

Department: Oral Pathology, Radiology and Medicine

Course Title: Introduction to Clinical Oral Radiology

Course Number: 86:145

Curriculum Level: II year (Sophomore)

Course Director: Dr. A. Ruprecht

Course Contributors: Dr. V. Allareddy
 Dr. T. Bamgbose
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Students seeking academic accommodations for disabilities should contact the instructor and/or the Assistant Dean for Student Affairs.

I. COURSE DESCRIPTION

This course consists of a series of lectures that deal with the radiologic appearances of disease processes and specific diseases of concern to the dentist, and practical sessions that introduce the student to the basic technique of making intra-oral radiographs.

Although this course has a designation as a separate course, for reasons of convenience for the curriculum flow, some of the lectures are presented in conjunction with several other courses including Preventive and Community Dentistry, Operative Dentistry, Oral and Maxillofacial Surgery, and Oral and Maxillofacial Pathology. Although material covered may be examined in examinations by those departments, it may be included in any subsequent radiology examinations.

Attendance during clinic hours is mandatory, as is adherence to the College of Dentistry clinic dress code. Any planned absences must be approved by the course director and coordinated with the Radiology Supervisor (Ms. Rosemary Stanley) at least 5 working days prior to the absence. Emergency absences must be reported to the Associate Dean for Student Affairs office as soon as possible. If deemed appropriate by the course director, a doctor's note explaining the reason for absence may be required. Failure to comply could result in a failing grade. (See Remediation below)

II. SYNOPSIS OF GOALS

The student will be able to:

1. describe the radiologic appearances of developing teeth and jaws from birth to adulthood
2. describe the radiologic appearances of the more common dental developmental anomalies.
3. describe the radiologic appearances of dental caries.
4. describe the radiologic appearances of trauma to bone and teeth.
5. describe the radiologic appearances of inflammatory bone changes.
6. describe and recognize the radiologic appearances of dental resorption.
7. describe and recognize the radiologic features of benign space occupying lesions and be able to differentiate these from those of malignant lesions.
8. make a complete mouth survey using the paralleling technique.*
9. make the standardized occlusal technique radiographs*
6. set up for a pantomograph*

* Students are not permitted to make radiographs independently in the College until they have had the third year radiology rotation.

III. COURSE OUTLINE

1. Aug. 24, 2006 The Radiology of Caries
2. Aug. 29, 2006 The Radiology of Periodontal Disease
3. Jan. 4, 2007 Variations in Size, Shape and Number of Teeth I
4. Jan. 4, 2007 Variations in Size, Shape and Number of Teeth II
5. Jan. 30, 2007 Normal Radiographic Appearances Throughout Childhood
6. Jan. 30, 2007 The Radiology of Trauma to Teeth
7. Feb. 2, 2007 The Radiology of Trauma to Jaws and Related Bones
8. Feb. 2, 2007 The Radiology of Apical Problems
9. Feb. 6, 2007 Inflammation of the Jaws and Periosteal Reactions
10. Feb. 13, 2007 Resorption of Teeth
11. Feb. 27, 2007 The Radiology of Odontomas
12. Feb. 27, 2007 Radiology of the Temporomandibular Joints: I. Imaging
13. Mar. 6, 2007 The Radiology of Oral and Perioral Cysts I
14. Mar. 6, 2007 The Radiology of Oral and Perioral Cysts II
15. Mar. 20, 2007 The Radiology of Benign Neoplasms I

16. Mar. 20, 2007 The Radiology of Benign Neoplasms II
17. Mar. 22, 2007 The Radiology of Malignant Neoplasms I
18. Mar. 22, 2007 The Radiology of Malignant Neoplasms II
19. Mar. 27, 2007 The Radiology of Dysplastic Diseases I
20. Mar. 27, 2007 The Radiology of Dysplastic Diseases II
21. Mar. 29, 2007 Imaging of the Maxillary Sinuses I
22. Mar. 29, 2007 Radiology of the Maxillary Sinuses II
23. April 3, 2007 Radiology of Endocrine Disease I
24. April 3, 2007 Radiology of Endocrine Disease II
25. May 18, 2007 Final Examination Galagan A, B, C

IV. METHODOLOGY

Required Textbook

Agur, A.M.R., Dalley, A.F. Grant's Atlas of Anatomy, 11th ed. Lippincott, Williams & Wilkins, Baltimore, 2005.

