

PREV

NEXT

1	2	3	4	5	6	7	8	9	10
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What pathologic process is most likely in the canine radiograph below?

[Click here to see image](#)

Note: Hitting Ctrl + will enlarge a web page in most browsers. Ctrl - will shrink a page again.

Congenital malformation	HIDE
Trauma	HIDE
Osteochondrosis	HIDE
Neoplasia	HIDE
Infection	HIDE

NEXT

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THE MERCK VETERINARY MANUAL **Multimedia**



Courtesy of Dr. Ronald Green.



PREV

1

Correct: Infection

Although biopsy is required for definitive diagnosis, the joint-crossing lytic damage seen between p2 and p3 is most likely to be osteomyelitis (infection).

Osteosarcoma, an aggressive bone tumor, usually does not cross joint.

What pat

[Click here](#)

Note: Hit again.

Refs: Pasquini's, Tschauner's Guide to Small Animal Clinics, vol 1, 2nd ed. pp. 606-609, Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 738-40 and the Merck Veterinary Manual online edition.

Congenit

Trauma

Osteochondrosis	HIDE
Neoplasia	HIDE
Infection	HIDE

NEXT


SAVE & EXIT

PREV
NEXT

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

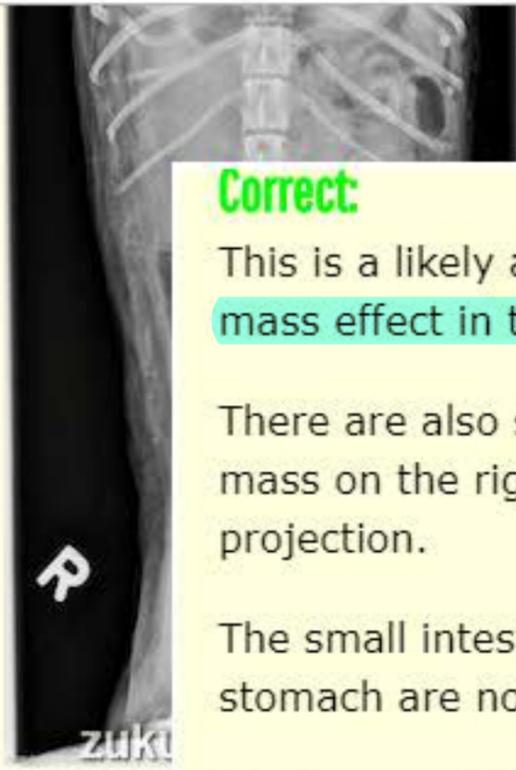
A 9-year-old male neutered Bichon Frise is presented with chronic inappetence and weight loss. Radiographs reveal a large abdominal mass.

From which one of the following choices is the mass most likely originating?





Sublumbar lymph node	HIDE
Liver	HIDE
Left kidney	HIDE
Urinary bladder	HIDE
Small intestine	HIDE



Correct:

This is a likely a small intestinal mass. On abdominal radiographs, there is a large mass effect in the right cranial abdomen, caudal to the stomach.

There are also several mildly enlarged small intestinal loops superimposed over the mass on the right lateral projection. The duodenum is dilated on the right lateral projection.

The small intestine is displaced peripherally away from the mass. The liver and stomach are normal.

No abnormalities are noted in the urinary tract. The portion of the thorax included is normal.

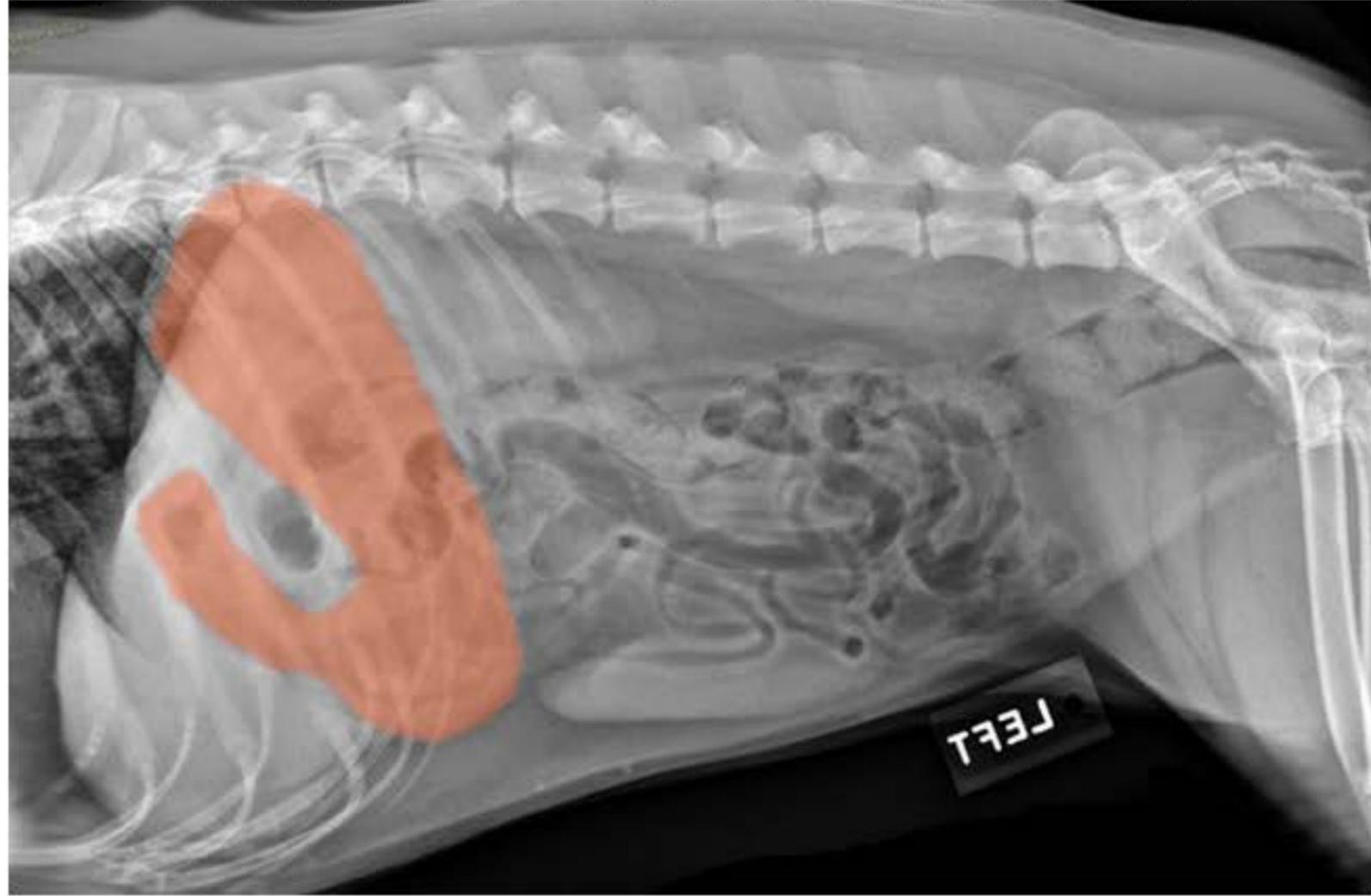
The mass was surgically removed from the mid-jejunum and characterized as a myxosarcoma.

Sublum	
Liver	
Left kidney	HIDE
Urinary bladder	HIDE
Small intestine	HIDE

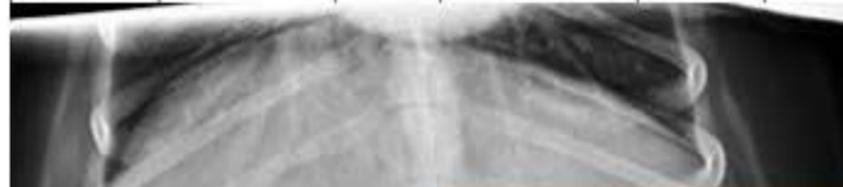
BACK NEXT

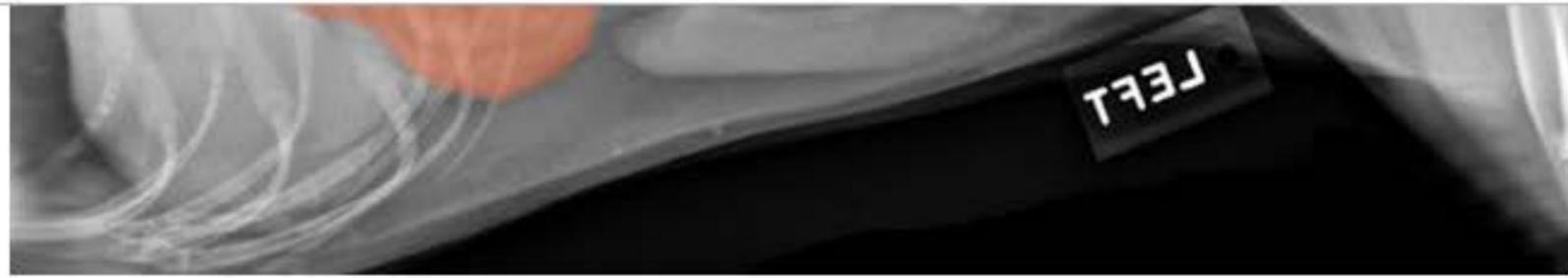
The following radiographs are the left lateral and ventrodorsal views of the abdomen of a three-year-old Mixed Breed dog.

Plain All Layers Liver Spleen Stomach Left Kidney Colon Right Kidney Bladder Duodenum

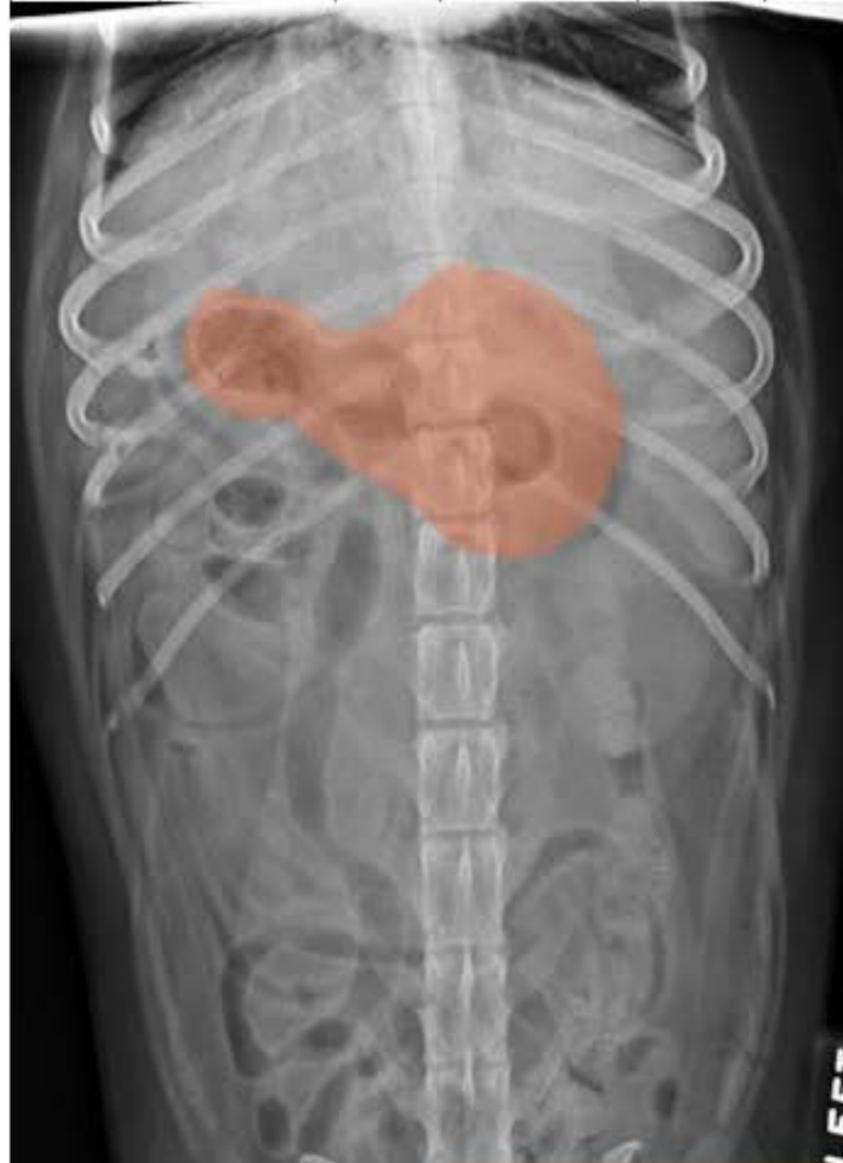


Plain All Layers Liver Spleen
Stomach Left Kidney Colon Right Kidney Bladder





Plain All Layers Liver Spleen
Stomach Left Kidney Colon Right Kidney Bladder



1	2	3	4	5	6	7	8	9	10
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A 6-month-old Manchester terrier is presented with a worsening history of right hindlimb lameness.

A VD radiograph is shown below.

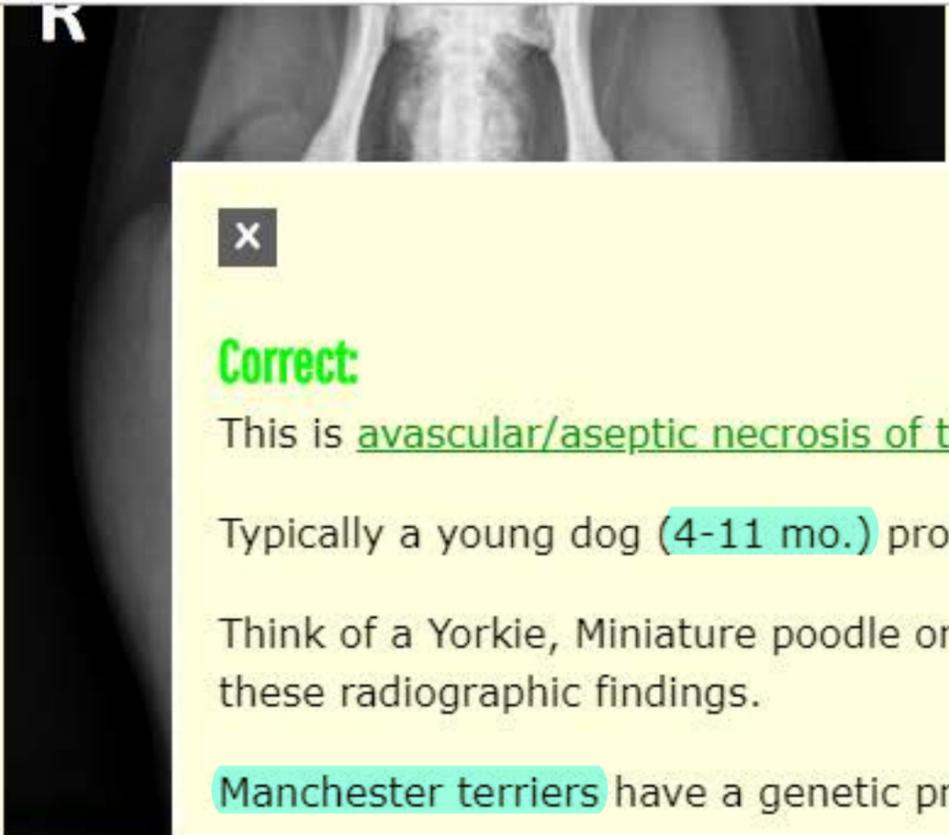
What is the diagnosis?





Coxofemoral luxation	HIDE
Congenital sacroiliac malformation/degeneration	HIDE
Osteochondrosis	HIDE
Lumbosacral subluxation	HIDE
Aseptic necrosis of the femoral head	HIDE

BACK NEXT LEAVE BLANK



Correct:

This is avascular/aseptic necrosis of the femoral head (Legg-Perthes).

Typically a young dog (4-11 mo.) problem of small and miniature breeds.

Think of a Yorkie, Miniature poodle or Chihuahua presenting with a hind lameness and these radiographic findings.

Manchester terriers have a genetic predisposition- do not breed affected animals.

Unknown etiology. Typically Rx with NSAIDS, femoral head and neck osteotomy.

Refs: Pasquini's, Tschauner's Guide to Sm An Clin, vol 1, 2nd ed. p. 628-9, 641;

Coxofen

Congeni

Osteochondrosis

HIDE

Lumbosacral subluxation

HIDE

Aseptic necrosis of the femoral head

HIDE

BACK

NEXT

 **zukureview**  **SAVE & EXIT**

[<](#) PREV

NEXT [>](#)

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In radiology, foreshortening artifact results from which one of the following choices?

- The milliamperere-seconds (mAs) setting is too high HIDE
- Taking a second radiograph too soon after one that required a very high exposure HIDE
- The x-ray beam is more intense at the cathode side compared to the anode side HIDE
- The structure being radiographed is not in contact with the table HIDE
- The kilovoltage (kVp) is too low HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this  Lab  Definitions  Report



Correct: The structure being radiographed is not in contact with the table

Foreshortening occurs when the structure being radiographed is not in contact with the table, causing the structure to appear shorter than its actual size.

The heel effect occurs when the x-ray beam is more intense at the cathode side compared to the anode side, resulting in uneven x-ray photon distribution.

This phenomenon is related to the angle of the anode target area and to the absorption of the x-ray beam by the anode target material.

Click here to see a YouTube video describing the heel effect.

Taking a second radiograph too soon after one that required a very high exposure results in a ghost image.



The structure being radiographed is not in contact with the table	HIDE
The kilovoltage (kVp) is too low	HIDE

BACK NEXT

Overview | Mark this | Lab | Definitions | Report

 **zukureview**  **SAVE & EXIT**

 **PREV**

NEXT 

1 	2 	3 	4 	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

What is the purpose of an x-ray grid?

Increases penetrating power of the x-ray beam	HIDE
Prevents x-ray beam scatter	HIDE
Protects technician from x-rays	HIDE
Reduces patient exposure to radiation	HIDE
Decreases mAs and kV needed for an exposure	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 **Overview**  **Mark this Question**  **Lab Values**  **Definitions**  **Report a Problem**



PREV

1

What is t

Increase

Prevents

Protects

Reduces

Decreases

Correct: Prevents x-ray beam scatter

As x-rays pass through a body, they get scattered in different directions. A grid prevents scattered radiation from reaching an x-ray film (or detector panel, with digital radiography), so that only the primary, directly aimed x-rays that penetrate straight through the animal make it to the x-ray cassette for the best image.

An x-ray grid is basically a plate made of alternating strips of lead, which block scattered x-rays, interspersed between strips of plastic or aluminum, which allow the straight x-rays through.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 536-7.

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

1 	2 	3 	4 	5 	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Which one of the following choices correctly defines "dosimetry"?

The rate of decay of a radionuclide	HIDE
The amount of scatter radiation emitted per radiograph taken	HIDE
A measurement of personal radiation exposure	HIDE
The magnitude of energy produced by an x-ray beam	HIDE
The quantity of ionizing radiation produced by magnetic resonance imaging (MRI)	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem

 **SAVE & EXIT**

1

Which of the following is true regarding radiation exposure?

The rate of radiation exposure is measured in Sieverts (Sv).

The amount of radiation exposure is measured in Rads.

A measure of the biological effect of radiation is the relative biological effectiveness (RBE).

The maximum permissible dose (MPD) is the maximum dose of radiation an individual is allowed to receive over a given time period.

The quantity of ionizing radiation produced by magnetic resonance imaging (MRI) is negligible.

Correct:

Dosimetry is a measurement of personal radiation exposure.

All personnel exposed to ionizing radiation (e.g. x-rays, computed tomography) should wear a film badge.

Film badges measure the amount of individual radiation exposure.

The maximum permissible dose (MPD) is the maximum dose of radiation an individual is allowed to receive over a given time period.

The MPD for occupational exposure is 0.05 Sv (Sievert) per year.

HIDE

BACK **NEXT**

 Overview  Mark this Question  Definitions  Report a Problem



PREV

1

Which of the following is a measure of the amount of ionizing radiation produced by magnetic resonance imaging (MRI)?

The rate of ionizing radiation production

The amount of ionizing radiation produced

A measure of the amount of ionizing radiation

The maximum permissible dose (MPD)

The quantity of ionizing radiation produced by magnetic resonance imaging (MRI)

The maximum permissible dose (MPD) is the maximum dose of radiation an individual is allowed to receive over a given time period.

The MPD for occupational exposure is 0.05 Sv (Sievert) per year.

Exposure to levels greater than the MPD is likely to result in physical effects (e.g., cancer, cataracts) from radiation exposure.

Note: Unlike radiography and computed tomography, MRI does NOT produce ionizing radiation.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 501-5 and the Merck Veterinary Manual online edition.

HIDE

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

1 	2 	3 	4 	5 	6 	7	8	9	10
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Which factor would contribute to making an x-ray film come out too gray?

