

SMALL ANIMAL DIAGNOSTIC IMAGING II CLINICAL MENTORSHIP



VM 21600

CRITERIA HANDBOOK AND LOGBOOK

INDEX OF NOTEBOOK

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Clinical Mentorship Tasks

Introduction to Essential Tasks and Criteria

1. Veterinary Facility Standard Operating Procedure for X-ray Machine
2. Preparation of an Analog Radiographic Technique Chart (film + screen)

NOTE: Digital imaging may be used to produce the following images. The files should be saved and submitted on a disc or flash drive or emailed. The student may NOT crop the image post-exposure (appropriate collimation should be done when taking the image) nor should computer-editing software be used.

The patient should be heavily sedated or anesthetized for these views:

3. Mediolateral Projection of the Shoulder (scapulohumeral) Joint
4. Caudocranial Projection of the Shoulder (scapulohumeral) Joint
5. Mediolateral Projection of the Radius/Ulna (Antebrachium)
6. Craniocaudal Projection of the Radius/Ulna (Antebrachium)
7. Mediolateral Projection of the Stifle Joint (Femorotibial)
8. Caudocranial Projection of the Stifle Joint (Femorotibial)
9. Lateral Projection of the Pelvis
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Projects

21. Radiographic Contrast Study Project

Appendices I and II

IMPORTANT! See following page for due dates for all tasks

NOTE THE FOLLOWING DUE DATES FOR THE TASKS ABOVE:

Fall or Spring semester ***5:00p.m. Thursday of week 2 – Task 1***
5:00p.m. Thursday of week 5 – Task 2
5:00p.m. Thursday of week 10 – Tasks 3-20
5:00p.m. Thursday of week 12 – Task 21

Summer session ***5:00p.m. Thursday of week 2 – Task 1***
5:00p.m. Thursday of week 4 – Task 2
5:00p.m. Thursday of week 8 – Tasks 3-20
5:00p.m. Thursday of week 10 – Task 21

Incomplete grades will not be assigned for mentorships at the end of the semester.

Grade penalties will be assessed for tasks submitted after the due date.

Resubmission due dates will be set by the instructor as required.

Animal Use Guidelines

The student shall abide by the following guidelines when performing mentorship tasks:

1. A mentorship task may be performed only once on a single animal.
2. A student may perform a maximum of ten (10) minimally invasive tasks (denoted by one asterisk) on a single animal within a 24-hour period.
3. A student may perform a maximum of three (3) moderately invasive tasks (denoted by two asterisks) on a single animal within a 24-hour period.
4. When combining tasks, a student may perform a maximum of five (5) minimally and three (3) moderately invasive tasks on a single animal within a 24-hour period.
5. Tasks denoted with no asterisks do not involve live animal use.

For example, a student might perform the following tasks on an animal in a single day:

1. Restrain a dog in sternal recumbency*
2. Restrain a dog in lateral recumbency*
3. Restrain a dog for cephalic venipuncture*
4. Restrain a dog for saphenous venipuncture*
5. Restrain a dog for jugular venipuncture*
6. Administer subcutaneous injection**
7. Administer intramuscular injection**
8. Intravenous cephalic injection – canine**

Failure to comply with the Animal Use Guidelines may result in failure of the Clinical Mentorship.

STUDENT INFORMATION

GOALS OF VM 21600 SA DIAGNOSTIC IMAGING II CLINICAL MENTORSHIP

Working with a veterinary care facility, the student will perform tasks under the supervision of a clinical mentor (veterinarian or credentialed veterinary technician).

In order to achieve the goals for this Clinical Mentorship, the tasks must be performed to the level of competency as outlined by the *Criteria* for each task.

The student is responsible for providing documentation for each task as defined by the *Materials Submitted for Evaluation and Verification* section on each task.

In addition to the documentation, the Clinical Mentorship site supervisor will verify that the student performed the task under their supervision.

Final approval of successful performance and completion of the Clinical Mentorship will be made by the Purdue University instructor in charge of the Clinical Mentorship. This approval will be based upon the documentation provided by the student.

The Purdue University instructor in charge has the option to require additional documentation if, in their judgment, the student has not performed and/or documented the task to the level set by the *Criteria*.

Documentation of completed tasks is essential to validating the educational process and insuring that the performance of graduates of the Veterinary Technology Distance Learning Program meets the standards of quality required by the Purdue University College of Veterinary Medicine faculty and the American Veterinary Medical Association accrediting bodies.

CONTACT PERSON

Any questions regarding the Clinical Mentorship process should be directed to:

Pam Phegley, BS, RVT
Purdue University
Veterinary Technology Program
625 Harrison Street, Lynn Hall G171
West Lafayette IN 47907
(765) 496-6809
phegley@purdue.edu

PRE-REQUISITES FOR VM 21600 SA DIAGNOSTIC IMAGING II CLINICAL MENTORSHIP

Contracts and Agreements

Because of legal, liability and AVMA accreditation issues, the following documents must be completed *prior to beginning* the Clinical Mentorship

1. Facility Requirement Agreement
2. Clinical Mentorship Agreement
3. Supervisor Agreement
4. Health Risk and Insurance Acknowledgment
5. Professional Liability Insurance Coverage
6. Agreement and Release of Liability
7. Technical Standards Acknowledgment
8. Code of Conduct

These forms are available on the VTDL website for downloading, printout, and completion.

If more than one Clinical Mentorship course is taken, a separate Facility Requirement Agreement, Clinical Mentorship Agreement and Supervisor Agreement must be completed for each course.

Failure to complete and return the listed documents and the payment for Student Professional Liability Insurance Coverage will prevent the student from enrolling in the Clinical Mentorship.

Insurance

Two types of insurance are recommended or required for the student working in a Clinical Mentorship.

Health Insurance is highly recommended to cover the medical expenses should the student become injured while on the job. It is the student's responsibility to procure such insurance.

Liability Insurance is required to protect the student in the event of a suit filed against the student for acts he/she performed while in the Clinical Mentorship.

Each VTDL student is required to purchase, for a nominal fee, Professional Liability Insurance through Purdue University. This is done by completing the Professional Liability Insurance Coverage form and sending a check for the fee. This check must be separate from payment of course fees. The fee covers from the time of initiation of coverage until the subsequent July 31st.

Students will not be enrolled in Clinical Mentorships until the Professional Liability Insurance is paid, and the student is covered by the policy.

SELECTING THE CLINICAL MENTORSHIP SITE – FACILITY REQUIREMENTS

You must visit the Clinical Mentorship Site and determine if the following supplies and equipment are readily available to you for use during your Clinical Mentorship. You must complete and have the facility veterinarian sign the Clinical Mentorship Site Facility Requirements Agreement.

The veterinary care facility must be equipped with the following:

- Practical Diagnostic Imaging for Veterinary Technicians by Han/Hurd (textbook)
- 300MA/125KVP X-ray machine (high-output machine for analog or digital radiography)
- Intensifying screens with compatible film (at minimum Par film and screens, preferably both Par and Slow) for technique chart task
- Measuring calipers
- Thyroid shields (2)
- 0.5mm Lead aprons (2)
- 0.5mm Lead gloves that provide 360^o coverage of hands (2 pr)
- Right and Left identification markers and oblique marker
- Patient Identification Labeling system for analog (film and screen) or for digital images
- Automatic processor with chemicals
- Safelight with appropriate filter
- Single bank view box
- Individual Radiation exposure monitoring device (badge, ring, etc)
- Appropriate materials to perform a radiographic contrast study on a patient
 - Approved radiographic contrast media

ATTENTION:

Read this before beginning VM 21600 Diagnostic Imaging II for Veterinary Technicians:

1. All tasks must be done using a dog between 40-50 pounds (18-23 kg).

***Note:** For a dog this size, ALL tasks will be achieved using a grid technique EXCEPT mediolateral and craniocaudal radius/ulna and mediolateral stifle, which will be done tabletop. If the mentorship site has no slow speed (detail) cassettes, refer to Appendix II.

