Radiology


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Radiology 45 min

Part A: **40 Pts**

- The candidate will be given a sedated or anesthetized canine animal, and an x-ray machine (either digital or conventional), and all appropriate accessories.
- The candidate will be provided with a suspected diagnosis for the animal, and the candidate will position the animal using leg ties, wedges, etc., in order to produce appropriate diagnostic quality radiographic images to confirm or rule out the suspected diagnosis.
- The image(s) produced must be the appropriate views of the appropriate anatomic structures/region and be of diagnostic quality.

Part B: **60 Pts**

- Given a digital or conventional x-ray machine (KVP, Ma, time settings) and a radiographic technique chart specific for that machine, the candidate will determine the required settings for the above exposures, set the machine, employ radiation safety measures and take the required exposures to obtain appropriate diagnostic quality radiographs.
- The candidate will be allowed to evaluate the quality of each initial radiographic image and **allowed to repeat each image only one time**, if desired by candidate. In any situation where images are repeated, the candidate is then allowed to designate which of the two images should be scored.

Summary of this section:

1. Enter the room with **full scrubs, lab gown and pens/ pencils**
2. Ask if anyone is **pregnant or under 18teen**
3. **Wear protective gear: lead apron and thyroid shield**
4. **Measure the thickness of area of interest**
5. Set your **kVP and MAs** base on your measurements.
6. **Set up the focal-film distance which is 40 inches/100 cm** (distance between the collimator and table).
7. Ask **if patient is stable** and if it is ok to remove ECG leads. Then, remove ECG leads.
8. Position the patient base on the area of exposure needed for the given case. **Use only ties, wedges, sandbags, tape, etc.**
9. **Position the x-ray source and collimate**.
10. **Place lead markers** to mark side (R - right side down/right leg, L - left side down, left leg). **Tip use a tape to place the marker when you are taking VD**
11. Let personnel know that you are ready to take the shot and **ask them to leave the room**
12. **Move pedal and shield to the maximum distance** (examiner behind the shield with you)
13. **Notify the examiner and techs** when you are about to take xRay and take it
14. Repeat the process for the next view

Reminders and quality control

Reminders:

- Prior to positioning patient on the table:
  - **make sure machine is turned on**
  - **have at hand technique chart, caliper (for measurement)**
  - know what study is requested and landmarks
  - know how to move the table
  - **adjust collimator**
  - Have all PPE ready to put on have positioning markers close by
  - Have positioning devices ready.
    - Avoid scattered radiation: Use only ties, wedges, sandbags, tape, etc. Gloves only protects from scattered radiation and not from the primary radiation.
  - if pet is anesthetized (monitoring devices should be in the room)
- Objects should be parallel to the film, centered and as close to the plate as possible.
- Primary beam should never exceed cassette
- **Troubleshooting and x-ray: light - increase kVp by 10-15% or ad 10 KVp if it is to dark: substract 10 KVp (contrast)**
- **Before take the radiopgraph, check the measurements**

Quality control checklist:

- Is the appropriate area captured?
- Is the patient straight (ie. nike swoosh on spine)
- Is the technique ok - over or underexposed?
- Is there a position marker?
- Name and ID

Protection

https://www.youtube.com/watch?time_continue=1&v=TSN7ddkcf6A

1. Wear a full apron that covers the front part of their body,
2. A thyroid shield that covers the thyroid around the neck area and then the leg gloves

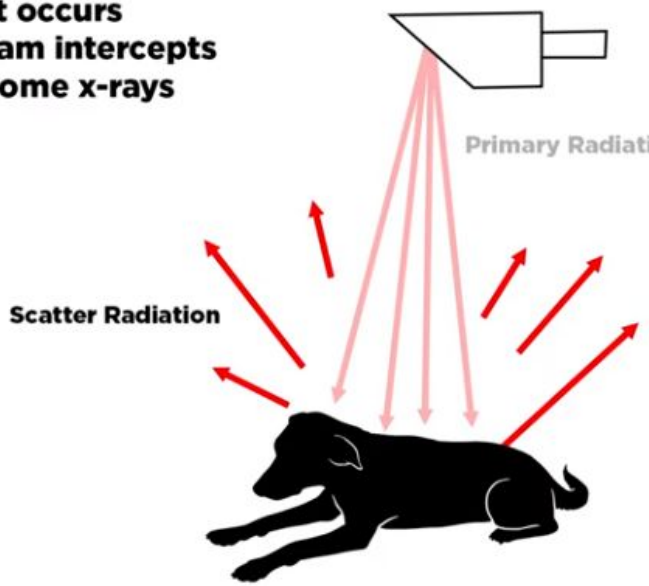
https://antechimagingservices.com/antechweb/clinical-courses

https://antechimagingservices.com/antechweb/video/Radiation_Safety/story_html5.html?v2

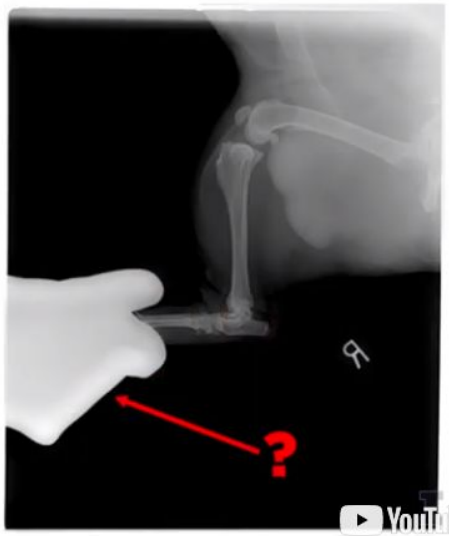
Protection

https://www.youtube.com/watch?v=A22-9X1Dwlg

Scatter radiation that occurs when the primary beam intercepts any object, causing some x-rays to be scattered.



Lead shielding only protects against scatter radiation, NOT primary radiation.



Positioning and radiographic terms

Positioning Terms

- Dorsal Recumbency: patient lying on his/her back
- Sternal Recumbency: Patient lying on his/her sternum
- Lateral Recumbency: **Lateral Recumbency: patient lying with side down on the x-ray table**
  a. Right Lateral: right side of patient is on the x-ray table
  b. Left Lateral: left side of patient is on x-ray table

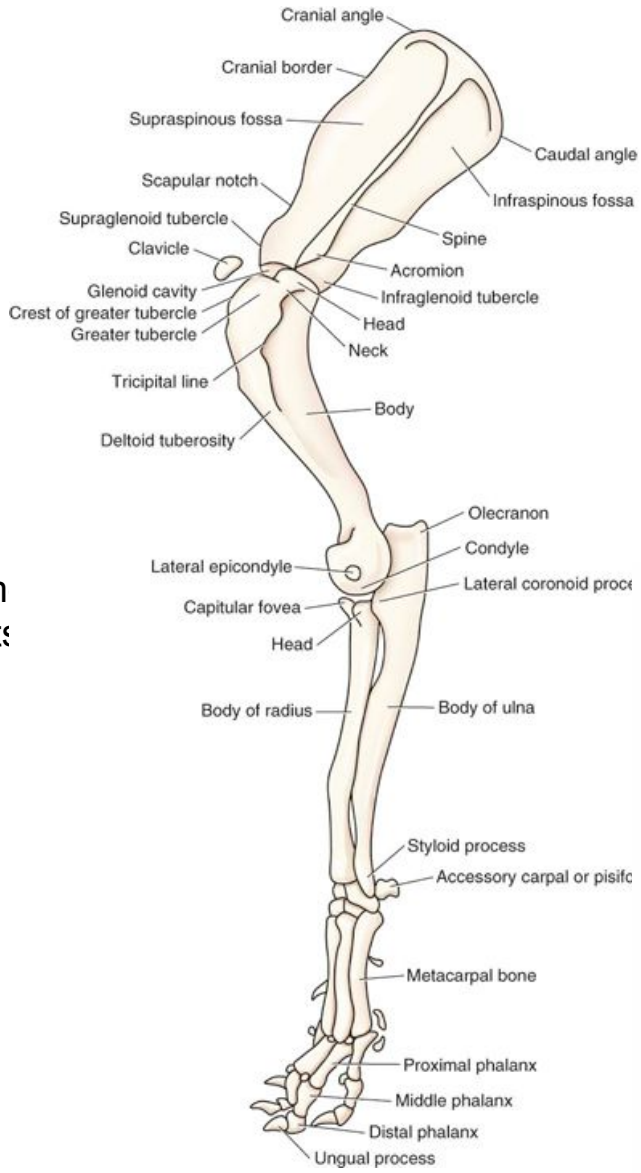
Radiographic Terms: direction of the x-ray beam as it passes through the patient's body until it reaches the plate or cassette.

