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Arthroscopy Mini Series

Session 3: Improving your arthroscopy skills

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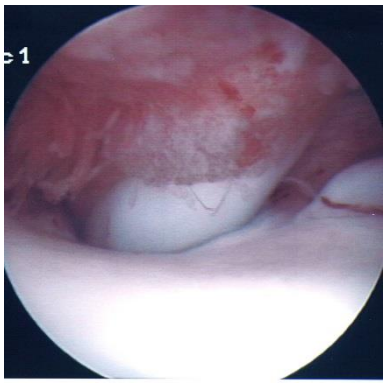

Arthroscopy Miniseries Session 3

Improving your arthroscopy skills

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Willows Referrals, Solihull

Miniseries Session 3 Course Outline

- Arthroscopy in elbow disease
  - Elbow dysplasia
  - Humeral condylar fissures
  - Flexor tendon enthesiopathy
- Arthroscopy in shoulder disease
  - Osteochondrosis
  - Biceps tendinitis
  - Medial shoulder instability
  - Supraspinatus tendinopathy

Arthroscopy in elbow disease

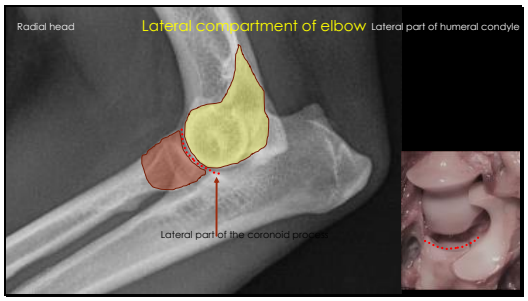
Elbow dysplasia

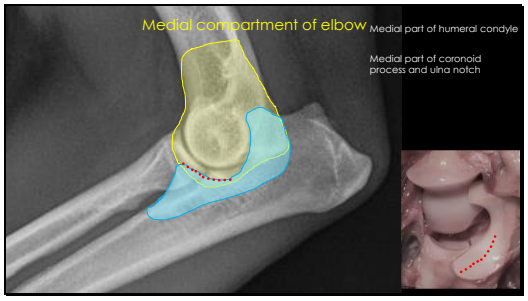
- Umbrella term for several conditions
  - "Developmental elbow disease" proposed as alternative name
- Aetiology remains speculative and probably multifactorial
  - Growth asynchronicity, osteochondrosis, static and dynamic joint incongruity
- Disease typically manifests in medial compartment
- Up to 50% of certain breeds affected
  - 25% Labrador retrievers
- Typically present as insidious onset lameness from 4-6 months of age
- Toe-out stance, elbow pain on joint extension, elbow effusion

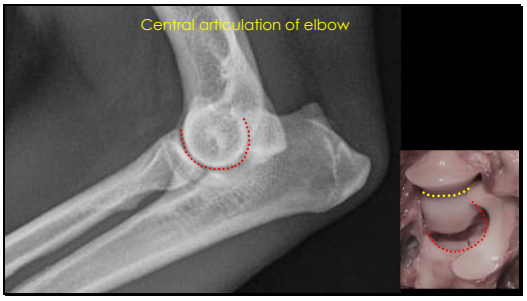
Elbow dysplasia

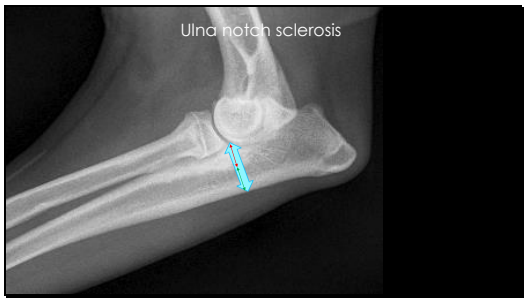
Medial coronoid process disease	>96%
Humeral osteochondrosis	<25%
Elbow incongruity	6-50%
Flexor tendon enthesiopathy	~15% (possibly higher)
Ununited anconeal process	Uncommon

- Most common breeds
  - Bernese mountain dogs
  - Labrador retrievers
  - German shepherd dogs
  - Rottweilers

