



<b>Study program:</b> Integrated Academic Studies in Dental Medicine
<b>Course title:</b> Orthodontics
<b>Teacher:</b> Djordje D. Petrovic, Predrag V. Vucinic, Stojan M. Ivic
<b>Course status:</b> compulsory
<b>ECTS Credits:</b> 10
<b>Condition:</b> General Radiology ;Gnathology
<p><b>Course aim:</b></p> <p>The objective of the course in Orthodontics is to acquaint students with jaw growth and development and to enable him to understand and identify the age-related general and local factors, as well as the diverse interventions and procedures (extraction of milk teeth and permanent teeth, tooth fillings, etc.) that can induce a range of orthodontic disorders. Learning mutual connections between diverse general and local disorders and conditions and development of chewing organs and face, the students will develop ability of critical thinking and conclusion making. The objective is also to acquaint students with procedures and measures for establishing complete diagnosis of orthodontic anomalies, treatment stage planning according to the established diagnosis, general principles of orthodontic treatment and application of diverse orthodontic equipment depending on patient's age and psychological maturity. Mastering abilities of critical thinking and linking different basic and advanced diagnostic methods with an aim of training future dentists to establish reliable and timely diagnosis in view of orthodontic patient triage. Defining the most appropriate development stage and methods of preventive action against dysgnathia or appropriately indicate the orthodontic treatment to provide better functionality of the orofacial system and facial appearance, thus contributing to improvement of general physical and psychological health.</p>
<p><b>Expected outcome of the course:</b></p> <p>Learning on normal growth and development of jaws and teeth; development of normal occlusion. Etiological factors associated with the occurrence of malocclusions. Morphological diagnostic procedure as a baseline for orthodontic treatment planning (analysis of teeth position, shape and size of the jaws and occlusion findings on dental study models in sagittal, vertical and transverse plane of space). Knowing basic principles of orthodontic abnormalities in sagittal, vertical and transverse plane of space. Taking anatomical imprints, molding and creating of working and study models. Analysis of study models using instrumentation for gnathometric analysis (differentiating between milk teeth and permanent teeth, determining the middle point of the jaw, analysis of teeth position and dental arch development, analysis of occlusal relationships). Creation of retention and active wire elements for mobile orthodontic apparatus. Possibilities of prevention and application of interceptive measures aimed at preventing the development and aggravation of orthodontic impairments. Basic principles in the therapy of orthodontic impairments. Therapeutic capacities of particular orthodontic apparatuses. Taking anatomical imprints. Establishing morphological and functional diagnosis on the basis of clinical examination. Establishing of final diagnosis after completing diagnostic procedures and analyzing the findings. Planning of orthodontic therapy. Conducting orthodontic therapy using various orthodontic apparatuses. Application of preventive and interceptive measures. Interdisciplinary approach in treating severe orthodontic impairments.</p>
<p><b>Course description</b></p> <p><i>Theoretical education</i></p> <p>Definition, tasks and objectives of the course; Psychological and social-economical importance of orthodontics. History of orthodontics; first records on orthodontic disorders; records on orthodontic therapy before Engel and towards modern orthodontic therapy approach. Prenatal development of head and face, Prenatal development of teeth. Postnatal development of the head, face, jaws and teeth from birth to first milk teeth eruption. Development of masticatory organs from first milk teeth eruption to completion of milk teeth series (to 2.5 years). Development of masticatory organs in the period of first milk teeth series and early mixed teeth series (early mixed dentition). Development of masticatory organs in the period of late mixed teeth series (late mixed dentition). Development of masticatory organs in the period of permanent teeth series (permanent dentition). Normal occlusion – ideal occlusion and articulation. Motor functions – general characteristics of muscles and their overall function, normal breathing function and its influence on the development of orofacial system. Normal function of feeding – breast-feeding and swallowing and their effect on orofacial region development. Function of feeding – chewing and its effect on normal development of orofacial system. Function of speech focusing on articulation of sounds in oral cavity and its importance in masticatory organ development. Features and importance of the imprint in orthodontics. Importance and creation of study models. Instruments used for analysis of study models. Schwartz analysis of study models, measuring points for width and height of dental arch, median values. Analysis of teeth position in transversal plane in the upper and lower jaw, determining the mid-point of upper and lower jaw. Analysis of</p>

