Novel Treatment for Chronic Elbow Osteoarthritis: Intra-articular Therapy - Part 1

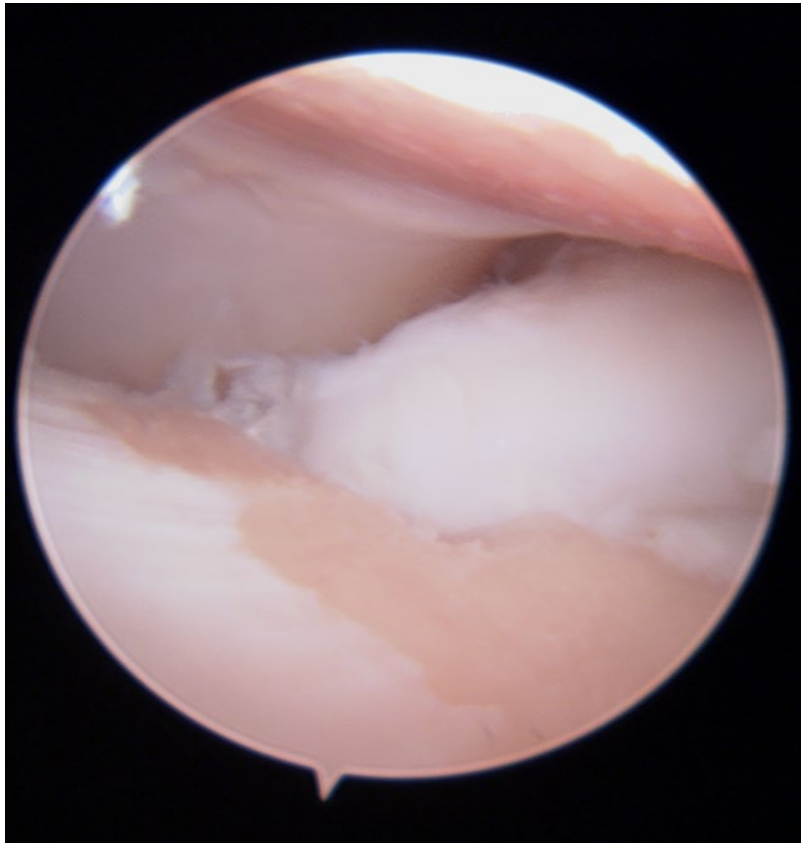
Kevin Benjamino, DVM, Diplomate, ACVS
Shawn C. Kennedy, DVM, Diplomate, ACVS
MedVet Columbus

MEDVET
Leading Specialty Healthcare for Pets

Outline

- What do we all agree on with elbow osteoarthritis and elbow dysplasia
- Two phases of presentation
- What is elbow dysplasia
- Key points for evaluation of the suspected patient
- Common diagnostics for elbow dysplasia
- Problems with current therapies

Elbow Dysplasia



What do we agree on about elbow dysplasia???

- Genetic component
  - Multiple genes involved without direct transmission
- Environmental factors
  - Diet
  - Type and amount of exercise/activity
- Other disease processes NOT elbow dysplasia that affect the juvenile
  - Incomplete ossification of the humeral condyle (IOHC)
  - Failed fusion of the medial condyle of the humerus (UME)/Ossification of the tendons and flexor muscles

What do we agree on about elbow dysplasia???

- Begins to occur in juvenile dogs 4-7 months of age
- Medium, large, and giant breed dogs
- Most affected breeds: Labrador Retriever, Golden Retriever, GSD, Rottweiler, Bernese Mountain Dog, etc.
- Male and female

What do we agree on about elbow dysplasia???

- Our treatment options are often limited
  - Many time treating the secondary changes versus primary cause
  - Age of patient at presentation can be problematic
- Little agreement on the correct procedures to follow
  - Multiple procedures in the juvenile and mature patient: SHO, PAUL, CUE, TER, etc.
- Long term progressive disease process

What do we agree on about elbow dysplasia???

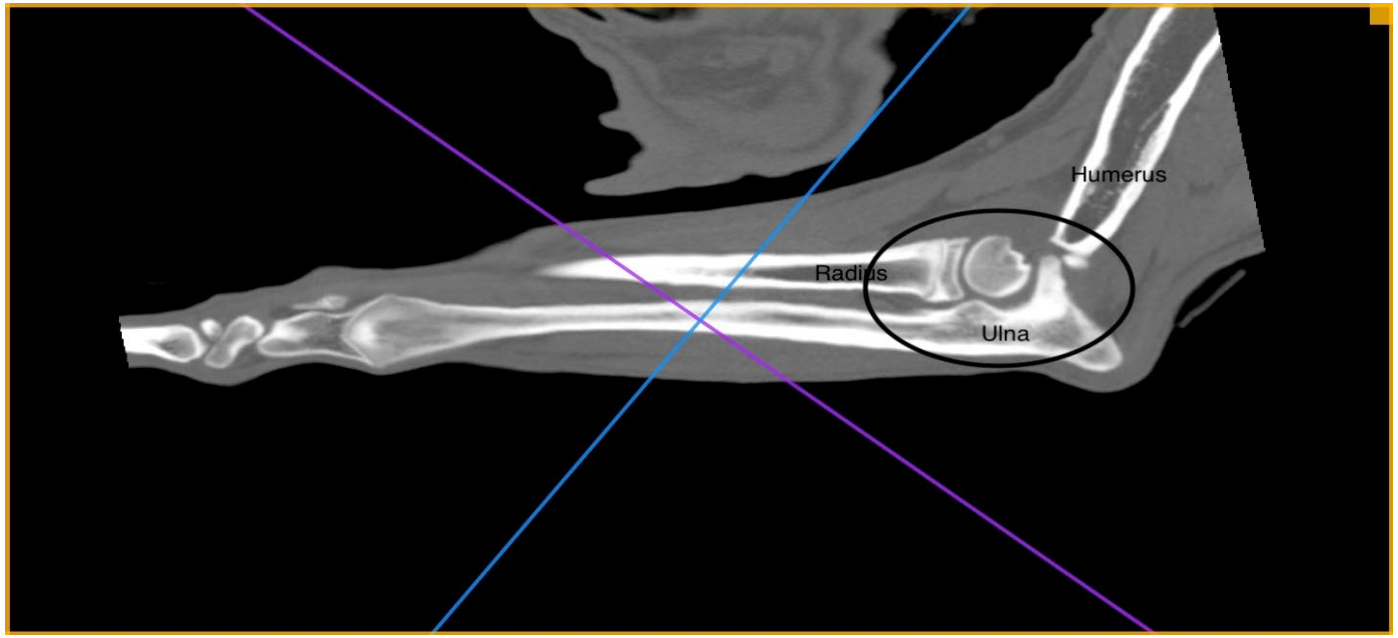
- Cannot restore to a normal joint
  - ”You can take the rock out of the shoe, but you can’t make the shoe fit” – D. Hulse

Two phases (of presentation) of elbow dysplasia

- Juvenile
  - Typical presentation for dogs is between 6-12 months of age
  - Unilateral or bilateral lameness noted
  - Can vary in severity – age does not dictate degree of secondary change
- Mature
  - Generally thought to be >2 years of age
  - Pan-osteoarthritis
  - Medial compartment disease
  - Can have traumatic form of fragmentation of medial coronoid process (rare)

What is elbow dysplasia ???

