DIVISION OF ORAL RADIOLOGY.
SCHOOL OF DENTAL AND ORAL SURGERY.
COLUMBIA UNIVERSITY.

2002-2003

NEILL J. SERMAN,  B.D.S  DDS.  MS. (RAD).  FACD.  FIADMFR

Professor and Head
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Objectives of Oral Radiology</td>
<td>3</td>
</tr>
<tr>
<td>Educational Objectives</td>
<td>4</td>
</tr>
<tr>
<td>Guideline for Students</td>
<td>5</td>
</tr>
<tr>
<td>Sophomore Preclinical Radiology</td>
<td>11</td>
</tr>
<tr>
<td>Objectives</td>
<td>11</td>
</tr>
<tr>
<td>Junior Preclinical Radiology</td>
<td>12</td>
</tr>
<tr>
<td>Clinical Competencies</td>
<td>12</td>
</tr>
<tr>
<td>Junior Objectives</td>
<td>12</td>
</tr>
<tr>
<td>Seniors. Competencies</td>
<td>14</td>
</tr>
<tr>
<td>Seniors. Objectives</td>
<td>14</td>
</tr>
<tr>
<td>Criteria for Diagnostically Acceptable FMS</td>
<td>15</td>
</tr>
<tr>
<td>Grading the FMS</td>
<td>17</td>
</tr>
<tr>
<td>The FMS – The Clinical Procedure</td>
<td>18</td>
</tr>
<tr>
<td>The Panoramic Radiograph – Clinical Procedure</td>
<td>20</td>
</tr>
</tbody>
</table>
Behavioral Objectives of Oral Radiology

1. Ensure that radiation safety procedures are carried out at all times for the patient, the operator and the general public.

2. Ensure that Universal Precautions are carried out at all times.

3. Ensure that patients are treated professionally, courteously and expeditiously.

4. Take the prescribed radiographs for the patients, as requested on the Radiology Request Form.


6. Ensure that all radiographs leaving the Division are of a high quality. Have faculty or techs sign off on quality of radiographs before dismissing patient.

7. Interpret, critique, and write radiographic reports.

8. Ensure that radiographs reach their destination promptly.

9. Ensure that the radiology cubicles are left clean at all times.

10. Place all instruments, etc. away in the correct place.
Educational Objectives.

Students should understand:

1. Prescriptions for radiographs.

2. Advantages & disadvantages of various views.

3. Impact of patient movement on appearance of images.

4. Paralleling technique utilizing XCP instruments.

5. Parameters for acceptable intraoral & panoramic radiographs

6. Role of kVp & mAs in obtaining acceptable images.

7. Use of Universal Precautions

8. Recognize “normal” radiographic anatomy

9. Interpretation of radiographs.

10. Determine which radiographs require to be retaken.
GUIDELINES FOR STUDENTS.

WELCOME TO ORAL RADIOLOGY

We wish you a fulfilling, educational experience in this section. Kindly ensure that it will be a happy and productive time spent in Radiology by being cooperative and following instructions carefully. The staff is here to assist you, so please feel free to ask for assistance. This document has been written in some detail so that the student will be better informed, to avoid confusion and to avoid the ever-green excuse “I DID NOT KNOW”. There are only so many hours in a day and insufficient instructor man-hours to provide for Oral Radiology teaching on a tutorial basis. We will help in every way possible but... THE ULTIMATE RESPONSIBILITY IS YOURS!

This is YOUR SCHOOL. Be proud of it and keep it neat and clean. Please let there be no reason to have to speak to you about your dress. Please have a professional attitude at all times.

1. The morning sessions commence at 9:00 a.m. sharp and end at 12:00 p.m. The afternoon sessions commence at 1:00 p.m. sharp and end at 5:00 p.m. When there is a lecture at 9:00 a.m., students are to be present in Oral Radiology at 10:00 a.m.

Please always be prompt and do not attempt to leave early, because your absence impairs your colleagues as well as patient care. Immediately on arrival in the Radiology Clinic, sign in and record the time. We will be obliged to mark students who come late or leave early as absent for half a session. This applies equally to students who disappear during the session without informing the staff where they will be. Thus it is essential to inform faculty or the technicians when you are leaving the Department for whatever reason. You are purposely being warned to avoid unpleasantness at a later stage.
1.1. In the absence of Faculty you are expected to take instructions from the Radiology Technicians.

