

**STARK STATE COLLEGE  
DENTAL HYGIENE PROGRAM**

**RADIATION PROTECTION AND INSTRUCTION MANUAL**

Radiation Protection and Instruction Manual (pages 1-5)

Safe Operating Procedures (page 6)

Notice to Employees (page 7)

**INTRODUCTION**

The purpose of this manual is to ensure the proper and safe utilization of all radiographic equipment in the Dental Hygiene Department of Stark State College. This manual will increase awareness of our faculty, staff, and students and benefit our patients. This manual complies with the Ohio Administrative code 3701-33-22 (A). The rule states, "Each registrant shall inform individuals working in or frequenting any portion of a restricted area of the occurrence of radiation or radiation sources in such portions of the restricted area; shall instruct such individuals in the safety problems associated with exposure to such radiation sources and in precautions or procedures to minimize exposure; shall instruct such individuals in the applicable rules for the protection of personnel from exposure to radiation or radioactive materials; and shall advise such individuals of reports of radiation exposure which those individuals may request pursuant to this rule."

**WHY IS THIS EDUCATIONAL PROGRAM CONCERNED ABOUT RADIATION?**

X-Rays are a type of high-energy production called ionizing radiation. Unlike other electromagnetic radiation, x-rays are capable of penetrating and interacting with materials causing ionization. Ionization causes individual atoms and molecules to split apart in the human body.

Different tissues and organs in the body will vary according to their sensitivity to x-rays. The cells most sensitive to radiation are: small lymphocyte, bone marrow, reproductive cells, and immature bone.

All ionizing radiation is hazardous and cause biological changes in living tissues. Therefore, it is very important that the necessary precautions are taken to assure adequate protection for the patient and the operator.

Individuals are exposed to all types of artificial and natural sources of radiation daily. Most of the effects of radiation are indirect, and our bodies are capable of repairing much of the damage that can occur. However, there are limits to our body's ability to repair damage from all types of radiation. Therefore, limits have been established for occupational exposure. These limits can be referenced in the Ohio Department of Health's Radiation Protection Rules.

The public may have real or unwarranted concerns about the needs for radiation for diagnostic or treatment purposes. Therefore, it is essential that optimal safety features be incorporated into the facility, equipment and technique and that student, faculty and staff operators be knowledgeable about radiation protection and be able to discuss these issues with patients.

## **LOCATION OF RADIOGRAPHIC SUPPLIES, EQUIPMENT, AND DOCUMENTS**

The locations of the radiographic supplies, equipment, and documents for the Dental Hygiene Program at Stark State College are as follows:

1. Intraoral radiograph equipment is located in Dental Hygiene Radiography Rooms 1 and 2. The extraoral (panoramic) equipment is located in the Dental Hygiene Clinic in Room H100B.
2. These areas are restricted and are clearly identified with room numbers and caution labels.
3. Automatic and manual processors are located in the Dental Hygiene Clinic Darkroom H101A.
4. A practice manikin is located in each Radiography Room (1 and 2).
5. All radiographic exposures must be made with the operator outside the room to eliminate any measurable exposure to the operator.
6. No one other than the patient will be in the x-ray room during a radiographic exposure.
7. A lead apron with a thyroid collar is located in each radiography room.
8. A panoramic style apron is located in the panoramic room.
9. Radiographic film used during clinic hours is secured in a cabinet in the faculty office (H100A) and is dispensed by the supervising dentist.
10. Stock radiographic film is stored in a room temp, dry place in the faculty office cabinet (H100A)
11. Radiation exposure reports are maintained in the clinic reception area: the most current report in kept in the Radiation Safety; past reports on file
12. The Safe Operating Procedures and the Ohio Department of Health “Notice to Employees” are posted in the two radiography rooms and in the darkroom and are attached to the Manual.
13. The master copy of the Radiation Protection and Instruction Manual (Manual) is located in the Radiation Safety Notebook. A copy of the Manual is provided to each student, faculty and staff.
14. A copy of the Ohio Administrative Code is posted on the bulletin board in the darkroom, which is visible to all students, faculty, and staff.
15. The current equipment registration certificate is posted in the Panoramic Room.
16. The Quality Assurance Plan for equipment is located in the Radiation Safety Notebook; current schedules of processing equipment maintenance are posted in the darkroom by the equipment.