- Complex disease involving the humero-radio-ulnar joint
- Incongruity involving all 3 joint components, asynchronous growth of radius and ulna – rapid growth phase
- Congruency may improve by time of diagnosis – still the path has been set for force disturbance in the elbow



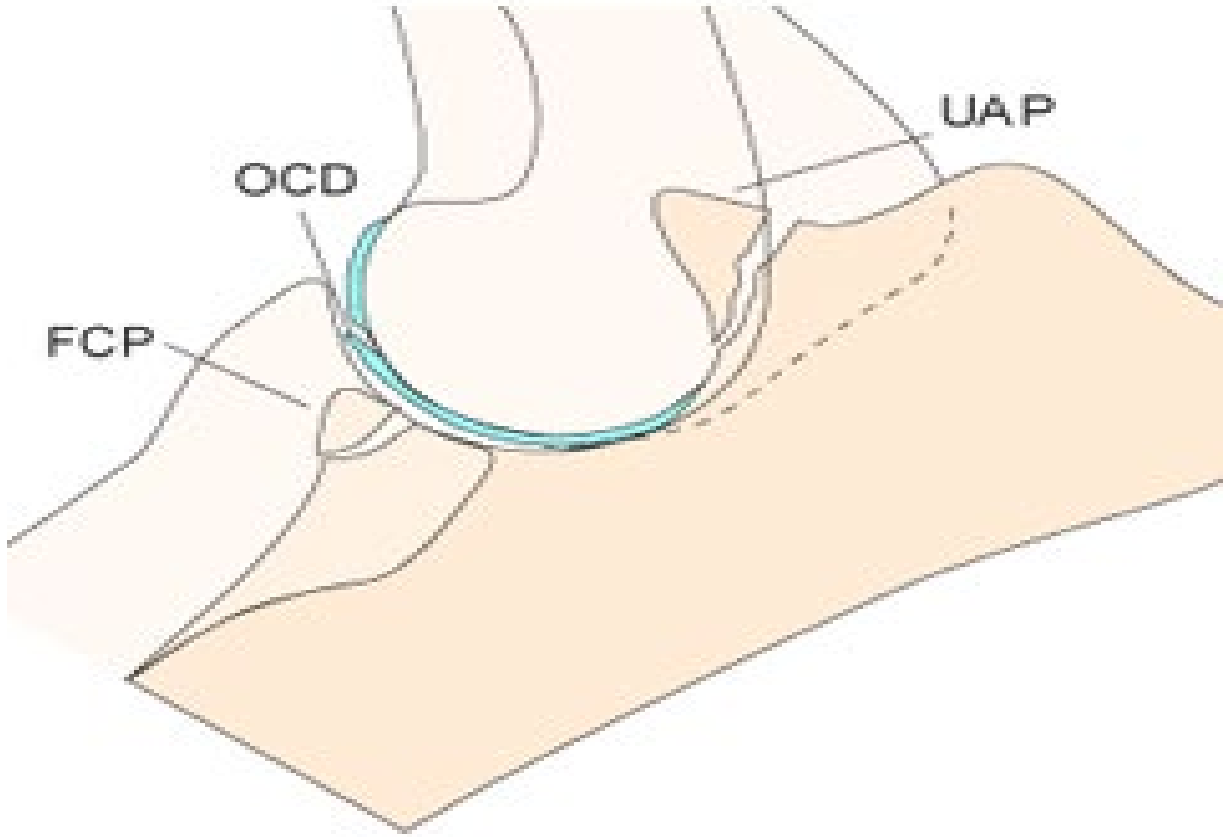
MEDVET

What is elbow dysplasia???

- Umbrella term
  - Elbow incongruency (EI) – early and sustained
  - Fragmented medial coronoid process (FMCP)
  - Osteochondritis dissecans (OCD)
  - Ununited anconeal process (UAP)
  - Medial compartment Disease (MCD)

