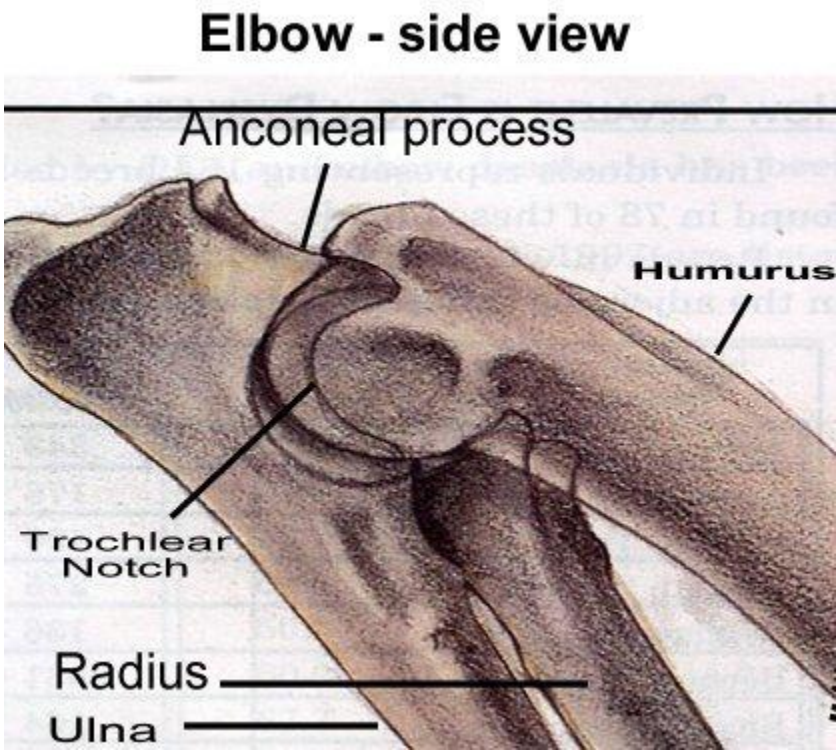
Dr. Henry De Boer Jr. on Elbow Dysplasia: Part 1

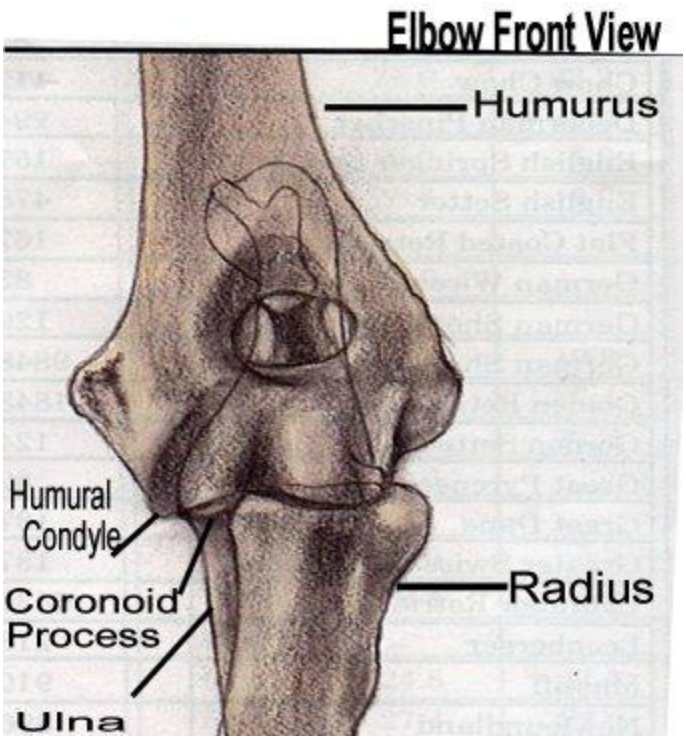
Question:
I have been hearing a lot about elbow dysplasia recently. What exactly is elbow dysplasia? Are there symptoms I should be watching for in my young dog?

Answer:

The term *elbow dysplasia* ("ED") is a general term that is used to describe a developmental degenerative disease of the elbow joint. There are in fact three different etiologies that can create a diagnosis of ED. These etiologies may occur individually or in combination with each other in any one dog. This disease has created considerable confusion and controversy not only on the part of dog owner, but with practicing veterinarians as well as researchers who are studying the problem. While our ability to diagnose ED has improved in recent years, there is still a great deal to be learned about its causes, prevention, and what constitutes appropriate treatment.