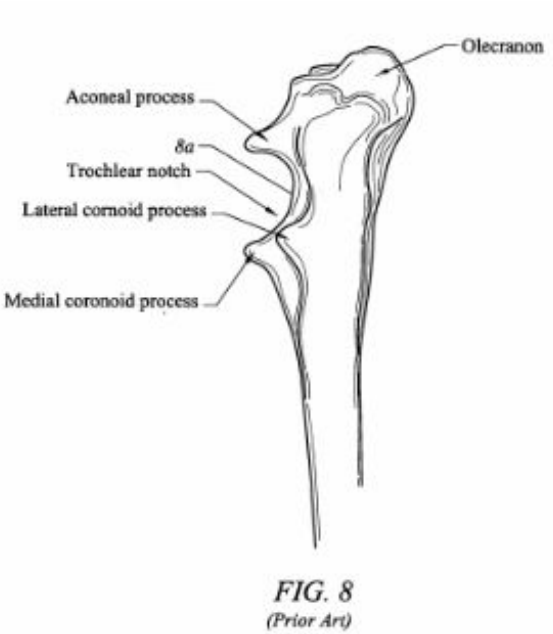
- Ventrodorsal (VD): Patient in dorsal recumbency
- Dorsoventral (DV): patient in ventral or sternal recumbency
- Craniocaudal (CrCd): from the front of the limb to the back of the limb
- Caudocranial (CdCr): from the back of the limb to the front of the limb

Conditions - forelimb

1. Acromion fracture
2. Supraglenoid tubercle fracture
3. Glenoid fracture
4. Humeral fractures
5. Scapulo-humeral luxation
6. Supra-condyle fractures
7. Condylar fractures
8. Radius/ulna fractures
9. Olecranon fracture
10. Trochlear notch fracture
11. Medial/ lateral coronoid process fx
12. Styloid process fx
13. Elbow luxation
14. Elbow dysplasia
15. Carpal bones fx (radial most comm
16. Luxation/subluxation of carpal joints

- **Acromion - scapula**
- **Supraglenoid tubercle - shoulder**
- Glenoid - shoulder
- **Condyle, olecranon - elbow**
- **Coronoid and anconeal process - elbow, mention would also want non-flexed elbow shot**
- **Trochlear notch -elbow**
- Styloid process - high carpus

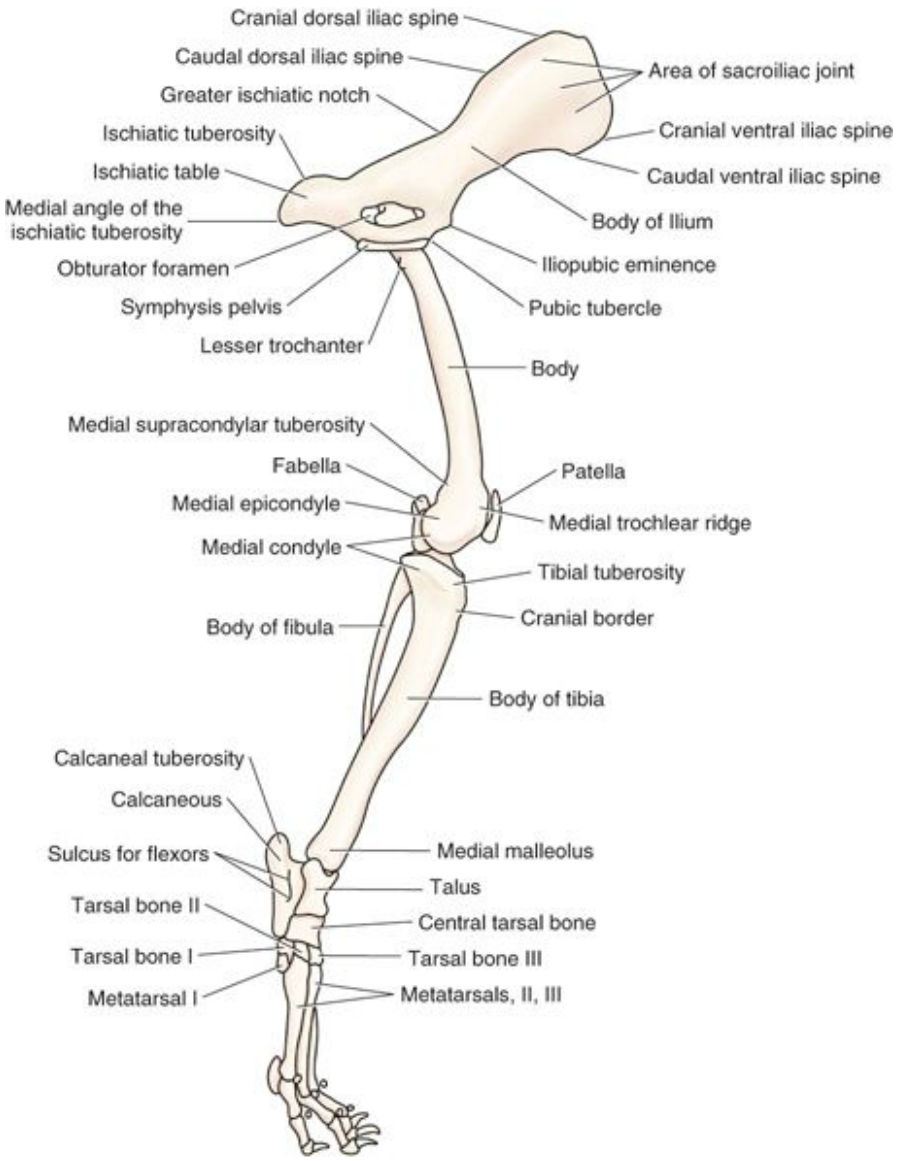




Conditions - hindlimb

- Fractures of the femur
  a. femoral head
  b. femoral neck
  c. trochanters
  d. diaphysis
  e. metaphysis
  f. condyles
  g. Trochlear groove (where the patella is lies in)
- Patella
- Patellar luxation - medial most common
- Cranial/ caudal cruciate lig rupture
- Meniscal problems
- Fractures of the tibia and fibula
- Luxation/sublux of tarsal joints
- Metacarpal and metatarsal fractures
- Phalangeal fractures

- Trochanters - hip
- Trochlea - knee
- TPLO - stifle and hock in 90 degree angles LAT and AP with leg straight on DV



Positioning

https://todaysveterinarypractice.com/small-animal-thoracic-radiography/

The following positioning devices can be used to help position patients and reduce staff members' exposure to radiation:

- Elastic tape
- Plastic tongs
- Positioning trough (foam or plastic)
- Rope and cleats along the side of the table
- Sandbags (particularly long snake-like sand bags)

Hands Free Radiography with Vet Ray Technology by Sedecal

Room

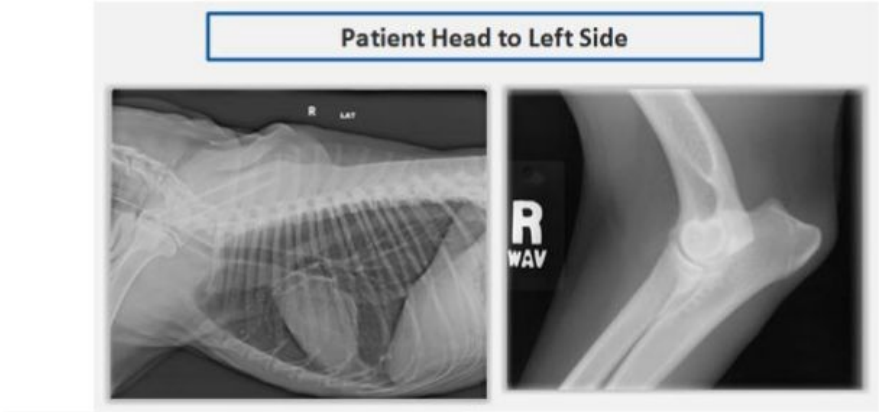
Lead barrier, X-ray barrier shield, lead shield

Positioning

https://antechimagingservices.com/antechweb/video/Radiology_Preparation_Overview/story_html5.html?v2

How do you orient the film for viewing?

- Lateral views including extremities in the lateral position, the head of the patient should be on the left side of the view box or screen.
- Ventrodorsal or dorsoventral views, the view should be hung in a “handshaking position” with the patient’s right side on the x-ray viewers left side.
- Craniocaudal or caudocranial views for extremities, always put the medial side on the x-ray viewers left side.



Put the animal on the table

https://www.youtube.com/watch?time_continue=524&v=TSN7ddkcf6A

1. Someone grab the back end. Other person grab front and synchronously lift the animal
2. Lay down lay him right down on his side and remove the leash

Measurements of the animal

1. New digital system: you do not need measure.
2. It's all based on the size of the patient.

Technique Chart

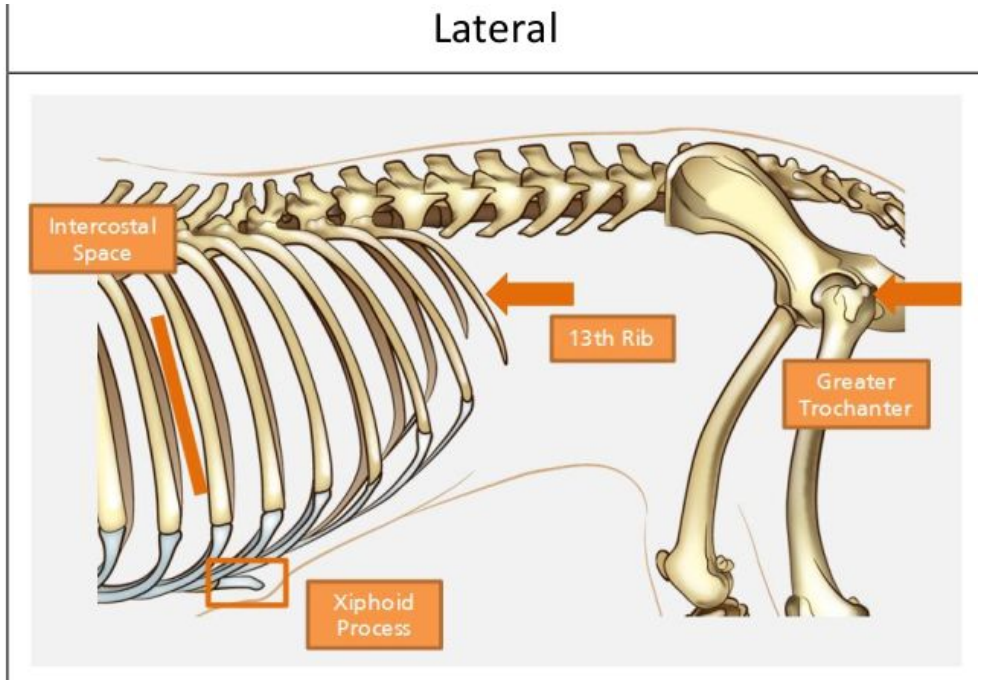
Thickness	Thorax		Abdomen		Spine	
cm	kVp	mAs	kVp	mAs	kVp	mAs
9	83	3	60	15	45	40
10	86	3	62	15	47	40
11	89	3	64	15	49	40
12	92	3	66	15	51	40
13	82	6	68	15	53	40
14	85	6	70	15	55	40
15	88	6	72	15	57	40
16	91	6	74	15	59	40
17	94	6	76	15	61	40
18	97	6	78	15	63	40
19	100	6	80	15	65	40
20	104	6	83	15	67	40
21	108	6	86	15	69	40
22	112	6	89	15	71	40
23	116	6	92	15	73	40
24	120	6	95	15	75	40
25	124	6	98	15	77	40

https://www.youtube.com/watch?v=A22-9X1Dwlg

Do not forget to measure the thickness!

