

University of Detroit Mercy School of Dentistry

Orthodontic Department

Course Syllabus

Growth and Development DOD 820

Course Information

Web Address: <http://knowledge.udmercy.edu>

Course Director:

Richard Kulbersh, DMD, MS Office: 217 Manning Hall Office Hours by appointment or contact P. J. Baker, Administrative Assistant Phone: 313-494-6606 Email: ortho@udmercy.edu
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Summer Term, 2007

DS2 Students (Class of 2010)

HS 133, Wednesday mornings, 8:00am – 9:50am

Credit Hours: 1

Prerequisites: Successful completion of DS1

Lecturers/Support Faculty

Lecturers:

Carol Anne Murdoch-Kinch, DDS

Academic Policies

All policies in the School of Dentistry Academic Policies Handbook including but not limited to academic integrity, mandatory attendance, professional decorum & dress code, identification (ID) badges, preclinical and classroom decorum, use of cell phone and electronic devices, examination policies and exam/quiz absences apply.

Accommodations

If you would like to request a classroom, testing, preclinical, clinical, or other accommodation because of a legally protected disability, or if you might require any special assistance in the event of an emergency or evacuation, please contact the University of Detroit Mercy's Office of University Academic Services (UAC) at 313-578-0310 or email your request for information to gallegem@udmercy.edu

Student Evaluation of Instruction

Student feedback is valued by the faculty and the administration. All students are required to complete the School of Dentistry's on-line course evaluation by a specified date. Failure to comply by posted deadline dates will result in the receipt of an F (Failing) grade of record for the Evaluation Responsibility Course. Only constructive, professional recommendations will be reported and considered.

Course Description

Purpose of the course:

- This course consists of two 4 hour case- based seminar sessions and a simulated case exercise that students will complete outside of class, working in small groups. This course presents and reviews foundation knowledge of basic principles of genetics covered in undergraduate biology courses and further extends this basic knowledge into clinical applications, likely to be encountered by the general dentist or dental specialist in clinical practice. Prerequisites include 1st year pre-doctoral dental curriculum.
- The second half of the course will begin with an overview of the general nature of growth, growth curves, and the factors influencing growth and maturation. A review of bone formation (intramembranous and endochondral) and remodeling principles, embryology of the craniofacial complex, and osteology of the skull will serve as a springboard from which the mechanisms of growth of the calvarium, cranial base, maxilla, mandible, as well as the controlling theories of Scott, Moss, Sicher, and Van Limborgh will be discussed. An overview of the application of craniofacial growth data in clinical orthodontics will be presented. This course provides foundation knowledge for topics covered in General Pathology, Oral Pathology and Radiology, and Microbiology and Immunology in the second year of dental school, as well as clinical practice.

Course Goals:

This course will introduce the student to:

1. The various growth periods in human development as well as basic concepts of growth, development, and maturation.
2. The differences between longitudinal and cross sectional studies.

3. The variables affecting physical growth.
4. Various methods of growth assessment such as chronological, skeletal, dental, sexual age, etc.
5. Various techniques for studying and investigating bone growth.
6. The overall historical development of the study of craniofacial growth.
7. Neural and somatic growth curves.
8. The various bones as well as the sutures and synchondroses of importance in craniofacial development.
9. The embryonic origins of the palate, mandible, maxilla, cranial base, and calvarium.
10. The important aspects of endochondral and intramembranous bone growth as they relate to craniofacial development.
11. The structure of sutures and synchondroses.
12. The principles of bone remodeling such as apposition, resorption, area relocation, "v" principle, and drift.
13. The remodeling processes and know the major growth areas in the brain case, cranial base, maxilla, and mandible.
14. The major theories of craniofacial growth and development as postulated by scott, moss, sicher, and vanlimborgh.
15. The difference between growth centers and growth sites as explained by koski.
16. The use of craniofacial growth data in the application of orthopedic forces in orthodontics.
17. Developmental deformities secondary to aberrations of embryonic growth and development.
18. Craniofacial pathology of bone, carriage and dentition, secondary to genetic/chromosomal defects of embryologic growth.
19. Central nervous system syndromes secondary to genetic/chromosomal developments etiologies.
20. Hamartomas and epithelial tissue abnormalities.

Course Objectives:

The student will be able to:

1. Explain the basic principles of gene expression, from transcription through translation and post-translational modifications.
2. Describe how mutations occur and their significance.
3. Recognize genetic vs. non-genetically regulated diseases.
4. Recognize pattern of inheritance through pedigree analysis, family history and clinical findings
5. Understand why dentists need to know genetics.
6. Use information technology to access resources and apply genetics information to clinical cases.

