JOINT INJURIES
Prof. MVDr. Alois Nečas, PhD, MBA
University of Veterinary and Pharmaceutical Sciences Brno
Joint trauma
Bone structures

- Intraarticular fx

Supportive structures

- Intraarticular and periarticular
- Joint capsule, ligaments, tendons, muscles
- Juxtaarticular muscles

HIP INJURIES
Hip luxation

- Traumatic
  - Adult dogs
  - 50% of luxations
  - Rupture of lig. capitis femoris and joint capsule
  - Craniodorsal 95%
  - Caudoventral
  - Cranioventral
  - Medial acetabular fx
- Due to severe hip dysplasia

Hip luxation
Tx
Depends on grade of HD

- Closed reduction
  - Within 10 - 14 days
  - General anaesthesia
  - Stable craniodorsal
  - „Ehmer sling“, sling 90 - 90 14 days

- Relaxation
- Open reduction
  - Open reduction craniodorsal lx
- Suture of joint capsule
- Capsule reconstruction using synthetic material
- Transacetabular pin
  - „Toggle pin“
FHE

✓ caudoventral lx
Suture of joint capsule
Extracapsular stabilization using synthetic material

Hip fractures
Intraarticular femoral head fractures
▪ two types
▪ are seen with hip luxation

Each type presents a challenge to veterinary surgeon to achieve a satisfactory outcome

Sagittal femoral head fracture
▪ less common type
▪ larger than one-quarter of the femoral head
open reduction and stabilization

Avulsion of a small portion
of the femoral head
▪ the more common type
▪ attached to the round ligament
▪ the fragment too small to be adequately stabilized
▪ and its presence may result in failure of attempts at treatment by closed reduction

▪ excision is indicated

▪ can be done ASC
Portals
Avulsion of a small portion
of the femoral head
STIFLE INJURIES
CCL rupture
CCL avulsion
✓ up to 1 year
soft bones
CCL avulsion
Collateral ligaments injuries
and knee luxation
Incidence
▪ sporadically isolated
▪ dogs, cats
▪ no age and breed predilection
Ethiology in small animals

- Complex injury

- dog  car accident, falling from heights, biting injury
- cat  biting injury, falling from heights

MCL, LCL, CCL, CaCL, menisci, extensor
collateral ligaments injuries

Clinical signs
- Degree of instability depends on

- type of injury

  which ligament is torn

Clinical signs
- acute severe lameness
- joint effusion
- haemarthrosis
- pain

Therapy
- Revision - ligaments, menisci
- Reconstruction of the MCL/LCL
  Kessler suture
- Capsule suture

Therapy
- Ancillary fixation of the MCL, LCL
- CCL/CaCL
- Avulsion – screw
Ancillary fixation
- medial x lateral
Stabilisation
- **Rigid** = ESF
- **Parcial** = cast

**Intraarticular foreign bodies**
*Avulsion of long digital extensor*
**History**
- young, large breeds
- trauma: lameness, pain, lateral swelling
**Dg**
- Ddg.: parcial CCL, OCD

might be seen just avulsion of the cartilage
**X-ray + diagnostic A/A**
**Therapy**
- screw + washer OR anchor
- excision of the fragment
  - + suture of the tendon to the capsule
**Prognosis**
- in correctly managed cases
- favourable

**SHOULDER INJURIES**
*Supraglenoid tubercle avulsion*
**Arthroscopy**
*Supraglenoid tubercle avulsion*

**Shoulder instability / luxation**

More often
**medial shoulder instability**
**Therapy**

- **Conservative**
- **Surgical**
  - RF shrinkage
  - anchors and prosthetic suture
  - Medial shoulder lx
**Tx**
- **Closed reduction**
✓ stable
Velpeau 14 days
(passive exercises, swimming
after 1 months no limitation
✓ unstable
- medial biceps brachii transposition
- arthrodesis

Medial shoulder luxation
- screw and washer
- anchors

horse stepped on her today
acute severe lameness – right foreleg

Clinical signs
- grade 4 lameness
- severe shoulder pain

Lateral shoulder instability

Lateral shoulder lx
Tx
- Closed reduction
  - stable
  - „spica splint“ 14 days
  (passive exercises, swimming
after 1 months no limitation
✓ unstable
- Lateral biceps transposition

- arthrodesis

Lateral shoulder luxation
- screw and washer
- anchors

Rhodesian ridgeback, female, 3 years

- 18 months lameness – right foreleg
- after playing with the other dog
- long-term and repeatedly NSAIDs

Shoulder flexion + elbow extension
X-ray
mineralized opacity (sulcus)
glenoid

Ultrasound + asc

**Rupture of**
m. biceps brachii tendon

**Therapy**

- **Conservative**
- **Surgical**
tenotomy

**Prognosis**

- **good**

**ELBOW INJURIES**

Elbow luxation
Monteggia fx
Traumatic
Elbow lx

**Tx**

- **Closed reduction** within 7 - 10 days

**General anaesthesia**

✓ stable

„spica splint“ 7 days

passive exercises, swimming + 3 weeks limited activity

✓ unstable

- **Open reduction** caudolateral approach
reconstruction of collaterals
- **arthrodesis**

