

# Heart Murmurs in Dogs

## What is a heart murmur?

A heart murmur is an abnormal heart sound, usually heard by listening to the heart with a stethoscope.

## What causes a heart murmur?

A heart murmur is caused by turbulent blood flow within the heart. Sometimes a murmur is determined to be “innocent” or “physiologic,” while other times the murmur is determined to be pathologic or caused by disease. Pathologic heart murmurs can be caused by a structural problem within the heart (i.e., cardiac disease), or can be due to an extracardiac problem (i.e., not caused by heart disease).

## Do all murmurs sound the same?

No. The loudness of a murmur reflects the amount of turbulence that is present in the heart. However, the loudness of a heart murmur does not always correlate directly with the severity of the disease. Murmurs are graded by their intensity, usually on a scale of I-VI. A Grade I murmur is very soft or quiet, may only be heard intermittently, and is usually only heard in one location on the chest, while a Grade VI murmur is very loud, heard everywhere that the heart can be heard, and can be felt when a person places their hand on the chest in the area of the heart.

Murmurs are also characterized by the time in which they occur during the heart cycle and by whether they are long or short. Most murmurs are also characterized by their location or where they are the loudest. The majority of murmurs in the dog occur during systole, the phase of the heart cycle when the heart is contracting to pump blood out.

The specific characteristics of the murmur, along with any symptoms that your dog might be showing, will help your veterinarian determine what is causing the murmur.

## What structural heart problems cause a heart murmur?

The heart is composed of four chambers - the left atrium, the left ventricle, the right atrium, and the right ventricle. Blood flows from the right side of the heart through the pulmonary artery to the lungs where it is oxygenated, and then the oxygenated blood goes through the left side of the heart and into the aorta, where it is pumped to the rest of the body. Between each of the chambers and main blood vessels, there is a valve that functions to prevent blood from flowing back into the chamber as the heart pumps.

With structural heart disease, there is some sort of abnormal structure or defect that is disturbing the flow of blood, creating turbulence. The abnormality in the heart may be a leaky heart valve, a thickening or narrowing of a valve or large blood vessel, or an abnormal hole between the heart chambers or between two arteries that are not normally connected.

## **"Structural heart problems may be congenital (the dog is born with a defective heart) or acquired later in life."**

Structural heart problems may be congenital (the dog is born with a defective heart) or acquired later in life. Some congenital heart diseases are hereditary in certain breeds of dogs, including subaortic stenosis, pulmonic stenosis, and patent ductus arteriosus. Other congenital heart diseases are not documented as being hereditary, including ventricular septal defects, atrial septal defects, and Tetralogy of Fallot.

The most common cause of an acquired heart murmur in the dog is mitral insufficiency (also called mitral regurgitation), a condition in which the mitral valve becomes thickened and begins leaking (see handout "Mitral Valve Disease in Dogs"). Mitral insufficiency tends to be more common in small breed dogs. Other causes of an acquired heart murmur in older dogs include bacterial endocarditis caused by a bacterial infection that localizes on a heart valve and dilated cardiomyopathy (DCM). (See the handouts "Endocarditis in Dogs" and "Dilated Cardiomyopathy in Dogs.")

### **What extracardiac problems cause a heart murmur?**

Some extracardiac problems can cause what is called a "functional heart murmur." A functional heart murmur may be due to anemia (low levels of red blood cells), hypoproteinemia (low protein levels in the blood), fever or infection, pregnancy, obesity, or emaciation. With anemia or hypoproteinemia, the blood is too thin or watery, so turbulence is created as it flows through the valves. With young puppies, anemia and/or hypoproteinemia can be caused by a heavy infestation of parasites such as intestinal worms, blood parasites, fleas, or ticks. Adult dogs may become anemic because of blood loss or may have a serious underlying disorder.

### **What is an innocent or physiologic heart murmur?**

An innocent or physiologic heart murmur is a heart murmur that has no impact on the dog's health. It is very common for young puppies, especially large breed puppies, to develop an innocent heart murmur while they are growing rapidly. The murmur may first appear at 6-8 weeks of age, and a puppy with an innocent heart murmur will usually outgrow it by about 4-5 months of age. This type of murmur is benign (not harmful). In general, a physiologic or innocent heart murmur will have a low intensity (usually Grade I-II out of VI) and does not cause any symptoms or clinical signs.