7. Understand the role of a Cleft Palate/Craniofacial Team, and how to refer patients to such a team for optimal care
8. Describe the role of genetics and apply foundation knowledge of genetics, in the diagnosis and management of the following oral diseases
 - a. Dental caries
 - b. Periodontal disease
 - c. Oral Cancer
 - d. Orofacial clefting
 - e. Facial pain
 - f. Dental anomalies
 - g. Craniofacial syndromes including those associated with craniosynostosis
9. Understand how genetic information and technology will impact on the future of dentistry
10. Explain the postnatal remodeling of the craniofacial skeleton.
11. Explain the embryological development of the craniofacial skeleton.
12. Explain the theories of craniofacial growth.
13. Explain Koski's "growth centers" and "growth sites".
14. Recognize absolute and velocity growth curves.
15. Recognize Scammon's curves.

Instructional Methods:

Instructional methods utilized in this course will be based on class lectures, the Riolo and Avery text readings, handouts, reading assignments from the dental/medical literature.

School of Dentistry Competencies

Competency-based Education: Assumes that learning to become an entry-level professional is a progression through stages from novice to competent.

Stages of Progression to Competence:

F or Foundation Knowledge: Basic knowledge, skills, and attitudes needed to begin the journey to competence.

N or Novice Level: Ability to articulate or describe the appropriate skills, knowledge, and professional attitudes. Novices need structure, clarity of goals, single and clearly explained approaches.

B or Beginner Level: Combines the appropriate skills, knowledge, and professional attitudes, all of which are performed with guidance and correction.

C or Competent Level: Combines the appropriate supporting skills, knowledge, and professional attitudes, all of which are performed reliably without assistance.

	Competencies of the Graduating Dental Student	Addressed	Evaluated	Method
1.	The graduating student obtains, records, updates and organizes accurate and completed medical/dental histories including pertinent psychological and socioeconomic information.	NO	NO	NA NA NA
2.	The graduating student performs, records and organizes a physical assessment appropriate for dental care.	NO	NO	NA NA NA
3.	The graduating student determines differential, provisional or definitive diagnoses by correlating and interpreting examination and assessment findings.	YES	N	Written Evaluation NA NA
4.	The graduating student develops alternative treatment plans which are sequenced to address the chief complaint, eliminate oral disease, restore function, and maintain health, and prevent oral disease consistent with assessment and diagnoses.	YES	F	Written Evaluation NA NA
5.	The graduating student establishes with the patient a mutually acceptable treatment plan.	YES	F	Written Evaluation NA NA
6.	The graduating student monitors and provides for patient comfort associated with dental care.	NO	NO	NA NA NA
7.	The graduating student delivers and/or manages the planned treatment in sequence and in accordance with accepted standards of care.	NO	NO	NA NA NA
8.	The graduating student promotes health maintenance and disease prevention.	NO	NO	NA NA NA
9.	The graduating student applies the principles of infection control and environmental safety.	NO	NO	NA NA NA

	Competencies of the Graduating Dental Student	Addressed	Evaluated	Method
10.	The graduating student makes professional decisions affecting the practice of dentistry based on values that satisfy legal and ethical principles and service to society.	NO	NO	NA NA NA
11.	The graduating student performs routine self evaluation.	NO	NO	NA NA NA
12.	The graduating student applies business and practice management skills.	NO	NO	NA NA NA
13.	The graduating student demonstrates interpersonal skills to function successfully in a multicultural work environment.	NO	NO	NA NA NA
14.	The graduate critically evaluates the validity of new information, new products, and/or techniques and their relevance to the practice of dentistry.	NO	NO	NA NA NA

Course Policies

- Use of Blackboard or additional websites or electronic resources
- Four (4) announced non-cumulative short 15 minute quizzes. No make up quizzes will be given unless an excuse is received through Dean Zarkowski's office. A grade of zero (0) will be given for all unexcused quizzes.
- The group case report will be completed outside of class during the week between the two genetics seminar sessions. Each group will consist of 6-8 students. Students will access the case "Emily" on the Genetics Education Dental Case Simulator, and following the instructions provided in class, will formulate a diagnosis for the case. They will also develop a management plan for this simulated patient. Finally they will complete the survey at the end of the case report. This will be submitted before the second seminar in order to get full credit.

Textbook and Resource Materials

- Essentials of Orthodontic Practice, Riolo and Avery (Required)
- Class handouts
- Material on Blackboard
- Class lecture material

Evaluation and Grading

Grading Scale:

- Grading scale: Consistent with school grading policy, we will award "+" or "—" grades with general whole grade categories as follows:

A	=	94-100%
A-	=	90-93%
B+	=	87-89%
B	=	83-86%
B-	=	80-82%
C+	=	77-79%
C	=	73-76%
C-	=	70-72%
D	=	60-69%
F	=	0-59%

Course Grade Components:

Quizzes	40%
Online Homework	10%
Genetics Final Exam	<u>50%</u>
	100%

Course Evaluation Methods

Quizzes:

Dr. Kulbersh will give four (4) short quizzes on the previous week's lecture at the beginning of each lecture session. The last quiz will be given during the final exam hour but will be a separate section.

