



# Arthritis in Young Dogs

An extract from *The Dog Owner's Manual* by Dr Karen Hedberg BVSc

Osteochondritis (OC) and its more severe form (OCD) are problems seen in the rapidly growing dog, often from as early as 18-20 weeks of age. Usually it is only seen in breeds where the adult weight is greater than 18-20kg. OCD can occur in many different joints, most commonly in the elbows, followed by shoulders, and less commonly in the hocks. The affected joints can be single or bilateral. Different breeds have higher incidences or predilections for various joints to be affected. Both hip and (in particular) elbow dysplasia are considered to have OC as part of their underlying pathology.

Osteochondritis is characterised by defective cartilage in various to multiple joints in the rapidly growing dog. The main feature is a failure of the cartilage to properly convert to bone during the growth process. Due to rapid growth, the cartilage cells divide at a normal or increased rate, but the

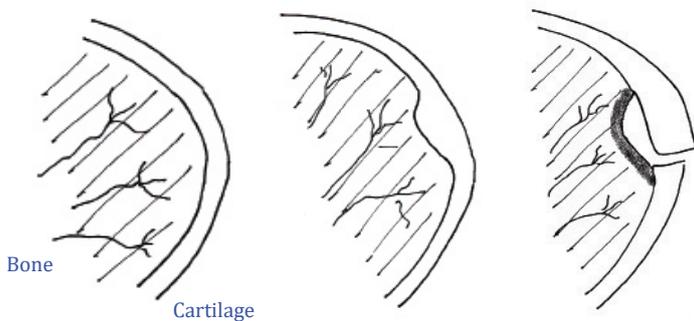
cells do not fully mature and this can result in thickening of the cartilage in various areas of the joint and a delay in bone formation underneath. As the cartilage continues to grow without being normally converted to bone, it loses part of its nutrition because of its increased thickness. Cartilage has no direct blood supply and relies on nutrition from the joint fluid and the underlying bone. The thicker cartilage results in loss of blood supply, in turn causing necrosis (death) of the lower layer of cartilage. Once this happens, the overlying cartilage can separate from the underlying bone causing "flaps" to lift. Such splits allow the joint fluid into direct contact with underlying bone, creating pain and mild to severe inflammatory response. This in turn causes the joint capsule to become inflamed and can result in bursitis (increased fluid).

Cartilage flaps or loose sections that break away (joint mice) result in continuing pain, and inflammation. Early lesions of OC can go three ways:-

1. Heal through rest and appropriate treatment such that there is restoration of the ossification process (ie. normal bone and cartilage development and maturation);
2. Remain unchanged or
3. Progress to OCD, development of arthritis and clinical lameness.

Radiographically cartilage is radiolucent, so early changes to cartilage are not readily detectable until there is a delay in the bone formation underneath the cartilage defects, creating a "flattening" affect visible on x-ray in the area affected.

Osteoarthritis – develops further over time.



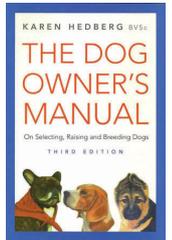
Normal development of a joint surface

2. Failure of developing cartilage to convert to bone results in a delay in bone formation and a "flattening" effect and a thickening of the cartilage. Can be due to reduced blood supply, genetic and environmental factors.

3. Loss of nutrition to the lower sections of thickened cartilage results in necrosis and splits in the cartilage. Lifting of the cartilage exposes bone tissue to joint fluid, resulting in an inflammatory response.



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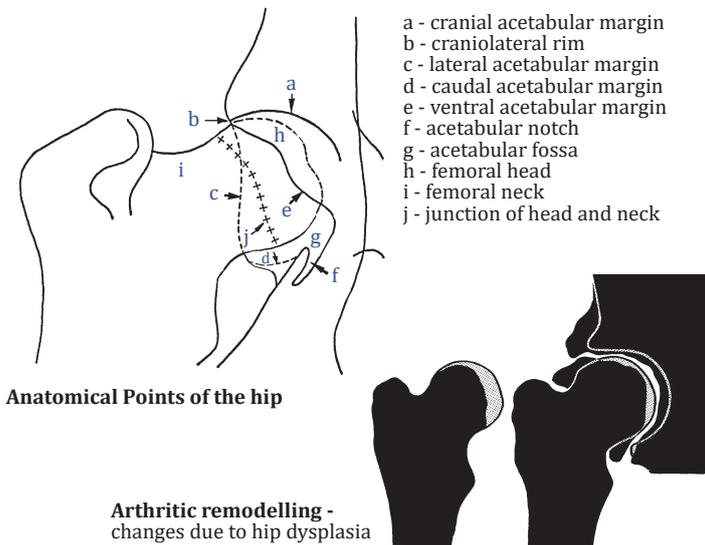
## Hip Dysplasia

The hip joint is a ball and socket joint. Hip Dysplasia is an inherited disorder that is very commonly seen in many dog breeds from small to giant breeds. It is most commonly seen in breeds with the heavier bone to muscle ratio and where the overall ligamentation is slightly loose.

