high temperature. So, at a temperature of 1100-1300 ° C, potassium feldspar turns into
potassium feldspar glass. Kaolin and quartz have a higher melting point than feldspar. However, in the feldspar glass melt, kaolin and quartz interact with the glass.

In this case, kaolin forms needle-shaped mullite crystals, penetrating the entire mass of porcelain. Particles of quartz are melted, lose their needle shape, and a small amount of them passes into the molten glass.

Numerous microscopic studies have established the following basic structural elements of porcelain:

1) a glassy isotropic mass, consisting of feldspar glass with various degrees of saturation (A1203; Si02);
2) melted quartz particles that do not dissolve in the glass;
3) mullite crystals ZA1203 x 2Si02 distributed in a melt of silica-feldspar glass;
4) pores.

The vitreous isotropic mass in modern dental porcelain is their main part. It determines its quality and properties. The amount of glass phase increases with increasing melting temperature and increasing melting time.

The ratio of crystalline and glassy phases determines the physical properties of porcelain. The content of glass phase in porcelain masses provides their brilliance and transparency. The high firing temperature leads to the appearance of excessive gloss and small bubbles on the surface of the product [Karalnik D.M. et al., 1983].

With an excessive increase in the glass phase, the strength of porcelain decreases. Quartz particles insoluble in feldspar glass together with mullite and alumina crystals form a porcelain skeleton. An important factor in the structure of porcelain are pores. The greatest porosity is C5-45%) the material has before sintering [Budnikov P.P. et al., 1972]. As the vitreous phase forms, porosity decreases. This increases the density of the material and, accordingly,
product dimensions are reduced. Complete destruction of pores is prevented by the gas bubbles enclosed in them, which are formed as a result of the physicochemical interaction of the individual components of the mass. The high viscosity of feldspar glass prevents the removal of gas bubbles from the porcelain material, which determines the formation of closed pores.

According to the firing temperature, modern dental porcelain is classified as refractory A300-1370 ° C), medium-melting A090-1260 ° C) and low-melting (870-
1065 ° C).

Refractory porcelain is commonly used to fabricate artificial teeth for dentures.

Medium and low melting china is used to produce crowns, inlays and bridges. The use of low-melting and medium-melting porcelain allowed the use of kilns for firing with nichrome and other heaters.

When creating crowns, inlays, bridges, porcelain powder is mixed with distilled water to the consistency of a thick slurry. Porcelain gruel
applied to a matrix made of platinum foil, or to a refractory model for the preparation of inlays, or directly to the metal when porcelain is lined with metal fixed prostheses. The gruel is thoroughly condensed, the excess water is removed with filter paper. After that, the product is installed on a ceramic tray and dried in the inlet of the vacuum oven. Then fired prosthesis

injected into the oven and fired in accordance with the regime recommended by the manufacturer of porcelain material.
The optical properties of porcelain are one of the main advantages of artificial teeth. The crown of a natural tooth shines through, but is not transparent, like glass. This is due to the fact that along with the absorption of light, transparency is expressed by the ratio
diffusely scattered and transmitted light. Light, consisting of waves of different lengths, falling on the surface of the tooth, can be absorbed, reflected and refracted.
Short waves (less than 400 nm) are reflected from the enamel of the cutting edge of the tooth, creating a bluish tint [Serova G.A. et al., 1975; Bartels G., 1997]. Long waves, passing through the middle part of the tooth containing the bulk of hard tissues, reflecting and refracting, form many color shades from yellow-orange to blue [Sked IR, 1977]. In the cervical part, the enamel sharply thins out. This area has a color from yellow-orange to brown [McLean JW, 1978].
Dental porcelain is also a material heterogeneous in structure.
The optical effect of porcelain is close to that of natural teeth in cases where it is possible to find the correct ratio between the glass phase and porcelain opacifiers. Typically, a large amount of air pores and the turbid effect of crystals interfere with this. A decrease in crystalline inclusions leads to an increase in the deformation of the product during firing and a decrease in the strength of porcelain. This way of increasing transparency has a certain limit. The second way to increase the transparency of dental porcelain is to reduce the size and number of gas pores. Before firing, the total volume of air inclusions of condensed porcelain gruel is 20-45%.
To reduce gas pores, four methods are proposed:
1) roasting porcelain in a vacuum - with this method, air is removed before it has time to linger in the molten mass;
2) firing porcelain in a diffuse gas (hydrogen, helium), when the usual atmosphere of the furnace is filled with diffusible gas; during firing, the air leaves the gaps and cracks of porcelain (the method is unsuitable in practice);
3) porcelain firing under a pressure of 10 atm. If molten porcelain is cooled under pressure, then air bubbles can decrease in volume, and their light-refracting effect is significantly weakened. The pressure is maintained until the porcelain is completely cooled. This method is still used in some factories for the production of artificial teeth. The disadvantage of this method is the impossibility of reheating and glazing under atmospheric pressure, since gas bubbles
they are restored to their original size;
4) in atmospheric firing, coarse-grained material is used to increase porcelain transparency. When firing such porcelain, larger pores are formed, but their number is much smaller than that of fine-grained materials.
Of the above four methods, vacuum firing is the most widely used, which is currently used both for creating prostheses in dental laboratories and in factories for the production of artificial teeth.
Porcelain fired in vacuum has 60 times fewer pores than in atmospheric firing. When firing porcelain masses shrinkage is 20-40%.
The reasons for this shrinkage are:
- insufficient compaction (condensation) of particles of ceramic mass;
- loss of fluid necessary for the preparation of porcelain gruel;
- burnout of organic additives (dextrin, sugar, starch, aniline dyes).
Of great practical importance is the direction of shrinkage. Shrinkage may be:
- in the direction of more heat;
- in the direction of gravity;
- in the direction of greater mass.
The strength of porcelain depends on the formulation (composition of the components) of the porcelain mass and production technology. The main indicators of the strength of porcelain are:
- tensile strength;
- compressive strength D600-8000 kg / cm2);
- bending strength D47-625 kg / cm2).

The bending strength of modern ceramics (according to the International Standard ISO-9693 “Dental cermets for dental prosthetics”, the strength of porcelain in bending should not be lower than 50 MPa) for facing metal frames 80-90 MPa, and for porcelain EX-3 Noritaki (Japan) it is 30% higher [Hiroshi I., Ban K., 1987]. A great influence on the strength is exerted by the method of condensation of porcelain particles. There are four condensation methods:
- electrochemical vibration;
- column or sable brush;
- by gravity method (without condensation);
- corrugated tool.
Most researchers believe that the best compaction of porcelain mass can be achieved with a corrugated tool, followed by applying pressure with filter paper to remove the liquid.
Among the technological conditions that significantly affect the strength indicators, the following should be noted:
- the necessary compaction of the material, or the condensation of porcelain particles (see above);
- good drying of the mass before firing;
- optimal (usually no more than 3-4) number of firing;
- firing at an adequate temperature for a given mass;
- firing time;
- a method of applying vacuum during firing;
- glazing the surface of the prosthesis.
We will comment, in particular, on the dependence of the strength of porcelain on a change (violation) of firing technology:
1) the start of firing must coincide with the beginning of the discharge of the atmosphere of the working chamber of the furnace;
2) when the optimum firing temperature is reached, a full vacuum must be achieved;
3) an increase in the number of calcinations reduces the strength of porcelain due to its vitrification;
4) firing at a temperature exceeding the optimum reduces strength due to a lack of the amount of glass phase;
5) firing at a temperature below the optimum for a given mass reduces strength due to an excessive increase in the glass phase;
6) the firing time in vacuum when the optimum firing temperature is reached does not exceed 2 minutes (with increasing exposure time in vacuum even at the optimum temperature, the strength of porcelain decreases).
The best varieties of dental porcelain, subject to optimal production conditions, have a flexural strength of 600-700 kg / cm2. Such strength of the dental material is insufficient. Therefore, it is conditionally possible to distinguish at least two main directions in the search for ways to increase the strength of porcelain: due to new firing technologies, including the development of appropriate equipment and tools; due to changes in the formulation of porcelain mass.

Tests on this topic.

1. What are the porcelain masses used in the OS?

$

Feldspar, quartz, kaolin $ *

Quartz, copper sulfate $

Glass, calcium $

Feldspar, gypsum #

2. What component of porcelain gives it increased hardness and chemical inertness?

$

Quartz $ *

Feldspar $

Kaolin $

None of the components has such properties #
3. What element is a part of quartz?
$
Silicon $ *
Calcium $
Potassium $
Sodium #
4. What is the function of kaolin in porcelain?
$
Makes porcelain mass not transparent and reduces fluidity $ *
Gives porcelain hardness $
Gives increased chemical inertness $
Increases fluidity #
5. Shrinkage during firing of porcelain masses
$
15 - 42% $ *
30 - 50% $
18 - 25% $
20 - 33% #
6. Density of porcelain masses
$
2.6 - 2.8% $ *
3 - 5% $
4 - 6% $
5 - 7% #
7. The melting temperature of porcelain masses
$
900 - 1350 C $ *
800 - 1000 C $
700 - 800 C $
750 - 900 C #
8. Bending resistance of porcelain masses
$
350 - 900 kg / cm2 $ *
450 - 500 kg / cm2 $
500 - 600 kg / cm2 $
400 - 800 kg / s
9. Wax modeling is used for:
$
modeling of dentures or parts thereof *
$
temporary connection of prosthetic parts
$
making wax bases
$
sprue fixing
#
10. Sticky wax is used for:
$
modeling of dentures or parts thereof *
$
temporary connection of prosthetic parts

$
casting
$
sprue fixing
#
11. Protacryl, redont are used for:
$
repairs, relocation of dentures *
$
manufacturing bases of removable dentures
$
making artificial teeth
$
making plastic crowns
#
12. Moldin is used in the apparatus:
$
Parker *
$
Sharpe
$
Samson
$
electroodontodiagnostics
#
13. Izokol belong to the materials:
$
insulating *
$
basic
$
modeling
$
filling
#
14. Dentoflex refers to the materials:
$
cast *
$
basic
$
modeling
$
isolating
#

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent	- statement of conclusion and completion

	"5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy	- gives the wrong answer to some questions

	completely "3"	- has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 15: The use of plastics in practice Orthopedic dentistry.
- types of plastics
- plastic preparation technology
- polymerization process

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	28. Preparing the audience. 29. Analysis of student preparation for class 30. Attendance check	Listen
Lecture introduction (10 minutes)	28. Preparation of the educational complex on this topic. 29. Preparing slides for the lesson. 30. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	46. Divide the group and ask questions. 47. Use visual aid 48. Use slides, multimedia 49. Summing up the topic 50. Assessment of actively participatingstudents.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Plastics used in orthopedic dentistry
2. Types of Plastics
3. Plastic Technology
4. Polymerization

Methodology of the practical lesson:

Currently, in dentistry, synthetic plastics (plastics) are widely used as basic materials.

♦ Plastics - materials based on polymers that are in the form of a viscous-flowing or highly elastic form during the formation of products, and in operation in a glassy or crystalline state.

The base plastics used in the clinic of orthopedic dentistry can be classified according to generally accepted (traditional) signs:

- in terms of stiffness - plastics are rigid (for denture bases and their restoration) and soft, or elastic, which are used independently (boxing tires) or as a soft lining under a rigid basis;
- according to the temperature regime of polymerization, they are divided into high-temperature and low-temperature hardening plastics ("quick-hardening");
- by the presence of dyes - on plastics "pink" and "colorless", etc.

At the same time, plastics as polymeric materials are divided into 2 main groups:

1) thermoplastic (thermoplastics) - when they harden, chemical reactions do not occur and the materials do not lose their ability to soften when reheated, i.e. they are reversible. Despite the successful results of a number of studies on the use of thermoplastics as basic materials and methods for creating dentures from them by injection molding, this type of material has not found wide application in the practice of orthopedic dentistry. Apparently, the hardware difficulties in obtaining the prosthesis, the lack of a reliable connection of the basis of thermoplastic with artificial acrylic teeth impeded the widespread use of these materials in practice (I. Yu. Poyurovskaya);

2) thermosetting (thermosetting plastics), - during the processing of which a chemical reaction occurs in the products, leading to hardening, while the material loses its ability
soften when reheated, i.e., it is irreversible.

In dentistry, basic materials based on derivatives of acrylic and methacrylic acids have held the primacy for several decades. Acrylic materials deserve a leading role due to their main properties:

- relatively low toxicity;
- ease of processing;
- chemical resistance;
- mechanical strength;
- aesthetic qualities.

Most basic materials currently contain polymethyl methacrylate (PMMA) as the main ingredient. Acrylic base plastics replaced rubber,
used as a base material until the mid-1940s, gained widespread use, among other things, due to a fairly simple application technology available to any dental laboratory.

Much attention was paid to improving the acrylic base materials. The following areas of these works can be distinguished (I. Yu. Poyurovskaya):

- copolymerization of acrylates;
- changes in the processing mode of polymer-monomeric acrylic compositions in the production of dentures;
- a complete rejection of acrylates and the use of injection molding thermoplastics or other materials of non-acrylic nature, for example polyurethane (N.M. Balalaev).

The most effective method for improving the physicomechanical properties of base materials was the copolymerization method, in particular grafted copolymerization.

♦ Copolymerization is the process of formation of macromolecules from two or more monomers.

Using this method allowed to obtain domestic basic materials - in 1972 . Ftoraks material (V.N. Natovsky and others), and the study of polyacetals in the composition of basic materials led to the development in 1979 . Acronil material
(M. 3. Steingart and others.).

The intensity of scientific research in the field of new basic polymer materials indicates both the importance and difficulty of creating high-strength, convenient, cheap material for dentistry, without fundamental changes in technological methods.
The creation of more advanced polymer base materials is carried out by the following methods:
- crosslinking of copolymer molecules of methyl methacrylate (for example, Acrylic);
- obtaining copolymer compositions (Acronil, Ftoraks) \
- the introduction of plasticizing additives (Acronil),
Thus, the modification of acrylic polymers remains the main way to improve the basic materials, with the help of which it is possible to increase the impact and fatigue strength of the bases of removable dentures. Examples of such a modification are: the addition of the rubber phase to the bead particles
Powder, introduction of high modulus fibers to the material. The introduction of high-modulus polyethylene fibers into the base material proved to be more effective in achieving increased impact strength of the material, and at the same time its aesthetic properties did not deteriorate, as in the case of adding carbon fibers (I. Yu. Poyurovskaya).
The impact on the polymerizable plastic of the electromagnetic field (EMF) of the radio frequency range markedly reduced the content of residual free monomer in it and improved its physical qualities. The creators of this technology (V.N.
Trezuboe, A. P. Bobrov, V. I. Zarembo, M. 3. Shteingart, K. A. Makarov, Yu. M. Maksimovsky) the titles of authors of the scientific discovery of 2001 were awarded).

Basic base plastics and their properties
Ethacryl (AKP-15) is a basic material, which is a copolymer of methyl methacrylate, ethyl methacrylate and methyl acrylate, painted in a color close to that of the oral mucosa. It has increased ductility at the time of molding and sufficient elasticity after polymerization. It is used for removable denture bases, individual impression spoons, phantom models of jaws.
The powder (polymer) is plasticized by internal plasticization by introducing methacrylate into the macromolecule. The liquid is represented by a combination of three monomers -
methyl methacrylate, ethyl methacrylate and methyl acrylate in a ratio of 89: 8: 2. Polymerization of the polymer-monomer composition
carried out, as a rule, in a water bath (see above). Fluorox base material
is a high-temperature polymerization plastic and refers to grafted copolymers. The material is grafted on the basis of acrylic resins made of fluororubber and compares favorably with other acrylates in higher physicomechanical and chemical indices. In Ftoraks, the angle of static bending is 20% higher than AKR-15, and 15% higher than Acrela's, and specific impact strength is higher by 9 and 11%, respectively.
It should be noted also such properties as slow aging, slight water absorption, conservation or slight change in linear dimensions, the absence of toxic effects on the microflora of the oral cavity, as well as on the body as a whole. This should add a shorter period of adaptation to prostheses from Ftoraksa
and a good imitation of the color of the oral mucosa
Fluoroax powder is a finely divided, pink-colored, suspension and grafted copolymer of methacrylic acid methyl ester and fluororubber. Fluorox Liquid - Methacrylic acid methyl ester containing the cross-linking agent dimenilopropane dimethacrylic ester.
The main disadvantage of Ftorax is the significant content of residual MMA monomer, which, apparently, is the reason for the fairly frequent toxic-allergic reactions to this material.
Acronil has high impact resistance, low water absorption, good technological performance. The powder is methyl methacrylate copolymer grafted to polyvinyl acetal; the liquid is methyl methacrylate containing a crosslinking agent. The composition of Acronil introduced an inhibitor and stabilizer.

Acrylic is a copolymer with "crosslinked" polymer chains, which gives it enhanced physical and mechanical properties. The formation of a network (crosslinked) structure of the polymer occurs during polymerization using a crosslinking agent, which
introduced into the monomer and participates in the reaction only during the polymerization of the molding material. Acrela liquid, in addition to methyl methacrylate, contains a crosslinking agent and an inhibitor. The powder consists of finely divided polymethyl methacrylate plasticized with dibutyl phthalate.
Bakril is a high-strength acrylic plastic, which, compared to other polymers, has high resistance to cracking, abrasion, impact strength and high bending strength. The powder is an elastomer-modified polymethyl methacrylate. The liquid is methyl methacrylate with inhibitors. Plastic has good manufacturability. Colorless plastic for prosthesis bases is a polymer based on stabilizer-free
polymethyl methacrylate containing an anti-aging agent and consists of powder and liquid. It differs from other manufactured basic materials in increased strength and transparency. Technological manipulations with plastic do not differ from generally accepted ones. Imported analogs of base plastics supplied to Russia, according to the basic physical and mechanical indicators, correspond to domestic ones. So, for example, the base plastic of hot polymerization Paladon-65 (Germany) is supplied in the following configuration:
- pink monomer and polymer;
- pink monomer and polymer with veins;
- monomer and polymer of pink turbid color with streaks of "vessels";
- monomer and colorless polymer.
Impact-2000 (USA) - acrylic plastic of hot hardening for bases of removable prostheses has high impact resistance and resistance to deformation and fatigue damage under the influence of bending loads.
Plastics such as Magnum (Germany) are also known; Mega L (Germany); Futura acrylic 2000 (Germany); QC-20, Select-plus, Trevalon, Trevalon-S (USA) - pink acrylic plastics; Akron M Si (Japan) - acrylic plastic in different colors (pink, colorless, pink with streaks of "vessels"), etc.
ELASTIC BASIC POLYMERS
In the practice of prosthetic dentistry, we have accumulated many years of experience in using elastomers as an elastic lining in combined bases of dentures. The presence of bone protrusions and exostoses in the oral cavity, covered with a thin atrophied mucous membrane, significant or complete resorption of the alveolar ridges with the presence of longitudinal folds of the mucous membrane complicates the use of prostheses due to pain, which leads to a significant decrease in the effectiveness of prosthetics. In such cases, the use of dentures with elastic plastic lining is indicated. When determining indications for the use of soft linings, attention should be paid to the patient's age and pathological changes in the tissues of the oral cavity. Providing elastic linings under a hard tooth base not only improves chewing effectiveness, but also creates a feeling of comfort. They protect the mucous membrane from being injured by the basis of the prosthesis, help to improve retention, reduce the time of adaptation.
The disadvantages of elastic linings include:
- loss of elasticity due to aging of the plastic after six months;
- the impossibility of polishing elastomers, friability, making them unhygienic;
- lack of optimal marginal fit of elastomers to hard base plastics;
- the complexity of processing elastomers with a cutting tool, and hence the occurrence of problems in the correction of the prosthesis base.
Depending on the indications, the elastic layer is positioned:
1) over the entire surface of the basis;
2) along its borders;
3) in individual sections of the basis;
4) under artificial teeth, creating a shock absorber imitating periodontal.

