

Chapter 1 The Basics

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Echocardiographic Applications

- Evaluation of:
 - Valve morphology
 - Chamber sizes
 - Wall thickness
 - Myocardial function
 - Pericardial effusion
- Aid in the Diagnosis of:
 - Chronic valve disease
 - Endocarditis
 - Cardiomyopathies (hypertrophic, dilated, unclassified)
 - Pericardial effusions
 - Cardiac neoplasia
 - Pulmonary hypertension
 - Congenital heart disease

Some Indications for an Echocardiogram

- Coughing
- Exercise intolerance
- Arrhythmia
- Pulmonary edema
- Pulmonary congestion
- Collapse or syncope
- Murmurs
- Cyanosis
- Lethargy
- Weak pulses
- Radiographic evidence of heart enlargement

Cardiac Anatomy

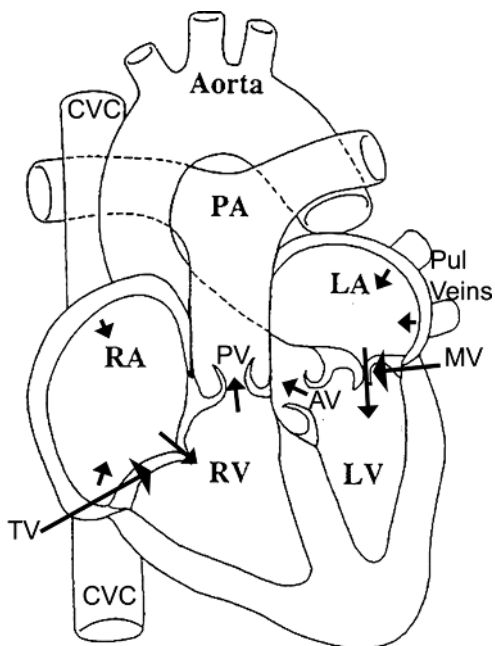


Figure 1.1 Heart Diagram. Diagram of the heart showing the chambers, valves and vessels of the heart. Flow through the heart is indicated. Note the relationships between the mitral valve and the aorta, and the pulmonary artery and the tricuspid valve. For details of abbreviations used in the figures, see the Glossary.

Orientation of the Heart in the Thorax

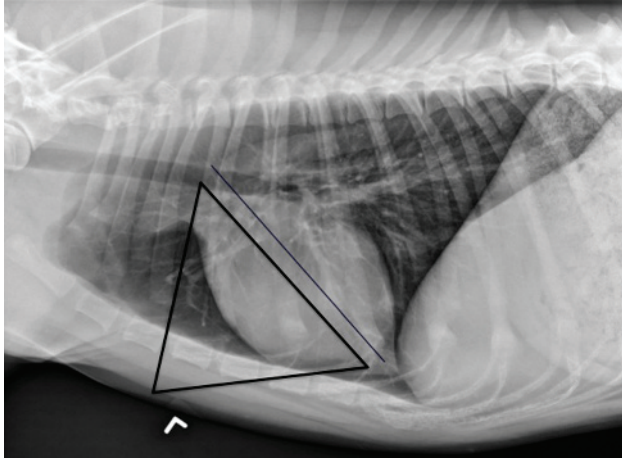


Figure 1.2 Canine lateral thoracic radiograph. This lateral radiograph shows the typical orientation of the dog's heart in the thorax. The triangle superimposed over this radiograph represents the sheet of sound coming from the transducer. Note that the transducer crystals need to be directed to the mid lumbar spine in order to create the long-axis image. Short-axis echocardiographic images of the heart have the sheet of sound oriented 90° to the long axis.

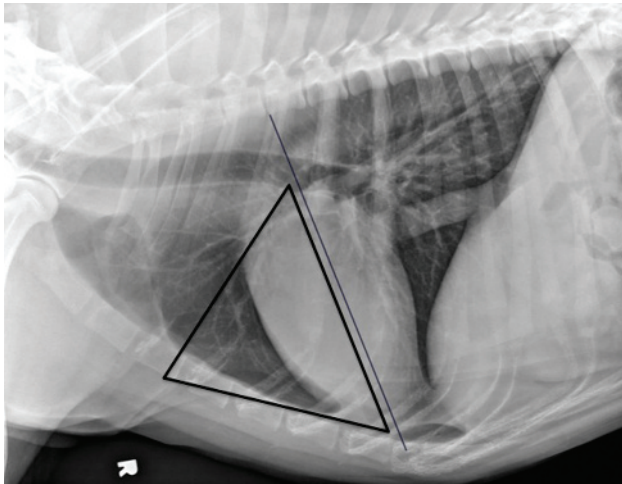


Figure 1.3 Canine lateral thoracic radiograph – deep-chested dog. This lateral radiograph shows the typical orientation of the dog's heart in the thorax when the dog has a deep chest, such as the Doberman Pinscher, Irish Wolfhound and the German Shepherd. The triangle superimposed over this radiograph represents the sheet of sound coming from the transducer. Because the heart is oriented more vertically in the thorax, the sheet of sound needs to be directed more to the tail than the mid lumbar spine, and the transducer needs to be located more cranially and dorsally to be in front of the heart. Short-axis echocardiographic images of the heart have the sheet of sound oriented 90° to the long axis.

