

Oregon Board of Dentistry  
Unit 23  
PO Box 4395  
Portland, Oregon 97208-4395  
(971) 673-3200

**APPLICATION FOR APPROVAL AS AN INSTRUCTOR  
IN RADIOLOGIC PROFICIENCY FOR DENTAL ASSISTANTS  
Instructor Permit Fee \$40**

NAME OF PERSON CONDUCTING COURSE:  
(NAME OF SCHOOL AFFILIATED WITH, IF APPLICABLE)

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MAILING ADDRESS: \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

PLEASE LIST QUALIFICATIONS BELOW AND SUBMIT COPIES OF CURRENT LICENSES AND/OR  
CERTIFICATES THAT APPLY:

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INSTRUCTOR QUALIFICATIONS:

Instructors should have background in and current knowledge of dental radiology, and shall have passed either the American Dental Association's National Board examination or the Radiation Health and Safety examination conducted by the Dental Assisting National Board (DANB). Instructor must have one of the following credentials:

- Dentist with an Oregon license;
- Dental Hygienist with an Oregon license; or
- Dental Assistant holding an Oregon Certificate of Radiological Proficiency and continuous employment for the past two years as a chairside assistant or in an educational setting with taking of radiographs as a primary function.

You may obtain information about the written Radiation Health and Safety Examination from DANB by calling 1-800-367-3262.

I certify this application is correct and agree to teach the course to the goals and objectives outline provided in the course description.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

**OREGON BOARD OF DENTISTRY  
1600 SW 4<sup>th</sup> AVENUE  
SUITE 770  
PORTLAND, OR 97201  
971-673-3200**

**RADIATION USE AND SAFETY COURSE FOR DENTAL ASSISTANTS**

**I. COURSE DESIGN and REQUIRED COMPONENTS**

This course should be presented in a series of lectures and discussion followed by a practical application of principles in the dental setting.

All persons taking radiographs shall follow the correct infection control protocol.

This course offers instruction regarding operator training as required by the State of Oregon, Health Division, "Rules for the Control of Radiation:"

*OAR 333-106-055 (1) The registrant shall assure that individuals who will be operating the X-ray equipment shall have adequate training in radiation safety. Adequate training in radiation safety means instruction in the following subjects:*

- (a) Nature of X-rays*
- (b) Interaction of X-rays with matter*
- (c) Radiation units*
- (d) Principles of the X-ray machine*
- (e) Biological effects of X-ray*
- (f) Principles of radiation protection*
- (g) Low dose techniques*
- (h) Applicable radiation regulation including those portions of Divisions 100, 101, 103, 106, 111 and 120.*
- (i) Darkroom and film processing*
- (j) Film critique"*

**Required Course Components**

This course must include sufficient material and allotted time to adequately cover the requirements of OAR 333-106-055 as explained above and sufficient information regarding techniques of dental radiology to assure that the dental assistant can practice safely in the dental office and in accordance with all Oregon laws and rules regarding operation of x-ray machines and taking of radiographs on actual patients.



This course is only one of three parts necessary to receive an Oregon Certificate of Radiological Proficiency. Oregon Administrative Rule 818-042-0060 states the three steps to obtaining a certificate:

- *Complete a course of instruction in a program accredited by the Commission on Dental Accreditation of the American Dental Association or other course of instruction approved by the Board;*
- *Pass a clinical examination\*; and*
- *Pass the Dental Radiation Health and Safety (RHS) examination administered by the Dental Assisting National Board, Inc. (DANB).*

*\* Instructions regarding Oregon's clinical examination can be obtained from DANB (1-800-367-3262).*

### **Suggested Texts:**

"Radiographic Imaging for Dental Auxiliaries", Third Edition, Miles.  
"Fundamentals of Dental Radiography", Third Edition, Manson-Hing.  
"Radiology for Dental Auxiliaries", Seventh Edition, Frommer.

## **II. INSTRUCTOR QUALIFICATIONS**

Instructors should have background in and current knowledge of dental radiology, and shall have passed either the American Dental Association's National Board examination or the Radiation Health and Safety examination conducted by the Dental Assisting National Board (DANB). Instructor must have one of the following credentials:

- Dentist with an Oregon license;
- Dental Hygienist with an Oregon license; or
- Dental Assistant holding an Oregon Certificate of Radiological Proficiency and continuous employment for the past two years as a chairside assistant or in an educational setting with taking of radiographs as a primary function.