So, with a dry, thin and unstable mucous membrane, severe atrophy of the alveolar part, intolerance to plastics make a soft lining over the entire surface of the prosthesis. It improves fixation, eliminates soreness and reduces
microcirculatory disorders.
To correct the boundaries of the basis during their shortening, the elastic layer is placed only along the edge, respectively, of the valve zone. In this case, the elasticity of the plastic allows you to maintain good contact of the edge with the mucous membrane without injuring it and providing an edge closing valve.
In the form of separate sections, a soft lining is used for exostoses, a torus, an acute alveolar ridge, etc. The use of elastic plastics improves fixation and
stabilization of prostheses on both jaws, minimizes the side effect of the prosthesis, more evenly distributes chewing pressure on the tissue of the prosthetic bed.
Elastic plastics, in addition to general plastics, must meet the following specific requirements:
- have a strong and long-term connection with the base material, which should have a minimum adsorbing ability with respect to saliva and food products;
- due to their high plasticity, they should fit snugly to the mucous membrane during chewing, not cause irritation and absorb the masticatory pressure;
- must not contain either external or internal plasticizers, which excludes curing of the lining due to their leaching;
- have good wettability in the absence of swelling in the oral cavity and a constant volume;
- have an initial softness and elasticity of the lining, must be stably elastic in the conditions of the oral cavity;
- must not dissolve in oral conditions;
- possess high wear resistance and color fastness.
Elastic pads for denture bases can be classified:
1) depending on the nature of the material:
- acrylic (for example, SR-Ivozil);
- polyvinyl chloride or based on vinyl chloride with butyl acrylate (Elent-100, PM-01);
- siloxane or silicone (Bisiko Softbayz, Ortosil-M, Simpa, Molloplast-B, Mollosil, Soft Liner, Softik-49, Ufa gel);
- polyphosphazene fluorelastomers - fluoroelastomers (Novus-Sh) \
2) according to the polymerization conditions:
- high-temperature polymerization plastics (Elent-100, Elastoplast, Palaziv-62, PM-01, Novus-TM) \
- Plastics of low-temperature polymerization (Ortosil-M, Correntil, Flexon, etc.).

Acrylic elastic materials

Acrylic elastic materials can have two forms of release: a) a set of powder and liquid; b) elastic plates.
Sets of powder with liquid can be high and low temperature polymerization. The powder is a copolymer of acrylic monomers (methyl, ethyl, butyl acrylate; hydroxy esters of methacrylic acid, etc.).
The liquid for preparing the molding material is of two types:
1) a mixture of acrylic monomers or methyl methacrylate (may contain a plasticizer - dibutyl phthalate, dioctyl phthalate or others, as well as some organic solvents);
2) a mixture of acrylic monomers - a liquid for quick-hardening plastics.
The liquid of some elastic materials contains substances that regulate the growth of the polymer chain. During polymerization in this case, a polymer of lower molecular weight is formed. A decrease in molecular weight increases the elasticity of the material.
Elastic plates for the base are supplied in the form of colorless or pink-colored plates 100 x 65 x 1 mm for the upper jaw and 100 x 65 x 2 mm for the lower jaw.
The material reaches optimal elasticity in the oral cavity at 37 ° C.

A significant disadvantage of some acrylic materials can be considered their relatively rapid aging, which manifests itself in a loss of elasticity. SR-Ivozil (Liechtenstein) - elastic mass, represented by a set of powder with a universal and special liquid based on methacrylate. Material intended:
- to identify places of excessive pressure when using removable dentures;
- for use as a temporary lining (up to 4 weeks);
- to obtain anatomical and functional impressions in the complete absence of teeth (it is not recommended to use for this purpose with intact dentitions and with partial loss of teeth);
- to design the functional edge of the prosthesis base.
The material has high fluidity, the possibility of correction, short-term (up to 4 weeks) connection with the basis of the prosthesis, fast setting time, the possibility of individual selection of consistency and color. For ease of use, the set of materials includes special metering units for powder and two liquids. The powder and universal liquid are mixed with a spatula in a cup for 1.5-2 minutes until a solid consistency is obtained, and when using a special liquid, 2-3 minutes until a homogeneous liquid is obtained. Immediately before using the material in the oral cavity, an adhesive is applied to the base of the removable denture or impression tray, which improves the adhesion of SR-Evozil to the impression
spoon, the basis of the prosthesis, as well as the hardened material of the impression during its correction. SR-Evozil-adhesive in the conditions of the oral cavity forms a connection between the impression and the basis of the prosthesis as a temporary (up to 4 weeks) lining.
A universal fluid is used to prepare the mass, if necessary, to functionally refine the edges of the prosthesis base, to obtain functional impressions and as a material for a temporary (up to 4 weeks) lining under the basis of a removable denture. In the latter case, red pigment is used (1 dosage spoon of pigment is added to 1 measuring cup of powder), which ensures that the color of the material matches the color of the mucous membrane. In all other cases, blue pigment can be used as a contrast additive for white impression spoons. The resulting homogeneous mixture is removed from the cup and formed in the hands in the form of a roller (flagellum), and then, after applying the adhesive, it is distributed in the desired areas and introduced into the oral cavity, where functional impressions are obtained using the generally accepted technique.
A special liquid is used to prepare the mass, if necessary, to obtain accurate impressions of the relief of the mucous membrane of the palate. When using a special liquid, the powder is structured stronger and gives a uniform consistency.
The imprint surface becomes smoother and the adhesion of the impression material to the denture base is improved. It should be remembered that SR-Evozil, mixed with a special liquid, strongly adheres to rubber gloves.

Polyvinyl chloride materials

These materials are of two types: a) a set of powder and liquid; b) a gel in the form of a thin cake, laminated with a plastic film. Both types of materials are copolymers of vinyl chloride with other monomers. Acrylates, vinyl acetate, etc. can be used as copolymers. Elasticity is achieved due to external plasticization. Domestic material Elent-100 is a set of powder and liquid. It has good elasticity, is resistant to the effects of oral fluid for some time, and perfectly coalesces with the base material. Its powder is a suspension polymer of vinyl chloride with butacrylate, cloudy with titanium dioxide. The liquid is dioctyl phthalate.
PVC materials resist abrasion better than acrylic and silicone. Their connection with the base is also better than that of silicone elastomers. The presence of plasticizers in the composition of polyvinyl chloride compositions determines
disadvantages inherent in plastics with external plasticization (plasticizer migration, aging).
Plastic PM-01 is an elastomer based on a copolymer of chlorovinyl butyl acrylate and consists of powder and liquid. The lining made of plastic PM-01 is characterized by long-lasting softness, durability of connection with the basis of the prosthesis and does not lose

their properties under the influence of the environment of the oral cavity. Plastic PM-01 is used for two-layer bases of removable dentures in case of atrophy of the alveolar part, its sharp crest, bony protrusions and in the presence of longitudinal folds of the mucous membrane.

Obtaining a soft lining made of PM-01 plastic provides for two methods:

1) the creation of a two-layer basis of the prosthesis with the simultaneous packing of plastic PM-01 and the base plastic in a pasty state, which ensures their strong connection;

2) the creation of a two-layer basis of the prosthesis with a soft lining on the finished prosthesis (the resulting bond with the base plastic is less strong).

Mass preparation PM-01 is as follows. 10 g of powder and 6-7 ml of liquid are placed in a porcelain mortar , thoroughly triturated with a pestle and mixed until a homogeneous mass is obtained. After packing the plastic PM-01, the cuvette is clamped in a clasp, placed in a water bath at room temperature and the temperature of the water is increased to 100 ° C for 50 minutes, kept at this temperature for 30-40 minutes and cooled in air. The processing of the finished two-layer prostheses is carried out by the usual method.

POLYMERIC MATERIALS FOR TEMPORARY
FIXED DENTURES

Prosthetics with crowns and bridges implies the preparation of hard tissues of the supporting teeth. The volume of preparation depends on the type of fixed denture. A prerequisite after preparation is the protection of the hard tissues of the teeth from the damaging effects of external factors (temperature, the nature of the food taken, etc.). The following are used to protect hard tissues of teeth.

polymeric materials: acrylate, polycarbonate, celluloid. Temporary crowns and bridges can be created in two ways - direct and indirect.

An indirect method involves obtaining a temporary fixed prosthesis in the laboratory. To do this, the doctor in the office takes impressions of the jaw (see chap. 2) before the preparation of the abutment (or teeth). On the plaster model, a layer of gypsum is removed from the abutment with a sharp tool according to the thickness of the permanent structure of the prosthesis. In the future, in a known manner, modeling of fixed prostheses (crowns, bridges) from wax is carried out with subsequent replacement with acrylic

Sinma-M plastic

It should be noted that the preparation of supporting teeth is carried out by the doctor after the readiness of temporary fixed prostheses. Therefore, the prosthesis after preparation of hard tissues of the supporting teeth requires correction in the oral cavity, which is weak
the place of this method.

The direct method involves the receipt by the doctor or his assistant of a temporary fixed prosthesis directly in the patient’s chair.

For a long time the clinic had the application of creating temporary crowns from quick-hardening acrylic plastic and artificial teeth of the corresponding color and size from a headset, for example from Estedent-02. To do this, plastic is removed from the artificial tooth with a cutting tool (milling cutter, boron, etc.) so that the remaining shell retains the cutting edge (occlusal surface), vestibular and contact surfaces. Subsequently, such a shell-lining is fitted to the prepared abutment, and the palatine (lingual) surface is restored with acrylic plastic. The whole structure is removed from the oral cavity for polymerization, which is carried out in a container of water at a temperature of 50-60 ° C for 10-15 minutes. After that, the finished crown is finished, polished, again fitted to the abutment tooth and fixed with temporary material.

To protect the hard tissues of the prepared teeth, standard protective caps made of celluloid can be used, for example, Strip Crown and Pella caps. Standard temporary polymer crowns are also available. Sets of 5 plastic temporary crowns Poly Crown Refill and 180 plastic crowns Poly Crowne Kit developed in the UK.

Temporary polycarbonate crowns make it possible to use scissors or a scalpel if necessary to fit them, and after fixing on the prepared tooth, they provide reliable protection of its tissues.

Bosworth (USA) has added 12 new sizes for the Big Boys temporary crowns to the previously released Bee Crown Molar Kit kit. This expands the possibilities of choice when selecting crowns for the first, second and third molars. All temporary crowns for molars have a pronounced anatomical shape and are made of polycarbonate nylon. They are transparent, aesthetic, flexible, which makes them easy to fit, and thin enough so that there are no difficulties when applying them in
interdental spaces. These crowns can be easily adjusted using crown scissors or a scalpel. These temporary crowns have good
compatibility with all types of quick hardening acrylates and composite materials, as well as zinc oxide cements.
Obtaining temporary crowns involves the following actions:
1) an impression is obtained in the oral cavity with silicone impression material before the preparation of a tooth or group of teeth;
2) after preparation of the teeth, the required amount of polymer material is introduced into the dried impression, and the impression is again introduced into the oral cavity for 2 minutes, until the elastic phase of the cured material appears;
3) after 2 min, the impression is removed from the oral cavity, the temporary crown in an elastic state is removed from the impression or removed from the prepared tooth and is corrected to the optimum using cutting tools;
4) after finishing, a temporary crown in an elastic state is applied to the prepared tooth. Then, light curing is performed in the oral cavity for 10 s, which eliminates possible changes in shape. Final polymerization
carried out outside the oral cavity. For this, light treatment of each surface of the crown is carried out for 20 s. Obtaining temporary bridges
differs from the above technology of temporary crowns in that prior to obtaining an impression in the oral cavity in the area of missing teeth, the fitting of artificial teeth from polystyrene is carried out. These teeth are adhesive (Heliobond) or composite material are fixed on the teeth that limit the defect.
After this, it is necessary to obtain an impression with a soft silicone material. Artificial teeth are removed from the impression (or from the oral cavity) and the preparation of abutment teeth is carried out. A sufficient amount of polymer material is placed in the print
The impression spoon is inserted into the oral cavity, where within two minutes the material acquires an elastic state in which it can be corrected with a cutting tool.
Light curing of the material for the temporary bridge implies processing in the oral cavity of each intermediate link of the bridge for 30 s and each crown for 10-15 s. Then the bridge is removed from the oral cavity and is further cured.When used for photopolymerization of light-curing devices of the Spectrumat-Mini type (Fig. 36), the processing time is 3 minutes.
Provipont-DC (Liechtenstein) - material for temporary crowns and bridges. It comes in the form of a paste and ready-to-use catalyst, in three colors (white, yellow, brown), in cartridges.
The components of the main paste (per 100 g): bisphenol-A-diglycidyl methacrylate - 3.9 g ; urethanedimethacrylate - 25.5 g ; tri-ethylene glycol dimethacrylate - 9.5 g ; highly dispersed silanized silica - 23.8 g ; polymerizate from urethanedimethacrylate and silanized silica - 15.8 g ; poly-
alcohol — 2.5 g; zeolite - 8 g ; catalyst and stabilizer - 0.9 g . The activator used is polyisocyanate. The material is mixed in a ratio of 4: 1, placed in a silicone impression or in the area of the prepared tooth.
After mixing, Provipont-VS polymerizes to an elastic phase within 2 minutes. In this phase, it remains until light curing is carried out and can be easily processed with scissors, a scalpel or rubber discs. Final polymerization
material can also be carried out under the influence of light, first in the oral cavity, and then outside it.

Tests on this topic.
1. What is the chemical nature of plastic?
$
Polymer $ *
Cement $
Monomer $
Amid #
2. Depending on how heat affects the properties of plastics, they are divided into
$
Thermoplastic, thermosetting $ *
One-component, multi-component $
Reversible, irreversible $
Solid, liquid #
3. One component plastics are
$
Polystyrene $ *
Aminoplasts $
Phenoplasts $
Plexiglass #
4. Multicomponent plastics are
$
Aminoplasts, phenoplasts $ *
Plexiglass, polystyrene $
Aminoplasts, polystyrene $
Plexiglass, phenoplasts #
5. Thermoplastic plastics include
$
Kapron, polystyrene $ *
Aminoplasts $
Phenoplasts $
Ftoroplasty #
6. Thermosetting plastics include
$
Phenoplasts, Bakelite, Aminoplasts $ *
Kapron $
Polyethylene $
Ftoroplasty #
7. The main methods for producing plastics
$
Polymerization, polycondensation $ *
Hydrolysis $
Copolymerization $
Electrophoresis #
8. How many stages are isolated during polymerization
$
3 $ *
2 $
1 $
4 #
9. What stage is the activation of monomer molecules during polymerization?
$

1 $ *
2 $
3 $
This stage is not #
10. The second stage is
$
Polymer chain growth $ *
Activation of monomer molecules $
Decay $
Copolymerization #
11. What is the name of the process for producing polymers from molecules of various monomers?
$
Copolymerization $ *
Polycondensation $
Polymerization $
Plasticization #
12. Examples of copolymers
$
Ethacryl, Elemental $ *
Dibutylphthalate $
Dioctylphthalate $
Ethacrylpolyethylene #
13. What are the substances that are introduced into the polymer to increase its elastic properties?
$
Plasticizers $ *
Copolymers $
Monomers $
Inhibitors #
14. Examples of plasticizers
$
Dibutyl phthalate, dioctyl phthalate $ *
Methyl Methacrylate $
Ethacryl $
Elodent #
15. Plastics polymerized at room temperature are called
$
Self-hardening $ *
Light curing $
Chemical Curing $
Physical curing #
16. Plastic for fixed dentures
$
Cinma $ *
Protacryl $
Boxil $
Redont #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic

61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 16: Application of Materials in Oral Dentistry

Waxes and its types

- general information about dental materials

- main properties of materials (mechanical, technological, physical, chemical and biological)

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	31. Preparing the audience. 32. Analysis of student preparation for class 33. Attendance check	Listen
Lecture introduction (10 minutes)	31. Preparation of the educational complex on this topic. 32. Preparing slides for the lesson. 33. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	51. Divide the group and ask questions. 52. Use visual aid 53. Use slides, multimedia 54. Summing up the topic 55. Assessment of actively participatingstudents.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

6. Materials used in orthopedic dentistry
7. Classification of dental materials
8. The main properties of materials

9. Mechanical and technological properties of materials
10. Physical and chemical properties of materials

Methodology of the practical lesson:

CLASSIFICATION OF MATERIALS,
APPLICABLE IN ORTHOPEDIC
DENTISTRY

Dental materials science is an applied section of science aimed at creating new and improving numerous known materials, studying their technological and clinical properties related to dental practice.

♦ Material science —- the science of the structure and properties of materials.

Dental materials are conventionally divided into main, auxiliary and clinical.

The main materials are those from which dentures, devices, fillings are made. In the literature you can find the term "structural" materials, which is synonymous with the definition of "basic". We prefer the latter as more understandable and simple.

The main materials include:

- metals and their alloys;
- ceramics (dental porcelain and ceramic);
- polymers (basic, facing, elastic, quick-hardening plastics);
- composite materials;
- filling materials.

Auxiliary materials used at various stages of prosthetic technology are called auxiliary materials:

- impression;
- modeling;
- molding;
- abrasive;
- polishing;
- insulating;
- fusible alloys;
- solders;
- fluxes;
- bleached.

Clinical refers to materials used by doctors at a clinical dental appointment. They are:

- impression materials;
- filling materials;
- waxes and wax compositions.