2. Should you require to reschedule, please contact me well in advance so that you can attempt to reschedule. You will only be permitted to reschedule IF you can find a student to change sessions with you. Please have the name of the student available when you approach the staff to reschedule.

3. Should you have to be excused from a Radiology rotation it is essential that you inform Faculty or the supervisor PRIOR to your absence. You must find a replacement. Anyone who misses a rotation without prior approval will be required to make up DOUBLE the time missed, or will receive an F grade. PLEASE TAKE NOTE OF THIS.

3.1. In case of an emergency, when you are scheduled to be on duty in Radiology, please call the Radiology Clinic, 212-305-5694, and inform them of the problem. Scheduling a patient is not an emergency, but poor organization.

4. You may find that you are scheduled for another rotation at the same time. Because of the short period of time that you spend on Radiology rotation, Radiology ALWAYS takes preference over ALL other rotations.

5. Please always read handouts before coming to the Department so that you will know what is expected of you while on rotation.

6. Radiographs with explanations are displayed in the Radiology Department continuously.
7. These radiographs are changed approximately once a month. Thus, please ensure that you come into the Department at least once a month, even though you may not be on Radiology rotation, to view that series of radiographs. When on rotation and not busy with patients you have a golden opportunity to study the radiographs in detail. These radiographs may form part of the final exam.

8. Gloves must be worn at all times when sterilizing the cubicles, taking, and processing radiographs. Use new gloves for each patient.

9. It is essential the YOU sterilize the X-ray cubicle PRIOR to taking a patient into that cubicle to be radiographed. Thus, immediately on arriving in the Department on a rotation and before you see a patient please sterilize the cubicle. You will be given a demonstration during the preclinical demonstrations. The procedure for sterilizing the cubicles is posted in the Oral Radiology Section. Please ensure availability of an X-ray cubicle BEFORE bringing the patient in to be radiographed.

10. Immediately after taking, but before processing radiographs, the film packets MUST BE DRIED OF SALIVA. When the covering of the film packet remains wet for a while it may tear at the edges and let in light. Also, saliva contains bacteria.

11. Please ensure that you uncouple, wash, dry and repack, aligning instruments after you have completed using them, so that they can be autoclaved.

12. It is essential that patients are protected with a lead apron AND a thyroid collar when exposed to ionizing radiation. As lead aprons are expensive and tend to crack if not hung up after use, we will be strict on anyone lax in this respect.
13. FMS are to be performed routinely, utilizing aligning instruments and the long rectangular cone.

14. NO patient may be radiographed unless a request form has previously been completely FILLED IN and SIGNED by Faculty. This applies equally to payments.

After you have taken radiographs for a patient, request the patient to wait in the reception area until you have processed the radiographs and determined whether any retakes or additional view are required. If not, inform the patient accordingly and direct them where to go. **NO CREDIT WILL BE GIVEN FOR RADIOGRAPHS THAT HAVE NOT BEEN EXAMINED, APPROVED, AND SIGNED OFF BY FACULTY OR A TECHNICIAN BEFORE THE PATIENT IS DISMISSED.**

15. When you are ready to radiograph the next patient ask the technicians for the next request form. In this way, patients are seen in the order in which they arrived.

16. Should you not process the radiographs yourself, give the exposed films AND the requisition form to the technician to process. This also applies to the PAN films.

17. All radiographic exposure factors must be RECORDED on the X-ray envelope in the patient’s chart while the radiographs are being processed. **This is a Federal requirement.** Record what you have done in the continuation sheet followed by PICP.

It is important to note that the different X-ray cubicles have different exposure times

18. No student will be permitted to take radiographs unless they are wearing their monitoring badges. This is a regulation for you own safety so please assist in this regard.
19. No senior student may take a panoramic radiograph unless they have attended the mandatory demonstration given by me.

20. Radiographs may not be taken out of the Section until they have been correctly mounted and have been approved and signed by Faculty or the Supervisor. If no Faculty is present, request a technician to examine and sign them. Students may NOT take radiographs away from the school.

21. You are required to keep a record of all the films you have taken by filling in the “Student Performance Chart”. Keep a copy for your own records. Ensure that each procedure is correctly signed off by Faculty, a Technician, or the Supervisor in order to be credited with the work done. The duplicate set of full mouth radiographs must be mounted, with details of the patient recorded in pencil on the film mount and on the coin envelope.