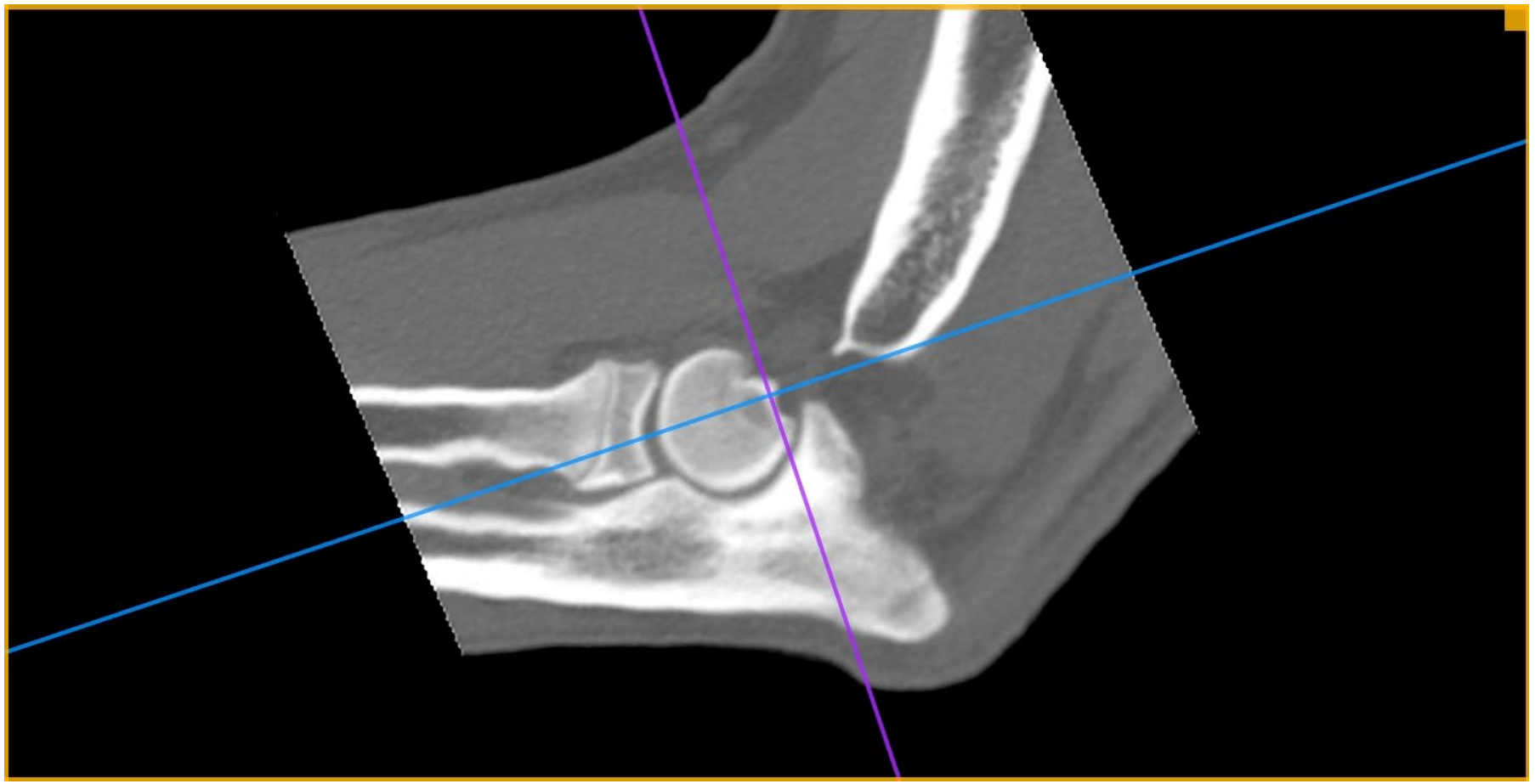
MEDVET

What is elbow dysplasia???



Elbow Incongruency

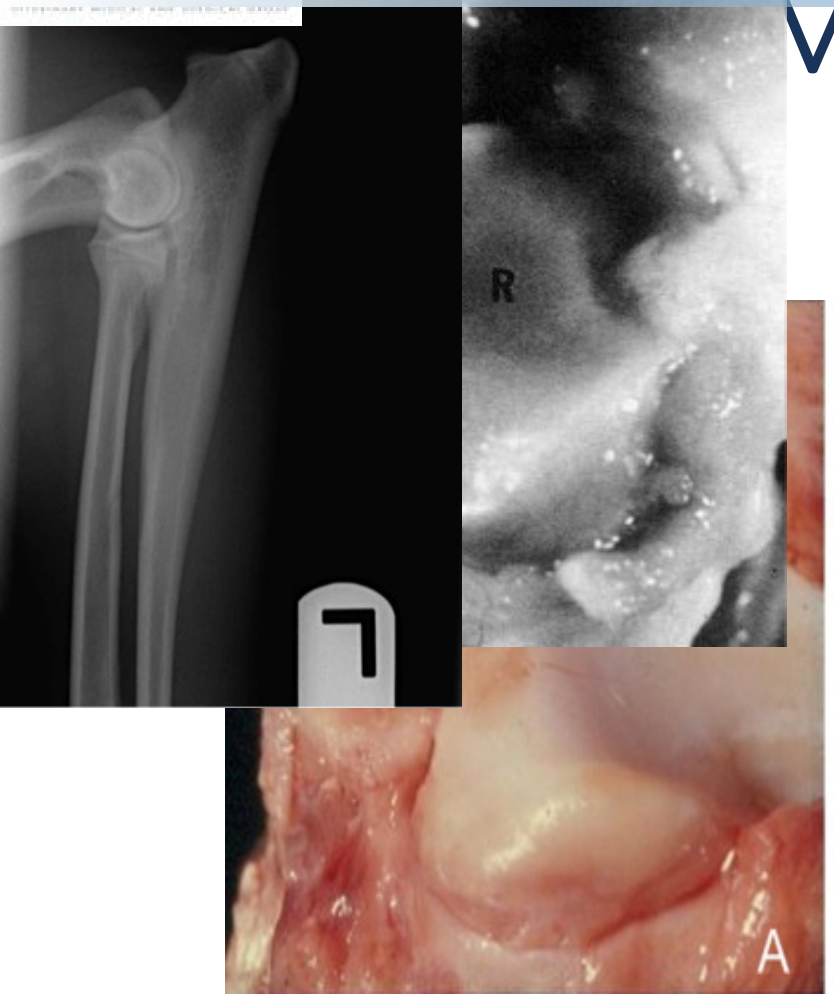
- Suspect to be the main cause of elbow dysplasia in the canine
- Three physis responsible for growth of antebrachium (2 in radius and 1 in ulna (distal)
- Most of patients develop incongruity in first 6 months of age – fast phase of growth
- Elbow incongruity can resolve through growth leaving abnormal force through the medial aspect of joint
- Elbow incongruency can persist

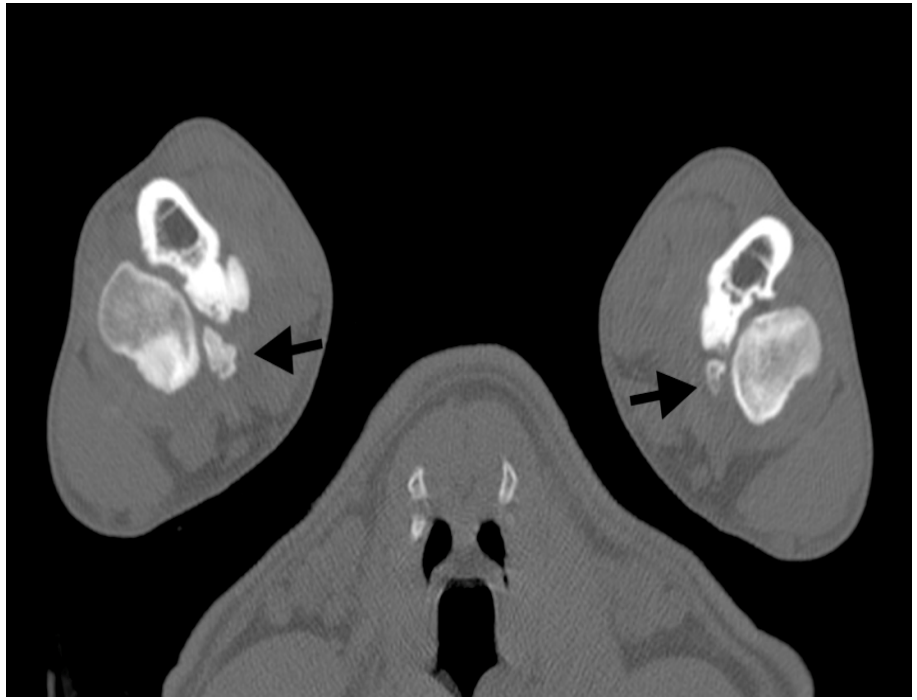


Fragmented Medial Coronoid Process

- Formation of a separate osteocartilaginous fragment
- Fissure/abrasion involving the cartilage and subchondral bone
- Typical locations: apex or incisor
- Most common form of elbow dysplasia
- Completely cartilaginous at birth and ossification around 20 weeks
- Bilateral in many cases