Such a classification is conditional, if only because the group of clinical materials is artificially created. It includes both auxiliary (impression masses) and basic (filling) materials. In addition, materials such as polymers,

fine waxes, metals, ceramics, in fact, are clinical, as an orthopedic dentist works with them in the clinic and they are designed for a long-term stay in the oral cavity. However, this group was born because of the extreme importance
and the prevalence of these substances in dental clinical practice.
In fact, in orthopedic dentistry, we should talk about basic, auxiliary and impression materials.
Dental materials are highly demanding.
They are very diverse:
- toxicological - the absence of irritating, blastomogenic (i.e., contributing to the formation of a tumor), toxic-allergic effects;
- hygienic - the absence of conditions that worsen oral hygiene, in particular - retention points for food and plaque formation;
- physical and mechanical - high strength properties, wear resistance, linear volumetric constancy;
- chemical - the constancy of the chemical composition, anti-corrosion properties;
- aesthetic - the possibility of complete imitation of tissues of the oral cavity and face, the effect of naturalness;
- technological - simplicity and ease of processing, preparation, shaping and volume.
In this regard, the materials emit physical, mechanical, chemical and technological properties.
The most common concepts and definitions of material properties are as follows:
♦ Strength is the ability of a material to resist the action of external forces causing deformation without destruction.
♦ Resilience, or elasticity, is the ability of a material to restore its shape after the cessation of the action of external forces that cause a change in its shape (deformation).
♦ Plasticity is the property of a material to deform without destruction under the influence of external forces and to maintain a new shape after their termination (that is, plasticity is a property opposite to elasticity).
♦ Deformation - a change in the size and shape of the body under the action of the forces applied to it. Deformation can be elastic and plastic (residual). The first disappears after unloading. It does not cause changes in the structure, volume and properties of the material. The second is not eliminated after removing the load and causes changes in the structure, volume, and sometimes the properties of the material.
♦ Hardness characterizes the body's ability to withstand plastic deformation when another solid enters it.
♦ Viscosity (internal friction) is the ability of gases and liquids to resist the action of external forces that cause their flow. Impact strength - this is the work spent on the shock fracture of the sample (in the reference literature refers to KS).
♦ Flowability is the ability of a material to fill a form.
Wax Modeling
DENTAL MATERIALS
Wax modeling dental materials that reproduce the anatomical shape of the tooth, prosthetic base or scaffold, are subsequently replaced by the main material - metal, ceramic or plastic. As a rule, modeling materials are various wax compositions and are temporary materials, i.e., to be replaced by basic ones.
Without the use of modeling materials, in most cases, the process of creating dentures is impossible. The accuracy and many other properties of future prostheses depend on them. Therefore, these materials must meet certain requirements. Along with toxicological indifference, wax modeling materials require the following:
1) low shrinkage (not more than 0.1-0.15% by volume per degree when cooled from 90 to 0 ° C);
2) good plastic properties in the temperature range - 41-55 ° C;
3) sufficient hardness at a temperature of 37-40 ° C, providing stability of the form of reproduction in the oral cavity;

4) the absence of brittleness and delamination during processing at room temperature, as well as a significant residue after calcination at a temperature of 500 ° C;
5) homogeneity during softening;
6) do not stain the prosthesis material, quickly and completely remove from the plaster mold, it is easy to replace the prosthesis material;
7) have a color different from the color of the oral mucosa.
♦ Wax - fat-like amorphous substances with a melting point of 40-90 ° C. In terms of chemical composition, these are the highest saturated hydrocarbons of the fat series, their monohydric alcohols and esters of higher essential acids.
Waxes * may contain all of these substances in a free state, but more often in the form of compounds called esters. Esters are formed as a result of the interaction of alcohols with acids with the loss of a water molecule. Waxes dissolve well in gasoline, chloroform, benzene and essential oils. Their relative density is less than 1, i.e., they are lighter than water. With weak heating, they soften well, acquiring a high degree of ductility. With a further increase in temperature, they easily turn into a liquid state, and then burn without residue with a minimum ash content, which is important in casting processes.
Waxes are divided (see tab. 93, 94) into the following groups:
- vegetable (palm - carnauba, herbal - candelilla, fruit - Japanese);
- produced by insects and animals (bee, Chinese, stearin, spermaceti);
- mineral (brown coal and peat, distillation - paraffin);
- fossils (ozokerite);
- synthetic (ethylene and polyisobutylene resins).
In dental practice, waxes are more often used in compositions that contain various components. These mixtures are characterized by the content of natural synthetic waxes, resins, fats and fatty acids, oils, pigments and dyes
All of these components, correlated with each other in a certain proportion, make it possible to obtain wax with a set of dominant properties, which predetermine their clinical use. Even with good quality wax, the model can have excessive internal stresses if it is created with some violation of technology. If the wax is softened by heating and then cooled, then it is exposed to internal stresses. Reheating, and in some cases just long-term storage of the resulting model, can lead to its deformation. Storage in chilled conditions contributes to a certain decrease in deformation due to stress relieving, which manifests itself to a greater extent in the first 2-3 hours after receiving the model. Another characteristic of wax patterns, which is also about
it must be remembered is the coefficient of thermal expansion. This is one of the drawbacks that is more or less common to all modern waxes.
Modeling waxes have a CTE more than any other dental material: from 300 x 10 ~ 6 ° C ~ 1 to 350 x 10 ° C-1. Therefore, it should be remembered that when obtaining accurate structures from wax, they may shrink when cooled.And if not
to control the change in size of the model, which is exposed to the action of temperature difference, and not to take measures to compensate for shrinkage, the size of the model can change even in tenths of a percent.
To remove the surface tension of the wax, you can use VNM (Germany) - a drug that makes it possible to make accurate castings with a smooth surface. This material is available in the form of a ready-to-use solution in a bottle and in a spray bottle. For almost all waxes, proper storage is essential, eliminating the change in properties under the influence of external factors. Wax is stored in a closed, dry room, excluding direct sunlight, at a temperature not exceeding 30 ° C and humidity up to 80%, in the absence of open sources of fire and at a distance of at least 1 m from heating appliances.
Wax mixtures (compositions), depending on the purpose, are of the following varieties:
- basic;
- clasp;
- modeling for fixed prostheses, including immersion mixtures and for inlays;

- profile;
- sticky.

In accordance with the specified classification attribute, domestic wax compositions and their imported analogues are discussed in detail below.

Base Waxes

• Base wax is produced in the form of rectangular plates of pink color measuring 170 x 80 x 1.8 mm . It has the following properties:

- high ductility, easily molded in a heated state;
- it is well processed by the tool, not breaking and not stratifying;
- has a smooth surface after light melting above the burner flame;
- a small residual stress that occurs when the wax model is cooled;
- completely and without residue washed with boiling water from gypsum forms.

The composition of the base wax (in% by weight): paraffin - 77.99; ceresin - 20.0; dammar resin - 2.0; dye - 0.01.

The use of basic wax: modeling the bases of removable dentures, orthodontic appliances and individual spoons, obtaining wax bases with occlusal rollers (patterns).

• LZ modeling wax is available in the form of pink plates with a thickness of 1.5 mm in two consistencies: normal and hard.

• Waxes of the Bego company (Germany) for modeling have good ductility, are easily processed and burn without residues. Available in the form of pink plates measuring 175 x 80 mm and a thickness of 0.5-0.6-0.7 mm:

- smooth foundry wax in the form of green plates measuring 175 x 80 mm and a thickness of 0.25; 0.3; 0.4; 0.5; 0.6; 0.8 mm .
- Ribbed casting wax (the so-called coarse, medium and fine) is produced in the form of green plates with a size of 150 x 75 mm and a thickness of 0.3; 0.35; 0.4; 0.5; 0.6 mm .

• Wax for modeling Ceradent (Czech Republic) comes in two types - soft and medium hard. Ceradent-1 wax is used for occlusal rollers, to obtain occlusal impressions. Ceradent-P is used for wax bases of removable dentures and orthodontic appliances. The manufacturer plans to expand the range with solid wax, which will be indicated by the Roman numeral III. This wax will be universal.

It will find application in the modeling of fixed prostheses, as well as in obtaining wax bases of partial removable prostheses.

• Flexi-wax (Germany) - transparent, flexible wax, which at the temperature of the hands can be easily processed. Allows, thanks to its stickiness and ductility, to easily fit the model. Comes with knurled, grooved and smooth surface, size 150 x 75 mm with a thickness of 0.3 to 0.6 mm .

• Base wax pink (Germany) has good modeling properties, flexural strength and quick cure after application. Moreover, due to insignificant thermal shrinkage, the wax remains constant in the given form of the basis on the gypsum model. It is supplied in 1.5 mm thick plates of the following types: standard, medium, special elastic, standard elastic, summer, hard, soft winter.

The aforementioned basic waxes suggest the use of concomitant wax blanks, which facilitate and significantly simplify a number of manipulations by the dental technician and dentist orthopedist, but at the same time guarantee the high quality of the semi-finished prosthesis. So, for example, Setting wax (Germany) (see Fig. 44, b) facilitates the setting of teeth in full and partial removable dentures. This is very important when setting teeth, since during hardening a ductile-plastic phase sets in and thus it becomes possible to carry out adjustment of the setting.

After hardening, staged wax prevents tooth displacement. In the oral cavity at a temperature of 37 ° C, it also remains rigid and contributes to the stable position of the teeth. Setting wax (see table. 96), in addition, improves the connection between the bases and the occlusal rollers. It comes in pink stripes.

In addition, Schuler-Dental (Germany) produces blanks for occlusal rollers and palatine patterns:

- full wax occlusal rollers (soft, medium, hard) are used for wax bases with occlusal rollers (patterns). They are delivered specially for a toothless upper jaw in the form of a semi-ellipse, for a toothless lower jaw
- in the form of a parabola, which reduces the time spent when they are installed on a wax basis.
In these forms, sagittal and transverse occlusal curves have already been taken into account. On the labial side, the occlusal ridges remain in planar contact during protrusion movement. In addition, the use of such rollers significantly saves the doctor's working time when registering the central ratio of the jaws;
- gastigin wax rollers (soft, medium, hard) are used for wax bases (patterns) with occlusal rollers when prosthetics are made with partial removable dentures. They have a size of 110 x 10 x 6 mm . Soft rollers have
lemon yellow, medium - yellow, solid - pink;
- The palatine patterns come in three sizes (large, medium, small) with a wax thickness of 1.5 mm . They are flexible and fit the model easily. When pressed to the models, distortion of their surface is not formed.

Clasp waxes

• Clasp wax is available in the form of pink discs with a diameter of 82 mm , a thickness of 0.4 and 0.5 mm . Its composition is similar to the base wax, but due to special technological processing, the wax foil has high ductility and low
heat shrinkage. It is used to create an intermediate layer when modeling the frames of arc (clasp) prostheses.
• Film wax ("C" 375) (Czech Republic), size: 80 x 72 x 0.3 mm and 80 x 72 x 0.66 mm ; It is used to isolate the gypsum model when modeling arches (clasp) prostheses and bridges. It is an analogue of clasp wax
Injection molding waxes for arc (arch)
dentures are issued under the names Formodent molding and Formodent solid, in the form of rectangular green plates.
Injection mold is a wax composition that, when heated, easily fills the nests of the mold — a matrix — of an elastic silicone plate designed for wax models of various clasps, arcs, and other elements of an arch (clasp) prosthesis. Wax is used only on a model made of refractory material cast by duplication of a gypsum model using agar duplicating material.
Solid wax Formodent is used to model solid cast arches (clasp) prostheses. When softened, it is well formed on the gypsum model, without delamination and cracking. It has sufficient hardness at room temperature. It has low heat shrinkage and ash content not higher than 0.02%.
• A set of clasps according to Markscors (Germany) is used to model carcasses (arches) for end defects of the dentition.
• Wax ladder retention nets, waxed perforated retention nets, wax round-elongated retention nets (Germany) - 17 cm red in length - designed to model frameworks of 45 partial dentures.
• Wax cutting edge with retention hinges
(Germany) is used in modeling cast bases on
upper jaw.
• Wax restraining tapes with retention loops (Germany) - red 170 mm long - are used to model the bases of partial removable dentures on the upper jaw.
• Wax lattice retention nets (Germany). After replacing them with metal, the polymer bases are secured to the metal frame. Three types are available:
A - in the form of red plates 60 x 42 mm in size - for use in the process of modeling the bases of partial and complete removable dentures;
B - in the form of red plates 75 x 150 mm in size - for modeling the bases of partial removable prostheses;
B - in the form of red plates with a size of 100 x 100 mm for modeling the bases of partial and complete removable dentures.

• Wax patterns (Germany) in the form of green blanks for modeling cast supporting and holding clasps of different types into molars and premolars.
• Wax to insulate undercuts (Germany) is well scrubbed, cut and has strong adhesion to the model. Therefore, it is used to isolate undercuts in model casting technology.
• Wax patterns from injection wax (Germany) are used for the wax design of the arch (clasp) prosthesis. They are flexible and tacky, and thanks to the new method, such wax patterns are easy
separated from their linings. The working temperature should not be lower than 20 ° C. The complete set of wax patterns provides for the following standard blanks: clasps (two-shouldered Claire Bonigard; Roach; ring; multi-link; for premolars and molars); large and small lamellar retention gratings and nets; scallop retention devices; arches on the lower jaw.
• Retention devices (Germany) for modeling the retention part in arch (arch) prostheses for the upper and lower jaws. Obtained from one wax composition, which is distinguished by its stability and ductility. In addition, they adhere well to the refractory mass. The following retention forms are supplied: round, oval, round offset, double row, with end edge.
• Saddle and lining wax (Germany) - transparent, elastic, does not peel off when in contact with hot backing materials during the preparation of the mold for the refractory model. It is supplied in red plates with a thickness of 0.3 to 0.7 mm and a size of 150 x 75 mm . There are wax blanks for clasps and blanks for insulation in the area of saddles, for cast bases, arc-plates of “smooth” (thickness from 0.4 to 0.75 mm) and “folded” (thickness of 0.4 and 0.5 mm) wax (Germany).

Modeling waxes for fixed prostheses and inlays

Dental modeling wax for modeling crowns, claddings, pin teeth, reproduction of the skeleton of the prosthesis. Available in the form of rectangular bars of blue color, size 40 x 9 x 9 mm . This wax is characterized by low heat shrinkage and does not change its properties during repeated melting, it actually burns out completely in the process of preparing the mold for casting (the ash content does not exceed 0.05%). The specified wax is easy to process with tools, gives dry inviscid chips, has minimal thermal shrinkage. The melting point is 58 ° C. Wax is supplied from Germany for the impregnation of models, which is simple and convenient to use. At the same time, models immersed in wax become hard, smooth and provide good surface adhesion with modeling materials. In addition, modeling materials for various purposes are produced.
- Wax for crowns of blue color has an average degree of hardness. Used to model crowns and bridges. It is supplied in cans, as well as in the form of cylinders for filling the Zeradip wax heating device (a 28 ml device for immersing wax with a regulator of stepless temperature change in the range from 50 to 90 ° C).
- Milling wax is a solid material for modeling crowns and bridges. It lends itself to milling, processing and well retains the given shape.
- Cervical wax - a special red wax without internal stresses to highlight cervical edges when modeling crowns. It is delivered in jars of 50 g each, as well as in the form of cylinders for filling the Ceradip wax heater

To increase the mechanical adhesion of the facing material and the metal frame of the metal-acrylic and ceramic-metal crowns and bridges, retention wax (“C” 460) (Czech Republic) is produced in the form of grains 0.3-0.4-0.5-0.6mm in size .

There are also wax blanks for crowns (Germany), the intermediate part of the bridge, blanks of the intermediate part of the bridge from a mixture of waxes and polymers. A variety of wax compositions are offered (Germany) for modeling fixed dentures:
• Blue modeling wax is intended for modeling chewing surfaces and crown walls, as well as the intermediate part of the bridge. It is distinguished by its surface density. Opaque and intense coloring of this
Wax makes it visible on the background of the model. The pour point is 64 ° C.
• The modeling wax is green in quality, physical and performance characteristics similar to blue hard wax, but softer. It is used for modeling crowns. The pour point is 57 ° C.

• Secondary wax was specially developed in the summer and winter versions for modeling the external telescopic crown, tongue-and-groove castle mounts. After solidification, it adheres tightly to the metal. The pour point of the “summer” wax is 62 ° C, of the “winter” - 59 ° C.
• Cervical wax is used to work in the cervical part of crowns, half crowns, tabs. This soft non-shrinking wax is applied to the cervical part after the final modeling in order to obtain a snug fit of the edge of the reproduction of the prosthesis to the neck area. The pour point is 66 ° C.
• Wax for milling works for modeling internal telescopic crowns. It is suitable for processing with special rotating tools and heating tools (electric spatula) due to its composition, ensuring constant stability and surface density. The pour point is 63 ° C.
• Special blue wax complements the use of wax blanks (“rp-scabets”) from this type of wax to model the frames of fixed prostheses. The main properties of special blue wax are good formation in the heated state and stability after solidification, as well as dimensional stability. The pour point is 64 ° C.
• Caviplan wax is used to instantly smooth out roughness on gypsum stumps. Due to its high melting point A20 ° C) after conventional insulation, it is possible to apply modeling wax, as well as to obtain caps by immersion or through polymer disks. It should be noted that the cap does not connect at this time with wax.
• Gnat wax in a set of four colors (blue, red, green, yellow), has high fluidity and hardness. With repeated heating of the wax, changes in the crystal structure do not appear, which guarantees the continuity of work with this material.Even with a deep cross-section, gnato wax does not show any internal stresses. The pour point is 64 ° C.
• Gnato-wax A (according to Polts) is similar to the previous one. The inorganic coloring of this wax makes it possible in the liquid state to appear opaque, which greatly facilitates the targeted application of wax and allows you to adjust its thickness. The pour point is 57 ° C.
• K + B Wax Kit is a wax for modeling crowns and bridges. A set with five wax cones is presented: modeling wax, cervical wax, caviplane wax, tab wax and special (leveling) wax.
• Pearl blue wax, pearl green wax correspond in quality to the proven modeling blue wax. The use of this wax makes it possible to accurately dispense the right amount during simulation. The pour point is 64 ° C.
• Immersion wax in bars of yellow (very soft), green (soft) and dark brown (contrasts with the color of the model) is used to obtain wax caps by immersion. Thanks to this wax, high casting accuracy is guaranteed. 30 s after immersion of a fragment of the model, the wax acquires high strength, which eliminates deformation. The temperature during immersion is 85-90 ° C. With a duration of immersion of 1 s, you can get a wax cap with a thickness of 0.4 mm . The pour point is about 74 ° C.
♦ Aesthetic wax-0 is used to model glass-ceramic prostheses. It has ashlessness, slight shrinkage, good fluidity, high surface density, and can be easily scraped.
♦ Estetige wax-A contains a small amount (<1%) of inorganic additives, which makes the wax even opaque when in a liquid state. This allows you to accurately dose it when modeling fixed prostheses. This type of wax is not suitable for glass ceramics. The aesthetic waxes O and A are supplied in cones, in two colors (brown and beige) and in different degrees of transparency.
♦ Wax chameleon fits snugly on the cervical part of the tooth on the model. Optically (due to its color identical to super gypsum) allows you to control the accuracy of the simulation. In physical properties similar to the previous wax.For glass ceramics unsuitable. It is delivered in cones of five different colors (brown, green, yellow, pink, gray). The pour point is 51 ° C. Finished rp-scabets wax products (Germany) are delivered in the following forms and configuration:
♦ VGK one-piece crowns - original assortment of 48 different shapes. The concept of “form” includes a wax blank of a cast crown of one of the molars or premolars of the upper or lower jaw, each of which has 3 sizes (A, B, C).
♦ Chewing surfaces K - an original range of 48 different shapes.
♦ Chewing surfaces in KBL blocks - an assortment of 12 different forms of C sizes: A, B and C of four monoblocks of premolars and molars of the upper and lower jaws).