2. The following tasks will require you to use a heavily sedated or anesthetized** patient
 - Preparation of a Radiographic Technique Chart
 - Mediolateral Projection of the Shoulder (Scapulohumeral) Joint
 - Caudocranial Projection of the Shoulder (scapulohumeral) Joint
 - Mediolateral Projection of the Radius/Ulna (Antebrachium)
 - Craniocaudal Projection of the Radius/Ulna (Antebrachium)
 - Mediolateral Projection of the Stifle Joint (Femorotibial)
 - Caudocranial Projection of the Stifle Joint (Femorotibial)
 - Lateral Projection of the Pelvis
 - Ventrodorsal Projection of the Pelvis-extended
 - Lateral Projection of the Cervical Vertebral Column
 - Lateral Projection of the Thoracolumbar Vertebral Column
 - Lateral Projection of the Lumbar Vertebral Column
 - Ventrodorsal Projection of the Cervical Vertebral Column
 - Lateral Projection of the Skull
 - Ventrodorsal Projection of the Skull
 - Rostrocaudal Projection of the Canine Open Mouth Tympanic Bulla
 - Rostrocaudal 90 degree Projection of the Frontal Sinus
 - Extraoral Ventrodorsal Left to Right 30 degree Lateral Oblique Projection of the Maxillary Dental Arcade
 - Extraoral Dorsoventral Left to Right 30 degree Lateral Oblique Projection of the Mandibular Dental Arcade

**Anesthesia must be administered and monitored by a veterinarian or a registered veterinary technician for specific reasons:

- a) This is your diagnostic imaging mentorship and you need to focus on the radiographic procedures.
 - b) Unless you have had your anesthesia mentorship, you have not been educated in the administration of anesthesia.
3. The "Preparation of a Radiographic Technique Chart" task is lengthy and can take anywhere from 2-3 hours to complete. It is wise to seek help ahead of time and have all materials prepared prior to anesthetizing the dog. This is why we require a DVM or RVT to assist you in this task.
 4. You need your technique chart worksheet from prerequisite coursework to complete this task.
 5. Task 1 requires that you provide the Standard Operating Procedure (SOP) for the particular machine that is in use. Please provide the technique chart for the machine and any special instructions or other material that are used in conjunction with the machine and the type of film and screens used
 6. Animal Use Guidelines are not outlined for this mentorship because it is assumed that one dog will be sedated and used for all views in as short a time as possible, with appropriate monitoring.

If you have further questions either prior to or during this mentorship, please contact the mentorship coordinator or the instructor.

SELECTION OF CLINICAL MENTORSHIP SUPERVISOR

The Clinical Mentorship Supervisor is the person who will sign your Logbook and verify performance of tasks at the Clinical Mentorship site. This person must be a credentialed veterinary technician (have graduated from an AVMA accredited program or met State requirements for credentialing as a veterinary technician) or a licensed veterinarian.

An individual who claims to be a “veterinary technician” but has not met the criteria for credentialing above is not eligible to be a mentorship supervisor.

The individual is not considered to be an employee of Purdue University when acting as your Clinical Mentorship supervisor.

Each Clinical Mentorship Supervisor must complete the *Clinical Mentorship Supervisor Agreement*. You must return this agreement with the other agreements prior to beginning your Clinical Mentorship.

Should your Clinical Mentorship Supervisor change during the course of the Clinical Mentorship, you will need to have your new supervisor complete a *Clinical Mentorship Supervisor Agreement* and return it to the Purdue VTDL office. These forms are available on the VTDL website for downloading and printing.

CRITERIA HANDBOOK AND LOGBOOK

This Criteria Handbook and Logbook contains the list of tasks that must be successfully completed in order to receive credit for this Clinical Mentorship. You are expected to have learned the basics of how, why, and when each procedure is to be done from the courses listed as pre-requisites for this Clinical Mentorship. This booklet contains the directions and forms that must be followed and completed in order to meet the standards set for successful completion of this Clinical Mentorship.

Please read each component of each task carefully before doing the task to minimize the number of times you have to repeat the task. The components of each task are summarized:

Goal – Describes the ultimate outcome of the task you will perform.

Description – Lists the physical acts that you will perform, and under what conditions these acts will be completed.

Criteria – Lists specific, observable, objective behaviors that you must demonstrate for each task. Your ability to demonstrate each of these behaviors will be required in order to be considered as having successfully completed each task.

Number of Times Task Needs to be Successfully Performed – States the required number of times to repeat the tasks. The patient's name and the date each repetition of the task was performed must be recorded on the Task Verification Form.

EACH REQUIRED REPETITION OF THE TASK MUST BE PERFORMED ON A DIFFERENT ANIMAL. You cannot use the same animal to do all of the repetitions of a task. However, you can use the same animal to perform different tasks. In other words, you can't do three ear cleanings on the same animal, however, you can do an ear cleaning, an anal sac expression, and a venipuncture on the same animal.

Materials Submitted for Evaluation and Verification – These specific materials, which usually include video or other materials, must be submitted to demonstrate that you actually performed the task as stated. Each evaluation states specifically what must be shown in the submitted materials.

The Purdue University course instructor for this Clinical Mentorship has the option to request further documentation if the submitted materials do not clearly illustrate the required tasks.

It is recommended that the video materials document all angles of the procedure. The purpose of the video and other material is to provide "concrete evidence" that you were able to perform the task to the standard required.

If you do not own a video camera, one may be borrowed or rented. Pre-planning the video procedures will help reduce the need to redo the video documentation. Explain what you are doing as you perform the video documentation, as narration will help the evaluator follow your thought process and clarify what is seen on the video. Voiceovers may be done to clearly explain what is being performed. At the beginning of each task, clearly announce what task you are doing, or insert a written title in the video.

Videotapes, photographs, radiographs, slides, written projects, the Criteria Handbook and Logbook and any other required documentation will not be returned. These items will be kept at Purdue as documentation of the student's performance for accreditation purposes.

This validation is essential to help the Purdue VTDL meet AVMA accreditation criteria. Therefore, it is essential that you follow the evaluation and validation requirements.

Task Verification Forms – Each task has a form that must be completed and signed by the Clinical Mentorship Supervisor.

Supplementary Materials – Logs, written materials, photographs, or other forms/documentation may be required for specific tasks. Be sure to read the Materials to be Submitted for Evaluation section very carefully and return all documented evidence as prescribed.

COMPLETION OF THE CLINICAL MENTORSHIP

Mentorship logbooks include due dates for sections of courses. Each section must arrive at Purdue by the deadline (not a postmark date).

Paperwork may be

- FAXed to 765-496-2873
- e-mailed to phegleyp@purdue.edu
- sent by regular mail to 625 Harrison Street, Lynn Hall G171, West Lafayette, IN 47907

Videos may be submitted

- in the Media Gallery of Blackboard. If submitted on Blackboard, send an e-mail to phegleyp@purdue.edu notifying of the submission. ***This is the preferred method of online submission***, since it does not limit how much you put on, is no cost to you, and automatically archives here. You must assign the videos to the correct course in order for the instructor to view them.
- by an online source such as Dropbox. If a password is required to open videos submitted with an online service, email the password to phegleyp@purdue.edu. These methods may not be acceptable if they cannot be archived.
- by sending on a disc or flash drive by regular mail to 625 Harrison Street, Lynn Hall G171, West Lafayette, IN 47907

Late submissions will incur a grade penalty. Incomplete grades will no longer be assigned for mentorships at the end of each semester.