White, S.C., Pharoah, M.J. Oral Radiology: Principles and Practice. 5 ed. Mosby, St. Louis, 2004.

Recommended Textbook

Curry, T.S., Dowdey, J.E. and Murray, R.C. jr. Christensen's Physics of Diagnostic Radiology, latest ed. Lea & Febiger, Philadelphia.

Selman, J. Fundamentals of X-Ray and Radium Physics, latest ed. Charles C. Thomas, Springfield.

Required Other Reading

FDA/ADA The selection of patients for radiographic examinations, 2004.
http://ada.org/prof/resources/topics/topics_radiography_examinations.pdf

Anderson, M.H., Bales, D.J. and Omnell, K.-Å. Modern Management of Dental Caries: The Cutting Edge is not the Dental Bur. JADA 124:37-44, 1993.

Bader, J.D. and Brown, J.P. Dilemmas Caries Diagnosis. JADA 124:48-50, 1993.

Hardison, J.D., Rafferty-Parker, D., Mitchell, R.J. and Bean, L.R. Radiolucent halos associated with radiopaque composite resin restorations. JADA 118:595-597, 1989.

Recommended Other Reading

Ruprecht, A. 86:145 Introduction to Clinical Oral Radiology, The University of Iowa, UPACS

V. PRE-REQUISITES AND/OR CO-REQUISITES

A. Pre-requisites

Gross Anatomy
Oral Radiology 86:120

B. Co-requisites

Basic Oral and Maxillofacial Surgery 87:130
Oral Pathology 86:135

VI. BEHAVIORAL OBJECTIVES (LECTURES)

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| 1.01 | The student will be able to describe the radiologic appearances of caries as it advances from an incipient lesion to the point of pulpal involvement. |
| 2.01 | The student will be able to describe normal periodontal appearances. |
| 2.02 | The student will be able to describe the early changes of periodontitis, as seen radiographically. |
| 2.03 | The student will be able to describe and differentiate the radiographic appearances of horizontal and vertical bone loss. |
| 2.04 | The student will be able to describe the radiologic appearances of open contacts, and how they might be masked. |
| 2.05 | The student will be able to describe the radiologic appearances of overhanging margins, and how they might be masked. |
| 2.06 | The student will be able list the major diseases to be considered in the differential interpretation of periodontitis. |

- 2.07 The student will be able describe the radiologic appearances of calculus.
3. & 4.01 The student will be able to differentiate between supernumerary and supplemental teeth.
3. & 4.01 The student will know the radiographic appearances of the more commonly encountered dental anomalies. This will be reinforced in the clinical courses.
3. & 4.02 The student will be able to describe and differentiate among dens invaginatus, dens in dente and dilated odontome.
3. & 4.03 The student will be able to describe and differentiate among the more common forms of amelogenesis imperfecta, dentinogenesis imperfecta, dentinal dysplasia, and regional odontodysplasia.
3. & 4.04 The student will be able to describe and differentiate between amelogenesis imperfecta and acquired enamel hypoplasia.
3. & 4.05 The student will be able to describe and differentiate among gemination, fusion, macrodontia and microdontia.
3. & 4.06 The student will be able to describe and differentiate among the various shapes and sizes of pulp chamber and root canal morphology.
3. & 4.07 The student will be able to describe and differentiate among the various types of extra cusps (e.g. talon cusp, dens evaginatus)
3. & 4.08 The student will be able to describe and differentiate between hypercementosis and periapical cemental dysplasia.
- 5.01 The student will know that bone and bones, as they grow and develop, change along a wide pathway. Under normal conditions, the appearance of normal bone, relative to age and sex, is such that it belongs somewhere on this path.
- 5.02 The student will be able to describe the radiographic features of developing teeth, from the soft tissue stage to completion of development, and be able to describe the appearances of erupting teeth throughout the various stages of eruption.
- 5.03 The student will be able to list the radiographic features of coronal external resorption.
- 6.01 The student will be able to describe the radiographic appearances of coronal and radicular fractures of teeth.

