



## Physiology of the Masticatory System

### 1. IMPRINT

<b>Academic Year</b>	2023/2024
<b>Department</b>	Faculty of Medicine and Dentistry
<b>Field of study</b>	Medicine and Dentistry
<b>Main scientific discipline</b>	Medical science
<b>Study Profile</b>	General academic
<b>Level of studies</b>	Uniform MSc
<b>Form of studies</b>	Extramural study (paid)
<b>Type of module / course</b>	Obligatory
<b>Form of verification of learning outcomes</b>	Completion
<b>Educational Unit / Educational Units</b>	Department of Dental Propaedeutics and Prophylaxis, 59 Nowogrodzka Str., 02-006, Warsaw, phone: 22 6256602 e-mail: zpips@wum.edu.pl Department of Orthodontics, 6 Binieckiego Str., 02-097 Warsaw; phone:22 1166454, e-mail: ortodoncja@wum.edu.pl

	Department of Periodontology, 6 Binięckiego Str., 02-097 Warszawa; phone: 22 1166431, e-mail: sluzowki@wum.edu.pl
<b>Head of Educational Unit / Heads of Educational Units</b>	Leopold Wagner DDS, PhD prof. Małgorzata Zadurska DDS, PhD Maciej Czerniuk DDS, PhD
<b>Course coordinator</b>	Renata Lenkiewicz DDS; rlenkiewicz@wum.edu.pl; phone: 22 6256602
<b>Person responsible for syllabus</b>	Renata Lenkiewicz DDS, rlenkiewicz@wum.edu.pl; phone: 22 6256602
<b>Teachers</b>	Renata Lenkiewicz DDS, rlenkiewicz@wum.edu.pl Ewa Czochrowska DDS, PhD, eczochrowska@wum.edu.pl Jan Kowaski DDS, PhD, jan.kowalski@wum.edu.pl

## 2. BASIC INFORMATION

<b>Year and semester of studies</b>	II year, III and IV semester	<b>Number of ECTS credits</b>	4
<b>FORMS OF CLASSES</b>		<b>Number of hours</b>	<b>ECTS credits calculation</b>
<b>Contacting hours with academic teacher</b>			
Lecture (L)		9	0,93
Seminar (S)		14	0,47
Discussions (D)		-	-
e-learning (e-L)		-	-
Practical classes (PC)		22	0,73
Work placement (WP)		-	-
<b>Unassisted student's work</b>			
Preparation for classes and completions		56	1,87

## 3. COURSE OBJECTIVES

O1	Acquiring knowledge in the field of development, function, neurophysiology, mechanics, interaction and mutual relationships of the masticatory system structures, as well as its integration with the rest of the body.
O2	Acquiring knowledge in the field of anatomy and physiology of oral mucosa, occlusal norm appropriate for the given age, the occurrence of the variability of individual characteristics of the stomatognathic system and their relationship with the external and internal environment.
O3	Acquiring ability to recognize the occlusal norm and assess the masticatory system functions at different stages of individual development using simple clinical tests.
O4	Acquiring ability to discuss the functional significance of stomatognathic system structures and interpreting their anatomical and functional phenomena.
O5	Acquiring ability to evaluate the presence of the physiological norm and aberrations.

#### 4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING

<b>Code and number of effect of learning in accordance with standards of learning</b>	<b>Effects in the field of morphological, preclinical and clinical science as well as the scientific foundations of medicine.</b>
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##### Knowledge – Graduate\* knows and understands:

A.W1.	human body structures: cells, tissues, organs and systems with particular emphasis on the stomatognathic system
A.W2.	development of organs and the whole organism, with particular emphasis on the masticatory apparatus
A.W3.	structure of the human body in topographical and functional approach
A.W5.	functional significance of the individual organs and the systems they form
A.W6.	anatomical justification for the physical examination
B.W8.	mechanics of the masticatory apparatus
B.W19.	human body functions
F.W1.	occlusal norms at different stages of development and deviations from the norms
F.W11.	indications and contraindications in the field of esthetic dentistry