## **MINIMIZING RADIATION EXPOSURE**

Exposure to the patient and operator can be kept to a minimum by keeping the exposures as low as reasonably achievable using the following patient and operator techniques:

1. Clinical faculty must read (as validated by signature) the Radiation Protection and Instruction Manual and hold an appropriate license relative to the exposure of radiographs.
2. Only dental hygiene students who have successfully completed the Radiography DHY123 course, or are enrolled in it and/or dental assisting students who have successfully completed the Radiation Safety Quiz are permitted to operate the radiography equipment. SSCT employees who are appropriately licensed dental personnel may also operate the equipment.
3. Use the fastest film speed available (fall 2003 → F Speed)
4. Use proper filtration (2.5 mm when over 70 kVp).
5. Use proper collimation for small beam size.
6. Use only open-ended, lead lined position indicating device (cone).
7. Use the long cone position indicating device when possible.
8. Use a film holder of some type (other than the human finger).
9. Use proper film exposure and processing techniques.
10. Limit retakes to four per full mouth series under direct supervision of a licensed practitioner.
11. Avoid exposing radiographs on a patient who is, or may be pregnant.
12. In every case, final determination for prescribing radiographs is by authority of a licensed dentist and is based individual needs.
13. Reinforce notice to pregnant patients posted in each Radiograph Room.

## **MONITORING EXPOSURE TO RADIATION**

1. 90-day area monitor badges are used to monitor maximum individual exposure to radiation.
2. Area monitoring badges are affixed to maximum exposure areas outside each room where radiograph are exposed.
3. Badges are exchanged quarterly and reports are available to all students and faculty during business hours. Reports are maintained in the reception area.
4. The Clinic Facilities Specialist is responsible for exchanging the badges and maintaining the reports.

## **RADIATION OVEREXPOSURE POLICY**

**In the event of notification of a positive reading through the dosimetry service, the following steps will be taken immediately for the safety and well-being of faculty, staff, students, and patients:**

1. Determine how many area badges were identified as being “overexposed” by doing one or both of the following:
  - (a) inquire when notification phone call is received
  - (b) analyze the written report
  
2. Immediately call for service. Cease taking radiographs with the unit in the specific problem area until safe operation is validated. Continue taking radiographs using any unaffected units. *In the event that use of one of more units must be ceased while awaiting service and/or repair, a sign reading “DO NOT USE THIS X-RAY UNIT” will be clearly posted on the affected unit(s).*
  
3. Document, in writing, the nature and date of any positive findings, and actions taken, and place in the Radiation Safety Notebook. Insert a copy of the service report with findings and repair notes. Service report with positive findings should include a statement that the unit is now safe to operate. If applicable, complete a copy of the Ohio Department of Health “Confidential Presumptive Overexposure Report” and submit within 10 days of the findings.

**In the event of notification through a professional inspection of radiation generating equipment that a unit does not meet safety standards, the following steps will be taken:**

1. Cease exposing radiographs with the problem unit(s) until safe operation is validated. Continue exposing radiographs with units that are not problematic, if available. \*
  
2. Schedule an immediate service call and authorize repair or replacement, as necessary.
  
3. Insert a copy of the service report with findings and repair notes and/or evidence of the purchase of new equipment. (If new equipment is required, file appropriate notice with the Ohio Department of Health)

## **DEPARTMENT RULES FOR RADIATION SAFETY AND PROTECTION**

The radiation protection policies have been developed specifically for the Dental Hygiene Department and are detailed in the previous sections of this document.

1. Location of the radiographic equipment and supplies.
2. Use of the lead apron with the thyroid collar for intraoral exposures; use of the panoramic lead apron for panoramic exposures.
3. Minimizing exposure to radiation.
4. Quality Assurance Plan for RGE's and radiograph processing equipment.
5. Monitoring of radiation exposure.
6. Managing reported radiation overexposure / failed inspections

### **ALL FACULTY, STAFF, AND STUDENTS WHO EXPOSE AND PROCESS RADIOGRAPHS IN THE DENTAL HYGIENE FACILITY MUST:**

1. Read and practice the Safe Operating Procedures.
2. Read and follow the Radiation Protection and Instruction Manual.
3. Read and practice the related provisions in the Ohio Administrative Code
4. Read and understand the "Notice to Employees".
5. Tour and be instructed (self or group) using the "Instruction to Workers" document.
6. Verify compliance with all of the above by placing signature on file.
7. Verifying knowledge of alterations to the current information by reading and validating by signature document revisions.

