Western Technical College

10508103 Dental Radiography

Course Outcome Summary

Course Information

Description
Prepares dental auxiliary students to operate x-ray units and expose bitewing, periapical, extra oral, and occlusal images. Emphasis is placed on protection against x-ray hazards. Students also process, mount, and evaluate dental images for diagnostic value. In this course students demonstrate competency on a manikin. In addition, students expose bitewing images on a peer, role-play patient. Students gain further experience in exposing images on patients in the clinical portion of their program. This course also provides the background in radiographic theory required for students to make informed decisions and adjustments.

Career Cluster
Health Science

Instructional Level
Associate Degree Courses

Total Credits
2

Textbooks


508-103 Dental Radiography Course Manual. Western. Publisher: Western. Required.

Learner Supplies

Uniform: Black lab jacket - $22, black pants - $22, white shoes - $20-35, and safety glasses - $5.50. Vendor: To be discussed in class. Required.

Latex free exam gloves. Vendor: To be discussed in class. Required if clinic does not supply.

Success Abilities

1. Apply mathematical concepts.

2. Demonstrate ability to think critically.

3. Demonstrate ability to value self and work ethically with others in a diverse population.

4. Make decisions that incorporate the importance of sustainability.

5. Transfer social and natural science theories into practical applications.
6. Use effective communication skills.

7. Use technology effectively.

Course Competencies

1. Illustrate how dental imaging technology has progressed since its first use to the ways in which it is used in providing dental health care today

   Assessment Strategies
   1.1. by assembling a timeline identifying highlights of history of dental imaging

   Criteria
   You will know you are successful when
   1.1. you include uses, discovery, pioneers, and history of equipment and techniques
   1.2. you ensure timeline is accurate
   1.3. you exhibit correct use of terminology
   1.4. you create a timeline that is neat, well organized, legible, and reflects correct use of Standard English
   1.5. you prepare a timeline using a computer/word processor

Learning Objectives
   1.a. Define the key words
   1.b. Summarize the importance of dental radiographs
   1.c. List the uses of the dental radiographs
   1.d. Summarize the discovery of x-radiation
   1.e. List the highlights in the history of x-ray equipment and film
   1.f. List the highlights in the history of dental radiographic techniques

2. Explain how the process of exposing dental images works

   Assessment Strategies
   2.1. by labeling a diagram of a x-ray tube using proper terminology
   2.2. by presenting a written, oral, or graphic explanation of how the process of exposing images works
   2.3. by responding to scenarios presenting clinical decisions related to the process of exposing images
   2.4. by answering questions that require you to apply knowledge about this competency (Your instructor may require several written exams as a part of this course. You will be notified in advance.)

   Criteria
   Your performance will be successful when:
   2.1. your diagram is labeled accurately
   2.2. your explanation includes an accurate representation of the characteristics of x-rays
   2.3. your explanation includes an accurate representation of the basic physics of dental imaging
   2.4. your explanation includes an accurate representation of the biological effects of radiation that occurs during the process of exposing images in the dental healthcare environment
   2.5. your responses to questions about the process of exposing images are accurate and complete

Learning Objectives
   2.a. Define key terms
   2.b. Describe the general concepts and physical properties of radiation
   2.c. Describe the biological effects of radiation exposure
   2.d. Identify the component parts of the x-ray machine
   2.e. Describe the effect of kilovoltage on the quality of the x-ray beam
   2.f. Describe how the milliamperage affects the quality of the x-ray beam
   2.g. Explain how x-rays are produced

3. Apply principles of radiation safety to patient and operator

   Assessment Strategies
   3.1. by preparing to expose images on a manikin in a laboratory setting
   3.2. by responding to scenarios presenting clinical decisions related to image exposure
   3.3. by answering questions that require you to apply knowledge about this competency (Your instructor may require several written exams as a part of this course. You will be notified in advance.)
Criteria

Your performance will be successful when:

