Common Causes of Forelimb Lameness

Matthew Barnhart DVM MS
Diplomate American College of Veterinary Surgeons
MedVet Medical & Cancer Centers for Pets
Worthington, Hilliard, Dayton, Cincinnati, Toledo, OH
Mandeville and New Orleans, LA
Indianapolis, IN, Lexington, KY, Chicago, IL, and Mobile, AL
Elbow Dysplasia

- Medial Compartment Disease (MCD)
  1. Fragmented medial coronoid process
  2. FMCP + adjacent cartilage erosion
  3. FMCP + diffuse cartilage erosion +/- humeral kissing lesion
- Ununited Anconeal Process
- Osteochondritis dissecans
- Ununited Medial Humeral Epicondyle
MCD Presentation

- Large breed dogs < 1 yr old
  - Bernese Mt. dog, Rottweiler, Labrador retrievers (!)

- Large breed dogs > 3 yr old
  - OA present

- Lameness worsens throughout the day with activity and is most obvious after rest
  - Can be bilateral
  - Polygenetic inheritance
Elbow Dysplasia Diagnosis

• Physical examination
  • Variable forelimb lameness
  • Pain on elbow manipulation (extension, supination) and medial palpation
  • Variable joint effusion and PA thickening

• Radiographs
  • Lateral (degrees of flexion) and AP
  • Caudomedial-craniolateral oblique

• Computed tomography
Elbow Examination

- Variable weight bearing lameness
- Variable joint effusion
- Variable periarticular (PA) thickening
- Variable pain on supination
- Variable pain on palpation
  - Digital pressure over MCP
MCD Etiology

- Narrow ulnar notch
- Radioulnar incongruency (short radius)
- Supraphysiologic forces transmitted through biceps tendon
Elbow Radiographs
Radiographs are **not** sensitive for MCD
MCD Diagnosis - Arthroscopy

[Images of arthroscopic views of a joint with labeled areas]
### Medial coronoid process (MCP) pathology

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Calibration guidelines</th>
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| Fragment (F)    | - There is an obvious step or gap at the cleavage plane, with the fragment being elevated or separated relative to the remaining ulnar coronoid process.  
                   - [Fragments are NOT subdivided into free fragments or fragments in situ]       |
| Fissure (F)     | - There is no obvious step or gap at the level of the cleavage plane.                   
                   - [Fragments in situ are classified as fissures when there is no visible step] |

### MCP fragment morphology

- **Radial incisure fragment or fissure (RIF)**
  - The shape of the fragment is semi-circular, with an obviously convex abaxial border.
  - The fragment cleavage plane does not scan the apex of the medial coronoid process (MCP).
  - CR: the abaxial border of the fragment bisects the apex of the MCP.

- **Tip fragment or fissure (TF)**
  - The shape of the fragment is more triangular than the RIF, with a less convex abaxial border.
  - The fragment cleavage plane scans the apex of the MCP.
  - The medial peripheral margin of the fragment is frequently obscured by synovial fronds.

- **Radial incisure-tip fragment or fissure (RITF)**
  - RI fragments with an abaxial border that spans the apex of the MCP.
  - [RITF fragments can further fragment into multiple pieces.]

### Focal vs. diffuse pathology

- **Focal ulnar pathology**
  - Pathology is confined to the free (axial) margin of the MCP, with the main body of the MCP being unaffected.
  - Arthritis, pathology involves <33% of the total surface area of the MCP.

- **Diffuse ulnar pathology**
  - Pathology involves >33% of the total surface area of the MCP.
  - Humoral change (focal vs. diffuse) mirrors the surface areas defined for ulnar pathology.

### Modified Outerbridge Score (MOS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
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<tbody>
<tr>
<td>MOS 1</td>
<td>- No visible cartilage pathology</td>
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<tr>
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<td>- There should be normal synovium in normal elbows, however, attribution of a global cartilage pathology grade of 0 should not be influenced by the presence of synovial inflammation</td>
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<tr>
<td>MOS 2</td>
<td>- Cartilage softening and swelling</td>
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<td>- Cartilage thickening or a dull surface (less translucent) compared with adjacent cartilage are used as visual guidelines in the absence of tactile feedback from the hook probe</td>
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<tr>
<td>MOS 3</td>
<td>- Partial thickness surface defects</td>
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<td>- Cartilage fibrillation</td>
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<td>- Fibrillation does not reach subchondral bone</td>
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<tr>
<td>MOS 4</td>
<td>- Deep fibrillation to the level of subchondral bone</td>
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<tr>
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<td>- Differentiated from MOS 3 due to the presence of poor quality focosulent cartilage</td>
</tr>
<tr>
<td>MOS 5</td>
<td>- Full thickness cartilage erosion</td>
</tr>
<tr>
<td></td>
<td>- Full thickness cartilage erosion</td>
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<tr>
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<td>- The exposed subchondral bone has a burnished appearance</td>
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</table>
Limited FMCP Disease Treatment

