ELBOW ARTHROSCOPY – PRACTICAL TIPS AND INTERESTING CASES

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INDICATIONS

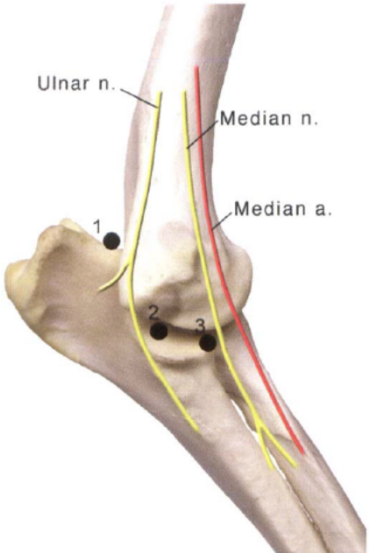
The elbow is the simplest joint to learn arthroscopy. Elbow arthroscopy is used most commonly in dogs and cats having elbow dysplasia but it can also be used to evaluate and treat septic arthritis, lateral condyle fractures and humeral condylar fissures. Elbow arthroscopy is used in elbow dysplastic patients to treat fragmented medial coronoid process (FCP), humeral condyle osteochondrosis (OCD), ununited anconeal process (UAP) and elbow incongruity with associated cartilage abrasion. Arthroscopy is used to evaluate the severity and region of cartilage erosion, remove cartilage and osteochondral fragments, debride damaged bone, perform microfracture of subchondral bone and assist in intraarticular fracture or fissure repair.

This dog is positioned for left elbow arthroscopy at the edge of the table, using a minimal clip and a waterproof adhesive incision drape.

ARTHROSCOPIC TECHNIQUE

Canine elbow arthroscopy was originally described using a 2.7 mm scope but most surgeons use a scope between 1.9 - 2.4 mm to lessen the change of iatrogenic cartilage damage due to the small joint space. A 1.9 mm scope can be used in cats and small dogs. The 2.4 scope is adequate for medium and large dogs. Disposable needle scopes (1 mm) are also available and can be used to evaluate elbow joints. A scope cannula and either an egress cannula or an egress needle (18 gauge) are needed. An egress needle is typically used. A fluid pump or pressure bag are needed to deliver fluid through the scope under pressure. Recommended instruments include small grasper, large grasper, slender punch forceps, standard punch forceps, banana knife, meniscal pull knife, meniscal push knife, small probe, large probe, small curette, arthroscopic shaver, assorted shaver blades, assorted shaver burrs, hand burr, microfracture awl, 2mm osteotome, 3 mm osteotome, mallet and instrument cannulas.

The patient is positioned in lateral recumbency with the medial aspect of the operated limb up. The elbow should be positioned at the edge of the operating table on a sandbag or rolled towel to use as a fulcrum. A hanging leg prep can be used but most experienced surgeons used a small clip over the medial aspect of the elbow with a clear waterproof adhesive incision drape. An assisted can hold and manipulate the limb through the surgical drape. The scope portal is located distal and caudal to the medial epicondyle at the level of the joint. The egress portal is located proximal and caudal to the supracondylar space. The instrument portal is located cranial to the scope portal at the level of the joint.

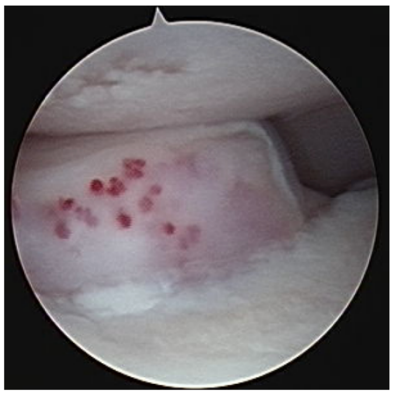


Medial portal location for elbow arthroscopy 1. Egress portal, 2. Scope portal, 3. Instrument portal

Developing a standardized pattern for examination of the joint will help development of arthroscopic skills and ensure that all accessible areas of the joint are examined. Standard images of specific regions should be routinely obtained even when normal. The type, severity, and location

of lesions should be documented and recorded. An example of standard medial elbow joint examination would be to visualize and image each area of the medial joint as follows:

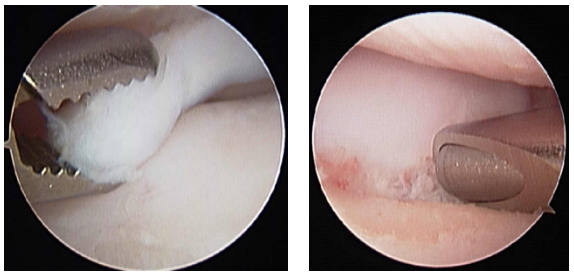
1. anconeal process
2. semilunar notch
3. lateral coronoid process
4. radial incisure
5. medial coronoid process
6. radial head
7. medial humeral condyle
8. medial collateral ligament



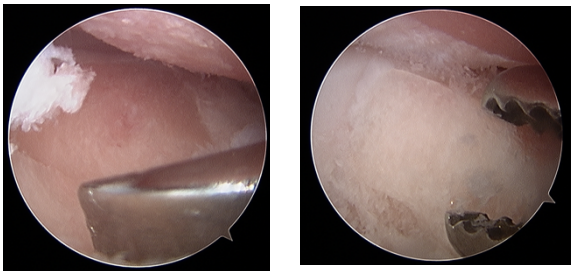
Large osteochondral fragment associated with FCP. Cartilage wear and chondromalacia is also seen on the MHC and MCP