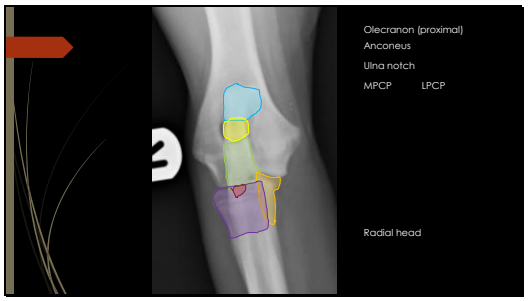


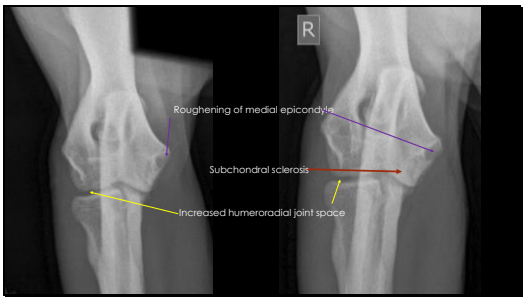

Medial compartment of elbow
Medial part of humeral condyle
Medial part of coronoid process and ulna notch


Central articulation of elbow


Ulna notch sclerosis


Osteophytosis and ulna notch sclerosis


Olecranon (proximal)
Anconeus
Ulna notch
MPCP
LPCP
Radial head

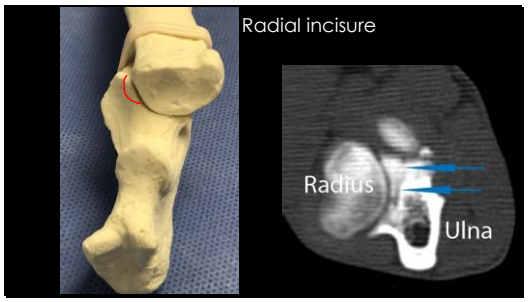

R
Roughening of medial epicondyle
Subchondral sclerosis
Increased humeroradial joint space

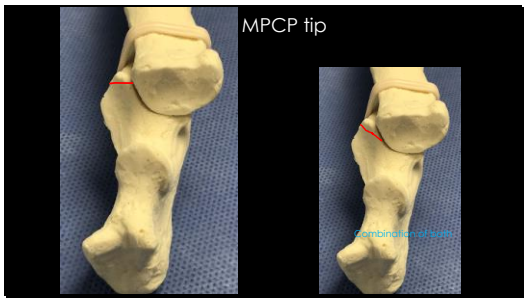
Medial coronoid process disease

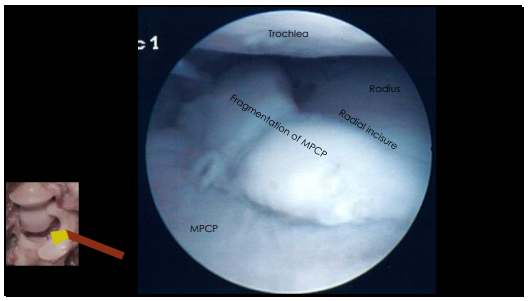
- A spectrum of disease ranging from mild cartilage damage to displaced fragments
- Cartilage
  - Can range from OB 0 (normal) to 5 (subchondral bone erosion)
  - Typically OB 2-4 and discoloured
- Subchondral bone
  - Typically sclerotic and hypovascular
  - Microfractured (microscopic), fissures (visible, non-displaced) and fractured (visible, displaced)
- Gross physical structure may be altered
  - Blunted, pointed or irregular
- Disease may be focal or diffuse

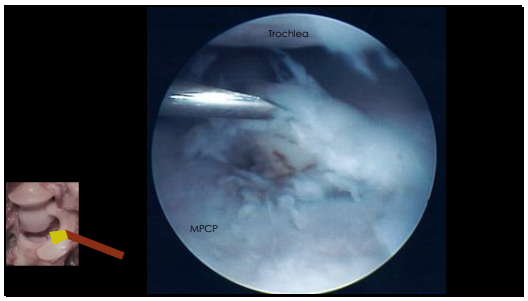
Medial coronoid process disease: diagnosis