Group Case Report:

This will be an online assignment from Dr. Murdoch-Kinch worth 20 points.

Final Exam

The genetics final exam will be a 50 point multiple choice exam during finals week. Also, Dr. Kulbersh's last quiz will be given at this time.

COURSE SCHEDULE DOD 820

The time and place remain the same for the whole semester, except for two weeks in June as noted.

DATE	TOPICS	LECTURERS	READINGS/ ASSIGNMENTS	QUIZ #
May 16, 23 & 30	No Class			
Wednesday, June 6 8:00-9:50 AM HS 133	<u>Outline:</u> I. Definitions A. Growth B. Development C. Maturation II. Adolescence and Puberty A. Adolescence/maturity/puberty B. Cardinal signs C. Secondary sexual characteristics 1. Male 2. Female III. Growth Curves A. Distance and Velocity B. Scammon's IV. Craniofacial Biology A. Introduction B. Definition C. Evolution 1. Anthropological studies 2. Development of cephalometrics, etc. V. Paradigms A. Definition of various components B. Early research (1920-1940) C. Craniofacial growth research (1940-1960) 1. Comprehensive approach 2. Structuro-functional approach D. Craniofacial biology (1960-present) 1. Moss functional matrix theory. 2. Scott cartilaginous theory. 3. Winman and Sicher sutural theory.	Kulbersh	See handout	none

DATE	TOPICS	LECTURERS	READINGS/ ASSIGNMENTS	QUIZ #
June 13	<u>Outline:</u> I. Osteology Review; calvaria, cranial base, facial skeleton II. Synchronoses and sutures of the head III. Pre-Natal Growth and Development A. Three stages of prenatal life 1. Ovum (pre-embryonic) 2. Embryonal 3. Fetal B. Overview of prenatal human development in-utero C. Morphologic changes in the craniofacial area from 10-40 weeks post-conception. III. Somato types IV. Cleft Lip and Palate: Overview of Veau classification, embryology and clinical treatment.	Kulbersh	Riolo and Avery, Chp. 2-3, pp. 97-109	Quiz 1
<p>****Instead of June 20 and 27, please attend two Thursday sessions as follows:****</p>				
Thursday, June 21 1:00-5:00 PM HS 133	1 Introduction – Why do dentists need to know genetics? Basic Principles of Genetics Transcription, Translation 2 Mutation, Variability and Regulation of Gene Expression <i>Break</i> 3 Patterns of Inheritance –Chromosomal and Mendelian, cases 4 Patterns of Inheritance – Multifactorial inheritance, cases Introduction to the Genetics Education Dental Case Simulator	Murdoch-Kinch	See handouts	Quiz 2
Thursday, June 28 1:00-5:00 PM HS 133	5 Class discussion of “Emily” <i>Break</i> 6, 7 Genetics and Common Oral Diseases – Current state of the evidence a. Facial pain b. Dental caries c. Periodontal disease d. Oral cancer e. Growth and development f. Root resorption 8 Future of genetics and dentistry Gene therapy and tissue engineering	Murdoch-Kinch	See handouts	

DATE	TOPICS	LECTURERS	READINGS/ ASSIGNMENTS	QUIZ #
July 4	Midsummer Break // Holiday			
July 11	<p><u>Outline:</u></p> <ul style="list-style-type: none"> I. Bone Growth <ul style="list-style-type: none"> A. Intramembranous B. Endochondral C. Embyology of Craniofacial bones: II. Mechanisms of bone growth <ul style="list-style-type: none"> A. Remodeling <ul style="list-style-type: none"> 1. Apposition 2. Resorption 3. Reversal lines B. Cortical Drift C. Area Relocation D. “V” Principle III. Mechanisms of Post-natal craniofacial growth <ul style="list-style-type: none"> A. Growth of the Calvaria B. Growth of the Cranial Base C. Growth of the Facial Skeleton D. Growth of the Maxilla E. Growth of the Mandible 	Kulbersh	Riolo and Avery, Chp. 2	none
July 18	<p><u>Outline:</u></p> <ul style="list-style-type: none"> I. Remodeling movements and Regional Growth Summary II. Koski: Growth sites and growth centers III. Overview of theories of craniofacial growth <ul style="list-style-type: none"> A. Classical B. Scott C. Sicher D. Moss E. Latham F. Van Limborgh G. Hunter-Enlow 	Kulbersh	Riolo and Avery, Chp. 4	Quiz 3 **Quiz 4** (on today’s lecture) will be given during the final exam hour