ARTHROSCOPIC TREATMENT

Arthroscopy is used to treat FCP to provide minimally invasive disease assessment, fragment removal, and debridement of diseased cartilage and bone. It is common to see one or more fragments in the cranial aspect of the joint. The fragments may have a synovial attachment that may need to be transected for fragment removal. Fragments are removed using an arthroscopic grasper or a burr. Care should be taken to avoid iatrogenic trauma during fragment removal. It is often helpful to remove a portion of the medial coronoid process (MCP) immediately adjacent to the loose fragments to facilitate atraumatic removal of large osteochondral fragments. This area of bone contains microfractures, has reduced density and may be a source of pain similar to stress fractures in bone that result in pain. Large fragments may need to be divided with a small osteotome or debulked using an arthroscopic shaver to reduce them to a size that accommodates the jaws of the arthroscopic grasper. The grasper can be damaged if the fragment is grasped too aggressively or if excessive torque is used when removing fragment. The medial coronoid process is debrided using a curette or arthroscopic shaver following removal of loose fragments. Soft damaged bone is removed until normal dense bone is reached. The rationale for this is that the damaged bone is unlikely to heal due to subtle incongruence leading to pressure overload and this zone of microfractures may be a source of pain. This is a form or subtotal coronoidectomy but this technique removes less of the coronoid compared to that described using a saw or osteotome. Bone is generally removed using an arthroscopic shaver (full radius or aggressive cutting blade) or hand burr, but sclerotic bone may require removal using the arthroscopic shaver with a burr blade or a small osteotome and mallet. Another potential benefit of removal of damaged bone of the MCP is creation of space and shifting of the load to other regions of the joint. The removal of the zone of conflict in cases of medial compartment disease may help to relieve pain and reduce potential for further cartilage damage and osteoarthritis. Once the fragments have been completely removed lavage the joint to remove any remaining bone debris. An adjunctive biceps release procedure can be performed if desired following treatment of the MCP. Adjunctive joint resurfacing techniques (CUE) cannot currently be performed arthroscopically.

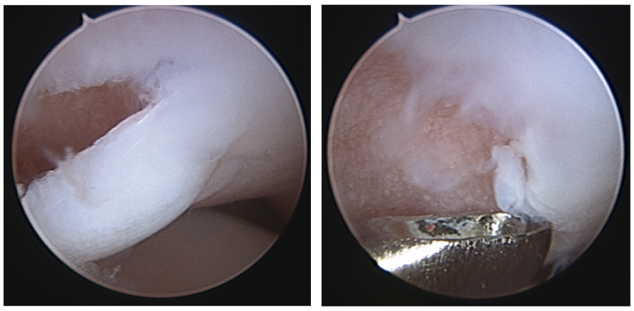


A grasper is used to remove a FCP fragment on left. An arthroscopic full radius shaver blade is used to debride the MCP on right.



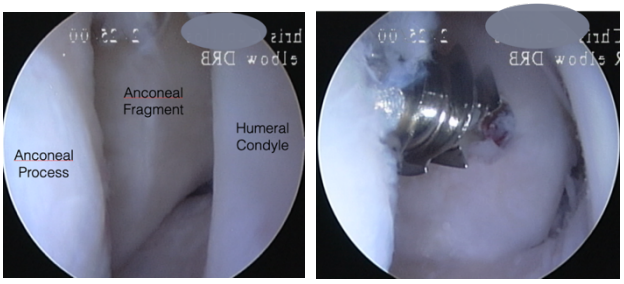
An osteotome is used to divide a large dense FCP fragment into several smaller pieces to facilitate removal on left. A grasper is used to remove an osteochondral fragment on right.

OCD of the elbow most commonly affects the medial humeral condyle (MHC). OCD can be treated with elevation of the cartilage flap and removal with graspers. The subchondral bed should be debrided with a curette or arthroscopic shaver. The defect can also be treated with microfracture or forage technique to allow a encourage mesenchymal cell infiltration and fibrocartilage repair. It is also important to evaluate the MCP as many OCD patients have concurrent FCP. The treatment of FCP is performed as described above. Adjunctive joint resurfacing techniques (OATS, Synacart) cannot currently be performed arthroscopically.



OCD flap on the MHC on left. A curette is used to remove damaged cartilage at the edge of the defect following flap removal

A ununited anconeal process can be evaluated arthroscopically for integrity and amount of displacement and mobility. The surgeon can use this information to decide whether a dynamic ulnar osteotomy may assist healing of the anconeal process. Arthroscopic viewing of the anconeal process can also assist the surgeon in percutaneous placement of a lag screw across the anconeal process if attempting repair. Arthroscopic removal of the anconeal process is not recommended because of its large size and density. A minimally invasive lateral arthrotomy should be used to remove the fragment following arthroscopy. It is also important to evaluate the MCP as many UAP patients have concurrent FCP. The treatment of FCP is performed as described above.



This anconeal fragment is mobile but the size and intregrity appear suitable for reattachment with a lag screw and dynamic ulnar osteotomy

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