

Algorithm for elbow dysplasia

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Introduction

Elbow dysplasia or “developmental elbow disease” is a disease of young large to giant breed dogs. Elbow disease includes ununited anconeal process (UAP), humeral trochlea osteochondrosis dissecans (OCD), fragmented medial coronoid process (FCP), joint incongruity and articular cartilage damage. In up to 80% of dogs the disease is bilateral. FCP is the most common finding, followed by humeral OCD and incongruity. The term ‘medial compartment disease’ describes the lameness, reduced range of motion and osteoarthritis caused by diseases of the medial coronoid (fragmented medial coronoid, lesions of the humeral trochlea and loss of joint cartilage).

The aetiology of elbow disease is still speculated, and it is possible that the different types of elbow disease are not related. The biologic vs biomechanical debate as to the underlying cause continues. The current proposed aetiological causes are, genetics, OCD, abnormal forces and microtrauma. The focus of this presentation is the diagnosis and treatment of FCPs and the management of subsequent medial compartment disease.

Diagnosis

As always, a thorough clinical examination is required. Start by walking the patient in a large, open area, free of distractions, on a short lead. Lameness in the forelimbs can be observed with movements of the head during each stride. If bilateral disease is present, lameness may be more difficult to detect, and the stride length and flexion of joints can be useful to assess. Affected dogs may hold their elbows in abduction with external rotation of the antebrachium.

Joint effusion is a frequent finding in dogs with elbow dysplasia and it is important to remember that effusion is best identified by palpation while the patient is standing. I find it best to stand/crouch behind the patient and run your hands over the elbows. The caudolateral aspect of the joint capsule is often palpably enlarged and can be felt as a soft compressible area. The medial aspect of the joint over the medial epicondyle can also feel thickened which can be described as a “medial buttress”.

Another consistent finding in affected dogs is pain on elbow flexion and extension. Supination of the antebrachium with the elbow held at 90 degrees (similar to the Campbells’ test) will load the medial aspect of the joint and often elicits a pain response. Any pain isolated to the elbow in “at risk” breeds and age group is highly suggestive of the disease. Crepitus can sometimes be appreciated, however in my experience is rare in juvenile patients. If the joint causing lameness cannot be identified, intra-articular injections of local anaesthetic can be used in the elbow to assist in localization.¹

It is worth mentioning that late onset medial compartment disease has also been identified. These patients develop clinical disease at around 6 years of age; however the changes are different to those seen in young dogs.²

Imaging

I recommend two radiographic images; a 90-degree lateral centred over the joint and a craniocaudal view of the elbow and antebrachium. Oblique views (distomedial proximolateral oblique (DMPLO-35 degrees) may increase the sensitivity of radiographs of the medial coronoid process. Including the antebrachium in the standard orthogonal images is beneficial for patients with incongruity and those with associated angular limb deformities.

Identification of an FCP is seldom possible on plain radiographs. Diagnosis of FCP involves the exclusion of UAP and humeral trochlea OCD. The main radiographic changes suggestive of FCP are sclerosis of the ulnar trochlear notch and blurring of the cranial margin of the medial coronoid process. Measuring the width of the sclerosis can be used to increase sensitivity of radiographs.³ I find it best to look for narrowing of the medullary cavity at the level of the ulnar notch.

Osteophytosis of the joint is suggestive of intra-articular disease, however, does not identify the underlying cause. Osteophytes on the anconeal process have been shown to be an unreliable indicator of elbow disease due to a high percentage of false positive diagnosis. It is important to highlight that sensitivity of radiographs is poor – up to 69% of dogs with medial coronoid disease have no radiographic changes. Computed tomography or arthroscopy of ‘at-risk’ patients showing clinical signs is therefore prudent, even when there are no radiographic changes.

Computed Tomography (CT) is considered the gold standard imaging modality in identifying medial coronoid disease and can be performed in the sedated patient. Transverse images with < 1 cm slices are recommended. Standard positioning for image acquisition has not yet been established.

Unfortunately CT detected incongruity in only 71-86% of cases confirmed with arthroscopy.⁴ Arthroscopic assessment of the joint is advantageous as it can assess the degree of cartilage disease as well as fissures that extend into the joint. We currently recommend that a CT be performed prior to arthroscopic assessment of the joint, however, the majority of our clients will elect to proceed with arthroscopic assessment without CT. This way the patients can be assessed and treated for reduced cost. MRI appears comparable to CT with the added advantage for being able to assess the degree of cartilage damage. Nuclear scintigraphy and ultrasound have also been used but are of limited diagnostic value.

Arthroscopy is the best option for determining the degree of elbow incongruity and surgical treatment can be performed simultaneously.

Conservative Management

Conservative management of medial compartment disease is in line with other osteoarthritis management. Weight reduction is most important, and studies show a significant correlation between lower body condition scores and slower progression of osteoarthritis. Nutraceuticals, physiotherapy, exercise management and pain relief as required are also important aspects of medical management of elbow dysplasia and osteoarthritis in general.

Platelet Rich Plasma (PRP)

There are no published papers demonstrating that PRP injections into elbow joints help with acute elbow disease. Anecdotally we have found significant improvement in mobility in patients with degenerative joint disease. There is a growing body of published literature that supports the use of PRP in the treatment of osteoarthritis.

Surgical Management

- **Arthroscopic treatment.**

An arthroscope is surgically placed from the medial side into the joint mid-way between the ulna nerve and the medial collateral ligament. The cartilage is assessed and graded with the modified Outerbridge system. If an FCP is present it is removed via an instrument portal made adjacent to the medial collateral ligament. A subtotal coronoidectomy is performed if disease is isolated to the medial coronoid.

- **Ulnar osteotomies**

Performed to correct elbow incongruity and shifts the site of pressure within the joint (essentially away from the medial coronoid).

- **Proximal ulnar osteotomy**

Historically dynamic proximal ulnar osteotomies have been performed to correct ulna length, ideally unloading the medial joint compartment and improving joint congruity. This procedure has largely been replaced by bi-oblique proximal ulnar osteotomies.

- **Distal ulnar osteotomy**

This surgery is performed to allow movement of the ulna relative to the radius to re-establish joint congruity.

- **Biceps Ulnar Release Procedure**

Performed to relieve compressive forces of the radius onto the ulna by release of the biceps brachii tendon insertion on the medial ulna.

- **Proximal Abducting Ulnar Osteotomy**

Another procedure designed to unload the medial compartment of the elbow with a proximal ulnar osteotomy and application of a custom locking plate.

- **Sliding Humeral Osteotomy**

Mid-diaphyseal cut with a stepped plate that shifts the weight-bearing axis laterally to offload the diseased medial coronoid

- **Canine Unicompartamental Elbow**

Performed in end-stage medial compartment disease by replacing the joint surfaces with prosthetic implants.

- **Elbow replacement**

Currently not recommended due to high complication rates.

Recommendations

The following is a summary of the treatment recommendations for patients with clinically suspected medial compartment disease at North Coast Veterinary Specialists. Radiographs are taken of elbow in the sedated patient as described previously. CT is optional and provides helpful information regarding incongruity and the nature of any FCP.

Arthroscopic assessment is performed to determine the extent of the incongruity and the presence of a FCP. Large mobile FCPs are removed, diseased cartilage or smaller FCPs are treated with a subtotal coronoidectomy. If an incisural fragment is present a BURP procedure is performed. Incongruity is treated with an appropriate ulna osteotomy. End stage medial

compartment disease is initially treated with a course of PRP and medical management. Patients that do not respond and have isolated medial compartment disease are offered SHO, CUE or elbow arthrodesis.

References

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