Surgical Options for Juvenile Forelimb Lameness

Lynne A. Snow, DVM, MS, Diplomate, ACVS-SA
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- Ddx of juvenile forelimb lameness
- Review of diagnostic options
- Treatment options and prognosis

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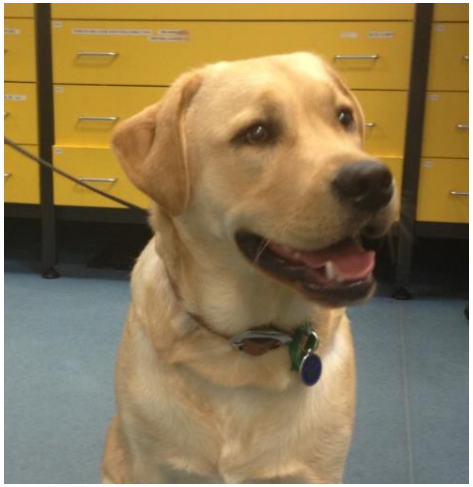
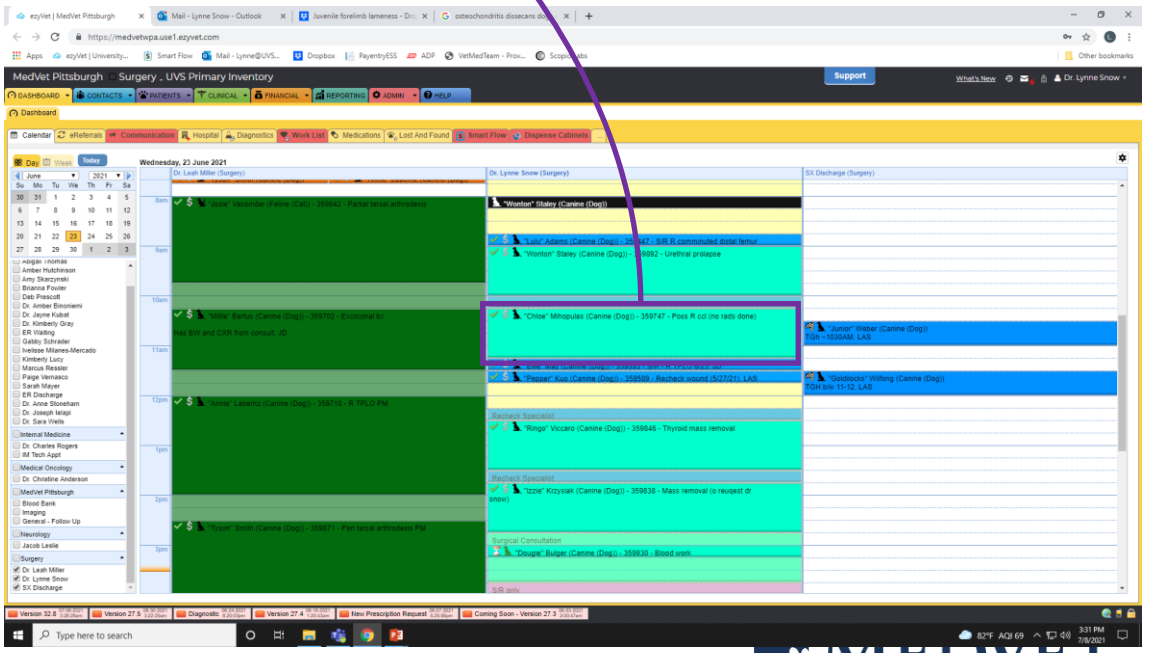
“Charlie”

“Charlie”
11 mo/o MN Labrador Retriever
Right forelimb lameness





Causes of Juvenile Forelimb lameness

Elbow

- "Elbow dysplasia"
- Incomplete ossification of the humeral condyle
- Humeral condyle fractures
- Congenital radial head subluxation

Shoulder

- Shoulder OCD
- Supraglenoid tubercle fractures
- Congenital shoulder subluxation

Long bones

- Angular limb deformities
  - Premature closure of physis
  - Hypertrophic osteodystrophy
- Hypertrophic osteodystrophy
- Panosteitis

Other/non-specific

- Traumatic fracture/ luxation/ligament damage
- Soft tissue injury
- Bone cyst
- Neoplasia
- Septic arthritis
- Immune mediated arthropathy

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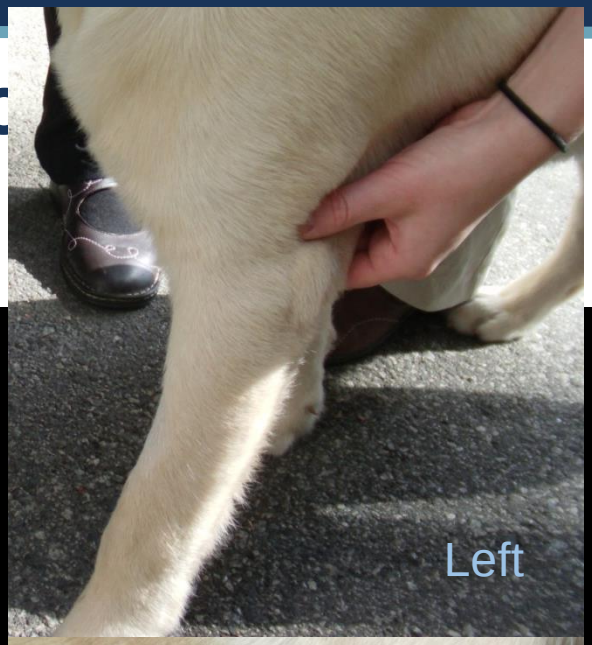
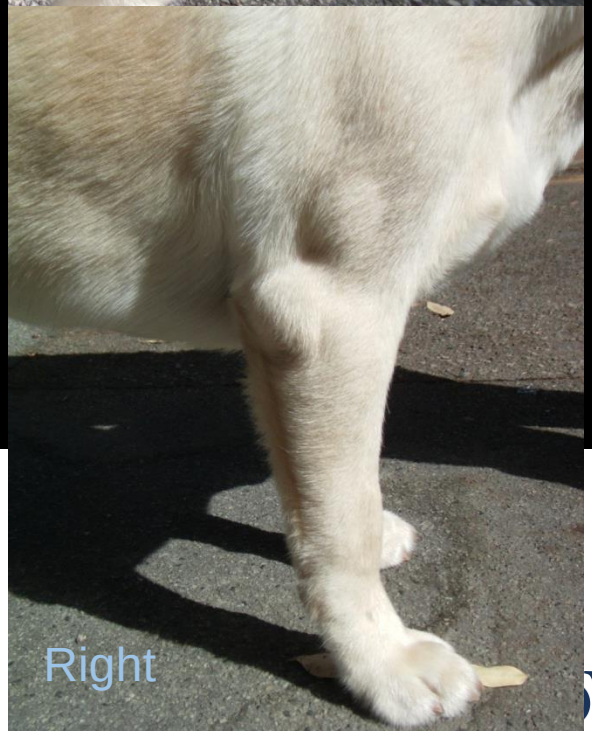
The value of a good ortho

