Imaging of Young Dog Skeletal Diseases

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Providing the best quality care and service for the patient, the client, and the referring veterinarian.

Objectives

- Demonstrate diagnostic imaging findings
- Discuss the signalment, history, etc.
- Recommend additional views, ancillary diagnostics, and/or treatments

Atlanto-axial subluxation/instability, Dens agenesis/hypoplasia

- Young, toy breed dogs
  - Absence of transverse ligament
  - +/- Trauma
  - Ataxia, +/- non-ambulatory, pain
- Radiographs: Increased distance between C1 dorsal arch and C2 spinous process
  - Avoid flexion!
- MRI: spinal cord edema/syrinx, compression

Oblique lateral views without flexion: Normal vs. abnormal dens
Atlanto-axial subluxation/instability, hypoplastic dens (3 yr. Chihuahua FS)

Aplastic dens - 11 mo. Terr-X FS

11 year old FS Shih Tzu. Running in back yard, acutely painful w/neuro deficits x 4

Hemivertebra
- English & French Bulldogs, Pugs, Boston Terriers
- Thoracic, LS spine
- Very common
- Rarely clinical
Hemivertebra

LS transitional vertebrae as a predisposing cause of cauda equina syndrome in German shepherd dogs, JAVMA 1993 Jun 1;202(11):1877-82.

Osteochondrosis
Osteochondritis dissecans

- Large breed dogs, 6-9 months
- Abnormal endochondral ossification
  - Uni- or bi-lateral
  - Joint effusion
  - Subchondral lucency
  - DJD despite young age

Shoulder OCD

- Caudal humeral head
- May need to supinate/pronate lateral view
- Great Dane, Border Collie, Retrievers
1 yr Labradoodle MC - 4 weeks left fore lameness

Humeral condyle OCD

CT: Humeral OCD/Wear Lesion
Lat Fem Condyle OCD - 9 mo Lab Ret MC

Medial Femoral Condyle OCD - 9 mo Lab Ret MC

Med Femoral Condyle OCD - CT coronal reformat

Tarsal OCD (13 month Lab Ret Fl) - Normal vs. OCD
**Panosteitis**

- German shepherds, large breeds
- 4-12 months, up to 7 years
- Male >> Female = 4:1
- Long bones, solitary or multiple
- Diaphyseal medullary increased opacity
  - incr medullary, endosteal, periosteal osteoblastic and fibroblastic activity
- Self-limiting

**Panosteitis - 11 mo Ger Shep MI**

**Femoral Head Necrosis**
aka. Legg-Calvé-Perthes Disease

- Toy breeds; any breed 2° to trauma
- Bilateral vs unilateral
- Aseptic necrosis
- Rads:
  - Early = normal
  - Mid = lucencies in subchondral bone
  - Later = irregular, collapsed, +/- path fracture, muscle atrophy
Femoral Head Necrosis:
11mo Havanese MC & 5 mo Maltese FS

Elbow Dysplasia
- Young Labs, Shepherds, Rottweilers, Pit bulls, Shetland Sheepdogs
- Uni- or bilateral forelimb lameness, pain on elbow extension
  - Medial coronoid process (MCP) disease
  - Ununited anconeal process (UAP)
  - Incongruity
  - OCD vs wear lesion

Normal Elbow Radiographs

Elbow Radiographs & CT
-FMCP, DJD
**Ununited Humeral Condyle aka. Incomplete ossification**

- Spaniels, spaniel-mixes
- Should fuse by 84d of age
- Condylar fracture w/ normal activity
- Difficult to image – anconeal process superimposed over lucency in CrCd view
  - Try 15° Cr-Med to Cd-Lat oblique

**CT Ununited humeral condyle**
(A) Normal vs (B) Partial and (C) Complete

**Hypertrophic Osteodystrophy**

- Large/giant breeds, Weimaraners
- 2-7 months
- Systemic illness, self limiting
  - Fever, pain, lethargy, V/D
- Bilaterally symmetrical long bone metaphyseal lucencies
  - Neutrophilic inflammation, necrosis, hemorrhage
  - “Double Physis”
Weimaraners with hypertrophic osteodystrophy -- JAVMA May 2013

- 94% had radiographic lesions at onset, while 6% had rad lesions 48-72 hrs after
- All treated initially w/ steroids achieved remission w/in 8-48 hrs
  - 55% treated w/ NSAIDs did not achieve remission by 7 days after Tx
- All 53 vaccinated 1-30d before onset

Hypertrophic Osteodystrophy
- Early (3 days)

Hypertrophic Osteodystrophy
- Mid (10 days)

Hypertrophic Osteodystrophy
- Late (4 months)
**Physeal Fractures**

- Why important?
  - Physeal injury can lead to premature closure
  - Most problematic with distal radial/ulnar physes
- Usually a hx of trauma
- Can lead to elbow joint incongruity, valgus/varus, etc

**Incongruity**

- Normal vs Distal radial premature physeal closure → shortened of radius

**Premature closure of the distal ulnar physis – pre and post-op**

- 8 month old Basset-mix FS
- HU & RU incongruities bilaterally

**Incongruity**

Immediate post-op vs healed → greatly improved congruity!
Nutritional secondary hyperparathyroidism

- All meat diet = insufficient calcium
- Generalized osteopenia, thinned cortices
- Multiple pathological fractures

10 month MC Golden retriever

- Injured 3 wks ago while playing w/ another dog, worsened 3d ago
- Grade 3/4 lame left pelvic limb, painful when extending left hip

Frog-legged VD view

- Left Femoral Capital Physeal Fracture

Other diseases ...

- Cervical spondylomyopathy (Wobbler)
  - Great Dane, Doberman Pinscher, Dalmatian
- Patellar luxation
  - Best diagnosed on exam
- Hip dysplasia
  - Dr Polidoro
Thanks!

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