Veterinary Orthopedics
Thinking Outside the View Box

Fred Pike, DVM, DACVS
Veterinary Specialty Hospital of San Diego
DISCLOSURE

MWI Consultant

Securos Orthopedic Institute

F.S. Pike, DACVS
Veterinary Specialty Hospital of San Diego
Advances in Veterinary Orthopedics
Objectives

- Review Medial Shoulder Instability
- Updates on Elbow Dysplasia
- Meniscal Pathology
- Minimally Invasive Plate Osteosynthesis
- Joint preservation
- Locking Plate Technology
1) Medial Shoulder Instability
Medial Shoulder Instability (MSI)

- Previously diagnosed only in performance dogs, MSI is being diagnosed with increasing frequency.
- Lameness can range from decreased performance to intermittently non-weightbearing.
- Pathology can affect the medial glenohumeral ligament, subscapularis tendon or occasional the biceps tendon.
What creates a stable shoulder?

- **Passive shoulder stabilizers**
  - Medial and Lateral Glenohumeral Ligaments
What creates a stable shoulder?

- **Passive shoulder stabilizers**
  - Joint Capsule
What creates a stable shoulder?

- **Active shoulder** stabilizers
  - Biceps
  - Supraspinatus
  - Infraspinatus
  - Teres minor
  - Subscapularis
Scapulohumeral Joint

Medial Shoulder Instability
What is shoulder instability?

- Incidence?
  - Unknown, but SI accounted for 50% of the etiologies in a series of 400 dogs with shoulder pathology
  - Medial ~77%, lateral or multidirectional ~23%
What is shoulder instability?

- Both traumatic and degenerative processes that result in damage to the shoulder stabilizers.
- Not typically infectious/inflammatory or immune
- MGH and subscapularis are affected in ~80% of MSI cases
Signalment

- Age: 1-13 years: mean 4.8 years
- Weight 2.5-59kg: mean 23.5kg
- Border collie, labs, Australian shep over represented
- Agility dogs ~50% of cases
- Male > female
- 96% unilateral

Clinical Findings

- **History**
  - Often acute presentation, but also waxing and waning.
  - May also be chronic, unilateral lameness
  - Often incompletely responsive to NSAIDs
How to diagnose

- Shoulder palpation
  - Pain with extension
  - Pain with craniomedial palpation
  - Pain with external rotation
How to diagnose

- Radiographs – Generally not rewarding
Radiographs – Rule out Other Pathology
Measurement of Angles of Abduction Using Goniometry and Digital Image Analysis

- Sensitive and specific means of evaluating MSI
- Dog should be sedated
- Lateral recumbency

Veterinary Surgery
Volume 34, Issue 5, pages 463-468, 24 OCT 2005
Measurement of Angles of Abduction for Diagnosis of Shoulder Instability in Dogs

- MSI: abduction angle $53.7 \pm 4.7^\circ$
- Normal $32.6 \pm 2^\circ$

Veterinary Surgery
Volume 34, Issue 5, pages 463-468, 24 OCT 2005
MRI

- ~90% agreement with surgical findings
- Most important to rule out extraarticular pathology
- Least valuable for MGH tearing
- Expensive
MSI Diagnosis
Scapulohumeral
Medial Compartment Pathology
MSI Repair
Surgical management

Shoulder Tightrope - Prosthetic Ligament
Scapulohumeral Joint
Tightrope verse intra-articular repair
Shoulder Hobbles for MSI

www.dogleggs.com
Summary

- MSI is a very common cause of forelimb lameness in the adult dog
- Shoulder abduction angles >50 are diagnostic
- Arthroscopy is the gold standard for diagnosing
- Prognosis with surgery is good and generally better than with medical management
2) Elbow Dysplasia
Humeroradioulnar Joint
Medial Compartment Disease

What we know

1. Radiographs evaluate secondary pathology
2. Advanced imaging detects primary pathology
3. Arthroscopy is the “gold standard” for cartilage evaluation
Humeroradioulnar Joint
Medial Compartment Disease