Feedback will be emailed until all tasks are completed successfully. A hard copy will be sent when the course is complete and a grade is assigned. As necessary, instructors may require resubmission of some tasks. When feedback is sent, due dates for resubmissions will be given. *It is crucial that students with pending feedback check their Purdue emails frequently so this information is received in a timely manner.*

Final approval of successful performance and completion of the Clinical Mentorship will be made by the Purdue University instructor in charge of the Clinical Mentorship based upon the documentation provided by the student.

Upon successful completion of all tasks in the clinical mentorship course, a grade will be assigned by the course instructor based upon the documented performance of the tasks.

CLINICAL MENTORSHIP TASKS

INTRODUCTION TO ESSENTIAL TASKS AND CRITERIA

Before starting each task:

1. Read the Goal, Description, Criteria, and Materials to be Submitted for Evaluation and Verification. Understand what is expected of you for each task.
2. Make sure you have whatever equipment and supplies you need to document the task. Pay particular attention to the details of what needs to be documented and submitted.
3. Make sure you obtain appropriate permissions where necessary. Please inform the facility's owner/manager of your activities. A good relationship with the veterinarian in charge is key to having a positive Clinical Mentorship experience.

After performing each task:

4. Label all items submitted so that the materials you submit for evaluation and validation at Purdue are identified as your submission.
5. Label all videos posted to Blackboard with the name of the task performed.
6. Submit materials to Purdue by the deadlines listed in the logbooks.

CLINICAL MENTORSHIP PROJECTS

INTRODUCTION TO SPECIAL PROJECTS

Certain mentorships will have required projects to complete in addition to the required tasks. These are things that are better assessed in the form of a project. Projects should be typed, and checked for correct grammar and spelling.

Before starting each project

1. Read through the project in its entirety. This will give you a description of the project and what is needed to complete it successfully.
2. Determine what materials, if any, need to be submitted for completion of the project.
3. Most projects will come with a list of questions that need to be answered. The responses should be placed inside the notebook for submission with other materials.
4. If videotaping is required for a project, it should be noted on the videotape verbally that this is for the project and not another required task. Some projects may require a verbal narration of a student doing something. Each individual project will define if that is a necessary requirement for that project.

Note: Videotaping and photographs are not for the purpose of verifying if the practice is within OSHA compliance or other government regulations. These projects are for the student's education. It may be determined by the student that the practice is not within the current recommendations. The purpose of these projects is to make the student aware of these issues, and how to recognize the issues and develop suggestions for improvement.

There will be certain mentorships where OSHA recommendations, in regards to equipment and policies, will be facility requirements for the mentorship.

1. VETERINARY FACILITY STANDARD OPERATING PROCEDURE FOR X-RAY MACHINE

This information is to help us evaluate the facility's current usage of the x-ray machine. The information you provide should be prior to the creation of the technique chart task.

1. Provide the Standard Operating Procedure (SOP) for the particular machine that is in use.
 - a. Provide make and model of the machine.
 - b. Provide minimum and maximum kVp output of the machine.
 - c. Provide the technique chart that is currently used with the machine if one has existed prior.
 - d. Provide any special instructions or other material that are used in conjunction with the machine.
 - e. Specify the type of film and screens used.
 - f. State whether the machine has a grid, or not.
 - g. State the weight, size and age of the dog being used to complete the technique chart
 - h. Using the time and mA stations available on the x-ray machine, construct a variable mAs matrix chart as defined in the textbook and using the information in Appendix III
 - i. Place the dog in right lateral recumbency and use the calipers to measure the abdomen at the highest point over the liver. State the exact measurement of the dog.
 - j. State the machine maximum and minimum kVp values
 - k. Correctly interpret the caliper measurement according to the manufacturer's instructions and use the measurements to construct a variable kVp chart as defined in the textbook and Appendix III
2. Provide a written, step-by-step outline of the procedure that will be used with this equipment, to produce a diagnostic technique chart. Include all calculations/equations needed to produce the technique chart.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

Written answers to the following:

- Provide make and model of the machine.
- Provide minimum and maximum kVp output of the machine.
- Provide the technique chart that is currently used with the machine if one has existed prior.
- Provide any special instructions or other material that are used in conjunction with the machine.
- Specify the type of film and screens used.
- State whether the machine has a grid, or not.
- State the weight, size and age of the dog being used to complete the technique chart
- Using the time and mA stations available on the x-ray machine, construct a variable mAs matrix chart as defined in the textbook and prerequisite course worksheet
- Place the dog in right lateral recumbency and use the calipers to measure the abdomen at the highest point over the liver. State the exact measurement of the dog.
- State the machine maximum and minimum kVp values
- Correctly interpret the caliper measurement according to the manufacturer's instructions and use the measurements to construct a variable kVp chart as defined in the textbook and the course worksheet.
- Provide a written, step-by-step outline of the procedure that will be used with this equipment, to produce a diagnostic technique chart. Include all calculations/equations needed to produce the technique chart.

Special Instructions for PREPARATION OF A RADIOGRAPHIC TECHNIQUE CHART

*If your veterinary facility has no detail cassettes, please refer to Appendix II for adaptations.

- Step 1:** Review Han and Hurd (textbook) and Appendix III for Technique Chart development.
- Step 2:** Prepare mAs matrix chart multiplying the time and mA stations on your machine.
Multiply time and mA station to complete mAs matrix chart.
- Step 3:** With your project dog in right lateral recumbency, measure the abdomen at the highest point over the liver.
- Step 4:** Using the measurement obtained in Step 3, prepare kVp chart according to Han and Hurd.
- Step 5:** Ask anesthetist to induce anesthesia/sedate in your dog and get them to a stable anesthetic plane.
- Step 6:** Once the dog is anesthetized/sedated, prepare for the three trial views.
-Choose from the mAs matrix chart the three values that most closely meet the 1, 3 and 6 mAs discussed in Han and Hurd.
- Step 7:** Obtain the three trial views on the single cassette according to Han and Hurd and task criteria.
- Step 8:** Chose best exposure of the three as the known value for your mAs conversion chart
-if none of these exposures are acceptable, return to mAs matrix chart and repeat steps 6 and 7 with different mAs values.

**Remember that the technique chart is a guide for exposure factors. Adjustments may be needed based on the patient type or the pathology of the patient.

2. PREPARATION OF A RADIOGRAPHIC TECHNIQUE CHART

Goal: To develop a radiographic technique chart

Description: The student, using an anesthetized dog (40-50 pounds), will develop a technique chart that will aid in the production of consistent diagnostic quality radiographs.

Notes:

- 1. The student will use an anesthetized dog that is being monitored by an RVT or DVM so the student may concentrate on the development of the technique chart.*
- 2. Criteria for thoracic and abdominal views may be found in Appendix I at the end of this logbook. All other criteria may be found in the main body of this logbook.*
- 3. Criteria adaptations for a clinic which has no detail cassettes available may be found in Appendix II at the end of this logbook.*

Criteria: The student selected the best possible film/screen combination available, and assured that the film/screen combination remained consistent throughout the technique chart development, as defined in the textbook, Appendix III, and veterinary facility SOP (Standard Operating Procedure).

The student assured that the processing chemicals were fresh, stirred and not expired.

If using a manual processing tank, the student assured the chemical processing time and temperature relationship was consistent throughout the duration of the task.

If using an automatic processor, the student assured the chemical processing temperature was consistent throughout the duration of the task.