Vibration in the Potter-Bucky diaphragm	HIDE
Prolonged exposure time	HIDE
Uneven temperature in developing tanks	HIDE
Static electricity	HIDE
Excess scatter radiation	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



- 1
- Which fa
- Vibratio
- Prolonge
- Uneven
- Static el

Correct: Excess scatter radiation

Too much scatter (ie: from radiographing a thick body part more than 10 cm without a grid) causes gray films.

Look more for uneven bands, reticulation on film when temperature in the tanks is uneven.

Static electricity production (from very low humidity) causes artifacts on the film (linear dots, tree pattern).

A light leak into the dark room, or accidentally turning on the lights while undeveloped film is out, would make a gray, fogged film.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 541-2, box 16-2 and Tighe & Brown, Mosby's Comprehensive Review for

Excess scatter radiation

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

PREV

NEXT

1	2	3	4	5	6	7	8	9	10
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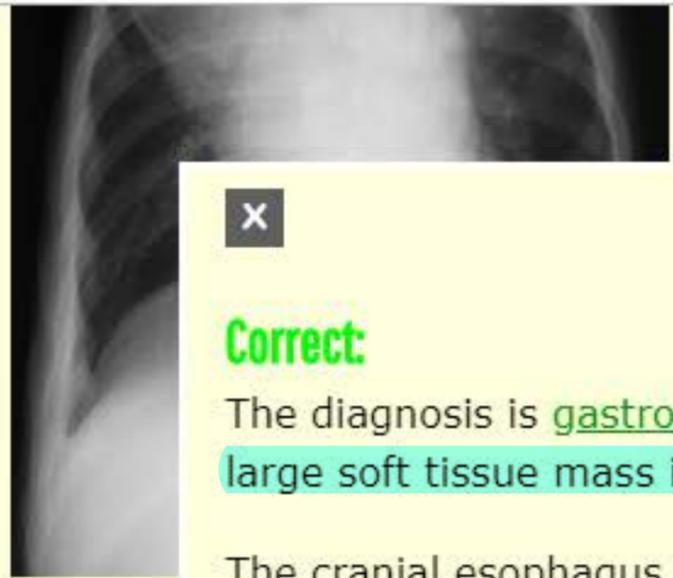
A-3-month-old male Labrador retriever is presented with a history of vomiting blood for 2 days.

Which one of the following choices is the most likely diagnosis?





Left caudal lung lobe torsion	HIDE
Megaesophagus	HIDE
Diaphragmatic hernia of the liver - left lateral lobe	HIDE
Vascular ring anomaly	HIDE
Gastroesophageal intussusception	HIDE



Correct:

The diagnosis is gastroesophageal intussusception. On plain radiographs, there is a large soft tissue mass in the caudal mediastinum.

The cranial esophagus is air filled and dilated. There is a sharp, vertical soft tissue-gas interface within the esophagus on the lateral projection.

Megaesophagus may be congenital or acquired (e.g. myasthenia gravis). There is no medication to improve esophageal function or motility.

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 485-6 and the Merck Veterinary Manual online edition. Images courtesy, Dr A Zwingenberger and Veterinary Radiology.

- Left cau
- Megaesc
- Diaphra**
- Vascular
- Gastroesophageal intussusception

HIDE

BACK

NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

1	2	3	4	5	6	7	8	9	10
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Which one of the following objects **will create an artifact** on a radiograph?

V-shaped positioning trough	HIDE
Debris on hair coat	HIDE
Foam wedges	HIDE
Tape that is out of the primary beam	HIDE
Movable grid	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

1

Which of the following will create an imaging artifact?

V-shaped collars

Debris on the hair coat

Foam with a V-shaped collar

Tape the hair coat

Movable collars

Correct:

Debris on the hair coat will create an imaging artifact.

There are many types of imaging artifacts related to what is physically on the patient.

It is important to remove collars, harnesses, splints and bandages (if possible) and any debris on the patient's hair coat.

These objects can obstruct anatomic structures and can cause misinterpretation of radiographs.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 487-507.

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Which one of the following choices is the best test to diagnose a **suspected brain tumor** in dogs and cats?

Myelography	HIDE
Dual energy x-ray absorptiometry	HIDE
Cerebrospinal fluid analysis	HIDE
Magnetic resonance imaging	HIDE
Nuclear scintigraphy	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

1

Which of the following is true for dogs and cats?

Myelography

Dual energy CT

Cerebrospinal fluid analysis

Magnetic resonance imaging

Correct:

Magnetic resonance imaging is superior to computerized tomography in the diagnosis of brain tumors.

Myelography is used to diagnose diseases of the spine and spinal cord.

Cerebrospinal fluid analysis may be abnormal in the presence of a brain tumor, but the changes are often nonspecific.

Refs: Curtis Dewey, A Practical Guide to Canine and Feline Neurology, 2nd ed. p. 159 and the Merck Veterinary Manual online edition.

Nuclear scintigraphy HIDE

BACK

NEXT





PREV

NEXT

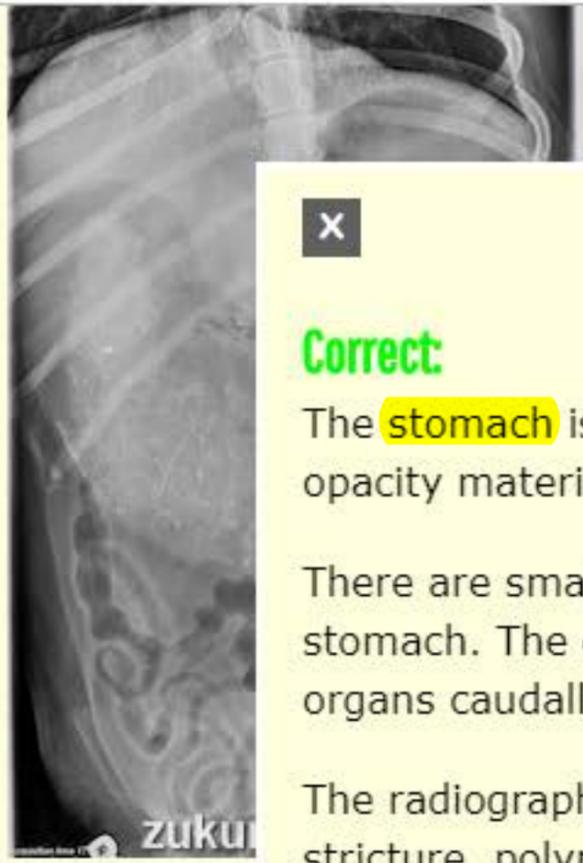
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Where is the predominant abnormality located in these radiographs from an 11 year old English sheepdog?





Pancreas	HIDE
Spleen	HIDE
Liver	HIDE
Right kidney	HIDE
Stomach	HIDE



Correct:

The **stomach** is **markedly enlarged** and filled with fluid and gas. There is mineral opacity material with a sharp edge in the body and pylorus.

There are small mineral opacities (**gravel sign**) in the dependent portion of the stomach. The enlarged stomach is causing a mass effect and displacing the other organs caudally, however peritoneal detail is good.

The radiographs show evidence of **pyloric outflow obstruction** such as a mass, stricture, polyp, or granuloma.

Click here to see [normal canine abdominal radiographs](#).

Pancreas	
Spleen	
Liver	HIDE
Right kidney	HIDE
Stomach	HIDE

BACK NEXT

PREV NEXT

11 ✓	12	13	14	15	16	17	18	19	20
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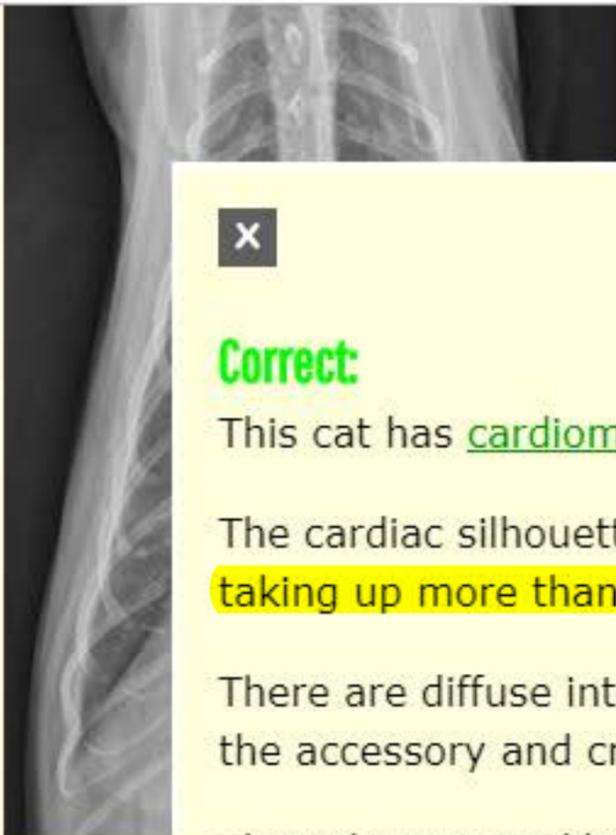
A 10-year-old spayed female DSH cat is presented with dehydration and anorexia.

Which one of the following choices can be ascertained from the thoracic radiographs?





Pleural effusion	HIDE
Cardiomegaly	HIDE
Aspiration pneumonia	HIDE
Normal radiographs	HIDE
Microhepatica	HIDE



Correct:

This cat has [cardiomegaly](#).

The cardiac silhouette is enlarged, appearing tall on the lateral projections, and taking up more than 50% of the thoracic width on the d/v projection.

There are diffuse interstitial to alveolar ventral pulmonary infiltrates concentrated in the accessory and cranial lung lobes.

The colon is gas dilated.

Click here to see [normal feline thoracic radiographs](#).

Pleural effusion

Cardiomegaly

Aspiration pneumonia	HIDE
Normal radiographs	HIDE
Microhepatica	HIDE

BACK

NEXT

Plain | All Layers | Pulmonary Veins | Heart
 Right & Left Caudal Bronchii | Right Pulmonary Artery | Left Pulmonary Artery



 **zukureview**  **SAVE & EXIT**

[PREV](#) [NEXT](#)

11 ✓	12 ✗	13	14	15	16	17	18	19	20
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What thoracic radiographic pattern is most prominent?

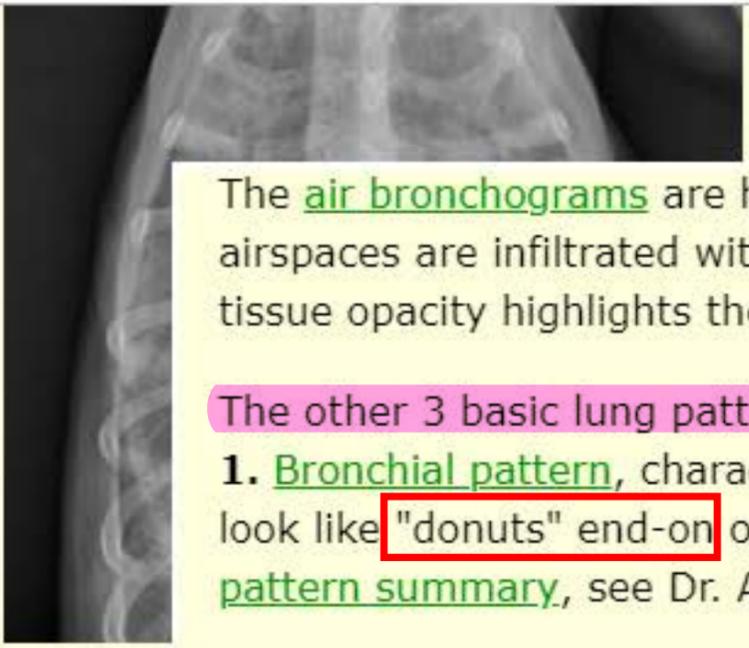




Vascular	HIDE
Alveolar	HIDE
Mixed alveolar-vascular	HIDE
Bronchial	HIDE
Hilar	HIDE

BACK NEXT LEAVE BLANK





The [air bronchograms](#) are hallmarks of the [alveolar pattern](#). When tiny alveolar airspaces are infiltrated with inflammatory fluid, hemorrhage or neoplasia, the soft-tissue opacity highlights the larger airways.

The other 3 basic lung patterns are:

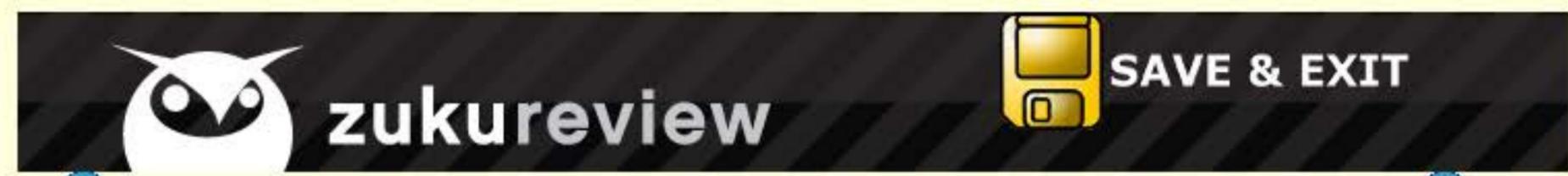
- [Bronchial pattern](#), characterized by irregularly thickened walls of bronchioles that look like "donuts" end-on or "tram tracks" side-on. For an excellent visual [bronchial pattern summary](#), see Dr. Allison Zwingenberger's Vet Radiology site.
- [Interstitial pattern](#), characterized by decreased visualization of pulmonary vessels, cardiac and diaphragm silhouettes. This particular radiograph is also an example of an interstitial pattern in the caudal lung fields.
- [Vascular pattern](#) can suggest either hypervascularity or hypovascularity. Click here to see [enlarged and tortuous pulmonary arteries](#) in lung the fields of a dog with severe heartworm.

- Bronchia
- Vascular
- Hilar
- Mixed al

Alveolar HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Report a Problem



PREV NEXT

11 ✓	12 ✗	13 M ✓	14	15	16	17	18	19	20
------	------	--------	----	----	----	----	----	----	----

As you look closely at an abdominal radiograph from a large German Shepherd, you see many regularly-spaced alternating light and dark lines on the radiograph.

What do these lines mean?

- This is a sign of static electricity HIDE
- The focal-film distance was too long HIDE
- The kilovoltage was too high HIDE
- The x-ray was shot with a grid under the dog HIDE
- The x-ray was shot through a Potter-Bucky diaphragm HIDE

BACK NEXT LEAVE BLANK





PREV 11

Correct: The x-ray was shot with a grid under the dog

These are gridlines.

An x-ray grid is basically a plate made of alternating strips of lead, which block scattered x-rays, interspersed between strips of plastic or aluminum, which allow the straight x-rays through.

Thick body parts like thorax, abdomen, skull and joints greater than 10 cm require a grid.

A grid is like the focusing lens in a camera.

The grid prevents scattered radiation from reaching an x-ray film, so that only the

- The x-ray was shot with a grid under the dog HIDE
- The x-ray was shot through a Potter-Bucky diaphragm HIDE

BACK NEXT



SAVE & EXIT

thick body parts like thorax, abdomen, skull and joints greater than 10 cm require a grid.

11 ✓

A grid is like the focusing lens in a camera.

The grid prevents scattered radiation from reaching an x-ray film, so that only the primary, directly aimed x-rays penetrate straight into the animal for the best, highest resolution image.

A Potter-Bucky diaphragm is a movable x-ray grid that moves in time with a particular x-ray exposure setting, so that gridlines from the lead strips in the grid do not show up on the x-ray film.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 536-7.

- The x-ray was shot with a grid under the dog HIDE
- The x-ray was shot through a Potter-Bucky diaphragm HIDE

BACK NEXT



 **zukureview**  **SAVE & EXIT**

 **PREV**

NEXT 

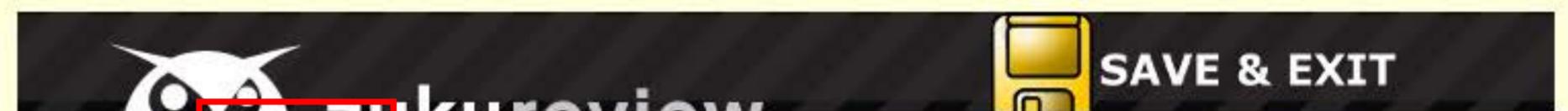
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Which choice controls the penetrating ability of an x-ray?

Kilovoltage	HIDE
Low-energy transformer	HIDE
Cassette screen	HIDE
Milliampere-seconds	HIDE

BACK **NEXT** **LEAVE BLANK**

 **Overview**  **Mark this Question**  **Lab Values**  **Definitions**  **Report a Problem**



Kilovoltage (kVp) controls the penetrating ability of an x-ray.

Generally, increasing **kVp** increases film blackness.

Milliamperes (mA) are the **QUANTITY** of electrons produced by the x-ray machine and exposure time (sec) is how **LONG** you expose the animal to these rays.

Together, milliamperes-seconds equals mA multiplied by time (mA X sec=mAs), which controls the intensity of an x-ray.

More mA, or longer exposure time, means a **DARKER** x-ray.

Usually you want a **HIGH** mA setting, and a very **SHORT** exposure time (like 1/20 of a second) so that even if the animal moves, you still get a sharply focused x-ray.

For **bone**, which has a lot more natural contrast because it is so hard, use a **lower kVp** and a **higher mAs**.

PREV

11

Which of the following controls the penetrating ability of an x-ray?

Kilovoltage

Low-energy x-rays

Cassette

Milliamperes

BACK NEXT

Overview

Mark this Question

Lab Values

Definitions

Report a Problem

 **zukureview**  **SAVE & EXIT**

 PREV

NEXT 

11	✓	12	✗	13	M ✓	14	✗	15	✓	16		17		18		19		20	
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Which one of the following choices best describes **how an image is produced with digital radiography?**

- A transducer emits a short pulse of sound into the patient; the sound that is reflected back creates an image HIDE
- An x-ray beam passes transaxially through a small segment of the patient; an image is created by measuring x-ray attenuation at sequential sites HIDE
- A detector panel converts x-rays into electrical signals; an analog image is created which is then digitalized HIDE
- Technetium 99 is administered to a patient; photon emission is detected and recorded with a gamma scintillation camera HIDE
- Radio waves are used to generate images by disrupting hydrogen nuclei in tissues HIDE

BACK NEXT LEAVE BLANK

PREV NEXT

11	12	13	14	15	16	17	18	19	20
----	----	----	----	----	----	----	----	----	----

Correct: A detector panel converts x-rays into electrical signals; an analog image is created which is then digitalized

In digital radiography, a specialized detector panel converts x-rays into electrical signals; an analog image is created which is then digitalized.

The image, which is displayed on a computer screen, can then be enhanced with magnification, rotation, and adjustments in brightness, contrast and zoom.

In ultrasonography, a transducer emits a short pulse of sound into the patient.

When the sound wave hits an echogenic structure, some of the sound is reflected back to the transducer, creating an image.

The strength of the reflected sound determines image brightness.

An x-ray beam passes transaxially through a small segment of the patient; an image is created by measuring x-ray attenuation at sequential sites HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

11	12	13	14	15	16	17	18	19	20
----	----	----	----	----	----	----	----	----	----

Which of the following is a cross-sectional radiograph?

Radio waves pass through soft tissues

A detected photon is created

Technetium is recorded

A transducer reflects

The time it takes for the sound to travel into the patient and back to the transducer determines where the echo is depicted on the screen.

With **computed tomography** (CT scans), an **x-ray beam passes transaxially** through a small segment of the patient; an image is created by measuring x-ray attenuation (drop off) at sequential sites.

In **nuclear medicine**, **technetium 99 is administered** to a patient; photon emission is detected and recorded with a gamma scintillation camera.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 490-2, 508-17 and the Merck Veterinary Manual online edition.