3.1. you check the integrity of the lead apron
3.2. you obtain the proper prescription for dental images for patient
3.3. you select safe exposure factors for the patient
3.4. you utilize techniques that will protect the patient from excess exposure
3.5. precautions are implemented for pregnant patients or staff
3.6. you place PID at safe distance from face
3.7. you stand at least six feet away from the x-ray unit and perpendicular to the primary ray
3.8. you incorporate ALARA for radiographic exposures

Learning Objectives

3.a. Identify the methods of patient radiation protection
3.b. Identify the methods of operator radiation protection
3.c. Identify the integrity, handling, and storage of a lead apron
3.d. Differentiate between a prescription and consent for radiographs
3.e. State the contraindications for radiographs

4. **Operate the x-ray equipment**

Assessment Strategies

4.1. in the completion of a role-play on the operation of the x-ray unit and assembling various film holders

Criteria

Your performance will be successful when:

4.1. you identify each step as you perform it as if you are explaining the process to a patient
4.2. you position yourself and role-play partner correctly
4.3. you perform all critical steps in the right order
4.4. you anticipate procedural steps
4.5. you employ safety precautions
4.6. you utilize infection control protocol
4.7. you wear personal protective equipment

Learning Objectives

4.a. Identify the component parts of the x-ray unit
4.b. Differentiate between the x-ray machines used for intra-oral and extra-oral films
4.c. Describe the purpose and the use of film holders and devices
4.d. Identify commonly used dental x-rays film holders and devices

5. **Select the film/sensor for an image**

Assessment Strategies

5.1. by responding to scenarios that require you to select the appropriate film/sensor for a variety of situations
5.2. by answering questions that require you to apply knowledge about this competency (Your instructor may require several written exams as a part of this course. You will be notified in advance.)

Criteria

Your performance will be successful when:

5.1. you identify the film/sensor you would select for each of the scenarios
5.2. you explain why the film/sensor type and size is correct for the given situation
5.3. you explain the possible consequences of selecting the wrong film/sensor

Learning Objectives

5.a. Identify the components and function of a film packet
5.b. Identify the composition of x-ray film
5.c. Explain how x-ray radiation energy is stored as a latent image
5.d. Explain the uses and handling techniques for the types of film used in dental radiography
5.e. Differentiate the need for bitewing, periapical, extra-oral and occlusal radiographs
5.f. Compare film size for bitewing, periapical, extra-oral and occlusal radiographs
5.g. Explain what determines the film speed
5.h. Explain the purpose of intensifying screens
6. **Process images of diagnostic quality**

**Assessment Strategies**
6.1. in a laboratory setting using automatic and/or digital processing equipment process images of diagnostic quality
6.2. by submitting processed images for evaluation

**Criteria**

*Your performance will be successful when:*
6.1. you check that equipment is prepared and ready for use.
6.2. you verbalize the processes you perform; identifying the parts, necessary materials, and functions of the automatic and/or digital processing equipment
6.3. processing errors are corrected and recorded
6.4. image meets standards of diagnostic quality

**Learning Objectives**
6.a. Describe the characteristics of an ideal darkroom to include location, size, lighting and equipment
6.b. Describe the composition of the processing chemicals
6.c. Discuss the parts of the processing equipment and function
6.d. Check to ensure that equipment has met quality assurance standards
6.e. Outline the step by step procedure for manual processing
6.f. Outline the step by step procedure for automatic processing
6.g. Explain the process of film duplication used in dentistry
6.h. Describe film processing problems that result from time and temperature errors
6.i. Describe film processing problems that result from chemical contamination errors
6.j. Describe the care and maintenance if the process solutions, equipment, and equipment accessories used in film processing

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7. **Produce images of diagnostic quality**

**Assessment Strategies**
7.1. in a laboratory setting using automatic and/or digital equipment produce images of diagnostic quality
7.2. by submitting images for evaluation

**Criteria**

7.1. you check that equipment is prepared and ready for use
7.2. you verbalize the processes you perform; identifying the parts, necessary materials, and functions of the automatic processing and/or digital equipment
7.3. errors are corrected and recorded
7.4. image meets standards of diagnostic quality