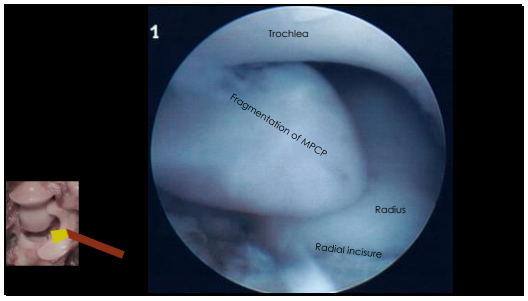
- Appropriate signalment, lameness, elbow pain, effusion
- Medial compression test – compresses medial compartment
  - Flex elbow to 90 degrees, internally rotate foot
- Look for comorbidities
  - Flexor tendon disease
  - Shoulder tendon disease
- Presumptive diagnosis – most young dogs with persistent elbow pain have MPCP disease
- Radiographs – ulna notch sclerosis is highly predictive
- CT scanning allows accurate assessment of the whole joint







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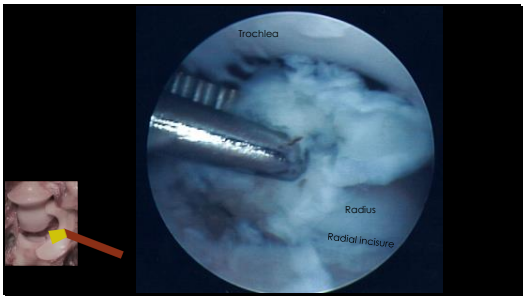
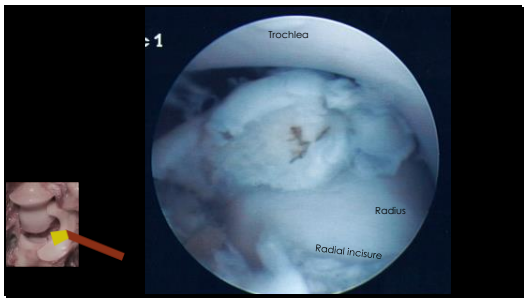
Trochlea
Fragmentation of MPCP
Radius
Radial incisure


Trochlea
Radius
Radial incisure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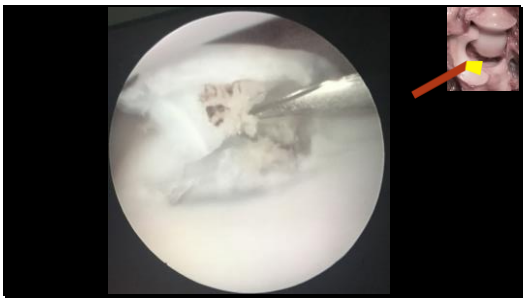
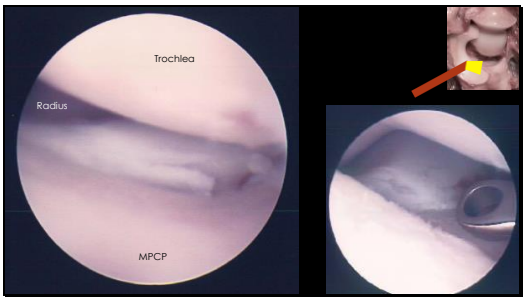
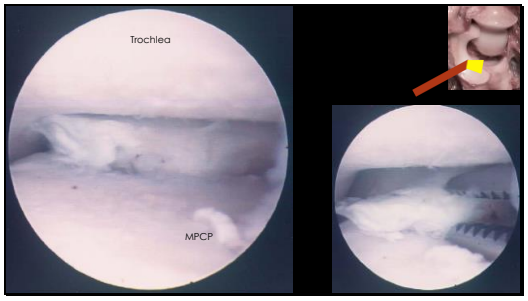
Trochlea
Radius
Radial incisure