An x-ray beam passes transaxially through a small segment of the patient; an image is created by measuring x-ray attenuation at sequential sites HIDE

BACK NEXT

Overview | Mark this Question | Lab Values | Definitions | Report a Problem

PREV NEXT

11 ✓	12 ✗	13 ^M ✓	14 ✗	15 ✓	16 ^M ✓	17	18	19	20
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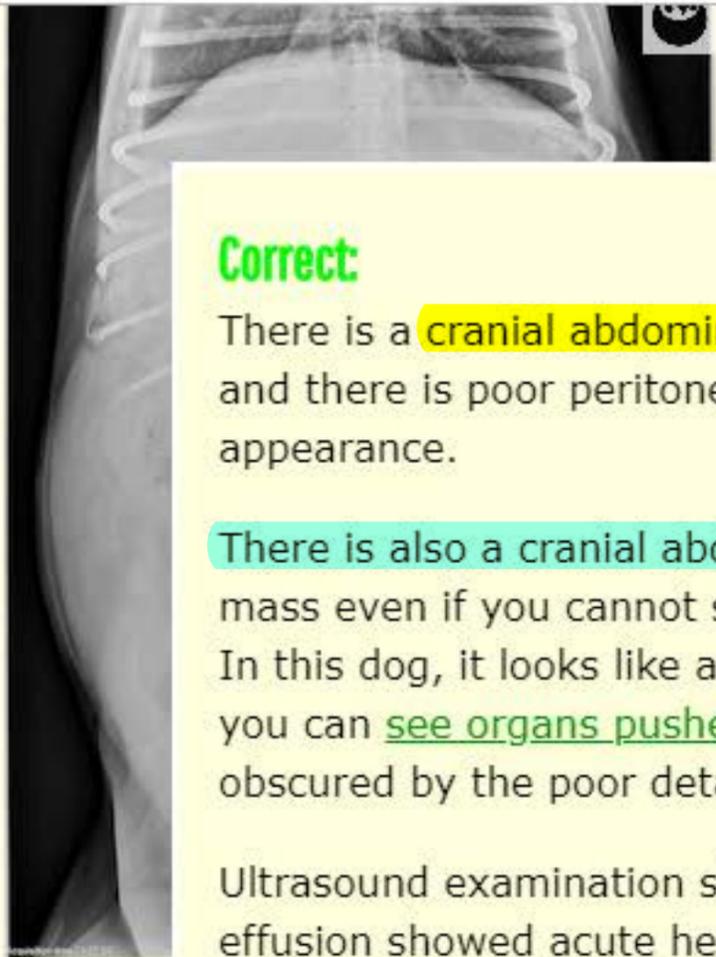
A 12 year old female spayed Lab-mix dog is presented after collapsing with difficulty breathing.

What is a key finding in these radiographs that is relevant to the dog's signs?





Renomegaly	HIDE
Diaphragmatic hernia	HIDE
Cranial abdominal mass	HIDE
Sublumbar lymphadenopathy	HIDE
Foreign body obstruction	HIDE



Correct:

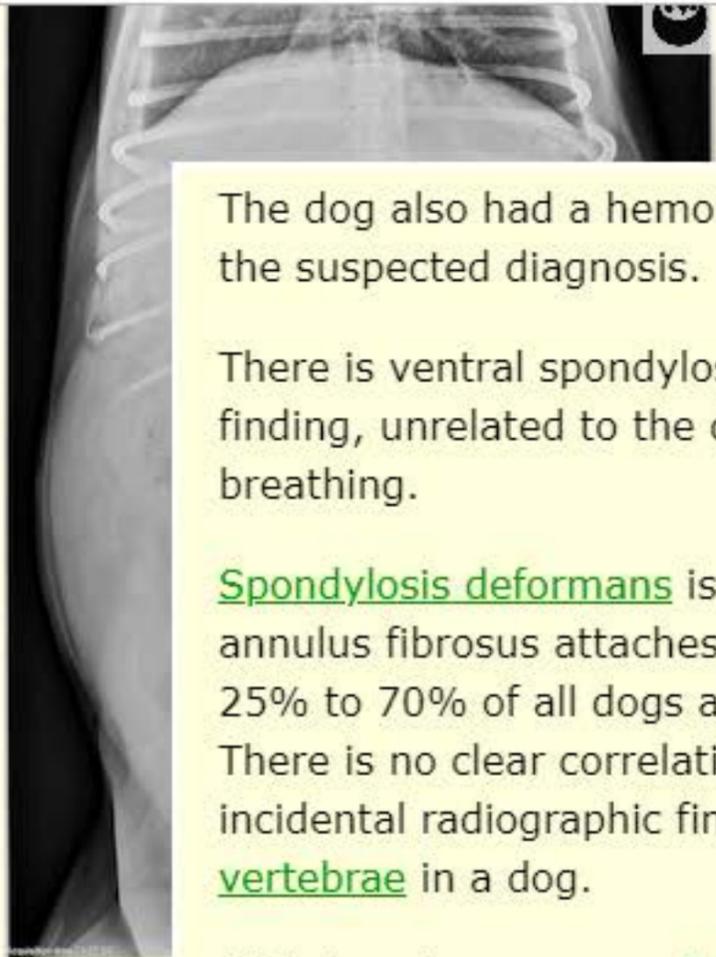
There is a **cranial abdominal mass** and peritoneal effusion. The abdomen is distended, and there is poor peritoneal detail throughout the abdomen with a mottled appearance.

There is also a cranial abdominal **mass effect** which means organs are displaced by a mass even if you cannot see the mass itself.

In this dog, it looks like an area of poor detail with increased soft tissue opacity, and you can **see organs pushed away** from it. The remainder of the abdominal organs are obscured by the poor detail.

Ultrasound examination showed a large splenic mass. Cytology of the abdominal effusion showed acute hemorrhage. Ultrasound examination revealed a large splenic mass.

Renome	HIDE
Diaphragmatic hernia	HIDE
Cranial abdominal mass	HIDE
Sublumbar lymphadenopathy	HIDE
Foreign body obstruction	HIDE



The dog also had a hemorrhagic pleural effusion, and diffuse [hemangiosarcoma](#) was the suspected diagnosis.

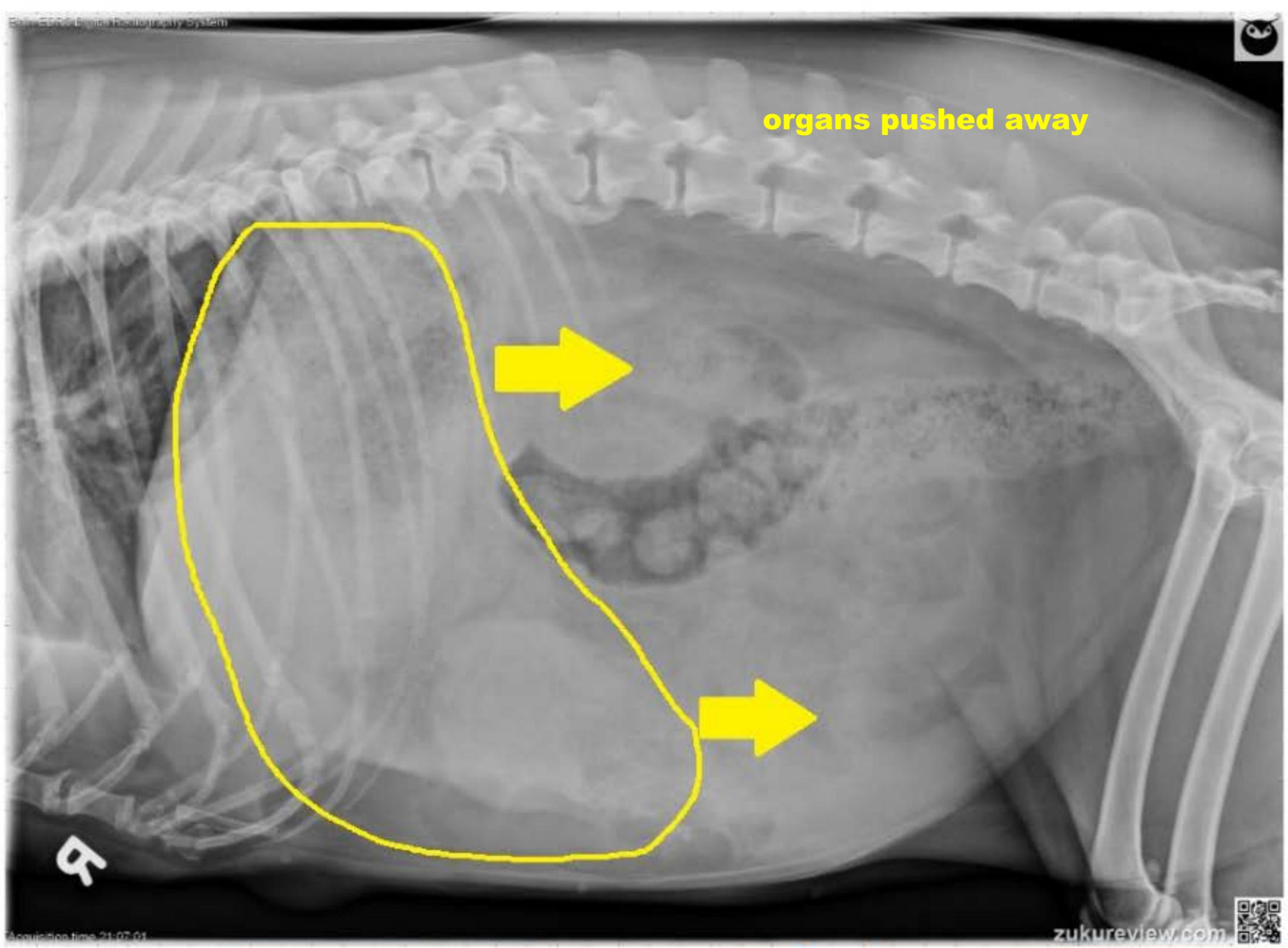
There is ventral spondylosis of two proximal lumbar vertebrae. This is an incidental finding, unrelated to the dog's presenting problems of collapse and difficulty breathing.

[Spondylosis deformans](#) is a **noninflammatory formation of bony projections** where the annulus fibrosus attaches to the cortical surface of adjacent vertebrae. **COMMON:** 25% to 70% of all dogs are affected.

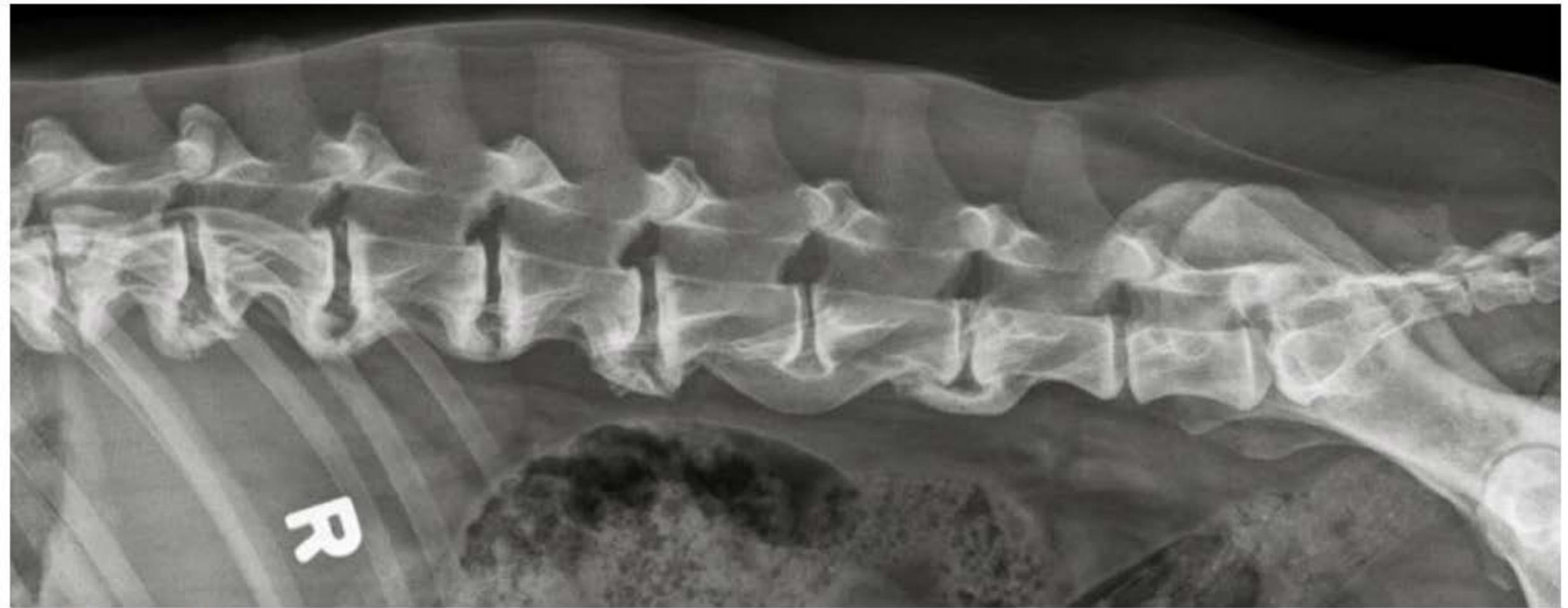
There is no clear correlation between spondylosis and clinical signs-typically an incidental radiographic finding. Click here to see [spondylosis bridging multiple vertebrae](#) in a dog.

Click here to see [normal abdominal radiographs](#).

Renome	
Diaphragmatic hernia	HIDE
Cranial abdominal mass	HIDE
Sublumbar lymphadenopathy	HIDE
Foreign body obstruction	HIDE



Spondylosis deformans, dog



Courtesy of Dr. William Thomas.

Spondylosis deformans in a dog.

 **zukureview**  **SAVE & EXIT**

[PREV](#) [NEXT](#)

11	✓	12	✗	13	M ✓	14	✗	15	✓	16	M ✓	17	M ✓	18		19		20
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Which one of the following choices is a type of **mechanical restraint** used to position a patient for a radiograph?

Foam wedge	HIDE
Rabies pole	HIDE
Technician's hands	HIDE
Tranquilizer	HIDE
Lead apron	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



Which of the following is a mechanical restraint used to position patients for a radiograph?

Foam wedges

Rabies post-exposure prophylaxis

Technician manual restraint

Tranquilizers

Lead apron HIDE

BACK

NEXT



Correct:

Foam wedges are a type of **mechanical** restraint used to position patients for a radiograph.

Other examples include V- or U-troughs, sandbags, wooden spoons, tape and gauze.

Tranquilizers, anesthetics and analgesics are examples of **chemical** restraints used to relax or immobilize a patient for a radiograph.

Manual restraint is achieved via **technicians' or doctors' hands**.

This type of restraint should be minimized to **reduce the radiation exposure of the holder(s)**.

If using manual restraint, **protective lead gear** (e.g., apron, thyroid shield) must be worn.

 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

11	✓	12	✗	13	M ✓	14	✗	15	✓	16	M ✓	17	M ✓	18	✗	19		20
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Which one of the following choices is a potential complication of barium sulfate administration for gastrointestinal studies?

May cause intestinal blockage	HIDE
Disruption of the physiologic function of the gastrointestinal tract	HIDE
Aspiration pneumonia	HIDE
Irritation of the gastrointestinal tract	HIDE
Poor visualization of barium on radiographs	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem

 **SAVE & EXIT**

Correct: Aspiration pneumonia

Aspiration of barium and subsequent pneumonia is a potential complication of barium sulfate administration.

Which or administ Risk to the patient must be considered when deciding whether to perform a barium study.

May cau Barium sulfate is an excellent contrast agent for gastrointestinal (GI) studies because it is easily visualized radiographically, is non-irritating and does not disrupt the normal physiologic function of the GI tract.

Disrupti

Aspiratic Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 507-8.

Irritatio

Poor visualization of barium on radiographs HIDE

[BACK](#) [NEXT](#)

- 
Overview
- 
Mark this Question
- 
Lab Values
- 
Definitions
- 
Report a Problem

 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

11 ✓	12 ✗	13 M ✓	14 ✗	15 ✓	16 M ✓	17 M ✓	18 ✗	19 ✗	20
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What pathologic process is evident in the canine radiograph below?

[Click here to see image](#)

Neoplasia	HIDE
Hypertrophy	HIDE
Osteochondrosis	HIDE
Osteomyelitis	HIDE
Congenital cyst	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem

THE MERCK VETERINARY MANUAL Multimedia



Courtesy of Dr. Ronald Green.



PREV
11

Correct:

Neoplasia. This is a classic image of Osteosarcoma, a COMMON, aggressive bone tumor typically found in the appendicular skeleton, especially distal radius. Bone biopsy and culture are required for definitive diagnosis of lytic bone lesion to differentiate between infection and neoplasia.

What pat
[Click here](#)

Usually, does not cross joint (unlike osteomyelitis, which usually DOES cross joint). Look for soft tissue swelling, periosteal proliferation, sunburst periosteal reaction (33%), possible pathologic fractures.

- Congenit
- Osteom
- Hypertro

Refs: Pasquini's, Tschauner's Guide to Small Animal Clinics, vol 1, 2nd ed. pp. 604-9, Blackwell's 5-Minute Vet Consult Canine Feline, 4th ed. pp. 1006-7, and the Merck Veterinary Manual online edition.

- Neoplasia
- Osteochondrosis

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

PREV

21	22	23	24	25	26	27	28	29	30
----	----	----	----	----	----	----	----	----	----

NEXT

What is being evaluated in these ultrasound images?





Images courtesy, Nottingham Vet School.

Kidney and adrenal gland	HIDE
Urinary bladder and prostate	HIDE
Liver and gall bladder	HIDE
Stomach	HIDE
Left ventricle	HIDE

BACK NEXT I FAVE RI ANK

Nottingham Vet School
10
Abd C11

Correct:

The images show a normal **liver** and **gall bladder** (first and second images). The gall bladder is the discrete hypoechoic region in the first and second images.

Refs: Merck Vet Manual 10th ed. online, [Ultrasonography](#), Image courtesy, [Nottingham Vet School](#).

Images c

Liver an

Urinary bladder and prostate	HIDE
Left ventricle	HIDE
Stomach	HIDE
Kidney and adrenal gland	HIDE

BACK NFXT

 **zukureview**  **SAVE & EXIT**

PREV

NEXT

21	22	23	24	25	26	27	28	29	30
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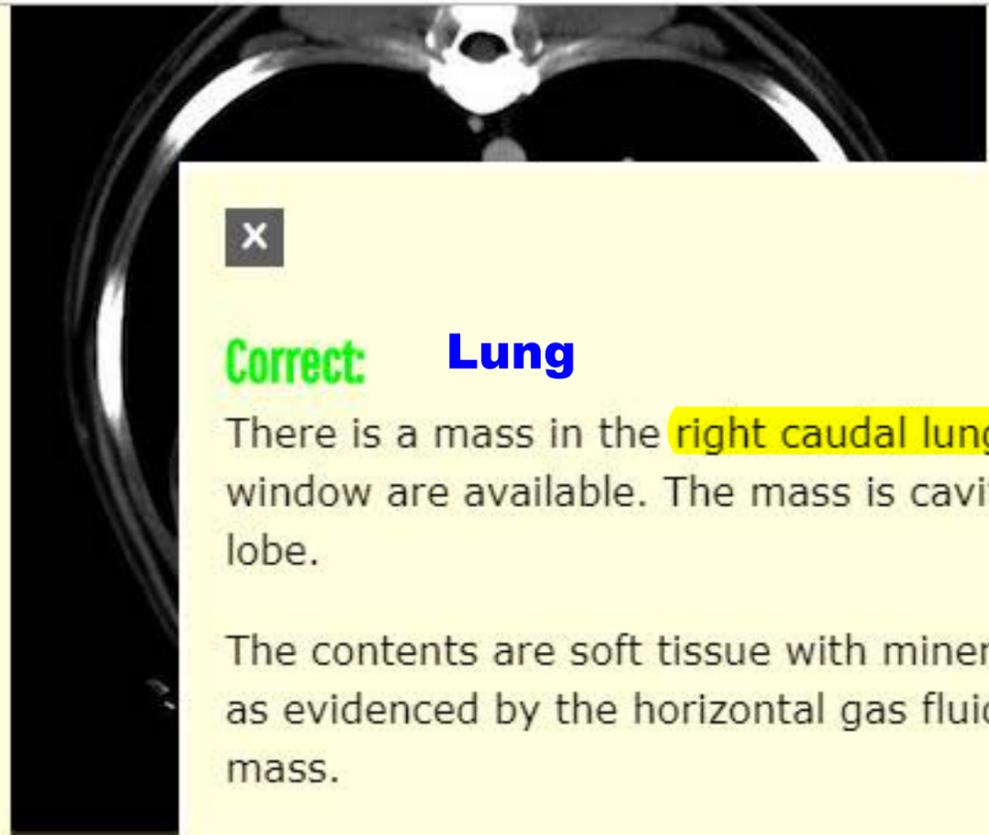
Where is the abnormality located in this CT scan of a 12-year-old German shepherd?





Lung	HIDE
Mediastinum	HIDE
Pleural space	HIDE
Liver	HIDE
Spinal cord	HIDE

BACK NEXT LEAVE BLANK



Correct: Lung

There is a mass in the **right caudal lung lobe**. CT images in a lung and soft tissue window are available. The mass is cavitary, and contained within the right caudal lung lobe.

The contents are soft tissue with mineralized material, and a small fluid component as evidenced by the horizontal gas fluid interface in the lower right portion of the mass.

Click here to see this dog's [radiographs](#). On all three radiographic projections, there is a cavitary mass in the right caudal lung lobe.

