

The following health conditions have been identified in the Boxer. Some of these conditions can be identified through testing. In those cases, the currently available tests have been listed and described. The text below is intended as an aid to those seeking health information and should not be used to form a diagnosis or to replace regular veterinary care by one's own veterinarian.

Hip Dysplasia

Hip dysplasia is the number one cause of hind limb lameness in dogs and results in an arthritic condition of the hip joint which is initially caused by a laxity (looseness) in the hip joint itself. This joint is a ball and socket joint in which the head of the thigh bone (femur) fits into a cup-like depression (acetabulum) in the pelvis. The laxity is associated with the tissues which surround and hold the joint in place, that is, the tendons, ligaments, connective tissue, and muscle, and this laxity leads to bony abnormalities of the ball and socket. While the laxity of the joint is not thought to change much with time, the presence of joint instability causes abnormal wear and tear on the cartilage lining of the joint with subsequent development of arthritis as the dog ages.

Indeed, the Orthopedic Foundation for Animals (OFA) believes that there is little change in the test for dysplasia after 4 months of age; however, they require testing at two years of age or older for certification purposes, to err on the side of caution. Clinical signs can be extremely variable -- from no symptoms to severe lameness. Severity of arthritic changes on radiographs (X-rays) does not necessarily correlate with degree of lameness.

Diagnosis is made from radiographs of the hip joint (from the pelvis to the kneecap) and does require sedation or anesthesia. Positioning of the dog is critical for proper evaluation. The radiographs are evaluated by veterinary radiologists specially trained for this task. The dogs are graded as excellent, good, fair, borderline, or mildly, moderately, or severely dysplastic.

A newer method of evaluating hip joint laxity called PennHIP has been developed at the University Of Pennsylvania School Of Veterinary Medicine. This involves a different method of positioning the dog and uses a distraction device that is fitted to the dog during the procedure. Three views are taken, including a compression view, a distraction view and the standard (OFA) extended view. From the radiographs, the dog is assigned a DI or distraction index from 0-1.0, with values of 0.3 or below considered NOT at high risk for developing dysplasia. The dog is also ranked with other members of its breed in a percentile. (A dog ranking in the 80th percentile has 20% of its breed showing tighter hips.) This test can be performed at 16 weeks of age, but the originators of the method admit greater reliability if the test is performed later (at one year).

Hip dysplasia is thought to be genetically determined in part, but the mode of inheritance has not been established, since multiple genes and environmental factors such as nutrition and rapid growth may play a role in its development.

While some have questioned the frequency and severity of hip dysplasia in the boxer, many owners are now testing their dogs. The OFA currently reports the boxer as 67th in incidence of dysplasia (among breeds where over 100 dogs have been tested) with 2.9% of boxers testing excellent and 11.3% dysplastic.

The OFA Web Site at <http://www.offa.org> or the PennHip website at http://www.vet.upenn.edu/ResearchCenters/pennhip/what_is_ph.html are sources of additional information. This and other information is best discussed with your own veterinarian.

Thyroid Disease in Boxers

Thyroid disease in the boxer occurs primarily as hypothyroidism, or impaired thyroid gland function with low thyroid hormone levels. It often develops slowly over several months or years. The animal's body, for as yet unknown reasons, forms antibodies against its own thyroid gland resulting in partial or complete destruction of the gland and the subsequent inability to produce adequate thyroid hormone.

Many breeds, including the boxer, seem to be genetically predisposed to hypothyroidism. Affected animals may be listless, develop coarse hair coats, have significant hair loss, gain weight, experience infertility and/or fetal re-absorption or show neurologic problems. In some cases, abnormal test results may precede the clinically apparent stage of the disease. A simple thyroid test (T4) obtained from your veterinarian is often inaccurate and can give falsely low readings in normal dogs with concurrent non-thyroid illness and normal values when thyroid disease is in the early stages.

More definitive testing may be obtained by performing a panel of tests which include Total T4, TGAA (thyroglobulin autoantibodies), cTSH (canine thyroid stimulating hormone), so-called "free T4 by equilibrium dialysis," and sometimes T3 and free T3. This panel is currently not available from all diagnostic laboratories and must be sent to one of several reference laboratories by your veterinarian. Repeat testing may be recommended at regular intervals, because the disease can be slow to develop and current test results may not predict future abnormalities. Your veterinarian may not feel the need for these additional tests if the dog has no clinical signs of hypothyroidism, but owners who suspect their animals of being hypothyroid despite normal values on simple T4 tests and/or those who suspect an hereditary condition due to knowledge of affected relatives may wish to pursue more definitive testing as a screening mechanism in consultation with their veterinarian.