Hip Dysplasia is by definition an ill fitting hip. The hip is a ball and socket joint, and the deeper the socket (ideally sufficiently deep to hold two thirds of the head of the femur), the better the fit of the femoral head and angle of the neck and the tighter the ligaments, the better the hip.

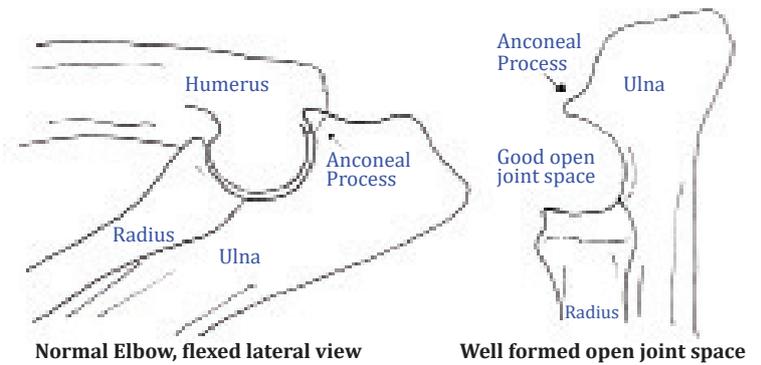
The various components that combine to give an unstable hip are combinations of the following:-

- i. shallow hip socket (the acetabulum),
- ii. an ill fitting head of the femur (head too small, neck too short and steep)
- iii. excessive looseness of ligamentation.



Where the socket is very shallow, the ligaments very loose and the femoral head either very steep in the neck or the head very small, these **combination** of factors lead to instability of the joint. Around the edges of the joint is attached the joint capsule, which in turn is attached to the periosteum. When the edges of the joint capsule are constantly being pulled, the periosteum is lifted and new bone is laid down in an attempt to stabilise the joint.

## Elbow Dysplasia

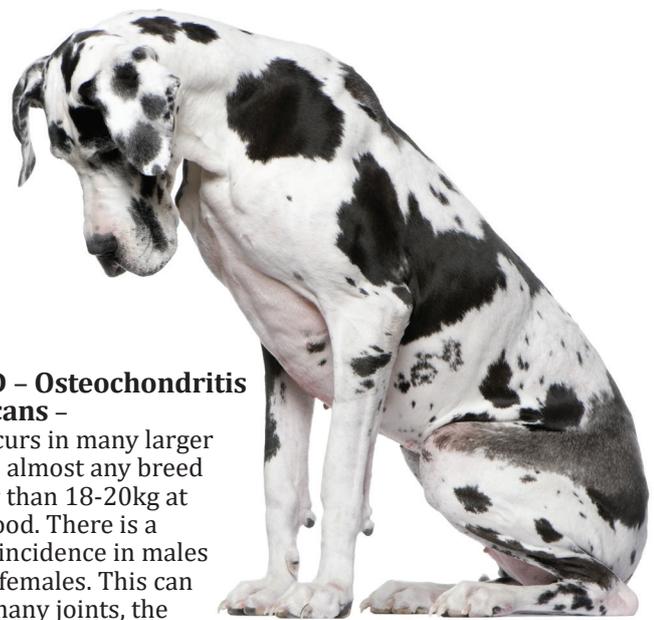


The elbow joint consists of three bones, the humerus above interlocking with the radius and ulna below. The elbow joint is a hinge joint and the three bones need to line up precisely to have an effective working joint. Elbow Dysplasia results from an incongruity of the joint. If the incongruity is minor, there may be minimal changes with no obvious clinical problems. If the incongruity is large, a combination of the following three major conditions may be seen – UAP, OCD, FCP.

Another form of Elbow Dysplasia can be seen from radial over growth (relative to the ulna) due to early closure of the distal growth plate of the ulna. Again this is where the cartilage core in this growth plate fails to get adequate nutrition, there is a delay in growth, resulting in a shortened ulna and overgrowth of the radius. This causes incongruity in the elbow and in severe cases may result in bowing of the front legs, lateral luxation of the proximal end (near the elbow) of the radius. The resulting incongruity can again lead to a combination of the above three conditions.