♦ Facings for metal-plastic prostheses VKS - an original range of 72 different forms C of standard size: A, B and C for teeth from the 1st to the 6th inclusive for the upper and lower jaws).
♦ Intermediate teeth for GW vestibular cladding - an original assortment of 84 different forms of C sizes: A, B and C of each tooth of the upper and lower jaw).
♦ Intermediate lips for cermet prostheses, circular, MK-s - an original assortment of 84 different forms of C sizes: A, B and C of each tooth of the upper and lower jaw).
♦ Blocks for cermet prostheses, circular, MK-BL-c - an assortment of 18 different shapes (each shape is represented by a monoblock of premolars and molars of the upper and lower jaw of three sizes A, B and C).
♦ Blocks for cermet prostheses, hollow circular, MK-BL-cs - an assortment of 18 different shapes. Each form is a wax monoblock - 3 on the upper and lower jaws (premolar and molars of the right side, premolar and molars of the left side and a group of incisors - 3 monoblocks of 4 teeth) - three sizes A, B and C.
♦ Blocks for cermet prostheses with chewing surface, MK-BL-K - an assortment of 12 different shapes (each shape is represented by a monoblock of molars and premolars of the upper and lower jaws of three sizes - A, B and C).
♦ RP-scabets-ic blocks in beige color - from aesthetic wax with a chewing surface of molars and premolars of the upper and lower jaw of the middle size (Fig. 46), provide contacts in the central occlusion position when prosthetics are made with oncoming bridges.
♦ Scabets MK-Vario - these are wax products reduced by the ceramic layer, obtained in the form of natural teeth. They save time on modeling the frames of metal-ceramic prostheses, do not have a garland, which increases the naturalness of the form; so-called “auxiliary rods” located on the labial or buccal surfaces simplify the exact connection of individual parts with wax, and contact auxiliary connecting parts make it possible to obtain wax frames without internal stresses.
In addition, the contact auxiliary connecting parts of the posterior teeth are installed mesially and distally in such a way that they can be directly connected to the adjacent wax cap. The bridge is significant
the length of the auxiliary connecting parts can be shortened if necessary.

These elements are made quite thin and are located very close to the occlusal surface in order to preserve the washing space of the bridge. Depending on the load and extension of the skeleton of the bridge, the connecting parts can be strengthened, and for the group of front teeth they enable individual setting when modeling the skeleton.
Buccal or labial auxiliary rods facilitate the fixation of parts of the bridge - they are located on the convex parts, and at the end of the modeling process, they can be easily removed and smoothed. Scabets MK-Vario is offered in three assortments of 10 parts of each shape: for the front teeth, for the posterior teeth and hollow gastes of the MK-Vario scabets. For the posterior teeth, hollow parts of the Scabets MK-Vario are produced, which reduce metal consumption by

up to 45%. At the same time, they are easily filled with ceramic mass. After firing the soil, the hollow parts are filled with the corresponding opaque dentin and simultaneously applied to the intermediate parts, and after removing the liquid with a napkin, the bridge is carefully removed from the model. Then, the needle is cut in the middle of each hollow part so that the ceramic mass shrinks toward the metal during the final firing. The Ivoklar company (Liechtenstein) produces wax fittings for modeling bridges, leading to a reduction in metal consumption of up to 40%. Such blanks are supplied with fixing wax of red color and modeling wax of green color of two types:

a) blanks for intermediate parts (bodies) of metal-polymer or cermet bridges of A8 form);

b) blanks for intermediate parts (bodies) of cermet bridges (B1 form).

• Wax modeling for tabs Lavax is available in the form of sticks of a lanceolate form of blue-green color. It is characterized by minimal shrinkage and ash content. It is used to create wax models for prosthetics with fixed structures (plastic, combined crowns, facings, pin teeth, half crowns, inlays). It softens at a temperature of + 55 ° ... 60 ° C. In the temperature range from + 43 ° to + 48 ° C, it is plastic and well formed. At a temperature of + 37 ° C, the wax remains relatively solid. When burning, it does not leave a dry residue.

• Cerin (Czech Republic) - a synthetic wax for modeling tabs by direct and indirect methods (in the oral cavity and in the dental laboratory on a plaster model). The wax is made in the form of sticks of a lanceolate shape. The material has volume stability and the optimum hardening interval necessary for work in an office or laboratory.

The plastic state occurs at a temperature of 45 ° C; therefore, minimal changes at an oral temperature of 37 ° C are the main prerequisite for successful work even in the oral cavity.

• Tab wax was developed in Germany in two versions - “summer” and “winter”. It is suitable for modeling various types of tabs, semi-crowns. The special properties of this wax are that during hardening it adheres tightly to the edges of the cavity under the insert. “Winter” wax is a bit softer than “summer” wax and has greater fluidity and modeling properties. The pour point of the “summer” wax is 57 ° C,

"Winter" - 55 ° C.

Profile Waxes

• Profile waxes are produced under the name Voskolit-1, Voskolit-2 and are used to create a gate-feeding system for casting metal parts of dentures. Scaffold easily connects to wax models, forming a strong bond without reacting with binders and refractory masses. It is smelted and burned without residue when it is in a muffle furnace, where a slow rise in temperature from 60 to 200 ° C is carried out for 1 h.

• Dentistry profile wax is intended for modeling arc (clasp) prostheses and creating a gate-feeding system for casting metal parts of dentures. It is a set of blue or red wax sticks of various configurations in cross section. When modeling the frames of arch (clasp) prostheses, wax profiles become plastic under the influence of the temperature of the fingers. When creating a gating system, the wax profile easily connects to wax models, forming a strong contact, does not react with binders and refractory masses, is melted and burns without residue (wax ash content not more than 0.05%) in a muffle furnace.

The kit contains 14 sizes of wax profiles: round profiles with a diameter of 1, 1.5, 2, 3 and 4 mm ; profiles for modeling clasps with dimensions of 1.5 x 1 mm , 2.5 x 1 mm , 3 x 1.8 mm ; profiles for modeling the arch on the lower jaw size 4 x 1.5 mm and 5 x 1.5 mm ; profile for modeling on the upper jaw of the arc measuring 6 x 1.5 mm ; profiles for auxiliary purposes with dimensions of 3.3 x 1.7 mm ; 5.6 x 1.5 mm and 7 x 1.5 mm .

• Wax profile rods (Germany) of green color 17 cm long are easily fixed and have good adhesion to the model, completely burn out and are used for casting various designs of dentures. Available in the form of:

- wire with a diameter of 0.8-1.0 mm ;
- casting pins with a diameter of 1.6 and 2.6 mm ;
- auxiliary casting pins with a diameter of 1.35 mm ;

- arches for the lower jaw, with a cross section of 1.6 x 4.0 mm , 2.0 x 4.0 mm and 1.4 x 3.0 mm .

• Wax profiles (Germany) of green color 170 mm long are supplied in a set consisting of a wax profile in the form of a wire weighing 6 g with a diameter of 0.8 mm , auxiliary casting pins with a diameter of 1.35 mm ; arches of the lower jaw - section 2.0 x 4.0 mm ; profiles for multi-link clasps - section 1.15 x 1.75 mm and wax profiles section 2.0 x 6.5 mm - for the upper jaw.

• Wax wire for foundry channels (Germany) can significantly save time when using it. It is delivered in the form of coils in the following assortment: diameter 2.5 mm and length 50 m ; diameter 3.0 mm and length 36 m ; diameter 3.5 mmand length 28 m ; diameter 4.0 mm and length 21 m ; diameter 5.0 mm and length 17 m .

• Wax profiles “Klinige packaging K” (Germany) are offered in numerous forms: round, semicircular, arch of the lower jaw, arch of the upper jaw, limiter for use with the technology of arch (clasp) prostheses.

• A set of wax profiles (Germany) is composed of the above and includes a semicircular A, 8 x 0.9 mm ; 2.0 x 1.0 mm ; 3.5 x 1.7 mm ; 4.0 x 1.5 mm) and round (diameter 0.8 mm , 1.2 mm , 1.5 mm , 2.0 mm) wire; an arch of the lower jaw D, 0 x 1.7 mm), as well as wax balls of different sizes.

• Connecting wax (Germany) for model casting in the form of a cone, dark green. It is necessary to connect wax profiles, clasps, in preparation for casting. It is well fixed on the refractory mass, easy to apply, can be scraped. Due to the translucency of the wax on the model, you can see the outlined contours of the prosthesis design. The hardening temperature is 54 ° C.

1 Blocking wax for model casting pink (Germany) is used to fill undercuts. Wax is opaque, therefore it is possible to distinguish contours only in a liquid and plastic state. It is well applied, sticky, scrubbing.

The pour point is 58 ° C.

• Wax wire (Germany) is supplied on coils with a diameter from 2.0 mm to 6.0 mm in two colors (blue and green) to prepare for casting certain elements of the prosthesis.

• Gating channels (Germany) with a height of 15 and 20 mm and a diameter of 4 and 5 mm contribute to the correct location of the part relative to the collector. Due to the rounded shape of the sprues, sharp edges are not formed in the injection mold, as a result of which the refractory mass is prevented from entering the metal. The cross beam of the sprue channel has a sufficient dimension to prevent pores in the metal. Its stable shape (straight or straight long, bent or bent long) prevents inadvertent deformation of the wax frame of the bridge when removing it from the model.

• Blue wax beams (Germany) are designed for sprues and cross beams. The latter facilitates the transfer of gate objects from the model and prevents inadvertent deformation. Available in diameters from 3.0 to 5.5 mm .

• Plastic wax wire of eight sections with a diameter of 1.5; 2.0; 2.5; 3.0; 3.5; 4.0; 4,5; 5.0 mm is available in the Czech Republic. It has a smooth surface and allows you to manually give it any shape.

• A colorless super soft wax wire (Germany) is used to fringe functionally formed edges on prints before obtaining a gypsum model. It has very good adhesion to impression materials. It is delivered with a diameter of 3 mm on coils.Wax is supplied from Germany to create sprues in the form of a wire with a diameter of 0.6; 1,2; 2.0; 2.5; 3.0; 3.5; 4.0 and 5.0 mm .

Sticky Waxes

• Sticky wax is produced in the form of cylindrical rods 82 mm long and 8.5 mm in diameter , brown. Sticky wax should have a dark color so that it stands out easily on light gypsum materials. Consists of rosin G0%), beeswax B5%) and black montan wax E%). It has good adhesion to metal and the necessary strength, has a convenient shape for use (sticks). The melting point of wax is 65-75 ° C. When burned, it does not give ash.

• Tenit - sticky wax (Czech Republic) for joining structural elements of dentures. The composition of this wax provides a good connection with gypsum, metals and plastics. At high temperatures, burns without residue (ashless wax).
• Sticky wax K + B (Germany) is used to glue the metal parts of prostheses prepared for soldering. Due to its brittle properties in a cooled state, displacement of individual parts (warping) is excluded. The pour point is 77 ° C.
• Sticky wax P (Germany) - universal sticky material in cones for partial removable dentures. Thanks to the adhesive adhesion, it is suitable for gluing plastic teeth in a gypsum bed, gives a good connection with the base plates and occlusal rollers. The pour point is 81 ° C.

Tests on this topic.

1. The ratio of body weight to its volume is
$
Density $ *
Strength $
Elasticity $
Viscosity #

2. Which element lowers the melting point of the alloy?
$
Cadmium $ *
Fluoride $
Nitrogen $
Hydrogen #

3. The ability of a substance to conduct heat is
$
Thermal Conductivity $ *
Strength $
Viscosity $
Density #

4. Do all bodies change their volume and linear dimensions when heated and cooled?
$
Yes $ *
No $
Only solid $
There is no right answer #

5. Hardness determines
$
Material Quality $ *
Size $
Ability $
Resistance #

6. How many types of corrosion?
$
3 $ *
4 $
6 $
2 #

7. How many times the coefficient of thermal expansion of acrylic plastics is more than tooth tissues?

$
10 times $ *
6 times $
4 times $
2 times #
8. What is corrosion?
$
Complicated process $ *
Simple process $
Easy process $
Short process #
9. What samples do gold alloys have?
$
900, $ 750 *
400 $
500 $
600 #
10. What types of materials are used in the OS?
$
Primary, auxiliary $ *
Basic $
Helper $
The correct answer is no #

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme

		situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 17 : Cast and impression materials used to take a cast.
- characteristics of the use of materials for taking an impression
- requirement for materials used to take an impression
- medical plaster
- impression materials of thermal and silicone groups

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	34. Preparing the audience. 35. Analysis of student preparation for class 36. Attendance check	Listen
Lecture introduction	34. Preparation of the educational complex on this topic.	Listen and record

(10 minutes)	35. Preparing slides for the lesson. 36. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	
Main part (65 minutes)	56. Divide the group and ask questions. 57. Use visual aid 58. Use slides, multimedia 59. Summing up the topic 60. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work 3. Set homework	Listen Write down Write down

Questions on this topic:

1. Casting a mold
2. Materials used for impression taking
3. Impression Material Requirements
4. Solid impression materials
5. Elastic Impression Materials
6. Thermoplastic impression materials
7. Method of taking a cast

Methodology of the practical lesson:

The impression is the inverse (negative) display of the surface of hard and soft tissues located on the prosthetic bed and its borders.

♦ The term prosthetic bed combines organs and tissues that are in direct contact with the prosthesis (E. I. Gavrilov). A synonym for the term "impression" is the definition of "cast", which had "citizenship rights", when plaster was almost the only material for receiving it. The word "cast" and is now found in the vocabulary of dentists and dental technicians, but is gradually moving into the category of anachronisms.

"An impression is the same as an imprint (an image left on something with pressure, for example, a footprint in the sand)." In the same place, with. 633 we read: "A cast is a copy made from something." Thus, lexically for dentistry it is more correct to use the term "impression".

Impressions are removed to obtain working (main), auxiliary (approximate), diagnostic, control models of jaws.

♦ A model is a model for the manufacture of a product that accurately reproduces the shape of the latter.

♦ The jaw model is an accurate reproduction of the surface of hard and soft tissues located on the prosthetic bed and its borders.

On the working models of the jaws create dentures, devices. The model of the dentition of the jaw opposite to the prosthetic one is called auxiliary if the defect of the dentition on one of the jaws is replaced. Diagnostic models are those that need to be studied to clarify the diagnosis, design planning
future prosthesis. The control refers to those diagnostic models that record the initial state of the oral cavity before prosthetics, orthodontic treatment, during treatment, after it. They are also called serial models. Impression half-genesis technique. The edges of the selected spoon are edged with adhesive plaster, and the inner surface is lubricated with a special adhesive adhesive. All this contributes to the adhesion of the impression material to the surface of the spoon.

♦ Adhesion, or adhesion of materials, usually means adhesion between two contacted surfaces. The amount of adhesion depends both on the structure of the materials being joined and on the bonding agent and is determined by two factors:

1) proper adhesion - strength to tear hard surfaces from the adhesive layer; 2) cohesion - the strength of the adhesive itself, retaining bonds only due to roughnesses of glued surfaces.

Material is mixed using a metal or plastic spatula in a rubber cup, on glass, waxed or coated paper, or in mechanical mixers. In addition, for this purpose, there are special mixing pistols that supply materials packaged in special cartridges and loaded into pistols.

The impression mass prepared in accordance with the instructions is placed in a spoon flush with the sides. The roof of the palate and the vestibule are smeared with excess mass (material)
the oral cavity in the area of the alveolar tubercles in the upper jaw or the lateral sections of the hyoid space in the lower jaw. These are the most inaccessible areas for impression material. Air bubbles may form here, resulting in gross imprint defects.

PRINT REQUIREMENTS

MATERIALS

They apply equally to impression masses. It should be emphasized the need for accurate reproduction of the relief of the prosthetic bed, ease of introduction and
removal of the impression from the oral cavity. In addition, impression materials should not collapse or change their volume and surface under the influence of oral fluid or disinfectants. These issues are discussed in detail below. Without an accurate impression, even experienced dental technicians cannot create a high-quality denture. The quality of the print depends to a large extent on the type and mode of use.
modern impression materials. Hydrocolloids and especially alginate materials after short-term deformation contribute only to a limited elastic recovery. A great influence on this is provided by the impression storage medium . To obtain an accurate model of the jaw impressions from reversible and irreversible hydrocolloids should be processed immediately after their solidification, since a delay in the manufacture of the model can lead to gross volume disturbances. it
due to the rapid swelling of the print in liquids or a decrease in its volume in air.

If it is necessary to make models at a later time, it is recommended to use impression materials on a polyester or vinyl siloxane basis.

The disinfectant should not have a negative effect on the prints [Shcherbakov A. S, Yushmanova T. A., 1994]. The main criterion for its use is the dimensional stability of prints during the disinfection process and at its end.

Measurement of the hardness of the gypsum models according to Brinell obtained after disinfection of the impressions with a 2.5% solution of glutaraldehyde did not reveal its negative effect on the strength of gypsum.

Disinfection of impressions from alginate materials is a more difficult problem than disinfection of silicone materials (rubbers). It was noted [V. Nikonorov, 1998] that the 2.5% solution of

glutaraldehyde is negatively affected by some (eg, Oralgin) alginate materials. Impression mass, like any other dental material, except plasticity and elasticity, should have
additional properties that make it suitable for imprinting. In particular, this is the absence of toxic or irritating effects on tissues, unpleasant taste and smell, as well as hygiene.
The tests [Komrska I. et al., 1989] of the cytotolerance of several compositions of siloxane impression materials Dentaflex solid, as well as the experimental mass of the polycondensation type and vinylsiloxane composition (hardening by the polyaddition reaction) showed the following.
Dentaflex solid materials do not differ in cytotoxicity from the polycondensation mass, while vinylsiloxane in the cured and even initial state proved to be completely cytotolerant. Possessing dimensional and chemical stability in the presence of gypsum, impression materials should have such surface properties that would ensure ease of wetting with standard gypsum mixtures. Insufficient wetting of the surface of the prints leads to air bubbles and voids in the gypsum castings. For a long time, researchers have noted poor wettability of silicone-based impression materials. The contact angle with water was more than 90 °. Now this drawback is eliminated. Manufacturers recommends using special fluids - Hera-CBE or Fixacryl, which is a silicone preparation to neutralize surfaces and relieve internal stresses, to obtain good wettability of the surface of alginate, hydrocolloid and silicone prints. Processing of prints of silicone, thiocol and polyester masses is carried out by immersion in this solution or by applying the solution with a brush or aerosol.
Of great importance for obtaining an accurate impression is plasticity, i.e., with respect to impression masses, the ability to fill all the relief elements of the touch surface, and elasticity, i.e. ability to keep dowry
shape when removing the impression from the oral cavity without permanent deformation
All dental impression materials can be divided into:
- solid;
- elastic;
- thermoplastic.

SOLID PRINTING MATERIALS
This group includes gypsum and zinc oxide-eugenol pastes.
Gypsum occupies a leading position in the group of auxiliary materials used in orthopedic dentistry. It is used at almost all stages of prosthetics. It is used to obtain:
- print;
- jaw models;
- face masks;
- as molding material;
- when soldering;
- for fixing models in the occluder (articulator) and the cuvette.