### **How is a heart murmur detected?**

In most cases, a heart murmur is detected when your veterinarian listens to your dog's heart with a stethoscope.

### **How do we find out if a murmur is due to a significant problem?**

If your veterinarian detects a heart murmur, you will be asked a series of questions about your dog's health. Your veterinarian will assess your dog's general physical condition to determine whether or not there are symptoms or clinical signs that indicate the need for further diagnostic testing.

**"...if a dog is extremely excited or is panting heavily, it can be difficult to determine if abnormal sounds are being caused by a heart murmur or are just related to the elevated heart rate or panting."**

If your dog is still a young puppy and the murmur is of low intensity, your veterinarian may recommend a re-evaluation in a few weeks to track whether the murmur has decreased in intensity or disappeared, indicating that it was likely an innocent murmur. Similarly, if your adult dog appears to be extremely stressed at the time of a routine health examination and the murmur is of low intensity, your veterinarian may recommend a re-evaluation at a later time when the dog is calmer. In some cases, if a dog is extremely excited or is panting heavily, it can be difficult to determine if abnormal sounds are caused by a heart murmur or are related to the elevated heart rate or panting.

A dog with a heart murmur that is caused by a structural heart disease or an extracardiac problem will generally have some symptoms or clinical signs that can be attributed to the disease. The most common symptoms are poor appetite, weight loss (or stunted growth in a puppy), breathing problems (often occurring in the middle of the night or after the dog has been lying down for a period of time), poor exercise tolerance, collapse or fainting spells, pale gums, and coughing.

If your veterinarian detects an abnormal rhythm to the heartbeat or finds that your dog has weak or irregular pulses, it will be more likely that the murmur is caused by an underlying problem. If your veterinarian determines or suspects that the heart murmur is caused by a structural heart disease or an extracardiac problem, further diagnostic testing will be recommended. In the majority of these cases, further diagnostic testing should be performed immediately so that any treatment can be started as soon as possible.

### **What other tests may be recommended?**

Depending on what other clinical signs are present in your dog, your veterinarian will usually recommend X-rays, an electrocardiogram (ECG), or an ultrasound examination of the heart (echocardiogram). If your veterinarian suspects that the heart murmur is secondary to another disease, blood tests or other tests might be recommended.

An echocardiogram that includes a Doppler examination is the most useful test to determine the location of a heart murmur. With an echocardiogram, the beating heart is imaged, allowing the examiner to evaluate the heart's size and movement. A Doppler examination is a specialized type of echocardiogram in which the speed and direction of blood flow can be measured across the heart valves and in the heart chambers. The Doppler examination will usually pinpoint the location of the turbulence that is causing the murmur.

### **How is a heart murmur treated?**

Treatment depends upon the underlying cause of the heart murmur or the turbulent blood flow. Physiologic heart murmurs do not require any treatment but regular monitoring is advised to ensure that no other problems develop. If the heart murmur is caused by an underlying problem, the treatment plan will be based on the diagnosis and may include a combination of specialized diets, medications, and supportive care. Some congenital heart defects can be surgically corrected, including pulmonic stenosis and patent ductus arteriosus. Your veterinarian will advise you on the appropriate course of action to meet your dog's unique needs.

## **What is the prognosis?**

The prognosis ranges from excellent to grave, depending on the cause of the murmur. If the murmur is physiologic, no treatment is required and the prognosis is generally good to excellent. If the murmur is caused by extracardiac disease or a functional problem that can be treated, the murmur may resolve over time. The long-term prognosis for a dog with a murmur caused by congenital heart disease is extremely variable, depending on the specific type of defect that is present. If the defect can be surgically corrected, the prognosis is very good.

### **"The prognosis ranges from excellent to grave, depending on the cause of the murmur."**

Acquired murmurs vary significantly in their prognosis. A dog with mitral insufficiency can usually be managed with long-term medications. The prognosis for a dog with dilated cardiomyopathy varies; if the dog is showing symptoms of heart failure, the prognosis will be grave. The prognosis for bacterial endocarditis varies with the severity of the infection and the valve that is affected. The need for good dental care, including regular professional dental cleaning under general anesthesia, cannot be overemphasized as a means of preventing endocarditis.

Each case is different and your veterinarian will discuss the prognosis and treatment options that best suit your dog's unique needs. In all cases, ongoing monitoring and periodic diagnostic testing will be necessary to track the progress of the condition.