



MARTIN COMMUNITY COLLEGE

DENTAL ASSISTING RADIATION PROTECTION POLICY

OPERATING AND SAFETY PROCEDURES



Shelby Brothers, Director of Dental Assisting
Updated 3/21/16

I. Introduction

Dental facilities are required to have operating and safety procedures for radiography. These policies and procedures apply to any student, faculty, or staff who operates the x-ray equipment. The guidelines are utilized to optimize patient care and minimize the total diagnostic radiation burden. The guidelines are further described as providing a format for appropriate clinical practice concerning radiation, using ALARA Principle (As Low As Reasonably Achievable) to minimize the patient's exposure to radiation. Martin Community College adheres to practice principles including:

- Use of the fastest image receptor compatible with the diagnostic task
- Collimation of the beam to the size of the receptor whenever feasible
- Proper film exposure and processing techniques
- Use of leaded aprons and collars

This policy complies with the Federal Radiation Control for Health and Safety Act of 1969, the Consumer Patient Radiation Health and Safety Act of 1981, state rules and regulations, and Dental Practice Act of NC.

***A copy of *The North Carolina Regulations for Protection Against Radiation* (NCRFPAR) is always available for students, faculty, staff, and patients. It can be located in the radiography laboratory in the cabinet above the sink

The intent of this manual is to establish procedures to minimize radiation exposure of radiography staff, faculty, students and radiography patients without sacrificing diagnostic quality. All are required to know the procedures and requirements in this manual to be able to demonstrate that they can use them. After reading this manual and demonstrating that you can use the machines safely and correctly, each person must sign and date the Record of Instruction of Individuals in Operating Safety Procedures provided in this manual.

Location of Items

- a. Notice to Employees
The Notice to Employees is displayed on the wall between operatory #5 and the dark room.
- b. NC Regulations for Protection Against Radiation
This documentation is located in the radiology clinic, in the cabinet above the sink.
- c. Plan Review
- d. Post Installation Survey
- e. Notice of Registration
The plan review, post installation survey, and notice of registration are located in the RSO's office.
- f. Annual review by all operators
All operators review this manual annually and/or when changes are made or updated.

II. Operating and Safety Procedures for Martin Community College

The following procedures have been established to minimize radiation exposure to patients, students, faculty, and staff.

1. Deliberate exposure of an individual for the sole purpose of training or demonstration is strictly prohibited. All radiographs must be prescribed before exposures are taken.
2. ADA guidelines on patient selection for x-ray exposure will be followed.
 - a. Dental radiographs will be taken on all new clinical patients who have not had them taken in the past year or longer.
 - b. Panoramic exposures including 2 or 4 bitewings are permitted every 2 years.
 - c. Bitewing exposures will be permitted at 6 month intervals.
 - d. Full mouth series (18 radiographs for most adults) every 3-5 years.
 - e. The clinical supervising dentist and/or the faculty may prescribe radiographs beyond the boundary of this policy depending on patient needs.
 - f. Prior to exposure, a thorough medical-dental history will be taken and a faculty member will complete an oral inspection.
3. The faculty shall provide direct supervision and assistance to all students taking radiographs.
4. The operator must observe the principles of optimal radiologic health for the patient by:
 - a. Always shielding the patient from unnecessary scatter by using the lead apron/thyroid collar.
 - b. Seeking help from an instructor when a patient exhibits an unusual oral condition or when sensor placement is questionable.
 - c. Using the principles of minimal exposure and ALARA when determining the minimum number of x-rays needed to diagnose dental conditions based on the patients needs.
 - d. Limiting retakes. Retakes will not be taken to merely improve the technical quality of the exposure.
 - e. Students will receive assistance from the faculty when exposing all retakes.
5. INFECTION CONTROL PROCEDURES
 - a. Students will wear appropriate PPE during both exposure and processing of all films.
 - b. The x-ray machine control panel, exposure button, tubehead, PID, chair, chair adjustments, digital sensor and all other surfaces that may be touched during exposure of radiographs will be wiped down with an appropriate disinfectant before and after use.
 - c. The x-ray machine control panel, tubehead, PID, chair adjustments, chair, and digital sensor shall be covered with a plastic barrier.
 - d. Students will follow a set sequence including:
 - Set up the radiography rooms
 - Dismiss the radiology patient and disinfect the dental operatory
 - Pre-prepare disinfected unit for another patient
 - Secure the radiology operatory at the end of the day
6. Documentation