- Gait analysis
  - “Down on sound”
  - The curse of the symmetric disease
- Standing exam
  - Weight bearing
  - Joint effusion
  - Muscle mass
  - Asymmetry
  - Conscious proprioception
- Recumbent exam
  - Palpation of long bones
  - Palpation and ROM of joints





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Elbow dysplasia

- Complex, multifaceted
- #1 cause of forelimb lameness
- Typically bilateral (25-80%)
  - Difficult to recognize
  - Symmetric lameness
  - Gait change
- Labrador, Golden Retriever, Bernese Mtn Dog, Rottweiler, Newfoundland
- 2 Males : 1 Female
- 6-18 mo/o

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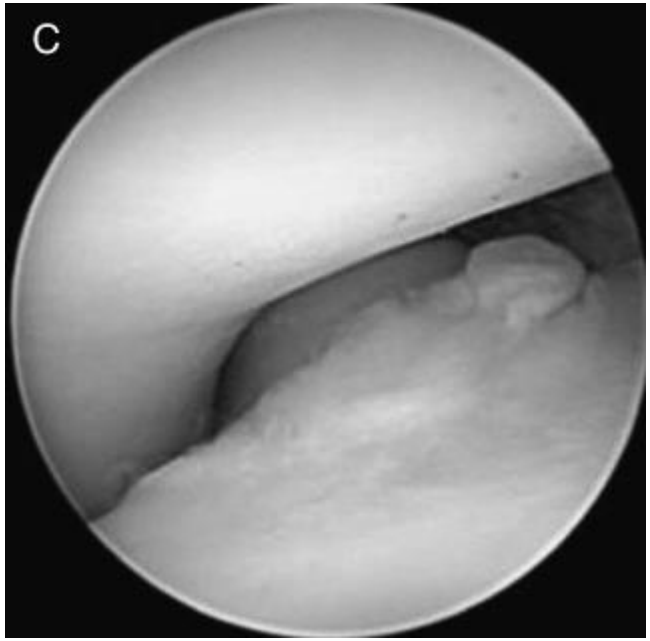
Elbow Dysplasia

- Medial Coronoid Disease
  - Fragmented medial coronoid (FCP)
  - Medial Compartment Disease (MCD)
- Medial humeral condyle osteochondrosis (OC or OCD)
- Ununited anconeal process (UAP)
- +/- Incongruity
- +/- Incomplete ossification of the humeral condyle
- +/- Ununited medial epicondyle



Punke; Vet Surg 2009

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Cook; Vet Surg 2009

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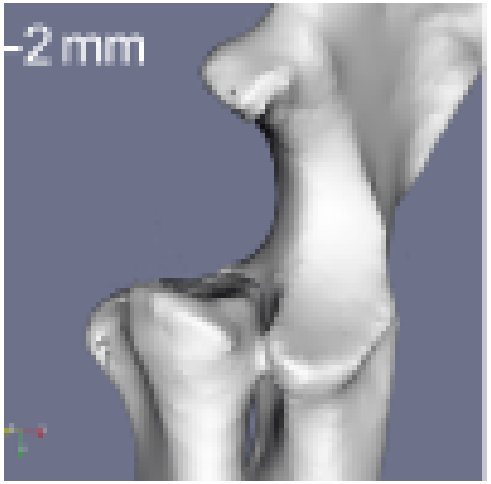

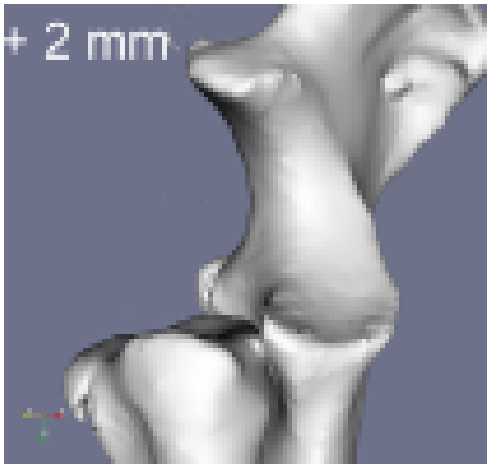

Bottcher; Vet Surg 2009

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Fitzpatrick; Vet Surg 2009

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Paster; Vet Surg 2009

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Charlie

Exam findings

- 3mo Hx subtle RFL lameness
- “Proppy” forelimb gait
- 1/5 RFL lameness
- Reluctant to trot
- Shifting weight from right side when standing
- Postural valgus
- Pain on full extension/flexion of elbows, R>L
- Significant right elbow joint effusion

What do we do?