Medial Coronoid Process

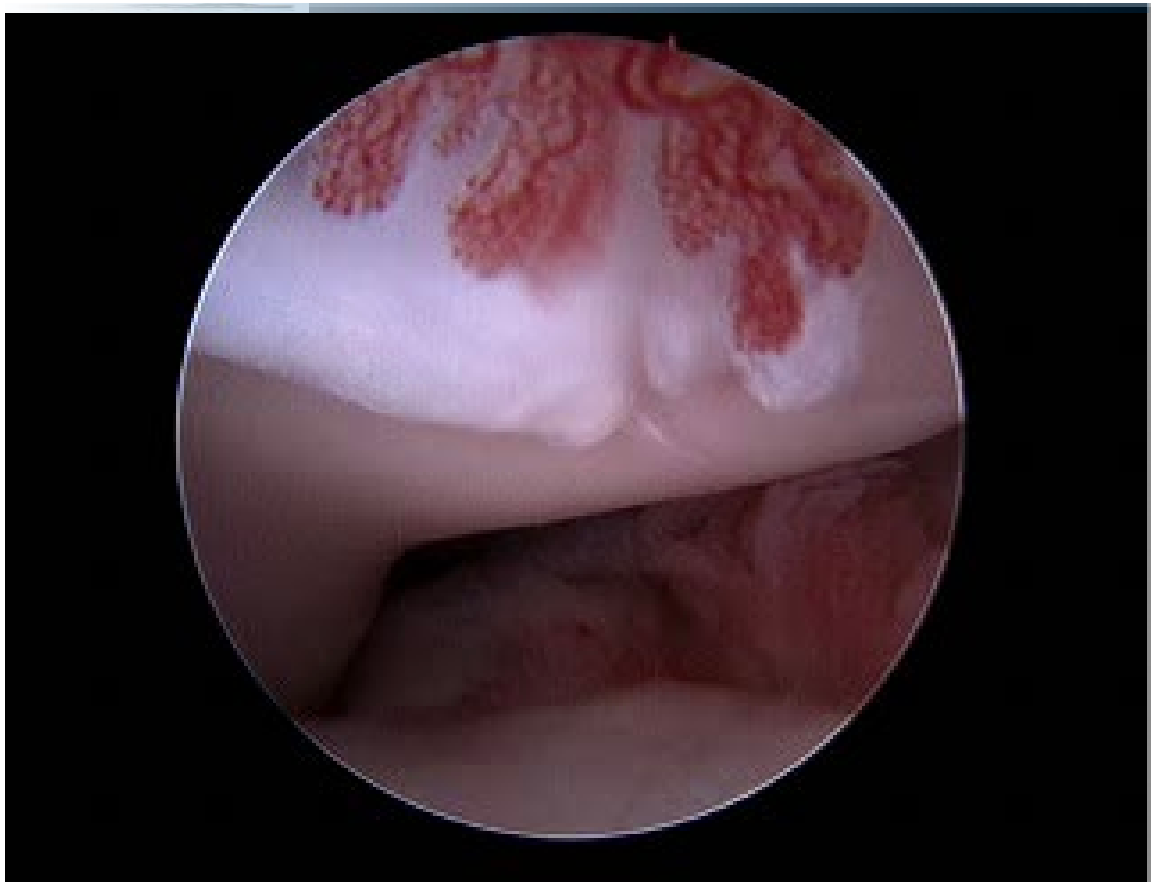




Osteochondritis Dissecans (OCD)

- Manifestation of osteochondrosis (enchondral ossification disorder)
- Focal failure of ossification and vascular penetration into epiphyseal cartilage
- Flap formation at articular surface
- Role of joint incongruity unclear, but likely overlaps with short radius – increase weight loads on medial humeral condyle
- Reactive biochemical mechanisms = synovial inflammation and arthritis
- Most bilateral

