

**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
EDUCATIONAL INSTITUTION
BELARUSIAN STATE MEDICAL UNIVERSITY**



APPROVED

by First Vice-Rector, Professor
S.V. Gubkin

Reg.# УД-578a/1614 /уч.



ORTHODONTICS

**Curriculum of higher educational institution
in the educational discipline for the specialty:**

1-79 01 07 «Dentistry»

Minsk,BSMU 2016

Curriculum is based on the standard educational program "Orthodontics", approved 31.08.2016, registration # ТД-.L.578/тип.

COMPILERS:

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RECOMMENDED FOR APPROVAL:

By the Department Orthodontic of the Educational Institution "Belarusian State Medical University"
(protocol # 15 of 01.06.2016);

By the Methodological Commission of Dental disciplines of the Educational Institution "Belarusian State Medical University"
(protocol # 9 of 30.05.2016)

EXPLANATORY NOTE

“Orthodontics” is an academic discipline containing systemized scientific knowledge studying etiology, pathogenesis, clinical picture, diagnostics, prevention and treatment of dentoalveolar system anomalies and deformities.

The curriculum in “Orthodontics” includes the latest scientific data on etiology and mechanisms of dentoalveolar anomaly and deformity formation, their diagnostic methods, prevention and treatment.

The objective of teaching and learning «Orthodontics» is the acquisition of scientific knowledge on etiology, pathogenesis, clinical picture, diagnostics, prevention and treatment of dentoalveolar system anomalies and deformities as well as training of professionals with basic clinical thinking; being able to examine a patient, make and confirm the diagnosis, work out a treatment plan for the patient with dentoalveolar pathology at different periods of occlusion formation; possessing basic manual skills in case of orthodontic treatment.

The study task is to acquire the academic competence based on the knowledge about:

- principles of organization and provision of orthodontic treatment to the population in the Republic of Belarus;
- history of Orthodontics development and modern scientific research in the discipline in the world and the Republic of Belarus;
- etiology, pathogenesis, clinical picture, diagnostics, differential diagnostics, prevention and treatment methods of dentoalveolar anomalies and deformities.

The teaching tasks are social, personal and professional competence formation based on knowledge and application of:

- preventive methods of dentoalveolar anomalies and deformities, rules of orthodontic clinical examination of children and adolescents;
- clinical, anthropometric, functional and roentgenological diagnostic methods of dentoalveolar anomalies;
- principles and methods of treatment of dentoalveolar system anomalies at different periods of occlusion formation.

Teaching and successful studying of Orthodontics are based on acquired knowledge and skills on following subjects:

General Chemistry. Chemical element sand their compounds. Chemical reactions. Properties of metals and their alloys, plastics.

Bioorganic Chemistry. Inorganic andorganic chemicals. Elements of Analytical Chemistry, synthesis and modification of useful chemical compounds.

Medical and Biological Physics. Medical devices and equipment used in dentistry. Structure and purpose of medical equipment, safety rules of working with electrical equipment. X-ray radiation and its biophysical mechanisms of action. Laser radiation and its properties. Basic notions of mechanics: external and internal forces, longitudinal and transverse forces, tension and deformation, static and dynamic loads. Basics of Medical Statistics and Informatics.

Medical Biology and General Genetics. Biological basis of vital activity of the human being. Basic laws of human embryonic development. Critical periods of organism development and teratogenesis. Heredity and variability. Evolution of the maxillofacial area. Biological aspects of human ecology.

Biological Chemistry. Structure, functions and exchange of amino acids, nucleic acids, proteins, carbohydrates and lipids. Nucleic acids and protein biosynthesis. Energy metabolism in the cell. Biochemical composition of saliva, fluorine, calcium and phosphorous exchange in the body. The role and function of vitamins.

Latin. Practical knowledge of grammar and principles of word formation. Knowledge of meanings of Latin and Greek word-formation elements and definite minimum of special terminology in Latin.

Human Anatomy. Structure of the human body, its constituent systems, organs, tissues, sex and age characteristics of the organism. International Anatomical Terminology.

Histology, Cytology, Embryology. Development and histological structure of the tooth and other organs of the dental system. Histological and functional characteristics of tooth tissues, periodontium and oral mucosa.

Normal Physiology. Organism and its protective systems. Principles of physiological function formation and regulation. Physiological role and importance of the masticatory system and its influence on digestion and the gastrointestinal tract in general. Fundamentals of biomechanics.

Pathological Physiology. Etiology. Pathogenesis studies. Pathogenic effects of environmental factors (biological factors, viruses, bacteria, protozoa). Role of organism reactivity in pathological processes. Allergic reactivity of the organism.

Pharmacology. Pharmacodynamics. Drug effect principles. Drug side and toxic effects. Substances that influence on inflammation and allergy processes. Antimicrobial and anti-parasitic agents: antiseptic, disinfectant, chemotherapeutic.

Otorhinolaryngology. The relationship of mouth, face and jaw diseases with the pathology of ENT-organs. The role of functions of breathing, swallowing and speech production in the formation of the dental system.

General Dentistry. Oral cavity biology (structure of the tooth, surrounding tissues, composition and biological role of saliva), anatomical and physiological peculiarities of the masticatory system, biomechanical issues, occlusion and articulation. Facilities and equipment of the dental office. Tools for clinical examination and dental procedures. Basic and supplementary methods of examining a patient (diagnosis). Semiotic analysis of the revealed pathological signs. Clinical material science and laboratory techniques (techniques of various dentures and orthopedic apparatuses making).