- a. The Clinical Radiography Log, documentation log of all x-rays taken on Dexters and patients, must be filled out with the date, patient's name, number and type of exposures, student name, and signature of supervising instructor (See Appendix A).
- b. ALL RADIOGRAPHS MUST REMAIN IN THE CLINIC.

III. Operator Training and Safety

A. The Radiation Safety Officer (RSO)

The RSO is Shelby Brothers, Director of Dental Assisting. This person has the responsibility and authority for overseeing matters relating to radiation protection confirming all training and serves as the contact person with the state. Faculty and students should submit all radiation questions or concerns about radiation safety to the RSO. Adjunct instructors and dentists assigned to the MCC Dental Radiology Clinic shall serve as adjunct RSO's. At the beginning of x-ray laboratory, an adjunct RSO will review these procedures and certify compliance by signing the certifying statement attached.

B. Retention of Records

- Registration
- Plan Reviews
- Letter of Acknowledgement
- Post Installation Survey
- FDA 2579 Forms

These documents are kept indefinitely in the RSO's office.

C. Training or Education Requirements for Authorized Users of X-ray Equipment

- Registering or Certifying Body

The RSO and all adjunct RSOs are certified in radiology and have completed a radiology course approved by The Commission on Dental Accreditation; therefore, approved by the state of North Carolina (See www.ncdentalboard/dentalassisting)

Students are trained in radiation safety and exposure technique. Prior to exposing radiographs on patient, students are required to expose multiple radiographs on the Dexter training mannequin, including completing 2 full mouth series at 84% accuracy.

D. Location of Operator During Exposures

- While exposing radiographs, the operator stands approximately 6 feet away at the control panel outside of the operatory to push the control panel exposure button.

E. Technique Chart

- Procedures for selecting exposure – Exposure settings are pre-set for the digital sensors found in each radiography operatory

F. Persons Allowed in the Room During the Exam

- Requirement for professional staff
- Non professional or ancillary staff

Only the patient is allowed in the room during a radiographic examination. Students are not to hold patients or sensor/film during exposures. There are no exceptions to this rule.

G. Gonadal/Lead Shielding

- Gonadal/Lead shielding is used on every patient at all times. All lead aprons have a thyroid collar.

H. Ordering of Exams and Retakes

- Retakes are prescribed by the supervising dentist during patient clinic. Each student is only allowed one retake on a patient with dentist and RSO's authorization.

I. Auxiliary Support for Patients and/or Film

- Mechanical restraining devices for patients
- Human holders

Because MCC is an educational facility the college does not use restraining devices or human holders to expose radiographs. Use film holders, such as the stabe and snap a ray, for all examinations to eliminate patients from holding films with their hands. Students are not to hold the tube housing or the support housing during any exposure. The tube housing must not drift or move during any exposure. If a problem with stability of the suspension arm develops, notify the Radiation Safety Officer must be notified immediately.

J. Mobile/Portable Exams

Not applicable, the college does not have portable units.

K. Closure of doors (if applicable)

Not applicable

L. Visual Contact with patient (if applicable)

During the extraoral exposure, a mirror on the operatory door provides vision of the patient during the entire panoramic exposure.

M. Visual and Audible Indication

Exposure button for extraoral and intraoral exposures is located outside the operatory containing the machine and allows the operator to see and hear the exposure button light up and beep during the exposure as well as view the patient during a panorex until the exposure is over. The light goes off and the machine stops when exposure is over. The operator must keep her/his finger on the exposure button until the exposure is complete.