A. Right elbow radiograph

B. Bilateral elbow radiographs

C. Right elbow arthrocentesis

D. Multiple joint arthrocentesis (carpi, elbows, hocks, stifles)

E. Elbow CT

F. Exploratory arthrotomy/arthroscopy

Audience question???

Image compliments of Mark Glyde

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Diagnostic Work up: Radiographs

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Charlie, Right elbow

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Charlie, Left elbow

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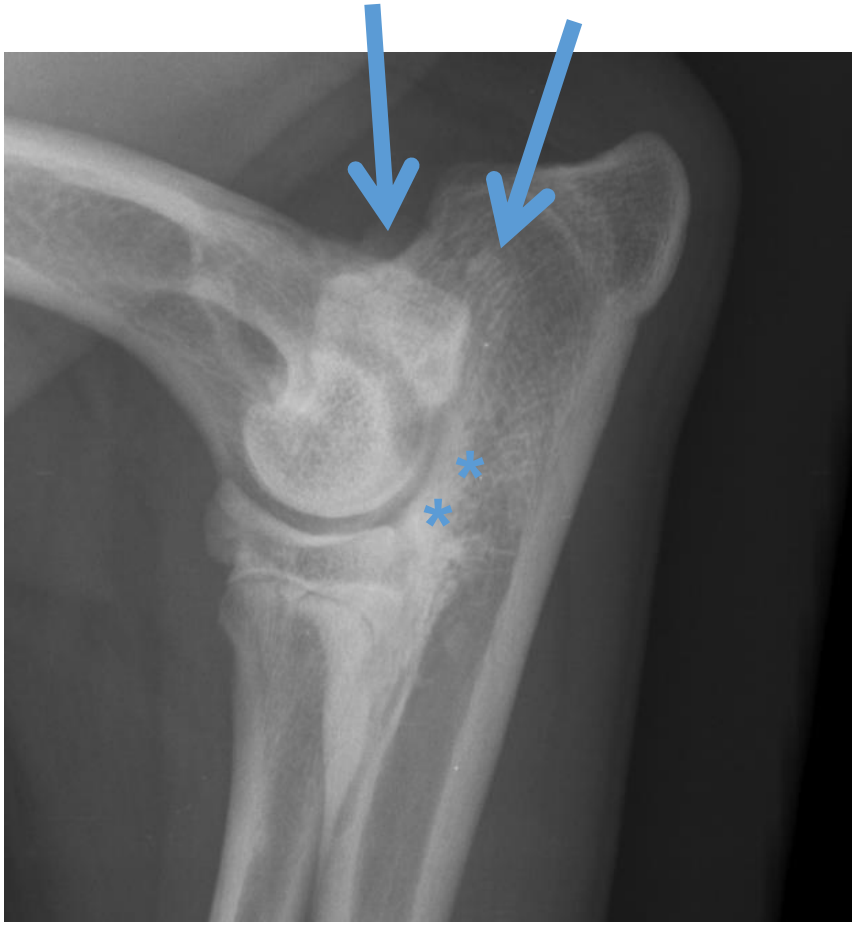
Are these radiographs normal?

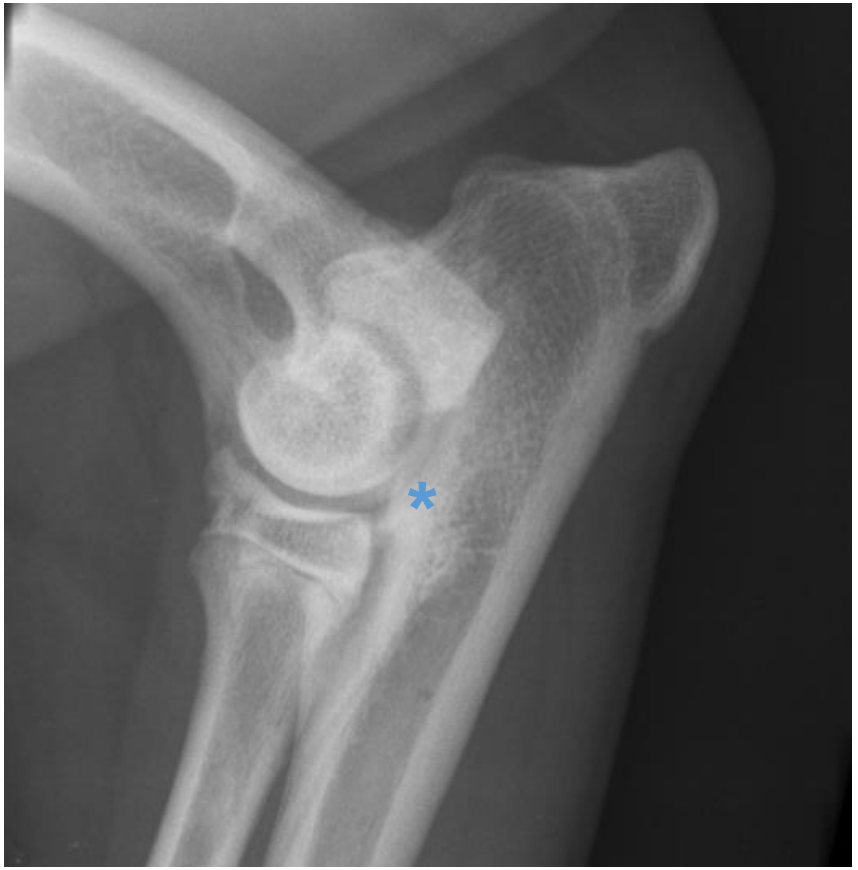
- 20-30% FCP have normal rads

- Right



* Subtrochlear sclerosis

- Left



Osteophytes (arrow)

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Elbow radiographs

- Both elbows
- Flexed lat & Cr/Ca (+/- 15° oblique)

Pros

- Diagnostic for OCD & UAP
- Evaluation of DJD
- Other lesions (neoplasia, panosteitis)
- Inexpensive ($)
- No specialized equipment

Cons

- No evaluation of articular cartilage
- 2D view of complex joint
- Not good at identifying FCP
  - Up to 30% of young dogs with FCP have normal rads
- IOHC
  - 15° Oblique views?