Pediatric Dentistry and Prevention of Dental Diseases. Features of psycho-emotional status of children undergoing dental treatment. General principles of treating diseases of hard tooth tissues, periodontium, oral mucosa and their peculiarities in children. Features of surgical dental procedures in children. Rehabilitation of children with congenital malformations and injuries of the maxillofacial area.

Prosthodontics. Examination of dental patients. Impression taking, casting of working models from plaster. Clinical features of try-in, correction and fixation of fixed and removable prosthesis. Mechanisms of adaptation to prosthesis.

Therapeutic dentistry. Classification of caries, pulpitis, apical periodontitis, marginal periodontitis. Etiology, pathogenesis, clinical picture, diagnostics, treatment, prevention. Diseases of the oral mucosa: classification, clinical picture, diagnosis, treatment, prevention. Lesions of hard tooth tissues except caries: etiology, clinical picture, diagnostics, treatment and prevention.

Requirements for the preparation of the student at the end of subject studying.

The student should know:

- diagnostic methods of dentoalveolar anomalies;
- classification of orthodontic appliances, design principles of orthodontic appliances;
- indications for the use of radio diagnostic methods in Orthodontics;
- preventive measures of dentoalveolar system anomalies;
- principles of treating dentoalveolar anomalies according to the period of occlusion formation;
- medical approaches of rehabilitation of children with clefts of the upper lip, palate and alveolar bone in different periods of occlusion formation;
- structure of space retaining appliances;
- indications for prosthetics of tooth and dentition defects in children with temporary, mixed and permanent occlusion;

The student should be able to:

- organize the orthodontist work place in accordance with ergonomics and requirements of asepsis, antiseptics, safety measures;
- fill in medical documentation;
- assess shape and size particularities of the face in patients with malocclusion;
- take jaw impressions in children and adolescents, make plaster models, measure diagnostic models of jaws;
- make clasps, vestibular arches, springs, the basis of one-jaw orthodontic appliance;
- use modern methods of treatment of dentoalveolar anomalies and evaluate results of orthodontic treatment;
- detect indications for in-patient surgical procedures;
- carry out rehabilitation of children with congenital malformations of the maxillofacial area in different periods of occlusion formation.

The structure of the training program on a subject "Orthodontia" is presented by four sections:

1. "Fundamentals of orthodontics" – the section of a preclinical orthodontia including development of technology of putting off of prints, production of working and diagnostic plaster models of jaws, one-gnathic orthodontic devices, studying of anthropometric diagnostic methods of dentoalveolar anomalies, the general ideas of diagnostics of dentoalveolar anomalies.

2. **"The general orthodontia"** – the section of a clinical orthodontia including studying of the general principles of diagnostics and treatment of dentoalveolar anomalies.

3. **"A private orthodontia"** – the section of a clinical orthodontia including studying of an etiology, pathogenesis, diagnostic methods, treatments and prophylaxes of the main nosological forms of anomalies of dentoalveolar system.

4. **"Special questions of an orthodontia"** – the section of a clinical orthodontia including studying of features of after treatment of patients with congenital hiatuses of maxillofacial area, the general principles of treatment of dentoalveolar anomalies a multibonding system and also use of new orthodontic devices for prophylaxis and treatment of dentoalveolar anomalies.

Total number of hours for the study of the discipline is 514 academic hours. Classroom hours according to the types of studies: lectures - 26 hours, practical classes - 270 hours, student independent work (self-study) - 218 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of a credit (7 and 10 semester), graded credit (9th semester) and examination (8th semester).

Final assessment – state examination.

Form of higher education – full-time.

**ALLOCATION OF ACADEMIC TIME
ACCORDING TO SEMESTERS OF STUDY**

Code, name of the specialty	semester	Number of academic hours					Form of current assessment
		total	in-class	including		out-of-class self-studies	
				lectures	laboratory studies (practical classes and seminars)		
1- 790107 «Stomatology»	7	138	84	12	72	54	credit
	8	166	86	14	72	80	examination
	9	90	49	-	49	41	graded credit
	10	120	77	-	77	43	credit
TOTAL		514	296	26	270	218	