Trochlea
Radius
MPCP


Trochlea
Radius
MPCP



Abrasion chondroplasty

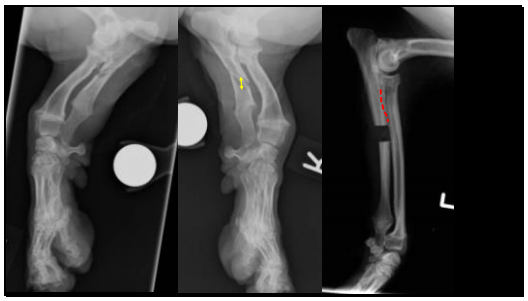
- Medial coronoid process disease without discrete fragment
- Overlying cartilage disease
  - Elevates easily, OB 2-4
- Evidence of humeroulnar conflict
  - Cartilage damage on humeral trochlea
  - Sclerosis of subchondral bone on radiographs
- Hand burr used to remove diseased cartilage and bone from MPCP
  - Diseased bone yellow and doesn't bleed
  - Fragments flushed from joint by fluid flow
  - Take bone back to bleeding, pink, healthy bone
  - Curette to clean up cartilage edges

Subtotal coronoidectomy

- Suggested that healthy MPCP bone has microcracks than can propagate
- Suggested that humeral trochlear cartilage damage can result from MPCP tip
- Subtotal coronoidectomy proposed to treat these issues
- Osteotome inserted through instrument port
- Concerns:
  - Removes healthy and diseased bone
  - May cause collapse of medial compartment
  - Evidence for efficacy limited
- May be useful in place of abrasion chondroplasty for large lesions

Assessing incongruity

- Many techniques based on radiographs or CT scans
- Positioning of the limb can alter congruity
- Assessment is only semi-objective
- Look for evidence of humeroulnar conflict
  - Suchondral bone sclerosis in humeral trochlea
  - OB 5 lesions at arthroscopy
- Consider an ulna osteotomy if conflict present
  - Dogs <6mths consider dynamic distal osteotomy
  - Dogs >6mths consider dynamic double oblique proximal osteotomy
  - Many other osteotomies
  - Little evidence to recommend use, timing or technique



Elbow dysplasia: Complications and Prognosis

- Complications
  - Infection <1%
  - Acute postoperative pain from medial nerve impingement or soft tissue trauma
- Prognosis rule of thirds
  - Third make significant improvement
  - Third make some improvement
  - Third make no improvement
- In those that make no improvement
  - Was your diagnosis correct?
  - How advanced was osteoarthritis?
  - Was there concurrent painful pathology?

Concurrent pathology

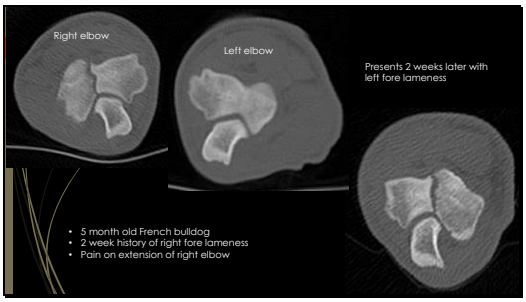
- Young dogs (<3 years)
  - Shoulder OCD
  - Panosteitis
  - Metaphyseal osteopathy
  - Flexor tendon enthesiopathy
  - Ununited anconeal process
- Middle aged and older dogs (>3 years)
  - Biceps tendon of origin tendinitis
  - Flexor tendon enthesiopathy
  - Osteoarthritis
  - Neoplasia

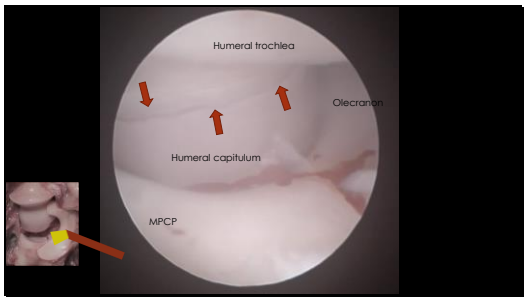
Osteochondrosis

- Humeral trochlea by far the most common
- Often only seen on CT rather than radiographs
- Distinct lesions
  - Differentiate from 'kissing' lesions resulting from humeroulnar conflict
  - Round rather than linear
- Debride cartilage flap
- Curette subchondral bone until bleeding
  - Microfracture or forage also described
- Adversely affects prognosis