ED occurs predominantly in medium or larger breeds of dogs. The Orthopedic Foundation for Animals (OFA) maintains statistics in their elbow registry for many breeds. As of December 31, 1998, ED had been diagnosed by OFA in 87 breeds. Incidences range from 0% in Border Collies up to 47.8% in Chow Chows. The average incidence of the breeds for which at least 75 individuals have been evaluated is 11.11%. Male dogs are more likely to have ED then females, and 20-35% of dogs with ED have it in both elbows.



Dogs with ED may or may not be lame, therefore, using lameness to determine its presence or the breed worthiness of an animal is foolhardy. Dogs with clinical ED typically develop foreleg lameness between the ages of 5 and 12 months of age, however, in some cases the lameness may not be apparent until as late as 5-7 years of age. The lameness may be variable and periodic. Some dogs may demonstrate soreness after rest, improve slightly with activity, but then worsen with increased activity. There may be intervals with no lameness at all. Jumping and sharp fast turns usually exaggerate the lameness. Pain can be elicited by overextending the elbow, and there may be a slight to moderate swelling noticeable when carefully feeling the elbow joint. If both legs are meaningfully affected the lameness may be more difficult to detect. Careful observation would show slight rotation of the top of the paws outwardly, as well as a stiff or stilted movement of the forelegs. There may be a reluctance on the dogs part to land hard on the front legs (e.g. trotting, loping or landing jumps).

For the sake of simplicity the three etiologies resulting in ED will be discussed individually, but it is important to note that there can be considerable overlapping in their presence, their cause and effect. The magnitude of the overlapping has probably not been fully realized at this time.

The anconeal process is a small pyramid shaped piece of bone on the upper end of the ulna. In a young dog it is a piece of cartilage that gradually turns to bone and unites with the rest of the ulna at approximately 4 ½ - 5 months of age. If that union fails to take place we have an ununited anconeal process (UAP). The presence of UAP leads to degenerative joint disease as a result of a decrease in stability within the joint, and an increase in inflammation caused by the chip of bone being free within the joint.

Osteochondritis dessicans (OCD) can occur in many joints, but when it occurs in an elbow it most commonly is on the lower, inner aspect of the humurus (medial humural

condyle). In essence OCD is a vertical fracture in the articular cartilage of the humurus, which can lead to a flap of cartilage within the joint. This flap leads to degeneration within the joint as a result of an inflammatory process.

The coronoid process is a small piece of bone on the ulna, which articulates with the humurus. Similar to the anconeal process it starts as cartilage, and gradually turns to bone as it unites with the rest of the ulna. Failure of that fusion to occur or chipping of the area after fusion has occurred, creates a fragmented coronoid process (FCP). Subsequent to FCP degenerative joint disease develops for the same reason as with UAP.

The exact causes of ED have been the subject of considerable controversy. A number of predisposing factors have been identified, and recently some new theories have gained support as probable explanations for the development of ED. The individual etiologies of ED most likely have multiple possible causes.

OCD has at least three possible causes. Heredity certainly plays a role, as we do see a tendency for this problem to occur in family lines, as well as in those breeds that grow rapidly. Trauma within the joint also is a factor, evidenced by the fact that areas commonly affected by OCD are those that typically experience high levels of biomechanical stress. Additionally, animals housed on hard surfaces are more likely statistically to have a higher incidence of OCD. A third cause is a lack of sufficient blood supply to the joint cartilage. The specific cause of this marginal blood supply is not currently understood.

Understanding of the causes of FCD and UAP has experienced a surge in recent years. In addition to the causes listed for OCD, recent research strongly suggest that two factors are playing a major role in the development of these two etiologies. A disparity in the growth rate between the radius and ulna, as well as an abnormal formation of the trochleor notch in the ulna, have been implicated in the development of ED. The elbow joint is a very complex joint that is created by the junction of three different bones. Normally these bones fit and function together with very close tolerances. If the growth rate of the bones is changed, or a structure does not form normally, the tolerances change, enhancing the possibility of damage within the joint. The damage created typically results in either FCP or UAP.