THEMATIC PLAN

Theme	In-class hours	
	lectures	Practical (laboratory) classes
1. Fundamentals of Orthodontics	7	72
1.1. Orthodontics as a branch of dentistry: objectives, tasks. History and directions of specialty development. Organization of orthodontic care in the Republic of Belarus. Orthodontic office equipment, orthodontic tools.	1	6
1.2. Impressions. Impression materials used in Orthodontics. Classification and general characteristics of properties of modern impression materials.	-	6
1.3. Anthropometric research method in Orthodontics. Methods of studying facial aesthetics. Studying facial and head parameters of the patient.	1	6
1.4. Anthropometric research method in Orthodontics. Diagnostic jaw models. Methods of studying diagnostic jaw models in the period of mixed and permanent occlusion.	1	12
1.5. General concepts of orthodontic appliances. Types of orthodontic appliances, force allocation and support principles in their application, types of fixation	1	6
1.6. Principles of orthodontic appliance making. Parts of removable orthodontic appliances: clasps, vestibular arches, springs. Administration, classification, making technology	1	6
1.7. Basis of orthodontic appliances. Clinical and laboratory stages of making orthodontic appliances. Peculiarities of making orthodontic crowns and rings.	1	12
1.8. Orthodontic screws: purpose, types, features. The rules of placing.	-	6
1.9. The concept of norm and pathology in Orthodontics. The norm of occlusion in different periods of its formation. General concept of the diagnosis of dentoalveolar anomalies.	1	12
2. General Orthodontics	6	72
2.1. Research methods in Orthodontics. Clinical and functional diagnostic methods	1	12
2.2. X-ray diagnostic method	2	12
2.3. Treatment of dentoalveolar anomalies in different periods of occlusion formation. Methods of treatment. Myotherapy in Orthodontics.	1	12
2.4. Instrumental treatment of dental anomalies. Classification of orthodontic appliances. Appliances of mechanical and functional-guiding action. Appliances of mechanical and functional-directing action.	-	12
2.5. Principles of functional treatment of dentoalveolar anomalies.	1	6

Theme	In-class hours	
	lectures	Practical (laboratory) classes
Functional-operating and combined orthodontic appliances. Peculiarities of action, designs, usage.		
2.6. Complex and surgical treatment of dentoalveolar anomalies. Differences, indications. Orthodontic indications for removal of permanent teeth.	1	12
2.7. Prosthetic treatment of dentoalveolar anomalies.	-	6
3. Specific Orthodontics	8	49
3.1. Anomalies of tooth development: anomalies of hard tissue structure, shape, size, eruption period, number of teeth, position of teeth in the dentition. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications.	2	7
3.2. Anomalies of dentitions. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications.	1	7
3.3. Distal occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to distal occlusion formation. Clinical picture, diagnosis, treatment. Mistakes and complications.	1	7
3.4. Mesial occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to mesial occlusion formation. Clinical picture, diagnosis, treatment. Mistakes and complications.	1	7
3.5. Deep overbite. Anomalies of development and deformations leading to the development of deep overbite. Clinical picture, diagnosis, treatment. Mistakes and complications.	1	7
3.6. Open bite. Anomalies of development and deformations leading to the development of open bite. Clinical picture, diagnosis, treatment. Mistakes and complications.	1	7
3.7. Crossbite. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to pathology formation. Clinical picture, diagnosis, differential diagnosis. Treatment. Mistakes and complications.	1	7
4. Special issues in Orthodontics	5	77
4.1. Rehabilitation of children with congenital isolated clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with isolated clefts of the maxillofacial area.	1	7
4.2. Rehabilitation of children with congenital through clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with through clefts maxillofacial area.	1	14

Theme	In-class hours	
	lectures	Practical (laboratory) classes
4.3. Prosthetics of tooth defects, dentitions, alveolar processes and jaws in children: indications and contraindications. Types of children's dentures, design features and principles of their application	1	7
4.4. Control and space management in the dentition. Placeretaining appliances: types, indications.	1	7
4.5. Multibonding systems: types, indications and contraindications. Stages of treatment of dentoalveolar anomalies using multibonding system. Retention of orthodontic treatment.	1	28
4.6. New orthodontic appliances and devices for prevention and treatment of dentoalveolar anomalies		14
Total time	26	270

CONTENT OF THE EDUCATIONAL MATERIAL

1. FUNDAMENTALS OF ORTHODONTICS

1.1. Orthodontics as a branch of dentistry: objectives, tasks. History and directions of specialty development. Organization of orthodontic care in the Republic of Belarus. Orthodontic office equipment, orthodontic tools.

Orthodontics as a branch of dentistry: objectives, tasks. History and directions of specialty development. Organization of orthodontic care in the Republic of Belarus. Organization of work, material and technical equipment of orthodontic office, its differences from orthopedic office. Orthodontic tools.

1.2. Impressions. Impression materials used in Orthodontics. Classification and general characteristics of properties of modern impression materials.

Classification of impression materials. Impression material requirements. Impression technique with modern materials. Peculiarities of making impressions in children. Types of impression materials used in treating children. Working models of jaws: purpose, requirements, manufacturing technology.

1.3. Anthropometric research method in Orthodontics. Methods of studying facial aesthetics. Studying facial and head parameters of the patient.

Facial aesthetics, methods of studying facial aesthetics. Anthropometric points of the head and face, their location. Vertical and horizontal parameters of the head and face. Index evaluation of the correlation of head and face parameters. Angular parameters of the face. Evaluation of face profile: Ricketts's aesthetic plane, variety of face profile by F.Y. Khoroshilkina. Evaluation of face shape.

1.4. Anthropometric research method in Orthodontics. Diagnostic jaw models. Methods of studying diagnostic jaw models in the period of mixed and permanent occlusion.

Diagnostic jaw models: purpose, requirements, making technique. Methods of studying crown sizes of temporary and permanent teeth, evaluation of the results. Measurement of diagnostic jaw models by L.P. Zubkova, Pon, Korkhauz, Little, Merrifield, Johnston-Tanaka, Moyers. Interpretation of measurement results of diagnostic models. Methods of studying crown sizes of permanent teeth, evaluation of the results. Measurement of diagnostic jaw models by L.P. Zubkova, Nans, Pon, Korkhauz, Shmudt, Gerlach, N.G. Snagina, Bolton, Little, Merrifield. Hauley-Gerber-Gerbst's geometrically graphic method. Interpretation of measurement results of diagnostic models. Automated methods of studying diagnostic jaw models.