Osteochondritis Dissecans



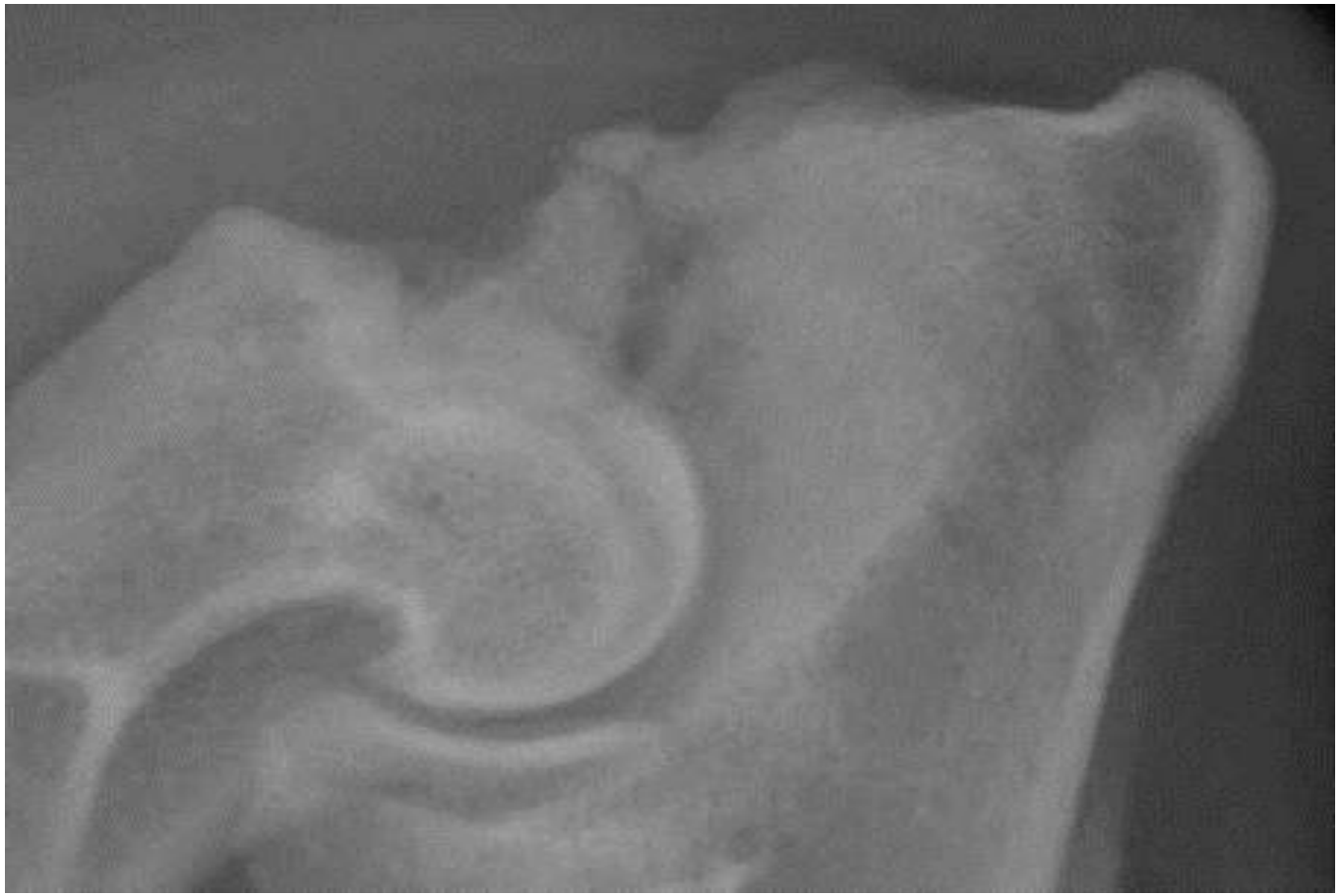
Ununited Anconeal Process

- High incidence in GSD, moderate to low in Great Dane, Newfoundland, Saint Bernard, Basset Hound, Cane Corso, etc
- Separate center of ossification
- Failure of anconeal process to unite with proximal ulna during first months of growth
- Fusion should occur by 16-20 weeks
- Pathogenesis is asynchronous growth of radius relative to ulna in early growth phase

Ununited Anconeal Process

- Causes proximal displacement of the radial head and abnormal pressure on anconeal process from humeral trochlea
- Pressure prevents bone union
- Asynchronous growth of radius and ulna can result in shorter ulna in first phase (up to 4-5 months) and shorter radius in subsequent phase (5-6 months)
- Both can occur in same dog – different diseases at different times of development
- In young patients need to address both incongruity and fusion
- In older patient severe OA develops

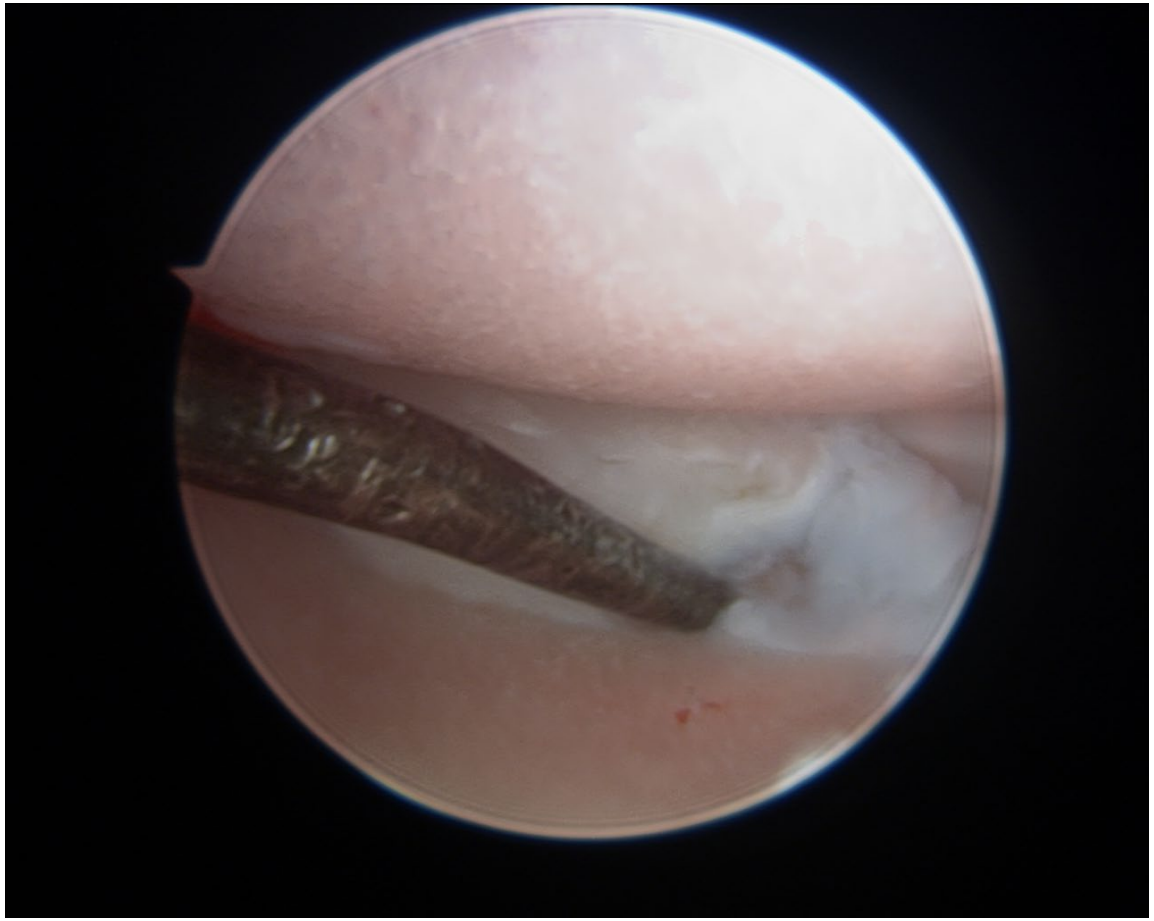
Ununited Anconeal Process



Medial Compartment Disease

- Manifestation of medial compartment overload – sequela
- Can occur in the juvenile patient and mature
- Evidenced by the following
  - Medial humeral and ulnar cartilage wear
  - Progressive osteoarthritis and synovitis
  - Medial collapse of joint
- Range of severity and progressive
- Most difficult aspect of elbow dysplasia to treat

Medial Compartment Disease



Evaluation of the Potential Elbow Dysplasia Patient

- Signalment is key!
- Get thorough history from client
- Gait Analysis is part of physical examination
- Evaluate the forelimbs

History/Clinical Signs

- Be specific in questioning
  - - When did signs begin/duration
  - - Static vs. progressive vs. Intermittent
  - - Ask for description of lameness/video
- One limb vs. multiple limbs

Gait Analysis

- Evaluate for symmetry/asymmetry between forelimbs
- Assign a grade to lameness (be consistent)
- Assess for head movement
  - Most patients will move head away from ground when placing painful limb
- Differentiate orthopedic versus neurologic
- 60% of body weight transferred to forelimbs (in normal patients)
- Tip: if subtle, record in slow motion