## **III. APPROVED CURRICULUM**

### **A. THE DISCOVERY AND HISTORY OF X-RADIATION**

#### Instructional Goals:

The goal is to develop knowledge and understanding of the discovery, adaptation and use of x-radiation and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Name the discoverer of x-radiation and the date this discovery was made;
2. Describe the early use and experimentation with x-radiation for dentistry in America and Europe; and
3. Describe the physiological effects of x-radiation on those who first worked with radiation and the effects on operators today.

**B. RADIATION PHYSICS**

*Relates to OAR 333-106-055 (1) (a) Nature of x-rays; (b) Interaction of x-rays with matter; and (f) Principles of radiation protection.*

Instructional Goals:

The goal is to develop understanding and knowledge of the physical properties of radiation and its interaction with other matter and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Describe the detailed structure of an atom;
2. Explain the ionizing process and name two types of ionizing radiation;
3. Describe the characteristics of electromagnetic radiation and relate this information to a diagram or picture of the spectrum;
4. Explain the inverse square law and how it is applied in dental radiology;
5. Compare the properties of x-radiation with those of light;
6. Describe the difference of x-ray absorption between lead and acrylic; and
7. Explain the difference between primary and secondary radiation.

**C. BIOLOGICAL EFFECTS OF RADIATION AND X-RAY PROTECTION**

*Relates to OAR 333-106-055 (1) (e) Biological effects of x-rays; (g) Low dose techniques; and (h) Applicable radiation regulation.*

Instructional Goals:

The goal is to develop understanding of the biological effects of x-radiation, knowledge of protective devices and skill in the use of "Regulations for Control of Radiation" of the State of Oregon and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Describe the short and long range biological effects of radiation on living cells and tissues according to:
  - a. least and most sensitive tissues
  - b. acute and chronic exposure
  - c. latent period
  - d. cumulative effects;
2. Describe the nature, application and protective results of the following:
  - a. long versus short cone
  - b. collimator
  - c. aluminum filter
  - d. speed factor of the film
  - e. lead apron with or without a cervical collar;
3. Describe the implications of film distance;
4. Describe the appropriate design and wall structure of operatories;
5. Describe proper operator techniques needed to prevent operator exposure;
6. Explain the use of the film badge;
7. Explain the importance of an accurate and recent health history and describe conditions that would limit patient exposure;
8. Describe precautions necessary for a pregnant patient or operator at various stages of the pregnancy;
9. Demonstrate an understanding of the need to reduce errors and film retakes; and
10. Explain the reasons for a "radiation survey" and list the "Oregon State Safety Rules."

**D. THE DENTAL X-RAY UNIT**

*Relates to OAR 333-106-055 (1) (c) Radiation units; and (d) Principles of the x-ray machine.*

Instructional Goals:

The goal is to develop understanding and knowledge of the components that are essential for generation and control of x-radiation and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Identify the primary source of energy for an x-ray machine;
2. Define voltage and amperage;
3. Explain the use of the transformer;
4. Label all the components of the x-ray tube on a diagram;
5. Explain how high voltage electrical current affects the cathode and anode;
6. Identify the main source of electrons in the x-ray tube and explain why a transformer is needed;
7. Describe "thermionic emission effect;"
8. Label a diagram showing the conversion of electrical energy to x-radiation; and
9. Explain radiation units, i.e., sieverts and grays.

**E. DENTAL X-RAY MACHINE FUNCTION/OPERATION**

*Relates to OAR 333-106-055 (1) (d) Principles of the x-ray machine.*

Instructional Goals:

The goal is to develop knowledge and skill in the function and operation of the three basic parts of the x-ray machine: the control panel, tube head and indicating device and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Demonstrate and explain the operation of the control panel and exposure switch, timer calibration in impulses;
2. Demonstrate horizontal and vertical angulation;
3. Discuss the advantages and disadvantages of the following indicating devices:
  - a. closed cone
  - b. short and long cylinder
  - c. rectangular indicator
4. Demonstrate manipulation of the indicating device.

**F. DENTAL X-RAY FILM**

*Relates to OAR 333-106-055 (1) (g) Low does techniques.*

Instructional Goals:

The goal is to develop knowledge of the characteristics of the x-ray film base and emulsion and skill in handling the different sizes of screen and non-screen films, storage and record keeping and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Identify screen and non-screen film and describe their use;
2. Identify various sizes of intra and extra oral film and describe the appropriate uses for each size;
3. Describe the advantages and disadvantages of low, high and ultra speed films;
4. Define and describe film base and emulsion;

5. Explain the reaction of the emulsion to exposure to an x-ray beam;
6. Identify other sources of energy that also affect film emulsion;
7. Differentiate between paper and polyester packets and explain the color coding;
8. Describe film shelf-life according to storage conditions;
9. Describe the uses of double-file packets; and
10. Explain the use and composition of duplicating film.