Understanding the symptoms and causes of ED is extremely important if informed decisions are to be made regarding diagnosis, treatment, and prevention of ED. These are the topics that will be covered in the next installment of this column.

Picture credits: Orthopedic Foundation for Animals and Gheorghe M. Constantinescu D.V. M.

Dr. Henry De Boer Jr. on Elbow Dysplasia: Part 2

In Part 1, the following question was raised regarding elbow dysplasia. In the second and final part of this series the diagnosis, treatment and prevention of elbow dysplasia are discussed.

Question:
I have been hearing a lot about elbow dysplasia recently. What exactly is elbow dysplasia? Are there symptoms I should be watching for in my young dog?

Answer:

The last installment of this column discussed the definitions, symptoms and causes of elbow dysplasia (ED). In this column we will concern ourselves with the diagnosis, treatment and prevention of the three component causes of ED; Osteochondritis dessicans (OCD), ununited anconeal process (UAP), and fragmented coronoid process (FCP).

In general elbow dysplasia should be suspected as a possiblity with any foreleg lameness that persists for more than several days, especially if the dog is of a breed that may be prone to ED. Examination of the leg yields pain on palpation when the elbow joint is over-extended. The next step in establishing a diagnosis is having high quality radiographs taken. Multiple views of the leg should be taken, and if ED is evident, radiographs of the other elbow are appropriate given the possibility of this problem occurring in both elbows. UAP is easily detected with radiographs, and in most cases, a diagnosis of OCD can be made with radiographs as well. FCP can be diagnosed in most cases with radiographs, but can be a challenge in yet other cases. The problem is that the coronoid process is a relatively small piece of bone that in the majority of standard radiographic views cannot be visualized by itself, but rather is superimposed on the other bony structures within the elbow. Given that superimpositon, if the lesion is small, it may be difficult if not impossible to see. In many of the cases in which the coronoid process cannot be visualized there will be bony changes in other areas of the joint that will strongly suggest FCP. If the information from the radiographs is equivocal, a CT scan can typically help significantly in establishing a firm diagnosis. While CT scans are not readily available in all local areas, they are generally available at least regionally, and are a very valuable diagnostic tool for this problem.

The approach to diagnosing ED is consistent, however the approach to treating the problem is variable. Developing a treatment protocol for ED depends not only on the etiology, but also on the symptoms that the dog is demonstrating, as well as the duration of the problem.

UAP traditionally has been a problem that has been treated surgically. In the past, one of two surgical options have been used. In the first, the fragment of bone within the joint has been removed, and in the second, the fragment has been reattached using a lag screw. In general, dogs undergoing either of these surgeries have improved to an extent clinically, but in many cased, degenerative joint disease continued to develop and there is typically some loss of stability within the joint and/or some sporadic lameness. For working dogs these results have been less than impressive. Recently a new surgical approach to the problem has been developed, in accordance with the theory that a disparity in growth rates between the radius and ulna is to blame for the development of the UAP. In this surgery a small slice of bone is removed from the ulna, which prevents the disparity in growth rates from creating tension within the joint. This decrease in tension allows the anconeal process to unite, followed by healing of the ulna. Early reports from those surgeons using this technique have been extremely encouraging. In a high percentage of these cases the anconeal process is uniting, there is minimal degenerative change and no instabiliy within the joint. This procedure, in my opinion, is very promising for our working dogs. It is important to note that for this procedure to be beneficial the problem must be diagnosed as soon as possible. The anconeal process, in most dogs unites normally at approximately five months of age. Radiographic screening can be done at five to six months of age, and, in most cases no sedation or anesthetic would be necessary for the radiographic view required.

Treatment of FCP or OCD can be medical or surgical/medical. I typically recommend that most dogs with FCP or OCD be treated medically at first, and if the results are not satisfactory, surgery should be considered. Medical management would include a moderate

exercise restriction as well as a dietary change if warranted. The dietary alteration would be to achieve weight reduction if required and to alter food intake so as to keep growth rate at a relative minimum. The use of chondroprotective agents such as Cosequin, Glycoflex or similar products is appropriate, as well as the use of non steroidal anti-inflammatory medications. If after five to eight weeks, the results of medical management is not satisfactory, surgery can be performed. The surgical technique for both FCP and OCD essentially results in removal of the adversely affected area. Surgery should be followed by the ongoing administration of chondroprotective agents and anti-inflammatory medication if required.