Gait Analysis

- Grading scale: 0-5
  - Grade 0: no lameness perceived under any circumstances
  - Grade 1: Mild lameness, difficult to observe or inconsistent.; evaluate head movement
  - Grade 2: Lameness difficult to observe during normal gait, however, is consistent on different surfaces, turning, etc.
  - Grade 3: Lameness observable at trot
  - Grade 4: Lameness obvious to walk/trot, not bearing full weight at stand
  - Grade 5: Minimal/non-weight bearing in motion or at stand

Credit: American Association of Equine Practitioners (AAEP) and Julie Hart, DVM, MS, CCRT, CVA

MEDVET

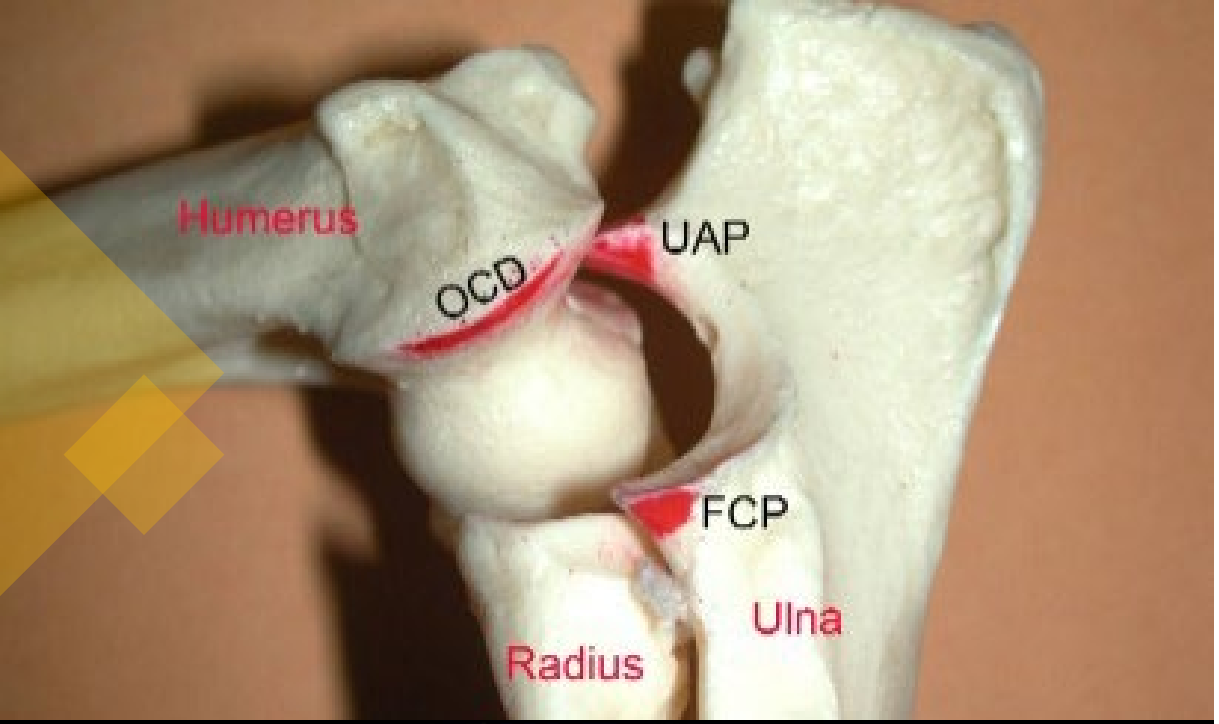
Gait Analysis

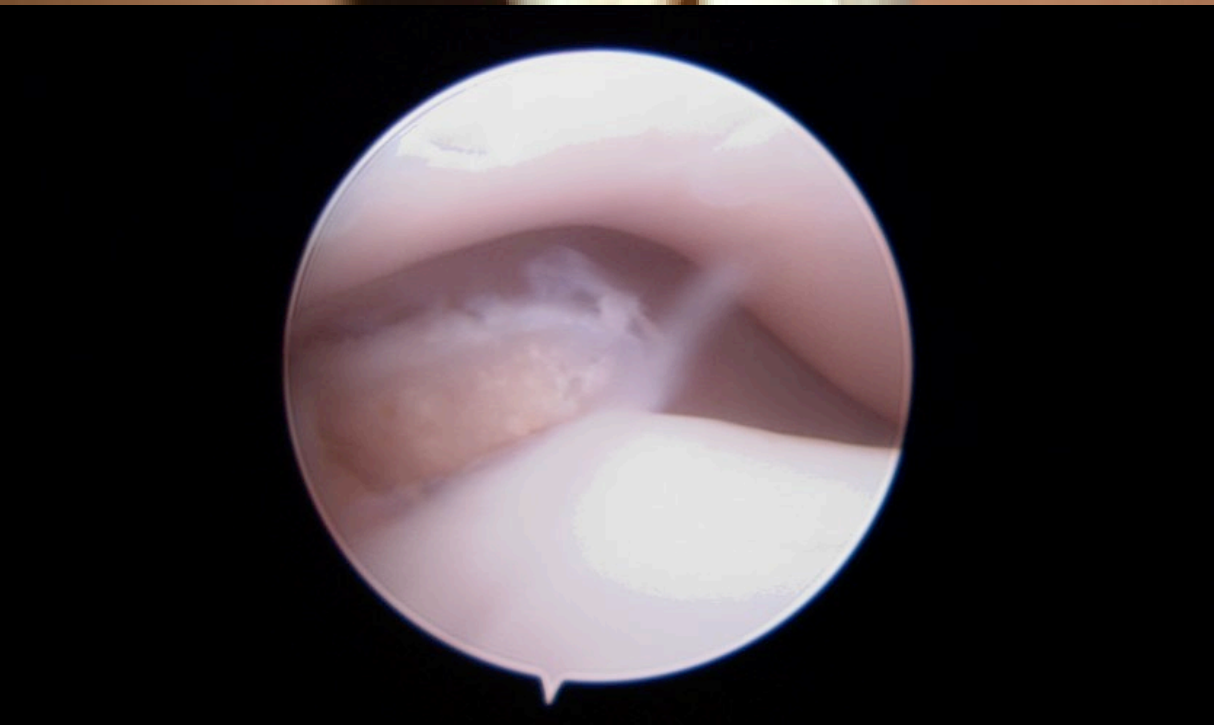
Evaluation of Agreement Between Numerical Rating Scales, Visual Analogue Scoring Scale, and Force Plate Gait Analysis in Dogs. Quinn MM , et al. Veterinary Surgery, June 1, 2007.