## **G. INTRA-ORAL RADIOGRAPHIC TECHNIQUES**

### Instructional Goals:

The goal is to develop skill in the intra-oral placement of film and cone positioning, using both paralleling and bisecting techniques, to produce diagnostic quality radiographs of both adult and child dentition and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Demonstrate an understanding of tooth anatomy and alignment., Especially as it relates to the long axis of teeth, proximal contacts, occlusal relationships, root positions and root length;
2. Demonstrate knowledge and correct placement of various types of film holders and tabs;
3. Select appropriate film size for specific exposures and according to the patient's mouth;
4. Select the appropriate exposure time, ma and kvp based upon physiological variables;
5. Demonstrate proper film placement and cone positioning for each film in a full-mouth series according to paralleling and bisecting techniques;
6. Demonstrate the ability to adapt film placement and cone positioning when oral anatomy interferes with standard techniques;
7. Utilize all safety techniques previously learned to reduce radiation exposure to both the operator and patient;
8. Identify exposure errors in processed film;
9. Describe measures needed to correct exposure errors; and
10. Demonstrate all of the above points by exposing 4 fmx's on dexter.

## **H. THE DARKROOM**

*Relates to OAR 333-106-055 (1) (i) Darkroom and film processing.*

### Instructional Goals:

The goal is to become familiar with darkroom equipment and supplies and to develop skill in darkroom maintenance and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Explain the nature and purpose of the safe light and describe the results of light "leaks";
2. Describe the structure, arrangement and general contents of processing tanks;
3. Describe the chemical components of developing and fixing solutions, explaining the differences between powder and liquid concentrates;
4. Describe how solutions become exhausted and how often additional chemicals can be added to old solutions to replenish them;
5. Explain the need for changing solutions and cleaning tanks;
6. Explain the need for water circulation and temperature control;
7. Demonstrate use of film holders; and
8. Describe the advantages and disadvantages of automatic film processing.

## **I. FILM PROCESSING AND MOUNTING**

*Relates to OAR 333-106-055 (1) (i) Darkroom and film processing.*

### Instructional Goals:

The goal is to develop knowledge and skill in the processing and mounting of dental radiographs and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. List the four basic steps in film processing;
2. Describe the effects of time and temperature variables during processing on dental x-ray film;
3. Demonstrate the ability to properly unwrap and clamp film to processing holders, properly labeling each holder;
4. Properly process exposed film according to the process described in items "1" and "2" above;
5. Identify processing errors when present and how to correct them;
6. Select an appropriate film mount for the number and type of processed radiographs;
7. Mount dental radiographs correctly to arch, quadrant and tooth sequence;
8. Identify and correct errors in film mounting and explain possible consequences of those errors; and
9. Describe the use and maintenance of view boxes.

## **J. RADIOGRAPHIC INTERPRETATION**

*Relates to OAR 333-106-055 (1) (j) Film critique.*

### Instructional Goals:

The goal is to develop knowledge and skill in identifying diagnostic qualities of radiographs; recognition of normal and abnormal oral conditions; and to understand the ethical and legal implications of radiographs and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Describe and identify the following radiographic qualities and list the basic factors which can influence these qualities:
  - a. density
  - b. contrast
  - c. image sharpness and shape
  - d. shadow casting
2. When given a film that is not diagnostic relative to factors listed in item number 1 (above), identify the errors and describe the causes;
3. Relate exposure errors to radiographic interpretations;
4. Identify major oral landmarks and normal oral conditions on radiographs; and
5. Describe the legal and ethical implications of dental radiographs according to:
  - a. the dental history and record
  - b. treatment planning
  - c. ownership
  - d. patient identification
  - e. referral/ consultation
  - f. disagreement/ legal action

## **K. ADDITIONAL RADIOGRAPHIC TECHNIQUES**

### Instructional Goals:

The goal is to develop knowledge and skill in additional radiographic techniques and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to demonstrate techniques used for periapical film placement other than the use of a film holder with cone guide and describe advantages and disadvantages of each of the following:

1. Cotton roll/ hand-held,
2. Hemostat,
3. Bite blocks (wood and plastic); and
4. Snap-a-Ray

## **L. BASIC SKILL DEVELOPMENT**

### Instructional Goals:

The student will be able to ensure mastery of previously learned information and skills and increase proficiency and efficiency and to relate this information directly and/ or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Correctly identify major oral landmarks as seen on any intra or extra oral film;
2. Analyze the quality of dental radiographs relative to exposure and development and describe corrections as needed;
3. Demonstrate the ability to expose periapical and bitewing film on manikins, using techniques previously taught;
4. Increasing accuracy and speed on all skills; and
5. Demonstrate the ability to solve problems independently.

## **M. DENTAL RADIOGRAPHY FOR PATIENTS**

### Instructional Goals:

The goal is to apply all previously learned knowledge and skills to the exposure and development of patient dental radiographs and to relate this information directly and/or indirectly to "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Read and correctly interpret an order from a dentist requesting patient x-rays;
2. Read, interpret and correctly respond to items found in the patient's medical and dental histories as related to radiology;
3. Demonstrate consistent application of standards as described in the Oregon Health Division publication "Oregon Rules for the Control of Radiation;"
4. Demonstrate consistent understanding and application of the principles of safety and the prevention of disease transmission;
5. Demonstrate understanding of the Oregon rules and regulations that apply to dental radiography;
6. Demonstrate professional courtesy and standards when working with patients;

7. Place, expose, develop and mount radiographs utilizing increasing proficiency and efficiency, especially as related to:
  - a. correct patient management
  - b. selection of film and technique
  - c. unit settings
  - d. correct film placement and exposure to reduce the number of needed retakes
  - e. correct processing and mounting of film;
8. Identify errors and make corrections on needed retakes;
9. Record all important information in the patient's chart at the time of appointment and obtain necessary signatures;
10. Demonstrate film placement and stabilization in edentulous areas; and
11. Select and expose films utilizing various film placement and tube angulation to meet a specific problem, i.e.:
  - a. crowded or overlapping teeth
  - b. excessively long roots
  - c. impacted teeth
  - d. small mouth/constricted arch
  - e. shallow palate/floor of the mouth
  - f. presence of tori
  - g. small child, age 4 or under

## **N. ALTERNATIVE RADIOGRAPHIC TECHNIQUES**

### Instructional Goal:

The goal is to develop knowledge and skill in alternative radiographic techniques and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Describe occlusal film technique according to type of film, placement and exposure Angulation;
2. Identify and describe situations where occlusal film would be appropriate;
3. Compare diagnostic usefulness of occlusal film compared to periapical film. Identify the various essential parts of a panoramic machine;
4. Describe the advantages and disadvantages of panoramic film;
5. Load and unload panoramic film cassettes;
6. Properly position patients of varying ages and sizes in the panoramic chair and unit and expose the film;
7. Identify panoramic film problems and describe needed corrective measures;
8. Describe additional extra-oral film techniques and their uses;
9. Describe dental radiographic procedures used in endodontics procedures and explain how root images can be separated; and
10. Correctly expose radiographs using distal oblique and mandibular third molar techniques.

## O. PATIENT MANAGEMENT

### Instructional Goal:

The goal is to develop awareness and skill in patient management needed to obtain diagnostic dental radiographs and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Explain the importance of communicating with the patient at an understandable level, including:
  - a. explaining why disabled patients and geriatric patients must be treated with courtesy and respect;
  - b. describing "show and tell" method of communication.
  - c. explaining why the operator should pay attention to the patient during radiography.
2. Discuss patient management problems and techniques associated with:
  - a. the very young
  - b. the elderly
  - c. patients who are afraid or uncooperative
  - d. the handicapped patient.
3. Discuss the questions patients ask about dental radiography and how some questions can be answered by the auxiliaries and others only by the dentist.

## P. BASIC RADIOGRAPHIC INTERPRETATION

### Instructional Goal:

The goal is to develop introductory level knowledge and skill in the interpretation of radiographic findings and to relate this information directly and/or indirectly to patient and operator "Radiation Health and Safety."

To meet this goal the dental auxiliary will be able to:

1. Identify unerupted and missing teeth of both primary and permanent dentition;
2. Identify in general terms the type of dental work present in the mouth;
3. Locate and describe oral lesions according to radiolucency, capacity, size and location; and
4. Demonstrate correct charting and recording of radiographic findings as directed by the dentist.