Abdomen: Lateral and VD views: Anatomy Boundaries

1. **Cranial: the 3 intercostal spaces cranial to the xiphoid process**
2. **Caudal: the greater trochanter** of the femur
3. The beam should be **centered at the 13th (or last) rib**
4. The entire diaphragm to the greater trochanter should be visualized
5. **Take the x-Ray during expiration**



https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Abdomen/story_html5.html?v2

Abdomen: Lateral view: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient right side down (for right lateral view)
- **Extend forelimbs and hindlimbs out of area of collimation**
- Positioning devices can be used to prevent obliquity and restrain the patient
- Collimate to landmarks
- Verify positioning
- Marker
- Capture image upon expiration

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Abdomen/story_html5.html?v2

Ventro Dorsal: To roll the dog into the trough

https://www.youtube.com/watch?time_continue=524&v=TSN7ddkcf6A

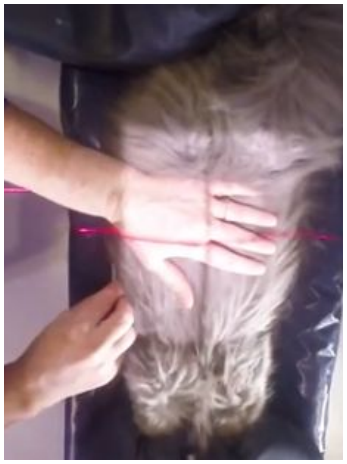
1. Lay down lay him right down on his side and slide the through underneath his body and ask for your helper to push it towards you

2. Collies that are very deep chested, they don't balance on their back very well, so this supports them.

Abdomen: How to Take an Abdomen X-Ray Ventrodorsal

1. Lay in the trough on her back and Grab the front and rear legs and do pull them so they are not in the view
2. Check the horizontal line if there is on the midline of the body. There's no place to center for an abdomen. Landmarks: coxofemoral joint, to about one inch cranial to find that xiphoid. See if the light is on both sides.
3. **Palpate your ribs to make sure that they're level.**
4. Place a marker just right on the fur on the side, the correct side.



https://www.youtube.com/watch?time_continue=118&v=rZqZPfgoh2U

Abdomen: VD view: Is the patient straight? Is the positioning appropriate?

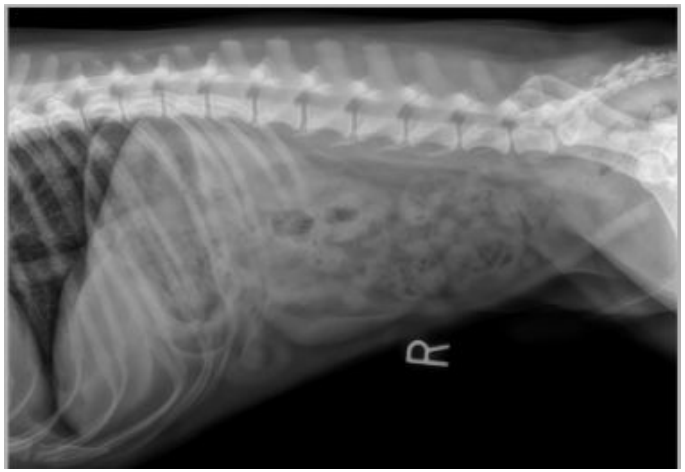
Checklist:

- Patient with back on the table – dorsal recumbency
- Extend forelimbs and hindlimbs out of area of collimation
- Positioning devices can be used
- Collimate to landmarks
- Verify positioning
- Marker
- **Capture image upon expiration**

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Abdomen/story_html5.html?v2

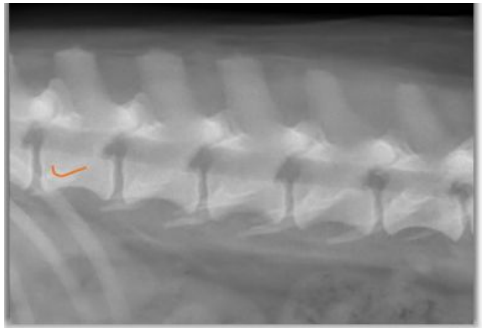
Abdomen: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

- Is there a positioning marker present?
- Is it on the correct side of the patient, not obscuring anatomy and legible?
- Is the patient ID information correct on the image or file?



1. caudal vena cava
2. liver
3. spleen
4. stomach
5. diaphragm
6. kidneys
7. small intestine
8. colon
9. Bladder
10. Spinous processes

- There should be superimposition of the transverse processes on the lateral view.
- Disc spaces in central portion of image should be easily visualized and symmetrical if the spine is straight



Nike smoosh on the spine

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Abdomen/story_html5.html?v2

VD view: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

- Is there a positioning marker present?
- Is it on the correct side of the patient, not obscuring anatomy and legible?
- Is the patient ID information correct on the image or file?

diaphragm
liver
stomach
spleen
kidneys
small intestine
colon

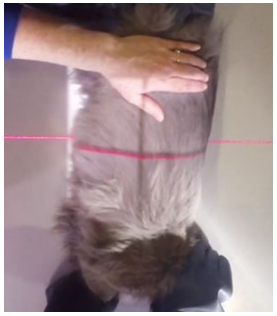
- Notice the spleen in the left cranial abdomen, fundus in the left cranial abdomen and pylorus in the right cranial abdomen.
- There should be symmetrical alignment of the spinous processes of the lumbar spine for the VD view.
- The disc spaces in central portion of image should be easily visualized.

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Abdomen/story_html5.html?v2

How to Take an Abdomen X-Ray
Left Lateral

1. Lay her down into left lateral and hold the head on the front. (thumb and finger over the head, and she's going to grab the feet)
2. Grab the front and rear legs and do pull them so they are not in the view
3. There's no place to center for an abdomen. Landmarks: coxofemoral joint, to about one inch cranial to the xiphoid
4. Place the marker, close to patient abdomen