##### Skills– Graduate\* is able to:

A.U1.	interpret anatomical relationships illustrated by basic diagnostic methods for radiological examination (radiological images and images with contrasting agents)
B.U2.	interpret physical phenomena occurring in the masticatory apparatus

C.U12.	replicate anatomical occlusal relations and perform occlusal analysis
F.U2.	conduct a dental physical examination of the patient
F.U6.	interpret results of additional tests and consultations

## 5. ADDITIONAL EFFECTS OF LEARNING

Number of effect of learning	Effects of learning in time
<b>Knowledge – Graduate knows and understands:</b>	
W1	-
<b>Skills– Graduate is able to:</b>	
U1	-
<b>Social Competencies – Graduate is ready for:</b>	
K1	-

## 6. CLASSES

Form of class	Class contents	Effects of Learning
L1 – lecture 1-2	Anatomy and physiology of the oral mucous membrane: oral epithelium; types of oral mucosa; oral, sulcular and junctional epithelium; defensive role of the oral mucous membrane.	A.W1.
S1 – seminar 1-2	Anatomy and physiology of the periodontium: tissues included in the periodontium; functions of the pointed tissues; Held's theory.	A.W1.
PC1 – practical class 1-2	Identification of the anatomical structures in oral mouth; repetition of the anatomy of neck and mouth; application of the acquired knowledge in practice.	A.W1., F.U2.
L2- lecture 3-4	Development of masticatory system: pre- and postnatal development, mechanisms of growth, craniofacial development.	A.W2.
S2- seminar 3	Skeletal development – mechanisms of growth and development of jaw bones: ossification on the cartilage basis, osseous sutures, apposition and resorption of bone; chronological and biological age; skeletal age.	A.W2.
S3- seminar 4	Development of occlusion: dental age versus skeletal age, description of normal occlusion and its assessment at different developmental stages (deciduous, mixed and permanent dentition).	A.W2., A.W6., F.W1.
S4- seminar 5-6	Stomatognathic system during sucking, biting, chewing and swallowing and during breathing and speaking; development and physiology of	A.W3., B.W19.

	sucking, chewing and swallowing, physiology of breathing in relation to the masticatory system; speech as a conditioned response; development of speaking in ontogenesis.	
PC2- practical class 3-4	Skeletal development: craniometric and cephalometric measurements, use of growth charts, assessment of skeletal age based on hand-wrist radiographs and cervical vertebrae on cephalometric radiographs.	F.U6.
PC3- practical class 5-6	Development of occlusion: description of a normal occlusion at different stages of development using diagnostic models, Angle classification, assessment of dental age using panoramic radiographs.	F.U6.
PC4- practical class 7-8	Physiology of masticatory system: assessment of chewing; methods to assess swallowing; self-assessment and analysis of swallowing; infant and mature swallowing; assessment of breathing and self-assessment, palpation of larynx during articulation; assessment of articulation sites; observation of breathing during articulation of nasal and oral phones.	B.U2., F.U2., F.U6.
L3 - lecture 5-6	Esthetic analysis in dentistry: significance and methods of esthetic analysis in diagnosis and treatment planning, face analysis, dento-labial analysis.	F.W11.
L4- lecture 7-8	Esthetic analysis in dentistry: phonetic analysis, detailed analysis of position and morphology of front teeth.	F.W11.
L5- lecture 9	Esthetic analysis in dentistry: gingival analysis.	F.W11.
S5- seminar 7-8	Physiology of facial skeleton regarding specific function, topography and role of facial bones, types of bone connections and physiology of bone tissues.	A.W1., A.W3.
S6- seminar 9	Movement within masticatory organ: muscle topography and physiology, function of masticatory muscles as single units and in coordinated jaw movements.	A.W1., A.W3., A.W6.
S7- seminar 10-11	Physiology and functions of dental tissues: enamel, dentin, pulp and periodontium.	A.W1., A.W3.
S8- seminar 12	Temporomandibular joints biomechanics: relations of TMJ elements during mandibular movements, static and dynamic relations between TMJs and tooth arches.	B.W8.
S9- seminar 13	Occlusion: static and dynamic teeth relations, goals for functional optimal occlusion, the importance of mutual protection of articulation, necessary conditions to obtain occlusal stability, determinants of occlusion, the envelope of function.	B.W8.
S10- seminar 14	Structural and functional changes in aging: face and teeth appearance, aging of masticatory system bones, muscles, dental and periodontal tissues, natural changes in occlusion.	A.W1., B.W8., B.W19.
PC5- practical class 9-10	Recognizing bony structures of the stomatognathic system in chosen radiological images.	A.U1.
PC6- practical class 11-12	Masticatory muscle examination: direct and indirect methods of muscle evaluation.	F.U2.
PC7- practical class 13-14	Dental tissues examination: pulp vitality tests, periodontal response to percussion, teeth mobility - discussion on examination results, evaluation of hard dental tissues.	F.U2.
PC8- practical class 15-16	Clinical evaluation of TMJs: palpation and auscultation, observation and evaluation of mandibular movements, methods of freeway space determination.	F.U2.
PC9- practical class 17-18	Occlusal analysis: evaluation of static occlusion (Bausch method) and dynamic occlusion, rest position of mandible and CR position of	C.U12., B.U2.