Humeral condylar fissures

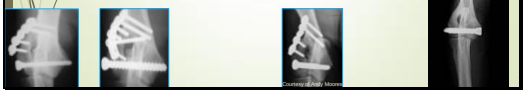
- Aetiology unclear
  - Incomplete ossification of the humeral condyle
  - Stress fracture
- May be partial or complete
- Often bilateral
- Rapid progression can be seen
- Can cause lameness and can be incidental finding
- Can predispose to condylar fractures





Transcondylar screw

- One shot – has to be right!
- Can be placed as lag or positional
- Can be placed from medial or lateral
- As wide as possible –typically 50% of condylar isthmus
- Consider ability to recover screw if it breaks – slightly longer than measured
- With fractures transcondylar screw alone is not sufficient

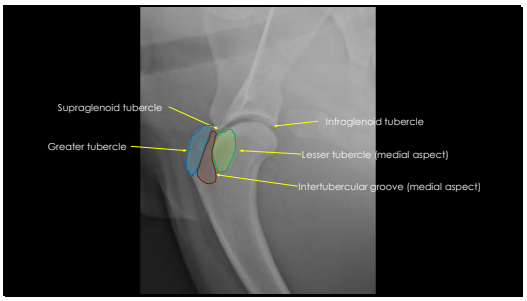


Ununited anconeal process

Flexor tendon enthesiopathy

- Once called 'ununited medial epicondyle'
- Inflammation and mineralisation of medial epicondyle and flexor tendons
  - 'Golfers elbow' in people
- Has been described as primary condition but typically secondary to elbow dysplasia
- Painful on direct pressure
- May be the primary cause of presentation through pain
- Treatment
  - Local methylprednisolone acetate
  - Extracorporeal shock wave therapy
  - Physiotherapy to correct gait abnormalities
  - Pain relief

Arthroscopy in shoulder disease



Warning! When the elbow leads you astray

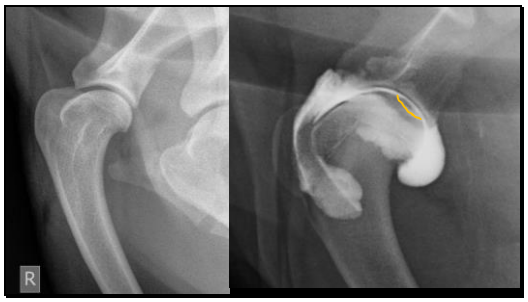
- Extension of the shoulder typically extends the elbow
  - Which is the patient reacting to?
- Extension of the elbow stretches the biceps tendon of origin
- Manipulation of the elbow requires
  - Pressure to the periarticular structures
  - Pressure to the distal limb
- Don't stop your exam when you find pain
  - Multiple foci and false positives

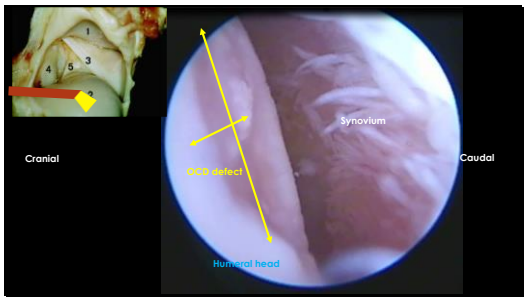
Humeral head osteochondrosis

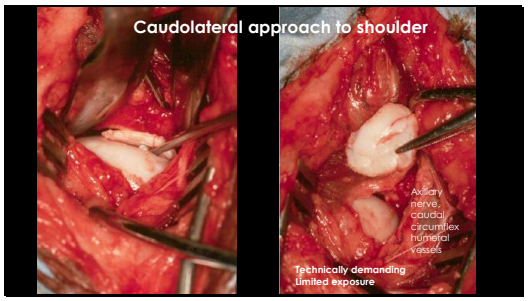
- Transition from peri- to subchonral blood supply interrupted
  - Focal necrosis of cartilage may develop
  - Overlying cartilage may fissure
- Nutrition
  - Overfeeding energy, , calcium and Vit D_3 may increase risk
    - Most studies done in Great Danes so questionable relevance to other breeds
- Trauma
  - Increased athletic activity associated with increased risk in people
  - Macrotrauma in pigs increased lesions
  - Microtrauma in dogs suggested as cause
    - Association with playing has been suggested
    - Evidence is inconsistent