For right recumbency: patient lying with right side down on the X-ray table

https://www.youtube.com/watch?time_continue=118&v=rZqZPfgoh2U

Positioning devices

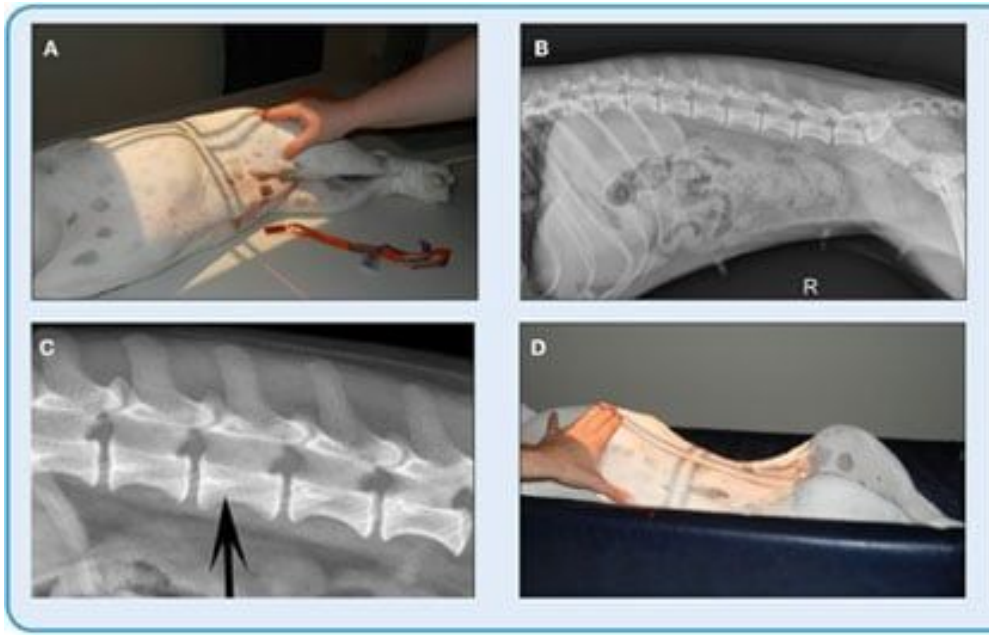


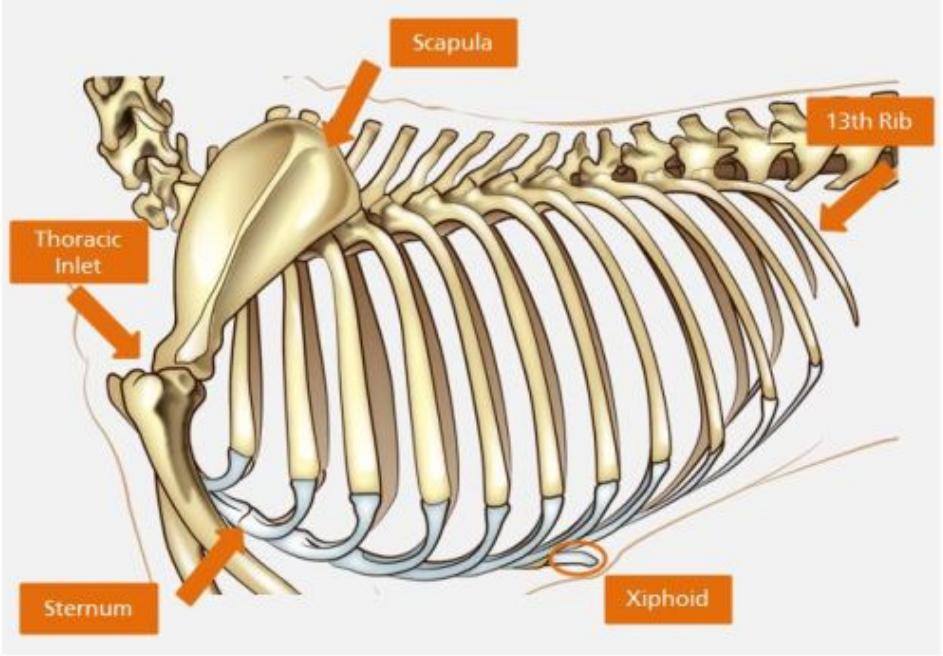
Figure 2. Lateral Radiographs of a Large Dog
A large dog positioned in right lateral recumbency. Since the entire abdomen will not fit onto 1 image for a given projection (right or left lateral or ventrodorsal), it must be divided into several projections.

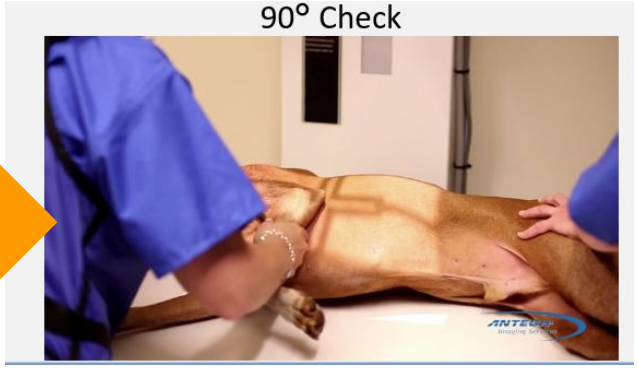
https://todaysveterinarypractice.com/small-animal-abdominal-radiography/

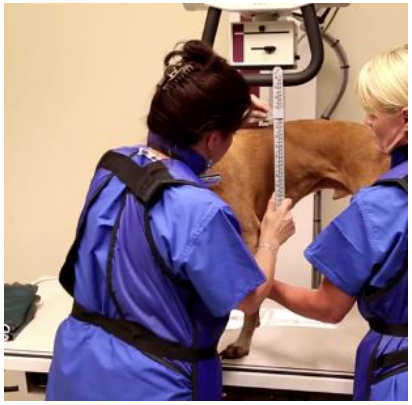
Hands Free Radiography with Vet Ray Technology by Sedecal

Thorax: Lateral and VD view: Anatomy Boundaries

1. The area cranial to the thoracic inlet (the manubrium) to **half way between the xiphoid process and the last rib** to include the caudal tips of the lungs.
2. The crosshairs of the beam should be **centered over the heart just behind the scapula and ⅓ of the way up from the sternum.**
3. **Inspiration**







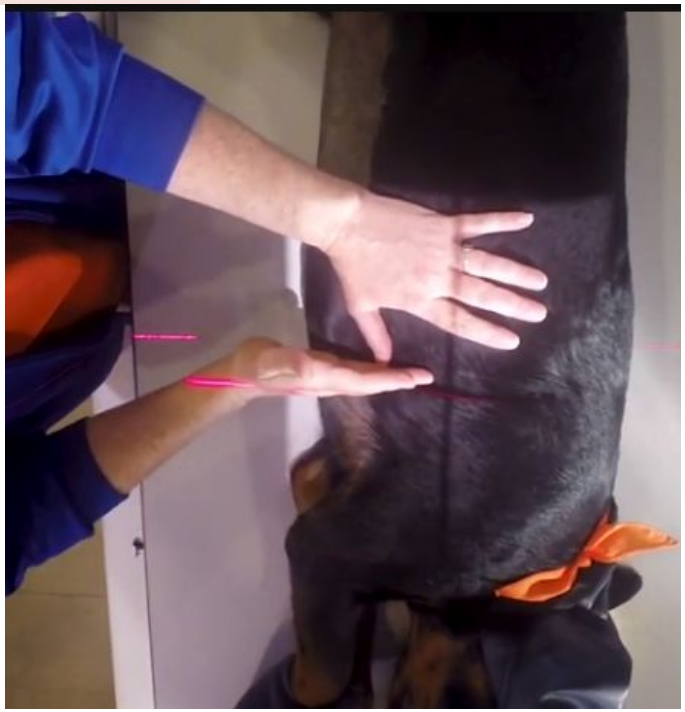
https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Thorax/story_html5.html?v2

Do not forget to measure!

X-Ray Chest (Left Lateral View): Put the animal on the table

1. **Pull the legs as far forward as possible, and turn on the field light and find that vertical line.**
2. **That's going to go on the caudal edge of the scapula of the patient.**
3. **The heart. Should be the center of the radiograph**

- Landmarks: From thoracic inlet/ shoulder joint to half way between xiphoid and last rib; heart in the center
- During peak inspiration



X-Ray Chest (Lateral View): Adjustments of the animal

1. Put one of your hands on the sternum and the other hand on the spinous process you feel and fell if your hands are on the same plane. One hand should not be higher or lower than the other.
2. Use a marker in the field - indicating he's lying on his left side.

Important!

Thorax: Lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient right side (affected side) down
- Extend forelimbs and hindlimbs out of area of collimation
- Head in neutral position
- Positioning devices can be used
- Collimate to landmarks
- Verify positioning
- Marker
- **Capture image upon inspiration**

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Thorax/story_html5.html?v2

Positioning devices

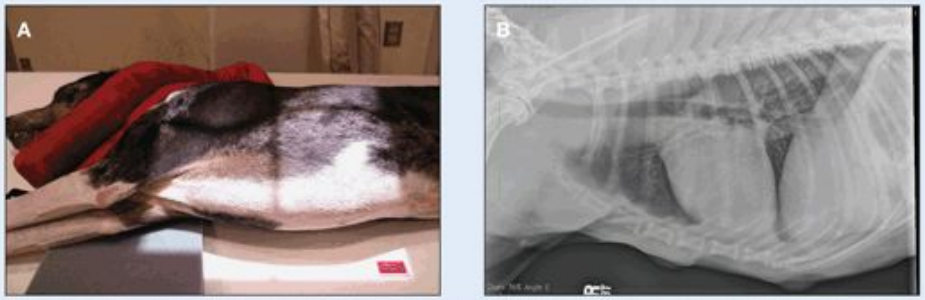


Figure 1. (A) Dog in right lateral recumbency with thoracic limbs pulled cranially. See text for anatomic boundaries of collimated thorax. (B) Right lateral thoracic radiograph of dog in Figure 2A; notice the cranial location of the thoracic limbs relative to the thoracic inlet.

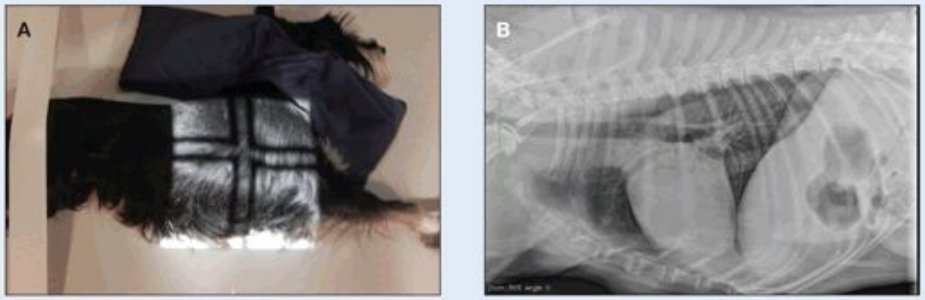
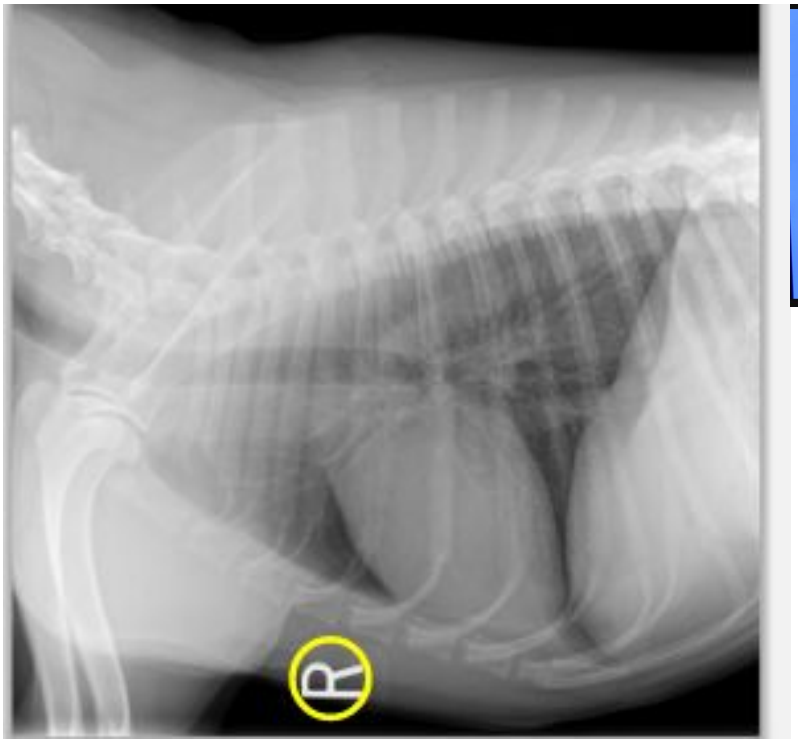


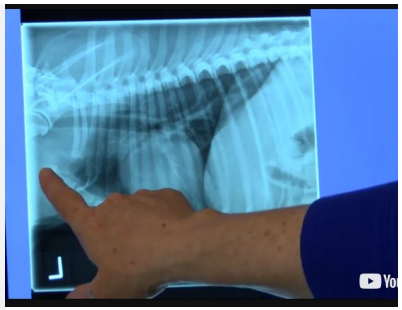
Figure 2. (A) Dog in left lateral recumbency with thoracic limbs pulled cranially. See text for anatomic boundaries of collimated thorax. (B) Left lateral thoracic radiograph of the dog in Figure 2A; notice the cranial location of the thoracic limbs relative to the thoracic inlet.