It is best seen on the left lateral projection. and contains soft tissue opacity as well as

Lung

Mediastinum

Pleural space

HIDE

Liver

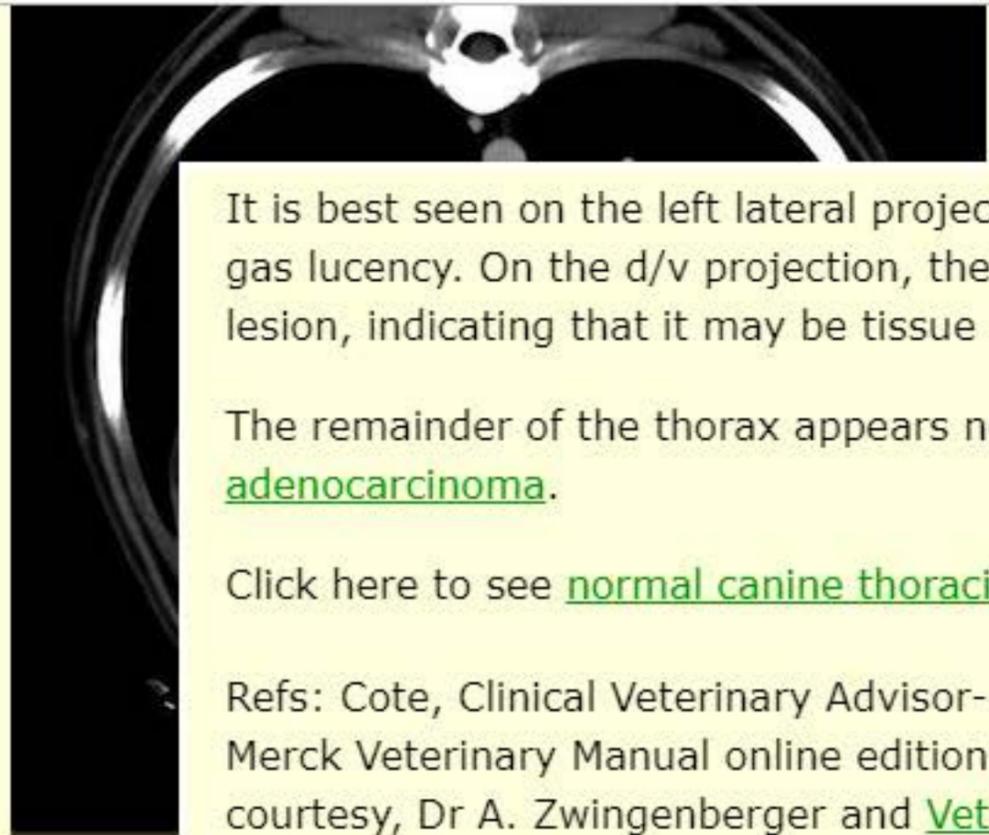
HIDE

Spinal cord

HIDE

BACK

NEXT



It is best seen on the left lateral projection, and contains soft tissue opacity as well as gas lucency. On the d/v projection, the soft tissue opacity is on the lateral side of the lesion, indicating that it may be tissue rather than fluid.

The remainder of the thorax appears normal. This mass was a [pulmonary adenocarcinoma](#).

Click here to see [normal canine thoracic radiographs](#).

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 145-6 and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, Dr A. Zwingenberger and [Veterinary Radiology](#). Normal radiograph links courtesy, [Imaging Anatomy](#) Univ. of Illinois Vet Med.

Lung	
Mediastinum	
Pleural space	HIDE
Liver	HIDE
Spinal cord	HIDE

BACK NEXT

 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

21	22	23	24	25	26	27	28	29	30
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Which one of the following choices is a **common** clinical **use of diagnostic nuclear medicine** in veterinary patients?

Estimation of central venous pressure	HIDE
Measurement of cardiac contractility	HIDE
Assessment of liver function	HIDE
Detection of bone metastasis	HIDE
Evaluation of esophageal motility	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



Correct: Detection of bone metastasis

In veterinary medicine, **diagnostic nuclear medicine** is commonly used to **detect tumor metastasis to bone.**

Also called a **"bone scan"**, it can be used to locate bone lesions not identifiable radiographically.

Other uses of nuclear medicine include **assessment of kidney and lung function, detection of pulmonary emboli** and **thyroid evaluation**. In diagnostic nuclear medicine, a radionuclide (e.g., **technetium 99m**) is **administered, usually intravenously.**

The electromagnetic radiation that is emitted is detected with a gamma scintillation camera.

This information provides functional, physiologic, pharmacologic and kinetic data from the patient.



Which o
in veteri

Estimati

Measure

Assessm

Detectio

Evaluation of esophageal motility HIDE

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

21 	22 	23  	24	25	26	27	28	29	30
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A 10-year-old DSH cat is presented with a history of weight loss and muscle wasting over the past year.

Which one of the following choices is the most striking finding?





Cranial abdominal mass	HIDE
Megacolon	HIDE
Prostatomegaly	HIDE
Gastrointestinal foreign body	HIDE
Renomegaly	HIDE



Correct:
This cat has a cranial abdominal mass. Radiographic findings:

- Cranial abdominal mass.
- Caudal displacement of the stomach and altered gastric axis.
- Caudal displacement of transverse colon
- Caudal displacement of the right kidney.
- Lobular mass cranial and caudal to stomach.

The caudal displacement of the stomach makes a liver mass most likely in this case.

The mass is also visible caudal to the stomach, but this can occur with pedunculated, lateralized, or very large masses.

Cranial abdominal mass	HIDE
Megacolon	HIDE
Prostatomegaly	HIDE



The caudal displacement of the transverse colon and right kidney also point to a hepatic mass.

Remember that the right kidney is in contact with the liver in the renal fossa.

This cat had a [biliary cystadenoma](#).

Click here to see [normal feline abdominal radiographs](#).

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 466-8 and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, Dr A. Zwingenberger and [Veterinary Radiology](#). Normal radiograph links courtesy, [Imaging Anatomy](#) Univ. of Illinois Vet Med.

Cranial abdominal mass	HIDE
Megacolon	HIDE
Prostatomegaly	HIDE



PREV > NEXT

21	22	23 M ✓	24 ✓	25	26	27	28	29	30
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An 8-year-old Tennessee Walker mare is presented for evaluation. She was accidentally turned out with a stallion twice - about 4 weeks ago and about 2 weeks ago. Transrectal ultrasound of the uterus reveals the following.

[Click here to see image](#)

What should the owner be told?

Twin fetuses present	HIDE
Normal estrus uterus	HIDE
There was uterine trauma	HIDE
Mare is pregnant	HIDE
Endometritis with endometrial cysts	HIDE

BACK NEXT LEAVE BLANK



Courtesy of Dr. Patricia Sertich.



PREV

21

Correct: Mare is pregnant

The mare is ~4 weeks pregnant - this ultrasound image shows a 29-day-old conceptus. The yolk sac (dorsal) and allantoic cavity (ventral) are nearly the same size, divided by the embryo. The heart beat is visible beginning at day 25.

An 8-year-old mare turned over on her side during ultrasound.

A 2-week pregnancy is imaged as a small, round, anechoic structure with bright hyperechoic dashes on the dorsal and ventral aspect of the yolk sac (called "specular reflectors"), located within the lumen of the uterus. Click here to see an ultrasound image of an ~2-week-old conceptus.

[Click here](#)

What should you suspect? This image is not consistent with uterine trauma, endometritis, or a twin pregnancy.

Refs: Pasquini's Guide to Equine Clinics, 3rd ed. and the Merck Veterinary Manual online

Twin fetuses	HIDE
Normal estrus uterus	HIDE
There was uterine trauma	HIDE
Mare is pregnant	HIDE
Endometritis with endometrial cysts	HIDE

BACK NEXT



Sonogram of 13-day conceptus, mare







PREV NEXT

21 ✗	22 ✗	23 M ✓	24 ✓	25 ✓	26	27	28	29	30
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This 8-year-old German shepherd mix dog is presented with a 48-hour history of lethargy and a distended abdomen.

Which one of the following choices is the most likely diagnosis?

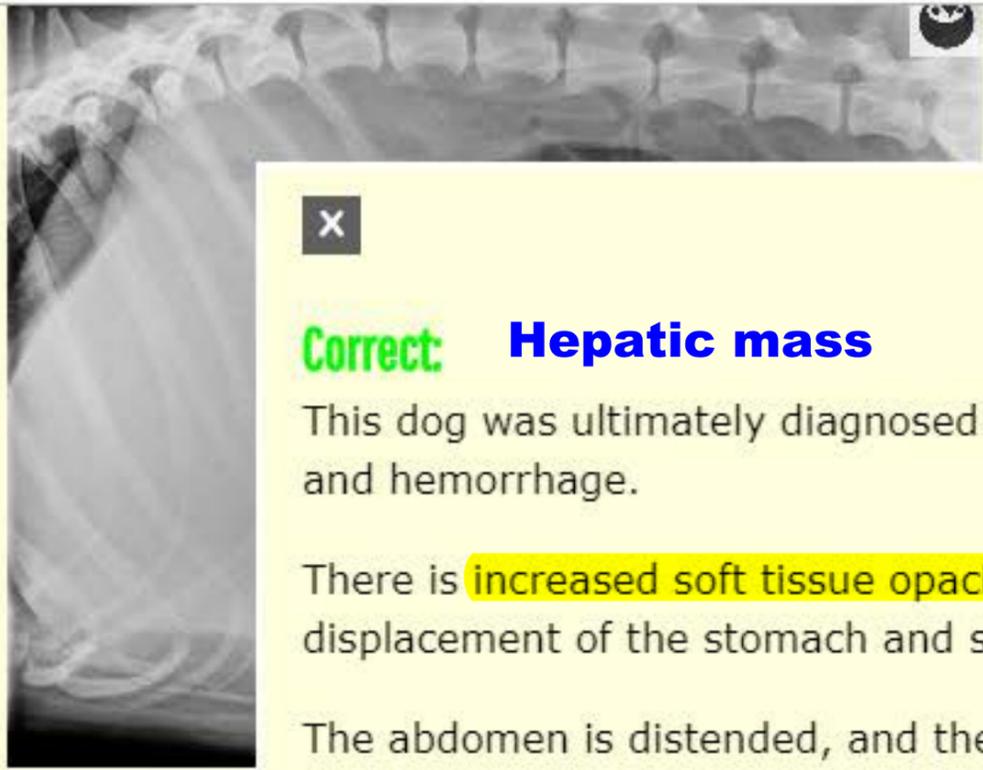


and a distended abdomen.

Which one of the following choices is the most likely diagnosis?



Mesenteric torsion	HIDE
Intussusception	HIDE
Ruptured urinary bladder	HIDE
Gastric dilatation/volvulus	HIDE
Hepatic mass	HIDE



Correct: Hepatic mass

This dog was ultimately diagnosed with hepatic carcinoma with suppurative effusion and hemorrhage.

There is **increased soft tissue opacity** in the cranial abdomen with caudal displacement of the stomach and small intestine.

The abdomen is distended, and there is mottle peritoneal detail in the cranioventral region.

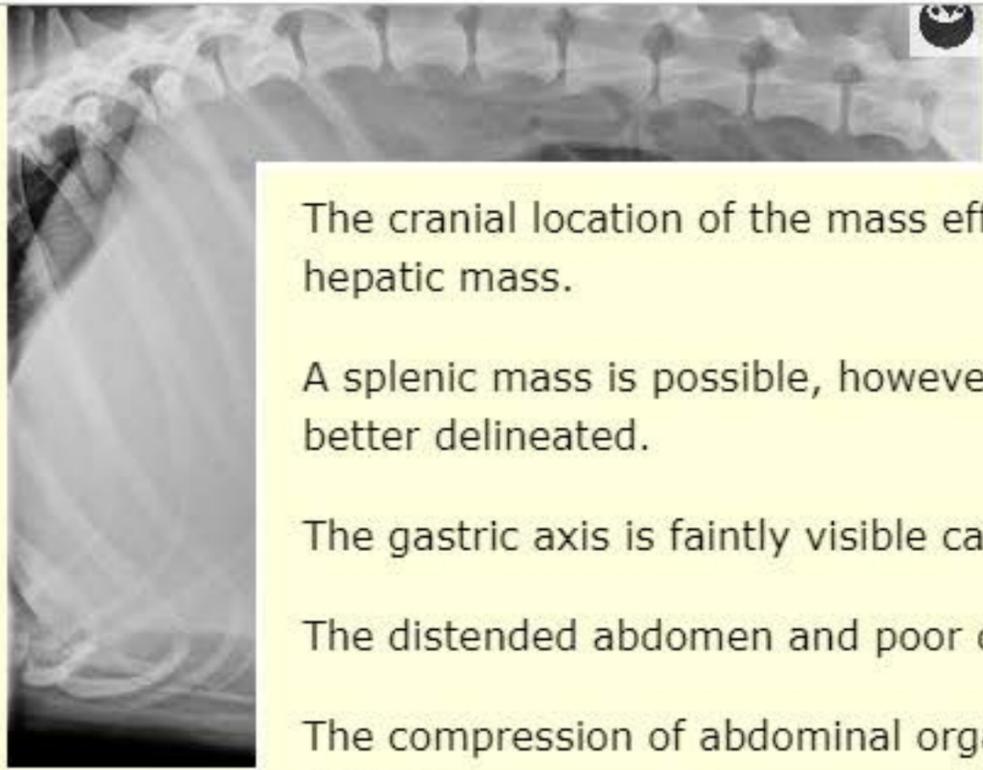
There is also a gas lucency overlying the dorsal portion of the liver.

This may be overlying bowel, or be within the hepatic parenchyma.

Mesenteric t	
Intussuscep	
Ruptured urinary bladder	HIDE
Gastric dilatation/volvulus	HIDE
Hepatic mass	HIDE

BACK NEXT





The cranial location of the mass effect makes the most likely differential diagnosis a hepatic mass.

A splenic mass is possible, however these are more often in the mid abdomen and better delineated.

The gastric axis is faintly visible caudal to the mass, supporting a hepatic origin.

The distended abdomen and poor detail are diagnostic of peritoneal effusion.

The compression of abdominal organs is also contributing to poor viewing of serosal surfaces.

Click here to see [normal canine abdominal radiographs](#).

Click here to see more details on this [case](#) including ultrasound images.

Mesenteric t	
Intussuscep	
Ruptured urinary bladder	HIDE
Gastric dilatation/volvulus	HIDE
Hepatic mass	HIDE

BACK NEXT





zukureview

SAVE & EXIT

PREV

NEXT

21	22	23	24	25	26	27	28	29	30
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What is the **correct order** of radiographic density of the following structures, from **least radiographically dense** to **most radiographically dense**?

- Urine-filled bladder
- Humerus
- Transarticular pin
- Inflated lung
- Abdominal fat

Transarticular pin, humerus, urine-filled bladder, abdominal fat, inflated lung	HIDE
Inflated lung, urine-filled bladder, humerus, transarticular pin, abdominal fat	HIDE
Urine-filled bladder, abdominal fat, transarticular pin, inflated lung, humerus	HIDE
Inflated lung, abdominal fat, urine-filled bladder, humerus, transarticular pin	HIDE
Humerus, abdominal fat, inflated lung, transarticular pin, urine-filled bladder	HIDE

BACK NEXT I FAVE RI ANK



21

Correct:

Radiographic density from least dense (black on x-ray) to most dense (white on x-ray) goes in this order: AIR-FAT-WATER-BONE-METAL.

Have a look at this radiograph of a [dog who swallowed a metal coin](#) to see example of differing radiographic densities. Depending on mineral density, a [urolith in a urine-filled bladder](#) may be more dense or less dense than the surrounding tissue.

Here is a mnemonic to help you remember the 5 types of radiographic density:

- 1. **Bubbles** - air (black)
- 2. **Blubber** - fat (black)
- 3. **Blood** - water, liquids (grey)
- 4. **Bones** - bone and mineral (white)
- 5. **Bullets** - metal (white)

Inflated lung, urine-filled bladder, humerus, transarticular pin, abdominal fat	HIDE
Urine-filled bladder, abdominal fat, transarticular pin, inflated lung, humerus	HIDE
Inflated lung, abdominal fat, urine-filled bladder, humerus, transarticular pin	HIDE
Humerus, abdominal fat, inflated lung, transarticular pin, urine-filled bladder	HIDE

BACK NEX

 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

21 	22 	23  	24 	25 	26 	27 	28	29	30
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Which one of the following choices may cause a radiograph to come out blurry?

Static electricity	HIDE
mAs too high	HIDE
Focal film distance too short	HIDE
kVp too low	HIDE
Patient movement	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV
21

Correct: Patient movement

Blurring can be caused by poor film-screen contact, patient movement, or poor centering of primary x-ray beam.

If the distance between the object and the film is increased, you may get distortion or magnification of the image.

Static electricity tends to make linear dots or a tree pattern on a radiograph.

For good tables that list common technical errors in taking and developing x-ray films, see Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 541-2, boxes 16-2 and 16-3.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 541-2.

- Which of the following causes blurring?
- Static electricity
- mAs too low
- Focal film distance too large
- kVp too low
- Patient movement

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

21	22	23 ^M ✓	24 ✓	25 ✓	26	27 ✓	28 ✓	29	30
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You have just taken an x-ray of a dog at 10 milliampere-seconds (mAs) from 100 cm away.
Now you need to reposition the dog and take another x-ray from 50 cm.
What mAs setting should you use to get a similar exposure to the first x-ray?

2.5 mAs	HIDE
20 mAs	HIDE
5mAs	HIDE
10 mAs	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



21

Correct: 2.5 mAs

A decrease in distance between the film and the x-ray source INCREASES the x-ray intensity.

You have

If you halve the distance between an x-ray source and the film, you must decrease the mAs to 1/4th in order have a similar exposure.

Now you

What mAs

So, halving the distance (from 100cm to 50cm) means the mAs must equal 2.5 (one-quarter the original mAs).

2.5 mAs

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 529-32.

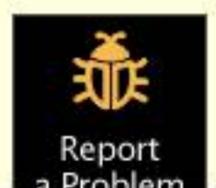
20 mAs

5mAs

10 mAs

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

21	22	23 ^M ✓	24 ✓	25 ✓	26	27 ✓	28 ✓	29 ✓	30
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In digital radiography, which one of the following artifacts results from taking a second radiograph too soon after one that required a very high exposure?

Uberschwinger artifact	HIDE
Ghost image	HIDE
Elongation	HIDE
Heel effect	HIDE
Foreshortening	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

21

In digital radiogra

Ubersch

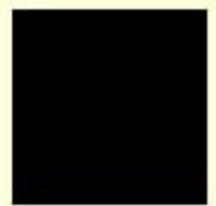
Ghost in

Elongat

Heel eff

Foreshortening HIDE

BACK NEXT



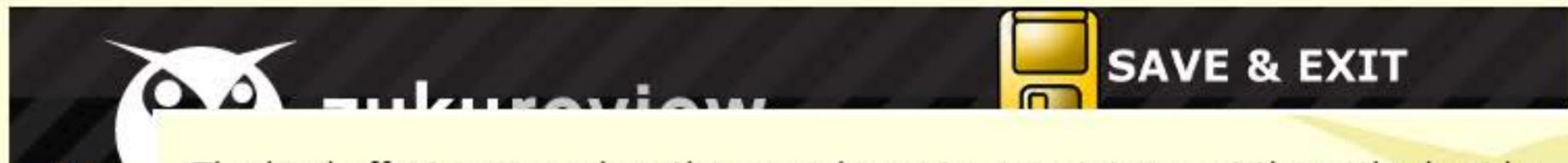
Correct:

A ghost image occurs when a second image is taken too quickly after a previous image that required a very high exposure.

A "ghost" of the first exposure will be visible on the second image because the detector plate has not yet lost all of its charge.

Elongation occurs when the x-ray beam is not centered on the structure being radiographed, causing the image to appear longer than its normal size.

The heel effect occurs when the x-ray beam is more intense at the cathode side compared to the anode side, resulting in uneven x-ray photon distribution.



- PREV
- 21
- In digital radiography
- Ubersch
- Ghost in
- Elongat
- Heel eff

The heel effect occurs when the x-ray beam is more intense at the cathode side compared to the anode side, resulting in uneven x-ray photon distribution.

This phenomenon is related to the angle of the anode target area and the absorption of the x-ray beam by the anode target material.

Click to see a YouTube video describing the [heel effect](#).

Foreshortening occurs when the structure being radiographed is lifted off the table, causing the structure to appear shorter than its actual size.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 480-499.