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8. **Manage patients during the imaging process**

**Assessment Strategies**
8.1. working with a role play partner in a simulated situation
8.2. using the patient management forms provided in the laboratory/clinical setting

**Criteria**

*Your performance will be successful when:*
8.1. you review health history, checking for contraindications
8.2. you are courteous, positive, and gentle
8.3. you explain the procedure to the patient, accurately answering questions
8.4. you answer patient’s safety questions or concerns based on factual, scientific data
8.5. you modify procedure to ensure patient comfort throughout the imaging process
8.6. you compensate for gag reflexes
8.7. you expose image
8.8. image is of diagnostic quality

**Learning Objectives**
8.a. Identify some important patient management skills for various film exposures
8.b. List examples of special need patients
8.c. Identify physical oral discrepancies
8.d. Identify some important patient management skills for the anxious patient
8.e. Identify some important patient management skills for the special need patient
8.f. Identify some important patient management skills for the patient who gags
8.g. Identify some important patient management skills for uncooperative patients
9. Use proper infection control procedures while producing images

Assessment Strategies
9.1. by using infection control techniques prior to exposure, during exposure, and following exposure on a manikin or role-play patient in a laboratory setting
9.2. by using infection control techniques processing unexposed images

Criteria
Your performance will be successful when:
9.1. you employ proper infection control techniques prior to exposure
9.2. you employ proper infection control techniques during mock film/sensor exposure
9.3. you employ proper infection control techniques following exposure
9.4. you employ proper infection control techniques during processing
9.5. without use of reference

Learning Objectives
9.a. Detail infection control procedures necessary prior to, during, and following film exposure
9.b. Detail infection control procedures necessary for film processing
9.c. Describe the infection control procedure for using a daylight loader of an automatic processor

10. Expose bitewing images

Assessment Strategies
10.1. by exposing images on a manikin or role-play patient in a laboratory setting
10.2. by submitting images
10.3. using the forms provided in the laboratory setting

Criteria
Your performance will be successful when:
10.1. you check the prescription before exposure
10.2. you record exposure accurately
10.3. you select the correct armamentarium
10.4. you position yourself and your patient correctly
10.5. you perform all critical steps in the correct order
10.6. you employ radiation safety precautions
10.7. you utilize infection control protocol
10.8. you wear personal protective equipment

Learning Objectives
10.a. you identify the purposes of exposing a bite-wing radiograph.
10.b. Show how bitewing radiographs are helpful in achieving the goals of preventative dentistry
10.c. Demonstrate correct patient position and film placement
10.d. Describe the steps for exposing a bitewing x-ray
10.e. Compare the bitewing radiograph with the periapical technique

11. Expose periapicals using the paralleling technique

Assessment Strategies
11.1. by exposing images on a manikin or role-play patient in a laboratory setting
11.2. by submitting images
11.3. using the forms provided in the laboratory setting

Criteria
Your performance will be successful when:
11.1. you check the prescription before exposure
11.2. you record exposure accurately
11.3. you select the correct armamentarium
11.4. you position yourself and your patient correctly
11.5. you perform all critical steps in the correct order
11.6. you employ safety precautions
11.7. you utilize infection control protocol
11.8. you wear personal protective equipment

Learning Objectives
11.a. State basic principles of paralleling technique
11.b. Discuss placement of film
11.c. Discuss placement of film holders
11.d. Describe placement of PID and angulation
11.e. Identify parts of film holding devices
11.f. Demonstrate proper patient positioning for film exposure

12. Expose periapicals and occlusals using the bisecting angle technique

Assessment Strategies
12.1. by exposing images on a manikin or role-play patient in a laboratory setting
12.2. by exposing an occlusal image on a manikin or role-play patient in a laboratory setting
12.3. by submitting images
12.4. using the forms provided in the laboratory setting

Criteria
Your performance will be successful when:
12.1. you check the prescription before exposure
12.2. you record exposure accurately
12.3. you select the correct armamentarium
12.4. you position yourself and your patient correctly
12.5. you perform all critical steps in the correct order
12.6. you employ safety precautions
12.7. you utilize infection control protocol
12.8. you wear personal protective equipment