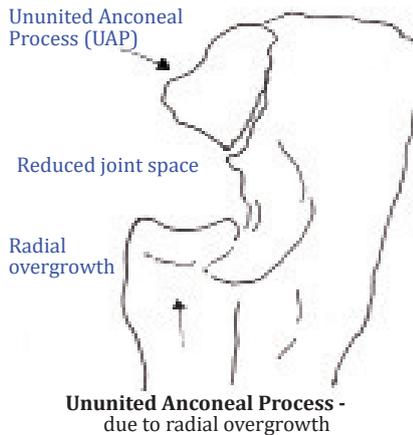
FCP (medial Fragmented Coronoid Process)- occasionally, after the anconeal process has united, there can be later development of joint incongruity can the micro-movement and stresses placed within the joint can result in a fragmented coronoid process – nearly always the medial process.

There are four main subgroups of Elbow Dysplasia – which may occur alone, or in combination, generally they are considered inherited in most breeds and the incidence may be adversely affected by incorrect diets in some breeds. Excessive rate of weight gain can affect the incidence of many elbow conditions, often leading to joint incongruity (uneven rate of growth between the radius and ulnar), and OCD seen particularly in males.



**(i) UAP – Ununited Anconeal Process –**

this process is a large triangular shaped piece of bone situated at the back of the elbow joint. This has a separate ossification centre in a handful of breeds mainly larger, heavier breeds - notably the German Shepherd Dog, Labrador Retriever, Great Dane, Irish Wolfhound, Newfoundland, Bloodhound, Basset Hound, Dogue de Bordeaux. This process normally is fully ossified (sealed) by 16-18 weeks of age.



The anconeal process forms the hinge at the back of the elbow. When the anconeal process has a separate ossification (growth area), it makes this area a target for poor conversion of cartilage to bone in those breeds. The combination of the separate ossification centre and a too small circumference of the ulna trochlear notch (inside edge of the back of the joint) results in small movements along the cartilagenous bridge between the ossification centre and the result of the ulna. This results in failure of the anconeal process to unite. Chronic movement of the UAP results in ongoing development of joint arthritis and further wear and tear of the cartilage surfaces of the joint.

Clinically signs are seen from as young as 5-6 months with often an intermittent lameness, which is exaggerated by exercise. Full flexion and extension of the elbow will elicit pain. There is often an accompanying lateral bursitis (fluid swelling). X-rays of the elbow in the flexed lateral position will readily show whether the process has unified or not. Long standing cases have arthritic changes as well.

**Treatment –** Either:

- a) removal of the process – if done while young, reasonable prognosis with some arthritis later,
- b) fixation of the loose fragment by a lag screw – reasonable prognosis in early cases.

As the anconeal process is not a weight bearing surface, results following early surgery gives better long term prospects than in the FCP cases (as loss of that process affects the weight bearing surfaces of the joint). This condition is considered inherited with a possible three different genes being involved. Dogs with UAP should not be bred with.

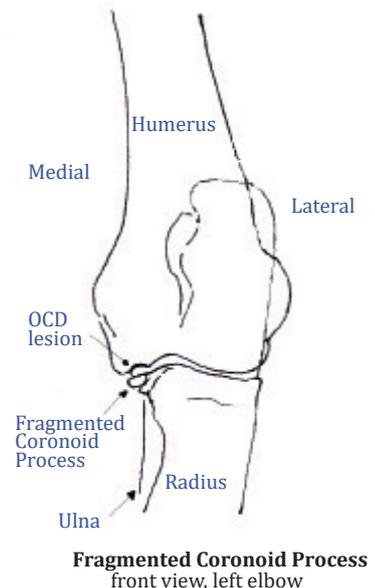
**ii. OCD – Osteochondritis Dessicans –**

this occurs in many larger breeds, almost any breed greater than 18-20kg at adulthood. There is a higher incidence in males versus females. This can affect many joints, the commonest being the elbow. Breeds that see with a reasonably high incidence of elbow OCD would cover the following :- Rottweiler (high incidence), German Shepherd Dog, Golden Retriever, Saint Bernard, Great Dane, Border Collie, Rhodesian Ridgeback, Labrador Retriever.

**Symptoms –** generally seen as a shifting lameness in the forequarter from around 5-8 months of age, some joint capsule swelling and usually a turning out of the front legs at stance, as the inner edges of the elbow are most commonly affected. The cause of the problem is due to a faulty blood supply to the joint cartilage secondary to very rapid growth.