N. Additional radiation safety activities (if applicable)

- X-ray equipment is not operated unless authorized by the radiology instructor, supervising dentist, or RSO during mannequin practice.
- During exposure, the student must exit the operatory, and stand behind the lead lined wall and call out exposing prior to exposing radiograph. Before the student pushes the exposure button you must say "clear" loud enough to be heard by other operators in the clinic.
- Students must use film holders for all examinations to eliminate patients from holding films with their hands.

- Students should never hold or allow the patient to hold the tube housing or support housing during any exposure. The tube housing must not drift or move during any exposure. If a problem with stability of the suspension arm develops, notify the RSO immediately.

IV. Pregnancy Reference

- ALARA
 - Personnel voluntary declared pregnancy policy
Occupational exposure of females who are pregnant to ionizing radiation poses a health risk to the developing embryo or fetus. Students and faculty in the Dental Assisting Program are classified as occupationally exposed individuals. In view of the health risks to the developing embryo or fetus, the following policy on student pregnancy is stated:
1. Student pregnancy while enrolled in the Dental Assisting Program is discouraged.
 2. It is the student's responsibility to inform the program coordinator of a pregnancy as early as possible.
 3. A pregnant student may continue in the above named program only with written permission of the attending physician. This written permission should include verification of counseling on the risks involved in exposing the embryo or fetus to ionizing radiation and a statement concerning the student's physical fitness to continue in the respective program.
 4. If a student and the attending physician agree that the student may continue in the respective program, the student must sign a waiver of liability. This waiver releases Martin Community College, its faculty, administration, and the Board of Trustees, clinical affiliates, and all other individuals involved with the respective program from any other responsibility for the safety, health, or well being of either the mother or the unborn child.
 5. If the student wishes to continue in the program and has completed the above procedures, exposure to the mother and fetus will be monitored on a monthly basis to insure that exposure does not exceed 4.5 rems during the entire gestation period. This maximum permissible dose is in accordance with NCRP recommendations as stated on page 200 or the North Carolina Regulations for Protection Against Radiation manual.
 6. It is highly recommended that pregnant students and faculty declare their pregnancy to the RSO as soon as possible to allow fetal monitoring can begin immediately.

- Patient pregnancy policy
Because MCC is an educational facility the institution does not allow exposure of radiographs on patients who are pregnant.
- Screen film combinations to minimize patient exposure
Screen film is used in the extraoral (panorex) machine cassette.

V. Personnel Exposure

a. Exposure policy

MCC requires personnel and student monitoring devices which monitor radiation during exposure. Students, staff and faculty must not exceed an annual limit, which is the total equivalent being equal to five rems (0.05Sv).

The dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, shall not exceed 0.45 rem (4.5mSv).

If operators suspect there has been an excessive exposure or a radiation incident, they must immediately notify the RSO. The Radiation Safety Officer will then notify the NCRFPAR. The address is: NCRFPAR, 3825 Barrett Drive, Raleigh, North Carolina, 27609-7221. The telephone number during working hours is (919) 571-4141.

The general requirements for radiation safety and user rights and obligations as a radiation operator are found in NCRFPAR, Section .1600. The specific sections of NCRFPAR that most impact our facility are rules .0603, 0604, .0607. Students are required to read these sections.

The x-ray machines are equipped with devices to limit the radiation exposure to patients, students and staff. These devices include filters that reduce unnecessary low-energy radiation, from the primary beam and collimators which restrict the size of the x-ray beam. These devices should not be altered, removed, tampered with, or in any way cause needless radiation exposure.

MCC's lead aprons all contain 0.25 millimeter or more lead equivalence. The protective apron must be used on all patients. After use, all aprons are stored in each operatory behind the door. Check the lead garments by looking for holes, cracks, or tears. If a defect is found, notify the RSO immediately.

VI. .1604 OCCUPATIONAL DOSE LIMITS FOR ADULTS

- (a) The licensee or registrant shall control the occupational dose to individual adults, except for planned special exposures as provided in Rule .1608 of this Section, to the following dose limits:
 - (1) an annual limit, which is the more limiting of:
 - (A) the total effective dose equivalent being equal to 5 rem (0.05 Sv); or
 - (B) the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rem (0.5 Sv); and

- (2) the annual limits to the lens of the eye, to the skin, and to the extremities which are:
 - (A) an eye dose equivalent of 15 rem (0.15 Sv), and
 - (B) a shallow-dose equivalent of 50 rem (0.50 Sv) to the skin or to each of the extremities.