The student surveyed the darkroom for light leaks and examined the safelight filter for cracks.

The student maintained the same focal film distance of 36-40 inches for each radiographic projection, throughout the duration of the tasks.

The student chose a dog weighing 40-50 pounds, not grossly over-or underweight, and without ascites or dehydration. **The student indicated the exact weight of the dog used.**

The student had a DVM or RT anesthetize or heavily sedate and monitor the dog for the duration of the task.

Using the time and mA station matrix chart from Task 1, the student selected the three trial exposure values from the matrix chart that most closely matched 1.0 mAs, 3.0 mAs and 6.0 mAs as defined in the textbook and Appendix III, and submitted a copy of the chart with the values circled that were used for the trial views.

Using a 14 x 17 cassette, the student placed the cassette on the x-ray table and directly underneath the right lateral recumbent dog.

The student covered 2/3 of the cassette with thin flexible lead blocking strips and collimated to prevent x-rays from penetrating that portion of the cassette, centering the exposed 1/3 of the cassette under the previously measured area of the liver and produced the first trial exposure. (lead gloves may be used in place of lead strips)

The student then moved the cassette and shifted the lead blocking strips underneath the dog in order to make the next 2 trial exposures of the measured area.

The student processed the film with the 3 trial exposures and chose the technique that allowed the best visualization of the differing soft tissue densities for an abdomen technique: lots of shades of gray.

The student calculated the mAs conversion chart using this chosen technique as the known value of table top abdomen as described in the textbook and Appendix III.

The student produced and processed a lateral tabletop abdominal radiograph using a high-speed or par cassette and the chosen known value, thus establishing a tabletop abdominal technique.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

The student produced and processed a lateral grid abdominal radiograph using a high-speed or par cassette and the calculated conversion value from the mAs conversion chart, thus establishing a grid abdominal technique.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

The student produced and processed a lateral tabletop thoracic radiograph using a high-speed or par cassette and the calculated conversion value from the mAs conversion chart, thus establishing a tabletop thoracic technique.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

The student produced and processed a lateral thoracic radiograph, using grid technique using a high-speed or par cassette and the calculated conversion value from the mAs conversion chart, thus establishing a grid thoracic technique.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

The student produced and processed a mediolateral radiograph of the radius and ulna using tabletop technique and a detail (slow speed) cassette and the calculated conversion value from the Mas conversion chart, thus establishing a tabletop technique. If there are no detail cassettes available, refer to Appendix II.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

The student produced and processed a lateral skull radiograph using a detail (slow speed) cassette and the calculated conversion value from the mAs conversion chart, thus establishing a radiograph, using grid technique. If there are no detail cassettes available, refer to Appendix II.

If the image was non-diagnostic (under- or over-exposed) the student made appropriate adjustments and repeated the view.

If at any time during the technique chart development process the radiographs had too much or too little density with the chosen calculated conversion techniques, the student produced adjustments to the mAs values according to the textbook and the VCS 14300 Module 6 worksheets.

The student submitted a **detailed** written narrative of the process of developing their technique chart, clearly explaining the choices made and reason why, or verbally explained the same **in detail** on the video.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Preparation of a Radiographic Technique Chart skill, signed by the Clinical Mentorship supervisor.
2. Written or verbal detailed narrative for Technique Chart to include the following:
 - a. A brief statement on the importance of a technique chart.
 - b. The signalment of the project dog.
 - c. Detailed discussion or outline of the three trial views.
 - d. Detailed discussion or outline of images and each step of the process.
 - e. Describe thought process as you worked through each step.
 - f. Validate the technique choices that were made for each radiograph.
3. Written
 - g. mAs matrix chart
 - h. kVp chart
 - i. mAs conversion chart
4. The developed films from the required views taken while developing the Radiographic Technique Chart, clearly marked with the following information on each:
 - a. View
 - b. mA used
 - c. s (time) used
 - d. kVp used

Student Name: _____

Supervisor Name: _____

RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

3. MEDIOLATERAL PROJECTION OF THE SHOULDER (SCAPULOHUMERAL) JOINT TECHNIQUE

- Goal:** To produce a diagnostic mediolateral radiographic projection of the shoulder (scapulohumeral) joint
- Description:** The student will position the animal in lateral recumbency and produce a mediolateral shoulder radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the anatomic region to be radiographed and appropriately collimated the primary beam to include only the landmarks for the shoulder joint as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in lateral recumbency with the shoulder joint of interest nearest to the x-ray table.
- The limb of interest was then extended and secured cranially such that the proximal portion of the limb was not superimposed on the rest of the body.
- The opposite front limb was extended and secured caudally, such that it was not superimposed over the shoulder joint of interest.
- The student positioned the animal such that the x-ray beam would enter the medial side of the shoulder joint and exit the lateral side.
- The student extended and secured the head and neck dorsally such that the head and neck created a 90° angle with the extended limb of interest and the trachea would not be superimposed over the shoulder joint.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer instructions.
- The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker just cranial to the shoulder joint of interest.
- The student selected the exposure factors for producing a diagnostic a radiograph.
- The student produced the radiograph with proper collimation such that only the landmarks for the entire shoulder joint and the correct “right” or “left” marker are included.
- No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Mediolateral Shoulder Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed Mediolateral shoulder image, clearly labeled.
3. Written Self Evaluation of Image including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

4. CAUDOCRANIAL PROJECTION OF THE SHOULDER (SCAPULOHUMERAL) JOINT

- Goal:** To produce a diagnostic caudocranial radiographic projection of the shoulder (scapulohumeral) joint
- Description:** The student will position the animal in dorsal recumbency and produce a caudocranial shoulder radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:**
- The student selected a size of cassette appropriate or the anatomic region to be radiographed and appropriately collimated the primary beam to include only the landmarks for the shoulder joint as defined in the textbook.
 - The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
 - The student positioned the animal in dorsal recumbency with the shoulder joint of interest extended cranially and parallel to the x-ray table.
 - The opposite front limb was extended and secured caudally, such that it was not superimposed over the shoulder joint of interest. The head is then pushed slightly laterally away from the affected limb.
 - The student positioned the animal such that the x-ray beam would enter the caudal side of the shoulder joint and exit the cranial side.
 - The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer instructions.
 - The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker just cranial to the shoulder joint of interest.
 - The student selected the exposure factors for producing a diagnostic a radiograph.
 - The student produced the radiograph with proper collimation such that only the landmarks for the entire shoulder joint and the correct "right" or "left" marker are included.
 - No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

4. Task Verification Form for Caudocranial Shoulder Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
5. One processed caudocranial shoulder image, clearly labeled.
6. Written Self Evaluation of Image including:
 - g. mAs and kVp settings
 - h. Positioning critique
 - i. Landmark critique
 - j. Collimation critique
 - k. Exposure factor critique including any improvements that could be made
 - l. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

5. MEDIOLATERAL PROJECTION OF THE RADIUS/ULNA (ANTEBRACHIUM) TECHNIQUE

Goal: To produce a diagnostic mediolateral radiographic projection of the radius/ulna (Antebrachium).

Description: The student will position the animal in lateral recumbency and produce a mediolateral radius/ulna radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the anatomic region to be radiographed and appropriately collimated the primary beam to include only the landmarks for the radius/ulna as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency with the radius/ulna of interest nearest to the x-ray table.

The student extended and secured the radius/ulna of interest cranially to prevent superimposition by the rest of the body.

The student positioned the animal such that the x-ray beam would enter the medial side of the radius/ulna and exit the lateral side.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker just cranial to the radius/ulna of interest.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included the correctly chosen lead limb marker and the landmarks for the entire radius/ulna, including the joints proximal and distal.