Humeral head osteochondrosis

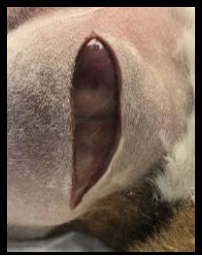
- Large or giant breed dogs
- ~50% are bilateral
- Often only become painful when progress to osteochondritis dessicans
- Pain on shoulder manipulation
- Radiography usually adequate for diagnosis
  - Radiograph both shoulders
  - Do you treat a sound leg with osteochondrosis only?
- Treatment is to remove cartilage flap
- Excellent prognosis

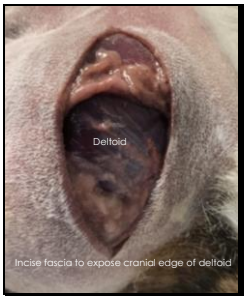


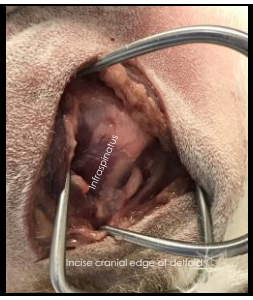


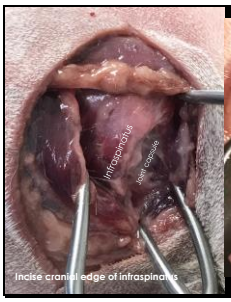


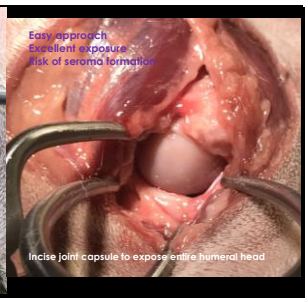
Modified craniolateral approach to shoulder









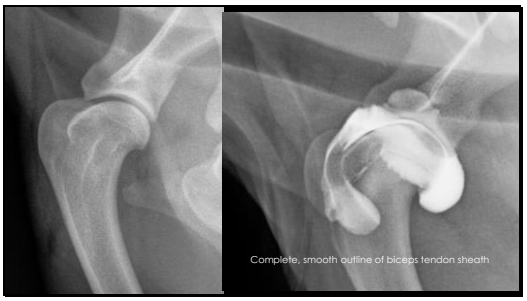


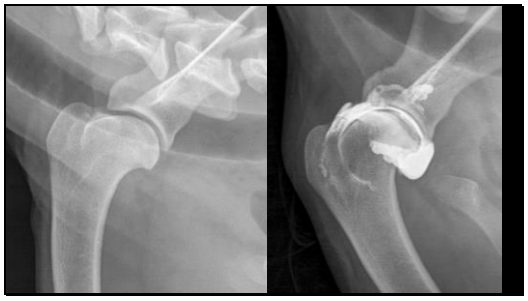
Biceps tendon of origin tendonitis

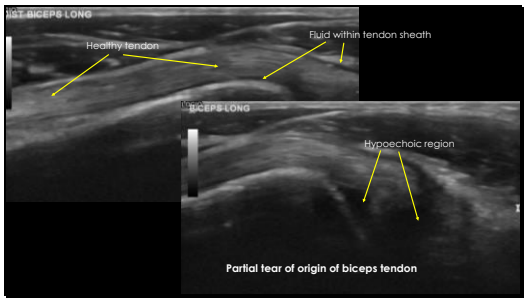
- Perhaps the most common cause of shoulder pain
- Primary disease is injury of the tendon causing inflammation or structural damage
- Secondary disease
  - Extension of local shoulder disease e.g. migrating osteochondral flap
  - Injury from altered gait due to disease at another site e.g. contralateral elbow dysplasia
- Typically painful on shoulder manipulation
  - Direct pressure to tendon
  - Shoulder flexion with elbow extension unreliable
  - REMEMBER that elbow extension will strain the biceps tendon of origin!

