



Elbow Dysplasia

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Introduction:

Elbow dysplasia is one of the most commonly diagnosed and poorly understood conditions in veterinary orthopedics. There are many opinions on the etiology, diagnosis and treatment of elbow dysplasia in dogs, making it one of the most challenging orthopedic conditions to manage. Ununited anconeal process (UAP), Fragmented coronoid process (FCP) and osteochondrosis (OCD) are all components of elbow dysplasia that can occur alone or in combination. The term “Elbow Dysplasia” is controversial in itself as it implies malformation and it is unlikely that all three components of the syndrome share a common etiology.

Etiology:

Originally elbow dysplasia was thought to be a manifestation of osteochondrosis. The main feature of osteochondrosis is a disturbance of endochondral ossification. The arrest of the differentiation of cartilage cells prevents vascular invasion and bony differentiation resulting in abnormally thick cartilage. The resultant cartilage is less resistant to mechanical stress. The etiology of osteochondrosis is still uncertain but it is clear that hereditary and nutritional factors are an important component. Overnutrition and high intake of calcium have both been documented as etiologic factors in osteochondrosis.

Research in this field is ongoing. Current studies (Preston et al. 1999) have shown that the pathology from elbow dysplasia may be associated with a change in contact areas of the elbow joint. Disparity in growth between the radius and ulna or malformation of the joint may lead to an increase in load on the coronoid process or the anconeal process. The increase in load may lead to the secondary microscopic cartilage change. With this theory, fragmentation of the coronoid (FCP) or an ununited anconeal process (UAP) would both be secondary to the underlying disease.

The above theory may work for some cases, but fails to describe the mechanism in dogs where FCP, UAP and OC occur concurrently.

Diagnosis

Clinical presentation:

Signalment: Large breed dogs with an onset of signs between the age of 5 and 18 months. Rottweilers, German Shepherds, Labradors, chows, retrievers, mastiffs and basset hounds (UAP) are predisposed.

History: Forelimb lameness that worsens with exercise. Onset can be acute or chronic. Generally responsive to anti-inflammatory drugs.

Physical examination:

Lameness of one forelimb is usually evident. Elbow effusion, decreased range of motion, crepitus and pain with flexion and extension are common. It is important to palpate the long bones to help rule out panosteitis and HOD as well as the shoulder to rule out OCD since these conditions can mimic elbow dysplasia.

Radiography:

Often helps confirm the diagnosis, but signs can be very subtle. The absence of radiographic changes does not rule out elbow dysplasia. Generally an AP and lateral projection are sufficient to determine abnormalities. A flexed lateral and 15 degree medio-caudal-laterocranial oblique views have also been advocated to further evaluate early changes and may show the outline of the coronoid process better than traditional views. Early changes include osteophytosis of the proximal anconeal process, periarticular osteophytes, subcondylar sclerosis at the trochlear notch, increased joint space, OCD or “kissing” lesions of the distal, medial humeral condyle and soft tissue thickening. Since the disease is often bilateral, both elbows should be radiographed.

A diagnosis of UAP should not be made prior to 5-6 months; the age of normal proximal ulnar physal closure.

Computed tomography (CT scan) is a sensitive diagnostic aid for identifying FCP. Although it may be the most accurate imaging modality for FCP, it is rarely needed to establish elbow pathology and rarely alters therapy once elbow pathology has been established.

Scintigraphy:

In the absence of radiographic or clinical signs, bone scans may be valuable to determine presence of elbow pathology. This minimally invasive diagnostic is not specific for types of elbow pathology, but sensitive enough to be used as a screen with nebulous forlimb lameness. Dogs with elbow dysplasia will have increased soft tissue and bone phase radionucleotide uptake.

Magnetic Resonance Imaging (MRI):

Recently described as more sensitive than radiographs for detecting nondisplaced, unmineralized coronoid process lesions. Due to cost, availability and need for anesthesia, this modality is rarely indicated for diagnosis.

Treatment

Ununited Anconeal Process:

Conservative: medical therapy alone has been less successful than surgical management. Usually this results in severe and rapid progression of osteoarthritis although spontaneous fusion has been reported.

Surgical Excision: Surgical excision via lateral arthrotomy has been the traditional treatment. Concern for lack of stability and progression of osteoarthritis. Long term follow-up (Sinibaldi, Arnoczky 1975): 19 joints, 2-40 (mean 19.5) months follow-up. ROM: 58% normal flexion, 84% of extension

Lameness: 1 excellent, 14 good, 4 poor

Osteoarthritis: 1 slight, 9 minimal, 5 moderate, 4 severe

Surgical Reattachment: Theoretically preferable to maintain joint stability, doesn't address underlying cause. Lateral approach with lag screw or screw/pin combination. Long term follow-up: 10 joints, 6-48 months follow-up (mean 20 months).

Osteoarthritis: 1 minimal, 2 mild, 5 moderate

No range of motion or lameness scores noted. Good subjective response

Osteotomy of the proximal ulna: based on the assumption of joint incongruity. Allows functional lengthening of the ulna. First described by Olson 1990. First series of dogs Sjostrom et al VCOT 1995. 22 elbows, 4-51 (mean 21) months follow-up, 21 went on to fuse.

Range of motion: 16 dogs within 5° of normal, 3 reduced 10°, 1 reduced 20°

Lameness: 12 excellent, 5 good, 2 fair, 1 poor

Osteoarthritis: 6 none, 10 mild, 3 moderate 1 severe

Combined osteotomy of proximal ulna with surgical reattachment: not yet described.

Fragmented Coronoid Process / OCD:

Conservative treatment: Similar results when compared with traditional (open joint) fragment removal. Houlton (1984), Read et al (1990), Hubregste et al (1994) and Bouck et al (1995) all found that FCP and OCD can be treated with a similar expectation of success with either surgery or medical management. All dogs in both surgical and medically managed groups had progressive radiographic signs of osteoarthritis.

Open Surgical Removal: Varied clinical results. Objective evaluation lacking. Subjective improvement. Dogs with advanced osteoarthritis prior to surgery are unlikely to benefit. Higher morbidity than other techniques: seroma, severe swelling, post-operative pain. Progressive radiographic osteoarthritis is likely.

Arthroscopic removal/ curettage: Objective evaluation lacking

Proximal Ulnar Osteotomy:

Arthroscopy and osteotomy: not yet described.