- Agreement between observers is low unless lameness is severe
- Subjective lameness scoring scales may not reflect lameness

MEDVET

Gait Analysis

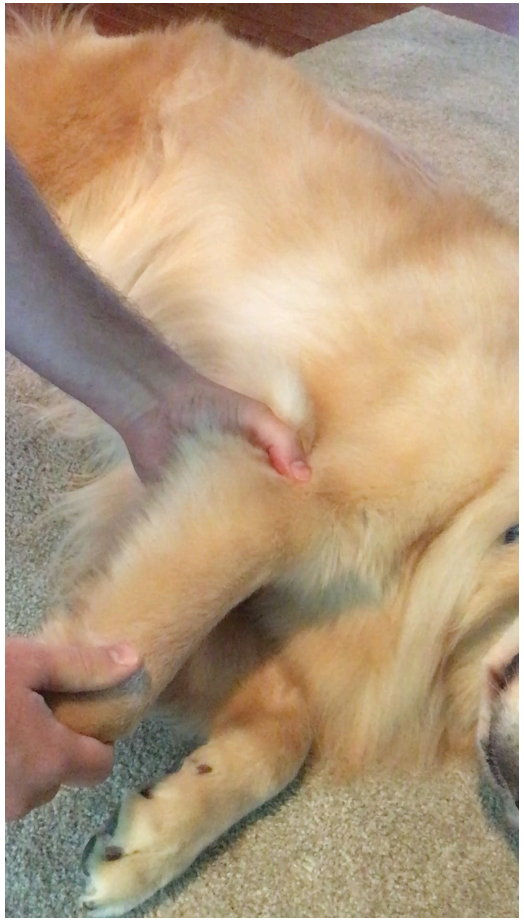




Elbow Examination

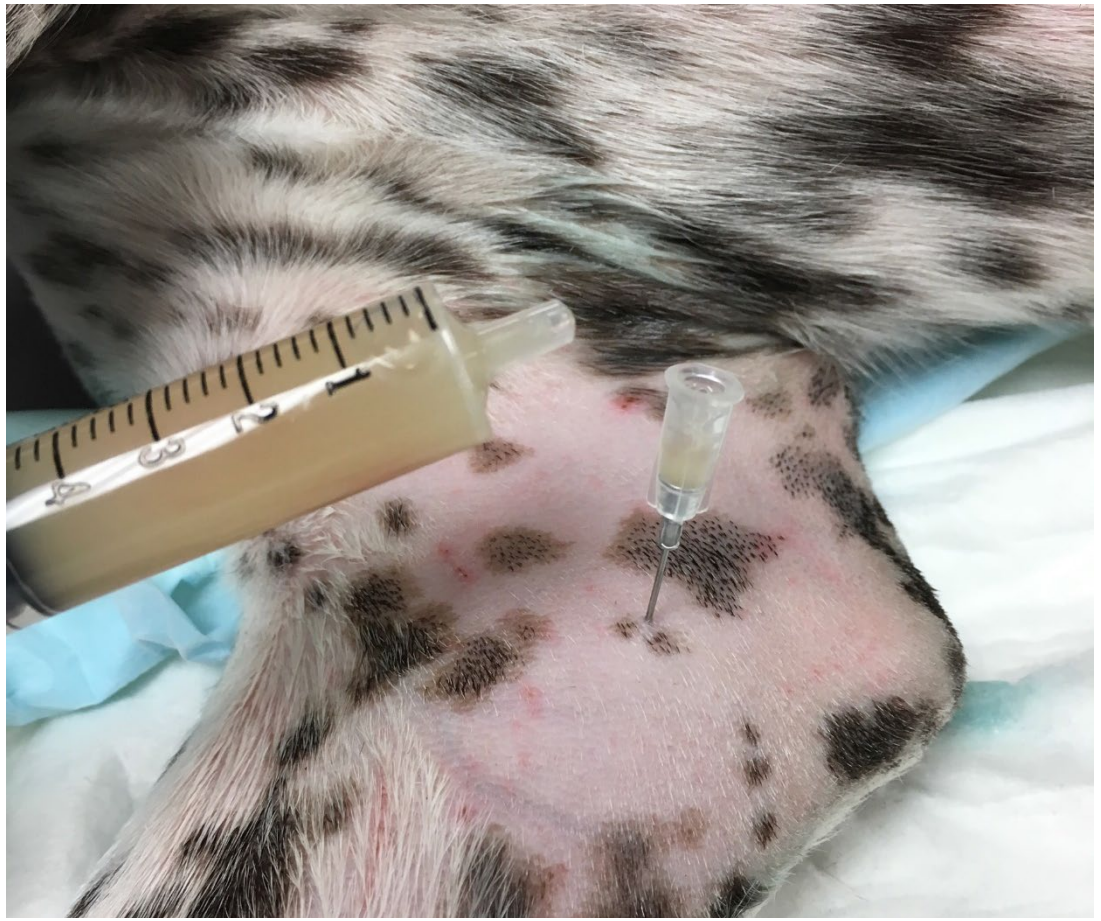
- Palpate elbow for effusion
- Manipulate elbow in flexion and extension
- Apply pressure to medial aspect of joint – over coronoid process
- Apply medial compression during flexion and supination

Elbow Examination



Elbow Examination

- Common injuries/pathology
  - Elbow dysplasia
  - Condylar fractures
  - Musculotendinous injuries
  - Neoplastic – bone vs joint
  - Septic arthropathy



Common Diagnostics

- Diagnosis
  - Physical examination
    - Isolate to joint
    - Pain on manipulation
    - Joint effusion
  - Imaging
    - Radiographs
    - CT scan

Elbow Dysplasia

- Radiographic findings
  - Early (or advanced) osteophytes on the anconeal ridge
  - Subtrochlear sclerosis of ulna
  - Joint effusion
  - Fragmentation of medial coronoid process
  - Ununited anconeal process