Natural gypsum is a widespread mineral of white, gray or yellowish color. Its deposits are found together with clays, limestones. Fixation of jaw models with rock salt. Chemical in the articulator

the composition of natural gypsum is determined by the formula CaS04 x 2H20 - two-water calcium sulfate. The formation of gypsum occurs as a result of its precipitation in lakes and lagoons from aqueous solutions rich in sulfate salts.Gypsum deposits usually contain impurities of quartz, pyrite, carbonates, clay and bituminous substances. The density of gypsum is 2.2-2.4 g / cm3. Its solubility in water is 2.05 g / l at 20 ° C.

Gypsum for dental practice is obtained by roasting natural gypsum. In this case, two-water calcium sulfate loses part of the crystallization water and passes into semi-aqueous (hemihydrate) calcium sulfate. The dehydration process proceeds most intensively in the temperature range from 120 ° C to 190 ° C. 2 (CaS04 x 2H20) -> (CaS04J x H20 + ZN20) Depending on the heat treatment conditions, semi-aquatic gypsum can have two modifications - a and p-hemihydrates, which differ in physicochemical properties:

- a-gypsum is obtained by heating two-water gypsum under a pressure of 1.3 atm., Which significantly increases its strength. This gypsum is called super gypsum, autoclaved, stone gypsum;
- p-gypsum is obtained by heating two-water gypsum at atmospheric pressure.

After firing, the gypsum is ground, sieved through special sieves and packed in bags of special paper or in barrels. When mixing gypsum hemihydrate with water, the formation of hemihydrate, and the whole mixture hardens.

(CaS04J x H20 + ZN20 -> 2 (CaS04 x 2H20)

This reaction is exothermic, i.e., accompanied by heat.

The setting of gypsum proceeds very quickly (see table. 4). Immediately after mixing with water, a thickening of the mass becomes noticeable, but during this period the gypsum is still easily formed. Further compaction no longer allows molding. The setting process is preceded by a short period of plasticity of the gypsum mixture. Mixed to the consistency of sour cream, gypsum fills the forms well and gives clear prints of it. The plasticity of the gypsum and the subsequent rapid hardening make it possible to use it to obtain impressions from the jaws and teeth. However, the process of increasing the strength of gypsum still continues for some time, and the maximum strength of the gypsum impression and the gypsum model is achieved by drying it to a constant masses in the environment.

A number of factors affect the setting rate of gypsum:

temperature, degree of grinding (dispersion), method of kneading, quality of gypsum and the presence of impurities in the gypsum. Raising the temperature of the mixture to + 30 ° - + 37 ° C leads to a reduction in the setting time of gypsum. When the temperature increases from + 37 ° to + 50 ° C, the setting speed starts to drop noticeably, but at a temperature above 100 ° C, setting does not occur. The degree of grinding (fineness of grinding) also affects the hardening rate: the higher the dispersion of gypsum, the larger its surface, and an increase in the surface of two chemically reactive substances accelerates the process. The setting speed of the hemihydrate is also affected by the way it is mixed. The more vigorously the mixture is kneaded, the fuller the contact between the gypsum and the water will become and, therefore, the faster the setting. Damp gypsum hardens much more slowly than dry. This gypsum is best dried with temperature + 150 ° - + 170 ° C. During drying, gypsum must be constantly stirred, since due to its poor thermal conductivity, uneven heating is possible, which leads to the partial formation of products such as insoluble anhydride, etc.

When working with dental gypsum, catalyst salts are of particular importance. They usually accelerate the setting process of gypsum. The most effective are accelerators such as potassium or sodium sulfate, potassium chloride or sodium. With an increase in concentration over 3%, they, on the contrary, slow down the setting. Most often, in dental offices, a 2-3% solution of table salt is used as an accelerator.

Gypsum hardening inhibitors are sugar, starch, glycerin.

♦ Catalysts - substances that accelerate chemical reactions.

♦ Inhibitors - substances that slow down the course of chemical reactions or stop them.

When obtaining models of jaws, accelerators should not be used, firstly, to slow down hardening, and secondly, to harden gypsum.

As a rule, there is an inverse relationship between the hardening speed of gypsum and its strength: the faster the setting, the less the strength of the product obtained, and vice versa, the slower the mixture hardens, the stronger it is. For example, kneading gypsum on a solution of borax gives a noticeable slowdown in hardening, resulting in a very durable product.

Hardening of gypsum models is carried out in various ways. After thoroughly drying the gypsum (to remove moisture remaining in the pores), the model is immersed in molten stearin or paraffin. The surface of the product acquires luster and appearance of ivory. Such processing is used to prepare educational exhibits (imitations) in order to give gypsum models a beautiful appearance and increase strength. Freshly prepared gypsum and previously hardened gypsum products are firmly interconnected. This property is used in dental prosthetics, for example, when plastering models in an articulator or cuvette. In cases where the gypsum model is obtained from the gypsum impression, this property serves as an obstacle to their subsequent separation. In order to avoid this phenomenon, sometimes a fat layer is applied to the surface of the form. However, the use of fat or petroleum jelly can lead to distortion of the model; therefore, a soap or liquid glass solution in which the print is immersed for 5-10 minutes can serve as a more suitable material for separating the surfaces of the print and the model. These solutions form a thin film and less distort the relief of the model. Practice shows that the separation of two gypsum products, such as print and model, can be done without the use of insulating substances. To weaken the connection between them, the impression is pre-immersed in water until it is completely saturated, i.e., until all air is expelled from its pores. An imprint saturated with water can no longer absorb moisture from a freshly prepared gypsum mass deposited on its surface. Thus, the surface of the model will fit snugly against the surface of the print without the penetration of particles of one into the thickness of the other, and they can be easily separated by chipping.

In the work of dental institutions it is important to observe the rules for the storage of gypsum. Semi-aquatic dental gypsum has significant hygroscopicity; absorbing atmospheric moisture, it deteriorates, and its grasp becomes worse.Therefore, it is recommended to store gypsum in good packaging (metal barrels, thick paper bags), preferably in a dry and warm place and not on the floor. This prevents it from damping.

Long-term storage of gypsum, even in well-sealed containers and without access to moisture, makes it unsuitable, since gypsum coalesces into lumps, and sometimes does not set at all. This is explained by the fact that hemihydrate is an unstable compound and water is redistributed between its particles, as a result of which a more stable compound is formed - hemihydrate and anhydride.

2 (CaS04) x H20 -> CaS04 x 2H20 + CaS04

The fact that gypsum has long been the main material for prints is due, firstly, to the lack of alternative masses. Secondly, it was affordable and cheap. In addition, the advantages of gypsum include the fact that it allows you to get a clear imprint of the surface of the tissues of the prosthetic bed, is harmless, does not have an unpleasant taste and smell, practically does not shrink, does not dissolve in saliva, does not swell when wetted with water, it is easily separated from the model when using the simplest release agents (water, soapy water, etc.). However, along with the positive qualities, gypsum has several disadvantages, as a result of which in recent years it has been almost completely replaced by other materials. In particular, gypsum is fragile, which often leads to a breakage of the impression when removed from the oral cavity. At the same time, small details of it, filling the space between the teeth, are often lost. This deficiency of gypsum is especially evident in cases when there is divergence and convergence of the teeth, their inclination to the lingual or buccal sides, as well as with periodontal diseases, when the extra-alveolar part of the teeth increases. In addition, the gypsum impression with difficulty, by splitting into fragments, is removed from the oral cavity, poorly separated from the model, is not

disinfected. Therefore, gypsum, especially superhard grades, is much more often used as an auxiliary material, mainly for obtaining models of jaws.

There are many varieties of gypsum available for the needs of orthopedic dentistry. In accordance with the requirements of the international standard (ISO), five classes of gypsum are distinguished according to the degree of hardness:

I - soft, used to obtain impressions (occlusal impressions);

II - conventional, used for applying gypsum dressings in general surgery (this type of gypsum is sometimes referred to in the literature as "medical gypsum"), for example, Haliplaster, which includes calcium sulfate α-hemihydrate;

III - solid, used for the manufacture of diagnostic and working models of jaws in the technology of removable dentures, for example Plaston-L, Gzhsogal, which includes calcium sulfate a-hemihydrate;

IV - superhard, used to obtain collapsible models of the jaws, for example Fujirok-EP, Haligranite, which includes calcium sulfate α-hemihydrate;

V - extra hard, with the addition of synthetic components. This type of gypsum has increased surface strength. For mixing, high accuracy of the ratio of powder to water is required. So, for example, Duralit-S - a material based on synthetic α-hemihydrate of calcium sulfate - is characterized by very low expansion during solidification, which ensures accurate working models.

High fluidity provides good mold filling ability as well as high compressive strength and hardness. The ratio of powder and water when kneading is 100: 19-21. Setting time is 7-10 minutes; expansion after setting <0.12%; compressive strength> 50 N / mm2; Brinell hardness> 15 MPa.

Superhard gypsum (a-hemihydrates) - Super gypsum (Russia), Begodur, Begostoun, Herastone-M, Vel-Mix Stone and Supra Stone (Germany) - have a curing time of 8-10 minutes, while the expansion during curing does not exceed 0, 07-0.09%, strength at a pressure of 1 h after hardening is 30 N / mm2, after 1 day - 35-60 N / mm2

These materials are used in the manufacture of collapsible, combined with
ordinary plaster of the jaw patterns. The mixing ratio of powder and water is 100 g per 22-24 ml.
Obtaining plaster models of the jaws.

The print after washing under running water at room temperature should be disinfected using one of the known methods. To relieve internal stresses in the impression material and improve wettability (gypsum fluidity), the surface of the print is treated (by immersion, applying with a brush or in the form of an aerosol) with a special liquid to relieve surface tension (for example, Hera-SVE; Fixacril and others). Mixing gypsum powder and water (based on 100 g ofpowder per 22-24 ml of water) is carried out in one of the ways:

- manual. To do this, add gypsum of I-III class (according to ISO) in small portions to a pre-poured amount of water and mix it with a spatula to a homogeneous creamy consistency. Moreover, the more energetic
the mixture will be mixed, the fuller the contact between the gypsum and the water will become and, therefore, the faster the setting will take place (the average setting time is 7-10 minutes);

- using vacuum mixers, working, as a rule, in an automatic mode in the time interval set by the doctor. In addition to water, a special liquid can be used as a liquid when mixing especially hard gypsum (IV-V class according to ISO), the use of which ensures uniform distribution of powder and setting gypsum. The tendency to form pores on the surfaces of gypsum in contact with water, in cases where this fluid is used, is reduced to a minimum. The resulting gypsum model is characterized by high homogeneous density, strength and accuracy of reproduction of the original. Mixed to the consistency of sour cream, gypsum fills the forms well and gives clear
prints. Filling the impression involves the portioned application of gypsum using a spatula (manual version) or directly into the impression through the outlet nozzle of the vacuum mixer. To exclude porosity and shells in the gypsum model, filling the impression with gypsum is accompanied by its shaking and shaking, but the most justified option is to use special devices

- vibrating tables. After filling the tooth prints, the gypsum with some excess is placed above the surface of the impression material and the formation of the base of the model is started:
- with a spatula. For this plaster is applied hillock on a smooth flat table surface and to overturn it impression filled with plaster so that the height of the cap was 1.5 2.0 cm , while the bottom of the impression tray thus was parallel to the table surface. Excess gypsum around the perimeter of the impression and impression tray is removed with a spatula. Moreover, the angle of the faces of the base of the gypsum model of the jaw with the table surface is 90 °;
- using a standard rubber hollow mold (chipped) for a plinth, in which, after pouring it with gypsum, an impression filled with gypsum is placed;
- using elements of articulation socles included in most modern articulators.
After crystallization of the gypsum, an impression tray and impression material are removed from the model. Wherein:
- in the case of the use of elastic impression materials - sequentially, using tools (spatula, scalpel, tweezers, etc.), remove the impression spoon, and subsequently the impression material, cutting it into fragments;
- in the case of using thermoplastic materials, preliminary heating of the impression material with warm water is required. In this case, as a rule, the spoon is removed along with the impression material.
The machining of the base of the gypsum model of the jaw is carried out using cutting tools (gypsum knife) and special tools (trimmer) to give it a uniform thickness and parallelism of the side faces by removing excess gypsum.
Synthetic especially hard gypsum, for example, Gerarock, Moldatsint (Germany), are characterized by an expansion coefficient of approximately 0.1% 2 hours after mixing. In this case, the compression resistance reaches a level of 48 N / mm2. Powders
superhard gypsum is strictly dosed with water and kneaded in vacuum mixers.
For mixing extra-hard synthetic gypsum, the company “Hereus Kulzer” (Germany) recommends using a special liquid - Gypsum-Brillant-liquid. Thanks to the use of this fluid, a uniform distribution of the powder occurs.
in fluid and setting gypsum. The resulting gypsum model is characterized by high homogeneous density, strength and accuracy of reproduction of the original.
The tendency to form pores on the surfaces of gypsum in contact with water in cases of use of this fluid is minimized. The liquid is supplied in 1 liter bottles as a concentrate and diluted with 19 liters of distilled water, which makes up a total weight of 20 liters .
There are electronic gypsum mixers, fully working in automatic mode. The gypsum tank has a volume of 25-30 kg . Mixing takes place in a vacuum, there is a choice of time. After mixing, the internal surfaces of the appliance are automatically cleaned. If necessary, you can heat the water.
The Mottava-SL vacuum mixer with the help of a strong motor provides intensive mixing of the material and produces up to 98% of the mixed mass. The device uses 2 motors: one serves as the drive of the mixing device, the other drives the vacuum pump. The mixing tank is made of hard rubber and makes cleaning easy. After completion of the mixing programs, the solenoid valve automatically shuts off
Vacuum pump.
The company “Hereus Kulzer” (Germany) produces the CL-VMR-W vacuum kneading device for molding materials and gypsum, which allows to obtain air-free material. After setting the kneading time (max. 90 s), the process proceeds automatically. Forms are filled with gypsum on vibrating tables (Vibromister, Vibroboy, Vibrobeby, KV-16, KV-36, KV-56). This eliminates the appearance of pores and shells in the model.
Zinc oxide-eugenol pastes also belong to solid impression materials, among which Czech Repin is the most widespread, consisting of 2 aluminum tubes with white (main) and yellow (catalyst) pastes. The composition of the catalyst paste includes:
- clove oil (eugenol) - 15%;
- rosin and fir oil - 65%;

- filler (talc or white clay) - 16%;
- accelerator (magnesium chloride) - 4%.

Both pastes are mixed in equal proportions. The precipitation reaction that takes place between eugenol and zinc oxide leads to the hardening of the material (zinc eugenolate), which is accelerated by intensive mixing, adding moisture and increasing temperature. The material is intended for functional impressions, especially from the edentulous jaws. It gives a clear detailed imprint of the mucous membrane, adheres well to an individual spoon, and can be easily separated from the model. Eugenol mass Neogenat (France) includes white paste based on zinc oxide and red paste based on eugenol A5%). Designed to obtain functional impressions from toothless jaws, relocation of prostheses, fixation of the wax basis during determination of the central ratio of the jaws.

To prepare the material, approximately 10 cm of paste is squeezed from each tube onto a glass plate or block of thick coated paper. Using a hard wide spatula, both pastes are thoroughly mixed for 30 s until a flowing pink homogeneous mass is obtained. The latter is applied to an individual spoon, which is inserted into the oral cavity, slightly shaken to evenly distribute the material, pressed to the jaw and held for about 1 min, after which the patient makes the necessary functional movements with the lips, cheeks, tongue, the bottom of the oral cavity, soft palate.

The print is displayed 2.5-3 minutes after the introduction of the spoon. If the print has defects, then in their area and on the periphery a layer of mass 1 mm deep is removed . This place is filling up

freshly prepared pasta, and the spoon is again introduced into the oral cavity. The material is not subject to shrinkage, so the receipt of the model may be delayed.

Vicopres is a zinc oxide eugenol paste for functional prints. Due to its water-absorbing properties, it absorbs water from the surface of the tissues of the oral cavity when a print is taken and provides an accurate print.

Additional components are attached to the paste:

- Vico-1 - antiseptic cream for the skin, intended

to protect the lips of the patient and the hands of the dentist;

- Vico-2 - liquid for removing paste from tools and models.

However, with all its advantages, zinc oxide-eugenol pastes can be deformed or crumble when removed from the oral cavity. Therefore, they are replaced by elastic impression materials and find their main application as a temporary fixing material for fixed dentures

ELASTIC PRINTING MATERIALS

This group includes several subgroups of materials for prints:

- alginate;
- silicone (polysiloxanes);
- polysulfide (thiocol);
- polyester.

The last three subgroups are united by the concept of “synthetic elastomers” section

Alginate masses

The appearance of alginate impression masses dates back to the early 1940s. Materials of this type have gained a strong place in dental practice and have contributed to a significant reduction in the use of gypsum as an impression material. Modern alginate materials are available in the form of a multicomponent fine powder. To the latter, the doctor adds cold tap water. The proportion of powder and water is determined by the attached measuring devices. The alginate powder is mixed with a spatula in a rubber cup for 30-40 s until a homogeneous paste is obtained. In this form, it is ready for an impression. Setting time for different masses is from 2-2.5 to 5 minutes. The readiness of the masses is judged by

the state of its residues in a rubber cup. You should not focus on the consistency of the mass of the print itself, since its outer layers harden under the influence of oral temperature faster than deep ones. Premature removal of the impression from the oral cavity

leads to its deformation. The print is displayed with a sharp enough constricting movement to reduce permanent deformation. Numerous perforations of the spoon, as well as a strip of adhesive tape, with which the doctor edges its edges, hold the impression material in the spoon. After removal from the oral cavity, the print is rinsed from the oral fluid with a stream of running water. The alginate impression quickly changes its volume: it shrinks in air, and swells in water.

♦ Shrinkage - reducing the linear dimensions and volume of the body during its hardening, cooling, storage.

♦ Swelling is the opposite of shrinkage caused by absorption of moisture and leading to an increase in volume. You can save an alginate impression in a wet gauze for several minutes, but it is better to get a gypsum model right away.Special solutions are used to disinfect alginate prints.

The composition of the alginate composition should include the following main components:

- alginate monovalent cation;
- crosslinking agent;
- regulator of the rate of structuring;
- fillers;
- indicators;
- corrective taste and color of the substance.

Sodium alginate (more often it is the main component) is a sodium salt of alginic acid obtained from seaweed. Its optimum content in the powder is 20%. It is a finely divided powder passing through a sieve with 6400 holes / cm2, swelling in water and forming a soluble gel. To ensure the setting of the material and its transformation into an insoluble gel, it is necessary to "crosslink" linear macromolecules with polyvalent cations into carboxyl groups to form a network spatial structure. Barium, lead, strontium, and calcium salts poorly soluble in water are used as crosslinking agents [BaS04; BaC03; PbSi03; SrS04; CaS04; (CaS04J x H20].