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Diagnostic Work up: CT

- FCP
- IOHC
- Incongruity

- Punke, et al: Vet Surg 2009
  - n = 16 dogs, normal radiographs
  - CT suggestive of elbow disease
  - Arthroscopy- all had FCP, 2 had OCD

FCP

Reference Normal

Images compliments of Mark Glyde

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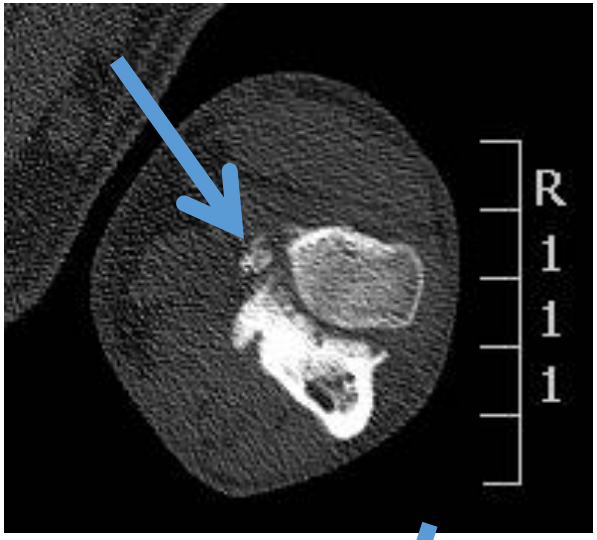
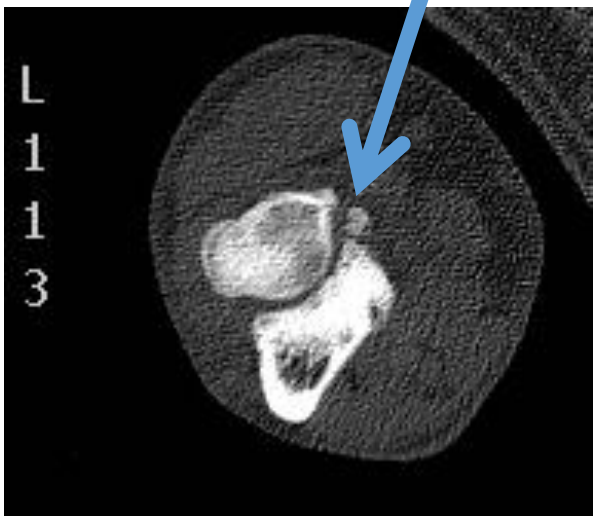
Charlie- Computed Tomography (CT)





Right

Left

Elbow Computed Tomography (CT)

Pros

- 3D view of complex joint
- Improved sensitivity in diagnosing FCP & IOHC
  - Evaluation of subchondral bone
- More complete evaluation of DJD

Cons

- No evaluation of articular cartilage
- Expense ($$)
- Specialized equipment
- Skill at interpretation

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Treatment Options?

A. Conservative OA management
B. Arthrotomy- Fragment removal and debridement
C. Arthroscopy- Fragment removal and debridement
D. Subtotal coronoid ostectomy
E. Sliding humeral osteotomy
F. Elbow replacement

Audience question???

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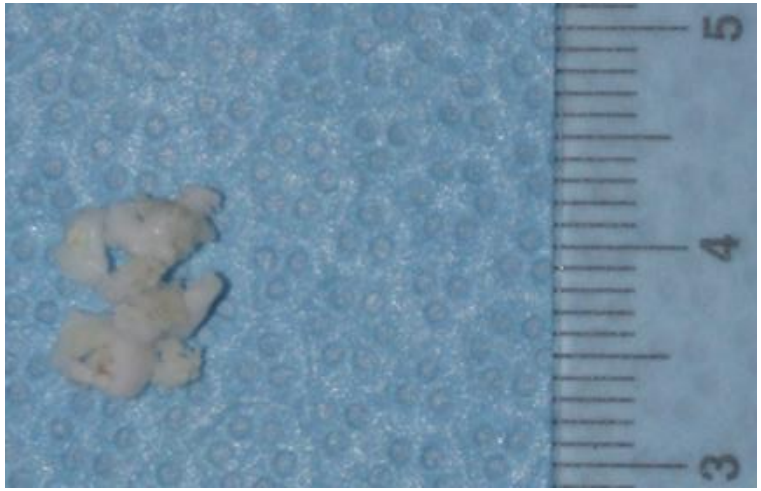

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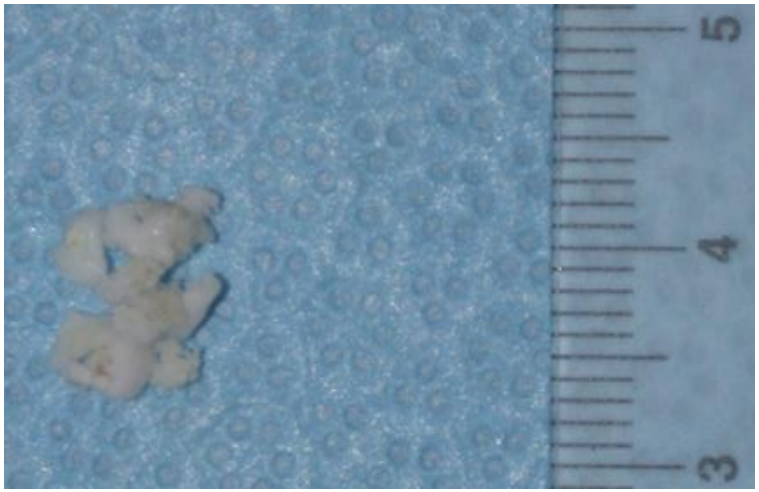
Arthrotomy vs Arthroscopy