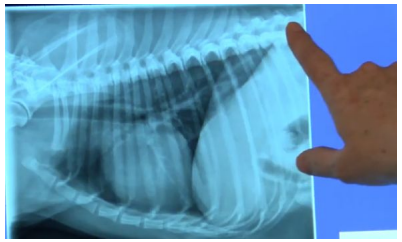
https://todaysveterinarypractice.com/small-animal-thoracic-radiography/

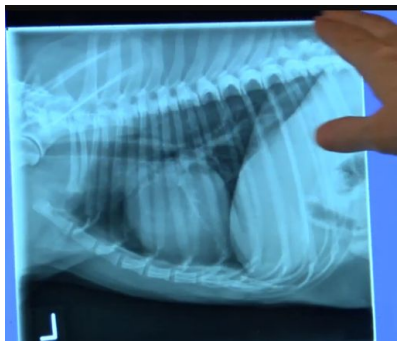
Hands Free Radiography with Vet Ray Technology by Sedecal

Thorax: Lateral: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?









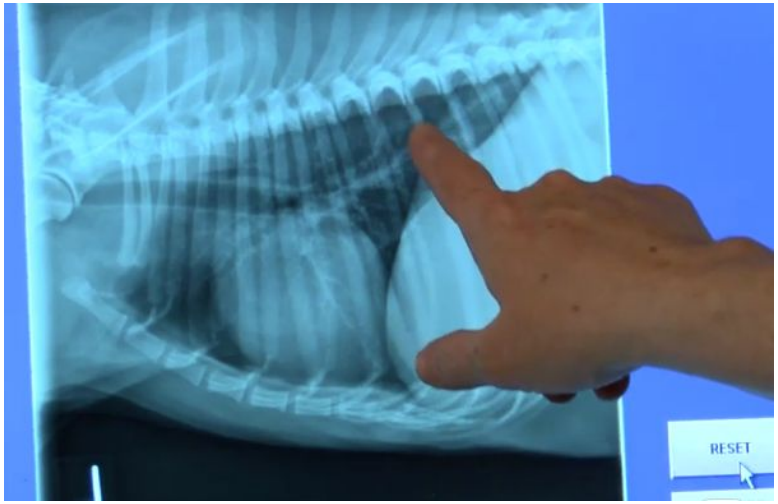
1. Cardiac silhouette (heart)
2. pulmonary vessels
3. trachea
4. lungs
5. Diaphragm
6. Spinous process

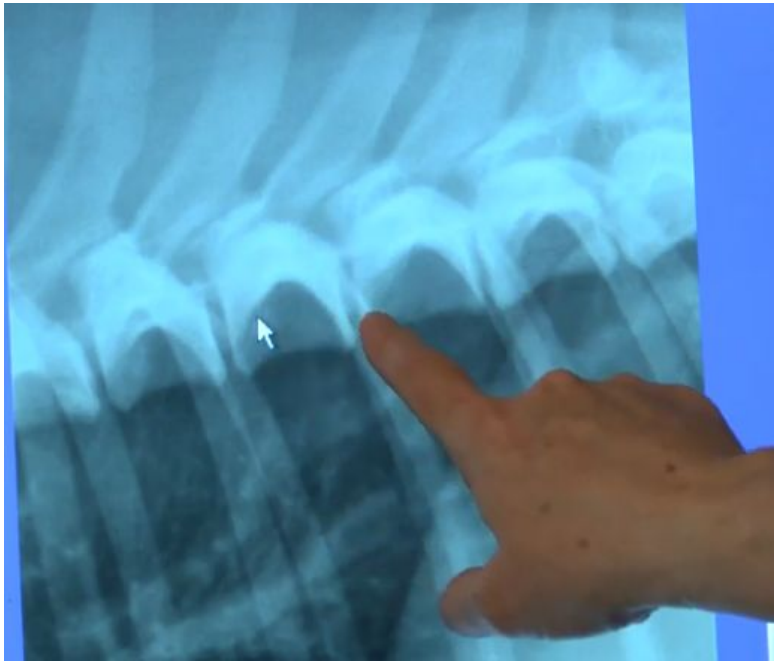
Look for:

1. **the entire lung field from the thoracic inlet,**
2. **to the caudal tips of your lung field, which it is all included,**
3. **Plenty of spine above**

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Thorax/story_html5.html?v2

Checking the quality of the X-ray - Checking if the animal was straight, no rotation

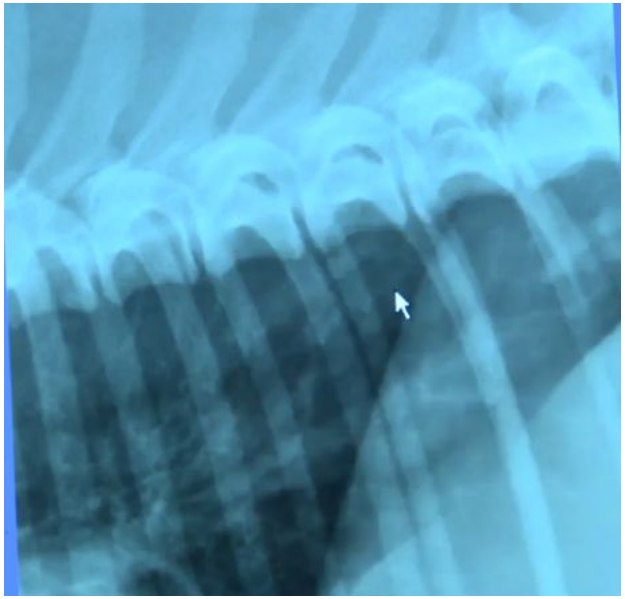




There should be superimposition of the ribs!

You see: two ribs that are completely superimposed because you only see one as they come off the vertebra.

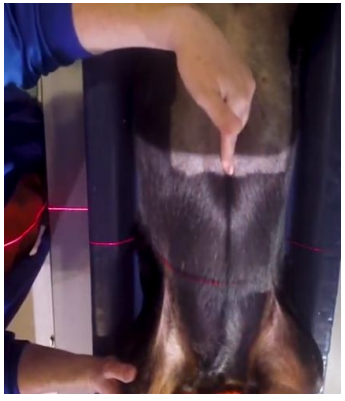
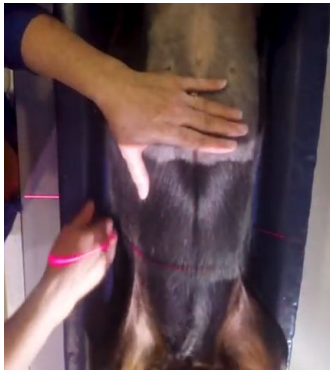
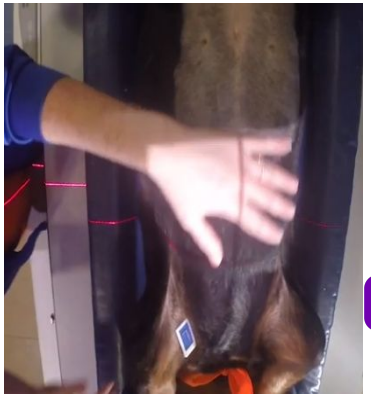
You see that there's separation, a small gap in between the ribs



Thorax (Ventro Dorsal): Positioning

1. Slide him over to the center and take turns holding legs; the head will control the cranial portion of his thorax.
2. Feel his ribs as they come off the xiphoid and feel if they're level. Use your fingers and your palm.
3. If your one of your palm is higher, just take and twist the animal to that side.
4. Check the light again, to make sure if it still midline of his body, and one to two inches cranial to the xiphoid.
5. Check if the light on both sides of the patient,
6. Put a marker on correct side (it does not matter which marker you choose)



https://www.youtube.com/watch?time_continue=524&v=TSN7ddkcf6A

Thorax (Ventro Dorsal): Find the heart

https://www.youtube.com/watch?time_continue=524&v=TSN7ddkcf6A

The heart should be the center of our radiograph

1. Find the xiphoid
2. **Center the beam one to two inches cranial to it**. Center the bean over the heart.

Figure 3. *(A) Dog in ventrodorsal recumbency with thoracic limbs taped and pulled cranially. The light marks the cranial border of the image that is collimated to the level just cranial to the thoracic inlet. (B) Ventrodorsal lateral thoracic radiograph of the dog in Figure 3A; notice the cranial location of the thoracic limbs relative to the thoracic inlet.*

https://todaysveterinarypractice.com/small-animal-thoracic-radiography/

Thorax: VD: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient with back on the table
- Extend forelimbs and hindlimbs
- out of area of collimation
- Spine and head should be in-line
- Spine and sternum must be in-line
- Positioning devices can be used
- Collimate to landmarks
- Verify positioning
- Marker
- **Capture image upon inspiration**

