



## Veterinary Surgical Center of Portland

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### Information for Pet owners

## Elbow Dysplasia

### Overview:

The elbow is a complex joint made up of three bones, the humerus in the upper arm and the radius and ulna in the lower forearm. The top of the radius is flat and supports the humerus. This is the weight bearing bone in the forearm. The top of the ulna curves around the humerus to allow the normal movements of the elbow joint. In young, fast growing, large breed puppies and in dogs bred to have crooked legs, abnormal development of the elbow joint may occur. This abnormality, elbow dysplasia, may result in damage to the cartilage or failure of portions of bone to fuse properly. Left untreated, severe, crippling arthritis will occur. Canine elbow dysplasia (ED) is a disease of the elbows of dogs caused by growth disturbances in the elbow joint. There are a number of theories as to the exact cause of the disease that include defects in cartilage growth, trauma, genetics, exercise, diet and so on. It is likely that a combination of these factors leads to a **mismatch of growth** between the two bones in the fore leg located between the elbow and the wrist (radius and ulna). If the radius grows more slowly than the ulna it becomes shorter leading to increased pressure on the medial coronoid process of the ulna (Figure 1). This in turn can cause damage to the cartilage in joint and even fracture of the tip of the coronoid process, which damages the medial compartment (side closest to the body) of the joint. Less commonly, if the ulna grows too slowly then the radius pushes the upper arm bone (humerus) against the anconeal process, which can then lead to failure of the anconeal process to attach to the ulna at maturity. It is believed that the mismatch in growth between the radius and ulna may sometimes only occur during a puppy's growth, but it may also persist when the pup has finished growing. For the most part, elbow dysplasia is inherited and can be passed on to offspring. Elbow dysplasia may manifest itself as a variety of different conditions.

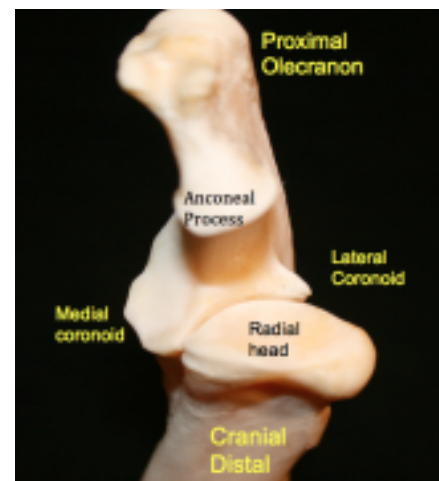


Figure 1; The lower bones of the elbow of the dog. The radius is at the front and the ulna at the back.

## Signs and Symptoms

Elbow dysplasia is most often seen in **large to giant breed dogs**, particularly Labradors, Golden Retrievers, German Shepherds, and Rottweilers, but can occur in most breeds of dog. Different breeds have predispositions to different forms of the disease, so that ununited anconeal process (UAP) is largely a problem of German Shepherds, medial compartment disease (medial coronoid injury) is seen in many other breeds and sight hounds are free of the disease.

Unfortunately once the elbow joint has been damaged through either cartilage loss, the presence of medial coronoid fragments or an ununited anconeal process, a vicious circle of inflammation and further cartilage damage begins. Ultimately this causes **progressive arthritis** of the elbow joint leading to pain and loss of function.

Dogs affected by elbow dysplasia often show signs from an early age, typically from 5 months on, but some may first be diagnosed after 4–6 years. Affected dogs develop a **front limb lameness** that typically worsens over a period of weeks to months. Lameness is usually worse after exercise and typically never completely resolves with rest. Often both fore legs are affected, which can make detection of lameness difficult, as the gait is not asymmetric. When both elbows are involved the dog usually becomes unwilling to exercise for long periods or may even refuse to complete a walk.

### Diagnostics:

Diagnosis of elbow dysplasia is usually performed with a combination of clinical **examination** and **x-rays**. Usually the dog has pain on fully bending or extending the elbow and often your veterinarian will want to watch your dog walk or trot to detect any lameness. X-rays will typically show signs of arthritis but may also show the presence of small bone fragments in the joint or an ununited anconeal process (Figures 2 and 3). Your veterinarian may also choose to refer you to a specialist veterinary surgeon for more advanced diagnostic procedures to be performed. This may include CT scans, MRI scans, or arthroscopy (Figures 4 and 5).