Foreshortening HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
-
-

PREV NEXT

31	32	33	34	35	36	37	38	39	40
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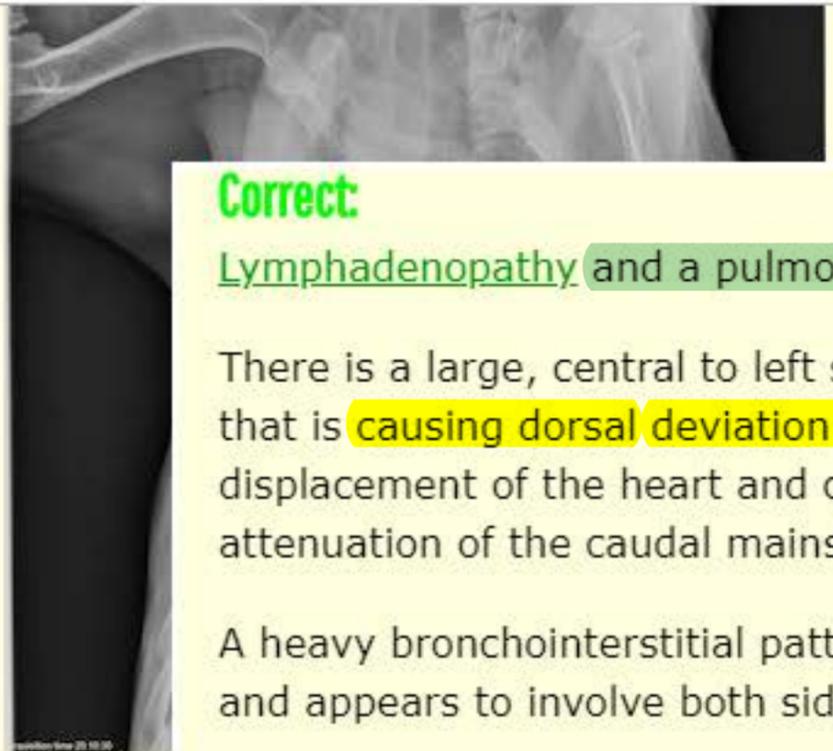
A 12-year-old male neutered mix breed is presented with a one-month history of vomiting, inappetence, and lymphadenopathy.

Which one of the following scenarios can be interpreted from the radiographs?





Lung lobe torsion	HIDE
Aspiration pneumonia	HIDE
Severe cardiomegaly with left-sided heart failure	HIDE
Advanced heartworm disease	HIDE
Pulmonary mass and lymphadenopathy	HIDE



Correct:

Lymphadenopathy and a pulmonary mass are present.

There is a large, central to left sided soft tissue mass dorsal to the cardiac silhouette that is causing dorsal deviation and narrowing of the mid thoracic esophagus, ventral displacement of the heart and caudal trachea and abaxial displacement and attenuation of the caudal mainstem bronchi.

A heavy bronchointerstitial pattern is seen radiating into the surrounding lung lobes and appears to involve both sides of the thorax.

Patchy alveolar infiltrates are also present in the right middle lung lobe.

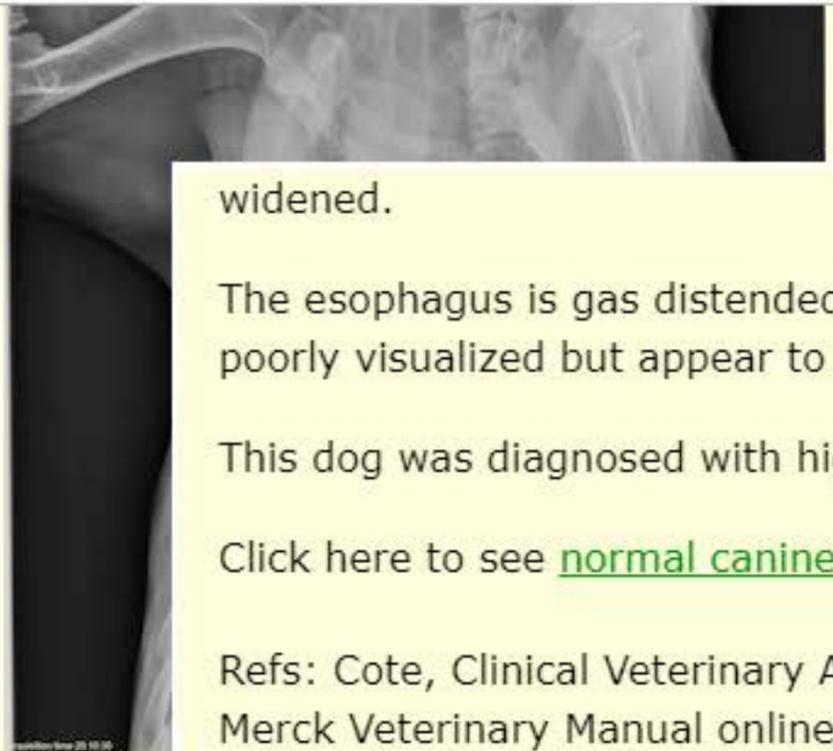
There are pleural fissure lines in both hemithoraces. The cranial mediastinum is widened.

- Lung lob
- Aspiratic
- Severe

Advanced heartworm disease	HIDE
Pulmonary mass and lymphadenopathy	HIDE

BACK NEXT





widened.

The esophagus is gas distended along its length. The cardiovascular structures are poorly visualized but appear to be within normal limits.

This dog was diagnosed with high grade T-cell lymphoma.

Click here to see [normal canine thoracic radiographs](#).

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 618-20 and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, [Dr A. Zwingenberger](#) and [Veterinary Radiology](#), Normal radiograph links courtesy, [Imaging Anatomy](#) Univ. of Illinois Vet Med.

- Lung lob
- Aspiratic
- Severe

Advanced heartworm disease	HIDE
Pulmonary mass and lymphadenopathy	HIDE

BACK NEXT



 **zukureview**  **SAVE & EXIT**

 PREV

NEXT 

31 	32	33	34	35	36	37	38	39	40
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Which one of the following choices best describes **fluoroscopy**?

- A continuous x-ray image that evaluates anatomic structures in real-time HIDE
- A sound wave is passed through the body and then reflected back to the transducer HIDE
- A radionuclide is administered to a patient; the emitted electromagnetic radiation is detected with a gamma scintillation camera HIDE
- A thin x-ray beam is passed transaxially through a patient; x-ray attenuation is measured at multiple sites HIDE
- A scope is passed down the esophagus to assess for mucosal lesions HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)



PREV

31

Which of

A contin

A sound transduc

A radior radiation

- A thin x-ray beam is passed transaxially through a patient; x-ray attenuation is measured at multiple sites HIDE
- A scope is passed down the esophagus to assess for mucosal lesions HIDE

BACK NEXT



Correct:

Fluoroscopy is a continuous x-ray image that evaluates anatomic structures in real-time.

It is useful for gastrointestinal (GI) evaluation (e.g. barium swallow), cardiovascular studies, myelography and diagnosing tracheal collapse.

Click here to see an example of a [fluoroscopic barium swallow in a human](#).

With ultrasonography, a sound wave is passed through the body and then reflected back to the transducer.

With computed tomography, a thin x-ray beam is passed transaxially through a patient; x-ray attenuation is measured at multiple sites.



back to the transducer.

With computed tomography, a thin x-ray beam is passed transaxially through a patient; x-ray attenuation is measured at multiple sites.

With nuclear scintigraphy, a radionuclide is administered to a patient; the emitted electromagnetic radiation is detected with a gamma scintillation camera.

With gastroscopy, an endoscope is passed down the esophagus and into the stomach and proximal duodenum.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 508-16. Image courtesy of [Normaler Schluckakt](#).



Which of

A contin

A sound transduc

A radior radiation

- A thin x-ray beam is passed transaxially through a patient; x-ray attenuation is measured at multiple sites HIDE
- A scope is passed down the esophagus to assess for mucosal lesions HIDE

BACK NEXT



 **zukureview**  **SAVE & EXIT**

PREV

NEXT

31	32	33	34	35	36	37	38	39	40
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The cardiologist at your clinic is examining a cat with suspected hypertrophic cardiomyopathy. Which mode of ultrasonography should you set up?

B-mode	HIDE
R mode	HIDE
M-mode	HIDE
C-mode	HIDE
A-mode	HIDE

BACK NEXT LEAVE BLANK





PREV

31

The card
cardiomy

A-mode

B-mode

M-mode

C-mode

R mode



Correct:

M-mode, (or motion mode), is most commonly used in echocardiography, for diseases like cardiomyopathy, where you have movement, and also want to measure distances accurately.

Follow this link to see a thick-walled [cat heart with hypertrophic cardiomyopathy](#).

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. p. 553 and Tighe & Brown, Mosby's Comprehensive Review for Vet Techs, 3rd ed. p. 197.

HIDE

BACK

NEXT





PREV

NEXT

31	32	33	34	35	36	37	38	39	40
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Which tissue is likely to produce an **ultrasound reverberation artifact** described as a **"comet tail"** with sets of bright parallel lines?

Urinary bladder	HIDE
Gallbladder	HIDE
Prostate	HIDE
Lungs	HIDE
Liver	HIDE

BACK NEXT LEAVE BLANK

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem



Correct
Lungs.

31 Reverberation artifact occurs when ultrasound meets strong reflectors like gas (in lungs for example).

It looks like a comet tail with bright parallel evenly spaced lines.

Through transmission (also called acoustic enhancement) happens when ultrasound hits nonattenuating structures, and the emerging ultrasound beam will have higher intensity (and image will be brighter) behind the low attenuation region.

For example, if you shine ultrasound through the gallbladder and liver, there is a bright beam below the gall bladder almost like a search light, compared to the darker areas of surrounding liver which has attenuated the beam more. (See Bassert Figs 16-47 and 48 for good pictures)

Urinary
 Gallblad
 Prostate
Lungs
 Liver HIDE

BACK NEXT

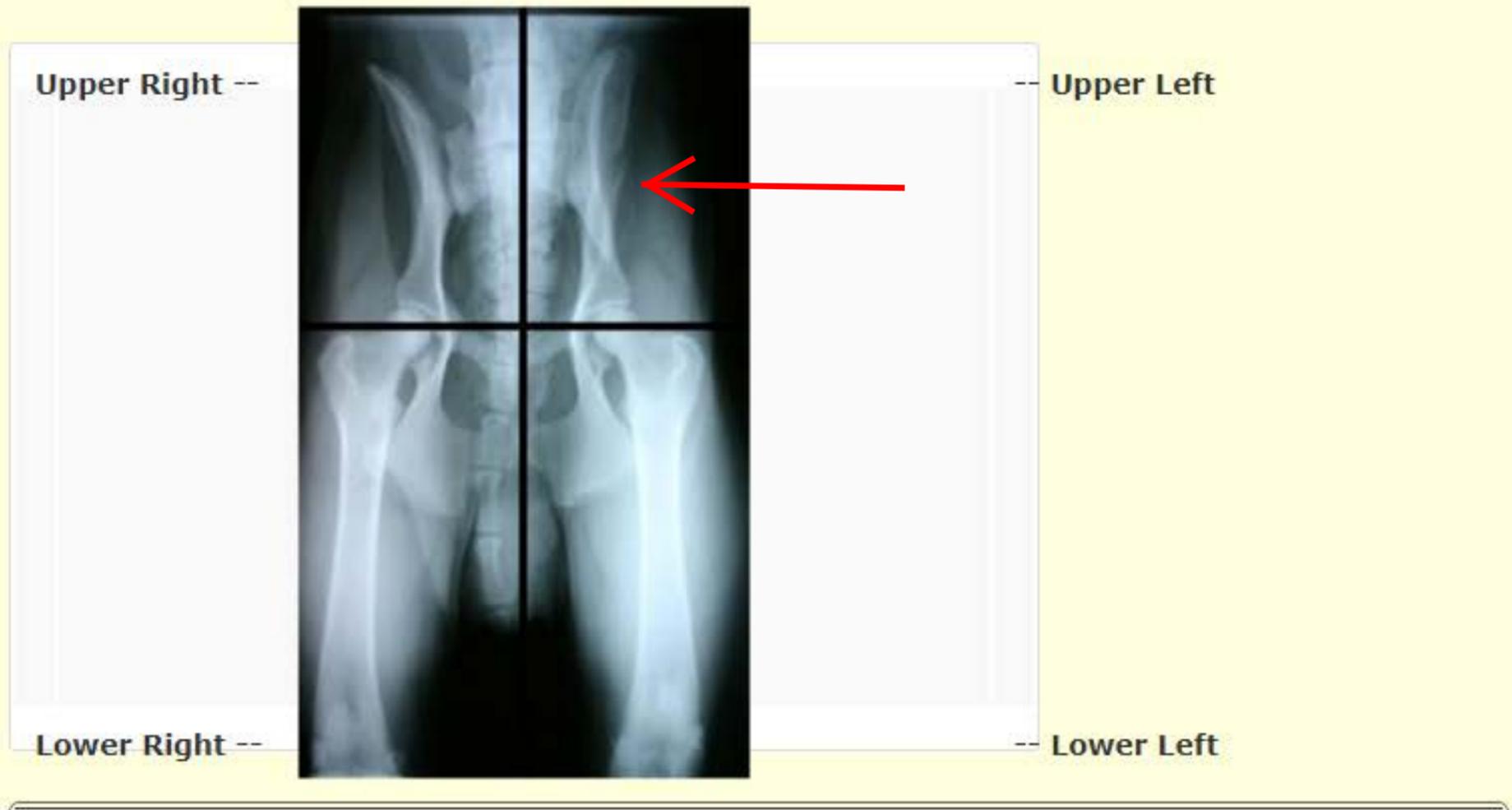
Overview | Mark this Question | Report a Problem

PREV NEXT

31 <input checked="" type="checkbox"/>	32 <input checked="" type="checkbox"/>	33 <input checked="" type="checkbox"/>	34 <input checked="" type="checkbox"/>	35 <input type="checkbox"/>	36 <input type="checkbox"/>	37 <input type="checkbox"/>	38 <input type="checkbox"/>	39 <input type="checkbox"/>	40 <input type="checkbox"/>
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A dog hit by a car in the last 3 hours is presented recumbent and traumatized. Plain radiographs of the awake dog are shown below.

Positioning is not perfect because the dog is in pain, but if there is a problem evident in the radiograph, in which quadrant does it lie?





Upper right	HIDE
Lower right	HIDE
Looks normal	HIDE
Upper left	HIDE
Lower left	HIDE

BACK NEXT LEAVE BLANK





Correct:

You are looking at an **iliac fracture in the UPPER LEFT quadrant.**

Generally, when you assess pelvic rads after trauma, you are looking for pelvic fractures, **femoral fractures**, (especially head-and-neck fractures) or **hip dislocation/luxation** (usually cranio-dorsal).

Click here to see a **radiograph of hip dislocation** in a dog, with the femoral head projecting forward and above the acetabulum.

Sometimes, the **priorities of triage** require you to accept less-than-optimal radiograph positioning in the service of rapid assessment.

Lower l

Upper ri

The visible space evident at the sacroiliac junction on the upper right is not a subluxation, it is simply poor positioning-a common hazard when taking radiographs on an awake dog.

Lower ri

Looks n

Upper left

HIDE

Lower left

HIDE

BACK

NEXT

 **zukureview**  **SAVE & EXIT**

PREV < > NEXT

31 	32 	33 	34 	35 	36	37	38	39	40
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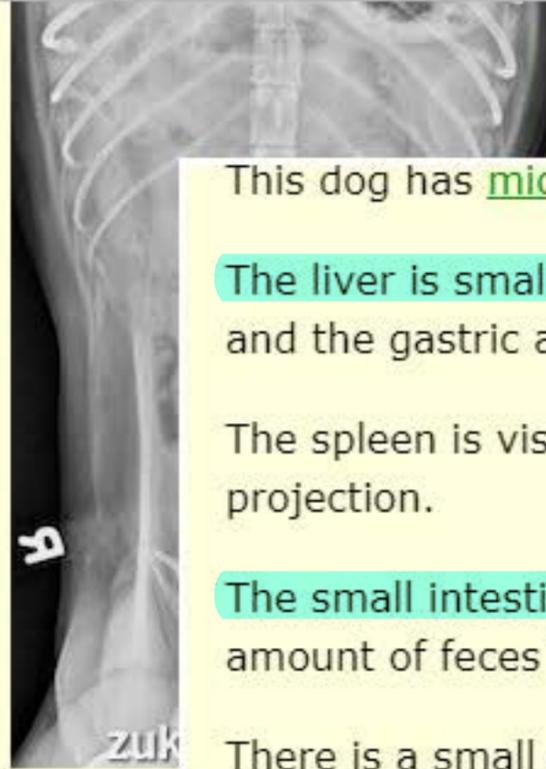
A 6-year-old female Cavalier King Charles spaniel is presented with inappetence and depression.

Which one of the following choices best describes the radiographic findings?





Microhepatica	HIDE
Foreign body	HIDE
Splenomegaly	HIDE
Normal radiographs	HIDE
Cranial abdominal mass	HIDE



This dog has [microhepatica](#).

The liver is small. There is decreased distance from the diaphragm to the stomach, and the gastric axis is rotated cranially.

The spleen is visible caudal to the stomach. Both kidneys are seen on the lateral projection.

The small intestine contains fluid and gas and is normal in size. There is a small amount of feces in the colon.

There is a small amount of spondylosis deformans in the lumbar spine.

The differentials in this case are congenital [portosystemic vascular anomaly](#) (PSVA, also referred to as a portosystemic shunt) or cirrhosis.

Click here to see [normal canine abdominal radiographs](#).

Microhe	HIDE
Foreign	
Splenomegaly	HIDE
Normal radiographs	HIDE
Cranial abdominal mass	HIDE