**SAFE OPERATING PROCEDURES (S.O.P.)**  
**STARK STATE COLLEGE OF TECHNOLOGY (SSCT) DENTAL HYGIENE PROGRAM**

1. Each individual operating the x-ray machine will read/be instructed in the applicable provisions of the Ohio Radiation Protection Standards and the program's safe operating procedures prior to initially operating the x-ray machine.
2. Neither the instructor nor student will hold patient films during exposure, nor will any other individual be regularly used for this service. Film holding devices will be used on both patients and manikins. Only the patient will be present in the room during an x-ray examination (procedure).
3. Neither the tube housing nor the cone will be hand-held during exposure.
4. During each exposure, the individual operating the x-ray machine will stand at least six (6) feet from the patient. Only the patient will be in the useful beam. When exposing radiographs in the Dental Hygiene Clinic, the operator must exit the radiography operatory and stand behind a leaded wall. When exposing panoramic radiographs, the operator must exit the room and close the door. The exposure switch location for all x-ray equipment prohibits activation inside the room.
5. Gonadal and thyroid shielding is required for all intraoral exposures on all patients regardless of age or number of exposures. Gonadal shielding is required for all panoramic exposures.
6. No radiographs will be exposed on a pregnant patient or one suspicious of being pregnant.
7. X-ray examinations will be performed only as ordered by a licensed dentist.
8. Exposure of a student's first three patients will be performed only under direct supervision by a licensed dental professional. Exposures on a manikin may be performed under direct or indirect supervision by a licensed dental professional.
9. With few exceptions, retakes on patients are limited to a maximum of four. Each retake is taken only under the direct supervision of a licensed dental professional.
- \*\*10. The following guidelines will be followed regarding exposure of assessment radiographs on patients (after review of the current medical and dental history):
  - All radiographs, including retakes, must be authorized by a licensed dentist.
  - Four bitewings may be taken if none has been taken in the past six months.\*
  - A complete series (fall '05: 15 periapicals/4 bitewings) may be taken if one has not been taken in the past three years.\*
  - Bitewings may be taken either as a separate entity or as part of a complete series, but not both.\*
  - With few exceptions retakes are limited to a maximum of four and are directly supervised by a licensed dental professional.
  - Radiographs will be mounted, labeled and placed on file with the department.
  - Upon request, duplicate radiographs (fee required) may be made and sent to a patient's dentist or hand carried by the patient.\*\*IN ALL CASES, FINAL DETERMINATION FOR RADIOGRAPHS WILL BE BASED ON INDIVIDUAL PATIENT NEEDS AND THE PRINCIPLES OF ALARA as stated in Haring and Jansen, Dental Radiography: Principles and Techniques, Saunders, Philadelphia (most recent edition)
11. Those authorized to use x-ray equipment are the Dental Hygiene Personnel licensed to operate x-ray equipment in Ohio and eligible dental hygiene students enrolled in or having completed DHY123, Dental Radiography and dental assisting students enrolled in SSCT's continuing ed program who have successfully completed the Radiation Safety Quiz.
12. Ohio Radiation Protection Rules and Ohio Department of Health Notice to Employees are posted in the darkroom. An exposure technique chart and additional Employee Notice are posted in each radiography room.
13. Types of radiographs taken in this facility include: periapical, bitewing, occlusal and panoramic.
14. Area monitoring is placed at each radiation generating unit. It will monitor maximum possible exposure for any individual. Quarterly reports are located at the Reception area of the clinic.
15. Employees and students are limited to .05 Sv of occupational exposure per calendar year.
16. Facility areas have been designed for the purpose of controlling exposure and are designated as such.
17. Film may be processed using either automatic or manual technique. Technique instructions are posted in the darkroom.
18. In the case of an unusual event, the Director, Patient Care Services, should be notified immediately at extension 4307. The same individual should also be contacted if an employee has questions concerning these policies or radiation protection.
19. Panoramic radiograph service is provided on a limited basis for non-SSCT clinic patients **only** by request, in writing, of the patient's dentist of record. The film is evaluated for quality by clinic faculty and forwarded to the requesting dentist. A copy is not retained by the SSCT clinic. A panoramic film will not be exposed on a patient who is or may be pregnant.