No part of the lead glove appeared on the radiograph..

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Mediolateral Projection of the Radius/Ulna (Antebrachium) Joint skill, signed by the Clinical Mentorship supervisor.
2. One processed mediolateral image of the radius/ulna, clearly labeled.

3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

6. CRANIOCAUDAL PROJECTION OF THE RADIUS/ULNA (ANTEBRACHIUM) TECHNIQUE

Goal: To produce a diagnostic craniocaudal radiographic projection of the radius/ulna.

Description: The student will position the animal in sternal recumbency and produce a craniocaudal radius/ulna radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the anatomic region to be radiographed and appropriately collimated the primary beam to include only the landmarks for the radius/ulna as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in sternal recumbency such that the caudal surface of the radius/ulna of interest was lying directly on the x-ray table with the cranial side of the limb facing up.

The student extended and secured the radius/ulna of interest cranially to prevent superimposition by any part of the body.

The student positioned the head and neck to prevent superimposition over the radius/ulna of interest.

The student positioned the x-ray tube head such that the x-ray beam would enter the cranial side of the radius/ulna and exit the caudal side.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker on the lateral side of the radius/ulna.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included the correctly chosen lead limb marker and the landmarks for the entire radius/ulna, including the joints proximal and distal.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Craniocaudal Radius/Ulna Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed Craniocaudal radius/ulna image, clearly labeled.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

7. MEDIOLATERAL PROJECTION OF THE STIFLE (FEMOROTIBIAL) JOINT TECHNIQUE

- Goal:** To produce a diagnostic mediolateral radiographic projection of the stifle joint.
- Description:** The student will position the animal in lateral recumbency and produce a mediolateral stifle joint radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the anatomic region to be radiographed and appropriately collimated the primary beam to include only the landmarks for the stifle joint as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in lateral recumbency with the stifle joint of interest nearest the x-ray table.
- The student extended and secured the limb of interest ventrally and slightly caudally to prevent superimposition by the body.
- The opposite rear limb was flexed and positioned dorsally and slightly cranially over the body and secured that this limb was not superimposed over the stifle joint of interest.
- The student placed padding under the ischium and/or the hock as needed to prevent image distortion or obliquing of the stifle joint, and to ensure the stifle and tibial crest were parallel to the x-ray table.
- The student positioned the animal such that the x-ray beam would enter the medial side of the stifle joint and exit the lateral side.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker just cranial to the stifle joint.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student produced the radiograph such that the collimated image included the correctly chosen lead limb marker and the landmarks for the entire stifle joint, including 2" proximal and distal to the joint.
- No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Mediolateral Stifle Joint Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed Mediolateral stifle joint images, clearly labeled.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

8. CAUDOCRANIAL PROJECTION OF THE STIFLE (FEMOROTIBIAL) JOINT TECHNIQUE

- Goal:** To produce a diagnostic caudocranial radiographic projection of the stifle joint.
- Description:** The student will position the animal in sternal recumbency and produce a cranial stifle joint radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the pelvis to be radiographed and appropriately collimated the primary beam to include only the landmarks for the stifle joint as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in sternal recumbency such that the stifle joint of interest was lying directly on the x-ray table.
- The student extended and secured the limb of interest caudally in caudocranial position to prevent superimposition of the body over the stifle joint.
- The opposite rear limb was positioned such that it did not superimpose over the stifle joint of interest.
- Padding was placed beneath the opposite rear limb and hip to insure optimal positioning and to prevent obliquing or distortion of the stifle joint of interest.
- The student positioned the animal such that the x-ray beam would enter the caudal side of the stifle joint and exit the cranial side.
- The student positioned the animal such that the patella of interest was centered in the trochlear groove, and perpendicular to the x-ray beam.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected a lead R or L limb marker according to which limb was being imaged and placed the marker on the lateral side of the stifle.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student produced the radiograph such that the collimated image included the correctly chosen lead limb marker, the entire stifle joint, clearly defined joint spaces and 2" proximal and distal to the joint.
- No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successful Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Caudocranial Stifle radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed caudocranial stifle image
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

9. LATERAL PROJECTION OF THE PELVIS TECHNIQUE

- Goal:** To produce a diagnostic lateral radiographic projection of the pelvis
- Description:** The student will position the animal in right lateral recumbency and produce a lateral pelvic radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the pelvis to be radiographed and appropriately collimated the primary beam to include only the landmarks for the pelvis as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in right lateral recumbency on the x-ray table.
- The student extended and secured the right hind limb cranially 20° and extended and secured the left hind limb 20 ° caudally.
- The student placed padding between the femurs to prevent obliquing of the pelvic region.
- The student positioned the animal such that the center of the x-ray beam would enter at the greater trochanter.
- The student collimated the primary beam to include only the landmarks for the pelvic region.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected a lead R or L limb marker and placed it near the appropriate limb.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student produced the radiograph such that the collimated image included only the landmarks for the pelvis.
- No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Pelvic Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral pelvic image.
3. Self-evaluation of radiograph including:
 - a. mAs and kVp setting
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

10. VENTRODORSAL EXTENDED PROJECTION OF THE PELVIS TECHNIQUE

Goal: To produce a diagnostic ventrodorsal extended radiographic projection of the pelvis.

Description: The student will position the animal in ventrodorsal recumbency and produce a ventrodorsal extended pelvic radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the pelvis to be radiographed and appropriately collimated the primary beam to include only the landmarks for the ventrodorsal pelvis as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in dorsal recumbency with the front limbs extended and secured cranially and the rear limbs extended and secured caudally.

The student positioned the animal such that each patella was perpendicular to the x-ray beam and centered in the trochlear groove and then secured the stifles to maintain this position.

The student ensured the rear limbs were parallel to the x-ray table, equally extended and as close to the table as possible to prevent increased object film distance and/or foreshortening.

The student positioned the pelvis such that the pelvic girdle was not angled in relation to the femurs.

The student placed a lead R or L marker next to the corresponding lateral side of the pelvis.

The student positioned the animal such that the x-ray beam would be centered between the coxofemoral joints at the level of the pubic symphysis.

The student collimated the primary beam to include the wings of the ilium and the stifle joints.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image include the correctly chosen lead limb marker and the landmarks for the ventrodorsal extended pelvic view.

No part of the lead glove appeared on the radiograph.

Number of Times Task needs to be Successfully Performed:

1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Ventrodorsal Extended Pelvis Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed ventrodorsal extended pelvic image.
3. Self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____

RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

11. LATERAL PROJECTION OF THE CERVICAL VERTEBRAL COLUMN TECHNIQUE

Goal: To produce a diagnostic lateral cervical vertebral column radiographic projection.

Description: The student will position the animal in lateral recumbency and produce a lateral cervical vertebral column radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the vertebral column to be radiographed and appropriately collimated the primary beam to include only the landmarks for the cervical vertebral column as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency.

The student secured the front limbs caudally while positioning the hindquarters dorsally and extending the head and neck cranially.

The student positioned the animal such that the cervical vertebrae were extended in a straight line from the tympanic bulla to halfway between the point of the shoulder and the dorsal tip of the spine of the scapula.

The student positioned the animal such that the x-ray beam was centered over the cervical (4-5) vertebrae at the level of the thoracic inlet.

The student used padding beneath the cervical region as necessary to prevent obliquing or false narrowing of joint spaces.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the cervical vertebral column.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Cervical Vertebral Column Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral cervical vertebral column image.
3. Self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

12. LATERAL PROJECTION OF THE THORACOLUMBAR (T13-L1) VETEBRAL COLUMN TECHNIQUE

Goal: To produce a diagnostic lateral thoracolumbar (T13-L1) vertebral column radiographic projection.