BACK NEXT

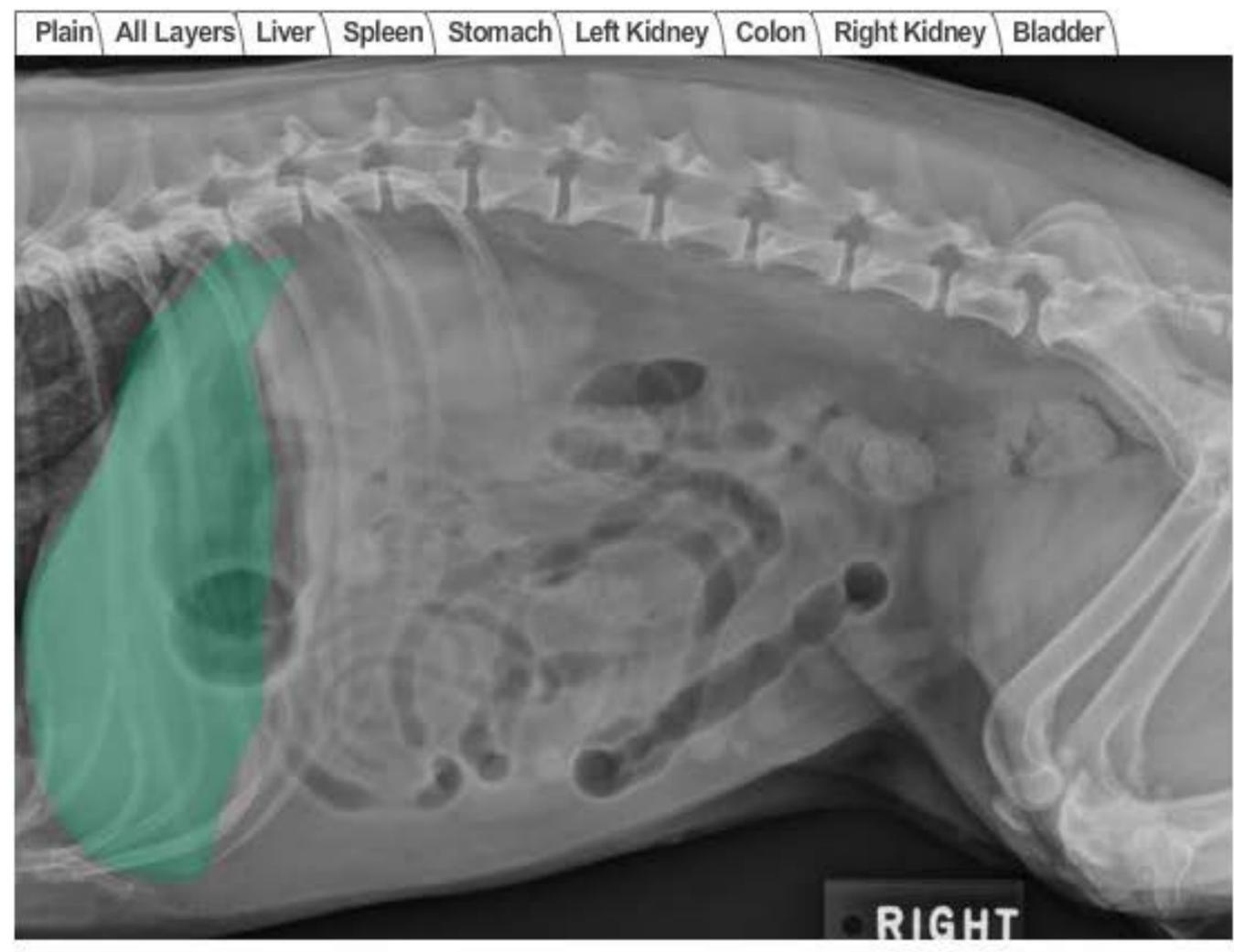


IMAGING ANATOMY

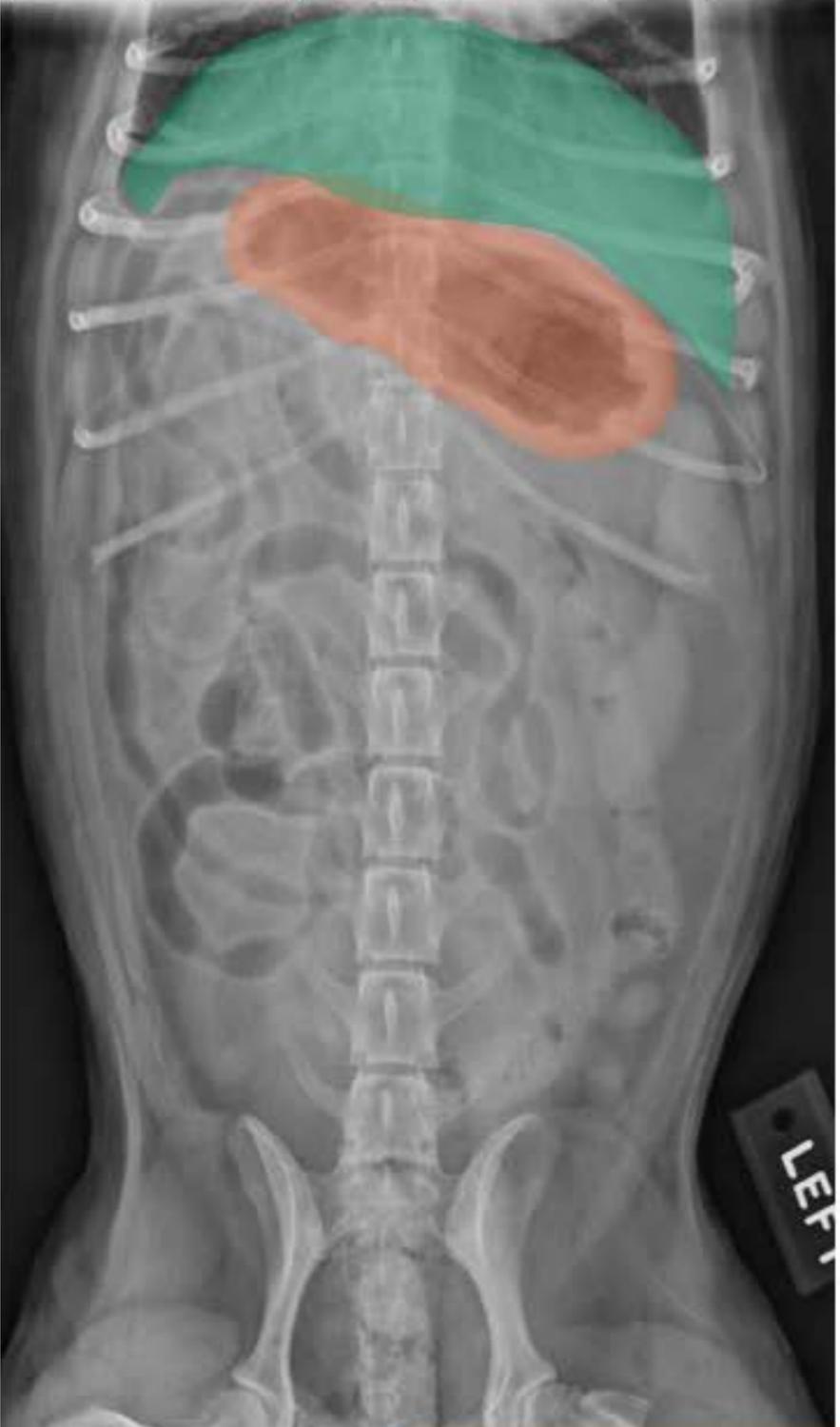
Home Canine Feline Equine Bovine Dental Professor's Resource

Canine Abdomen Example 3

The following radiographs are the left and right lateral views as well as ventrodorsal view of the abdomen of a ten-year-old Bichon Frise.



Plain | All Layers | Liver | Spleen
 Stomach | Left Kidney | Colon | Right Kidney | Bladder





PREV NEXT

31	32	33	34	35	36	37	38	39	40
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A cervical contrast myelogram from a dog looks like the image below. What neurologic signs if any, might be seen?

[Click here to see image](#)

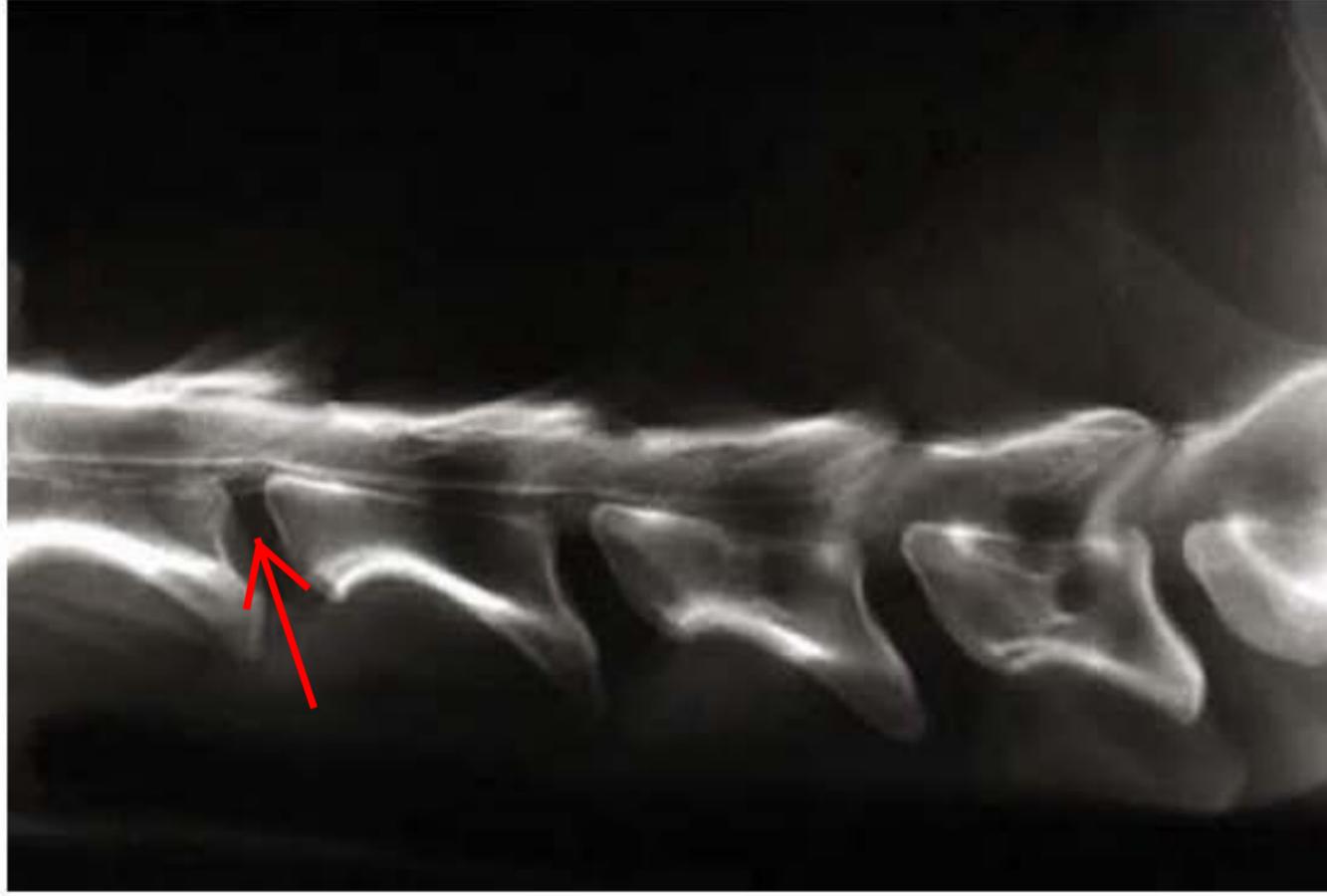
Note: Hitting Ctrl + will enlarge a web page in most browsers. Ctrl - will shrink a page again.

Ataxia and paresis, worse in hinds	HIDE
Pain on neck dorsoflexion, cerebellar tremors	HIDE
Vertical nystagmus, absent pupillary light reflexes	HIDE
Vagal indigestion, bradycardia	HIDE
No neurologic signs	HIDE

BACK NEXT LEAVE BLANK

THE MERCK VETERINARY MANUAL

Multimedia



Courtesy of Dr. Ronald Green.

The image is a lateral radiograph of a spine, showing several vertebrae. A red arrow points to a fracture in the vertebral body of one of the vertebrae. The fracture is a compression fracture, where the anterior part of the vertebral body is broken and compressed. The rest of the spine appears relatively normal.



PREV

31

A cervical
if any, m

[Click here](#)

Note: Hit
again.

Vagal in

Pain on neck dorsoflexion, cerebellar tremors	HIDE
Ataxia and paresis, worse in hinds	HIDE
Vertical nystagmus, absent pupillary light reflexes	HIDE
No neurologic signs	HIDE

BACK

NEXT

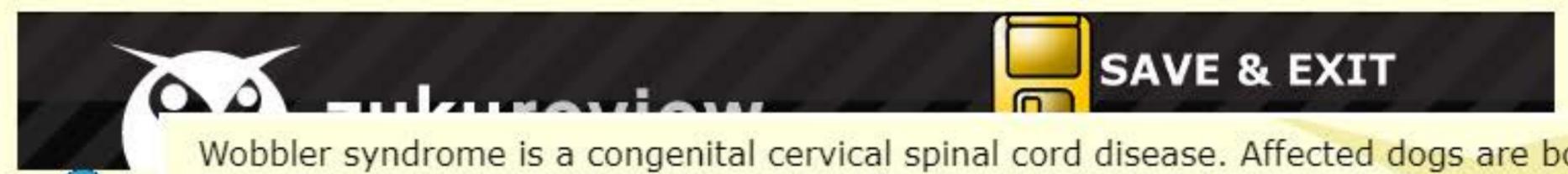
Correct: Ataxia and paresis, worse in hinds

This is wobbler syndrome (also called cervical vertebral instability/ caudal cervical spondylomyelopathy). Note how contrast media disappears as it approaches caudal cervical vertebrae. An extradural cervical lesion can be painful or nonpainful.

Expect a history of progressive upper motor neuron (UMN) ataxia and paresis in all 4 limbs, worse in the hinds (crouched hindlimb posture, swaying gait, knuckling, scuffing toenails, wobbling gait).

Dogs may hold neck in a ventral position, especially if painful.

Wobbler syndrome is a congenital cervical spinal cord disease. Affected dogs are born with vertebral canal stenosis which can worsen later in life due to intervertebral disc disease (IVDD), vertebral malformation and/or ligamentous hypertrophy. In Dobermans



PREV
31

Wobbler syndrome is a congenital cervical spinal cord disease. Affected dogs are born with vertebral canal stenosis which can worsen later in life due to intervertebral disc disease (IVDD), vertebral malformation and/or ligamentous hypertrophy. In Dobbies > 5 years and Great Danes > 2 years, IVDD is usually seen between C5-C6 or C6-C7.

Test of choice is MRI. At least need myelography to diagnose exact location and type of spinal cord compression.
Rx is steroids and surgery.

A cervical
if any, m

[Click here](#)

Refs: Blackwell's 5-Minute Vet Consult Canine Feline, 4th ed. pp. 1442-3, Pasquini's, Tschauner's Guide to Small Animal Clinics, vol 1, 2nd ed. p. 545, and the Merck Veterinary Manual online edition.

Note: Hit
again.

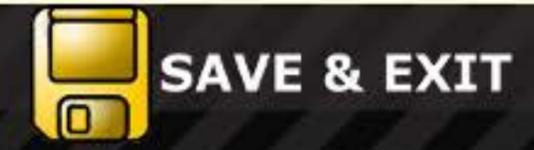
Vagal in

Pain on neck dorsoflexion, cerebellar tremors	HIDE
Ataxia and paresis, worse in hinds	HIDE
Vertical nystagmus, absent pupillary light reflexes	HIDE
No neurologic signs	HIDE

BACK NEXT



zukureview



PREV

NEXT

31	32	33	34	35	36	37	38	39	40
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What is the main difference between direct and indirect digital radiology systems?

With direct systems, a light flash is registered to an electrical signal	HIDE
No light intermediate with indirect systems	HIDE
Direct systems are wireless, indirect are not	HIDE
Direct systems use a photostimulable storage phosphor in a protective cassette	HIDE
Indirect systems use a scintillation x-ray detector plate	HIDE

BACK NEXT LEAVE BLANK

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem



31

What is t

With dir

No light

Direct s

Direct s

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Correct:
Indirect systems use a scintillation x-ray detector plate.

Digital radiography (DR) systems are divided into direct and indirect systems. DR images have excellent resolution and dynamic range. They have the advantage of being fast and flexible.

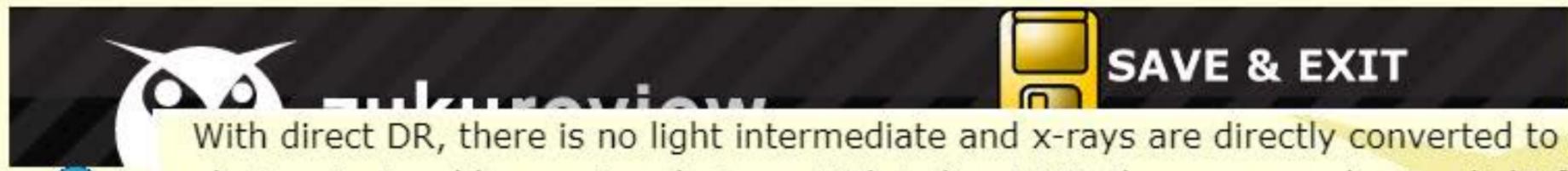
With direct DR, there is **no light intermediate** and x-rays are directly converted to an electronic signal **by semiconductors**. **With indirect DR**, the x-ray results in a light flash from a scintillation plate that is then registered into an electrical signal, which is subsequently processed into an image.

Computed radiography uses a photostimulable storage phosphor (instead of film) in a

Indirect systems use a scintillation x-ray detector plate HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem



PREV
31

With direct DR, there is no light intermediate and x-rays are directly converted to an electronic signal by semiconductors. With indirect DR, the x-ray results in a light flash from a scintillation plate that is then registered into an electrical signal, which is subsequently processed into an image.

Computed radiography uses a photostimulable storage phosphor (instead of film) in a protective cassette that is then electronically read. It is inexpensive, has image manipulation capabilities like DR, and provides excellent resolution.

Check out this article on "[Digital radiology product guide: Digital definitions](#)" by Julie Scheidegger, courtesy of dvm360.

Refs: The Merck Vet Manual online.

Indirect systems use a scintillation x-ray detector plate HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

31	32	33	34	35	36	37	38	39	40
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What is a **Potter-Bucky diaphragm**?

Canine birth control device	HIDE
Ultrasound focusing element	HIDE
Anesthetic gas filter	HIDE
Shield protecting the end of an endoscope	HIDE
Moveable x-ray grid	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV
31

Correct:

A Potter-Bucky diaphragm is a **moveable x-ray grid.**

An x-ray grid is basically a plate made of alternating strips of lead, which block scattered x-rays, interspersed between strips of plastic or aluminum, which allow the straight x-rays through.

What is a

Canine l

Ultrasou

Anesthe

Shield p

A Potter-Bucky diaphragm grid moves in time with a particular x-ray exposure setting, so that gridlines from the lead strips in the grid do not show up on the x-ray film.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 536-7.

Moveable x-ray grid

BACK NEXT



 **zukureview**  **SAVE & EXIT**

 **PREV** **31**  **32**  **33**  **34**  **35**  **36**  **37**  **38**  **39**  **40**  **NEXT**

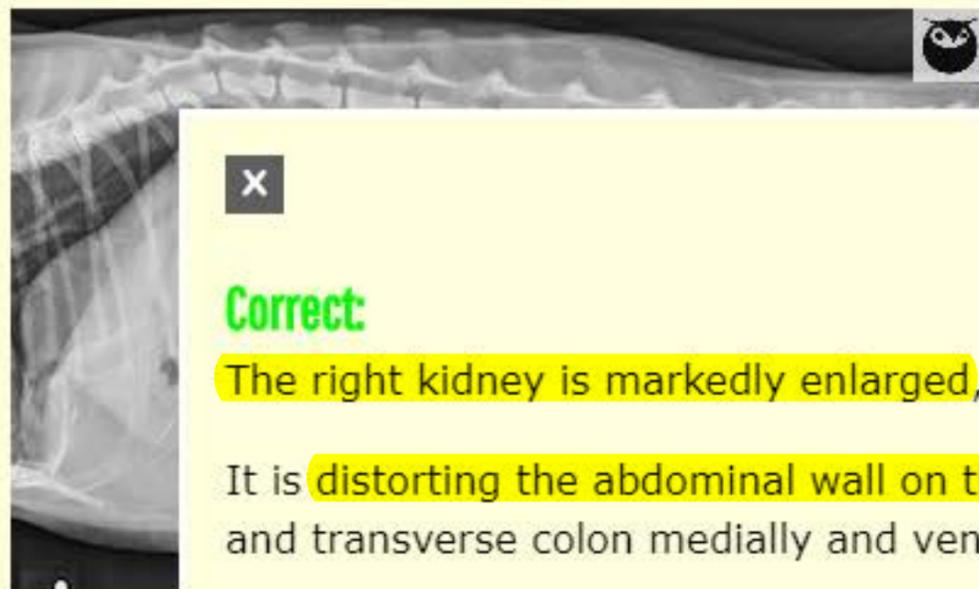
Which organ is abnormally affected in these radiographs from a 13-year-old cat?





Spleen	HIDE
Uterus	HIDE
Prostate	HIDE
Colon	HIDE
Kidney	HIDE

BACK NEXT LEAVE BLANK



Correct:

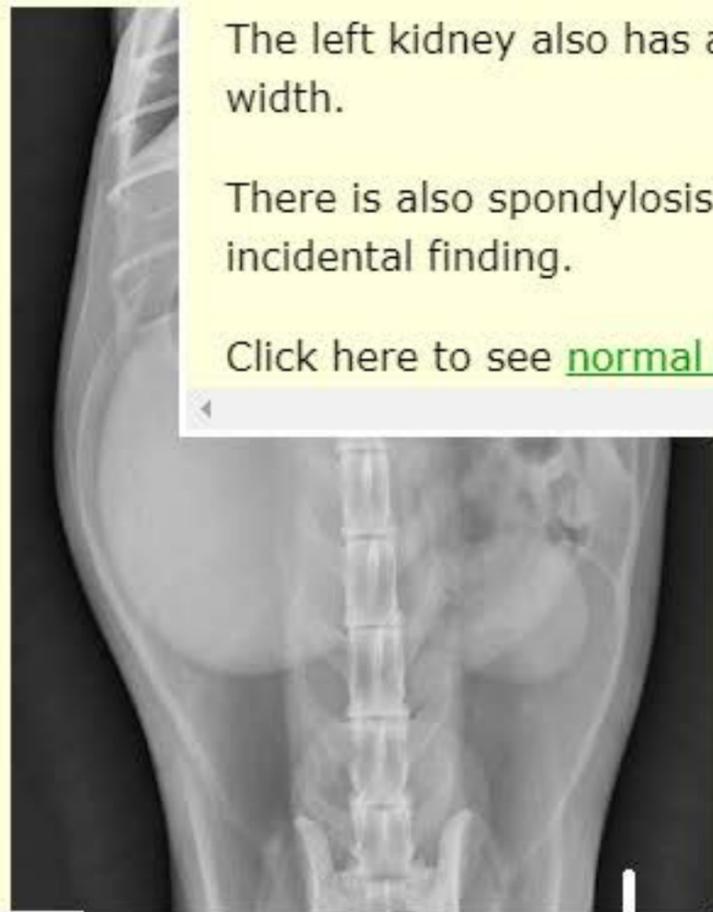
The right kidney is markedly enlarged, with a rounded shape.