1.5. General concepts of orthodontic appliances. Types of orthodontic appliances, force allocation and support principles in their application, types of fixation

Classification of orthodontic appliances according to U.M. Malygin. Types and force allocation in application of orthodontic appliances. Types of tooth movement. Types of fixation of orthodontic appliances. Anatomical retention and adhesion. Types of the support in orthodontic appliances.

1.6. Principles of orthodontic appliance making. Parts of removable orthodontic appliances: clasps, vestibular arches, springs. Administration, classification, making technology

General concepts of orthodontic appliance construction. The wire used in Orthodontics: composition, properties. Clasps: purpose, types, components, operating principle. Peculiarities of making round clasps and Adams's clasps. Vestibular arches: purpose, types, components, operating principle. Peculiarities of making vestibular arches with two semicircular bends, double semicircular bends and hand-shaped grasps, and M-shaped bends. Springs: purpose, types, components, operating principle. Peculiarities of making serpentine springs and springs with curves. Factors determining the action of springs. Peculiarities of placing wire elements into the basis of orthodontic appliance.

1.7. Basis of orthodontic appliances. Clinical and laboratory stages of making orthodontic appliances. Peculiarities of making orthodontic crowns and rings.

Basis of orthodontic appliances: borders, modeling features. Clinical and laboratory stages of making orthodontic appliances for one or two jaws. Methods of making orthodontic appliances: hot, cold and pneumo-vacuum polymerization. Peculiarities of making orthodontic crowns and rings.

1.8. Orthodontic screws: purpose, types, features. The rules of placing.

Orthodontic screws: purpose, types, features. The rules and peculiarities of screw placing into the basis of orthodontic appliance. Screws for moving individual teeth and the group of teeth. Screws for influencing the shape of the dentition. Screws for one-stage elongation and widening of the upper dentition. Screws for inter-maxillary influence.

1.9. The concept of the norm and pathology in Orthodontics. The norm of occlusion in different periods of its formation. General concept of the diagnosis of dentoalveolar anomalies.

The concept of the norm and pathology in Orthodontics. The norm of occlusion in different periods of its formation. The definition of the norm, average norm, individual average norm, holistic norm, morpho-functional and aesthetic optimum. Index evaluation of disturbances of dentoalveolar system structure. General concept of dentoalveolar anomaly diagnosis. Basics of orthodontic terminology. Systemic approach to diagnosis in Orthodontics. Classification of dentoalveolar anomalies by E. Engle. Clinical and morphological classification of dentoalveolar anomalies by D.A. Kalvelis. Classification of occlusion anomalies by L.S. Persina. The scheme of making clinical orthodontic diagnosis by F.Y. Khoroshilkina.

2. GENERAL ORTHODONTICS

2.1. Research methods in Orthodontics. Clinical and functional diagnostic methods.

Clinical examination method in Orthodontics: static and dynamic, functional study. Functional tests by Ilina-Markosyan, clinical tests by Eshlera-Bitner.

Functional diagnostic method of dentoalveolar anomalies. Myotonometry and electromyography of maxillofacial area muscles: indications, technique, interpretation of the results. Chewing efficiency study.

2.2. X-ray diagnostic method in Orthodontics.

X-ray diagnostic techniques of dentition structure disturbances. Intraoral roentgenography. Roentgenography of the median palatine suture. Orthopantomography of jaws. Roentgenological techniques of studying the temporomandibular joint. Indications, features, radiation dose, informativeness of the method in Orthodontics. Teleroentgenography of the facial skeleton: indications, rules, informativeness of the method, radiation dose. Determination of the position and size of jaws by I.V.Tokarevich. X-ray of the hand, determination of the stages of facial skeleton growth. Automated methods of studying the dentoalveolar system.

2.3. Treatment of dentoalveolar anomalies in different periods of occlusion formation. Methods of treatment. Myotherapy in Orthodontics.

Methods of treatment of dentoalveolar anomalies: definition, indications for use in different periods of occlusion formation. General principles of treating dentoalveolar anomalies according to the patient's age and severity of the disease.

Myotherapy in Orthodontics. Purpose, objectives and general rules of myotherapy. Myotherapy for different types of occlusion pathology.

2.4. Instrumental treatment of dental anomalies. Classification of orthodontic appliances. Appliances of mechanical and functional-guiding action. Appliances of mechanical and functional-directing action.

Instrumental treatment of dental anomalies: indications. Classification of orthodontic appliances according to their purpose, action principles, method and place of action, type of fixation, location, type of support, structure.

Removable and fixed mechanically operating apparatuses: Engle's arch, Gerling Gashimov's apparatus, multibonding system, apparatuses for distalization of molars, apparatuses for disclosure of the median palatine suture, palatine springs.

Functional-guiding orthodontic apparatuses: apparatus of Reyhensbaha-Brückl, plates with occlusal linings and biteplates. Peculiarities of action, structures. Indications for use according to the patient's age and type of orthodontic anomaly.

2.5. Principles of functional treatment of dentoalveolar anomalies. Functional-operating and combined orthodontic appliances. Peculiarities of action, designs, usage.