Investigations

- Radiography
  - Sclerosis of intertubercular groove
  - Mineralisation within tendon substance
  - Both indicate chronic but not active pathology
  - Strongly suggestive if consistent clinical examination
- Synovial fluid analysis
- Ultrasound scan
  - Operator dependent
- CT scanning soft tissue window can show fluid and swelling





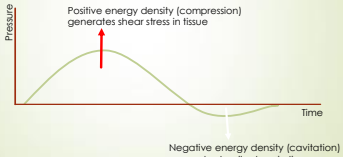


Managing biceps tendon disease

- Primary injury
  - Strict rest, NSAID
  - If unresponsive check diagnosis and consider
    - Intra-articular steroid therapy
    - Extracorporeal shockwave therapy
  - If remains unresponsive, check diagnosis again!
    - Consider biceps tenotomy
- Secondary injury
  - Treat local disease (rest, NSAID, local steroid, arthroscopy)
  - Manage concurrent conditions

Extracorporeal shockwave therapy

- A mechanical pressure wave generated pneumatically
- Energy transferred to tissue

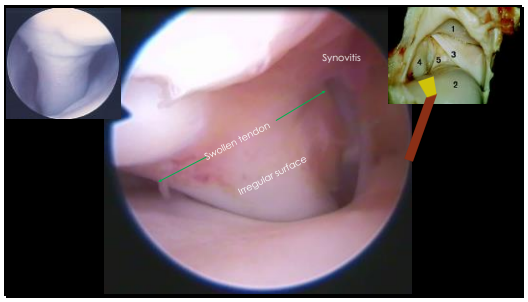


How is it delivered?

- No sedation required
  - Only mildly uncomfortable and well tolerated
- One session every 2 weeks for 3 sessions
  - Takes ~10 minutes to deliver
  - 400 pulses @4 Hz followed by 1600 @ 8Hz
  - Pressure as high as possible without causing discomfort
- Safe with few side effects (local bruising or discomfort occasionally)

How might it work?

- Mechanotransduction and cytokine release
- Pain reduction
  - Peripheral nerve modulation
  - Neuropeptide depletion
- Increased metabolism
- Neovascularisation
- Muscle relaxation
  - In people the 'vicious circle' of pain and muscle tension can be unwound

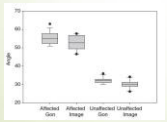


Arthroscopic biceps tendon release

- Swap instrument and arthroscope ports if required
- Insert hooked cutting knife
- Cut tendon midway between supraglenoid tubercle and intertubercular groove
- Controlled exercise for 4 weeks
  - Some walking is important to prevent fibrosis
- Good prognosis if no secondary change (osteoarthritis)
- No gait abnormalities are expected
  - Effects on long term stability if shoulder unknown

Medial shoulder instability

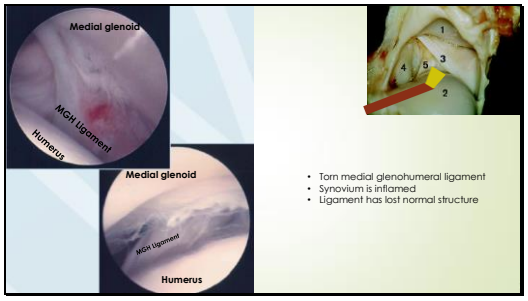
- Often long term lameness of variable intensity
  - Not the same as shoulder luxation
- Any breed or age
- Shoulder abduction test
  - Extend shoulder fully
  - Hold scapula flat



Cook et al 2005 Vet Surg 34:483

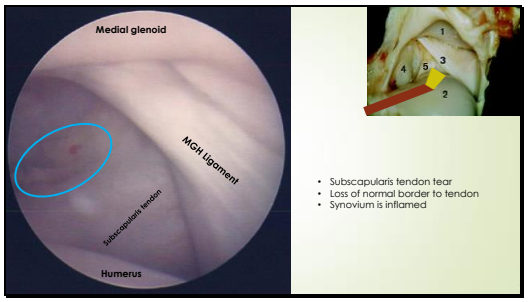
Medial shoulder instability

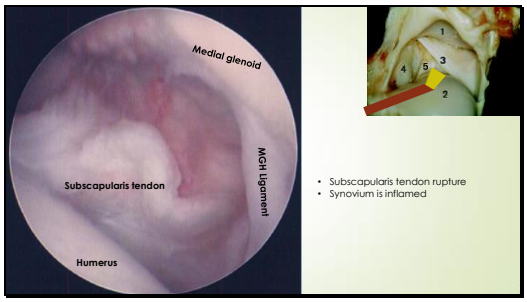
- Arthroscopy can be used to assess medial glenohumeral ligament
- Very useful in cases that have not responded to conservative management (or adhered to conservative management)
- Shoulder instability also described in lateral, cranial and caudal direction
- Treatment
  - Most texts advocate surgical repair
  - Evidence is ~70% success nonsurgical vs ~80% surgical
  - In my experience conservative treatment is highly effective
    - Strict rest, NSAID, physiotherapy +/- local anti-inflammatory therapy