   RECORD THE PATIENT’S AGE, RACE, AND SEX IN THE LOWER RIGHT HAND CORNER OF THE COIN ENVELOPE AND CIRCLE IT.

22. NO RADIOGRAPHS MAY BE REMOVED FROM THE ORAL RADIOLOGY DEPARTMENT IN ORDER TO GRADE OR CRITIQUE THEM. STUDENTS STOP TAKING RADIOGRAPHS AT 4:00 P.M. IN ORDER TO MOUNT AND CRITIQUE OR WRITE REPORTS. At the end of the day the radiographs with your name on them must be placed under the door of my office. If you hand in radiographs more than one day late, you will lose credit per FMS or PAN. The above will be strictly enforced.

23. Radiographs incorrectly positioned or incorrectly places in the X-ray mount count as major errors. Radiographs may not be retaken for the sake of technical perfection.
24. Any student found submitting radiographs he/she did not personally take or assist in taking will receive an automatic Fail grade and will be brought up for disciplinary action.

25. Radiation monitoring badges must be changed in the Radiology Clinic during the first week of January, April, July, and October every year. Losing a badge or late exchange of a badge will result in a $10.00 penalty.

26. Any student may be requested to perform associated tasks related to Oral Radiology.
SOPHOMORE PRECLINICAL RADIOLOGY ROTATION

STUDENT PREPARATION:

PRIOR TO COMING TO THE FIRST DEMONSTRATION, review the Rinn booklet you received in the radiology instrument kit in the fall. Practice putting together the aligning instruments, and study the paralleling technique.

You are responsible for coming to the session prepared with the information necessary to demonstrate the skill and meet the objectives set out below. Review film placement for each area as described in the Rinn booklet and the lecture.

Students are to report to the Radiology Clinic on the seventh floor punctually.

OBJECTIVES:

1. Be able to sterilize the X-ray cubicle.

2. Understand and regulate the control panel of the X-ray machine.

3. Understand the chemical reactions and be able to process radiographs both manually and in a processor (automatically).

4. Understand and be able to demonstrate the tube-shift technique on a model.

5. Students will be assisted by faculty on a 1:6 basis so that the learning experience will be to your greatest advantage.
JUNIOR STUDENTS

PRECLINICAL ROTATION

Junior students working in pairs, to assist each other, will take a FMS on the radiographic manikin. Students are required to complete the assignment on the same manikin. Students are at liberty to retake radiographs as many times as they wish until they are satisfied with the quality of the radiographs. (This will obviously not be permitted on patients). If one partner is satisfied with the quality of a radiograph but the other is not, that person is at liberty to redo the radiographs. Each radiograph is graded on an accept or reject basis. Deadlines are adhered to at all times. Radiographs must be discussed with Dr. Serman as they are taken. Radiographs (the completed FMS) must be discussed and handed in 7 days after the radiology rotation.

CLINICAL COMPETENCIES

Junior students are required to obtain 50 credits for FMS’s during the Fall Rotations.

OBJECTIVES

Junior students should be able to:

1. Execute a diagnostically acceptable FMS utilizing the long rectangular cone, paralleling technique.

2. Reduce ionizing radiation to the patient to the minimum.

3. Process and mount a FMS.

4. Critique a given FMS and recommend with reasons any retakes or additional films.
5. Identify the required films to satisfy a given request (e.g. periapicals of #20-25 would require 1) anterior, 2) cuspid/incisor, and 3) premolar views).

6. Use their own judgment when doing a FMS (e.g. with only a few teeth standing in the mouth, would it not be better to take a PAN and/or a few periapicals). Check with Faculty.

COMPETENCIES.

Junior students are required to obtain 50 credits for FMS during their rotation in the Spring Semester to fulfill their competencies. The credits are obtained as follows –

\[ \begin{align*}
A &= 8 & A- &= 7 & B+ &= 6 & B &= 5 & B- &= 4 \\
C+ &= 3 & C \text{ or } C- &= 0 & F &= \text{lose one } B+ \text{ competency}
\end{align*} \]
SENIOR STUDENTS

COMPETENCIES

I. SUMMER
   1. To take and WRITE RADIOGRAPHIC REPORTS on 2 FMS and 2 PANS. These reports are to be discussed in person with Dr. Serman DURING the rotation.
   2. Critique 3 FMS

II. FALL
   1. 3 FMS’S of B+ quality or better.
   2. 5 PANs of B+ quality or better

The quality of the radiographs as well as the report are taken into consideration when grading. A poor quality radiograph cannot obtain a B+. You may request that films be duplicated so that you can write the reports, or place 2 films in the cassette prior to taking the panoramic film.