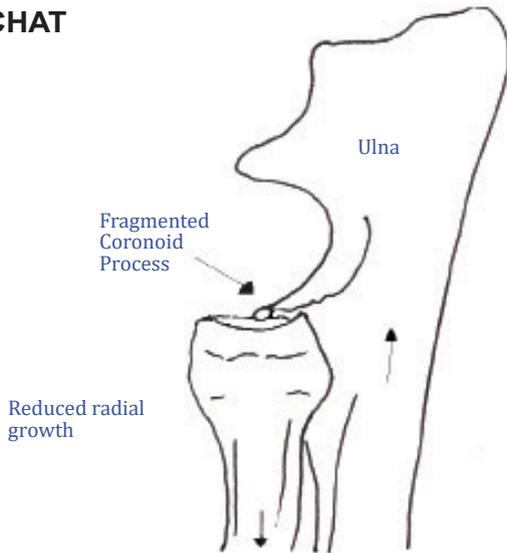
**Diagnosis –** On x-ray the signs are often quite subtle in mild cases with minor “fluffiness” and/or flattening of the joint surfaces to the more distinct pot holes of larger lesions. Generally diagnosed by x-rays of a straight extended and slightly medially rotated view of the elbow.

**Treatment –** If this condition is mild, treatment with drugs such as Cartrophen, which increases the blood supply to cartilages, can be very effective, along with complete rest, slowing down of the rate of weight gain and low doses of anti-inflammatories. Repair and recovery can take up to 6-8 weeks of age depending on the severity of the condition, very heavy puppies may have to be kept reasonably restricted until 9 months of age, by which stage rapid growth has slowed dramatically. Severe cases of OCD are often found in conjunction with a FCP, and may require surgical intervention. Most cases, over 80% show good responses to medical, dietary and exercise management.





## VET CHAT



**iii. FCP – Fragmented Coronoid Process** of the ulna. This is generally referring to the medial coronoid process, a process that stabilises the medial edge of the joint. Fragmentation of this process means that the inside edge of the elbow is not stable, hence the very typical lateral rotation of the leg away from the pain (ie.outwards). On x-ray the process can be seen as being separated on x-ray with the elbow extended straight out and a second view with slight medial rotation. If FCP is diagnosed when young, surgical intervention gives reasonable results, in the older dog where there are considerably secondary arthritic changes, medical management is probably preferred. Regardless of the treatment, the resulting joint incongruity (unevenness) will lead to ongoing osteoarthritis over time.

### **iv. Joint Incongruity –**

while most forms of Elbow Dysplasia can, by their development, result in joint incongruity, here we are looking at where there has been a possible early closure of a distal growth plate of the ulna in the foreleg, resulting in uneven growth of the radius (usually slightly longer) in relation to the ulna at the elbow. The resulting uneven ends of the bones within the joint, can cause excessive wear on cartilages and, in the worst cases, force the anconeal process distally (ie. create a UAP). These dogs will require surgery to correct the problem (cut the ulna to allow the bone to expand length wise and thus even the joint and the UAP if present).

*Rule outs (differential diagnoses)* – not all forelimb lameness is due to Elbow Dysplasia. Panosteitis and simple injuries should be checked for, particularly where there is a very sudden onset of lameness.

### **General Treatment of Elbow Dysplasia**

As with any painful bone disorder, regardless of the age presented, common treatment is aimed at pain management, sensible diet and weight control and a restricted, suitable exercise regime. Use of drugs to help cartilage healing eg. Cartrophen weekly for 3-4 weeks along with other anti-inflammatory drugs and rest.



Where there are only minor changes in joint surfaces, medical management and conservative treatment with anti-inflammatory agents and rest is generally all that is needed. Those animals with UAP require surgical intervention to minimise future arthritis. Dogs with FCP, or those with loose cartilaginous flaps, should in the younger dog be removed in order to minimise future damage to the joint. However, due to the incongruity of the joint, there will be some ongoing changes regardless. In the older dog with advanced arthritic changes, medical management and conservative exercise regimes is generally the preferred method of treatment.

**Rate of Weight Gain** - The causes of the development of Hip and Elbow Dysplasia are from a combination of genetic and environmental factors. ***Rapid weight gain and rate of growth through excessive nutritional intake may cause a disparity of development of supporting tissues.*** Factors affecting cartilage thickness and stability and joint fluid composition, such as repeated trauma from excessive looseness of the joint, can increase joint fluid production, thickening of the joint capsule, resulting in both joint pain and reduction in joint stability.

Control of the rate of weight gain, while it will not prevent Hip or Elbow Dysplasia, it will allow a steady growth pattern allowing the joint structure to mature with good ligamentation, in order to minimise excessive stress being placed on the developing joints.

Reduce the energy levels in the diets, particularly in the confined dogs, and ideally change puppies onto an adult maintenance diet. Affected puppies should have their weights at, or slightly below, the normal average for their breed, sex and age.

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