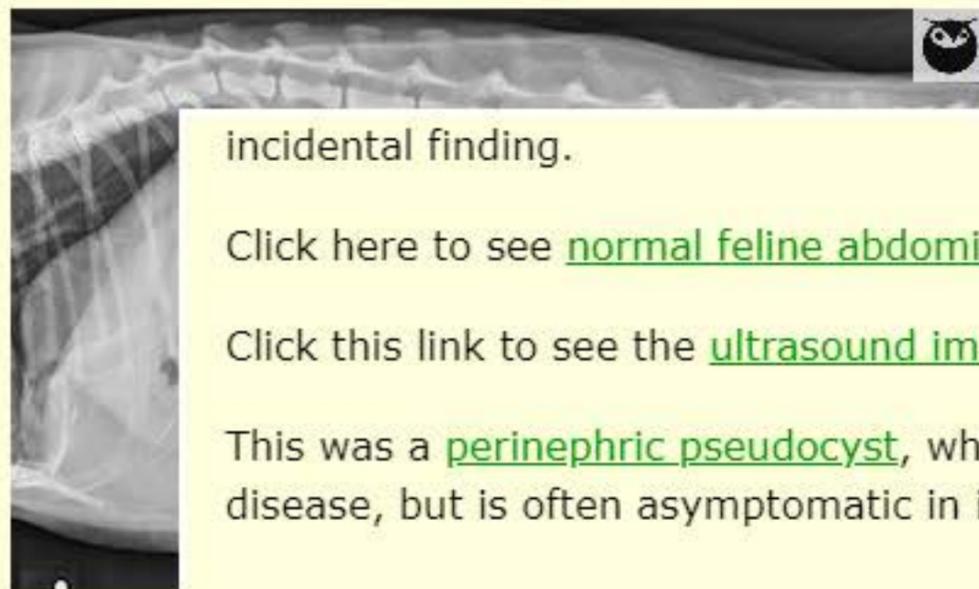
It is distorting the abdominal wall on the v/d projections and displacing the ascending and transverse colon medially and ventrally.

The left kidney also has an abnormal shape, with reduced length and increased width.

There is also spondylosis deformans at the L5-6 intervertebral disc space, which is an incidental finding.

Click here to see [normal feline abdominal radiographs](#).





incidental finding.

Click here to see [normal feline abdominal radiographs](#).

Click this link to see the [ultrasound image](#) from the cat above.

This was a [perinephric pseudocyst](#), which is often associated with chronic renal disease, but is often asymptomatic in itself.

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. Perinephric Pseudocyst, online and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, Dr A. Zwingenberger and [Veterinary Radiology](#). Normal radiograph links courtesy, [Imaging Anatomy](#) Univ. of Illinois Vet Med.



 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

41 ✓	42	43	44	45	46	47	48	49	50
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What is the **best way to arrive at a specific mAs** (milliamperage x time in seconds) to minimize motion blur when taking a radiograph?

Changing mAs does not affect motion blur	HIDE
High milliamperage and short exposure time	HIDE
Low milliamperage and short exposure time	HIDE
Low milliamperage and long exposure time	HIDE
High milliamperage and long exposure time	HIDE

[BACK](#)

[NEXT](#)

 Overview  Lab Values  Definitions  Report a Problem



PREV

41

What is t minimize

Changin

High mi

Low mill

Low mill

High milliamperage and long exposure time HIDE

BACK

NEXT



Correct:

Using the lowest time setting and highest milliamperage will maximize the number of x-ray photons in the least amount of time.

Both the miliamperage and the exposure time affect the number of x-ray photons created. Patient blur will be minimized with decreased exposure time.

The mAs setting is a combination of time and milliamperage.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th edition, p. 530.

 **zukureview**  **SAVE & EXIT**

 **PREV**

NEXT 

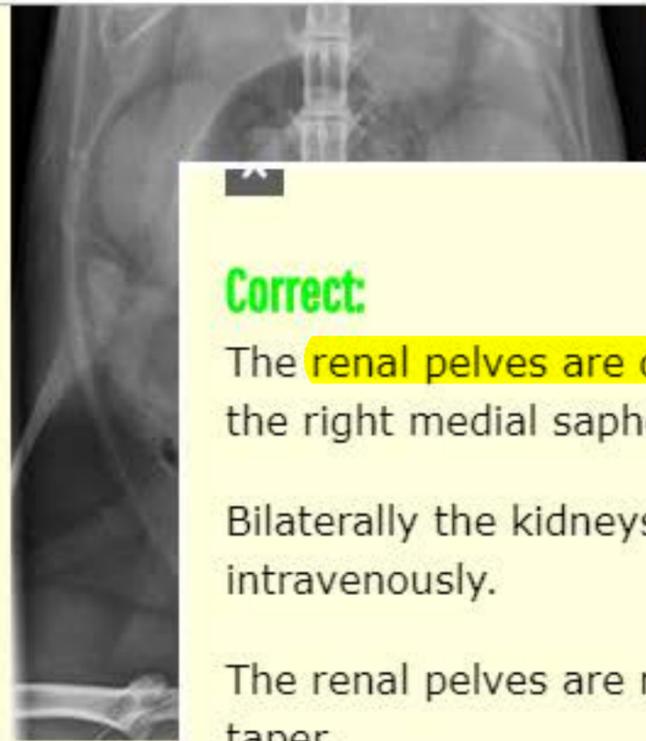
41 ✓	42	43	44	45	46	47	48	49	50
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Identify the problem on these radiographs of an excretory urogram from a 6-year-old male, neutered domestic shorthair cat.





Dilated renal pelves	HIDE
Hepatomegaly	HIDE
Retroperitoneal mass	HIDE
Subcutaneous emphysema	HIDE
Linear foreign body	HIDE



Correct:

The **renal pelves are dilated.** Initial projections reveal a intravenous catheter within the right medial saphenous vein terminating within the caudal vena cava.

Bilaterally the kidneys are mildly enlarged. Contrast material was administered intravenously.

The renal pelves are mildly distended. The proximal ureters are mildly distended but taper.

No obstructive process is identified. The enlarged renal pelves are suggestive of a urinary tract obstruction that has resolved.

Click here to see normal feline abdominal radiographs.

Retrope
Linear f
Subcuta

Hepatomegaly	HIDE
Dilated renal pelves	HIDE

BACK NEXT





zukureview



SAVE & EXIT

PREV

NEXT

41 ✓	42 ✓	43	44	45	46	47	48	49	50
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Under what conditions may the technician's hands be under the path of a primary x-ray beam when assisting in the radiology area?

If lead gloves are worn	HIDE
When the animal is moving too much for a clear radiograph	HIDE
If a grid is used	HIDE
When the x-ray beam is collimated	HIDE
Under no conditions	HIDE

BACK NEXT LEAVE BLANK

-  Overview
-  Mark this Question
-  Lab Values
-  Definitions
-  Report a Problem



41

Under w
beam w

When th

If a grid

When th

If lead g

Correct:
 Under **NO** conditions should your hands be in the x-ray beam, whether you have lead gloves on or not.

25% of a direct beam can still penetrate lead gloves, so never allow any part of the body to be in the primary beam even properly protected.

If the animal is moving too much, it may need tranquilization.

Collimation can limit primary radiation and decrease scatter.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 541-7 and Tighe & Brown, Mosby's Comprehensive Review for Vet Techs,

Under no conditions HIDE

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

 **PREV**

NEXT 

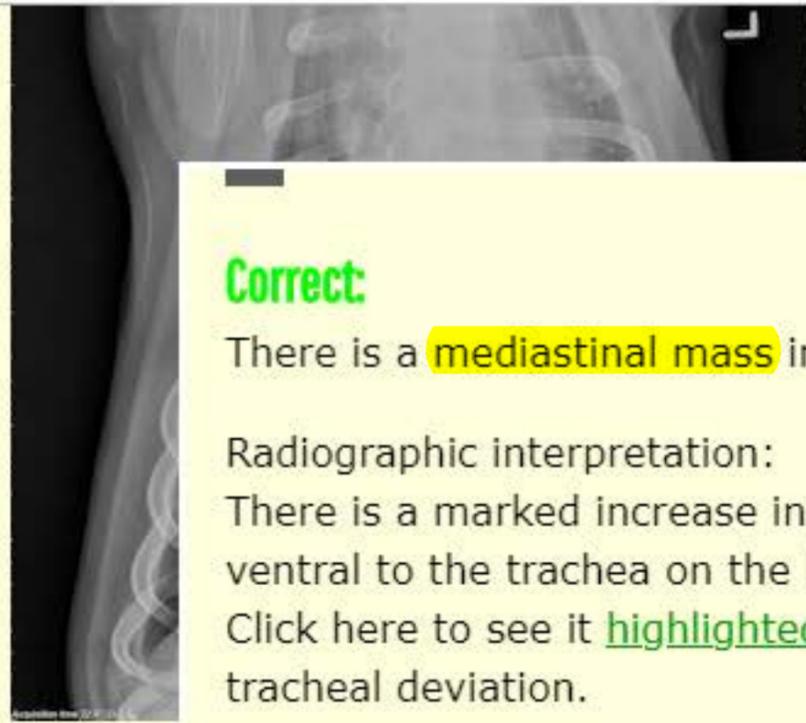
41 	42 	43  	44	45	46	47	48	49	50
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A Labrador retriever is presented with a **history of fever and coughing**. Which one of the following choices is found on the thoracic radiographs?





Dilated, tortuous pulmonary vessels	HIDE
Hypoinflated lungs	HIDE
Left atrial enlargement	HIDE
Mediastinal mass	HIDE
Bronchopneumonia	HIDE



Correct:

There is a **mediastinal mass** involving **the tracheobronchial lymph nodes**.

Radiographic interpretation:

There is a marked increase in soft tissue opacity dorsal to the cardiac silhouette, and ventral to the trachea on the lateral projections.

Click here to see it [highlighted on the lateral radiograph](#), with arrows pointing to the tracheal deviation.

These masses are causing ventral deviation of the main stem bronchi and dorsal deviation of the trachea, as well as splaying and narrowing of the lumen of the mainstem bronchi and widening of the cranial mediastinum on the d/v projections.

Click here to see it [highlighted on the d/v radiograph](#).

Dilated,
Hypoinfl
Left atri

Mediastinal mass	HIDE
Bronchopneumonia	HIDE

BACK NEXT





mainstem bronchi and widening of the cranial mediastinum on the d/v projections. Click here to see it [highlighted on the d/v radiograph](#).

There is additional pulmonary infiltrate radiating from the central masses to the periphery of the lungs along the airways. The cardiac silhouette is normal in size and shape.

In this case the masses were secondary to a [disseminated fungal infection](#). The morphology of the fungus was consistent with *Aspergillus* spp. or a zygomycete.

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 88-90 and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, [Dr A. Zwingenberger](#) and [Veterinary Radiology](#).

Dilated,
Hypoinfl
Left atri

Mediastinal mass	HIDE
Bronchopneumonia	HIDE

BACK NEXT





PREV NEXT

41 ✓	42 ✓	43 M ✓	44 ✗	45	46	47	48	49	50
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A mare is presented in June in Ottawa for signs of estrus for 3 days when teased by the stallion.

The owner requests an ultrasound to help determine when to breed with fresh cooled semen. A 37.1-mm anechoic structure is visible on the right ovary.

[Click here to see image](#)

What should the owner be told?

Breed now	HIDE
Recheck in 3 days	HIDE
Cystic ovary	HIDE
Administer prostaglandin F2a	HIDE
Give progesterone	HIDE

MERCK MANUAL Veterinary Manual



Courtesy of Dr. Patricia Sertich.



PREV
41

Correct:

The mare **should be bred now**. The structure seen on this ovary is a dominant follicle. Mares are seasonally polyestrus and typically ovulate when follicles are at least 30 mm.

A mare is
stallion.

Ideally mares are bred within the 48 hours prior to ovulation. Estrus usually lasts 2-8 days, and is shorter when days are longer. If you recheck this mare in 3 days, you will most likely miss ovulation.

The own
semen. A

[Click here](#)

Prostaglandin F_{2a} is used to lyse the corpus luteum (CL), which is fully formed 5 days after ovulation. The mare will come into estrus 2-5 days later.

What sh

[Click here to see a transrectal ultrasound of a CL](#). The CL is hyperechoic, not

Breed now	HIDE
Recheck in 3 days	HIDE
Cystic ovary	HIDE
Administer prostaglandin F2a	HIDE
Give progesterone	HIDE



PREV

41

A mare is bred to a stallion.

The owner wants to see semen. A mare is bred to a stallion.

What should the owner do?

[Prostaglandin F_{2a}](#) is used to lyse the corpus luteum (CL), which is fully formed 5 days after ovulation. The mare will come into estrus 2-5 days later.

Click here to see a transrectal [ultrasound of a CL](#). The CL is hyperechoic, not anechoic, and is typically smaller than a follicle.

Progesterone is used to suppress estrus or maintain pregnancy.

[Cystic ovaries](#) are uncommon in horses.

Refs: Pasquini's Guide to Equine Clinics, 3rd ed. and the Merck Veterinary Manual online.

Breed now	HIDE
Recheck in 3 days	HIDE
Cystic ovary	HIDE
Administer prostaglandin F2a	HIDE
Give progesterone	HIDE



Sonogram of corpus luteum and follicles, mare



 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

41 ✓	42 ✓	43 ^M ✓	44 ✗	45 ✗	46	47	48	49	50
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Which exposure setting will increase film blackness/radiographic density in an x-ray?

Longer focal-film distance	HIDE
Placement of a Potter-Bucky Diaphragm	HIDE
Higher milliamperes-seconds (mAs)	HIDE
Lower kilovoltage (kVp)	HIDE
Shorter exposure time	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

41

Correct: Higher milliampereseconds (mAs)

Milliamperes (mA) are the QUANTITY of electrons produced by the x-ray machine and exposure time (sec) is how LONG you expose the animal to these rays.

Which ex

Together, milliampereseconds equals mA multiplied by time (mA X sec=mAs), which controls the intensity of an x-ray.

Longer t

More mA, or longer exposure time, also means a DARKER x-ray.

Placeme

Kilovoltage (kVp) controls the penetrating ability of an x-ray.

Higher r

Generally, increasing kVp increases film blackness and density

Lower k

Refs: McCurnin and Bassert, Clinical Textbook for Vet Technicians, 8th ed. pp. 530 and

Shorter exposure time

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

 PREV NEXT 

41	42	43	44	45	46	47	48	49	50
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A five-month-old male Pomeranian is presented with a two week history of worsening to tetraparesis.

Plain lateral cervical radiographs show the image below.

What is the diagnosis?

[Click here to see image](#)

Type II intervertebral disc disease	HIDE
Axial diskospondylitis	HIDE
Hemivertebra	HIDE
Cervical spondylopathy	HIDE
Atlantoaxial subluxation	HIDE

[BACK](#) [NEXT](#) [LEAVE QUIZ](#)

THE MERCK VETERINARY MANUAL

Multimedia



Courtesy of Dr. Ronald Green.

PREV NEXT

41 ✓	42 ✓	43 M ✓	44 ✗	45 ✗	46 ✓	47 ✗	48	49	50
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Correct:

This is Atlantoaxial instability / subluxation. In this case, there is congenital agenesis of the dens of the axis--Note the large, abnormal gap between spinous process of the axis (C2) and the dorsal arch of the atlas at around 10 o'clock.

Primarily a toy/miniature breed problem (Poodles, Chihuahuas, Pekingese). Can also see a form of occipitoatlantoaxial malformation (OAAM) in Arabian foals and in miniature horses.

Refs: Blackwell's 5-Minute Vet Consult Canine Feline, 4th ed. p. 123, Pasquini's, Tschauner's Guide to Small Animal Clinics, vol 1, 2nd ed. p. 544, and the Merck Veterinary Manual online edition.

Type II	
Axial dis	
Hemiver	
Cervical spondylopathy	HIDE
Atlantoaxial subluxation	HIDE

BACK NEXT

Overview | Mark this | Definitions

 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

41 ✓	42 ✓	43 ^M ✓	44 ✗	45 ✗	46 ✓	47 ✗	48	49	50
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In addition to patient movement, which one of the following choices may cause a radiograph to come out blurry?

Kilovoltage too high	HIDE
Static electricity	HIDE
Poor film-screen contact	HIDE
Focal film distance too short	HIDE
mAs too low	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

41

Correct:

Blurring might be caused by poor film-screen contact, patient movement, or poor centering of primary x-ray beam.

In addition to come

If the distance between the object and the film is increased, you may get distortion or magnification of the image.

Poor film

Static electricity tends to make linear dots or a tree pattern on a radiograph.

Static el

For good tables that list common technical errors in taking and developing x-ray films, see Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 541-2, boxes 16-2 and 16-3.

mAs too

Focal fil

Kilovoltage too high HIDE

BACK

NEXT





PREV NEXT

41 ✓	42 ✓	43 M ✓	44 ✗	45 ✗	46 ✓	47 ✗	48 M ✓	49	50
------	------	--------	------	------	------	------	--------	----	----

A 15-year-old Quarter horse mare is presented for right front lameness grade 3/5 on the AAEP lameness scale (lameness consistently visible at the trot).

She becomes sound after an abaxial nerve block.

Radiographs of the distal limb look like this:

[Click here to see image](#)

What is the top differential diagnosis?

High ringbone	HIDE
Bone spavin	HIDE
Osselets	HIDE
Low ringbone	HIDE
Pedal osteitis	HIDE

THE MERCK VETERINARY MANUAL **Multimedia**



Courtesy of Dr. Matthew T. Brokken.

41 ✓	42 ✓	43 M ✓	44 ✗	45 ✗	46 ✓	47 ✗	48 M ✓	49 ✓	50
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A 15-year-old horse with a history of chronic lameness in the right front leg. This is an example of **high ringbone** (periostitis & osteoarthritis of the proximal interphalangeal joint leading to exostoses).

She became lame after a fall from a fence. Very common in horses. Can be due to chronic wear and tear, overuse, or secondary to a traumatic episode.

Radiographs of the right front fetlock joint show a large, bony spur extending from the proximal interphalangeal joint. Follow this link to see a radiograph of **arthrodesis of the proximal interphalangeal joint** to resolve high ringbone.

What is the most common cause of osselets? Osselets are traumatic arthritides of the metacarpophalangeal joints.

High ringbone **Pedal osteitis** is demineralization of the solar margin of the distal phalanx, usually due to inflammation.

Bone spavin **Bone spavin** is osteoarthritis of the distal intertarsal, tarsometatarsal, and less commonly, the proximal intertarsal joints.

Low ringbone	HIDE
Pedal osteitis	HIDE

BACK NEXT

Overview | Mark this | Lab | Definitions | Report

 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

41 ✓	42 ✓	43 M ✓	44 ✗	45 ✗	46 ✓	47 ✗	48 M ✓	49 ✓	50
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Which choice might explain why a radiograph comes out very light and washed out?

High kilovoltage	HIDE
Prolonged exposure time	HIDE
High milliamperes-seconds	HIDE
Focal distance is too long	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



41 ✓

Which of the following factors can cause an underexposed radiograph?

- High kilovoltage
- Prolonged exposure time
- High milliamperage
- Focal distance too long

Correct:

Too LONG a focal distance from the x-ray tube to the patient (fewer x-rays reach the film) can underexpose a radiograph.

An underexposed radiograph (ie: very light, washed out) may also occur if milliamperage (mAs) or kilovoltage (kV) are set too LOW.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 529-31.

BACK NEXT

- Overview
- Mark this Question
- Definitions
- Report a Problem

 **zukureview**  **SAVE & EXIT**

[<](#) PREV

NEXT [>](#)

51	52	53	54	55	56	57	58	59	60
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Which one of the following choices best describes the use of **teleradiology**?

Transmission of digital data between hospitals via the Internet	HIDE
Reconstruction of 2-dimensional digital radiographs into 3-dimensional images	HIDE
Conveyance of digital images from the x-ray unit detector plate to a computer monitor	HIDE
Transfer of digital images onto film for archiving purposes	HIDE
Movement of digital images from one computer to another within a hospital	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this  Lab  Definitions  Report



PREV

51

Correct:

With teleradiology, digital data is transmitted between hospitals via the Internet.

Teleradiology is made possible through the use of Digital Imaging and Communication in Medicine (DICOM).

DICOM is a universal digital image format that allows sharing of electronic images with hospitals, specialists and other locations.

DICOM is the standard image format for medical image generation and storage.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 490-2 and the Merck Veterinary Manual online edition.

- Transmi
- Reconst
- images
- Conveya
- compute

Transfer of digital images onto a server for archiving purposes	HIDE
Movement of digital images from one computer to another within a hospital	HIDE

BACK NEXT

- Overview
- Mark this
- Lab
- Definitions
- Report

 **zukureview**  **SAVE & EXIT**

 PREV

NEXT 

51 <small>M</small> ✓	52	53	54	55	56	57	58	59	60
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A 7-month-old Jack Russell terrier presents with right pelvic limb lameness. Based on the radiograph, which one of the following choices is the most likely diagnosis?



radiograph, which one of the following choices is the most likely diagnosis?



Osteochondrosis	HIDE
Medial patellar luxation	HIDE
Normal radiograph for age and breed	HIDE
Salter-Harris fracture	HIDE
Panosteitis	HIDE

radiograph, which one of the following choices is the most likely diagnosis?



Salter-Harris fracture, proximal tibia.

In immature animals, weakness of the physis predisposes it to injury. Salter-Harris classification is used to characterize the fracture relative to the physis and joint.