OBJECTIVES

IN ADDITION TO THOSE FOR THE JUNIOR STUDENTS – Senior students should be able to examine an occlusal, lateral oblique, a FMS, a PAN and an O.M. view, and be able to identify normal radiographic anatomy and the more commonly occurring abnormalities. Also, write radiographic reports pointing out the salient facts (e.g. missing, impacted, supernumary teeth, root remnants, periapicals, radiolucencies or opacities, anatomic anomalies, caries, bone loss, etc.) and make a differential diagnosis. NOTE: Radiographs are INTERPRETED.

Please feel free to contact me at any time at 5-5674 to discuss any aspect of Oral Radiology.
CRITERIA FOR DIAGNOSTICALLY ACCEPTABLE FMS

Ensure that there ARE NO:

1. Overlapping, foreshortening, or elongation.
2. Cone cutting.
4. Double exposures.
5. Incorrectly mounted films.
6. Films exposed the wrong side.

Ensure:

1. Apices of teeth plus 2-4 mm of bone are visible on the film.
2. That there is sufficient density and definition.
4. Correct angulation of the teeth
   ▶ Posterior teeth must have long axes $90^\circ$ to long axis of film.
   ▶ Anterior teeth must have long axes parallel to long axis of film
5. Incisal or occlusal tips of teeth visible.
6. Teeth are correctly positioned on film with occlusal plane correct.
7. Clear view of interproximal contact areas. I.E. correct horizontal angulation.
8. Sufficient density.

FILM POSITIONING

**Incisor view**  Mesial surfaces of both laterals to be seen
**Lat/Canine view**  Distal of central and mesial of first premolar to be seen.
**Premolar view**  Distal surface of canine visible.
**Molar view**  Anterior border second premolar (or where that tooth would have been)
Bite-wing views (whether vertical or horizontal)

Premolar view – Anterior border of film placed opposite middle of canine.

Molar view – Anterior border of film placed in middle of second premolar (or where that tooth would have been).

Occlusal plane of teeth to be in middle of film and parallel to long axis of film.
GRADING OF FMS

Each FMS will be graded utilizing the Criteria for Diagnostically Acceptable FMS (previous page) plus information on the Summary of Radiographic Errors form. The varying degree of patient difficulty will be taken into consideration. It is therefore necessary for the students to identify any problem that may prevent the taking of ideal radiographs and discuss this with faculty or staff if assistance is required. It must be recorded on the Summary of Radiographic Errors form that the discussion took place.

**Letter grades will be assigned as follows:**

- A – less than 3 errors
- A⁻ - less than 4 errors
- B⁺ - less than 5 errors
- B – less than 6 errors
- C⁺ - less than 8 errors
- C – less than 9 errors
- C⁻ - less than 10 errors
- F – more errors than above

Radiographs incorrectly positioned or incorrectly placed in the X-ray mount count as major errors. Radiographs may not be retaken for the sake of technical perfection.

**Any student found submitting radiographs he/she did not personally take or assist in taking, will receive an automatic Fail grade and will be brought up for disciplinary action.**
THE FMS – CLINICAL PROCEDURE

1. Sterilize the cubicle as demonstrated to you during the preclinical rotation.
2. Inquire whether female patients are pregnant.
3. Ensure that self pay patients have paid for the radiographs to be taken.
4. On your way to the cubicle explain to the patients what you are about to do and reassure the patient.
5. Seat the patient and request the patient to remove glasses, dentures, earrings, and nose rings.
6. Cover the patient with the lead apron as well as the thyroid shield.
7. WASH YOUR HANDS.
8. Remove the required number of radiographs from the holder.
9. Put on your gloves and do not remove them until after the radiographs have been placed in the processor.
10. Examine the patients mouth to determine the anatomy. Note size of tori, depth of palate, size of mouth.
11. Assemble the XCP aligning instruments and place cotton rolls with rubber bands.
12. Review your technique regularly.
13. Take the FMS as was demonstrated to you.
14. As each radiograph is taken, dry off the saliva and IMMEDIATELY place it in the plastic cup. No exposed radiographed is put down anywhere else – not even for one second.
15. Remove the lead apron from the patient and return dentures, etc. to the patient.
16. HANG UP THE LEAD APRON.
17. Request the patient to wait in the reception area while the radiographs are processed and interpreted. Explain to the patient that it will take about 15 minutes.
18. Process the films. Place the lead foil in the drawer and discard the rest of the film packet. LEAVE PROCESSOR CLEAN. This is an OSHA regulation.
19. The aligning instruments are to be separated, washed, dried, placed in a sterilizing pouch and returned to the receptionist. LEAVE X-RAY CUBICLE CLEAN.