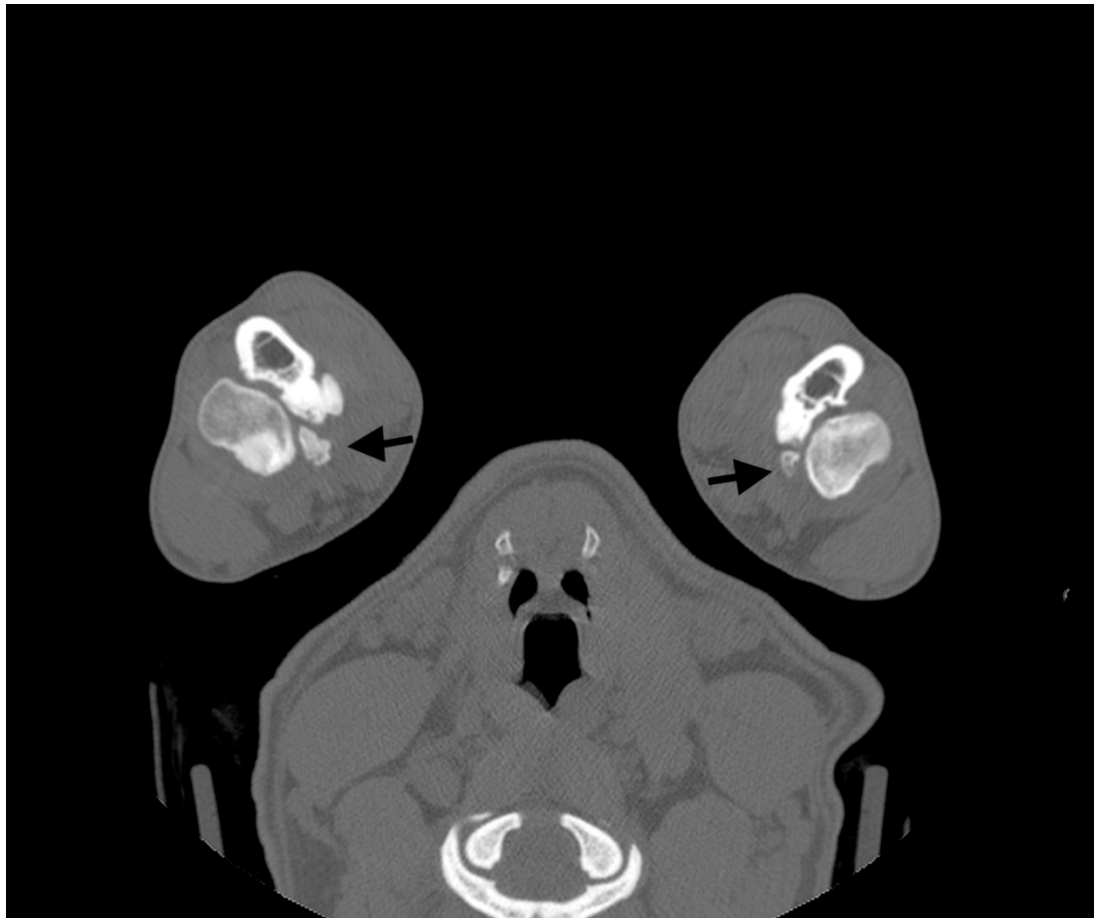
MedVet

Elbow Dysplasia

- Radiographs
  - May need sedation
  - Centered on elbow
  - Recommend 3 views
    - Standard lateral
    - Hyperflexed lateral
    - Cranial – caudal view

Elbow Dysplasia

- CT scan
  - Increased sensitivity (>90%) and specificity (>90%)
  - Can see changes not seen on radiographs
  - More information than radiographs
  - Heavy sedation

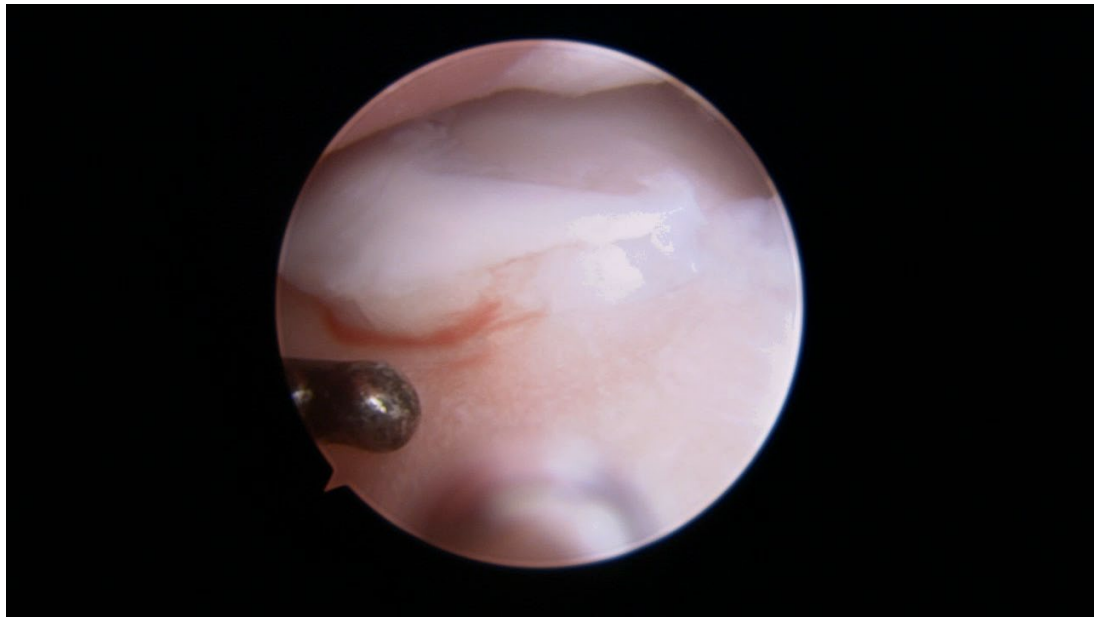


Common Treatments

- Treatment
  - Surgical
    - Arthroscopy – diagnostic and therapeutic
    - Advanced surgical procedure allow weight shifting from medial aspect
      - Dynamic Proximal Ulnar Osteotomy (DPUO)
      - Sliding Humeral Osteotomy (SHO)
      - Proximal Abducting ULnar osteotomy (PAUL)
      - Canine Unicompartment Elbow (CUE)
      - Total Elbow Replacement (TER)
  - Non-surgical/medical management

Common Treatments

- Surgical Treatment
  - Arthroscopy
    - Minimally invasive
    - Allow complete assessment
    - Removal of fragment(s) and OCD lesion
    - Biceps Ulnar Release Procedure (BURP)
    - Subtotal coronoidectomy



Common Treatments

- What are the criteria for other procedures?
  - Evidence of medial compartment disease on arthroscopy
  - Lameness refractory to medical management
  - Patient >9 months of age
  - Patient size appropriate for implants

MedVet

Common Treatments

- Non-surgical management/ Multimodal approach
  - NSAID of choice during periods of lameness/inflammation
  - Joint supplements – glucosamine/chondroitin
  - Adequan – polysulfated glycosaminoglycan
  - Rehabilitation/physical therapy/low impact activity

Common Treatments

- Intra-articular injections
  - Hyaluronic Acid (HA)
  - Platelet Rich Plasma (PRP)
  - Stem cells – adipose versus bone marrow
  - SYNOVETIN

MedVet

Questions???

MEDVET