Description: The student will position the animal in lateral recumbency and produce a T13-L1 vertebral column radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the vertebral column to be radiographed and appropriately collimated the primary beam to include only the landmarks for the T13-L1 vertebral column as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency.

The student secured the front legs cranially and evenly from the body and extended the rear limbs caudally and evenly from the body.

The student used padding beneath the dorsal spine, ventral abdomen or between the legs as needed to prevent obliquing or false narrowing of the joint spaces.

The student positioned the animal so that the x-ray beam was centered over T13-L1.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the T13-L1 vertebral column.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Thoracolumbar Vertebral Column Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral thoracolumbar vertebral column image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

13. LATERAL PROJECTION OF THE LUMBAR VERTEBRAL COLUMN TECHNIQUE

- Goal:** To produce a diagnostic lateral lumbar vertebral column radiographic projection.
- Description:** The student will position the animal in lateral recumbency and produce a lumbar vertebral column radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the vertebral column to be radiographed and appropriately collimated the primary beam to include only the landmarks for the lumbar vertebral column as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in lateral recumbency.
- The student secured the front legs cranially and evenly from the body and extended the rear limbs caudally and evenly from the body.
- The student placed padding between the rear limbs and/or under the dorsal lumbar area or ventral abdomen to ensure the lumbar spine was parallel to the x-ray table, and to prevent obliquing and/or false narrowing of the joint space.
- The student positioned the animal such that the center of the x-ray beam would enter at a point between the 4th and 5th lumbar vertebrae.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student produced the radiograph such that the collimated image included only the landmarks for the lumbar vertebral column.
- No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Lumbar Vertebral Column Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral lumbar vertebral column image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

14. VENTRODORSAL PROJECTION OF THE CERVICAL VERTEBRAL COLUMN TECHNIQUE

Goal: To produce a diagnostic ventrodorsal cervical vertebral column radiographic projection.

Description: The student will position the animal in dorsal recumbency and produce a ventrodorsal cervical vertebral column radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the vertebral column to be radiographed and appropriately collimated the primary beam to include only the landmarks for the cervical vertebral column as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in dorsal recumbency.

The student secured the front limbs caudally and extended the head and neck cranially.

The student positioned the animal such that the cervical vertebrae were extended in a straight line from the tympanic bulla to halfway between the point of the shoulder and the dorsal tip of the spine of the scapula.

The student positioned the animal such that the x-ray beam was centered over the cervical (4-5) vertebrae.

The student used padding beneath the cervical region as necessary to prevent obliquing or false narrowing of joint spaces.

The student placed the calipers at the highest point of the area to be radiographed accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the cervical vertebral column.

No part of the lead glove or endotracheal tube appear on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Ventrodorsal Cervical Vertebral Column Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed ventrodorsal cervical vertebral column image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation technique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

15. LATERAL PROJECITON OF THE SKULL TECHNIQUE

Goal: To Produce a diagnostic lateral skull radiographic projection.

Description: The student will position the animal in lateral recumbency and produce a skull radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the skull to be radiographed and appropriately collimated the primary beam to include only the landmarks for the skull as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency and placed padding as needed beneath the cervical 3-5 vertebrae region to ensure the skull was parallel to the x-ray table.

The student adjusted the positioning of the skull using padding and/or tape as needed such that the patient's eyes, ears and canine teeth were superimposed over one another.

The student positioned the rostral region of the skull using padding and/or tape as needed to ensure the muzzle was parallel to the x-ray table and on the same plane with the cranial portion of the skull and proximal cervical vertebrae.

The student positioned the patient's ears dorsally such that no part of the ears was superimposed over the ski and to prevent additional opacity from affecting the finished radiograph.

The student positioned the animal such that the center of the x-ray beam would enter at the level of the lateral canthus of the eye.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the lateral skull.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Skull Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral skull image.
3. Self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

16. VENTRODORSAL PROJECTION OF THE SKULL TECHNIQUE

- Goal:** To produce a diagnostic ventrodorsal skull radiographic projection.
- Description:** The student will position the animal in dorsal recumbency and produce a ventrodorsal skull radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the skull to be radiographed and appropriately collimated the primary beam to include only the landmarks for the skull as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- The student positioned the animal in dorsal recumbency and placed padding beneath the cervical 3-5 vertebrae region to ensure the skull was parallel to the x-ray table.
- If necessary, the student placed a small amount of padding under one or more areas of the skull to prevent obliquing.
- Using tape, the student attached one end of the tape strip to the opposite side of the x-ray table, running the strip across the table and in between the maxillary and mandibular arcades, resting on or just caudal to the maxillary canine teeth, secured the tape to the other side of the table and adjusted the skull to prevent obliquing and to ensure the hard palate was parallel to the x-ray table.
- The student positioned the patient's ears away from the lateral sides of the skull to prevent superimposition and added opacity to the finished radiograph.
- The student positioned the animal such that the center of the x-ray beam would enter at the level of the lateral canthus of the eye.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student placed a R or L lead marker on the corresponding side of the skull.
- The student produced the radiograph such that the collimated image included only the landmarks for the ventrodorsal skull and the correctly chosen lead marker.
- The student requested reintubation of the animal.
- No part of the lead glove or endotracheal tube appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Ventrodorsal Skull Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed ventrodorsal skull image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

17. ROSTROCAUDAL PROJECTION OF THE CANINE OPEN MOUTH TYMPANIC BULLA TECHNIQUE

- Goal:** To produce a diagnostic open mouth tympanic bulla radiographic projection.
- Description:** The student will position the animal (canine) in dorsal recumbency and produce an open mouth bulla radiograph of diagnostic quality.
- Note:** *Digital imaging may be used to produce this image.*
- Criteria:** The student selected a size of cassette appropriate for the skull to be radiographed and appropriately collimated the primary beam to include only the landmarks for the tympanic bulla as defined in the textbook.
- The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.
- Using sandbags, padding and tape if necessary, the student positioned the animal in dorsal recumbency with the base of the skull resting directly on the x-ray table and the rostral area of the skull positioned perpendicular to the x-ray table and pointing towards the x-ray tube head.
- The student placed tape around the maxillary area of the skull, just caudal to the canine teeth and positioned the rostral maxillary skull 10° cranially while securing the tape to the x-ray table.
- The student placed tape around the mandible at the base of the tongue where the hard and soft palate meet, also taping the endotracheal tube to the mandible, and extended the mandible 30° caudally. The tape was then secured to the end of the table.
- The student verified the endotracheal tube was not kinked or superimposed over the maxillary region before final positioning.
- The student positioned the animal such that the primary x-ray beam was centered between the tympanic bullae, entering the ventral laryngeal area and exiting the dorsal laryngeal area.
- The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student placed R or L lead marker next to the corresponding side of the skull.
- The student selected the exposure factors for producing a diagnostic radiograph.
- The student produced the radiograph such that the collimated image included only the landmarks for the tympanic bulla, and the correctly chosen lead marker.
- No part of the lead glove appeared on the radiograph.
- No part of the endotracheal tube was superimposed over either tympanic bullae.

Number Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Open Mouth Tympanic Bulla Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed open mouth tympanic bulla image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

18. ROSTROCAUDAL 90 DEGREE PROJECTION OF THE FRONTAL SINUS TECHNIQUE

Goal: To produce a diagnostic 90° frontal radiographic projection of the sinus.