♦ Crosslinking - the formation of cross-links between linear macromolecules that strengthen the polymer material.

♦ Crosslinking agents are crosslinking agents. They are divided into hardeners (for polymers) and vulcanizing (for rubbers).

The structuring rate increases due to the introduction of its regulators into the materials: sodium carbonate, ethylene glycol and triethanolamine (up to 2%). To obtain the necessary consistency of the mass, eliminate clumping during solidification, increase mechanical strength and reduce shrinkage, fillers are introduced into alginate compositions: chalk, diatomites, white soot, silicon dioxide, organosilicon.

♦ Fillers - substances that affect strength, hardness, shrinkage, thermal conductivity, resistance to aggressive media. They are mineral and organic, powdered and fibrous. Alginate impression materials have the ability to decrease in volume by more than 1.5% after 15-20 minutes. When imprints are immersed in water, shrinkage stops and a sharp increase in linear dimensions begins due to the absorption of water. The magnitude of the expansion depends on the composition of the alginate composition. Therefore, all recommendations for storing alginate prints in water, moist tissue, a desiccator saturated with water vapor cannot be accepted.

The advantages of alginate impression materials include high elasticity, good reproduction of the relief of soft and hard tissues of the oral cavity, ease of use.

Their main disadvantages can be considered the lack of adhesion to impression spoons and some shrinkage that occurs several minutes after receiving the impression as a result of loss of water, as well as low tensile strength. Alginate masses are used in prosthetics of patients with partial loss of teeth with removable dentures, to obtain preliminary impressions from toothless jaws, as well as in orthodontics for the manufacture of devices and diagnostic models of jaws.

According to some researchers (I. Yu. Poyurovskaya), over 80 names of various alginate impression masses are presented on the international dental market today. When mixed with water, a homogeneous paste is formed. The prints have sufficient plasticity and elasticity; they

are almost not deformed when filled with gypsum. Stomalgyn is characterized by high elastic and strength properties: its residual deformation under compression is 2.5%, tensile strength is 0.15 N / mm2.
An impression of the material Stomalgyn should be used to obtain gypsum models immediately after removal from the oral cavity, followed by washing it with water and disinfection. Obtaining a model must be done with liquid gypsum, without creating significant pressure on the print. The separation of the gypsum model from the elastic impression can be carried out without the use of any tools: it is removed from the model by pulling the edges with your fingers.
In recent years, Stomalgin-02 has been produced, in which due to the introduction of triethanolamine, homogeneity is improved and the elasticity of the material is increased.
The alginate mass of Ipen (Czech Republic) is prepared by mixing green finely divided powder A0 g) with water at room temperature B0 ml) for 30-45 s. The curing time is 2.5 minutes, the working time interval is 3 minutes.
♦ Working time * —the interval measured from the beginning of kneading of the material at room temperature until it reaches full hardening or increased viscosity, when handling the material becomes difficult or impossible.
♦ Hardening time - part of the working time characterizing the period of change in the state of aggregation of the material from readiness for manipulation (obtaining an impression, fixing a fixed prosthesis) to a state of complete solidification or rubber
state and accompanied by a change in its physical and mechanical properties.
In relation to impression materials, the hardening period implies a minimum amount of residence time (stay) of the spoon with impression material in the oral cavity. Elastic Plus (Czech Republic) - an updated alginate hydrocolloid impression mass based on sodium alginate. Gypsum models obtained from Elastic Plus prints have a smooth, non-erasable hard surface with accurate reproduction of the tissue surface of the prosthetic bed. This material is used both for removing preliminary impressions from toothless jaws (for individual impression spoons), and for partial loss of teeth (to obtain a working and auxiliary plaster model). Vokoloid (Germany) - monophasic impression material, which allows to obtain prints of high accuracy
(reproduction is accurate to 20 microns) for prosthetics with crowns, bridges and inlays. The material in powder form is packaged in bags, does not give dust, has a pleasant
Alginogal (Yugoslavia) - a quick-setting, dustless, self-disinfecting alginate in vacuum packaging.
Alginmaks is an alginate with a chrome phase indicator, does not contain zinc and cadmium. With proper storage, the mass has a long shelf life. The preparation of the material and the receipt of the impression are typical for alginate impression materials. Kromalagan (Great Britain) - alginate impression material with a three-color phase indicator (class A alginate). It can be used to obtain impressions for prosthetics with cast and stamped crowns, arc (clasp) and full removable dentures. It is a light colored powder with a pleasant
vanilla flavor. The technique of using the material is traditional for all alginates, but is accompanied by color transformations. The kneading time is 30 s. In this case, the paste has a purple hue. Before the introduction into the oral cavity, the doctor has 1.5 minutes left until the mass turns pink. The full period from the moment of kneading until the print is ready is 1 min. The color of the impression mass turns white.
The material has the following characteristics:
- the possibility of visual control of working time;
- lack of dust;
- the ability to adjust the consistency of kneading;
- high elasticity and tensile strength A, 20 MPa);
- high accuracy of reproduction of details E0 microns);
- the ability to preserve the dimensions of the print for several hours in sealed packaging;
- optimal compatibility with gypsum, that is, the formation of hard, smooth surfaces of jaw models;

- lack of lead and preservatives.
Algidur (Austria) - Alginate impression material is available with normal, quick and ultrafast setting. Alginate comes with a liquid alginate stabilizer, which makes obtaining models easier and eliminates the formation of air bubbles on them. Super Paste (USA) is an alginate impression material that changes color from kneading to setting. Comes in two tubes with paste.
Freyz (Poland) - a polychromatic alginate mass, is a purple powder, kneaded in the ratio of 9 g to 17 ml of water. After 30 seconds of mixing, the color of the paste changes to pink. At this point, the impression spoon is filled with paste. A change in color to white is a signal for introducing a spoon with a mass into the oral cavity. The curing time of the material at 23 ° C is 2.5 minutes.
Kromopan and Kromopan-2000 (Italy) are masses that also have a color indication of phases (violet, pink, white). The mixing ratio is 9 g per 20 ml. Marked distortion of the print does not occur, according to the manufacturer, within 48 hours after receiving it. This is due to the introduction of an integrated stabilizer into the mass. Similar is the Italian mass Oralgin. Good compatibility with gypsum, thixotropy, uniformity of composition is characterized by the alginate material Neocolloid (Italy).
♦ Thixotropy (Greek thixis - touch, trope - rotation, change) - the ability of dispersed systems to restore the original structure, destroyed by mechanical stress.
In addition to the above, other European materials are also known:
- Italian masses Gydrogum-Elastyk, Gydrogum-Soft, Phase-Plus, Orthoprint with antiemetic supplement (see table. 6);
- the German masses Palgat Plus and Palgat Plus Kvik, as well as Alginoplast, Xanthalgsh, Dupalflex, Tricoloralgin, Palafaflex (the last mass slowly hardens - 3 min 45 s);
- Plastalgin (France) is available in two versions - quickly and normally hardening. The kneading time is 30 D5) s, the time for making an impression in the oral cavity is 1.25 B, 25) minutes, the solidification time is 1.75 C , 17) minutes.The viscosity of the material is 36 C8) mm, the reproduction of parts is 50 B0) microns, and the compressive strain is 12.5%.
Of the American materials on the Russian market, Supergel Magic (chromatic alginate impression material with a color indication of the structuring phases — from pink to white — and without dusting), Bluprint Kremiks and Bluprint Print Entbek, Alginmaks, Jeltrate, Jeltrate Plus, Kos Elginay are widespread. The Jeltrate material is available in three consistencies: normal, dense and quick-hardening. Normal and dense are used with a high arch of the palate and in
orthodontics; quick-hardening - for obtaining prints with increased emetic reflex. The characteristics of a normal and dense Jeltrate are: solidification time - 2.5 minutes, permanent deformation - 2.1%, relative compression - 13.3%, fluidity - 1.86%; for quick-setting Jeltrate, respectively: 1.75 min; 1.7%; 13.9%; 1.67%.
The clinic also uses Aroma Fain (Japan) of normal (pink) and fast hardening (green). One of the modern representatives of alginate
The materials is Bisico-Chrominate. It allows you to get accurate prints. Changing its color from violet to blue demonstrates the process of converting the material. After the transition to the last (blue) color, the paste should be in the patient's mouth, and the forming movements stop. The material hardens in the mouth for 1-2 minutes. Before receiving the model of the jaw, the impression can withstand several hours without harming itself. To do this, it is packed in a damp cloth and placed in a closed container.

Silicone mass

Silicone masses appeared in dentistry in the 1950s.
Now they have entered a heyday, being the undisputed leaders among modern impression masses. Created on the basis of silicon-organic polymers - silicone rubbers. Most silicone impression materials are designed to produce double prints (see Figure 4). Available in the form of two pastes - main and catalyst. The catalyst may also be used the liquid supplied with the main paste.
The consistency of the paste determines its clinical purpose after preparation (mixing):

- high viscosity pastes (main and catalyst pastes or main pasta and catalyst liquid) are used independently or as the first, main layer in double prints;
- pastes of medium viscosity (main and catalyst pastes) are used to obtain functional impressions or during restoration of removable dentures;
- low viscosity pastes (main and catalyst pastes or main pasta and catalyst liquid) are used as the second or corrective layer in double prints.

To prepare the mixture, a catalyst liquid or paste is added to the required amount of basic paste, measured using a dosing paper scale, placed under a glass plate. They are kneaded with a plastic spatula until a uniform consistency or color is obtained. The paste of dense consistency (high viscosity) is collected by special measuring devices and after adding the catalyst liquid is mixed in the hands. The mixing time is 30-45 s. Some silicone masses harden in 2.5-4 minutes, others in 5-8 minutes. The impression spoon with perforations is edged with adhesive tape, as when using alginate masses, or coated with adhesive.

More often half-digestion of a double print is carried out in two stages. At the first stage, the main mixed with the catalyst is applied to the smeared with adhesive impression spoon.

dense paste and the impression is removed. At the same time, in order to create a space for corrective paste, the procedure is carried out before the preparation of the teeth or without removing the temporary crowns, or after covering the impression material with a thin strip

plastic film. Then, after preparation, a pharmaco-mechanical expansion of the gingival groove (pocket) of the abutment teeth is carried out, a flax or cotton thread or a knitted ring soaked in vasoconstrictor solutions is introduced there.

The first layer of the print individualizes the standard spoon with which it was obtained. It cuts off a layer of paste on the arch of the palate and along the edges of the print for its free re-introduction into the oral cavity. In addition, interdental septa are removed to prevent crushing of the interdental papillae. Finally, the bypass grooves are engraved from the tooth prints to the top of the palatal arch, radially, to prevent elastic deformation of the impression.

Then the first layer of the print is dried and filled with clarifying paste. Threads are removed from the pockets, the pockets themselves are dried by a stream of warm air. They can be filled with corrective paste using a special syringe with a curved cannula. You can take the impression without using a syringe, filling the impression with the clarifying paste and reintroducing it into the oral cavity. There is a one-step process for producing a double print. At the same time, by filling the spoon with the main paste, the doctor makes indentations in it in the area of the projection of the supporting teeth. Corrective paste is introduced there. She is applied from the syringe to the prepared teeth. After that, a spoon with two pastes is inserted into the oral cavity to obtain an impression. Therefore, when receiving a double print, the main pastes with high viscosity and corrective pastes with low viscosity are used. A paste of medium viscosity is used to obtain functional impressions from toothless jaws. For this, the paste, after mixing with the catalyst, is applied with a thin even layer on the inner surface of the individual spoon. A spoon with a mass is pressed to the jaw and, using functional tests,

edges of the print. Thus, silicone materials are used for tooth defects, partial and complete tooth loss. Their main purpose is to obtain double prints for combined crowns, linings and inlays, allowing

to shine the cavities prepared on the abutment teeth or the subgingival ledge. In addition, they are used to obtain functional impressions, as well as to relocate prostheses, in volume modeling of bases for complete removable dentures.

The silicone materials used differ in the mechanism of the polymerization reaction.

♦ Polymerization is a chemical reaction in which a compound having the same composition but higher molecular weight is obtained from two or more molecules of the same substance. In other words, this is the process of converting monomers to polymers.

Two types of polymerization are known: polyaddition and polycondensation.

Abroad, the masses polymerized by polyaddition are denoted by the letter “A” (from the English addition - addition, increase, addition). For materials polymerized by polycondensation, use the index "C" (from the English. Condensation - condensation, condensation, condensation).
In the first reaction, no by-products are formed and the elemental composition of the monomer and polymer is the same. According to this feature, vinyl polysiloxane materials belong to this group of materials, the polymerization rate of which is directly dependent on temperature - the higher the temperature, the higher the polymerization rate. Vinyl polysiloxane materials are the most dimensionally stable of all materials existing in the world.
In the second case, by-products are formed (usually water, less often ammonia, alcohols) and therefore the elemental composition of the monomer and polymer is different.
The main paste of polymerizable polymerization materials consists of a silicone with a relatively low molecular weight - dimethylsiloxane having reactive final hydroxyl groups. The fillers may be copper carbonate or silica. The catalyst is either a liquid consisting of a suspension of tin octoate and an alkyl silicate, or a paste with the addition of a thickening agent. The reaction proceeds with the formation of rubber with a three-dimensional structure and with the release of ethyl alcohol.
The type of silicone material polymerized by the type of polyaddition is represented by pastes of low, medium, high viscosity and is also polysiloxane. The main paste consists of a polymer with a moderately low molecular weight and silane groups, as well as a filler (diatomite, white soot). The catalyst paste is a polymer with a moderately low molecular weight and vinyl end groups, as well as a chloroplatinic acid catalyst. The polyaddition reaction does not create low molecular weight products. Physico-mechanical properties of silicone materials. It is known that their shrinkage is small. It starts from the moment the main paste is mixed with the catalyst and crosslinking agent and is due to the curing process of polymethylsiloxane.
However, the initial shrinkage does not matter, since the material is in close contact with hard tissues in the oral cavity and is located in the impression spoon. It will affect after removing the impression from the oral cavity. During this period, shrinkage is due to completion
the process of vulcanization of polymethylsiloxane, as well as cooling the print to room temperature. The coefficient of thermal expansion (CTE) of silicone impression materials in the temperature range of 22-37 ° C is 220 x 10 ~ 6 ° C-1.
Silicone impression materials allow you to accurately display the relief of the prosthetic bed (including in the functioning state of the chewing apparatus), have low shrinkage and permanent deformation, high tensile strength, various degrees of viscosity, can be easily separated from the model, are stable in disinfectant solutions, do not have unpleasant taste and smell and are durable. Their disadvantage is only poor adhesion to the spoon.
It should be remembered that when kneading two pastes with hands in rubber (latex) gloves, sulfur from them can get into the silicone material and reduce the activity of the platinum-containing catalyst. The result is a slowdown or a complete lack of hardening of the paste. Therefore, it is necessary to moisten the gloves with water or a weak solution of a disinfectant. Vinyl gloves do not have this latex side effect. His last modification was developed at the Research Institute of Synthetic Rubber (St. Petersburg). The Scientific Research Institute of Synthetic Rubbers also created material based on filled vinyl-silicone rubber, cured without isolation of by-products - Vigalen-30 and corrective material Vigalen-35. An impression mass of Sillit was also developed in St. Petersburg, and Erlosil in Moscow.
Vigalen-30 is a highly viscous impression material for double prints. It is used with Vigalen-35 medium-viscosity material for partial and full removable laminar dentures, as well as cast, metal-ceramic, metal-plastic bridges and single crowns, inlays, arch (clasp), splinting solid cast prostheses, for orthodontic treatment.
In addition, the material allows the restoration of the basis of removable prostheses using a laboratory method. To mix the material take equal proportions of the main and catalyst paste. Mixing continues for 30 s until a homogeneous homogeneous mass is obtained. The solidification time in the oral cavity is 4-5 minutes.

The low density of the material reduces its print consumption, which can be used to obtain several models of jaws of high accuracy. Before obtaining a model, it is advisable to place the print in a soap solution for 3-5 minutes, and then rinse with running water. This non-shrinking material (see table. 9) makes it possible to store prints for a long time (up to 2-4 weeks).

Vigalen-35 is a medium viscosity corrective silicone material for double prints with partial tooth loss, periodontal diseases with great tooth mobility, and any type of prosthetics. The material can be used not only with domestic Vigalen-30 and Sielast-21 impression masses, but also with imported analogues cured by reaction

polyadditions and having minimal shrinkage. To obtain a print, equal volumes of the main and catalyst pastes are kneaded for 30 s until a homogeneous homogeneous mixture is obtained having a minimum working time of 5-6.5 minutes.Using an individual spoon, you can get an accurate functional impression. The solidification time of the material in the oral cavity is 4-5 minutes.

Upon receipt of a corrective print, a mixed homogeneous mass is applied to the surface of the main print previously dried by a stream of dry air and reintroduced into the oral cavity. The material is not recommended to be used in combination with polycondensation type siloxane masses, polysulfide impression materials. Characteristics of impression materials

Erlosil - a two-component impression material containing pastes of high, medium and low viscosity, is a vinyl siloxane rubber designed to obtain accurate imprints of dentitions, including double ones.

The material has the following technical characteristics: the working time from the start of kneading is 5.5-7.5 minutes, the solidification time in the oral cavity is 4-5 minutes; compression strain 2-15%. The linear shrinkage of the material in 24 hours is 90.2%. Mixing of the material for the impression (in equal proportions of pastes) is carried out with a spatula or fingers until a uniform color tone is obtained for 30 s.

Since 1997, components of the Ron-Pulenc company (France) in our country have been producing impression dental material of high viscosity Silboplast-B and low viscosity Silboplast-N, which is a two-component (main and catalyst paste) silicone elastomer that hardens at room temperature as a result of the polyaddition reaction. Silboplast-B material is intended for obtaining the main print, which, in combination with the low-viscosity material Silboplast-N, allows to obtain double prints. It is used for prosthetics with cast-in-place, cermet, metal-plastic bridges, partial and full removable plate and arc (clasp) prostheses, when receiving orthodontic appliances. Silboplast-N is a low viscosity material for double prints. It is also used for functional impressions in the complete absence of teeth. Method of application of materials

simple enough: using measuring spoons, equal volumes of the main and catalyst pastes are thoroughly kneaded for 30 s, and then the impression is made. The working time is 5-6 minutes, hardening in the oral cavity lasts 3-4 minutes.Before obtaining a gypsum model, it is advisable to place the print in a soap solution for 3-5 minutes, and then rinse with running water. Before filling with gypsum, the print must be air dried. One of the best representatives of silicone impression materials is Japanese Exaflex, containing 2 main pastes (yellow and blue). Their mixing ends with a uniform green coloring of the material. There are also 2 pastes for creating a corrective layer, 2 more pastes for

receiving functional prints. In addition, adhesive adhesive, retarder, spatulas, syringe are included. The same mass, packaged in double cartridges for use in a metering gun with mixing tips, is called Examix.

Also known are the sets of silicone pastes Kolteks / Koltofleks (Switzerland) for multi-purpose, Dentaflex (Czech Republic), Kneton / Citran and Zafo-Tevezil (Germany), Condensed and Perfexil (France), Silbon (Italy), Zetaplus, Orenvosh,

Thixoflex.