Functional- operating orthodontic appliances: standard and individual vestibular plates, pre-orthodontic trainers, LM-activators myobrases, regulators of functions by Frenkel, activators and bionators. Peculiarities of action, structures, application. Indications for use of various functionally- operating orthodontic appliances according to the patient's age and type of orthodontic anomaly. Orthodontic appliances of a combined action: peculiarities of action, structures, application.

2.6. Complex and surgical treatment of dentoalveolar anomalies. Differences, indications. Orthodontic indications for removal of permanent teeth.

Indications for complex treatment of dentoalveolar anomalies. Compactosteotomy: indications, peculiarities. Plastics of frenulum of the upper and lower lip, tongue, vestibule of the mouth. Orthodontic indications. Creating access to the crown of the tooth detained in eruption: indications, peculiarities of unerupted tooth traction.

Hotz's method (serial extractions): advantages and disadvantages, indications. Absolute and relative orthodontic indications for removal of permanent teeth.

2.7. Prosthetic treatment of dentoalveolar anomalies.

Indications for prosthetics in periods of temporary, mixed and permanent occlusion. Types of removable and fixed dentures used in children. Peculiarities of making and application of partial dentures in children. Peculiarities of preparation of temporary and permanent teeth to fixation prosthetic designs.

3. Specific Orthodontics

3.1. Anomalies of tooth development: anomalies of hard tissue structure, shape, size, eruption period, number of teeth, position of teeth in the dentition. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications.

Anomalies of hard tissue structure and tooth shape. Etiology, clinical picture, diagnosis, treatment. Anomalies of tooth size: macrodontia (absolute and relative) and microdontia. Anomalies of eruption periods: early eruption and an eruption (retardation of eruption) of teeth. Etiology, clinical picture, diagnosis, treatment.

Anomalies of tooth number: hyperdontia (supernumerary teeth), hypodontia, adentia. Anomalies of tooth position in the dentition in three perpendicular planes. Etiology, clinical picture, diagnosis, treatment. Orthodontic appliances for the normalization of teeth in different periods of occlusion formation. Mistakes and complications.

3.2. Anomalies of dentitions. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications

Anomalies of dentition in the sagittal (lengthening and shortening of dentitions), vertical (dentoalveolar lengthening and dentoalveolar shortening) and horizontal (dentition narrowing and widening) planes. Etiology, clinical picture, diagnosis, treatment. Orthodontic appliances for the normalization of teeth in different periods of occlusion formation. Mistakes and complications.

3.3. Distal occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to distal occlusion formation. Clinical picture, diagnosis, treatment. Mistakes and complications.

Etiology of distal occlusion: anomalies of development and deformations of teeth, dentition, jaw bones and diseases of the temporomandibular joint leading to the formation of pathology. Basic clinical symptoms and morphological abnormalities in distal occlusion. Diagnosis and treatment depending on the period of occlusion formation. Orthodontic treatment outcomes, mistakes and complications.

3.4. Mesial occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to mesial occlusion formation. Clinical picture, diagnosis, treatment. Mistakes and complications.

Etiology of mesial occlusion: anomalies of development and deformations of teeth, dentition, jaw bones and diseases of the temporomandibular joint leading to the formation of pathology. Basic clinical symptoms and morphological abnormalities in mesial occlusion. Diagnosis and treatment depending on the period of occlusion formation. Orthodontic treatment outcomes, mistakes and complications.

3.5. Deep overbite. Anomalies of development and deformations leading to the development of deep overbite. Clinical picture, diagnosis, treatment. Mistakes and complications.

Etiology of deep overbite: anomalies of development and deformations of teeth, dentition, jaw bones leading to the formation of pathology. Basic clinical symptoms and morphological abnormalities in deep overbite. Diagnosis and treatment depending on the period of occlusion formation. Orthodontic treatment outcomes, mistakes and complications.

3.6. Open bite. Anomalies of development and deformations leading to the development of open bite. Clinical picture, diagnosis, treatment. Mistakes and complications.

Etiology of open bite: anomalies of development and deformations of teeth, dentition, jaw bones and diseases of the temporomandibular joint leading to the formation of pathology. Basic clinical symptoms and morphological abnormalities in open bite. Diagnosis and treatment depending on the period of occlusion formation. Orthodontic treatment outcomes, mistakes and complications.

3.7. Crossbite. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to pathology formation. Clinical picture, diagnosis, differential diagnosis. Treatment. Mistakes and complications.

Etiology of cross bite: anomalies of development and deformations of teeth, dentition, jaw bones and diseases of the temporomandibular joint leading to the formation of pathology. Basic clinical symptoms and morphological abnormalities in cross bite. Cross bite types, differential diagnosis. Treatment depending on the pathology, type and the period of occlusion formation. Orthodontic treatment outcomes, mistakes and complications.

4. SPECIAL ISSUES IN ORTHODONTICS

4.1. Rehabilitation of children with the congenital isolated hiatuses of an upper lip, an alveolar process, a hard and soft palate. A role of the orthodontist in restoration of dentoalveolar system of patients with the isolated hiatuses of maxillofacial area.

Etiology and pathogenesis of congenital malformations of the maxillofacial area. Classification of congenital clefts of the maxillofacial area. Rehabilitation stages of children with congenital isolated clefts of lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with this pathology.

4.2. Rehabilitation of children with congenital through clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with through clefts maxillofacial area.