- 6.02 The student will be able to describe the radiographic appearances of subluxation of teeth.
- 6.03 The student will be able to describe the radiographic appearances of an osteodentin cap and explain the probable cause of such a reaction.
- 6.04 The student will be able to describe the radiographic appearances of a retained root and differentiate it from other radiopaque entities.
- 7.01 The student will be able to list the radiologic features of dislocation of the temporomandibular joints.
- 7.02 The student will be able to list the radiologic features of fracture of bone.
- 7.03 The student will be able to list the radiologic features of various potential fractures of the mandible.
- 7.04 The student will be able to list the radiologic features of various potential fractures of the midface and zygomatico-facial areas.
- 7.05 The student will be able to list the radiologic features of vertically favorable and unfavorable fractures of the mandible.
- 7.06 The student will be able to list the radiologic features of horizontally favorable and unfavorable fractures of the mandible.
- 7.07 The student will be able to describe what is meant by alignment of fracture segments.
- 7.08 The student will be able to describe what is meant by angulation of fracture segments.
- 7.09 The student will be able to describe what is meant by apposition of fracture segments.
- 7.10 The student will be able to describe the radiographic appearance of healing of fractures.
- 7.11 The student will be able to describe the radiographic appearance of hematoma.
- 7.12 The student will be able to describe the radiographic appearance of foreign bodies.

- 7.13 The student will be able to describe the radiographic appearance of electric burns.
- 8.01 The student will be able to describe the radiographic appearances of apical inflammatory lesions.
- 8.02 The student will be able to explain how cysts and granulomas can be differentiated from each other and abscesses.
- 8.03 The student will be able to describe the radiographic appearances of hypercementosis.
- 9.01 The student will be able to describe the radiographic appearances of osteomyelitis.
- 9.02 The student will be able to describe the radiographic appearances of periostitis.
- 9.03 The student will be able to describe the radiographic appearances of mucositis.
- 9.04 The student will be able to describe the radiographic appearances and probable causes of the various types of periosteal reactions.
- 10.01 The student will be able to list the radiographic features of apical external resorption.
- 10.02 The student will know that teeth, as they develop from the soft tissue to the fully mature stage have a variety of appearances, all forming the spectrum of normal development.
- 10.03 The student will be able to list the radiographic features of internal resorption.
- 10.04 The student will be able to list the radiographic features of external resorption on the buccal or lingual aspect of a tooth.
- 10.05 The student will be able to differentiate between internal resorption and external resorption on the buccal or lingual aspect of a tooth.
- 10.06 The student will be able to list the radiographic features of external-internal resorption.
- 11.01 The student will be able to list the radiographic features of an ameloblastic fibroma.

- 11.02 The student will be able to list the radiographic features of an ameloblastic fibro-odontoma.
- 11.03 The student will be able to list the radiographic features of a compound odontoma.
- 11.04 The student will be able to list the radiographic features of a complex odontoma.
- 11.05 The student will be able to list the radiographic features of a dilated odontoma.
- 12.01 The student will be able to list and describe the methods of imaging the temporomandibular joints and the advantages and disadvantages of each.
- 13. & 14.01 The student will be able to list the radiographic features of a classic cyst.
- 13. & 14.02 The student will be able to list the radiographic features of a radicular cyst.
- 13. & 14.03 The student will be able to list the radiographic features of a dentigerous cyst.
- 13. & 14.04 The student will be able to list the radiographic features of a keratocyst.
- 13. & 14.05 The student will be able to list the radiographic features of an incisive canal cyst.
- 13. & 14.06 The student will be able to list the radiographic features of a mucous retention cyst.
- 13. & 14.07 The student will be able to list the radiographic features of a simple bone cyst.
- 13. & 14.08 The student will be able to list the radiographic features of a residual cyst.
- 13. & 14.09 The student will be able to list the radiographic features of a salivary inclusion defect.
- 15. & 16.01 The student will be able to list the radiographic features of a classic benign tumor.
- 15. & 16.02 The student will be able to list the radiographic features of a classic ameloblastoma.