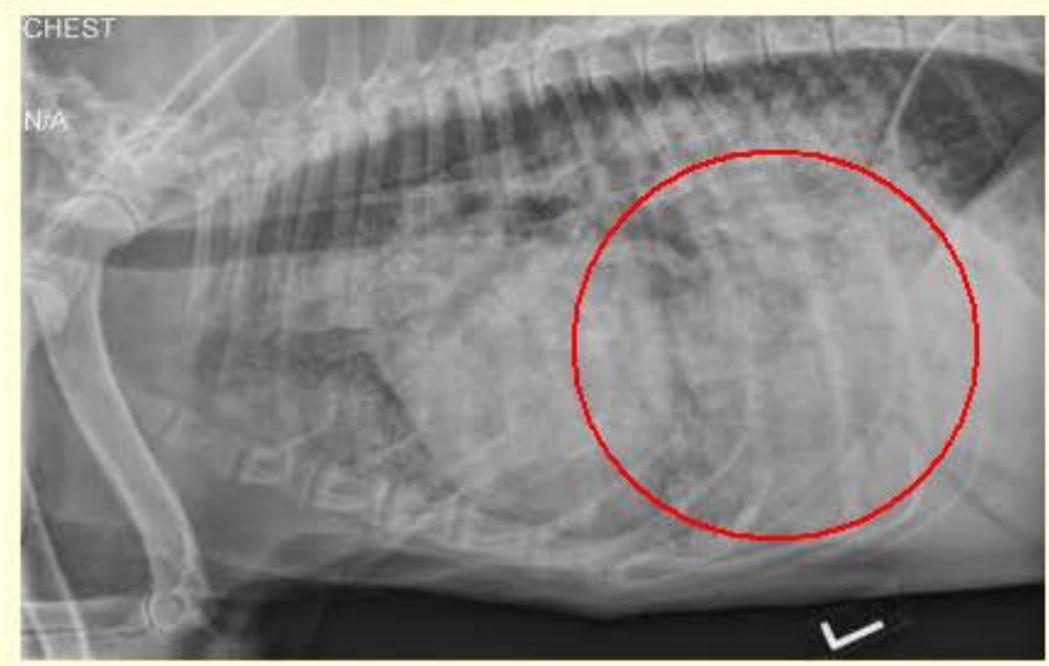
- Type 1 is displacement of the epiphysis
- Type 2 is fracture of the metaphysis and physis
- Type 3 is fracture through the epiphysis and physis
- Type 4 is fracture through the physis, metaphysis, and epiphysis
- Type 5 is compression of the physis

Osteochondrosis is a condition of young, usually large breeds, and is caused by an abnormal endochondral ossification of epiphyseal cartilage. It is characterized radiographically by flattening of the joint surface, subchondral bone lucency, or sclerosis.

Osteoch	
Medial patellar luxation	HIDE
Normal radiograph for age and breed	HIDE
Salter-Harris fracture	HIDE
Panosteitis	HIDE

51	52	53	54	55	56	57	58	59	60
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What abnormalities are seen in the circled area in the radiograph seen below?



Nodular pattern, pulmonary bulla	HIDE
Interstitial pattern, air bronchograms	HIDE
Vascular pattern, pleural fissure lines	HIDE
Miliary pattern, hypoinflation	HIDE
Bronchial pattern, pleural effusion	HIDE

BACK NEXT LEAVE BLANK

51	52	53	54	55	56	57	58	59	60
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What ab



Correct:

An interstitial pattern and air bronchograms.

Interstitial lung patterns are characterized by decreased visualization of cardiac and diaphragm silhouettes and pulmonary vessels.

Air bronchograms are the hallmark of an alveolar pattern. They occur when tiny alveolar air spaces are infiltrated with inflammatory fluid, hemorrhage or neoplasia. The soft-tissue opacity highlights the larger airways.

Click here to see air bronchograms on a DV view.

Refs: Pasquinis and Spurgeon, Anatomy of Dom Animals, 11th ed. pp. **620**, 614-625,

Nodular

Interstitial pattern, air bronchograms	HIDE
Vascular pattern, pleural fissure lines	HIDE
Miliary pattern, hypoinflation	HIDE
Bronchial pattern, pleural effusion	HIDE

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

51 ^M ✓	52 ✗	53 ✗	54	55	56	57	58	59	60
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Which **three anatomic landmarks** indicate the **animal's left side** in a DV or VD radiograph?

Ascending large colon, Thymus, Caudal lobe of the liver	HIDE
Pylorus, Cranial kidney, Caudal vena cava	HIDE
Aortic arch, Cranial kidney, Spleen	HIDE
Anticlinal vertebra, Tracheal carina, Descending colon	HIDE
Gas bubble in stomach fundus, Caudal kidney, Apex of heart	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV
51 M

Correct:

Anatomic landmarks which indicate an animal's left side include the
Gas bubble in stomach fundus,
Caudal kidney,
Descending colon and the
Apex of the heart (the point, or tip end).

Which th

- Ascendin
- Pylorus,
- Aortic ar
- Anticlin

The cranial kidney is on the right. The anticlinal vertebra is the vertical vertebra, usually T11 in dogs.

Follow this link to see a radiograph of LEFT-sided structures in a cat with pneumothorax secondary to trauma: Note apex (caudal end) of heart, gas bubble in fundus and descending colon are all on the LEFT.

Gas bubble in stomach fundus, Caudal kidney, Apex of heart

BACK NEXT

- Overview
- Mark this Question
- Lab Values
- Definitions

 **zukureview**  **SAVE & EXIT**

[< PREV](#) [NEXT >](#)

51 ^M ✓	52 ✗	53 ✗	54 ✓	55	56	57	58	59	60
-------------------	------	------	------	----	----	----	----	----	----

You have just taken an x-ray of a dog at 5 milliampere-seconds (mAs) from 50 cm away.
Now you need to reposition the dog and take another x-ray from 100 cm.
What mAs setting should you use to get a similar exposure to the first x-ray?

20 mAs	HIDE
5mAs	HIDE
10 mAs	HIDE
2.5 mAs	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

51 M

You have

Now you

What mAs

20 mAs

5mAs

10 mAs

2.5 mAs

Correct: 20 mAs

A doubling in distance between the film and the x-ray source DECREASES the x-ray intensity by a factor of FOUR.

That is, if you double the distance between an x-ray source and the film, your x-ray beam strength decreases to 1/4.

Double the distance (from 50 cm to 100cm) means the mAs must be QUADRUPLED to 20 mAs to get the same exposure at 100 cm as you got previously with 5mAs at 50 cm.

Refs: Bassert and Thomas, McCurnin's Clinical Textbook for Veterinary Technicians, 8th ed. pp. 529-32.

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

 [PREV](#)

[NEXT](#) 

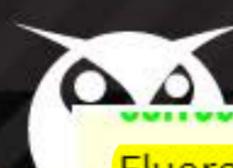
51 ^M ✓	52 ✗	53 ✗	54 ✓	55 ✓	56	57	58	59	60
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Which one of the following image modalities is best for evaluating esophageal motility?

Survey radiographs	HIDE
Computed tomography	HIDE
Thoracic ultrasonography	HIDE
Magnetic resonance imaging	HIDE
Fluoroscopy	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem

 **SAVE & EXIT**

 PREV

51 M 

Which of

- Survey
- Comput
- Thoracic
- Magneti
- Fluorosc

Fluoroscopy is best for evaluating esophageal motility.

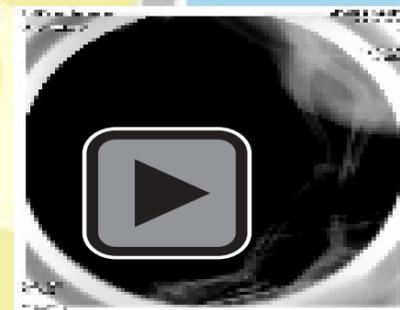
This imaging modality is superior to survey radiographs when assessing dynamic processes and moving structures.

Click here to see a [fluoroscopy video assessing esophageal function in a dog](#).

Other indications for fluoroscopy include assessment of the trachea for collapse, myelography, cardiovascular studies, fracture reductions and catheter/stent placement.

Because a continuous x-ray beam is used in fluoroscopy, radiation exposure is a concern.

Radiographers must follow safety procedures and wear a dosimeter during procedures.



BACK NEXT

 Overview
  Mark this Question
  Lab Values
  Definitions
  Report a Problem

 **zukureview**  **SAVE & EXIT**

 PREV

NEXT 

51 ^M ✓	52 ✗	53 ✗	54 ✓	55 ✓	56 ✓	57	58	59	60
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In digital radiography, which one of the following choices will create a grainy appearance on an image?

Double image	HIDE
Metal implants	HIDE
Plate saturation	HIDE
A positioning trough underneath the patient	HIDE
Underexposure	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



Correct:

With **severe underexposure**, few photos strike the detector panel resulting in a grainy image with poor resolution (also **called "noise" or "quantum mottle"**).

In digital an image

Plate saturation (overexposure) results in linear striations on the image background.

Double i

Double exposures can result in "ghost" images where the first exposure is visible on the second image because the detector plate has not yet lost all of its charge.

Metal in

Positioning troughs do not typically affect the image quality.

Plate sa

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 490-6.

A positio

Underexposure HIDE

BACK

NEXT



 **zukureview**  **SAVE & EXIT**

[PREV](#)

[NEXT](#)

51 ^M ✓	52 ✗	53 ✗	54 ✓	55 ✓	56 ✓	57 ✓	58	59	60
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Which one of the following choices is best for imaging the internal architecture of the nasal cavity?

Diagnostic nuclear medicine	HIDE
Ultrasonography	HIDE
Bone scan	HIDE
Fluoroscopy	HIDE
Computed tomography	HIDE

[BACK](#) [NEXT](#) [LEAVE BLANK](#)

 Overview  Mark this Question  Lab Values  Definitions  Report a Problem



PREV

51 M

Which or cavity?

- Diagnos
- Ultrason
- Bone sc
- Fluorosc

Correct:

Computed tomography (CT) is best for imaging the internal architecture of the nasal cavity.

Radiography can also be used but CT is far superior.

Click here to see a [CT image of a canine nasal tumor](#) (scroll down).

During a CT scan, an x-ray beam passes transaxially through the patient.

X-ray attenuation (drop off) is measured at sequential sites in a segment of the patient's anatomy.

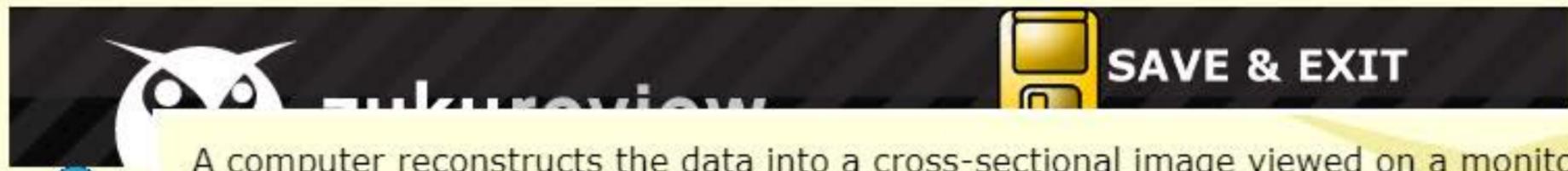
A computer reconstructs the data into a cross-sectional image viewed on a monitor.

Computed tomography HIDE

BACK

NEXT





PREV

51 M

Which or cavity?

- Diagnos
- Ultrason
- Bone sc
- Fluorosc

Computed tomography HIDE

BACK NEXT

- Overview
- Lab Values
- Definitions
- Report a Problem

A computer reconstructs the data into a cross-sectional image viewed on a monitor.

In addition to the nasal cavity, CT is useful for evaluating the thorax, abdomen, vasculature and musculoskeletal system.

CT – with or without contrast – may be used to image the brain and spinal cord, as often only one advanced imaging modality is available at a practice.

However, magnetic resonance imaging (MRI) is more sensitive for detecting lesions in the central nervous system.

Refs: McCurnin and Bassert, Clinical Textbook for Veterinary Technicians, 9th ed. pp. 515-6, Tuft's Cummings School of Veterinary Medicine and Merck Veterinary Manual online edition.

 **zukureview**  **SAVE & EXIT**

PREV NEXT

51 ^M ✓	52 ✗	53 ✗	54 ✓	55 ✓	56 ✓	57 ✓	58 ✓	59	60
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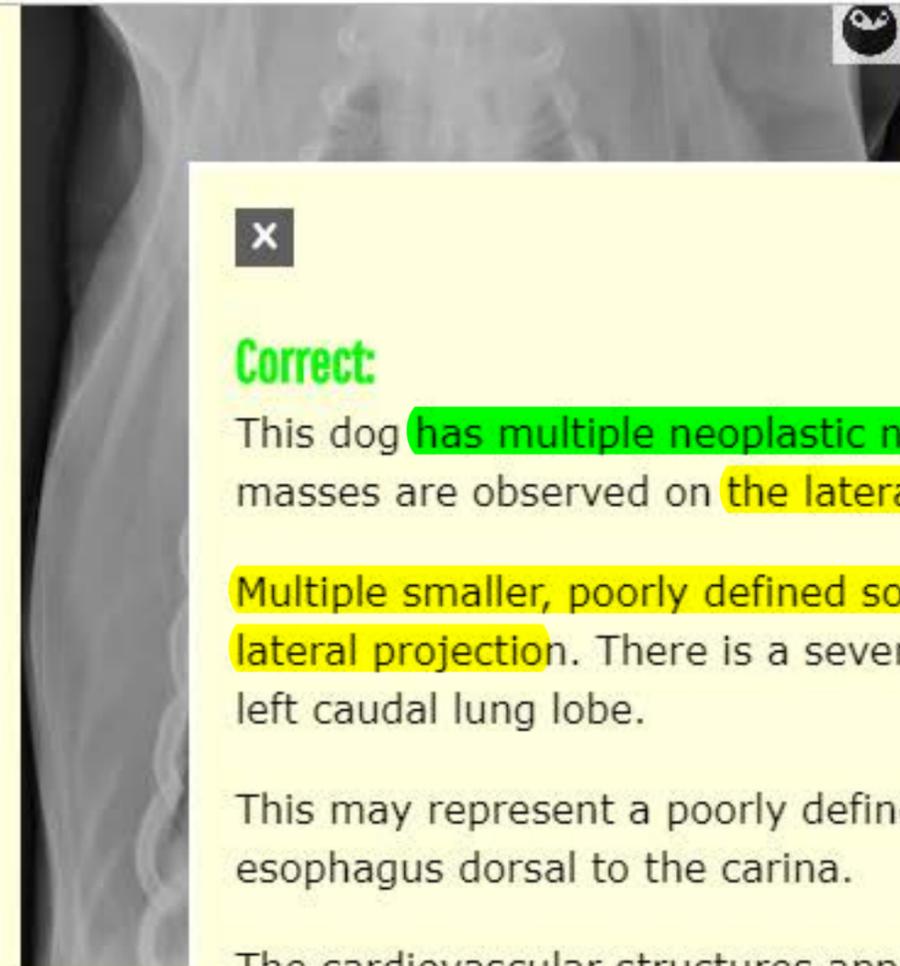
Which one of the following disease processes is most likely in this 9-year-old golden retriever with a cough?





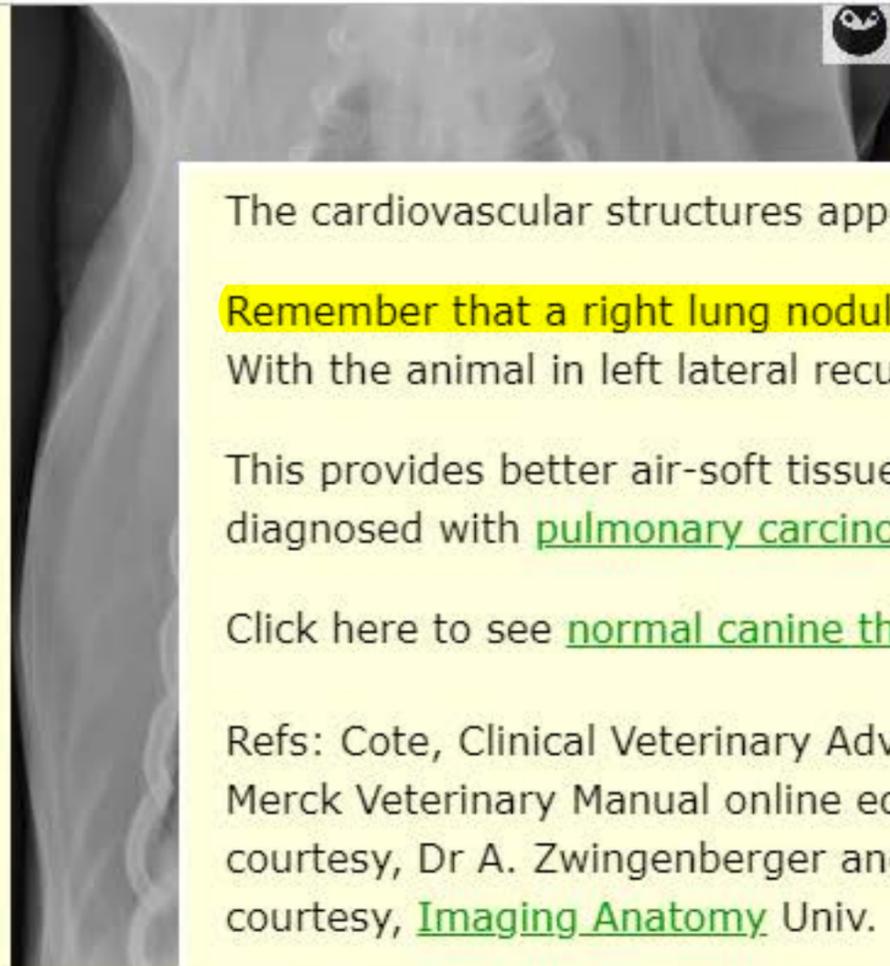
zukureview.com

Infectious	HIDE
Traumatic	HIDE
Degenerative	HIDE
Neoplastic	HIDE
Vascular	HIDE



Correct:
This dog **has multiple neoplastic nodules**. Three well defined, **2-3 cm soft tissue masses** are observed on **the lateral and DV projections**.
Multiple smaller, poorly defined soft tissue nodules are also observed on the **right lateral projection**. There is a severe alveolar pattern in the dependent portion of the left caudal lung lobe.
This may represent a poorly defined mass. A small amount of gas is present in the esophagus dorsal to the carina.
The cardiovascular structures appear within normal limits.

Infectious	HIDE
Traumatic	HIDE
Degenerative	HIDE
Neoplastic	HIDE
Vascular	HIDE



The cardiovascular structures appear within normal limits.

Remember that a right lung nodule will show up better on a left lateral projection.
 With the animal in left lateral recumbency, the right lung is better inflated.

This provides better air-soft tissue contrast to highlight the nodule. This dog was diagnosed with [pulmonary carcinoma](#) via a fine needle aspirate of the large nodule.

Click here to see [normal canine thoracic radiographs](#).

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 863-5 and the Merck Veterinary Manual online edition. Radiographic interpretation and images courtesy, Dr A. Zwingenberger and [Veterinary Radiology](#). Normal radiograph links courtesy, [Imaging Anatomy](#) Univ. of Illinois Vet Med.

Infectious	HIDE
Traumatic	HIDE
Degenerative	HIDE
Neoplastic	HIDE
Vascular	HIDE



An 8-year old male neutered dog is presented after being hit by a car.
The dog is BAR with normal perfusion and moderate tachypnea.
On chest auscultation lung sounds are almost absent.

Value	Normal
T=102.1 F (38.9 C)	99.5-102.5 F, 37.5-39.2 C
HR=144 bpm	60-120
RR=50 brpm	15-34

A lateral radiograph is below.
What is the interpretation?



RR=50 brpm 15-34

A lateral radiograph is below.

What is the interpretation?



Lung lobe torsion	HIDE
Flail chest	HIDE
Hiatal hernia	HIDE
Diaphragmatic hernia	HIDE
Pneumothorax	HIDE

BACK

RR=50 brpm 15-34

A lateral

What is t



Correct:

This is traumatic pneumothorax.

Note the dark airspace below the heart and the retraction of the lung lobes from the chest.

Decreased to absent lung sounds with a history of recent trauma strongly suggest pneumothorax.

Refs: Cote, Clinical Veterinary Advisor-Dogs and Cats, 3rd ed. pp. 816-7, Pasquini, Tschauner's Guide to Sm An Clinics, 2nd ed. p. 161, 224-8 and the Merck Veterinary Manual online edition. Image courtesy of Dr. Terri DeFrancesco, .

Lung lob

Flail chest

Hiatal hernia

Diaphragmatic hernia

Pneumothorax

HIDE

HIDE

HIDE

HIDE

BACK