


THE CUTTING EDGE

A RESOURCE FOR REFERRING VETERINARIANS

Canine Elbow Dysplasia

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The elbow joint is one of the most complex joints in the appendicular skeleton since it consists of three different bones. The bones of the joint all develop from several ossification centers and any disturbance of the developmental process, either in concert or independently can result in skeletal growth abnormalities. Reduced longitudinal growth of the radius or ulna results in elbow incongruity. The clinical disease resulting from the abnormal development or formation of the elbow during growth is referred to as elbow dysplasia (ED). In contrast to hip dysplasia, ED can be the result of at least four different abnormalities or diseases i.e. osteochondritis dissecans (OCD); ununited anconeal process (UAP); ununited or fragmented coronoid process (FCP); elbow incongruity (INC). The underlying abnormality, termed osteochondrosis, is disturbed endochondral ossification in both articular and physeal cartilage and is most likely the basis for most of the four diseases mentioned. The cause of growth disturbance can be either genetic or environmental (nutrition or trauma) and probably is a combination of both in most cases.

Since ED is a disease of the developing elbow, the first clinical signs are noticed at the age of 5-8 months in most cases. Adult animals may be presented with osteoarthritic changes of the elbow joints due to long-standing, not previously diagnosed ED.

OSTEOCHONDRITIS DISSECANS (OCD)

OCD of the elbow most frequently involves the medial humeral condyle and results in relatively severe lameness in the affected dog. Labrador Retrievers, Golden Retrievers, Bourdeaux Dogs, Bouviers, Rottweilers and German Shepherds and other large and giant breed dogs are among the breeds that show the highest incidence of the disease. The thickened joint cartilage is more vulnerable to wear and tear and as a result a cartilage flap can develop. The flap can be partially attached or may become free in the joint space. The elbow joint is effused and in chronic cases, severe DJD develops. Radiographically, the condition is characterized by a radiolucent area in the affected condyle, which can be best visualized on the anterior-posterior (AP) and anterior-posterior medial oblique (APMO) views. Definitive diagnosis is made by an exploratory arthrotomy, arthroscopy, computer tomography (CT) or magnetic resonance imaging (MRI). Treatment of the condition is by a medial approach to the elbow joint (either an osteotomy of the medial humeral epicondyle; or muscle separation between the pronator teres and flexor carpi radialis muscle; or muscle

separation between the flexor carpi radialis and the deep digital flexor muscle (humeral head)). The devitalized cartilage flap is removed and the subchondral bone is gently curetted. Bone lysis around the lag screw that is used for fixation of the osteotomized medial humeral epicondyle and subsequent nonunion has been reported to cause lameness. In my experience and that of other surgeons, the muscle separation technique provides adequate exposure of the medial aspect of the joint. Prognosis for full function is fair to good provided surgery is performed before secondary degenerative joint disease is well established.

FRAGMENTED MEDIAL CORONOID PROCESS (FCP)

Three different forms can be diagnosed. The loose apex, the fragmented CP and the interposed small fragment between the ulna and the radius. The latter type of FCP is the most difficult to diagnose. Breeds most commonly affected with this condition are Labrador Retrievers, Rottweilers, Bernese Mountain Dogs and German Shepherds. In cases of INC with a (subtle) short (er) radius, the coronoid process takes more of the body weight resulting in cartilage damage. Clinical signs include supination of the forelimb, mild to severe elbow effusion and pain on hyperextension in combination with external rotation. Radiographic examination includes standard AP and ML views in combination with (APMO) and ML-extended (15° external rotation) views. In most cases, the FCP cannot be visualized. An early diagnosis is aided by observation of osteophyte formation proximal to the anconeal process (ML

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view) and along the medial side of the elbow (AP view). These changes are suggestive only. Definitive diagnosis can be made by exploratory arthrotomy, arthroscopy, CT and MRI. Irregularities of the surface of the CP can result in a kissing lesion of the cartilage of the medial humeral condyle that strongly resembles an OCD lesion. The treatment of FCP includes removal of the fragment(s) via a medial arthrotomy (similar approach for OCD). Dogs less than 2 years old at the time of surgery have a success rate of about 78%, dogs 2-5 year of age at the time of surgery have a success rate of 60% and

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those patients greater than 5 years of age at the time of surgery have a success rate of 57%. When compared to dogs that have the FCP managed by conservative measures, surgery yields a better outcome. This is especially true for dogs kept as companion animals. This stresses the importance of early diagnosis and surgical treatment of FCP.

UNUNITED ANCONEAL PROCESS (UAP)

UAP results in severe lameness in the affected animals. German Shepherds are over represented. In most cases, the diagnosis can be made at an early age (5-6 months). Since in most cases the ventral aspect of the anconeal process seems to be affected (separated) first, it is now thought that ventral loading of the anconeal process due to a relatively long radius might be an important causative factor, i.e. elbow incongruity (INC) due to a relatively short ulna. The radius pushes the humerus upward thereby inducing malarticulation between the anconeal process and the olecranon fossa of the humerus. On clinical examination, the joint is effused, and crepitation due to arthrosis is apparent at an early age. Hyperextension of the joint is painful. Chronic cases show severely disabling osteoarthritis with reduced range of motion. Radiographically, the UAP can be easily diagnosed on a flexed lateral projection. The most widely practiced method of treatment is surgical removal of the loose anconeal fragment. Screw fixation of the anconeal process (animals presented early, between 5-6 months of age) has been reported to be successful. In Basset Hounds, a dynamic proximal ulnar osteotomy relieves the tension forces of the short ulna and can result in spontaneous healing. Removal of the UAP leads to mild joint instability however, prognosis is good provided the degenerative changes are minimal.

ELBOW INCONGRUITY (INC)

INC is the result of either decreased growth of the radius (short radius) with a relatively long ulna, or a decrease in the growth

of the ulna with a relatively long radius. INC can also include an abnormal development of the semilunar notch of the olecranon compared to the humeral trochlea. Minimal changes in length of the antebrachial bones may result in differences in loading of the joint surfaces involved, leading to cartilage damage and DJD.

Overloading of the radius in cases of short ulna may contribute to UAP, whereas a slightly shortened radius may be involved in the development of FCP. INC (short radius) is most

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frequently diagnosed in the Bernese Mountain Dog and INC (short ulna) most commonly occurs in Basset Hounds. Clinically, joint effusion is present and crepitation can be identified. Optimally positioned ML-extended radiographs are required to make the diagnoses. Severe changes in length will result in DJD of the joint. The optimal treatment protocol depends on the severity of the condition. In general, the treatment includes an osteotomy (either radius or ulna or both) plus fixation. Treatment should not be postponed until adulthood, since secondary changes may prohibit successful therapy by that time. Prognosis depends upon the degree of degenerative changes present.

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Capital District Veterinary Surgical Associates