- Arthroscopy
- FMCP removal
- Subtotal medial coronoidectomy
- Biceps Ulnar Release Procedure (BURP)
B.U.R.P.

Arthroscopic release of ulnar portion of biceps insertion
Diffuse MCD Treatment

- No lateral compartment dz
- Sliding Humeral Osteotomy
- CUE
- End-Stage options
  - Arthrodesis
  - Elbow replacement
Canine Unicompartmental Elbow (CUE)
Clinical outcomes associated with the initial use of the CUE arthroplasty system in dogs

- 90 dogs with MCD that had failed previous treatment(s)
- Data: orthopedic examination, lameness evaluation, owner evaluation, complications, and arthroscopic and radiographic assessments
- Postoperative follow-up: 6 - 47 months
- 11.7% complication rate
- 91% Owner assessed full and acceptable outcomes
- 90% of working dogs returned to work
- Lameness scores and mean % body weight distributions improved significantly
- Arthroscopic assessment: stable implants with new tissue ingrowth adjacent to the implants, no implant wear, no lateral compartment changes
Osteosarcoma

- 85-95% of bone tumors
- Large, giant-breed dogs
- Bimodal age peaks: 18-24 months and 7 years
- Distal radius most common site
- 10% of patients present with gross pulmonary metastases

Osteosarcoma

- 98% of patients have pulmonary micrometastases
- Radiographs - proliferative or lytic or mixed
- Very rarely associated with implants
Osteosarcoma Treatment

• Surgical excision of affected bone is treatment of choice
  • Amputation
  • Limb Sparing Surgery

• Palliative radiation

• Palliative medical management
Osteosarcoma Prognosis

- Mean survival times
  - < 3 months with palliative medical treatment
  - ~6 months with amputation/limb sparing alone
    - 11.5% alive at 1 year and 2% alive at 2 years
  - ~12 months with surgery and chemotherapy
    - 45-50% alive at 1 year and 10-28% alive at 2 years
  - ~4-5 months with radiation treatment

Osteochondritis Dissecans (OCD)

- Osteochondrosis: failure of normal cartilage differentiation
- OCD: dissecting articular cartilage flap with inflammation
  - Only OCD is clinical
- Genetic and nutritional
  - Influenced by “over nutrition”
- Often bilateral
Shoulder (humeral head) OCD

- Most common location
- Chronic slowly progressive lameness
  - Worst after activity and when first rising after rest
- Young (6-8 months of age) large breed dogs
  - Golden retrievers, Labrador retrievers, Bernese Mt. Dogs
Shoulder OCD - Diagnosis

- Physical examination
  - Weight-bearing lameness
  - Variable muscle atrophy
  - Pain on shoulder ROM especially on flexion
- Radiographs
  - Lateral view definitive
Arthroscopic cartilage flap removal and subchondral defect debridement

- Minimally invasive
- Quick recovery
- No tenotomy required
- Excellent visualization of joint
Shoulder OCD - Prognosis

• Excellent
• OA progression is variable but generally minimal
Stifle OCD

- Lateral femoral condyle OCD
- Rare
- Stifle pain, marked joint effusion
- AP radiographic view is diagnostic
- Poor prognosis - old tx
- Good prognosis – new tx
Hock OCD

- Medial or lateral trochlear ridge of talus
  - Medial more common in Labs
  - Lateral usually seen in Rottweilers
- Hock pain, joint effusion, periarticular thickening
- AP radiographic view is diagnostic
- Guarded prognosis
Elbow OCD

- Medial aspect of humeral condyle
- Often associated with other lesions (FMCP)
- Radiographs alone may be diagnostic
  - CT and arthroscopy are definitive
- Guarded prognosis