Description: The student will position the animal in ventrodorsal recumbency and produce a 90° frontal sinus radiograph of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the skull to be radiographed and appropriately collimated the primary beam to include only the landmarks for the frontal sinus as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in dorsal recumbency, placed padding beneath the cervical 3-5 vertebral region and taped the muzzle to ensure the skull was perpendicular to the x-ray table and the rostral skull was pointed toward the x-ray tube.

The student ensured the endotracheal tube was not kinked.

If necessary, the student placed a small amount of padding under one or more areas of the skull to ensure perpendicular position.

The student positioned the patient's ears away from the lateral sides of the skull to prevent superimposition and added opacity to the finished radiograph.

The student positioned and secured the rostral skull such that the center of the x-ray beam would enter directly between the two frontal sinus cavities, with $\frac{1}{2}$ of the central beam directed toward the frontal sinus cavities and the other $\frac{1}{2}$ of the central beam directed just cranial to the frontal sinus cavities, casting a shadow of the frontal sinus on the x-ray table.

The student verified the endotracheal tube was not kinked or superimposed over the frontal sinus.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student placed a R or L lead marker on the corresponding side of the skull.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the frontal sinus and the correctly chosen lead marker.

No part of the lead glove or endotracheal tube appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for 90° Frontal Sinus Radiographic Technique skill, signed by the Clinical Mentorship supervisor.
2. One processed 90° frontal skull image.
3. Written self-evaluation of radiograph including:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

19. EXTRAORAL VENTRODORSAL LEFT TO RIGHT 30 DEGREE LATERAL OBLIQUE PROJECTION OF THE MAXILLARY DENTAL ARCADE

Goal: To produce a diagnostic extraoral ventrodorsal oblique radiographic projection of the maxillary dental arcade

Description: The student will position the animal in lateral recumbency and produce an extraoral oblique radiograph of the maxillary dental arcade of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the dental arcade to be radiographed and appropriately collimated the primary beam to include only the landmarks for the maxillary arcade as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency, adjusted padding beneath the cervical 3-5 vertebral region to prevent obliquing and placed a mouth speculum.

The student adjusted the positioning, using padding if necessary, to ensure the skull was angled 30° ventrodorsal from lateral.

The student positioned the rostral region of the skull to ensure the muzzle remained parallel to the x-ray table and on the same plane with the cranial portion of the skull and proximal cervical vertebrae.

The student positioned the patient's ears dorsally to prevent superimposition and additional opacity.

Using padding and/or tape, as necessary, the student positioned the animal such that the center of the x-ray beam would enter the skull from a ventral angle striking the medial occlusal surface of the maxillary arcade and exiting the lateral-dorsal skull surface of the maxillary arcade.

The student placed the appropriate oblique marker within the collimated area of the primary beam.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the maxillary arcade and the appropriate oblique marker.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

1. Task Verification Form for Lateral Extraoral Oblique Radiograph of the Maxillary Arcade skill, signed by the Clinical Mentorship supervisor.
2. One processed lateral extraoral oblique image of the maxillary arcade.
3. Written self-evaluation of radiograph oblique image of the mandibular arcade:
 - a. mAs and kVp settings
 - b. Positioning critique
 - c. Landmark critique
 - d. Collimation critique
 - e. Exposure factor critique including any improvements that could be made
 - f. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

20. EXTRAORAL DORSVENTRAL LEFT TO RIGHT 30 DEGREE LATERAL OBLIQUE PROJECTION OF THE MANDIBULAR DENTAL ARCADE

Goal: To produce a diagnostic extraoral oblique radiographic projection of the mandibular dental arcade

Description: The student will position the animal in lateral recumbency and produce an extraoral oblique radiograph of the mandibular dental arcade of diagnostic quality.

Note: *Digital imaging may be used to produce this image.*

Criteria: The student selected a size of cassette appropriate for the dental arcade to be radiographed and appropriately collimated the primary beam to include only the landmarks for the mandibular arcade as defined in the textbook.

The student selected a detail (slow speed) cassette, or made adjustments outlined in Appendix II for rapid speed cassettes, or used a digital imaging receptor.

The student positioned the animal in lateral recumbency, adjusted padding beneath the cervical 3-5 vertebral region to prevent obliquing and placed a mouth speculum.

The student adjusted the positioning, using padding if necessary, to ensure the skull was angled 30° dorsoventral from lateral.

The student positioned the rostral region of the skull to ensure the muzzle remained parallel to the x-ray table and in line with the cranial portion of the skull and proximal cervical vertebrae.

The student positioned the patient's ears dorsally to prevent superimposition and additional opacity.

The student, using padding and tape if necessary, positioned the animal such that the center of the x-ray beam would enter the skull from a dorsal angle, first striking the medial occlusal surface of the mandibular arcade and exiting the ventral-lateral surface of the mandibular arcade.

The student placed the appropriate oblique marker within the collimated area of the primary beam.

The student placed the calipers at the highest point of the area to be radiographed and accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors for producing a diagnostic radiograph.

The student produced the radiograph such that the collimated image included only the landmarks for the mandibular arcade and the appropriate oblique marker.

No part of the lead glove appeared on the radiograph.

Number of Times Task Needs to be Successfully Performed: 1

Materials Submitted for Evaluation and Verification:

4. Task Verification Form for Lateral Extraoral Oblique Radiograph of the Mandibular Arcade skill, signed by the Clinical Mentorship supervisor.
5. One processed lateral extraoral oblique image of the mandibular arcade.
6. Written self-evaluation of radiograph oblique image of the mandibular arcade:
 - g. mAs and kVp settings
 - h. Positioning critique
 - i. Landmark critique
 - j. Collimation critique
 - k. Exposure factor critique including any improvements that could be made
 - l. Evaluate radiographic overall quality on a scale of 1 to 10 with 10 being the perfect radiograph

Student Name: _____

Supervisor Name: _____ RVT, CVT, LVT
DVM, VMD

Date: _____

I verify that the student performed this task under my supervision.

Signature of Clinical Mentorship Supervisor: _____

21. RADIOGRAPHIC CONTRAST STUDY PROJECT

The student will participate in a radiographic contrast study and provide a written report on the procedure. Examples of appropriate procedures for this task include the following:

Esophogram
Gastrogram
Cystogram
Excretory Urogram
Myelogram
Fistulogram
Arthrogram
Upper Gastrointestinal Series
Barium Enema
Urethrogram
Vaginogram
Sialogram
Celiogram
Angiocardiogram

The student will submit a written report that includes the following:

- Patient signalment
- Patient history
- Physical exam findings
- Contrast study performed and reason
- Discussion of patient preparation necessary for this procedure and the importance of this preparation
- Discussion of survey radiographs taken and the importance of these views
- Contrast media used for the procedure and any contraindications for this type
- Discussion of whether this was a positive, negative, or both contrasts study, and how the contrast appears on a radiograph
- Result of the contrast study and any post-procedure care provided to the patient
- Synopsis of procedure, the student's role in the procedure, and any changes the student would suggest to improve the process

The paper should be typed, and will be checked for grammar and spelling.

APPENDIX I

LATERAL ABDOMINAL RADIOGRAPHIC TECHNIQUE

Goal: To produce a diagnostic lateral abdominal radiograph.

Description: The student will position the animal in right lateral recumbency such that a lateral abdominal radiograph of diagnostic quality can be produced.

Criteria: The student followed standard safely procedures as defined in the textbook.

The student positioned the animal in right lateral recumbency.

If multiple sizes of cassettes are available, the student selected a size of cassette appropriate for the size of the animal to be radiographed.

If multiple sizes are not available, the student appropriately collimated the primary beam to include only the landmarks for abdominal radiographs as defined in the textbook.