Classification of congenital clefts of the maxillofacial area. Rehabilitation stages of children with congenital through clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with this pathology.

4.3. Prosthetics of tooth defects, dentitions, alveolar processes and jaws in children: indications and contraindications. Types of children's dentures, design features and principles of their application

Indications and contraindications to prosthetics of defects of teeth, dentitions, alveolar processes and jaws in different periods of occlusion formation. Degrees of destruction of the dentoalveolar system and approaches to prosthetics of children and adolescents. Types of removable and fixed orthopedic constructions used in childhood. Features of partial removable dentures making and using in pediatric practice. Features of making and using temporary and permanent crowns. Features of preparation of temporary and permanent teeth for fixation of fixed orthopedic constructions.

4.4. Control and space management in the dentition. Place retaining appliances: types, indications.

Morphological and functional abnormalities of the dentoalveolar system in early loss of deciduous teeth in children. Indications for space controlling in the dentition. Place retaining appliances: types, design features, indications. Space management in the dentition: indications and approaches, choice of appliance design.

4.5. Multibonding systems: types, indications and contraindications. Stages of treatment of dentoalveolar anomalies using multibonding system. Retention of orthodontic treatment.

Multibonding systems (MBS): types, indications and contraindications, components. Ways of brackets fixing on teeth. Distinctive features of multibonding systems from removable orthodontic appliances. Keys of occlusion by L. Andrews.

Stages of treatment of dentoalveolar anomalies using multibonding system. The sequence of replacement of wire arches in the application of MBS. The first, second and third stages of treatment: selection of supports, alignment of teeth on a level and in a line, vertical control of tooth position. Features of implementation. Possible mistakes.

The fourth and fifth stages of treatment of dentoalveolar anomalies using multibonding systems: closing the sagittal gap and crevices between teeth and final steps. Features of selection of supports, arches. Methods of normalization of dentitions relationship. Easy tooth movement and mechanism of sliding.

Recurrences of dentoalveolar anomalies: causes, measures to minimize recurrences. Retention appliances: types, indications. Retention of the results of treatment depending on a type of orthodontic pathology.

4.6. New orthodontic appliances and devices for prevention and treatment of dentoalveolar anomalies.

Pre-orthodontic trainers, LM-activators, myobracers: indications and contraindications, design features, application features. Lingual braces: indications and application features. Using micro implants in orthodontic treatment. Face masks: types, indications. Aligners (positioners): indications and application features.

EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	number of hours		Self-studies	Literature	Form of control
		lectures	practical			
1.	Fundamentals of Orthodontics	7	72	54		
1.1	Orthodontics as a branch of dentistry: objectives, tasks. History and directions of specialty development. Organization of orthodontic care in the Republic of Belarus. Orthodontic office equipment, orthodontic tools.	1	6	4	1, 3	interviews
1.2	Impressions. Impression materials used in Orthodontics. Classification and general characteristics of properties of modern impression materials.	-	6	4	1, 3	Written and oral control questioning
1.3	Anthropometric research method in Orthodontics. Methods of studying facial aesthetics. Studying facial and head parameters of the patient.	1	6	4	1, 3, 8	Written and oral control questioning
1.4	Anthropometric research method in Orthodontics. Diagnostic jaw models. Methods of studying diagnostic jaw models in the period of mixed and permanent occlusion.	1	12	10	1, 3, 8	Written and oral control questioning
1.5	General concepts of orthodontic appliances. Types of orthodontic appliances, force allocation and support principles in their application, types of fixation	1	6	4	1, 3	Written and oral control questioning
1.6	Principles of orthodontic appliance making. Parts of removable orthodontic appliances: clasps, vestibular arches, springs. Administration, classification, making technology	1	6	4	1, 3	Written and oral control questioning
1.7	Basis of orthodontic appliances. Clinical and laboratory stages of making orthodontic appliances. Peculiarities of making orthodontic crowns and rings.	1	12	10	1, 3	Written and oral control questioning
1.8	Orthodontic screws: purpose, types, features. The rules of placing	-	6	4	1, 3	Written and oral control questioning
1.9	The concept of norm and pathology in Orthodontics. The norm of occlusion in different periods of its formation. General concept of the diagnosis of	1	12	10	1, 3, 9	Electronic tests, oral credits, estimation on

	dentoalveolar anomalies.					modular and rating system
2.	General orthodontics	6	72	80		
2.1	Research methods in Orthodontics. Clinical and functional diagnostic methods	1	12	12	1, 2, 9	Electronic tests, an interview
2.2	X-ray diagnostic method	2	12	12	1, 2, 8, 9	Written and oral control questioning
2.3	Treatment of dentoalveolar anomalies in different periods of occlusion formation. Methods of treatment. Myotherapy in Orthodontics.	1	12	12	1, 2, 9	Written and oral control questioning
2.5	Principles of functional treatment of dentoalveolar anomalies. Functional-operating and combined orthodontic appliances. Peculiarities of action, designs, usage.	1	6	10	1, 2, 9	Written and oral control questioning
2.6	Complex and surgical treatment of dentoalveolar anomalies. Differences, indications. Orthodontic indications for removal of permanent teeth.	1	12	12	1, 2, 9	Written and oral control questioning
2.7	Prosthetic treatment of dentoalveolar anomalies.	-	6	10	1, 2, 9	Electronic tests, oral examinations
3.	Private Orthodontics	8	49	41		
3.1	Anomalies of tooth development: anomalies of hard tissue structure, shape, size, eruption period, number of teeth, position of teeth in the dentition. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications.	2	7	6	6, 9, 10, 11	Electronic tests, an interview
3.2	Anomalies of dentitions. Etiology, clinical picture, diagnosis, treatment. Mistakes and complications	1	7	6	6, 9, 10, 11	Written and oral control questioning
3.3	Distal occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bone and diseases of the temporomandibular joint leading to distal occlusion formation. Clinical picture, diagnosis, treatment. Mistakes	1	7	6	6, 9, 10, 11	Written and oral control questioning