- (b) Doses received in excess of the annual limits, including doses received during accidents, emergencies, and planned special exposures, shall be subtracted from the limits for planned special exposures that the individual may receive during the current year and during the individual's lifetime. Dose limits for planned special exposures are provided in Subparagraph (5) of Rule .1608 of this Section.

- (c) The assigned deep-dose equivalent and shallow-dose equivalent shall be for the part of the body receiving the highest exposure. If the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable The deep-dose equivalent, eye- dose equivalent, and shallow-dose equivalent may be assessed from surveys of other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits,

- (d) Derived air concentration (DAC) and annual limit on intake (ALI) values are presented in Table 1 of Appendix B to 10 CFR §§ 20.1001 – 20.2401 and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits.

- (e) In addition to the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. Requirements for annual limits on intake for uranium are provided in Appendix B to 10 CFR §§ 20.1001 – 20.2401.

- (f) The licensee of registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person. Requirements for determining prior occupational exposure are provided in Rule .1638(E) of this section.

Each dental assisting applicant/faculty has the responsibility to acquire a previous employee to disclose their previous occupational dose prior to becoming a dental assisting student or faculty member at MCC. The applicant/faculty must obtain a written, signed statement that states either that the he/she had no prior occupational dose during the current calendar quarter or states the nature and amount of any prior occupational dose during the current calendar quarter. For the purpose of this statement, the current calendar quarter is interpreted to mean the most recently available calendar quarter. The applicant/faculty must maintain these written statements while attending MCC.

- **Monitoring**
All faculty and students are provided with radiation badges. Badges are monitored on a quarterly basis.

Badges are stored in the desk drawer of the RSO and are worn only while exposing radiographs. Badges must be returned to the RSO daily. Control monitoring devices are kept outside of the radiography clinic.

Exposure records are kept in the program coordinator's office in a notebook entitled *Radiology Monitoring* and are kept indefinitely.

- **Occupational Dose Limits for Minors**
The occupational dose limits for minors are ten percent of the annual limits specified for adult workers in Rule. 1604.

Minors do not expose radiographs in this facility.

VII. General Public

Dose Limits for Individual Members of the Public. [.1611]

- (a) Each licensee or registrant shall maintain records sufficient to demonstrate compliance with dose limit for individual members of the public required by Rule .1611. These records may include such things as survey results, personnel monitoring results, calculations and other documents pertaining to the determination of doses to individual members of the public.
- (b) The licensee or registrant shall retain the records required by paragraph (a) of this rule until the agency terminates each pertinent license or registration requiring the record.

MCC's dental radiography facility uses procedures and engineering controls to achieve occupational and general public doses that are as-low-as-is-reasonably-achievable (ALARA). Students must use their patient log to keep track of the patients seen in clinic, their age and the description of radiographs being exposed. Each patient must fill out a consent form stating any medical conditions and last radiographs taken. The attending dentist in clinic must sign the consent form as well as the student before radiographs are exposed on the patient. The information of the dentist or dentists where previous radiographs were taken must be on the consent form as well. Students must not take a full mouth series or panorex radiographs more often than every three years on the general public. If a patient states on the consent form that they have had radiographs earlier than three years ago, that patient no longer meets the criteria for student radiographs.

Bitewing radiographs are taken only once annually on adults and every six months on children sixteen years of age and under.

Film speed used in our facility is F-speed in operatory 2 and 5 and D-speed in operatory 4. Film speed minimizes radiation exposure to the patient.

VIII. Exceeding limits

Reporting of exceeding limits

Information to be reported

Name of the person, social security number, date of birth and dose amount

What caused the exposure?

What steps have been taken to prevent this from happening in the future?

IX. Notification of appropriate entities

In the case of exceeding limits report to the RSO.