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Arthroscopy- diagnostic and therapeutic

- Moores; Vet Surg 2008
  - n = 101 canine elbows (58 dogs)
  - CT correctly identified FCP in 77% (sensitivity 71%, specificity 84%)
  - Arthroscopy found 15 (29%) FCP missed by CT
- Fitzpatrick; Vet Surg 2009
  - Osteophytosis poor predictor of severity of arthroscopic pathology
  - Wide range of clinical, radiographic, and arthroscopic findings

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Normal arthroscopy

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Charlie- FCP

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Elbow Arthroscopy

Pros

- Evaluate articular cartilage
- Diagnostic & therapeutic
  - Fragment removal/subtotal coronoidectomy
  - Debridement of subchondral bone
- Improved visualization & reduced morbidity compared to arthrotomy
  - Magnification, lighting

Cons

- Limited evaluation of subchondral bone if cartilage is intact
  - CT & arthroscopy are synergistic diagnostic modalities ($$$)
- Specialized equipment
- Surgical skill
- Expense ($$)

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Treatment- Subtotal coronoid ostectomy

- Abnormal subchondral bone
- Pyramidal portion of medial coronoid process
- Fitzpatrick; Vet Surg 2009
  - Dogs with MCD (n = 263; 437 elbows)
  - 74.4% no lameness at 5 wks (45.6% owner)
  - 71.5% no lameness at 12 wks (91.2% owner)
  - Minimal complications
    - 1 elbow fissured intraop
    - 8.2% postop (30 septic jt)

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Prognosis?

- 90% improved function with surgery
- There is no cure, surgery is intended to limit OA progression.
- Lifelong DJD management needed.
  - Weight control!
  - Daily moderate activity/rehabilitation
  - Analgesia
  - Joint modifying agents
  - Alternative therapy
    - High Intensity LASER Therapy, Acupuncture, stem cell therapy, PRP
- Prognosis with OA management alone is variable, greater progression of OA

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Ununited Anconeal Process

- Large to Giant breeds
  - Bernese Mt Dog, GSD, Golden Ret, Lab Ret, Mastiff, Newfoundland, Rottweiler, St Bernard, Basset Hound
- Bilateral in 20-35%
- Concurrent FCP in 13%
- Radioulnar incongruence in 50%
- Present b/w 5-12 months of age

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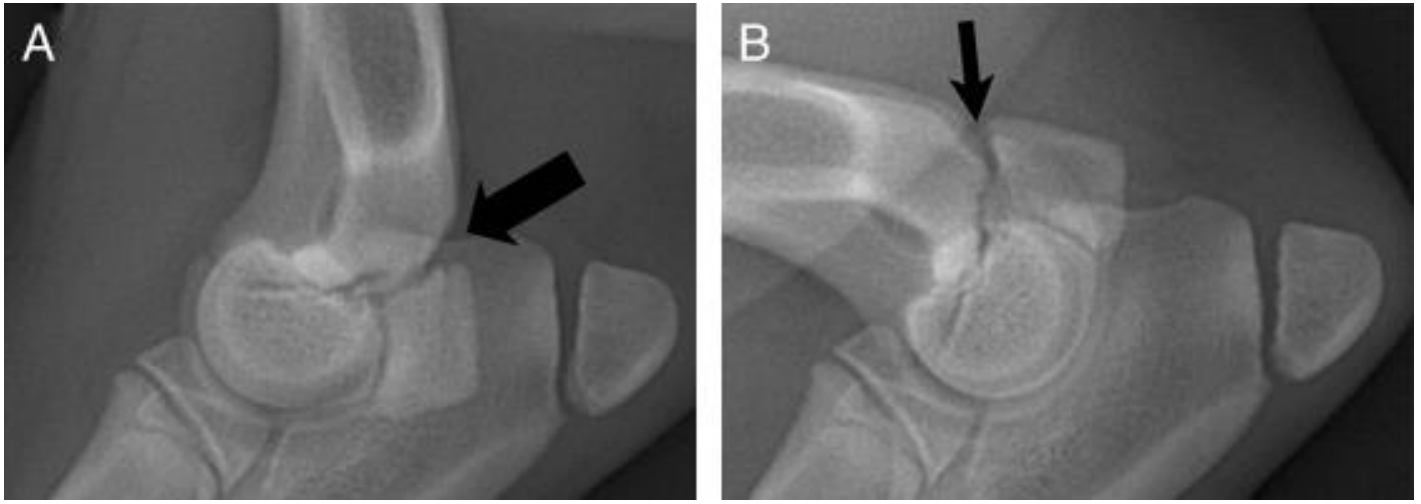
UAP- diagnosis

- Fusion of the anconeal process in Greyhounds @ 14-15 wks
  - Later in GSD at 16-20 wks
- Gradual progressive forelimb lameness, joint effusion, pain
- Flexed lateral radiographs
  - Diminish superimposition of humeral epicondyles over anconeal process and distal humeral physis
- Bilateral