15. & 16.03 The student will be able to list the radiographic features of a classic adenoid odontogenic tumor.
15. & 16.04 The student will be able to list the radiographic features of a classic calcifying epithelial odontogenic tumor.
15. & 16.05 The student will be able to list the radiographic features of a hemangioma.
15. & 16.06 The student will be able to list the radiographic features of a central giant cell lesion.
15. & 16.07 The student will be able to list the radiographic features of a cancellous or compact osteoma.
15. & 16.08 The student will be able to list the radiographic features of a cementoblastoma.
- 17 & 18.01 The student will be able to list the radiographic features of a malignant lesion.
- 17 & 18.02 The student will be able to list the radiographic features of a primary squamous cell carcinoma.
- 17 & 18.03 The student will be able to list the radiographic features of a secondary (metastatic) carcinoma.
- 17 & 18.04 The student will be able to list the radiographic features of multiple myeloma.
- 17 & 18.05 The student will be able to list the radiographic features of an osteosarcoma.
- 17 & 18.06 The student will be able to list the radiographic features of a chondrosarcoma
- 19 & 20.01 The student will be able to describe and differentiate among classic appearances of the fibrous dysplasias, cherubism, Paget disease of bone, periapical cemental dysplasia and florid cemento-osseous dysplasia.
- 21.01 The student will be able to list the major diagnostic images on which the paranasal sinuses, or some of their components, may be seen, and what the major advantages or disadvantages of each are.

- 22.01 The student will be able to list and describe the appearances of the major diseases of the paranasal sinuses, especially the maxillary sinuses.
- 23 & 24.01 The student will be able to list the steps of conversion of cholesterol to 1,25 dihydroxycholecalciferol.
- 23 & 24.02 The student will be able to give the pathogenesis and radiographic features of rickets.
- 23 & 24.03 The student will be familiar with osteomalacia.
- 23 & 24.04 The student will be able to give the pathogenesis and radiographic features of renal osteodystrophy.
- 23 & 24.05 The student will be familiar with renal osteomalacia.
- 23 & 24.06 The student will be able to give the pathogenesis radiographic features of hypophosphatemic vitamin D refractory rickets.
- 23 & 24.07 The student will be able to give the pathogenesis and radiographic features of hypophosphatasia.
- 23 & 24.08 The student will be familiar with hyperphosphatasia.
- 23 & 24.09 The student will be able to give the pathogenesis and radiographic features of acromegaly.
- 23 & 24.10 The student will be able to give the pathogenesis and radiographic features of hyperparathyroidism.
- 23 & 24.11 The student will be familiar with hypoparathyroidism.
- 23 & 24.12 The student will be familiar with pseudohypoparathyroidism.
- 23 & 24.13 The student will be familiar with pseudopseudo-hypoparathyroidism.
- Practical The student will attend three Tuesday or three Thursday morning clinical sessions as scheduled by the office of the Dean. At the completion of these sessions the student will be able to place, expose, process and mount the films/radiographs of a 20 radiograph complete mouth survey (20 CMS), and expose and process a pantomograph (usually an OP-10), under faculty/staff supervision. Findings on these radiographs will be reviewed with faculty members or residents.

VII. MEASUREMENT AND EVALUATION

The student will be evaluated on the basis of continuous quizzes, which, in their entirety, will constitute 30 % of the final mark. Any missed quizzes for valid reasons of absence that have been registered with the Associate Dean for Student Affairs must be made up within 5 days of returning to the College, or a zero mark will be registered.

The final examination, which is written (objective), constitutes 70% of the final mark.

Attendance for and satisfactory completion of clinical assignments, as directed by the departmental faculty and staff is mandatory. Failure to do so, without just cause, can result in a failure. Any excused absences must be made up by arrangement with the supervisor for radiology (Ms. R. Stanley).

Continuous quizzes	30%
Final examination	70%
Clinics	<u>P/F</u>
	100%

The criteria of terminal behavior will be a grade of 70% or above on the final composite mark, a mark of over 60% (based on 100) on the final examination and a pass in the clinical component.

Grading is 90 or above = A; 80-89 = B; 70-79 = C; <70 = F. +/- is not used.

Remediation

A student who does not attend all the preclinical and clinical sessions for valid reasons (sudden illness or similar problem for the student or a member of her/his family, or who has previously arranged, with approval of the course director, to be absent for a valid reason) can arrange to have a make-up sessions for missed preclinical procedures, provided such make-up sessions are arranged as soon as possible after the problem, and are completed prior to the end of the semester, unless there is a valid reason for an extension being granted. All decisions in this regard are made by the course director, and that decision will be final.

A student who fails to achieve a passing grade may, if approved by the course director, be granted a supplemental examination. The decision will be partially based upon the course director's evaluation of the student's knowledge base, and whether a review of material by the student should allow her/him to adequately understand the material. Passing such an examination will result in a grade of C regardless of the mark achieved upon the examination. Failure will require the student to repeat the course and achieve a passing grade. A supplemental examination is not a right, nor is it automatic. Students should not plan their studies upon such a contingency.