DA A140: DENTAL RADIOGRAPHY 1

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	124010 - Dental Assistant
Units	3 Total Units
Hours	90 Total Hours (Lecture Hours 36; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

A study of the principles of x-ray production and physics, biological effects, radiation safety procedures, and monitoring. Film identification, processing and mounting procedures and introduction to the bitewing, bisection, and paralleling techniques and practical application are presented. COREQUISITE: DA A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate appropriate patient care skills and safe practices of dental x-ray equipment and utilize exposure guidelines required to produce diagnostic quality dental radiographs.

Course Objectives

- 1. Trace the progress of radiography from its discovery to present.
- 2. List and demonstrate the steps involved to set the various controls, and deactivate the dental x ray machine by exposing dental x ray film packets.
- 3. Identify the common characteristics of radiation and the various atomic and molecular structures important to radiography
- 4. Demonstrate the safe use of dental x ray equipment.
- 5. Produce a full mouth series that demonstrates diagnostic quality on manikin, using radiation safety procedures.
- 6. Differentiate the techniques for bitewing, paralleling and bisecting exposure techniques.
- 7. Explain the sub atomic structure of an atom and its relationship to the production of gamma radiation.
- 8. Prepare correct armamentarium for the dental x ray procedures.
- 9. Relate the biological hazard of radiation.
- 10. Mount a full mouth series correctly for intra oral viewing and one for extra oral viewing.
- 11. Describe the correction needed for exposure errors and processing errors.
- 12. Demonstrate the use of infection control measures while exposing a full mouth series.
- 13. Identify and describe the various sizes and types of intraoral and extra oral film.
- 14. Identify the major ingredients in processing solutions and explain the function of each.
- 15. Demonstrate the correct procedure for automatic processing.
- 16. Produce a full mouth series that demonstrates diagnostic quality on a patient, using radiation safety procedures.
- 17. Demonstrate understanding of manual processing procedures through written examination.

Lecture Content

Radiology History of X rays Radiation Physics Properties of x ray X ray generation Dental x ray machine Control panel Circuitry X ray tube Filtration and collimation Production of X Rays Effects of variation of exposure factors lab Effects of time on density Effects of M A on density Effects of KVP on contract Relationship between film target distance and exposure time Radiological concept related to dentistry Biological effects of ionizing radiation Factors influencing biological responses Somatic and genetic effects of radiation exposure Legal aspects Radiation protection and safety protocol Patient Operator Radiation monitoring system Dental x ray film Composition Speed Package components Classification Periapical Bitewing Other Processing Fundamentals of processing Traditional tank processing Automatic processing Darkroom illuminators Care/maintenance of equipment Processing procedures Film preparation Development sequence Drying principles Techniques Bisecting principles Horizontal and vertical angles Facial landmarks Use of Rinn holder Advantages and disadvantages Appropriate adaption for exposure errors Paralleling principles n bsp; Concept of parallelism Use of ring locators Rectangular collimation Advantages and disadvantages Appropriate adaption of technique for exposure errors Principles of exposure Purpose of exposure Sequence of film positioning Exposure time Film retention methods Equipment adjustment Positioning of manikin and patient Film position Cone adjustment Supplemental techniques within paralleling Anatomical Landmarks Location of general and facial anatomical landmarks Film Mounting Techniques for mounting Systems of mounting Film viewing Recognition of common anomalies Caries Restorations Common pathological conditions Ownership of dental x rays Patient vs. dental office Legal ramifications Storage of dental x ray films Duplication of dental radiographs Identification/Correction of Faulty Radiographs Incorrect position of tube head Vertical distortions Horizontal distortion Incorrect exposure factors Insufficient exposure Excessive exposure Absence of exposure Incorrect film placement Absence of anatomical structure Vertical/horizontal film placement inadequacies Incorrect processing techniques Under and over development Faulty film and proce ssing techniques 1. Radiology a. History of X?rays 2. Radiation Physics a. Properties of x?ray b. X?ray generation c. Dental x?ray machine (1) Control panel (2) Circuitry (3) X?ray tube (4) Filtration and collimation 3. Produc tion of X?Rays a. Effects of variation of exposure factors ? lab b. Effects of time on density c. Effects of M?A on density d. Effects of KVP on contract e. Relationship between film target distance and exposure time 4. Radiological concept related to dentistry a. Biological effects of ionizing radiation b. Factors influencing biological responses c. Somatic and genetic effects of radiation exposure d. Legal aspects 5. Radiation protection and safety protocol a. Patient b. Operator c. Radiation monitoring system 6. Dental x?ray film a. Composition (1) Speed Package components b. Classification (1) Periapical (2) Bitewin g (3) Other 7. Processing a. Fundamentals of processing (1) Traditional tank processing (2) Automatic processing (3) Darkroom illuminators (4) Care/maintenance of equipment b. Processing procedures (1) Film preparation (2) Development sequence (3) Drying principles COURSE