Cook & Cook, Vet Surg 2009

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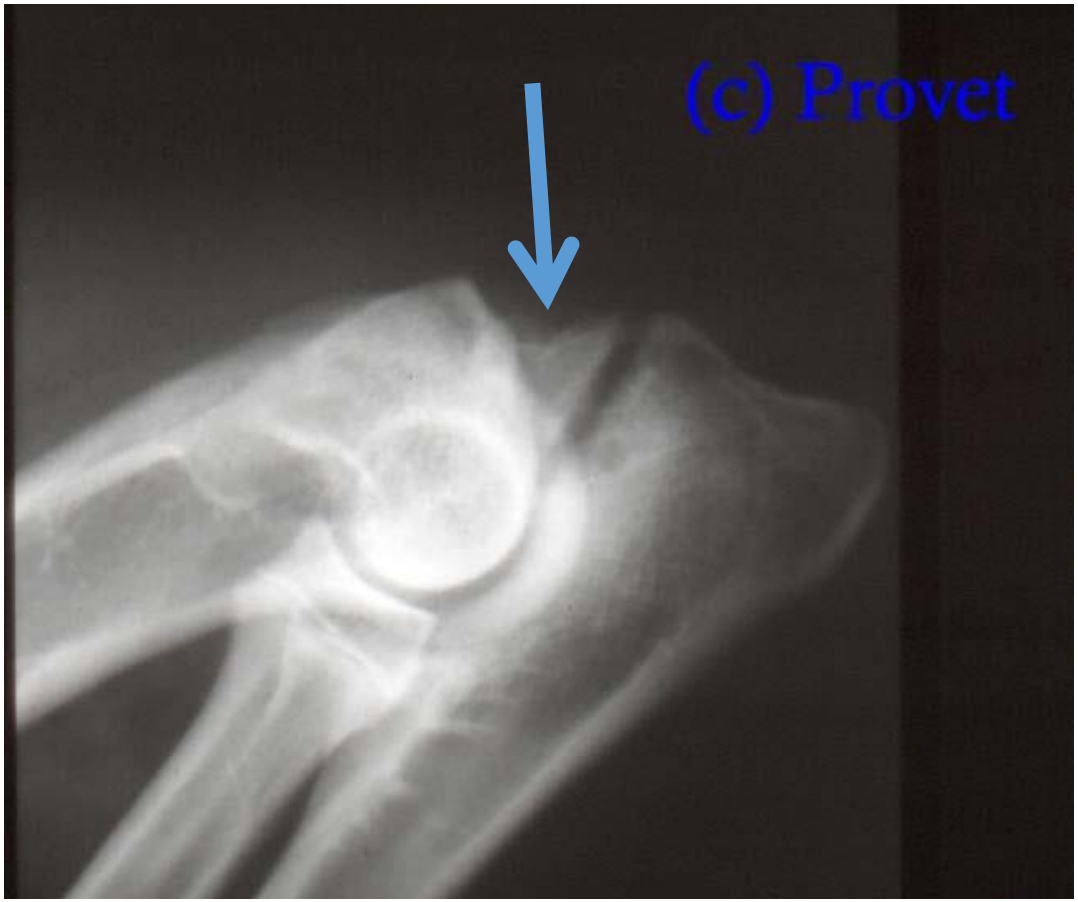
Flexed elbow radiograph



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UAP Tx options?

- Excision of fragment
  - 90 % satisfied w/ outcome
  - Only 50% dogs free of lameness
  - Progression of DJD
- Reattachment with lag screw
  - <24 wks of age, normal notch anatomy
  - Precise placement to avoid implant failure
  - Union in 6/10 dogs w/in 2-6 months
- +/- Proximal ulnar osteotomy
  - Limited by interosseous ligament
  - Variable results:
    - 17/21 good to excellent clinical outcome
    - 15/21 healed VS. 5/23 healed

Incomplete ossification of the humeral condyle

- Middle aged
- Medium sized dogs
- Spaniel breeds
- (Labrador retriever, Rottweiler)

- Failure of fusion of the 2 centers of ossification of the humeral condyle
  - Unite ~10 weeks of age (+/- 2 weeks)
  - Complete ossification ~32 weeks of age
  - Maintain fibrous band

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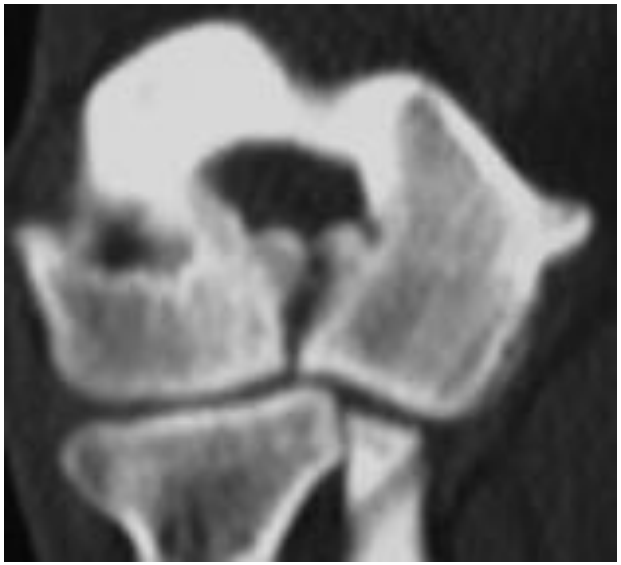
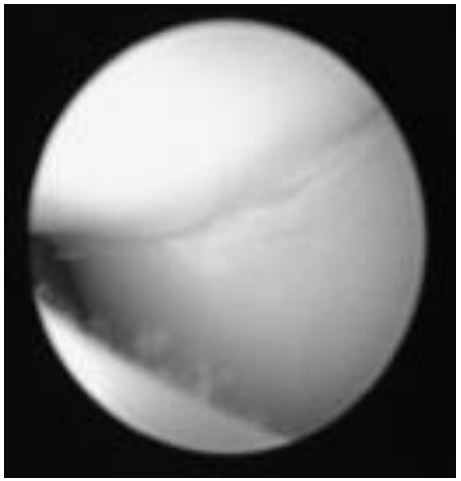
IOHC