The results of surgical/medical management are generally satisfactory, with some animals experiencing substantial relief but some others showing only moderate improvement. The prognosis for a working dog that has had surgical repair for FCP or OCD being able to work pain and lameness free is fair, and there is a moderate probability of early degenerative joint disease (arthritis).

Prevention of elbow dysplasia can indeed be a frustrating endeavor. While some of the causes are known, the level of understanding as to their relative importance, and how they relate to each other is still being examined. The primary factors we need to be conscious of are: genetics, nutrition, and trauma.

ED clearly has a genetic basis, however, it is not highly predictable as to which dogs will be affected by its presence. This lack of predictability eliminates our ability to confidently select breeding stock or puppies it they are from a breed that is predisposed to ED. In spite of this low level of predictability, every effort should be made to eliminate this problem. The Orthopedic Foundation for Animals (OFA) does have an elbow registry that will certify elbows at two years of age. They will give preliminary evaluations at any age, and given the surgery available for UAP, screening at five to seven months of age would certainly be prudent. Any dog with radiographic evidence of ED, whether or not they are lame, should probably be eliminated from breeding. It is important to note, however, that dogs with low level changes in an elbow (Grade 1 ED) may never develop any lameness whatsoever. Working these dogs is appropriate as long as the handler is mindful of the possibility of a future lameness. Clearly, if these dogs are being worked, weight should be kept at an appropriate level, and those exercises requiring hard landing on the forelegs should be minimized. Additionally, dogs with very low level changes on a preliminary evaluation should be re-evaluated in six to twelve months. Changes in an elbow that appear significant at a young age may be insignificant at an older age a long as there has been no progression in the changes. These dogs could potentially be clear of ED at a mature age.

Nutrition has also been shown to play a role in the development of ED. The specific factors that have been shown to be of particular consequence are the feeding of high energy foods, especially if fed in excessive volumes, and the level of calcium in the diet.

Rapid growth has been shown to increase the risk of ED. Every effort should be made in those breeds predisposed to ED to keep their growth rate as low as possible by keeping food volumes as well as the energy content low. A higher energy content of a diet increases the likelihood of a dogs consumption surpassing its requirements. Since fat is a substantial component of energy density, fat content of a chosen diet for young dogs should generally be below 17%. Total energy density should be kept below 4.0 kcal/g. This information should be available from the manufacturer of the food.

For many years it was felt that the ratio of calcium to phosphorus in a diet was more important than the absolute volumes. This has been shown to be inaccurate, and current recommendations are that calcium levels should be approximately .9 1.5% on a dry matter basis.

In recent years there has been a tremendous surge in nutritional supplements for dogs. Inasmuch as ED is concerned (as well as other skeletal developmental abnormalities) supplementation has the potential to create far more problems than it can prevent. Beware!

Trauma to growing and developing joints can also play a role in ED. Quantitating the effect of trauma is difficult at best, but common sense would suggest that while we want to keep young dogs in good physical condition, we should minimize those activities that would create high impact on developing joints.

Clearly, ED is a complex entity which much has been learned about in recent years, but much more needs to be done if we are to decrease its frequency, as well as its effect on our dogs. Hopefully, the increased awareness of ED on the part of dog owners, as well as continued veterinary research will lead to a significant decreases in the frequency and severity of this nagging problem.

Return to **Dr. DeBoer on Elbow Dysplasia: Part 1**.

Dr. Henry De Boer Jr. practices veterinary medicine at his Pioneer Valley Veterinary Hospital in western Massachusetts. An accomplished competitor in the sport of Schutzhund, his involvement with working dogs dates to the mid 1960's when he began training and handling hunting dogs. In 1984 he became involved with the sport of Schutzhund and has gradually risen to the level of national competitor. Known primarily as a motivational trainer, he also provides training assistance to others to help them achieve their training goals. His wide range of experience lends a unique understanding to the special veterinary problems of working canines and their handlers. Dr. De Boer provides specialized online veterinary services to working dogs and their owners on his innovative web site http://www.workingk-9vet.com **Working K9 Veterinary Consultation Services**.