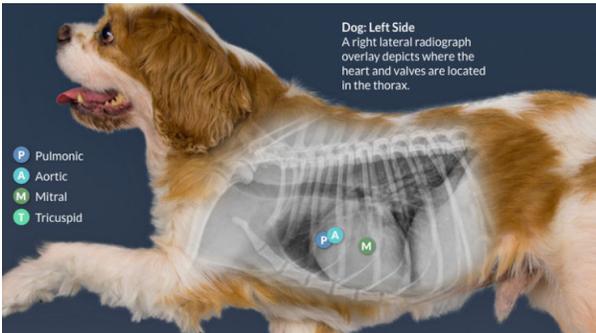


## VET 433C Cardiac Auscultation



Knowing anatomy is key!

### Cardiac Cycle Explained

Diastole	Systole
Filling phase AV Valves open (mitral and tricuspid)	Contraction phase Semilunar valves open (pulmonary and aortic)

### Heart Sounds

S1 “lup” = Closure of AV valves at the start of ventricular contraction (systole)

S2 “dup” = Closure of semilunar valves at the start of ventricular relaxation (diastole)

**Cardiac Murmurs** (occur when the Reynold’s number is >2000)

-Turbulent blood flow through valves, defects, and vessels

-Reynold’s number:  $Re = (2 * radius * mean\ velocity * blood\ density) / (blood\ viscosity)$

-Turbulence is primarily caused by changes in vessel diameter, blood velocity, and viscosity

-Murmurs are characterized by grade, location, timing, pitch, and shape/quality

### Grading murmurs

Grade I: Soft, focal, not readily apparent

Grade II: Soft and focal but readily apparent

Grade III: Moderate intensity but radiates to more than one location (apex and base)

Grade IV: Very loud (but no palpable thrill) and radiates widely (right and left hemithorax)

Grade V: Palpable precordial thrill and very loud

Grade VI: No stethoscope needed or heard with stethoscope slightly removed from chest wall + thrill

### **Localizing murmurs**

Dogs: Left apex, left base, right apex or sternal border

Cats: Left caudal parasternal, right caudal parasternal, left cranial

\*if there is a palpable thrill, PMI is the location of the thrill

### **Timing murmurs**

Systolic murmurs are most common

Diastolic murmurs are fairly uncommon – soft and low pitched (rumble or blowing)

### **Key Points for Heart Murmurs**

Murmurs can be common in cats but are not a great way to ID cardiac disease. Many cats with murmurs do not have cardiac disease while some cats with cardiac disease may not have a murmur.

A lack of a murmur in a dog rules out clinically important cardiac disease (almost 100% of the time)

Grade/intensity does not necessarily correlate with the severity of the cardiac disease

\*May be different for MMVD in the case that severity does correlate with the grade

### **Extra Heart Sounds**

Gallop sounds

- Low-pitched diastolic extra heart sounds
- Abnormal in small animals
- Early S<sub>3</sub> vs late S<sub>4</sub> vs summation gallop sounds
- More specific indicator of structural cardiac disease in cats compared to murmurs