	and complications.					
3.4	Mesial occlusion. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to mesial occlusion formation. Clinical picture, diagnosis, treatment.	1	7	6	6, 9, 10, 11	Written and oral control questioning
3.5	Deep overbite. Anomalies of development and deformations leading to the development of deep overbite. Clinical picture, diagnosis, treatment. Mistakes and complications.	1	7	6	6, 9, 10, 11	Written and oral control questioning
3.6	Open bite. Anomalies of development and deformations leading to the development of open bite. Clinical picture, diagnosis, treatment. Mistakes and complications	1	7	6	6, 9, 10, 11	Written and oral control questioning
3.7	Cross bite. Anomalies of development and deformations of teeth, dentitions, jaw bones and diseases of the temporomandibular joint leading to pathology formation. Clinical picture, diagnosis, differential diagnosis. Treatment. Mistakes and complications.	1	7	5	6, 9, 10, 11	Electronic tests, graded credit, estimation on modular and rating system
4.	Special questions of orthodontics	5	77	43		
4.1	Rehabilitation of children with congenital isolated clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with isolated clefts of the maxillofacial area.				5	Electronic tests, an interview
4.2	Rehabilitation of children with congenital through clefts of upper lips, alveolar process, hard and soft palate. The role of the orthodontist in the restoration of the dentoalveolar system in patients with through clefts maxillofacial area.	1	14	8	5	Written and oral control questioning
4.3	Prosthetics of tooth defects, dentitions, alveolar processes and jaw sin children: indications and contraindications. Types of children's dentures, design features and principles of their application	1	7	6	5, 9, 11	Written and oral control questioning
4.5	Multibonding systems: types, indications and contraindications. Stages of treatment of dentoalveolar anomalies using multibonding system. Retention of orthodontic treatment.	1	28	9	5, 6, 7	Paper, interview
4.6	New orthodontic appliances and devices for prevention and treatment of dentoalveolar anomalies	-	14	8	6, 9	Electronic tests, credits, estimation on modular and rating system

INFORMATION-METHODOLOGICAL PART**Literature:****Basic:**

1. Alexander, R.G. «Wick». The Alexander discipline / 1997. – 138 c.
2. Basics of orthodontics / D.V. Rublevsky [et all.]. – Minsk :BSMU, 2015. – 17 p.
3. Contemporary orthodontics / William R. Proffit [et al.] // third edition, 2010.
4. Graber, T.M. Orthodontics, current principles and concepts / T.M. Graber. – Philadelphia : Mosby, 2000. – 976 p.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

1. Oral form:
 - interviews;
 - control questioning;
 - conference reports;
 - oral credits;
 - oral examinations.
2. Written form:
 - control questioning;
 - written classroom (home) practical exercises;
 - essays;
 - accounts of scientific research work.
3. Oral-written form:
 - credits;
 - examinations;
 - graded credit.
4. Technical form:
 - electronic tests.

LECTIONS

TOPICS OF LECTURES FOR THE 7TH SEMESTER

1. Orthodontics as a branch of dentistry. Purpose, objectives. History and the direction of specialization. Organization of dental care in Belarus.
2. Anthropometric method in orthodontics. The aesthetics of the face. Methods of studying of the facial esthetics.
3. Anthropometric method in orthodontics. Study of diagnostic models.
4. Types of orthodontic appliances. The general idea of the design of orthodontic appliances.
5. The technology of the orthodontic appliances manufacture. Methods of orthodontic appliances fabrication in dental lab.
6. The concept of health and disease in orthodontics. Orthodontic classification. Statement of orthodontic diagnosis.
7. Functional method of research in orthodontics. Miotonometry and electromyographic examination of muscle activity.
8. Radiologic examination in orthodontics. Periapical radiograph. Radiography of the median palatal suture. Cephalometric radiography. Panoramic radiography. Tomography of TMJ. Hand – wrist radiograph.

TOPICS OF LECTURES FOR THE 8TH SEMESTER

TOPICS OF LECTURES

1. Treatment methods of maxillofacial anomalies. Treatment options according to the period of bite formation. The teeth's movement. Necessary conditions for teeth movement.
2. Application of orthodontic appliances. Classification of orthodontic appliances. The principles of application of different types of orthodontic appliances for treatment of maxillofacial disorders.
3. Principles of functional treatment method in orthodontics. Functional orthodontic appliances.
4. Prosthetic method in orthodontics. Restoration of temporary and permanent teeth defects with dentures. Space control and space management in dental arch.
5. Complex and surgical treatment methods in orthodontics. Orthodontic indications and peculiarities of complex and surgical methods.
6. Miner orthodontics in general dental practice.