Rev. 08/15/03, 03/10/06,08/24/06

# OHIO DEPARTMENT OF HEALTH NOTICE TO EMPLOYEES

In radiation protection rules adopted under Chapter 3748 of the Ohio Revised Code, the Ohio Department of Health has established standards for your protection from radiation sources which are required to be licensed/registered with the Ohio Department of Health.

## **YOUR EMPLOYER'S RESPONSIBILITY**

Your employer is required to:

- 1) Inform you of the occurrence of radiation or radiation sources and the presence of a restricted area;
- 2) Instruct you in the safety problems associated with exposure to radiation and in precautions or procedures to minimize exposure to radiation; instruct you in the applicable laws for the protection of personnel from exposure to radiation;
- 3) Post or otherwise make available to you a copy of the operating procedures applicable to work under the license/registration;
- 4) Apply the radiation protection rules to all work involving licensed/registered sources of radiation, and
- 5) Post notices of violation involving radiological working conditions.

## **YOUR RESPONSIBILITY AS A WORKER**

You should familiarize yourself with those provisions of the radiation protection rules and operating procedures that apply to the work you are engaged in. You should observe their provisions for your own protection, the protection of your co-workers and others. If you should observe violations of the law, or have a safety concern, you should report them to your supervisor. You may also report them to ODH.

## **WHAT IS COVERED BY THESE RULES**

- 1) Limits on exposure to radiation and radioactive materials in restricted and unrestricted areas;
- 2) Measures to be taken after accidental exposures;
- 3) Personnel monitoring; surveys and equipment;
- 4) Caution signs, labels, and safety interlock equipment;
- 5) Exposure records and reports; and
- 6) Related matters.

## **REPORTS ON YOUR RADIATION EXPOSURE HISTORY**

Your employer is required to advise you of your dose annually if you are exposed to radiation for which monitoring was required by ODH or upon request. In addition, you may request a written report of your exposure when you leave your job.

## **INSPECTIONS**

All activities covered by the ORC 3748 and other radiation protection laws are subject to inspection by representatives of the Ohio Department of Health.

ODH inspectors want to speak or talk with you if you are worried about radiation safety or have other safety concerns about licensed/registered activities. Your employer may not prevent you from talking with an inspector. The ODH will make all reasonable efforts to protect your identity where appropriate and possible.

If you believe that your employer has not corrected violations involving radiological working conditions, you may request an inspection. Your request should be addressed to the Ohio Department of Health, Bureau of Radiation Protection, and must describe the alleged violation in detail. It must be signed by you, or your representative.

## **DISCRIMINATION**

Your employer is prohibited from firing or otherwise discriminating against you for bringing safety concerns to the attention of your employer or the ODH. You may not be fired or discriminated against because you:

- ask the ODH to enforce the law against your employer;
- refuse to engage in activities that violate the law;
- provide information or are about to provide information to the ODH or your employer about violations of laws or safety concerns;
- are about to ask for, or testify, help, or take part in an ODH or other state proceeding.

The ODH will investigate each allegation of harassment, intimidation, or discrimination.

## **CONTACT INFORMATION**

Bureau of Radiation Protection  
Ohio Department of Health  
246 North High Street  
Post Office Box 118  
Columbus, Ohio 43216-0118

Radioactive Materials  
Phone 614-644-2727  
Fax 614-466-0381

Radiologic Technology Section (X-ray)  
Phone 614-644-2727  
Fax 614-466-0381

## **POSTING REQUIREMENTS**

Copies of this notice must be posted in a sufficient number of places in every facility where employees are engaged in activities subject to the radiation protection rules of the Ohio Administrative Code to permit employees working in or frequenting any portion of a restricted area to observe a copy on their way to or from their place of employment. OSHA requires 29 CFR 24 Appendix A "Energy Reorganization Act" Poster be displayed when applicable. **ODH 4786.32 (Rev. 7/04)**