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Thorax/story_html5.html?v2

Checking the quality of the X-ray - Field and positioning

1. Cardiac silhouette (heart)
2. pulmonary vessels
3. trachea
4. lungs
5. diaphragm

- **There should be symmetrical spinous processes**
- **The ribs should be symmetrical**

Field: Look for:

1. **Thoracic inlet**
2. **Caudal tips of the lung field**

For straightness

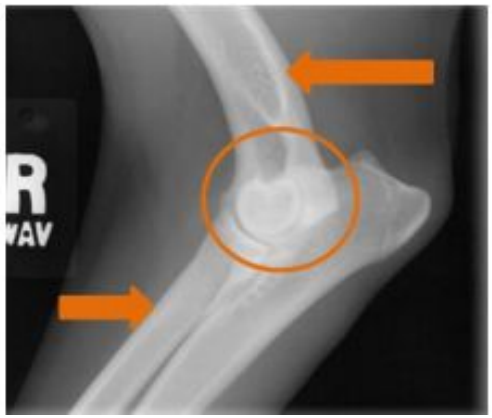
1. **See if the spine and the sternum are superimposed.**
2. **A vertebral body, a little teardrop**
3. **Similar rib distance on either side of the spine**

Elbow: Lateral, flexed lateral and CrCd: Anatomical Boundaries

1. The boundaries include the medial epicondyle with the **x-ray beam centered on the joint space/medial** epicondyle.

2. The **¼ distal humerus and the ¼ proximal antebrachium** or forearm must be included.

Lateral



Flexed Lateral

Cranio Caudal

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Elbow/story_html5.html?v2

Elbow: Lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

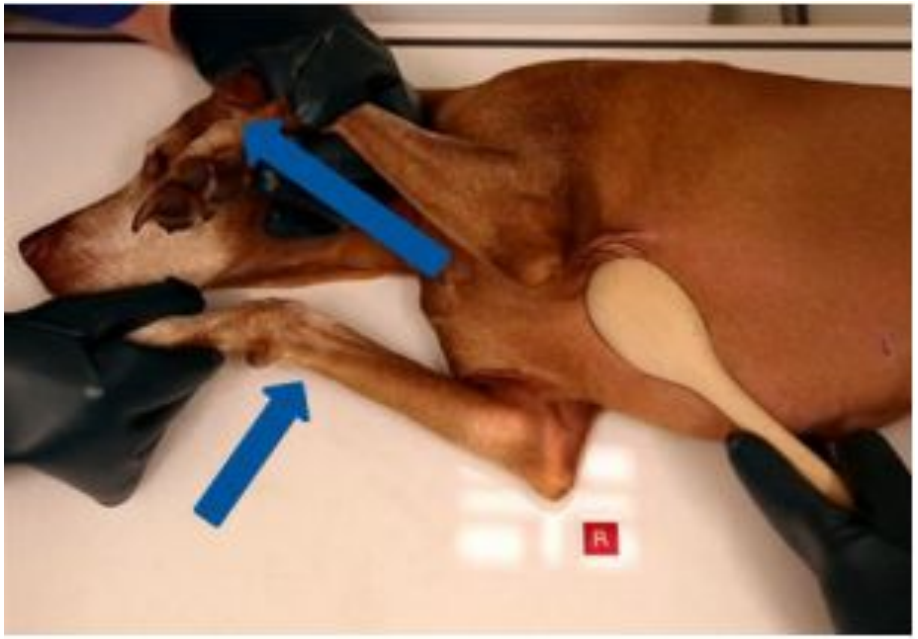
- Patient right side (affected side) down
  Limb's long axis is parallel to the table
- Pull top limb out cranially and affected limb in neutral position
  Positioning devices can be used
- Collimate to landmarks
- Marker
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Elbow/story_html5.html?v2

Elbow: Flexed lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient right side (affected side) down Limb's long axis is parallel to the table
- Pull top limb out of view cranially
- Pull forearm of down limb dorsally to maximally flex the elbow
- Maintain flexion on elbow; rotate the limb; push elbow ventrally
- Positioning devices can be used
- Collimate to landmarks Verify positioning



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Elbow: Cranio Caudal: Is the patient straight? Is the positioning appropriate?

Checklist:

- Limb's long axis is parallel to the table
- Traction on limb cranially Angle x-ray beam 5 to 10 degrees
- Roll body towards the limb being examined
- Apply external rotation to carpus to roll the elbow under the patient's body
- Position head away from limb being examined
- Positioning devices can be used
- Collimate to landmarks
- Markers
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Elbow/story_html5.html?v2

Elbow: CrCd, Lateral, Flexed Lateral: positioning devices

https://todaysveterinarypractice.com/imaging-essentials-small-animal-elbow-and-antebrachium-radiography/

Elbow: Lateral, Flexed lateral and Crcd: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

Lateral

1. Humerus
2. radius
3. ulna
4. olecranon process
5. humeral condyle including the medial and lateral epicondyle

Flexed Lateral

1. Humerus
2. radius
3. ulna
4. olecranon process
5. humeral condyle including the medial and lateral epicondyle

Cranio Caudal

1. humerus
2. radius
3. ulna
4. olecranon process
5. humeral condyle including the medial and lateral epicondyle

There should be superimposition of humeral epicondyles

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Elbow/story_html5.html?v2

Shoulder: Lateral and CdCr: Anatomical Boundaries

1. The shoulder joint and a small portion of the distal scapula and a small portion of the proximal humerus are needed for all views

2. The area just proximal and distal to the shoulder joint should be included.

Lateral

Caudo Cranial

Measurement

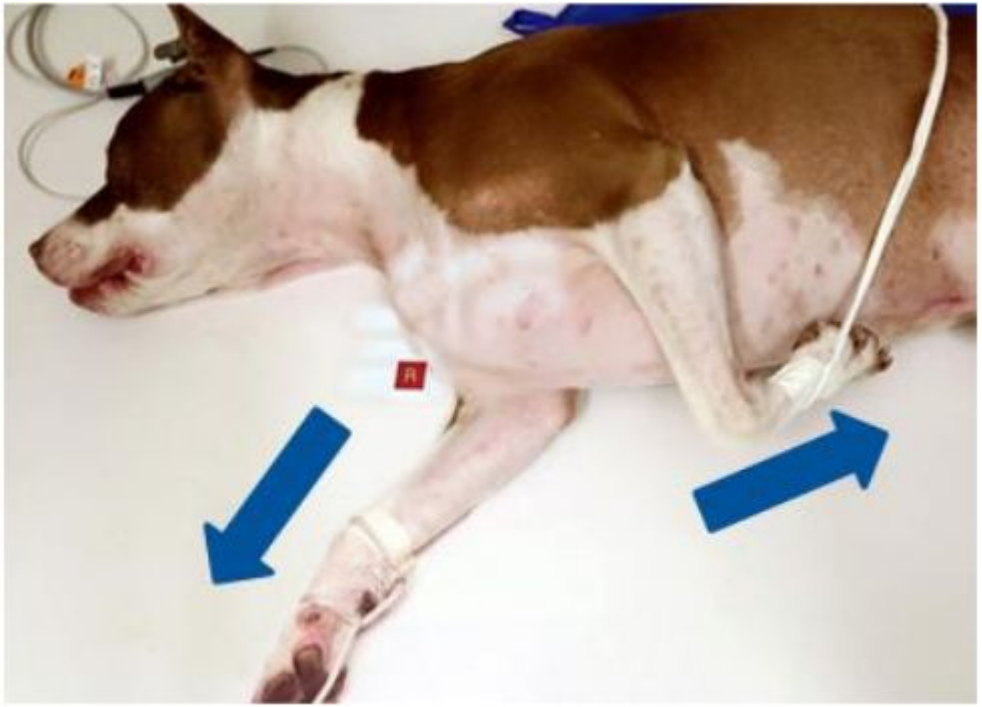
Thickness portion of shoulder joint

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Shoulder/story_html5.html?v2

Shoulder: Lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient right side (affected limb) down
- Keep patient in lateral position
- Pull the top limb toward the hind toes
- Traction on the down limb to pull the shoulder to the sternum
- Head dorsally
- Positioning devices can be used
- Collimate to landmarks
- Verify positioning



https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Shoulder/story_html5.html?v2

Shoulder: CdCr: Is the patient straight? Is the positioning appropriate?

Checklist:

- Sedation needed
- Patient on back
- Thoracic limb cranially and pelvic limb caudally
- Affected limb slight abducted (away from the midline)
- Long axis of the scapula and humerus are parallel to each other
- Do not use extreme traction
- Positioning devices can be used
- Collimate to landmarks
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Shoulder/story_html5.html?v2

Shoulder: Lateral and CdCr: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

Lateral

The shoulder joint should not be superimposed with the trachea

1. Humerus (humeral head, greater tubercle, bicipital groove)
2. Scapula

Caudo cranial

The humerus and scapula should be aligned and parallel to the x-ray table

1. The humerus (humeral head, greater tubercle, bicipital groove)
2. Scapula

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Elbow/story_html5.html?v2

Pelvis: Lateral: Anatomical Boundaries

1. The **cranial edge of the wing of the ilium, the caudal edge of the ischium** and the dorsal edge of wing of the ilium.
2. If **dorsal margin is ok and beam is centered on the greater trochanter**, ventral margin should be fine.
3. The area just cranial to the ilium, just caudal to the ischium and proximal femurs should be included.