PRACTICAL SESSION BASICS OF ORTHODONTICS

1. Orthodontics as a section of dentistry: aims and objectives. History of orthodontics and directions of its development. Structure of orthodontic service in Belarus. Equipment of orthodontic clinic, orthodontic instruments.

2. Dental impressions. Impression materials applied in orthodontics. Classification and common characteristics of main properties of contemporary impression materials.

3. Diagnostic plaster models. Methods of study of diagnostic plaster models.

4. General concepts of orthodontic appliances application, effect of force magnitude, distribution, and types of tooth movement, effects of force duration and force decay, methods of fixation, anchorage and its control, biologic control of tooth movement. Types of orthodontic appliances.

5. The main principles of the orthodontic appliances design. Components of the removable orthodontic appliances (clasps, labial bow, springs). Classification, purpose, fabrication technique.

6. Basis of orthodontic devices. Production in dental laboratory. Features of manufacturing of orthodontic crowns

7. Screws. Types. Features of installation in orthodontic appliances.

8. Concept of norm and pathology in orthodontics. Occlusion in different periods of its formation. General concepts of diagnosis of dentofacial anomalies.

GENERAL ORTHODONTICS

1. Classification of malocclusion. The basics of orthodontic terminology. System approach in orthodontic diagnostics.

2. Research methods in orthodontics. Clinical and functional diagnostic methods.

3. Radiologic method of diagnostics in orthodontics.

4. Treatment of dentofacial disorders in different periods of dentition formation. Application of myotherapy in orthodontics.

5. Orthodontic appliances as treatment method in orthodontics. Classification of orthodontic appliances. Mechanical and functional appliances.

6. The principles of functional treatment of malocclusion. Myofunctional appliances and combined appliances. Properties of action, design and application.

7. Complex treatment method of dentoalveolar anomalies. Orthodontic indications for permanent teeth extraction.

8. Prosthetic treatment method of malocclusion.

PRIVATE ORTHODONTIA (5TH COURSE, 9TH SEMESTER):

1. Anomalies of development of teeth: anomalies of structure of firm tissues, forms, sizes, terms of eruption, number of teeth, position of teeth in dentition.

2. Anomalies of development of dentitions in the sagittal, vertical and horizontal planes.

3. Distal occlusion: an etiology, clinical implications, diagnostics, methods of prophylaxis and treatment during various periods of formation of an occlusion.

4. Mesial occlusion: an etiology, clinical implications, diagnostics, methods of prophylaxis and treatment during various periods of formation of an occlusion.

5. Deep occlusion: an etiology, clinical implications, diagnostics and methods of prophylaxis and treatment during various periods of formation of an occlusion.
6. Open bite: an etiology, clinical implications, diagnostics and methods of prophylaxis and treatment during various periods of formation of an occlusion.
7. Crossbite: types, an etiology, clinical implications, diagnostics and methods of prophylaxis and treatment during various periods of formation of an occlusion.

SPECIAL QUESTIONS OF AN ORTHODONTIA (5TH COURSE, 10TH SEMESTER):

1. Aftertreatment of children with the congenital isolated hiatuses of an upper lip, an alveolar process, a hard and soft palate. A role of the orthodontist in restoration of dentoalveolar system of patients with the isolated hiatuses of maxillofacial area.
2. Aftertreatment of children with congenital unilateral through hiatuses of an upper lip, an alveolar process, a hard and soft palate. A role of the orthodontist in restoration of dentoalveolar system of patients with through hiatuses of maxillofacial area.
3. Aftertreatment of children with congenital bilateral through hiatuses of an upper lip, an alveolar process, a hard and soft palate. A role of the orthodontist in restoration of dentoalveolar system of patients with through hiatuses of maxillofacial area.
4. A prosthetic repair of defects of teeth, dentitions, alveolar processes and jaws at children's age: indications and contraindications. Types of children's prostheses, design features and principles of their use.
5. Control and management of space in dentition. Space control devices: types, indications to use.
6. System Multibonding: types, indications and contraindications to use. Keys of an ideal occlusion of L. Andrews.
7. The first and second stages of performing treatment of dentoalveolar anomalies with use a system multibonding.
8. The third and fourth stages of treatment of dentoalveolar anomalies with use a system multibonding.
9. The fifth stage of treatment of dentoalveolar anomalies with use a system multibonding. A retention of the achieved results of orthodontic treatment.
10. New orthodontic devices and devices for prophylaxis of dentoalveolar anomalies.
11. New orthodontic devices and devices for treatment of dentoalveolar anomalies.

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Curriculum content, composition and accompanying documents comply with established requirements.

Dean of the Medical Faculty of
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31.08 2016

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**PROTOCOL OF COORDINATION FOR THE DISCIPLINE "ORTHODONTICS" WITH THE CURRICULUM
OF OTHER DISCIPLINES FOR SPECIALTY 1-79 01 07 DENTISTRY**

Name of a related discipline	Name of the Department	The content of the proposed changes in the curriculum	The approval of the curriculum by the Department, responsible for its development (with the Protocol date and number)
General Dentistry	Department of General Dentistry	No proposals	The meeting of the Department of Orthodontics: , Protocol #.
Pediatric Dentistry	Department of Pediatric Dentistry	No proposals	The meeting of the Department of Orthodontics: , Protocol #.