- Chronic forelimb lameness + elbow pain
- Unilateral condylar fracture
  - Minor trauma
  - Partial or complete cleft contralateral humerus
  - 19/20 dogs had bilateral IOHC or IOHC + condylar fracture on CT
- 25% associated with MCD
- Easily overlooked on radiographs
  - 15º craniomedial-caudolateral oblique view
- CT





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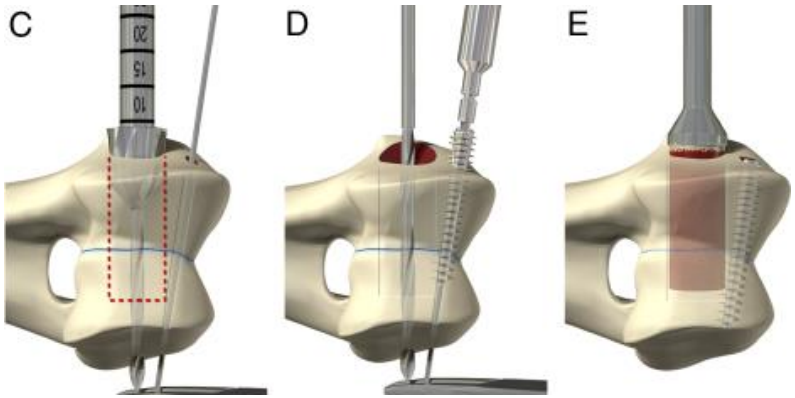
IOHC Prognosis/Outcome

- Controversial
- Conservative
  - Fracture risk, 8-43%
- Transcondylar screw
  - Acutrak
- Autogenous bone grafting



Fitzpatrick, Vet Surg 2009

- Screw failure
  - Continued instability, n=5
    (Alasdair Charles, Vet Surg 2009)
- Autogenous graft + screw
  (Fitzpatrick, Vet Surg 2009)
  - Fusion in 7/8 elbows
  - Improved function scores (n=6)
    - 5 improved, 1 NSAIDs
    - Mean 35 days
- Life long OA management
- "Guarded" with fracture
  - Non-union
  - Screw failure (23%)

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Would you rather?

A) Go to Australia but not see koalas

B) Go to Hawaii but not see sea turtles

C) Go to Australia but not see the northern lights

Audience question???

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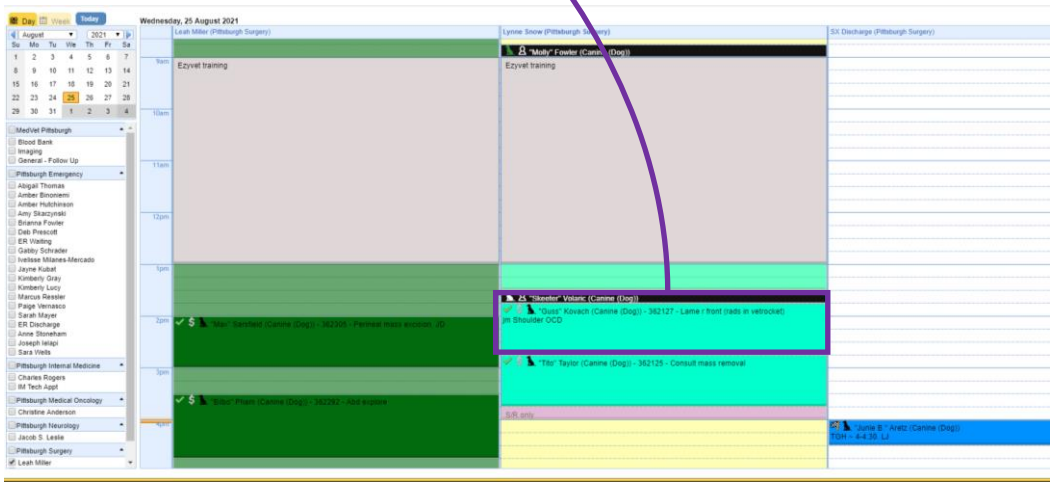
“Bernie”

“Bernie”
7 mo/o MN Bernedoodle
Right forelimb lameness



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The value of a good orthopedic exam

- History
  - Lame entire life, intermittent
  - Improved with NSAIDs
- Gait analysis
  - “Down on sound”
- Standing exam
  - Mildly shifting weight off RFL
- Recumbent exam
  - Pain on full extension of right shoulder