Diagnostic arthroscopy

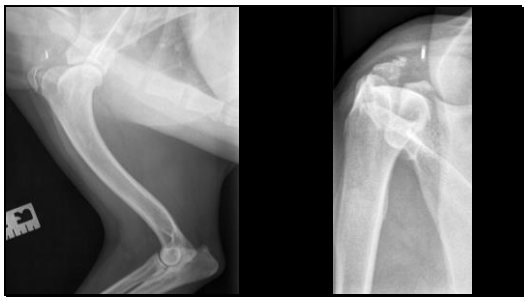
- Pain localised to shoulder but no diagnosis on investigation
- Synovial fluid analysis shows mononuclear arthropathy with low to medium cell count
- Instil 20mg methylprednisolone acetate (0.5mls DepoMedrone)
  - Improvement after a week and lasts1-6 weeks
  - Avoid local anaesthesia and often leaks!
- Synovial biopsy can be taken
- As always, must be thorough in examination





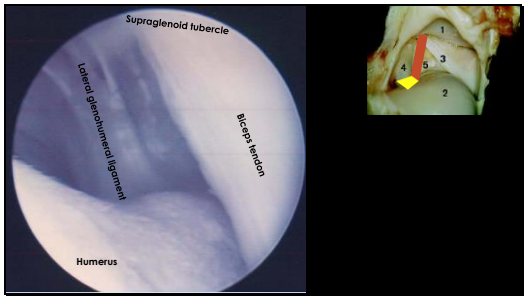
Supraspinatus tendinopathy

- Mineralisation of supraspinatus tendon is a common finding
- Not always associated with lameness (chronic or healed pathology)
- Often seen with biceps tendinopathy as tendons rub
  - Not clear which is the precipitating pathology
- Likely to be secondary to other pathology (especially elbow disease)
- Diagnosis
  - Direct pressure may be painful
  - Flex shoulder to 90 degrees and inward rotation of humerus stretches supra-and infraspinatus
- Radiographs usually diagnostic but ultrasound can be useful if acute



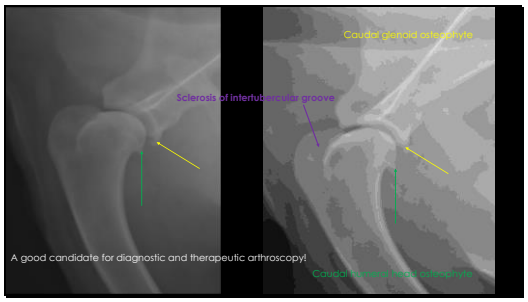
Management of supraspinatus tendinopathy

- Extra-articular so not visible arthroscopically
- Managed medially
  - Tendon must not be transected!
- Rest, NSAIDs and physiotherapy to address underlying pathology or comorbidities
- Clinical improvement not associated with reduction in tendon minseralisation
- Extracorporeal shockwave therapy is gold standard treatment



Glenoid pathology

- Osteochondrosis
  - Uncommon
  - Careful, systematic examination
  - Debride and curette
  - Prognosis fair
- Caudal osteophytosis
  - Formerly called incomplete ossification of the infraglenoid tubercle
  - Identified on radiographs
  - Arthroscopic retrieval
  - Prognosis good



Arthroscopy Miniseries Summary

- Buy good quality equipment and look after it
- Do not take shortcuts in the diagnostic process
  - Forelimb lameness may be due to multiple causes
- Make sure your anatomy knowledge is good
- Be consistent with positioning
- Have a plan B when you can't get ports in
- Plan your treatment carefully
- Be realistic with the prognosis