Learning Objectives
12.a. State basic principles of bisecting technique
12.b. Compare the essential characteristics between paralleling and bisecting techniques
12.c. Discuss placement of film
12.d. Discuss placement of film holders
12.e. Describe placement of PID and angulation
12.f. Identify parts of film holding devices
12.g. Demonstrate proper patient positioning for film exposure
12.h. List the uses of the occlusal exam.
12.i. State the purpose of localization techniques

13. Illustrate how extraoral images integrate with the use of intraoral images in dentistry

Assessment Strategies
13.1. by creating a chart comparing panoramic, extraoral and digital images
13.2. working with a group of your peers

Criteria
Your performance will be successful when:
13.1. chart identifies all types of extraoral images
13.2. chart compares similarities and differences of each type of technique
13.3. chart compares equipment needed for each type of technique
13.4. chart compares the advantages and disadvantages for each technique
13.5. chart neat, well organized, legible, and reflect correct use of Standard English language

Learning Objectives
13.a. Describe the uses and purpose of panoramic radiography
13.b. Describe the equipment used in panoramic radiography
13.c. Discuss the advantages and disadvantage panoramic radiography
13.d. Describe the uses and purpose of extraoral radiography
13.e. Describe the equipment used of extraoral radiography
13.f. Describe the uses and purpose of digital radiography
13.g. List and describe the equipment used in digital radiography
13.h. List and describe the three types digital radiography
13.i. List and discuss the advantages and disadvantage digital radiography

14. Mount images using anatomical landmarks

Assessment Strategies
14.1. by submitting correctly mounted images
14.2. by demonstrating optimal viewing conditions
14.3. in the lab using given materials and equipment

Criteria
Your performance will be successful when:
14.1. you demonstrate methods for film/digital mounting
14.2. images are mounted at the appropriate point in the process for films and in the correct sequence for digital
14.3. images are mounted using the recommended method
14.4. image integrity is maintained throughout this process
14.5. images are labeled accurately and according to required standards
14.6. you demonstrate optimal viewing conditions and explain the importance of these conditions

Learning Objectives
14.a. List reasons to use a film mount
14.b. Describe the labeling information used on the film mount
14.c. Identify the equipment necessary for viewing the mounted x-ray
14.d. Identify the anatomic landmarks used in film mounting
14.e. Describe the step by step procedures for film mounting
14.f. List the methods of film mounting

15. Evaluate images for diagnostic value

Assessment Strategies
15.1. by completing a checklist of dental imaging evaluation on a manikin or patient
15.2. in a skill demonstration in a clinical/laboratory setting

Criteria
Your performance will be successful when:
15.1. checklist includes all critical errors in the information or process
15.2. checklist includes positioning, exposure errors, processing errors
15.3. checklist includes recommendations for correcting the identified errors
15.4. checklist includes an analysis of the effect of the errors on the diagnostic value

Learning Objectives
15.a. List the visual characteristics of an acceptable radiograph
15.b. Define radiographic characteristics of density and contrast
15.c. Explain the quality control procedures necessary in dental radiographs
15.d. Given a radiograph of poor quality, identify the cause of errors
15.e. Recognize radiograph errors and explain how to correct

16. Interpret dental imaging findings

Assessment Strategies
16.1. by interpreting images using the form provided
16.2. without the use of references

Criteria
Your performance will be successful when:
16.1. you accurately identify normal anatomy
16.2. you accurately identify dental caries
16.3. you accurately identify periodontal disease
16.4. you accurately identify traumatic injuries
16.5. you accurately identify periodontal lesions

Learning Objectives
16.a. Explain the differences between interpretation and diagnosis of radiographs and who performs these functions
16.b. Describe dental caries
16.c. Explain why caries appear radiolucent on a dental radiograph
16.d. Identify specific radiographic finding - i.e. abscess, resorption, fractures