**Arthroscopy**

- **lateral humeral condylar fractures**
routinely repaired using open reduction
fluoroscopically guided closed reduction
arthroscopy might be used in closed management

**Arthroscopy**

**Arthroscopy**

**Arthroscopy**

**Arthroscopy**

- **can be also used** to diagnose and treat
incomplete ossification of the humeral condyle
LR, female, 3 months

- acute lameness – right foreleg
- yesterday while playing caught foot in the fence
- X-ray
- Lateral humeral condyle fx

- Lag screw + K-wire

Post op X-ray
- Lateral humeral condyle fx

AND

Fractured medial coronoid
- Arthroscopy

- FCP removal

**CARPAL INJURIES**
- Carpal injuries
  - fractures
  - ligamentous injuries
  - various combinations

Carpal injuries

List extended:
- **antebrachio [carpal joint subl]x or l [x]**
- radial carpal bone l [x]
- radial carpal bone fx
- accessory carpal bone fx
- accessory carpal bone sublx
- ulnar and numbered carpal bones fxs
- middle carpal l [x] or sublx
- **carpal hyperextension**
- **shearing injury of the carpus**

Carpal injuries

- History
  - falling or jumping from a height
  - car accident

Carpal injuries

- Clinical signs
acutelly non-weightbearing lameness
Radial carpal chip fx
Arthroscopy
Arthroscopy

*bordercolie, female, 4 years*

- acute onset of lameness – 7 days right foreleg
- jumped over the fence

Carpal injuries
Carpal injuries
Carpal injuries

#3:

- **#3: Berenika**
  - hovawart, 2,5 years, female
  - chronic lameness - 5 weeks
  - reluctance to walk
  - abnormal posture
  - „touching ground with the paw“
  - T: splinting

- **#3: Berenika**
  - bilateral forelimb lameness, grade 4
  - worse on left
  - painful carpus on manipulation
  - loss of caudal support

- **carpal hyperextension**
  - **#3: Berenika**
  - **#3: Berenika**
  - **#3: Berenika**
  - **#3: Berenika**

*Next step?*

- radiography
  - **#3: Berenika**
  - **#3: Berenika**
  - **#3: Berenika**
  - **#3: Berenika**
  - **#3: Berenika**

*Diagnosis?*

- carpal hyperextension bil
- medial instability sin
- Fx of 5 th MTC bil

*#3: Berenika*

*Treatment?*
-Reconstructive surgery x ARTHRODESIS?

-EXTERNAL COAPTATION !!!
Carpal arthrodesis
The goals:
✓ relieve pain
✓ provide stability
✓ stop advancing disease
✓ overcome postural deformity
Pancarpal vs Partial Arthrodesis
Arthrodesis
Rules:
✓ All articular cartilage must be thoroughly removed
to the level of subchondral bone
✓ shaving or osteotomy
✓ preservation of the normal joint contours by shaving permits intraoperative adjustment in the
fusion angles and simplifies later limb alignment
by hand with bone curettes or with a high speed burr
cool the burr with saline to prevent heat bone necrosis
✓ if long bone ends are sclerotic, holes can be drilled into the medullary canal
vascular access channels
Arthrodesis
Rules contd:
2. Bone grafting is harvested to promote bone healing
✓ cancellous bone graft
✓ donor site - proximal humerus
✓ timing of the grafting
shortly before it is needed - more viable cells
✓ separate instrument pack
Arthrodesis
Rules contd:
2. Bone grafting is harvested to promote bone healing
✓ place first the plate and the most important screws
without fully tighten the screws
✓ plate and screws are removed and the graft is packed
✓ then the plate is put back in place
✓ more graft can be placed around and over the arthrodesis surface
Arthrodesis
Rules contd:
3. Correct alignment of the limb
✓ normal “weight bearing” angle 140-180°
may differ from animal to animal
✓ preoperatively to determine the optimal angle of fusion for each particular patient
✓ it is better to make the arthrodesed angle too flexed, rather than too extended
toe dragging
✓ if a significant portion of bone ends are removed, the expected angle must be extended to
compensate for the loss of bone length
Arthrodesis
Rules contd:
4. Rigid stabilization
✓ plates and screws
Arthrodesis
Hybrid carpal arthrodesis plates
✓ in a range of three sizes were introduced by
Veterinary Instrumentation, UK
✓ 5 degrees of extension
✓ minimize the potential complications

TARSAL INJURIES

pitbull, male, 4 years

- acute onset of lameness – 3 days left foreleg

Tarsal injuries
Tarsal injuries
Arthroscopy
#2 „Shearing injury“
- Fx of medial malleolus

- Tissue abrasion

Tx
- fixation vs. excision of the fragment

- Bone anchor + prostetic ligament
- + reconstruction of the collateral

Prognosis
✓ If treated appropriately

good
Arthrodesis