The company "Galenika" (Yugoslavia) produces a group of condensation silicone materials Galesil:

- Galesil-P KIT - high viscosity;

- Galesil-X green - medium viscosity;
- Galesil-L blue - low viscosity;
- Galesil activator-paste is a universal catalyst for polycondensation silicone materials.

The tasteless and odorless materials Acculex and Accumix (USA) have high accuracy and stability in solutions for cold sterilization. They have a different degree of viscosity depending on the purpose. The hydrophilic structure of the material Aquasil (USA) combines a cross-linked polymer network with a surfactant included. The polymer network provides high tensile strength, and the included surfactant makes wetting capabilities equal to polyester materials.

This unique modified vinyl siloxane chemical structure provides high accuracy in the transfer of parts in a humid environment, which cannot be achieved using traditional impression materials.

Penpocwi-NF (USA) - silicone chemical hardening impression material for double prints. The material consists of two separate components of different consistencies.

High viscosity mass has good elasticity and does not complicate its extraction from undercuts. Serves for edging individual spoons, obtaining a preliminary print in a double print, as well as registering the central ratio of the jaws.

Due to its hydrophilicity, low viscosity mass allows accurate prints from wet surfaces. It is applied by syringe and is corrective in a double print. In addition, the material can be used to obtain functional impressions during restoration of the basis of a removable laminar denture. Before receiving a print on an individual spoon, it is recommended to apply a thin layer of Silfix adhesive. After 3 minutes, you can begin to get the impression using a spoon prepared in this way. For disinfection of impressions from Reprosila-NF, standard disinfectants are used (see table 13), aerosol

Sporicidin or a sterilizing composition Sporicidin in a 1:16 dilution.

The print can be stored for up to 7 days, but nevertheless, obtaining a plaster model is carried out no earlier than 1 hour after it is removed from the oral cavity. Pre-print must be washed and dried. Reprosil-NF impressions can be coated with copper or silver. Before galvanizing, a clean, dry impression must be uniformly coated with colloidal silver or

graphite. Due to its hydrophilic properties, the Contrast material gives high quality prints, despite the humidity of the oral cavity. It has good elasticity. The two-component base material is used for a preliminary print with its subsequent correction with a second layer, as well as for the design of the edges of individual impression spoons. In the kit, in addition, there is a medium viscosity corrective paste in a cartridge package. It can be used both in double prints and for obtaining functional prints with partial or complete loss of teeth.

Registerrado (Germany) - transparent blue silicone-based material, available in cartridge packaging. Used to produce impressions and to record the central ratio of the jaws.

The group of impression materials Panasit (Germany) was replenished with polysiloxane material of low and medium viscosity in syringes. It hardens within 4 minutes in the conditions of the oral cavity, characterized by a smooth surface and a clear relief.

Pastes are mixed in equal proportions. They are designed to produce double as well as functional prints. Material Detazil (Germany) guarantees the receipt of several plaster models on one print. The set of this impression material includes:

- Detazil-K - two pastes of high viscosity;
- Detazil-E - two pastes of medium viscosity, produced in tubes. It is used for functional prints with partial or complete loss of teeth;
- Detazil-L - paste of low viscosity, produced in tubes and which are corrective. Material mixing takes place in a double cartridge with a mixing nozzle.

In Germany, Silaplast is produced - a silicone impression material (main paste and a catalyst liquid), used as the first layer of a double impression. Silasoft material is used for the corrective layer, which, along with good fluidity and accurate transfer of tissue parts of the prosthetic bed, has high volume stability and tensile strength. Silasoft is available in tubes (Silasoft normal) and in cartridge packaging (Silasoft special).

ZM Express vinyl polysiloxane material restores volume after deformation when the impression is removed from the oral cavity by 99.84%. For comparison: the same indicator for polysulfide impression masses is 99.7%, polyester - 99.6%, and
polycondensation silicone materials - 99.34%. The priority of using automatic mixing of two pastes with a syringe-gun, two cartridges and a nozzle with a mixing spiral belongs to the company "ZM" (USA), producing a silicone impression mass ZM Express
For mixing viscous impression materials such as President (USA) produced in cartridges, the Quadro tip is proposed, the use of which, in addition to saving material by 22%, reduces stress and hand fatigue when working with it. In addition, by supplying more impression material, the impression tray is filled much faster.
Medstar AV (Great Britain) - impression mass based on vinyl polysiloxane, designed to produce double prints for prosthetics with ceramic-metal prostheses. The material is hydrophilic, easy to mix and does not stick to the tool.Available in two types - normal and soft. The latter is particularly suitable for use in periodontal diseases.
The mixing time of the main material is 45 s, corrective - 45 s. The solidification time of the base and corrective materials is 3.5 minutes. Compression shrinkage of the mass in the range of 0.3-0.5%. Shrinkage after 24 hours does not exceed 0.1%. Obtaining a plaster model is carried out 30 minutes after removing the impression from the oral cavity, and several models of the jaws can be cast one impression.
Kerr Extrud (USA) is a silicone material, has 3 degrees of viscosity - high, medium and low (pastes of medium and low viscosity are supplied in cartridges). The material does not shrink, is tear resistant and has hydrophilic properties, which
allows you to get an accurate impression of the wet tissue of the prosthetic bed. Obtaining a model is carried out 20 minutes after removing the impression from the oral cavity.
Resident's paste (Germany) a day after receiving the print has small volume changes equal to 0.14-0.60%. The vinyl siloxane impression material Tidrosil (USA) hardens after 5-5.5 minutes, has a permanent deformation of 0.2-0.5%,
relative compression of 2-2.5%, reproduction of parts 22 microns, fluidity 0-0.1%. Another vinyl siloxane material intended for occlusal impressions - Regisil (USA), quickly hardens B-3 min), has a shrink of 0.2%, relative compression of 1.3%.
The most widely represented on the domestic market are German silicone impression materials. Among them are Optosil II, Xanthoprene, DL-Knet, Panasil, Formasil II, Alfasil, Gammasil, Degouflex, Prowl, Memozil, Spideks, Rapid, President, Bysileks, Kolteks, Koltofleks, Preche Spot indicator, Imprint, Extrud, Unil Reprosil-HF and others. Such a German silicone material, as Dimentation, comes in various packaging:
- in 48 ml cartridges for the Garant hand-held mixer {Byte Dimen- tion - high viscosity material for recording occlusal relationships; Direction Guarantor L - corrective mass for two-layer prints);
- in cartridge packaging (main paste - 300 ml, catalytic paste —66 ml) for the Pentamix mixer (see p. 55):
Penta X Management - High Viscosity Paste, Penta X Management
Quick is a high viscosity paste and Dentation Penta L is a low viscosity paste. The entire range of silicone masses can be disassembled using the materials of the Bisiko company (Germany), which, according to our clinical observations, today are one of the best representatives of the group under consideration. The category of polycondensation materials includes the main paste for preliminary prints or the first layer of a double print - Bisiko Plast. Two options are available - normal and hard (normal , x - hart). As corrective pastes to
polycondensation pastes - fluid Bisiko Ikzekt N (light) and medium viscosity Bisiko Ikzekt G (medium) are also intended for this material.
To form the edges of an individual spoon or a complete removable denture during its restoration, Bisiko Function paste (dense) is used, equipped with a plastic syringe. In addition, the Bisiko company produces high-precision poly-bonded silicone impression materials - the main

Pastes: dense Bisiko-Sl (putty), medium viscosity Bisiko-1 Soft (medium) for double prints. Correcting pastes thereto are polyaddition materials medium flow Bisi- ko - S 2, - S 2 i (medium), high yield Eucuko - S 4, - S 4 i (light).
The latter are not thixotropic and hydrophilic. Therefore, an option is provided with high thixotropic and hydrophilic properties of Bisiko-41 Hydrophil (light). Silicone material Bucuko-S4, -S4i is used for toothless prosthetics
sick. To create an unloading impression or restoration of the base, the material is mixed with a paste of Bisiko Manizel (medium) also polyaddition class.
With an increased gag reflex, quick-hardening (less than 2 min) corrective paste Bisiko Quick (light) is used.
And finally, to obtain impressions of absolute accuracy when using telescopic, lock fasteners, implants, viscous fluidity is used with the polyadherent material Bisiko Prisayzhn (heavy). It can be used with
prosthetics with full removable dentures.
Most of the materials are packaged in two-chamber cartridges of the new system, which has the following advantages:
- both chambers of the cartridge are completely isolated, which eliminates premature hardening of the material due to diffusion through the walls;
- new cartridge gates have separate exit openings that excludes solidification of material in its bow (nozzle);
- New mixers streamline material mixing;
- the mixer has separate holes, which prevents premature hardening of the material;
- the asymmetric nozzle of the shutter and mixer prevents erroneous twisting and the resulting contact between the contents of the two chambers;
- A new manual injector (gun) with a high gear ratio requires little effort when applying the material.
For disinfection of silicone prints are used
solutions of various substances.

Polysulphide (thiocol) impression materials

The polysulfide polymer has finite and incomplete side mercaptene groups. These groups of adjacent molecules are oxidized by the catalyst, leading, on the one hand, to the expansion of the chain and, on the other, to crosslinking of the molecule.
The result of the reaction is a rapid increase in molecular weight and the conversion of the paste into rubber. Despite the receipt of rubber after 10 minutes, the reaction continues for several hours. Significant deformation of the print during its removal is prevented by crosslinking of the material. The consistency of the material depends on the amount of filler. Disinfection of polysulfide prints is carried out with a 2% solution of glutaraldehyde.
The materials in question are produced in the form of two pastes - the main and the catalyst. The most active ingredient in the catalyst paste - lead dioxide - is always present in it with a certain amount of magnesium oxide.
Bleaching agents are powerless to mask the black color of lead dioxide. Therefore, polysulfide pastes have shades from dark brown to gray-brown.
Other oxidizing agents, for example copper hydroxide or organic peroxides, can be used as substitutes for lead dioxide. They give the mass a green color. However, polysulfide rubbers also have other drawbacks (unpleasant, poorly fixed odor, lack of elasticity of the impression) that allow silicone materials to win the competition. Polysulfide materials have a long working time and hardening time, high accuracy, good adhesion to a spoon adhesive and volume stability in disinfectant fluids. However, models based on thiol prints must be cast no later than 1 hour after receiving the print. In addition, excellent elasticity and high tensile strength allow you to get several plaster models on one print.The material is also advantageous in that if it is necessary to clarify any details of the tissues of the prosthetic bed, a fresh portion of the material can be added to the already obtained impression and its correction can be carried out by introducing the

impression into the oral cavity. American polysulfide materials KOE-flex, Omniflex, German Permlastik are known in Russia.

Permlastic has 3 degrees of viscosity, which determine its use for both double and single-layer anatomical and functional impressions. The material has a very high accuracy and guarantees a high-quality impression, which, after removal from the oral cavity, is characterized by the constancy of linear-volume dimensions.

Polyester Impression Materials

Usually used in the form of a paste of medium consistency (basic and catalyst). The core paste is a moderately low molecular weight polyester with ethylene rings as end groups. The filler is silica, plasticizers - glycol ether phthalate. The catalyst paste contains 2,5-dichlorobenzene sulfonate as a crosslinking agent, as well as a filler. A separate tube includes a plasticizer - octyl phthalate and about 5% methyl cellulose as a filler.

♦ Plasticization is an increase in the ductility and elasticity of a material. There are 3 types of plasticization: external, internal and mechanical.

♦ Narcotic plasticization is achieved by introducing plasticizers (ethyl phthalate, dioctyl phthalate, dibutyl phthalate) into the polymer in order to reduce the forces of intermolecular interaction.

♦ Internal plasticization is achieved through a copolymerization reaction. Using different monomers and changing the ratio between them, one can purposefully change the properties of the obtained copolymers: elasticity, strength, water absorption and heat resistance.

♦ Mechanical plasticization is carried out by the targeted orientation of polymer molecules heated above the glass transition temperature and subsequent cooling in the stretched state.

Rubber is formed as a result of ionic polymerization and the appearance of an imine ring. The basis of the material is a copolymer of tetrahydrofuran and ethylene oxide. The reaction that takes place is more exothermic than other rubber-like materials with an increase in temperature of 4 ° C.

Dyes may be added to the base and catalyst pastes. Polyester pastes can also be high and low viscosity. The advantages of this group of materials are high accuracy, hydrophilicity, tear resistance, long-term volume stability, good adhesion to the spoon adhesive. Disadvantages include unpleasant odor and taste, permanent deformation, instability in some disinfectants, excessive rigidity of the material, leading to breakage of the model, the difficulty of kneading and the high cost of the material.

The most common representatives of polyester materials are Impregum and Permadin (ESPE, Germany), thixotropic consistency (fluidity under pressure and maintaining stability without pressure in the impression tray) and

whose hydrophilicity ensures the accuracy of the imprint of the tissues of the prosthetic bed. At the same time, the packaging of the material, which determines the features of the doctor's manipulations when receiving impressions, deserves attention:

- when released in tubes (main paste - 120 ml, catalyst paste - 15 ml), manually mix the pastes with a spatula in the usual way. Low viscosity pastes Impregum-F, Permadin and Permadin Tarant 2: 1 are used to obtain functional impressions using an individual impression tray, as well as for single-layer impressions for prosthetics with inlays, overlays, crowns and bridges. The working time (including mixing) of 180, 120 and 120 s, respectively, allows you to fill the impression material with a syringe, distribute the impression material in the impression spoon, apply the mass with a syringe to the prepared tooth and fix the impression spoon in the oral cavity. The structuring time of the material (from the beginning of mixing) is 5.5-6 minutes. Permadin of high and low viscosity is used to obtain two-layer prints for prosthetics with metal prostheses.

Ramitek high viscosity paste is supplied in the tubes for registration of occlusal relationships of the dentition;

- when releasing low viscosity pastes in D8 cartridges), for example Permadin Garant 2: 1, the Garant mechanical hand-gun mixer is used to mix the components;

- when issued in a cartridge (main paste - 300 ml, catalyst paste - 66 ml), the mixing of pastes is carried out in a special Pentamix tabletop electric mixer. Work with the mixer does not require special knowledge and is carried out by the assistant (assistant) of the doctor. To obtain a precisely dosed material of homogeneous consistency without air inclusions (bubbles), it is necessary after installing the cartridge in the fixture of the device and fixing the cannula for mixing, press (turn on) the button on the control panel. The mass squeezed out of the cannula can be applied directly to the impression spoon or into the syringe. The cannula acts as a plug until the next use and must be replaced before the next turn on of the mixer. The polyester materials intended for this type of mixer are marked on the packaging: Permadin Penta X (high viscosity paste), Permadin Penta L (low viscosity paste), Impregum Penta (low viscosity paste), Ramitek Penta (high viscosity paste).

THERMOPLASTIC (REVERSIBLE) PRINTING
MATERIALS

The features of this group of impression materials are their softening and hardening only under the influence of temperature changes. When heated, they soften; when cooled, they harden. These multicomponent systems are based on natural or synthetic resins, filler, modifying additives, plasticizers and dyes.

Paraffin, stearin, gutta-percha, beeswax, ceresin, etc. are also used as thermoplastic substances.

Thermoplastic masses with repeated temperature exposure can lose ductility. The representative of materials with limited reversibility is Wall.

Thermomass must:

1) soften at a temperature that does not cause pain and burns of the tissues of the oral cavity;
2) do not be sticky in the range of operating temperatures;
3) harden at a temperature slightly higher than the temperature of the oral cavity;
4) in a softened state to represent a homogeneous mass;
5) easy to handle with tools.

Due to the lack of elasticity of the material, deformations ("braces") of those sections of the impression that are located in the undercuts occur. In view of this, and also due to the high density, thermoplastic masses do not withstand competition
with rubber-like materials (elastomers). Their main purpose today is the edging of the edges of the impression spoon, the peeling of the protective plate devices after uranoplasty.

♦ Undercut - a slang expression that means the space between the parallelometer shaft, leaning against the tooth, and the tooth surface, starting from the point of contact of the tooth with the shaft (dividing line) and the gingival margin.

♦ A parallelometer is a device for determining the relative parallelism of two or more teeth. With its help, a dividing line is drawn on the teeth, delimiting the supporting and holding parts of the tooth.

The wall comes in the form of round plates of red tones.

The composition of this material (in% by weight):

- pine rosin - 36;
- zinc oxide - 3;
- petroleum paraffin - 12.98;
- ceresin - 5.5;
- dibutyl phthalate - 0.5;
- talc - 42;
- fat-soluble dye - 0.02.

The material softens at a temperature of 45-55 ° C, acquiring the necessary plasticity, and hardens at a temperature of 35-37 ° C. It is used in the clinic to obtain preliminary prints. To do this, from a plate softened at a temperature of 45-55 ° C in a water bath, quickly form a roller (for the lower jaw) or disk (for the upper jaw) with fingers, spread it over the surface of a standard spoon, insert it into the oral cavity and get an impression, which is then carefully removed from the oral cavity.

Re-use of the material is not recommended.
Thermoplastic impression mass (MCT-02) is available in the form of dark emerald-colored plates.
Material composition (in% by weight):
- rosin pentaerythritol ether - 45;
- rosin glycerin ester - 5;
- paraffin - 14.82;
- ceresin - 10;
- talc - 25;
- vanillin - 0.08;
- fat-soluble dye - 0.1.

The mass softens at a temperature of 50-60 ° C, loses ductility at a temperature of 20-25 ° C for three minutes. It is recommended for obtaining functional impressions from toothless jaws.
Thermomass MCT-03 is produced in the form of green sticks and is intended for obtaining fingerprints of cavities for tabs or for taking impressions with a copper ring. By analogy with the masses MCT-02/03, the Kerr mass and Exeptp material (in plates, sticks and cones) are produced in the USA, Xantpigen and others are Impression Compound (USA) - thermoplastic material for producing prints. Available in the form of plates and bars.
Different colors of the material correspond to different temperatures at which it is used:
- green - to design the edge of an individual spoon / prosthesis (operating temperature 50 ° C);
- gray - for functional prints due to its high fluidity (operating temperature 53 ° C);
- white - for orthodontic purposes (operating temperature 56 ° C);
- black - to obtain prints with individual spoons, it cools very quickly, does not change shape when removed (operating temperature 57 ° C);
- red - material for universal use (operating temperature 55 ° C).

The material quickly and evenly becomes ductile when heated, has a high fluidity, which provides sufficient time for working in the oral cavity. It quickly hardens, while maintaining the resulting shape.
Kuproventp (Yugoslavia) - thermoplastic mass is produced in the form of sticks to design the edges of an individual spoon when receiving functional impressions.
Dentyplastp (Czech Republic) - impression material is used mainly for framing (edging) of individual impression spoons when receiving functional impressions in the complete absence of teeth. For this, the material, packed in a plastic syringe, is preheated in warm water (up to
60 ° C). At an oral cavity temperature of C7 ° C) the mass is optimally plastic, due to which it displays the relief of soft tissues in details with the functional design of the edges of the impression spoon. The impression is removed after it is cooled with water from the syringe.