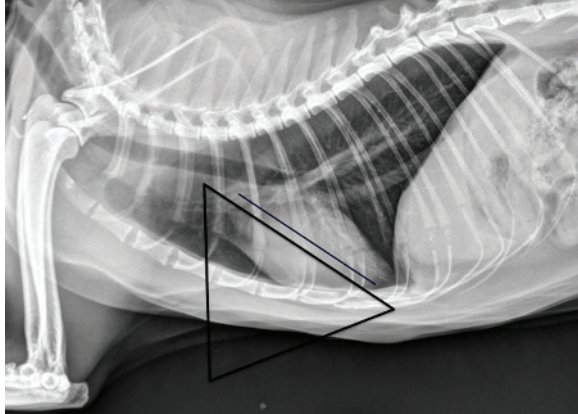


Figure 1.4 Feline lateral thoracic radiograph. This lateral radiograph shows the typical orientation of the cat's heart in the thorax. Note that it is aligned more parallel to the sternum than the dog's heart. The triangle superimposed over this radiograph represents the sheet of sound coming from the transducer. The sheet of sound needs to be directed more towards the thoracolumbar junction than in the dog in order to create the long-axis image. Short-axis echocardiographic images of the heart have the sheet of sound oriented 90° to the long axis.

How To

- Shaving (see Figures 1.5–1.6)
 - If the hair coat is thin enough to see the skin, shaving is not really necessary.
 - Most cats require shaving
 - If shaving is necessary
 - Shave from behind the front leg to about the sixth intercostal space on the right side, from the costochondral junction to the sternum.



Figure 1.5 Shaving on the right side. On the right side of the thorax in both dogs and cats, shave from behind the front leg to about the sixth intercostal space, from the costochondral junction to the sternum.

- Shave from behind the front leg at the costochondral junction to just past the last rib on the left side in a triangle shape.

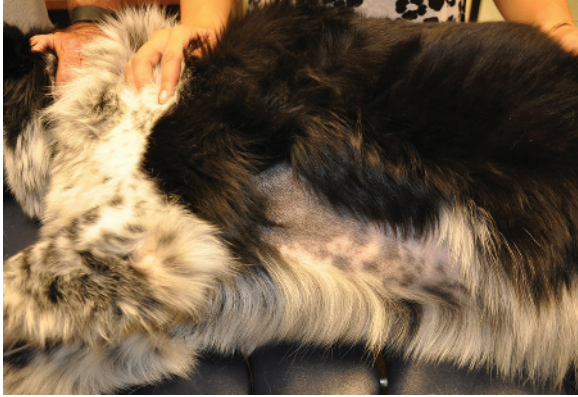
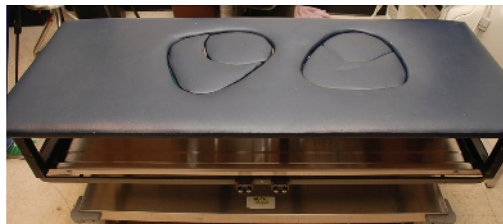
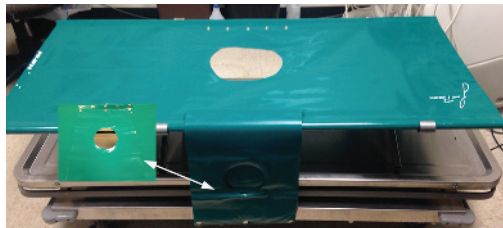


Figure 1.6 Shaving on the left side. On the left side of the thorax in both dogs and cats shave from behind the front leg at the costochondral junction to just past the last rib in a triangular shape. Shaving past the last rib is essential in order to obtain good image quality and long left apical views.

- Use a scan table for the best results (see Figures 1.7–1.8)



(a)



(b)

Figure 1.7 The Echocardiographic Scan Table. (a–c) A table with cut-outs that allow placement of the transducer from below the thorax enhances image quality because it reduces lung interference. Here, three echo scan tables are seen. (a) A homemade table with various cut-outs for different scanning techniques. (b) A commercially available table with a single cut-out that is used for both left and right parasternal imaging. An overlay (line with arrows) with a smaller hole can be positioned over the larger hole in order to accommodate small dogs and cats. (*Continued*)



(c)

Figure 1.7 (Continued) (c) Another commercially available scan table with cut-outs at each end of the table, one located at the edge of the table for left parasternal imaging. Many other options exist, but all improve image quality and minimize frustration.

- The heart will drop through the lungs, providing better image quality.
- Position in right or left lateral recumbency depending upon the imaging plane desired.
- Place the animal's thorax over the cut-out in the table.



Figure 1.8 **The Echocardiographic Scan Table and Animal Placement.** Place the animal in right or left lateral recumbency over the table cut-out. Here, the dog is placed in right lateral recumbency on the table with the thorax located over the cut-out. The dog's head is to the left side of this image. The transducer is positioned against the right side of the thorax from below the dog to obtain the right parasternal imaging planes. The heart drops through the lungs, and image quality is generally improved over imaging that is done with the animal placed in left lateral recumbency and obtaining right parasternal images from above. The same principles apply when obtaining left parasternal images: the animal is placed left-side down over the cut-out.