

Methods of Examination

Clinical Examination

1. The clinical cardiac examination should be conducted in a systematic manner. The arterial and venous pulses, mucous membranes, and precordium should be evaluated. Heart rate should be obtained. The clinical examination should be performed by an individual with advanced training in cardiac diagnosis. Board certification by the American College of Veterinary Internal Medicine, Specialty of Cardiology is considered by the American Veterinary Medical Association as the benchmark of clinical proficiency for veterinarians in clinical cardiology, and examination by a Diplomate of this specialty board is recommended. However, any licensed veterinarian may be able to perform this examination by auscultation.

2. Cardiac auscultation should be performed in a quiet, distraction-free environment. The animal should be standing and restrained, but sedative drugs should be avoided. Panting must be controlled, and if necessary, the dog should be given time to rest and acclimate to the environment. The clinician should be able to identify the cardiac valve areas for auscultation. The examiner should gradually move the stethoscope across all valve areas and also should auscultate over the subaortic area, ascending aorta, pulmonary artery, and the left craniodorsal cardiac base. Following examination of the left precordium, the right precordium should be examined.

- The mitral valve area is located over and immediately dorsal to the palpable left apical impulse and is identified by palpation with the tips of the fingers. The stethoscope is then placed over the mitral area and the heart sounds identified.
- The aortic valve area is dorsal and 1 or 2 intercostal spaces cranial to the left apical impulse. The second heart sound will become most intense when the stethoscope is centered over the aortic valve area. Murmurs originating from or radiating to the subaortic area of auscultation are evident immediately caudoventral to the aortic valve area. Murmurs originating from or radiating into the ascending aorta will be evident craniodorsal to the aortic valve and may also project to the right cranial thorax and to the carotid arteries in the neck.
- The pulmonic valve area is ventral and the one intercostal space cranial to the aortic valve area. Murmurs originating from or radiating into the main pulmonary artery will be evident dorsal to the pulmonic valve over the left hemithorax.
- The tricuspid valve area is a relatively large area located on the right hemithorax, opposite and slightly cranial to the mitral valve area.
- The clinician should also auscultate along the ventral right precordium (right sternal border) and over the right craniodorsal cardiac border.
- Any cardiac murmurs or abnormal sounds should be noted. Murmurs should be described as indicated below.

3. Description of cardiac murmurs—A full description of the cardiac murmur should be made and recorded in the medical record.

- Murmurs should be designated as systolic, diastolic, or continuous.
- The point of maximal murmur intensity should be indicated as described above. When a precordial thrill is palpable, the murmur will generally be most intense over this vibration.
- Murmurs that are only detected intermittently or are variable should be so indicated.
- The radiation of the murmur should be indicated.
- Grading of heart murmurs is as follows:
 - Grade 1—a very soft murmur only detected after very careful auscultation
 - Grade 2—a soft murmur that is readily evident
 - Grade 3—a moderately intense murmur not associated with a palpable precordial thrill (vibration)
 - Grade 4—a loud murmur; a palpable precordial thrill is not present or is intermittent
 - Grade 5—a loud cardiac murmur associated with a palpable precordial thrill and audible even when the stethoscope is lifted from the thoracic wall
 - Grade 6—a loud cardiac murmur associated with a palpable precordial thrill and audible even when the stethoscope is lifted from the thoracic wall
- Other descriptive terms may be indicated at the discretion of the examiner; these include such timing descriptors as: proto(early)-systolic, ejection or crescendo-decrescendo, holo-systolic or pan-systolic, decrescendo, and tele(late)-systolic and descriptions of subjective characteristics such as: musical, vibratory, harsh, and machinery.

4. Effects of heart rate, heart rhythm, and exercise.

- Some heart murmurs become evident or louder with changes in autonomic activity, heart rate, or cardiac cycle length. Such changes may be induced by exercise or other stresses. The importance of evaluating heart murmurs after exercise is currently unresolved. It appears that some dogs with congenital subaortic stenosis or with dynamic outflow tract obstruction may have murmurs that only become evident with increased sympathetic activity or after prolonged cardiac filling periods during marked sinus arrhythmia. It also should be noted that some normal, innocent heart murmurs may increase in intensity after exercise. Furthermore, panting artifact may be a problem after exercise.
- It is most likely that examining dogs after exercise will result in increased sensitivity to diagnosis of soft murmurs but probably decreased specificity as well. Auscultation of the heart following exercise is at the discretion of the examining veterinarian.
- At this time the OFA does not require a post exercise examination in the assessment of heart murmurs in dogs; however, this practice may be modified should definitive information become available.