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: Lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

- Patient right side (affected side) down
- Keep patient in lateral position
- Keep limbs together if desired by doctor; otherwise stagger top limb caudally and down limb cranially
- Use appropriate positioning devices
- Collimate to include landmarks
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: Lateral: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues

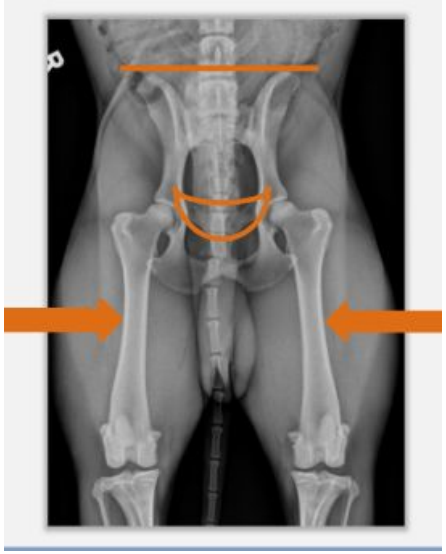
Verify that the femoral heads are superimposed
You should be able to see through the disc spaces

1. the ilium
2. the ischium
3. the femur

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: VD: Anatomical Boundaries

1. Center the x-ray beam on the pubis
2. Open collimator enough to include the **cranial edge of wing of the ilium to the stifle**. May move center as needed (depending on the conformation of the patient – if patient is large, it is better to cut off part of stifle than the ilium of pelvis
3. The area just cranial to the ilium to the level of the stifles must be included.



Thickness portion of pelvis

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: VD: Is the patient straight? Is the positioning appropriate?

Checklist:

- Sedation needed for this view
- Patient on back
- Reasonable but not extreme traction on pelvic limbs
- Femurs must be straight
- Pelvis must be straight
- Internal rotation of the femurs
- Traction on thoracic limbs to keep in place
- Utilize appropriate positioning devices
- Collimate to include landmarks
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Positioning Devices

Figure 2. Extended-Leg Ventrodorsal Radiographs of Pelvis

*(**A**) Lateral view of a dog that has been placed in dorsal recumbency in a V-trough (positioning trough) with the pelvis being pulled caudal to the V- trough. The pelvic limbs have been extended and are taped at the level of the stifle joints for appropriate positioning of the pelvic limbs relative to the pelvis, table, and each other.*

*(**B**) Another view of dog positioned for an extended-leg ventrodorsal radiograph. (**C**) Routine radiograph of the pelvis from the dog in A and B. Note the symmetry of the size and shape of the obturator foramina. (**D** and **E**) Obliqued or rotated radiographs where the pelvis was positioned incorrectly; note the asymmetry of the obturator foramina (arrows). For D, the right side of the dog's pelvis should pulled up (away from the table slightly) to correct this positioning abnormality. For E, the left side of the dog's pelvis should be pulled up (away from the table slightly) to correct this positioning abnormality.*

https://todaysveterinarypractice.com/imaging-essentials-small-animal-pelvic-radiography/

Pelvis: VD: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

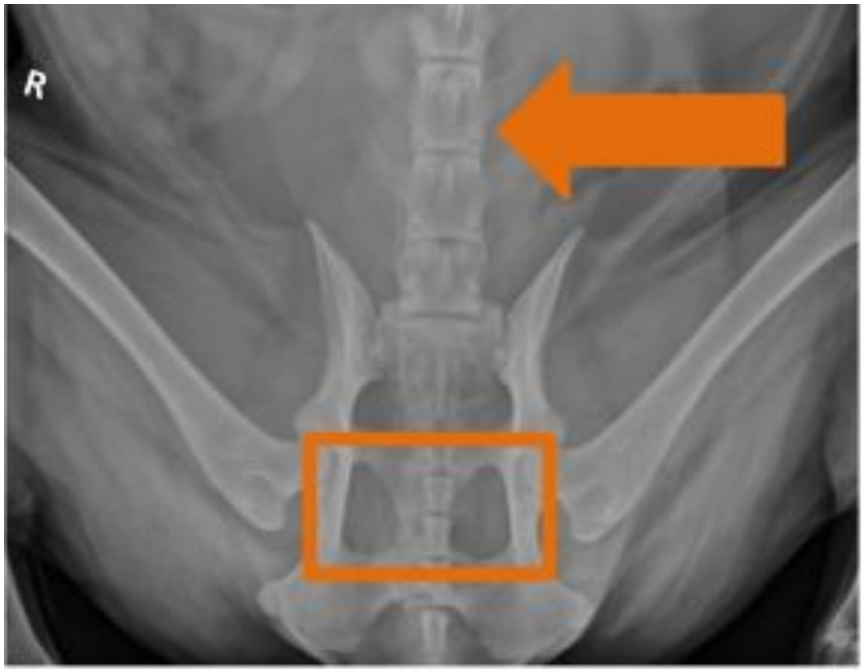
1. the ilium
2. the ischium
3. the femur
4. the stifles

The wings of the ilium and obturator foramen should be symmetrical
The femurs should be parallel to the x-ray table

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: Frog Leg VD: Anatomical Boundaries

1. Center the x-ray beam on the pubis
2. Open collimator just enough to include cranial edge of wing of the ilium and proximal 1/3 of the femurs

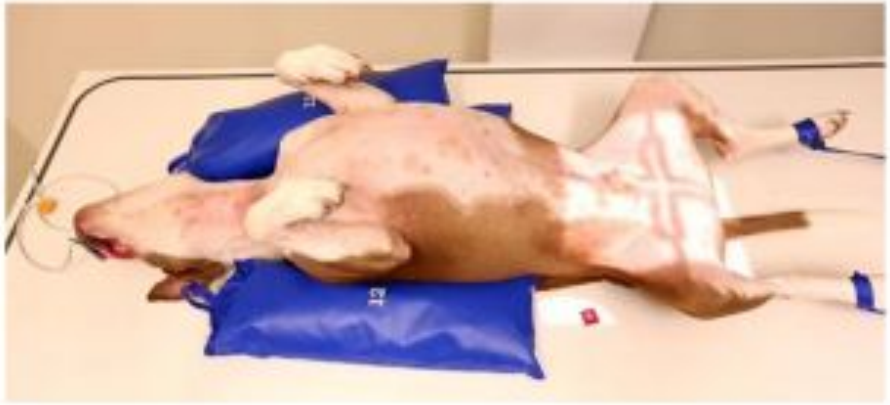


https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Pelvis: VD: Is the patient straight? Is the positioning appropriate?

Checklist:

- Sedation needed for this view
- Patient on back
- Pelvis must be straight
- Allow hindlimbs to fall naturally
- Femurs will be approximately 45 degree angles
- Utilize appropriate positioning
- devices
- Collimate to landmarks
- Verify positioning



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Pelvis: VD: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

1. the ilium
2. the ischium
3. the proximal 1/3 of the femurs

The wings of the ilium and obturator foramen should be symmetrical

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Pelvis/story_html5.html?v2

Stifle: Lateral, CdCr and CrCd: Anatomical Boundaries

1. The boundaries include the **mid-diaphyseal region of the femur to the mid-diaphyseal region of the tibia or fibula.**
2. The areas just proximal and distal to the stifle must be included.

Lateral

CdCr

CrCd

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Stifle/story_html5.html?v2

Stifle: Lateral: Is the patient straight? Is the positioning appropriate?

Checklist:

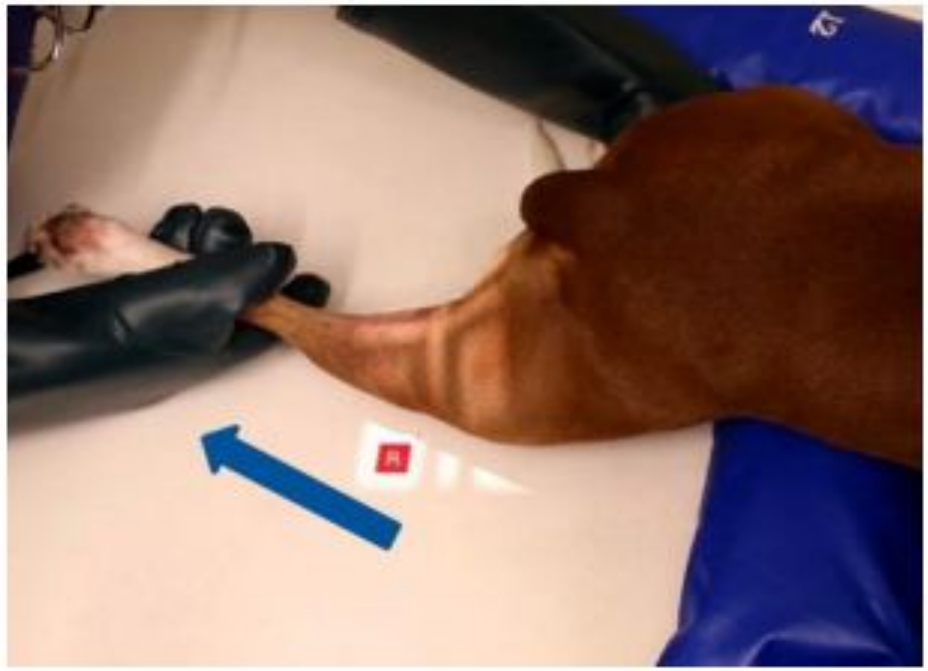
- Patient right side (affected side) down
- Stifle neutral to slightly flexed position
- Opposite limb flexed and abducted away from beam
  Superimposition of the femoral condyle
- Positioning devices can be used
- Collimate to landmarks
- Marker
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Stifle/story_html5.html?v2

Stifle: CdCr: Is the patient straight? Is the positioning appropriate?

Checklist:

- Sedation needed
- Patient sternal
- Cranial aspects of the stifle on the table
- **Angle x-ray beam 5 to 10 degrees toward the head**
- Affected limb extended so long axis of the femur is parallel to the long axis of the tibia Pelvis slightly rolled toward affected limb
- Positioning devices can be used
- Collimate to landmarks
- Marker
- Verify positioning



https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Stifle/story_html5.html?v2

Stifle: Positioning Device

Figure 2. A patient positioned for a mediolateral radiograph of the left stifle joint. Note the positioning of the sponges beneath the pelvis and the tarsus to allow correct positioning and alignment of the femoral condyles. The collimated area includes the caudal and cranial skin margins and the distal femoral diaphysis and proximal tibial diaphysis. The limb not being radiographed is taped in an abducted position.