teeth position in sagittal plane in the upper and lower jaw. Analysis of teeth position in vertical plane of space, shape and height of the palate. Analysis according to Moyers and Bolton. Assessment of sagittal relationship of jaws, terminology of the occlusal finding. Importance and analysis of intraoral and extraoral X-ray scans. Rtg craniometry and Rtg cephalometry. Analysis of profile Ro scan according to Schwartz and Steiner. Etiology of malocclusion, classification of malocclusions, biochemical basis of inheritance, inheritance pathways. Effects/role of inheritance on orofacial region. General diseases and disorders of endocrine function and their effects on the occurrence of malocclusions. Nutrition deficiency, congenital anomalies and their impact on the occurrence of malocclusions. Local diseases and trauma and their impact on the occurrence of malocclusions functional disorders and bad habits and their impact on the occurrence of malocclusions. Hyperdontia and hypodontia, macro- and microdontia, persistence of milk teeth and their impact on the occurrence of malocclusions. Impairments in the view of teeth position. Impairments in the view of the number and size of teeth. Impairments of dental arch – crooked teeth, irregular shape or size. Impairments of I class. Impairments of II class. Impairments of III class. Transversal and vertical impairments. Congenital anomalies – Cheilognathopalatoschisis. Congenital anomalies – syndromes. Introduction to orthodontic records, medical documentation. Medical history (importance in orthodontics) since birth to the moment of examination; family history. Present status - general: height, body weight, potential bone deformities, etc. Present status – local: extraoral, morphological analysis of the face while still and in occlusion. Functional examination. Present status – local: intraoral, general features of milk and permanent teeth and tooth lines, shape, position, size of the tongue, incisor relationship in sagittal and vertical plane in space, mid-point of tooth line. Prevention, interceptive orthodontics. General causal therapy. Biological principles of teeth displacement – response of soft tissues to relevant stimuli. Extraction therapy – systematic, compensatory, compromising. Active mobile apparatuses – parts, role of labial arch. Elastic wire elements – springs, screws, bow (ridge). Basic elements of functional apparatus – monoblock, reduced activators, vestibular plane. Basic elements of functional apparatus – bionator acc. to Balters, function regulator acc. to Frankel, propulsor. Fixed apparatuses – combination of mobile and fixed treatment. Impairment therapy in the period of mixed and permanent dentition in transversal direction. Therapy of impairments of teeth and jaws in sagittal direction. Therapy of impairments of teeth and jaws in vertical direction. Retention of the obtained therapy outcome, mouth hygiene and hygiene of the apparatus during therapy. Interdisciplinary cooperation – therapy.

#### *Practical education*

Taking anatomical imprints, individual bite wax moulds; working models and creating the base plate. Instruments for performing gnathometric analysis. Toothless jaw (milk teeth, permanent) and its characteristics; deviation from normal occlusion at all three planes – displaying characteristic cases. Differentiation between milk teeth and permanent dentition. Determining dental age. Analysis of study models – teeth status, labeling, numbering, type and shape of teeth. Determining the mid-point of the upper jaw. Transferring the median to the lower jaw. Rtg spine mentalis. Analysis of the symmetry/asymmetry of teeth; reconstruction. Schwartz analysis: measuring of the upper and lower jaw/width and height of the dental arch/median value. Comparison of the teeth series in the upper and lower jaw at all three planes in space (sagittal, vertical and transversal). Bite classification according to Engel. Tooth ratio and dentition analysis (Moyers, Bolton). Diagnostics of occlusal finding (terminology), therapy plan, description. Morphological diagnosis and therapy plan. Mechanical features of the wire and types of orthodontic forceps. Practicing the techniques of dental wire twisting. Components and basic characteristics of particular orthodontic apparatus. Twisting of retention and active wire elements of the orthodontic apparatus. Medical history. General and local extraoral clinical examination (body constitution, shape of the head and face, assessment of vertical and sagittal face esthetics, biometric field). Intraoral clinical examination, assessment of occlusal relationships, determining dental status and age. Functional analysis (breathing, mastication, swallowing, speech, movements, lip position, determining the position of physiological inactivity and interocclusal distance). Analysis of X-ray scans in orthodontics (orthopantomogram, teleroentgen profile of the head, rtg of the hand, parallax system, bite scans). Reading and interpretation of diagnostic findings, establishing final diagnosis and therapy planning. Performing complete diagnostic procedure in patients with diverse orthodontic impairments. Taking imprints and individual bite in wax mould, medical history, determining the extraoral and intraoral findings. Functional examination. Analysis of study models, RTG scans. Establishing of final diagnosis and therapy planning delivery of active mobile apparatus. Control examinations and monitoring of the patient. Admission and examination of new patients. Clinical-functional examination and analysis of study models and RTG scans of patients-candidates for functional therapy and establishing the diagnosis. Therapy plan and obtaining construction bite mould. Delivery of functional apparatus (monoblock) to new patients and control of former patients. Processing of patients – candidates for therapy with fixed orthodontic apparatus. Mounting fixed apparatus and monitoring of the therapy. Practicing identification of diverse orthodontic impairments in sagittal, transversal and vertical plane; treatment possibilities. Introduction to preventive and interceptive measures at different age (serial extraction, application of spatula, myofunctional exercises, confection and individual vestibular plates, myofunctional appliances). Indications for interdisciplinary cooperation in the diagnostics and treatment of severe deformities of the face and jaws (cleft lip, cleft palate, progeny, skeletal open bite, gothic palate, speech disorders) Consultations related to particular topics. Knowledge test.

#### **Literature**

##### *Compulsory*

1. Gardiner J.H. Orthodontics for dental students. Oxford University Press, 1998.

2. Rakosi Thomas. Color Atlas of Dental Medicine, Orthodontic Diagnosis. Thieme, 1993..

*Additional*

1. Ortodoncija; W. R. Proffit, H. W. Fields, D. M. Sarver, Zagreb

**Number of active classes**

**Theoretical: 60**

**Practice: 120**

**Teaching methods**

Lectures and practices

**Student activity assessment** (maximally 100 points)

<b>Pre-exam activities</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Lectures	15	Written	20
Practices	15	skills	20
Colloquium		Oral	30
Essay			