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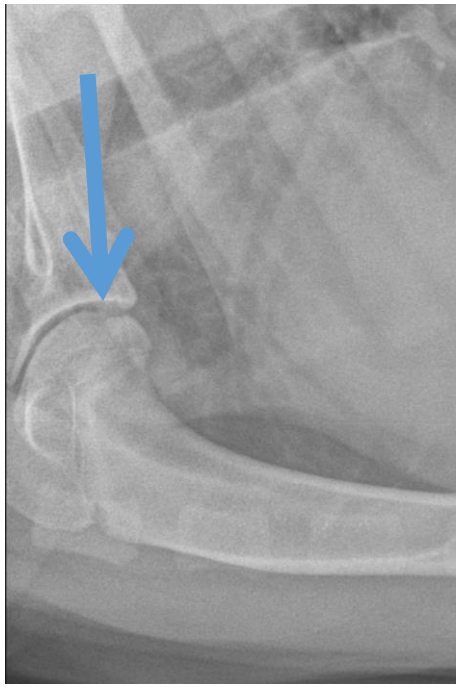
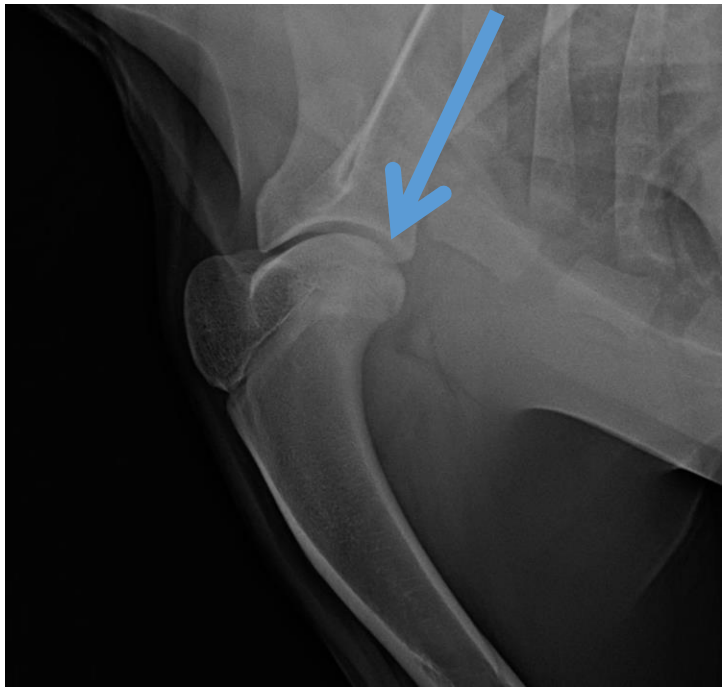
Shoulder radiographs





- Right

- Left

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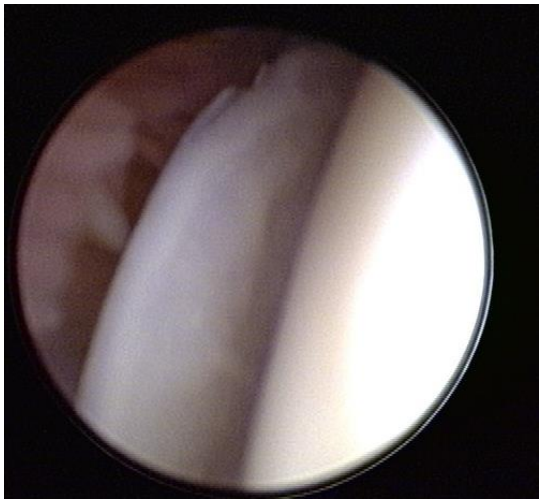
Osteochondrosis/ Osteochondritis Dissecans (OCD)

- Disturbance of endochondral ossification
- Formation of cartilage flap
- Large & giant breeds, males
- 27-68% bilateral
- 4-8 months of age

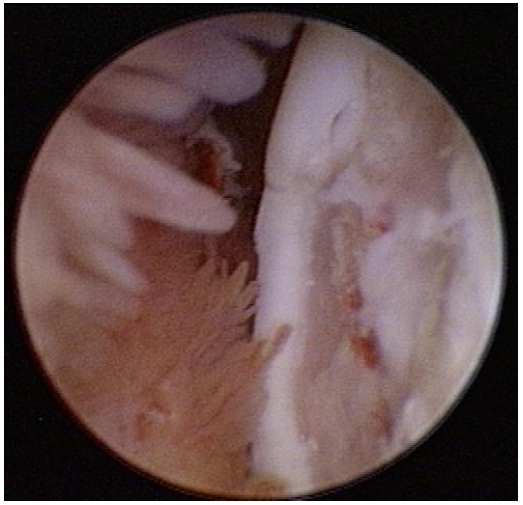
- Radiographs
  - Careful positioning
- Subchondral defect on lateral projection
- Mineralized body caudal joint pouch or biceps tendon sheath
- "Joint mouse"

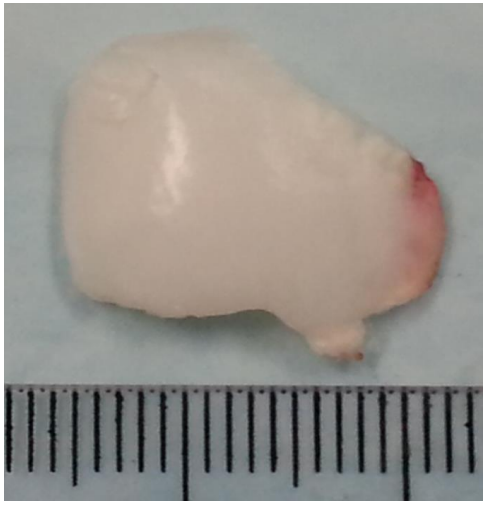
Osteochondrosis/ Osteochondritis Dissecans (OCD)



Treatment options

- Cartilage flap removal
  - Open arthrotomy
  - Arthroscopy
- Conservative management
  - Vigorous activity
  - Not predictable
  - Continued lameness
    - Dislodge to biceps tendon
    - Persistent cartilage flap





18mm long cartilage fragment

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Shoulder OCD Prognosis

- Excellent with minimal DJD for return to normal to near normal function
  - Shoulder OCD has best prognosis of all joints that can be affected by OCD
- Rehabilitation
- Improved outcome with surgical removal of cartilage flap

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Conclusions

- Rely on your orthopedic exam!
  - Lesion localization to help focus diagnostics
  - Elbow pain / elbow effusion = elbow disease until proven otherwise
- Bilateral disease
- Diagnostic imaging to differentiate etiologies
- Good prognosis with early intervention
  - Arthroscopy
  - Lifelong OA management

lynne.snow@medvet.com
surgery.pittsburgh@medvet.com

Thank you!

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