20. Mount the radiographs and present them to faculty or to the techs to be examined. Mount the duplicate set as soon as you have a spare few minutes. NO RADIOGRAPHS MAY BE REMOVED FROM THE RADIOLOGY DEPARTMENT TO BE CRITIQUED.

21. If all the radiographs are satisfactory, inform the patient accordingly and direct them where they are to go. If there are any that require to be redone, inform the patient that there are ADDITIONAL VIEWS THAT REQUIRE TO BE DONE (NEVER SAY RETAKES).

22. No Radiographs may be removed from the Department. They are patient records and records may not be removed.

23. Hand in work promptly to ensure that you avoid penalties.
THE PANORAMIC RADIOGRAPH – CLINICAL PROCEDURE

NO PANORAMIC RADIOGRAPHS MAY BE TAKEN UNLESS YOU HAVE ATTENDED A DEMONSTRATION BY DR. SERMAN.

1. You will be given a Radiology Request Form and asked to take a panoramic radiograph. WE DO NOT HAVE A PANOREX machine.
2. Check whether the patient is a self-pay or Medicaid patient. If self-pay, ensure that the fee has been collected.
3. On your way to the cubicle explain to the patients what you are about to do and reassure the patient.
4. Ask female patients whether they are pregnant.
5. Ask patients to remove dentures, glasses, earring, nose-rings, necklaces, hairpins, etc.
6. Place a clean bite stick in position and wipe down the head and the neck support.
7. Ensure that you have a cassette containing 2 films in those cases where a repot will be required.
8. Lock the drum and load the cassette. Then UNLOCK the drum and align it.
9. Request the patient to be seated upright and as far back in the chair as possible.
10. Protect the patient with a lead apron.
11. Ensure that the ala-tragus line is at a -5 degree angle at all times.
12. Ensure that the patient’s neck is straight, the midsagittal and inter-pupillary planes are correct.
13. Position the patient so that the head support is immediately in front of the external auditory meatus. Check that the same amount of tragus is felt bilaterally.
14. Ensure that the tip of the chin is in a higher plane than the lower border of the cassette.
15. Ensure that the bite sick is close to the mouth and on the occlusal plane.
16. Request the patient to bite with the anterior teeth, or where the anterior teeth would have been, into the grooves. Use cotton rolls for edentulous patients.
17. Ensure that the correct amount of tragus can be felt distal to the head support.
18. Tighten the head support gently.
19. Check the profile index and set it according to the reading.
20. Set the exposures factors.
21. Check again that the patient is correctly seated.
22. Inform the patient that everything will be moving but that nothing will touch or hurt them.
23. RE-ASSURE the patient.
24. Stress the importance of sitting still during the 25-second exposure.
25. Request the patient to place the tongue firmly against the palate and to keep it there as if swallowing during the exposure. Ask them whether they have done so.
26. Make the exposure.
27. Open the head support.
28. Unlock the unit without raising the X-ray machine. Ensure that you do not hurt the patient while doing so.
29. Raise the gentry so that the patient will not knock their head when exiting from the machine.
30. Remove the lead apron while keeping your hand on the patient’s head.
31. Request the patient to stand up.
32. HANG UP THE LEAD APRON.
33. Remove and wash the bite-stick. Place it in the packet to be sterilized.
34. Request the patient to wait in the reception area while the film is being processed. Explain to the patient that this will take about 15 minutes.
35. LOCK the drum and unload the cassette.
36. Hand the Radiology Request Form and the cassette to the technician to be processed.
37. Check that the radiograph is technically correct.
38. Examine the radiograph and have it checked by faculty.
39. Record findings where appropriate.
40. Dismiss the patient.