	mandible, determining the difference between centric relation and centric occlusion positions, cast models - evaluation of habitual occlusion and signs of functional adaptation.	
PC10- practical class 19-20	Esthetic analysis according to M. Fradeani protocol.	F.U2.
PC11- practical class 21-22	Evaluation of all elements of the masticatory system – determining presence/absence of physiological norm.	F.U2.

## 7. LITERATURE

### Obligatory

1. Wheeler's dental anatomy, physiology and occlusion. Nelson S.J., Ash M.M. Saunders/ Elsevier 2020
2. Periodontology. The essentials. Mueller HP., Thieme Verlag 2015
3. Contemporary Orthodontics. Proffit W., Fields H., Sarver D., Elsevier/Mosby 2018
4. Management of Temporomandibular Disorders and Occlusion. Okeson J.P. Elsevier/Mosby 2019
5. Esthetic rehabilitation in Fixed Prosthodontics vol.1: Esthetic Analysis. Fradeani M. Quintessence Publishing 2004

### Supplementary

1. The Masticatory Organ. Slavicek R. Gamma Med. GmbH 2006

## 8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
A.W1., A.W2., A.W3., A.W5., A.W6., B.W8., B.W19., F.W1., F.W11.	MCQ test – 50 questions	Achieving the expected learning outcomes of at least 55%
A.U1., B.U2., C.U12., F.U2., F.U6.	Observation and assessment of practical skills	Completion of each task.

## 9. ADDITIONAL INFORMATION

Completion of the course: no grade. Completion form: MCQ test, retake - written test, open questions  
The teaching supervisors of the subject:  
Renata Lenkiewicz DDS (Department of Dental Propaedeutics and Prophylaxis), rlenkiewicz@wum.edu.pl  
Ewa Czochrowska DDS, PhD (Department of Orthodontics), eczochrowska@wum.edu.pl  
Jan Kowalski DDS, PhD (Department of Periodontology), jan.kowalski@wum.edu.pl  
Presence on all lectures, seminars, practical classes and completion of all midterm tests is obligatory to be admitted to final test.  
The single absence is excused (one in the whole course in two departments) provided medical certificate submitted in 7 days - a form of completing the class is determined by the teacher. Being late more than 15 min. is treated as an absence.  
Seminars are stationary classes with sanitary regime.  
Students are required to change their shoes and leave the outer garments in the cloakroom.  
It's forbidden to use cell phones and other electronic devices during classes.  
Department website: <https://propedeutyka-stomatologiczna.wum.edu.pl>

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**ATTENTION**

The final 10 minutes of the last class in the block/semester/year should be allocated to students'  
Survey of Evaluation of Classes and Academic Teachers