Figure 3. (A) Patient positioned for a vertical beam caudal to cranial radiograph of the left stifle joint; (B) Photograph taken from the side showing the angle of the x-ray tube head and position of the patient in sternal recumbency for the caudal to cranial radiographic projection.

https://todaysveterinarypractice.com/imaging-essentials-small-animal-radiography-stifle-joint-and-crus/

Stifle: CrCd: Is the patient straight? Is the positioning appropriate?

Checklist:

- Sedation needed
- Patient in dorsal recumbency
- Caudal aspect of the stifle on the table
- Affected limb extended so long axis of the femur is parallel to the long axis of the tibia
- Extend coxofemoral joint to get stifle close to the table
- Rotate femurs inward
- Positioning devices can be used
- Collimate to landmarks
- Marker
- Verify positioning

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Stifle/story_html5.html?v2

Stifle: Is the technique appropriate? Is the background black? Can you see the needed anatomy including soft tissues?

Lateral

1. the femur
2. femoral condyle
3. patella
4. tibia
5. fibular head
6. tibial crest fabellae

There should be superimposition of the femoral condyle

CdCr

1. the femur
2. femoral
3. condyle
4. patella
5. tibia
6. fibular head
7. fabellae

CrCd

1. the femur
2. femoral condyle
3. patella
4. tibia
5. fibular head
6. fabellae

The femur and tibia/fibula should be aligned and parallel to the x-ray table

https://antechimagingservices.com/antechweb/video/Radiographic_Positioning_of_the_Dog_Stifle/story_html5.html?v2

Tibial Plateau Leveling Osteotomy (TPLO)

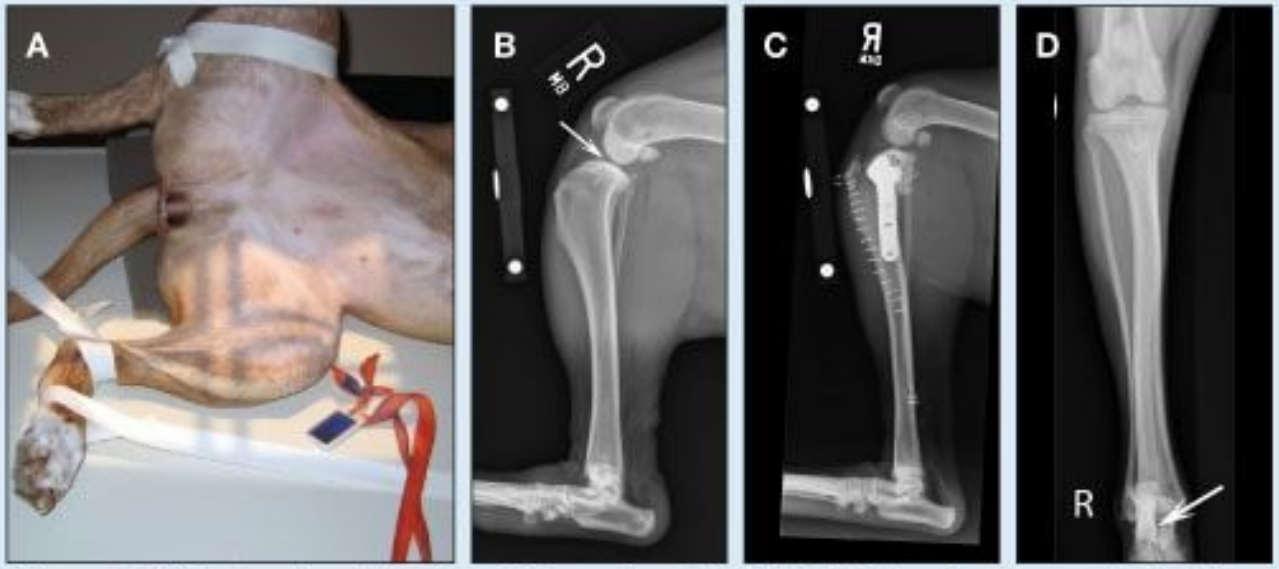


Figure 5. (A) Lateral positioning of the patient for a TPLO lateral radiograph. In this image, the dog has been placed in a similar position as seen in Figure 2A; however, the stifle and tarsal joints are flexed at 90 degrees. (B) Pre-operative, postoperative, and (C) mediolateral radiographs from a dog that has had a TPLO. The arrow in B points to the superimposed intercondylar eminences. (D) Pre-operative caudocranial image of the stifle joint and crus. In this dog there is central positioning of the patella (seen superimposed over the distal femur) as well as central positioning of the medial cortex of the distal tibial intermediate ridge or cochlea. The arrow points to the medial cortex of the calcaneous.

https://todaysveterinarypractice.com/imaging-essentials-small-animal-radiography-stifle-joint-and-crus/

How to take a limb-Ray: Lateral left Radius

1. For Left radius, lay the animal on the side left side and pull back the right radius to get it out of the way and hold the animal's head
2. Center the radius, and hold the region below of the carpus .
3. Center on the midshaft of the long bone
4. restrict the beam. Watch the handlers hand to make sure they are not in the primary field and add the marker to indicate which leg is

⚠ **You can use tape to so you can wrap the leg, pull the tape out and position the leg to protect hands from radiation**




https://www.youtube.com/watch?time_continue=52&v=5ulpYnZ_c4g

How to take a limb-Ray: Radius, Lateral view

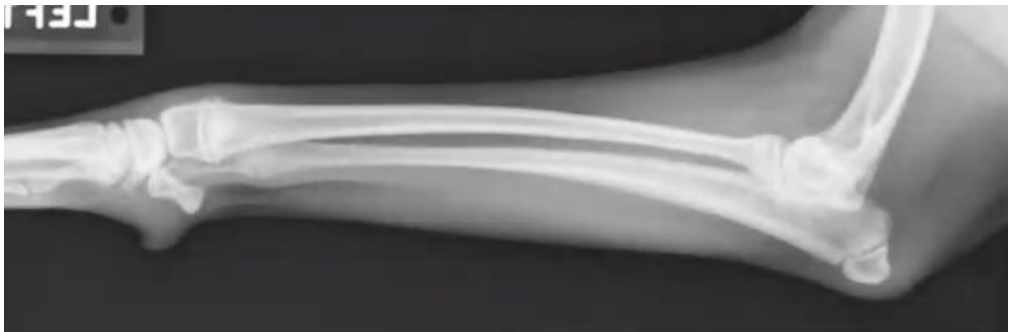
https://www.youtube.com/watch?time_continue=52&v=5ulpYnZ_c4g

1. For Left radius, lay the animal on the side left side and pull back the right radius to get it out of the way and hold the animal's head
2. Center the radius, and hold the region below of the carpus .
3. Center on the midshaft of the long bone
4. restrict the beam. Watch the handlers hand to make sure they are not in the primary field and add the marker to indicate which leg is

⚠ **You can use tape to so you can wrap the leg, pull the tape out and position the leg to protect hands from radiation**







How to take a limb-Ray: Radius, DP (dorsopalmar) view

https://www.youtube.com/watch?time_continue=52&v=5ulpYnZ_c4g

1. Take the animal's head and slide it back so it's out of the leg and extend the leg forward.
2. Center the mid-shaft of the beam right in the middle of the long bone.
3. Make sure that animal is straight, so palpate the epicondyles off the humerus to feel that the animal is level.
4. Just slide down her toes,
5. Put the left marker on the lateral aspect

⚠ **With a suspected fracture or other painful condition, pain medications are always administered to the patient prior to imaging**

How to take a spinal X-ray:
left lateral recumbency. Just going to roll him down.

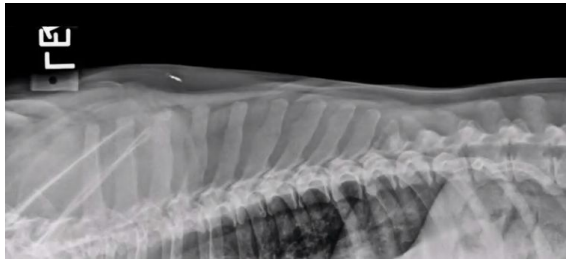
https://www.youtube.com/watch?v=wSA3AMJTbOk

1. Left lateral recumbency. Just going to roll him down.
2. Obtaining this whole field here from his shoulders back to his hip. going to hit our light. Our field maximum length we can have is a 17-inch field of view.
3. Center on the spine, or the area of interest. So shoulder areas, again, the cranial landmark, down to the wing of the ilium, which is right on your hip.The horizontal line should be on the center of the spine.
4. Feel patient's back and his sternum, so his whole body is going to be level.
5. If the body it is not level use a piece of foam wedge. We use foam here because it's radiolucent, it will not show up on your radiograph.
6. Put the left lateral marker.









Light sedation on board,having them still and quiet, because it takes a lot of manipulation of the body to get them properly positioned.

How to take a spinal X-ray: Ventrodorsal

1. Slide him in, and you're going to roll it up.
2. We're going to try and straighten him up; palpate his ribs (the right and left side), you want to feel that they're level.
3. Head straight on the front, because that is going to control the cranial portion of his spine. And the back legs do not need to be super extended,
4. Landmarks at your thoracic inlet and just for that wing of the ilium. Horizontal line centers down midline.
5. Horizontal line centers down midline.
6. Very small field of view because, so your light's not going to cover the whole body, just this small portion.
7. Place a marker on the correct side





https://www.youtube.com/watch?v=wSA3AMJTbOk