What we don’t know

1. When is subtotal coronoidectomy indicated
2. Which cases benefit from humeral or ulnar osteotomies
3. How to prognosticate for owners

- Personal experience
  >80% of cases treated with arthroscopic “standard of care” have a good to excellent prognosis
  <20% of patient experience progressive medial compartment disease
Medial Compartment Disease
Fragmented Medial Coronoid
Radial incisure lesion
Fragmented Medial Coronoid
How to Address Humeroulnar Conflict
Sliding Humeral Osteotomy

The Research

Measurement of humeroulnar transarticular joint force confirm that the articular surface of the ulna contributes significantly to load transfer.
The Research

Mean force on the medial articular surface of the ulna is decreased by a sliding osteotomy.
Offers an alternative for advanced medial compartment disease beyond medical management or total elbow replacement.

Proximal abducting ulnar osteotomy

PAUL displaces the medial coronoid process caudally and abaxially and shifts contact pressures towards the lateral elbow compartment

Varus angulation is decreased

Canine Unicompartmental Elbow

The CUE implant provides a less invasive, bone-sparing option for resurfacing the bone-on-bone medial compartment while preserving the dog’s own “good” cartilage in the lateral
3) Stifle Joint – The Meniscus

- Normal meniscal function
  - Disperse forces
  - Distribute joint fluid
    - Nutrition
    - Lubrication
  - Stability
  - Prevent joint capsule entrapment
  - Sensory feedback to stifle
Probing of the meniscus is imperative
Meniscal Treatment

- **Meniscal release**
  - Originally described by Slocum
    - Prevent meniscal tears after TPLO

- **Pros**
  - Prevents future meniscal tears
  - Treats “hidden” caudal pole tears

- **Cons**
  - Eliminates hoop stress
  - Increases load on articular cartilage in medial compartment
  - Increases DJD
Effect of Meniscal Treatment
Meniscectomy verses Release

Effect of Meniscal Treatment

- Loss of normal meniscal function
- Increase cartilage point pressures
- Breakdown of articular cartilage
- Degenerative joint disease
Key Point

- Always explore the stifle joint
  - Medial and lateral meniscal tears
  - Don’t just look; probe the meniscus

- If meniscal tear
  - Partial meniscectomy
    - Leave as much as possible
    - Re-probe meniscus
4) Minimally Invasive Orthopedics

- Goals of minimally invasive surgery

1. Minimize patient trauma
2. Minimize patient pain
3. Potential reduction of anesthetic time
4. Minimize hospitalization
Minimally Invasive Orthopedics

Applications for closed reduction / fixation

- Select humeral condylar fractures
- Sacroiliac luxations
- Percutaneous plating
Percutaneous Plating

“Elli” Vergil

Acutely non-weight bearing
15 months post definitive RT of a STS
Percutaneous plating
Fluoroscopic Condylar Fracture
Sacroiliac Luxation
Glenoid Avulsion
Glenoid Avulsion
Glenoid Avulsion
5) Coxofemoral Joint
Joint preservation vs replacement
Coxofemoral Joint
Joint elimination vs preservation vs replacement
Chronic slipped femoral capital physis

20 mo golden retriever
Micro Total Hip Arthroplasty

Avascular necrosis of the femoral head
6) Locking Plate

Conventional plates depend on friction between the screw / plate - plate / bone interface for stability.

Locking plates & screws create fixed angles that do not rely on screw purchase or friction.
How is a Locking Plate Different?

Conventional Plating
How is a Locking Plate Different?

Locking Plate
When to consider Locking Plates

When non-locked screw stability questioned

1. Osteopenic bone
2. Juxta-articular fractures / osteotomies
3. Periprosthetic fractures
4. Nonunion
5. Stripped screws
Locking Plates and Screws

How does fracture configuration influence implant?
Why Locking?
Limited bone stock above physis
6 mo MN Bengal injured in a fall

Presented to neurology service for tetraparesis
6 mo MN Bengal fed all meat diet
Immediate PO
2 weeks PO
- German Shepherd
  - Male, 20 months
  - 37 kg
  - Right humeral (bicondylar)

pre-op