Boxer Cardiomyopathy

One of the most common causes of sudden/unexpected death in boxers, both young and old, is a condition thought to be inherited and characterized by abnormal heart rhythms involving the ventricles (the main blood pumping chambers) of the heart. This condition can cause varying degrees of disability and occasionally results in congestive heart failure. Current research has determined that the disease is the result of an electrical

conduction disturbance which causes the heart to contract too early, thus producing an extra, ineffective beat, the so called Premature Ventricular Contraction (PVC). While many dog breeds may have a few of these PVC's, the boxer seems to be prone to having more of these premature beats. When large numbers of these PVC's occur together, the heart muscle cannot produce a normal, effective contraction, which results in a lack of blood flow to vital organs including the brain and the heart itself. This can cause the animal to experience a seizure-like or fainting episode (syncope). A prolonged sequence of PVC's can lead to complete cardiac arrest unless the heart resumes a normal pattern of contractions. Less commonly, the lack of adequate contractions may cause the heart to fail and the dog's heart may dilate, causing congestive heart failure with symptoms such as shortness of breath, exercise intolerance, abdominal swelling, coughing and symptoms similar to those occurring in humans with heart failure. This is known as dilated cardiomyopathy -- a less frequent condition in the boxer than the more commonly seen electrical conduction defect.

The definitive test for this disease would be a DNA test for the abnormal gene. This research is currently underway at Ohio State University, but research of this type can take a considerable amount of time and funding. Since affected dogs are often asymptomatic until a seizure or sudden death occurs, current attempts in screening for the disease are directed at the healthy appearing animal. The most sensitive tool has been determined to be a Halter Monitor examination (24-hour EKG), which records the dog's electrocardiographic activity over at least 24 hours. The monitor is strapped to the dog and electrodes are placed on the chest while the dog goes about its normal activities. The total numbers of beats, including the abnormal PVCs, are recorded. The electrodes must be correctly placed and the results must be interpreted by trained personnel. While current research at Ohio State University by Dr. Kate Meurs, funded by the American Boxer Charitable Foundation and the AKC Canine Health Foundation, has suggested certain thresholds of PVC's or other abnormalities for diagnosis of the condition, she has also discovered that an individual dog's numbers may vary from day to day or week to week. Her ongoing research, and that of others, will hopefully determine with greater certainty the value of this screening tool in the future until a definitive genetic test is available. While it is true that a symptomatic dog usually has thousands of beats in a 24 hour period and in severe cases may be diagnosed by simple auscultation of the heart or by a brief EKG, the Halter monitor is still probably the best screening tool for early detection, due to the often intermittent occurrence of the PVCs in the asymptomatic dog.

Of recent interest to boxer cardiology researchers is a somewhat similar condition found to occur in human families, the so-called arrhythmogenic right ventricular dysplasia (ARVD), in which young and old persons, previously in good health, experience sudden death. To our knowledge, attempts to find a precise DNA marker have not been successful so far, but if this occurs, it may help veterinary cardiologists find the canine genetic defect sooner. BCM appears to be unique to boxers, so far, in the dog world, and is dissimilar in many respects to cardiomyopathy occurring in other breeds, such as the Doberman and Great Dane. Continuing research and follow-up of dogs already under study will hopefully provide better insight and understanding of this unique condition in the boxer, as well as more widespread availability of screening.

Aortic / Subaortic Valvular Stenosis: AS/SAS

One of the most common heart defects occurring in dogs, boxers in particular, is aortic or subaortic stenosis. In most cases the stenosis, or narrowing, is produced by a fibrous ring of tissue below the aortic valve, hence the term "subaortic." The disease is inherited but its mode of transmission is not known at this time.

Oxygen-rich blood flows from the left ventricle of the heart, through the aortic valve and into the aorta, which transports the oxygenated blood to all organs and tissues in the body except the lungs. Narrowing of the aortic valve requires the left ventricle to work harder to pump the necessary amount of blood. This increased workload can result in hypertrophy (thickening) of the left heart muscle. Since the blood is being forced through a smaller-than-normal opening, there is also increased pressure generated by the pumping action of the heart. This increase in pressure can cause dilation (ballooning) of the aorta. Reduced flow can produce symptoms of fainting (syncope) and even sudden death, although abnormal heart rhythms (arrhythmias) may also contribute to these symptoms.

The stenosis creates a change in the flow of blood through the valve causing turbulence which results in swishing sound called a heart murmur. Often the stenosis can be seen on echocardiography. Murmurs are graded from one to six, but a weak murmur may not always be detectable, even by a trained cardiologist. Exercising the dog during the cardiac exam may increase detection of murmurs in some cases. Not all murmurs are the result of aortic stenosis/subaortic stenosis, but may be so-called "innocent" or physiologic murmurs, particularly when they occur in young animals.

The diagnosis of AS/SAS is best made by a veterinary cardiologist, or one with equivalent experience and training. When a murmur is identified and not presumed to be physiologic, further investigation is warranted. The least invasive and most available testing consists of Echo/Doppler. This testing is best performed when the animal is full grown or at least one year of age, unless the dog is experiencing symptoms of heart disease, in which case testing should be pursued promptly.

As in many instances in medicine, these tests have limitations and are not perfect. False positive and false negative diagnoses may occur. In some cases this is simply because the abnormality is too subtle to be diagnosed with currently available knowledge and/or technology. Echo-Doppler flow rates can vary considerably in the same animal depending on the proficiency of the operator and the amount of stress to which the animal is subjected. These limitations may be minimized in part by examiners with advanced training using the appropriate ultrasound equipment, techniques, and standards established by the American College of Veterinary Internal Medicine, Specialty of Cardiology.