CONTENT AND SCOPE/TOPIC OUTLINE continued: 8. Techniques a. Bisecting principles (1) Horizontal and vertical angles (2) Facial landmarks (3) Use of Rinn holder (4) Advantages and disadvantages (5) Appropriate adaption for exposure errors b. Paralleling principles p; (1) Concept of parallelism (2) Use of ring locators (3) Rectangular collimation (4) Advantages and disadvantages (5) Appropriate adaption of technique for exposure errors 9. Principles of exposure a. Purpose of exposure b. Sequence of film positioning c. Exposure time d. Film retention methods e. Equipment adjustment f. Positioning of manikin and patient g. Film position h. Cone adjustment i. Supplemental techniques within paralleling 10. Anatomical Landmarks a. Location of general and facial anatomical landmarks 11. Film Mounting a. Techniques for mounting (1) Systems of mounting (2) Film viewing b. Recognition of common anomalies (1) Caries (2) Restorations (3) Common pathological conditions c. Ownership of dental x?rays (1) Patient vs. dental office (2) Legal ramifications (3) Storage of dental x?ray films (4) Duplication of dental radiographs 11. Identification/Correction of Faulty Radiographs a. Incorrect position of tube head (1) Vertical distortions (2) Horizontal distortions COURSE CONTENT AND SCOPE/TOPIC OUTLINE continued: b. Incorrect exposure factors p; (1) Insufficient exposure (2) Excessive exposure (3) Absence of exposure c. Incorrect film placement (1) Absence of anatomical structure (2) Vertical/horizontal film placement inadequacies d. Incorrect processing techniques (1) Under and over development (2) Faulty film and processing techniques

Lab Content

Have satisfactorily exposed two bitewing series on manikin using film system as required to pass this course. Have satisfactorily exposed two full mouth series on patient using film system as required to pass this course. Accurately complete all necessary patient records and health history, and have all documents evaluated by an instructor prior to exposing radiographs on a patient. Complete films with the patient name, student/operator name, date of exposure, x-ray unit settings, cubicle and number of films and retakes taken. Students evaluate their films and have an instructor complete the final evaluation, in student presence, before proceeding to the next patient. Follow appropriate infection control protocols and safety guidelines before, during and after patient exposure of radiographs. Apply all radiation safety procedures to dental equipment, operator and patient. Demonstrate OSHA regulations in infection control in radiography.

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

Instructional Techniques

1. Lecture and demonstration 2. Laboratory with manikin and patient application 3. Video and Digital presentations 4. Worksheet/student workbook 5. Reading and written assignments 6. Computer labs

Reading Assignments

Students are expected to spend a minimum of two to four hours a week outside of class reading assigned texts in preparation of class.

Writing Assignments

1. A portion of the exams and quizzes include short answer. 2. Completion of reports which include patient information (name, age, DOB...) and vital signs and other parameters, such as: medical and dental history. 3. Proficiency demonstrations include several evaluated practicum applications where students must demonstrate laboratory skills (see student evaluation section). 4. Completion of self-evaluations and instructor evaluation for each FM radiographic survey.

Out-of-class Assignments

Students are expected to spend a minimum of four hours a week on appropriate outside assignments including assigned readings in texts, outlining text material and reviewing for exams.

Demonstration of Critical Thinking

The student must pass the written radiation safety examination with 70% or better. The student will produce diagnostic quality full mouth and bitewing series on manikin to 70% or better. The student will produce diagnostic quality full mouth series on patients to 73% or better. 1. Levels of Testing: Testing will include multiple choice, written short answers, and completion type questions. This will require the student to demonstrate: a. Memory: Both total recall and recognition are necessary.b. Interpretation(1) The student must define and be able to use vocabulary specific to each radiographic study.c. Application: In the laboratory setting the student will demonstrate procedures on manikins and patients.d. Analysis: Synthesis and evaluation by both instructor and student are involved in all areas of preclinical and clinical application. 2. A mastery level 75% of theory and laboratory must be achieved in order to pass course with minimum grade of "C." The grading scale is:90% - 100% = A83% - 89% = B75% - 82% = C65% - 74% = D 3. A 50% lecture and 50% laboratory grade will be combined. A passing grade of "C" must be achieved in both laboratory and lecture.

Required Writing, Problem Solving, Skills Demonstration

1. A portion of the exams and quizzes include short answer. 2. Completion of reports which include patient information (name, age, DOB...) and vital signs and other parameters, such as: medical and dental history. 3. Proficiency demonstrations include several evaluated practicum applications where students must demonstrate laboratory skills (see student evaluation section). 4. Completion of self-evaluations and instructor evaluation for each FM radiographic survey.

Eligible Disciplines

Dental technology (dental assisting, dental hygiene): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Iannucci, Howerton. Dental Radiography Principles and Techniques, 5th Edition ed. St Louis Missouri: Elsevier, 2016 2. Required Iannucci, Howerton. Dental Radiography Principles and Techniques Workbook and Laboratory Manual, 5th Edition ed. St Louis Missouri: Elsevier, 2016

Manuals Resources

1. Myers, Joy L. . DA 140 Course Materials Packet, Copied by bookstore for student purchase , 08-25-2014