Tests on this topic.

1.When is the impression taken?

$

After dissecting $ *
Before preparation $
After tooth extraction $
After prosthetics #

2. What is necessary for the manufacture of artificial crowns?

$

Impressions of dentitions $ *
Gums, teeth $
Dental arch $
nothing #

3. What is the impression of the dentition taken with before preparation?

$

Thick paste $ *
$ Liquid paste
Sticky paste $
Gypsum #
4. What fix the impression after preparation?
$
Liquid Paste $ *
Thick paste $
Dry paste $
Sticky paste #
5. When does a tooth become sensitive to thermal and chemical stimuli?
$
After dissecting $ *
Before preparation $
After prosthetics $
After tooth extraction #
6. What is usually a print?
$
Gypsum $ *
$ Liquid paste
Thermoplastic masses $
Do not remove the #
7. Are impressions removed from the opposite jaw?
$
Do not remove only if the tooth does not have an antagonist $ *
Take off $
Do not withdraw $
All answers are correct #
8. What masses can not be taken impressions?
$
Thermoplastic masses that give an extension to the shape of a tooth $ *
Gypsum $
Amalgam $
Elastic masses #
9. The positive aspects of plaster casts:
$
does not change for a long time *
$
shrinks
$
color close to the color of the mucosa
$
easily inserted into the oral cavity
#
10. The main disadvantages of plaster casts :
$
after hardening, it is difficult to remove from the mouth *
$
relatively expensive
$
shrinks
$

Be sure to urgently cast the model
#

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge
96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question

		- has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic
55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know

Topic 18: The requirement for spoons to take an impression and choosing them for the patient.

- stages of casting

- types of cast

- preparation of patients for casting

Stages and time of work	**Teacher Responsibilities**	**Student Responsibilities**
Training	37. Preparing the audience. 38. Analysis of student preparation for class 39. Attendance check	Listen
Lecture introduction (10 minutes)	37. Preparation of the educational complex on this topic. 38. Preparing slides for the lesson. 39. References on this subject. **Main literature:** 1. Scherbakov A. S. Gavrilov Y. I. Trezubov V. N. Zhulev E. N " Orthopedic dentistry" 2. Kopeikin V.N., Knubovets Ya.S., Kurlyandsky V.Yu., Oksman I.M. " Dental prosthetics " 3. Lebedenko I. Yu., Yericheva V.V., Markova B.P. " A Guide to Practical Classes in Orthopedic Dentistry " 4. Abolmasov N. G. "Textbook on orthopedic dentistry"	Listen and record
Main part (65 minutes)	61. Divide the group and ask questions. 62. Use visual aid 63. Use slides, multimedia 64. Summing up the topic 65. Assessment of actively participating students.	The division of the group into 2 subgroups: 1 group listens, 2 group - participates. Each student expresses his opinion.
Final part (10 minutes)	1. Summary 2. Set up an independent work	Listen Write down

	3. Set homework	Write down

Questions on this topic:

1. Impression Spoons
2. Types of spoons
3. The choice of spoons for the patient
4. Stages of taking a mold
5. Types of cast
6. Preparing the patient to take a cast

Methodology of the practical lesson:

Impression spoons.

The prints are removed with special impression spoons, which are standard and individual. Standard spoons are factory-made from stainless steel, duralumin or plastic for the upper and lower jaws. Metal spoons after appropriate treatment (sterilization) can be reused. Plastic spoons are intended for single use and are delivered in tight (vacuum) packaging. They have a different size and shape.

Metal spoons can be solid without perforations and with perforations for mechanical fixation of impression material in a spoon. Plastic spoons are available, as a rule, with perforations. Imported analogues of plastic

jaws differ from domestic ones in the angle of convergence of the spoon's edge with the base (in domestic spoons the angle of convergence is approximately 120 °, in imported spoons it approaches 90 °), in the number of perforations, their diameter, direction and location.

The shape and size of the impression tray are determined by the shape of the jaw, the width and length of the dentition, the topography of the defect, the height of the crowns of the remaining teeth, the severity of the toothless alveolar part and other conditions (Fig. 3). The more varied the choice of spoons, the greater the possibilities the doctor has for
receiving a print.

However, standard spoons are not always suitable for making prints. In some cases (with end defects of the dentition, complete loss of teeth), it is necessary to make an individual spoon.

The clinic uses a perforated metal impression spoon for the jaw area, it is specially designed to receive impressions from premolars and molars in the direct manufacture of inlays, overlays and facings. The presence of intersecting stiffening ribs on the inner surface of transparent polymer disposable impression trays ensures reliable retention of any impression material. A number of standard spoons included in this set, when heated over a flame of an alcohol lamp and

subsequent correction with a cutter, can be individualized to obtain impressions from both the dentition of the upper or lower jaw and the group of teeth.

There are double plastic spoons used for full dentitions, partial and complete tooth loss. These spoons allow you to get an impression simultaneously from the upper and lower dentition with a closed mouth with registration of the central ratio of the jaws.

Distinguish between anatomical and functional prints. The first receive a standard or individual spoon without the use of functional tests, and therefore, without taking into account the functional state of tissues located at the borders of the prosthetic bed. The functional impression is removed with a spoon using special functional tests that reflect the mobility of the transitional and other folds of the mucous membrane located on the border of the prosthetic bed.

A functional impression, as a rule, is removed from the edentulous jaws, and, according to indications, from the jaws that have partially lost their teeth. Impressions can be obtained under dosed, arbitrary or chewing pressure. In these cases, especially when viscous, dense impression materials are used, the impression is called compression. In cases where minimal pressure is required on the moving tissue of the prosthetic bed, unloading prints are removed using flowing material and a perforated spoon. In addition, prints are double or double layer when a dense, viscous material is used for the base of the print. The first layer turns a standard spoon into an individual one (for details, see the description of silicone impression materials). The resulting print is corrected by a second layer of fluid mass, giving a high definition print. Before receiving the impression, the selection of the impression spoon is carried out. Existing types of standard spoons do not always meet the necessary requirements. Therefore, you often have to simulate the edges of the spoon, modifying them.

A well-chosen spoon makes it easy to get an impression, and the more difficult the conditions for receiving it, the more carefully you need to select a spoon. When choosing it, a mark is necessary, in view of the following: the sides of the spoon should be at least ^ tg ~ 3 ^ - 5 mm from the teeth .

The same distance should be between the hard palate and the palatine bulge of the spoon.

Do not choose spoons with short or long sides that abut against the transitional folds. The best one will be the one whose edges are superimposed and the dentition reaches the transitional fold during the examination. When the impression is taken between the bottom of the spoon and the teeth, a layer of impression material with a thickness of 2–3 mm will lie down , the side of the dozhkh ~ t $ Ж1 ^^^. active movements of soft tissues. When the doctor forms the edges of the impression by moving the lips and cheeks of the patient with his fingers, the movements of the soft tissues are called passive. If soft tissues move due to the tension of the facial or chewing muscles, the muscles of the bottom of the oral cavity, and the tongue, then these movements are called active. When the edge of the spoon is held up, this possibility is excluded, since its edge will interfere with the movement of the tongue, cheeks and lips.

When choosing a spoon, you need to consider some of the anatomical features of the oral cavity. So, on the lower jaw, special attention should be paid to the lingual board; it should be done longer than the outer one in order to be able to push the soft tissues of the bottom of the oral cavity deeper. Before the procedure, the mouth is rinsed with a weak solution of an antiseptic (potassium permanganate, chlorhexidine, Dupleksol or PreEmp preparations).

The technique of obtaining a print.

The edges of the selected spoon are edged with adhesive plaster, and the inner surface is lubricated with a special adhesive adhesive. All this contributes to the adhesion of the impression material to the surface of the spoon.

♦ Adhesion, or adhesion of materials, usually means adhesion between two contacted surfaces. The amount of adhesion depends both on the structure of the materials being joined and on the bonding agent and is determined by two factors:

1) proper adhesion - strength to tear hard surfaces from the adhesive layer; 2) cohesion - the strength of the adhesive itself, retaining bonds only due to roughnesses of glued surfaces.

Material is mixed using a metal or plastic spatula in a rubber cup, on glass, waxed or coated paper, or in mechanical mixers. In addition, for this purpose, there are special mixing pistols that supply materials packaged in special cartridges and loaded into pistols.
The impression mass prepared in accordance with the instructions is placed in a spoon flush with the sides.
In excess of mass (material), the arch of the palate and the vestibule of the oral cavity in the area of the alveolar tubercles in the upper jaw or the lateral sections of the hyoid space in the lower jaw are smeared. These are the most inaccessible areas for impression material. Air bubbles may form here, resulting in gross imprint defects.
The corners of the patient's mouth are smeared with petroleum jelly or a special antiseptic cream. The spoon is inserted into the oral cavity with its left side, which pushes the left corner of the mouth. Then, with a dental mirror or a lingual spatula held by the doctor's left hand, the right corner of the mouth is pulled and the spoon is in the oral cavity. It is located in the projection of the dentition, while the handle is installed in the midline of the face. Then the spoon is pressed against the dentition so that the teeth and alveolar part
plunged into the impression mass. In this case, first the pressure is in the back, then in the front of the jaw. This eliminates the flow of mass into the throat. Excess impression material moves forward. When squeezing the mass in the area of the soft palate
Upon receipt of the impression (especially the upper jaw), the patient's head should be plumb or inclined forward. All this prevents the provocation of the gag reflex and aspiration of the mass or saliva into the larynx and trachea.Holding the spoon with the fingers of his right hand, the doctor forms the vestibular edge of the print with his left hand. At the same time, on the upper jaw, he grabs the upper lip and cheek with his fingers, pulls them down and to the sides, and then slightly presses them to the side of the spoon. On the lower jaw, the lower lip is pulled upwards, after which it is also slightly pressed against the side of the spoon. The lingual edge of the lower impression is formed by lifting and protruding the tongue. A few minutes after the hardening of the impression material, the impression is pulled from the dentition by the lever-like movement of the index fingers inserted into the lateral sections of the vestibule of the oral cavity. At the same time, the thumbs have
Relieving pressure on the handle of the impression tray. The impression is considered suitable if the relief of the prosthetic bed (including the transition fold, contours of the gingival margin, interdental spaces, dentition) is accurately imprinted and there are no pores or smears of relief on the surface of the mucus.
The following defects are the basis for re-obtaining the print:
- Relief of the relief, due to the quality of the material (guy) or the ingress of saliva, mucus;
- discrepancy of the print to the future dimensions of the prosthetic bed;
- lack of a clear design of the edges of the print, the presence of pores.
Imprinting may be complicated by gag reflex. To prevent it, you need to accurately select the impression spoon. A long spoon irritates the soft palate and pterygo-maxillary folds. In the event of a gag reflex, elastic masses should be used, and in a minimal amount. Before receiving the impression, it is useful to try on the spoon several times, accustoming the patient to it. While receiving the impression, the patient is given the correct position (a slight inclination of the head forward) and is asked not to move his tongue and breathe deeply through his nose. These simplest techniques, as well as the appropriate psychological preparation, allow in some cases to eliminate the urge to vomit. If with increased vomiting reflex these measures do not give a result, you have to carry out special medication. For this, the mucous membrane of the root of the tongue, pterygo-maxillary folds, the anterior part of the soft palate and the posterior third of the hard palate are sprayed with 10% lidocaine solution (Hungary), legacaine (Germany) or Peril-spray (France) containing 3.5% tetracaine hydrochloride solution . However, this can completely remove the protective gag reflex and

lead to leakage of saliva or aspiration of impression material into the larynx. Small doses of 0015-0.002 g of the antipsychotic haloperidol prescribed 45-60 minutes before the procedure for obtaining the impression have a good antiemetic effect (V.N. Trezuboe).

As mentioned above, the impression is made sequentially: first from one jaw, and then from the other. There is another technique for producing prints. With non-fixed interalveolar height, it is recommended to simultaneously receive an impression
with the upper and lower jaws with a closed mouth and the central ratio of the jaws.

The technique of simultaneous mutual imprint can be applied to virtually any patient who does not have disturbances in nasal breathing, since the patient must breathe through the nose for 1.5 minutes. To obtain such prints, impression trays of the SR-Ivotrey type are used. The SR-Ivotrey kit includes universal (interchangeable) spoons of different sizes (two for the upper, three for the lower jaw), with which anatomical impressions are obtained, and special spoons for receiving functional imprint with toothless jaws.

By means of special guides, the upper and lower impression spoons are interconnected in a single unit, which ensures the movement of the spoons in the sagittal plane.

A universal spoon for the upper and lower jaws in a known manner is checked in the patient's oral cavity and, if necessary, is individualized.

Before receiving a print, the patient should be given the following instructions:

- the tongue fits into the space between the spoons, and not under the spoon;
- swallowing movements are made during imprinting;
- breathing through the nose;
- spoons should be pressed with lips, and not with the jaw.

The interconnected spoons of the upper and lower jaws are introduced by lateral rotational movement into the oral cavity and are superimposed on the lower jaw, after which the patient slowly closes his mouth. To preserve the interalveolar height, dots on the nose and chin are marked until the impression is obtained. The distance between them is measured by a pair of compasses or a special measuring ruler. At the time of imprinting, the patient reaches this distance. To obtain impressions, alginate materials of a thick consistency are used, such as SR-Algicap or SR-Duralgin,

SR-dupalflex supplied in capsules. First, the capsule is crushed using a compressor, then it is fixed in a special vibrator and shaken for 30 seconds, after which the capsule is placed in a special syringe. All material is squeezed first onto the bottom, then onto the top spoon. After applying alginate impression material (separately in the lower and upper spoons), both spoons are sequentially inserted into the oral cavity and superimposed on the lower jaw. In this case, the alginate mass of the upper and lower impression spoons closes (connects). With his free hand, the doctor raises his upper lip, and the patient slowly closes his mouth. Spoons move (move) with closing movements in the direction of least resistance and are fixed in this position by an alginate conglomerate. When the alginate mass extends beyond the transitional fold, the upper lip is released. The patient's lips should be in contact, while he breathes through the nose and swallows. During the imprint, the interalveolar height is checked at the marked points, which can only be corrected if it exceeds a predetermined distance. The resulting single complex of the upper and lower impression trays with prints is removed from the oral cavity in a single block.

Before obtaining gypsum models, the area of the imprint of the tongue is filled with silicone mass (without catalyst). In this method of producing impressions with one kneading of gypsum, both casting of gypsum models and their gypsum casting into an occluder (articulator) are performed. In other words, part of the prepared gypsum is spent on obtaining a gypsum model of the lower jaw in a known manner with its simultaneous orientation on the lower frame of the occluder (articulator), and after installing the support pin between the upper and lower frame of the occluder, a gypsum model of the upper jaw is obtained. The plaster models of the jaws thus obtained are fixed in the articulator in a central ratio. In addition, it should be noted that the use of Ecu-Trey spoons to obtain gypsum and refractory models of the jaws can significantly reduce

the time to receive them and reduce material consumption, and the magnet in the spoon ensures accurate installation of the model in the articulator.

Tests on this topic.

1. Impression spoons are:

$
individual, anatomical *
$
individual
$
anatomical
$
physiological
#

2. Standard spoons are:

$
metal, plastic *
$
metal
$
plastic
$
wax
#

3. Casts taken taking into account the functional state of moving tissues located on the borders of the bed are called:
$
functional *
$
physiological
$
biological
$
individual
#
4. Functional prints are removed with spoons:
$
individual *
$
anatomical
$
functional
$
plastic
#
5. The author of this classification of impression masses: 1. Crystallizing 2. Thermoplastic 3. Elastic 4. Polymerizing
$
Oksman *
$
Kennedy
$
Gavrilov
$
Betelman
#
6. Gypsum refers to impression materials:
$
crystallized *
$
thermoplastic
$
polymerizable
$
Selikonov
#
7. Stens, wax belong to impression materials:
$
thermoplastic *
$
crystallizing
$
elastic
$
polymerizable
#

8. Stomalgin refers to impression materials
$
elastic *
$
crystallizing
$
thermoplastic
$
polymerizable
#
9. Silicone impression masses are referred to as impression materials:
$
elastic *
$
crystallizing
$
thermoplastic
$
polymerizable
#
10. Lack of gypsum:
$
fragility *
$
does not give a clear imprint of the neck of the teeth
$
self-curing during long-term storage
$
bad smell
#
11. The lack of elastic impression masses:
$
shrinks *
$
fragility
$
self-curing during long-term storage
$
bad smell
#
12. The lack of polymerizable impression masses:
$
self-polymerize during long-term storage *
$
fragility
$
shrinks
$
does not give a clear imprint of the neck of the teeth
#
13. Gypsum knead:
$

hypertonic solution *
$
distilled water
$
isotonic solution
$
special fluid
#
14. The main cast is a cast of the jaw:
$
on which the prosthesis will be made *
$
the opposite jaw to make the prosthesis
$
individual spoon only
$
only a standard spoon
#
15. Auxiliary cast, this is a cast of the jaw:
$
the opposite jaw to make the prosthesis *
$
on which the prosthesis will be made
$
basic cast material
$
only standard
#
16. Auxiliary cast, this is a cast of the jaw:
$
the opposite jaw to make the prosthesis *
$
on which the prosthesis will be made
$
basic cast material
$
only a standard spoon
#
17. Models are:
$
all listed *
$
gypsum
$
amalgam
$
cement
#
18. The least strength models are:
$
gypsum *
$

algamic
$
combined
$
all
#
19. Amalgam models are used in the manufacture of:
$
tabs and half-crowns *
$
full dentures
$
partially removable laminar dentures
$
arch prostheses
#
20. Cement models are used in the manufacture of:
$
tabs and half-crowns *
$
partially removable laminar dentures
$
plastic crowns
$
arch prostheses
#
21. What material is superior in strength to tooth enamel?
$
chrome cobalt alloy *
$
china
$
gold
$
silver palladium alloy
#
22. What is produced before:
$
casting *
$
casting model
$
setting the model in the occluder
$
stamping
#

Criteria for assessing student knowledge in a group

Academic performance (%, point)	Rating	Student knowledge

96-100	Excellent "5"	- statement of conclusion and completion - developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
91-95	Excellent "5"	- developed logical thinking - expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
86-90	Excellent "5"	- expressing one's own opinion - application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
81-85	Good "4"	- application of own knowledge in practice - active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
76-80	Good "4"	- active participation in interactive games - can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
71-75	Good "4"	- can make the right decision in extreme situations - understands the meaning of the questions asked - can give the correct answer to the question - has an accurate idea of the tasks
66-70	Satisfy completely "3"	- understands the meaning of the questions asked - cannot give a clear answer to the asked question - knows, with accuracy can answer - has an idea about the basis of the topic
61-65	Satisfy completely "3"	- gives the wrong answer to some questions - cannot give a clear answer to the asked question - has an idea about the basis of the topic

55-60	Satisfy completely "3"	- gives the wrong answer to some questions - has a partial view of the topic
54 and below	Dissatisfy completely "2"	- has no idea about the topic - does not know