The student extended the rear limbs caudally so that the femur is not superimposed over the caudal abdominal cavity on the radiograph.

The student had the animal positioned so that the sternum and dorsal spinous processes are in a plane parallel to the table, and the wings of the ilium are superimposed (the animal is not rotated).

The student placed the calipers at the highest point of the area to be radiographed.

The student accurately interpreted the caliper measurement according to manufacturer's instructions.

The student selected the exposure factors according to the veterinary facility standard operating procedure for producing a diagnostic radiograph.

The student produced the radiograph at peak expiration.

The student produced the radiograph such that the image included the three rib spaces cranial to the xiphoid as the cranial landmark, and greater trochanter as the caudal landmark. The image should include entire abdomen.

The student used the standard operating procedure exposure technique to visualize the soft tissue contrast.

APPENDIX I (continued)

LATERAL THORACIC RADIOGRAPHIC TECHNIQUE

- Goal:** To produce a diagnostic lateral radiograph of the thorax.
- Description:** The student will position the animal in right lateral recumbency such that a lateral radiograph of diagnostic quality can be produced.
- Criteria:** The student followed standard safety procedures as defined in the textbook.
- The student positioned the animal in right lateral recumbency.
- If multiple sizes of cassettes are available, the student selected a size of cassette appropriate for the size of the animal to be radiographed.
- If multiple sizes are not available, the student appropriately collimated the primary beam to include only the landmarks for thoracic radiographs as defined in the textbook.
- The student extended the front limbs cranially so that the elbow is not superimposed over the thoracic cavity on the radiograph.
- The student had the head and neck in a natural position such that the neck was neither extended nor flexed.
- The student had the animal positioned so that the sternum and dorsal spinous processes are in a plane parallel to the table (the animal is not rotated).
- The student placed the calipers at the highest point of the area to be radiographed.
- The student accurately interpreted the caliper measurement according to manufacturer's instructions.
- The student selected the exposure factors according to the veterinary facility standard operating procedure for producing a diagnostic radiograph.
- The student produced the radiograph at peak inspiration.
- The student produced the radiograph such that the image included the manubrium as the cranial landmark, and halfway between xiphoid and last rib as the caudal landmark. The image should include entire lung field from sternum to the thoracic spinal column.
- The student used the correct exposure technique to visualize the bronchial vasculature.
- No part of the lead glove or positioner appears on the radiograph.

APPENDIX II

SMALL ANIMAL DIAGNOSTIC IMAGING II

Modification of mAs Conversion Chart for X-Ray Machines Without Detail Cassettes (slow-speed)

Table Top Abdomen	=	known value
Grid Abdomen	=	3 X known value
Table Top Thorax	=	½ of known value
Grid Thorax	=	3 X TT Thorax
Table Top Bone	=	known value + 1
Grid Bone	=	3 X TT Bone

Example:

Table Top Abdomen	=	3.3 mAs
Grid Abdomen	=	9.9 mAs
Table Top Thorax	=	1.65 mAs
Grid Thorax	=	4.95 mAs
Table Top Bone	=	4.3 mAs
Grid Bone	=	12.9 mAs

APPENDIX III

SMALL ANIMAL DIAGNOSTIC IMAGING II

How to make a Technique Chart

Variables

- Processing chemicals need to be freshly changed, at proper temperature, and of a consistent brand
- Darkroom needs to be completely sealed
- Safelight and filters need to be working correctly
- Focal film distance needs to be maintained
- Films and film screen combinations need to be consistent and of the same brand

Dog size

- Needs to be 40-50 lbs, medium built, not overweight or underweight
- Be able to lay in right lateral position for long period of time
- Able to be sedated

Measurements and values

- Lay animal in right lateral
- Measure over the highest point of the dog (region of the liver and diaphragm)
- Know the machine's max and min kVp and mAs

kVp

- The measurements of the liver
 - Less than 10 cm = 60 kVp
 - Between 10-20cm = 70 kVp
 - Greater than 20 cm = 80 kVp
 - **Ideal measurement is between 10-20cm**
- Set up the chart by numbering from 1-35 vertically with spaces next to the numbers for kVp values for that measurement
- To begin take the kVp value that corresponds to the measurement you have found
 - To go down, subtract by twos till you either reach 1 or the lowest kVp output. If you reach lowest kVp output before 1, follow below:
 - Take lowest kVp value on the chart and multiply by 20%. Take that new value and add to the lowest kVp value on chart. Put brackets around adjusted measurements. Then keep proceeding down by twos. The corresponding mAs values must be halved for these kVp values
 - To go up, add by twos till 80 kVp is reached, then add by threes till kVp values reach or about to exceed 100 kVp, at 100 kVp add by fours till you reach highest kVp output possible for machine or 35 cm. If you reach highest kVp output follow below:
 - Take the highest kVp value on chart and multiply by 16%. Subtract that number from highest kVp value on chart and continue to add by fours. Put brackets around adjusted measurements. The corresponding mAs value must be double for these kVp values

Note that modifying the kVp outputs may happen more than once to make a 35cm chart.

mAs

- The highest mAs with the least amount of time, is the best option.
- In older machines you might have to figure out the mA and the seconds that your machine does and cross multiply to get all the mAs settings for your machine
- In newer machines this is already done for you so no need to worry.
- To begin the making of a mAs chart
 - Place a 14 x 17 cassette with your normal screen on the x-ray table
 - Divide the cassette into thirds by using lead stripes, gloves, or gowns (whatever lead is available) and cover 2/3rds of the cassette at a time.
 - You will be doing three exposures
 - Place the animal on top of the cassette/lead in right lateral recumbency
 - Mark the area that you are going to use in the three exposures to make sure the same area gets done each time.
 - This area is the liver/diaphragm region (tape this area to mark it)
 - Use the kVp that corresponds to the measurement that you originally made. **kVp remains the same throughout all the exposures!**
 - **You will only change the mAs for the three exposures**
 - First exposure= 1mAs, second exposure= 3mAs, and third exposure=6 mAs
 - If your machine doesn't have these exact mAs choose the closest values
 - For each exposure make sure you move the lead coverings so that the part you just exposed is covered and the unexposed part is now ready to be exposed
 - Process the film and select the most diagnostic image.
 - The most diagnostic image is the image with the best visualization of all variation of soft tissue densities
 - To obtain a diagnostic image, the procedure of 1/3 at a time may have to be redone if none of the first set is diagnostic enough, use three different mAs settings, either lower or higher, depending on your original three exposures
 - The mAs of the diagnostic view becomes the **Known Value** and is what you use to make your mAs conversion chart

mAs conversion chart

- Calculated values may not be values that your machine has, so choose the closest matching value (mAs)
- There are going to be times when the technique is going to need modification
 - Adjustments for very large or small patients
 - Grid vs no grid
 - Detailed cassettes vs no detailed cassettes
- **Soft tissue: (formulas)**
 - Table Top Abdomen=**Known Value mAs**
 - Grid Abdomen= 3 x **Known Value mAs**
 - Table Top Thorax= $\frac{1}{2}$ x **Known Value mAs**
 - Grid Thorax= 3 x (Table Top Thorax mAs)
- **Detail**
 - Table Top Bone= 4 x **Known Value mAs**
 - Grid Bone= 3 x (Table Top Bone mAs)
- **No Detailed**
 - Table Top Bone= **Known Value mAs** + 1
 - Grid Bone = 3 x Table Top Bone mAs
- Now that you have all of your mAs values, check your machine's outputs to see if those values are available. If not, choose the two closest values to your original mAs. Then you want to make more exposures seeing which of the two mAs values produces the best diagnostic image.