Figure 2: an ununited anconeal process (UAP) in an 18 month old dog. Note the large unattached fragment at the top of the joint (arrow)



Figure 3: Advanced arthritis. Note the new bone deposited around the joint (arrows) and the increased density of the bone under the joint (cross).

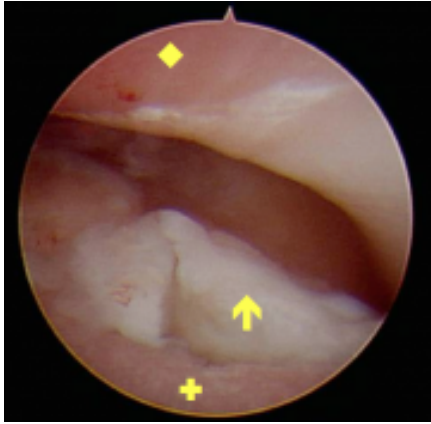


Figure 4: Arthroscopic image of a fracture coronoid fragment (arrow) with severe cartilage damage to the humerus (diamond) and ulna (cross).



Figure 5: A 3D reconstruction from a CT scan showing a medial coronoid fragment (arrow),

## Treatment:

Treatment depends on the severity of the disease in the elbow. In many cases surgery is recommended, but your veterinarian may recommend medical management if the problem is very mild or so severe that the joint is not likely to benefit from routine surgery. Treatment can be divided into the **correction of a joint step** between the radius and ulna if present, and **treatment of any other joint damage**. Often surgery is best performed arthroscopically, but conventional open surgery can also be done. Depending on the individual dog's elbow problem surgery may involve:

- Correction of joint step; is usually done by cutting the ulna to re-establish elbow congruence.
- Removal of any coronoid fragments and removal of loose cartilage (Figure 6)
- Surgical alteration of the elbow joint to shift weight away from damaged areas (Figure 7)
- Reattachment or removal of an united anconeal process of the medial joint compartment (Figure 8)
- Joint replacement if the elbow is severely diseased

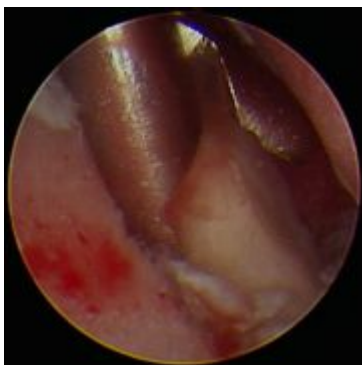


Figure 6: A medial coronoid fragment being removed arthroscopically.



Figure 7: A proximal abducting ulnar osteotomy. This is one of two procedures used to shift weight away from the damaged part of the joint to a healthy part of the joint.



Figure 8: An X-ray shows a repaired ununited anconeal process (UAP) in a 6 month old German Shepherd.

## **Aftercare and Outcome**

Obviously the aftercare will depend on the type of surgery performed, and your veterinarian will advise you of exactly what is required. In general your dog will need to be quiet and confined for a period of time, usually from 2–6 weeks or more.

The outcome will vary between dogs and many dogs need continued medical treatment after surgery. Most dogs will benefit from surgical treatment even if disease is more advanced, but unfortunately once arthritis is well established it will slowly progress regardless of any treatment. The aim is to slow the progression of arthritis and prolong the patients' use of the elbow. Maintaining optimal body weight, a regular controlled daily exercise program and chondroprotectants are recommended. If needed non steroidal anti-inflammatory drugs are prescribed. Dogs with ongoing elbow arthritis also benefit from passive range of motion therapy and joint injections with platelet rich plasma, stem cells and hyaluronic acid may be performed under short sedation. Many dogs with elbow problems, may enjoy aquatic therapy, as mechanical load on the abnormal joints is improved due to the buoyancy of the water. Treatment with laser has potential to decrease inflammation in the dysplastic elbow joint, but there are currently no clinical studies on this subject.

### **Literature:**

Client information is based on a brochure by the American College of Veterinary Surgeons ([www.acvs.org](http://www.acvs.org)) and the current peer reviewed literature.