Developmental elbow disease (elbow dysplasia)

What is developmental elbow disease (DED)?

Developmental elbow disease (elbow dysplasia) arises during growth; there is a strong genetic basis and often both elbows are affected. The dysplastic elbow joint does not "fit together" as well as a normal joint; abnormal loading occurs resulting in excessive forces in certain areas of the joint which cause damage and further affect development.

Developmental elbow disease may have several clinical manifestations; these include stress fracturing (microfracturing) of the medial coronoid process, which may result in fragments of bone breaking away (FCP), the development of a cartilage flap affecting the medial aspect of the humeral condyle (OCD) and ununited anconeal process (UAP). Osteoarthritis develops early in dogs affected by developmental elbow disease. Progression of osteoarthritis is inevitable, however early treatment may reduce the speed of progression of osteoarthritis.

Developmental elbow disease is a complex condition and a number of factors can affect the manifestation of disease, however genetics play a significant role; for example coronoid disease (FCP) is most commonly recognised in the Labrador and ununited anconeal process is most commonly seen in the German shepherd.

Treatment options

DED may be treated by arthroscopic surgery, open surgery or by rest and medical management. Surgical intervention should be given consideration in younger dogs and in dogs that are poorly responsive to medical management.

What is arthroscopy?

Arthroscopy involves looking inside joints with a telescopic camera. The telescope is inserted through a small puncture wound (portal) made into the joint. Sterile fluid is pumped into the joint under pressure to expand the joint sufficiently to perform an examination. Arthroscopy allows examination under high magnification of joint surfaces, cartilage, ligaments and tendons.

Aims of surgery

The purposes of surgery are as follows:

1. to arthroscopically assess the elbow joint, and, in particular, the medial coronoid process and opposing surface of the medial humeral condyle, in addition to the anconeal process. Critical assessment for evidence of other elbow conditions e.g. IOHC will also be performed.
2. to arthroscopically ("keyhole" surgery) treat manifestations of developmental elbow disease e.g. debridement / removal of medial coronoid process fragments, removal of cartilage flap in osteochondral dissecans (OCD).
3. in cases of coronoid disease, surgical removal of a significant portion of the still attached medial coronoid process (subtotal coronoidectomy) may be performed to relieve pain caused by repeated microfracturing (stress fracturing) of the process. This is typically done with either a very small osteotome to"chisel" away the bone, or a high-speed bur.
4. to reduce the excessive forces acting on the medial coronoid process or anconeal process. Partial coronoidectomy will reduce/eliminate the forces acting on the diseased coronoid region. Cutting the ulna (ostectomy/osteotomy) may also be performed in selected cases to favourably alter elbow joint loading.

Outcome and potential risks of surgery

Surgery is used to treat **manifestations** of developmental elbow disease; however, the underlying problem of incongruency or "poor-fit" of the elbow joint persists. i.e. the elbow will never be normal and some degree of progression of osteoarthritis is inevitable. Several studies have demonstrated significant improvement in lameness for most cases following subtotal coronoidectomy (one study reported complete resolution of lameness in 100% dogs *Puccio et al 2003 JAAHA*). However, the studies are small and some were not particularly well designed. Whilst STC should be considered most dogs suffering ongoing lameness, the available studies may overstate the success of the procedure. The prognosis for dogs with developmental elbow disease should still be considered somewhat guarded. Osteoarthritis is universally present and will continue to progress. It is an unfortunate reality that some dogs treated surgically for developmental elbow disease may not significantly improve despite appropriate surgery and good post-operative care.

Arthroscopy is known as "keyhole surgery" because it is performed through very small incisions. Discomfort after surgery, however, is also affected by what is done inside the joint. In cases where only small bone fragments are removed and

minimal joint manipulation is required discomfort may be barely noticeable and resolve in a matter of days. For cases where coronoidectomy (i.e. "chiselling" away bone) is performed and significant joint manipulation is required soreness may persist for several months. Occasionally, arthroscopy may have to be converted to an open surgical procedure.

As with any surgery complications may arise and are detailed below, although serious complications are rare.

- Excessive early activity may damage newly formed cartilage, delaying progress or otherwise affecting outcome.
- Some dogs may temporarily deteriorate after surgery and take several months to recover their pre-surgical state. Causes of deterioration may include ligament strain produced by joint distraction/manipulation during surgery (to aid arthroscope and instrument access) and microfractures produced in the peri-coronoid region during coronoidectomy. Management of these dogs may include strictly limited activity in addition to pain relieving medications. Additional physiotherapy including ultrasound, laser and shockwave therapy may be beneficial.
- It is important to have a controlled, gradual increase in activity following surgery. If activity is increased too quickly after surgery straining of joint structures may occur. Management is as above.
- Infection is a extremely rare complication follow arthroscopic surgery as it is a “key-hole” procedure performed under strict sterility and antibiotics are administered in the peri-operative period. Should infection occur, early detection and treatment generally results in rapid resolution.
- Occasionally, dogs that have coronoid fragments removed may have further bone fragments break away over time. This has become much less common as management techniques have evolved e.g. more aggressive debridement of the coronoid including subtotal coronoidectomy.
- The antebrachium (forearm) is mildly weakened after cutting the ulna (when performed) until the bone has healed; this places the radius at a mildly increased risk of fracture if excessive forces are applied i.e. jumping, running, turning sharply, although the incidence of radial fracture in these circumstances is rare.
- Arthritis is already present at the time of diagnosis. It is not possible to reverse the arthritic changes in the joint, nor halt progression.

Postoperative care

An adhesive pad may be covering the wound. This can be removed after several days, or immediately if soiled.

Medications e.g., Pain killers will be dispensed. Ice packs may also be helpful in the days following surgery to reduce swelling and improve comfort.

Your dog should be kept confined to **eliminate running and jumping** for the first 6 to 8 weeks: a small single room (or cordoning off a section of a larger room) with non-slip flooring and no furniture may be sufficient. Short leash walks in the garden (a few minutes four to six times daily) are recommended initially to allow toileting.

- One week following surgery: commence lead walking for 5 minutes at a time, two to three times daily.
- Two weeks following surgery: increase lead walking to 10 minutes at a time, two to three times daily. Hydrotherapy may also commence at this time.
- Four weeks following surgery: increase lead walking to 15 minutes at a time, two to three times daily.
- Five weeks following surgery: increase lead walking to 20 minutes at a time, two to three times daily.
- Six weeks following surgery: increase lead walking to 25 - 30 minutes at a time, two to three times daily.
- Maintain confinement **at all other times**; running, jumping and play should be avoided for 6 to 8 weeks.

Declaration:

I have read the information contained herein and am satisfied I have a sufficient understanding of the procedures my dog is scheduled to undergo, including potential complications that may occur and requirements for aftercare following surgery. I hereby consent for my dog to undergo elbow surgery.

Owner’s name: Dog’s Name:

Owner’s signature: Date: