FUNDAMENTALS OF ELBOW IMAGING

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Imaging the Elbow

- X-rays
- Fluoroscopy
- CT
- Isotope scans
- MRI
- MRI/CT Arthrography
- Ultrasound
WHAT DO YOU WANT TO SEE?

- **Bone:** XRAY, CT, MRI
- **SOFT TISSUE:** CEO/CFO/median nerve/Ulnar nerve-US +/- MRI
- **ARTICULAR CARTILAGE:** MRI ? CT or better still CT/MR ARTHROGRAM
- **SPORTS INJURIES:** UCL, LUCL-US, MRI
- **PAEDS:** COMPARISON WITH OTHER SIDE
Elbow X-ray Projections

- AP
- Lateral
- Radial Head
Elbow Trauma

- **Bone - Fracture**
  - Humerus
  - Ulna
  - Radius

- **Joint - Dislocation**
  - Elbow
  - Proximal radio-ulnar

- SOFT TISSUE STRUCTURES !!!
Effusion

- Visualised on lateral as “fat pad” sign
- In flexion, posterior fat pad not normally seen
- In extension, anterior not normally seen
- In acute trauma, consider
  - Occult radial head # (adults)
  - Occult supracondylar # (paediatric)
- In absence of trauma
  - Arthropathy (RA, OA, INFECTION, synovial chondromatosis et al)
Distal Humerus

- Diagnosis usually easy in adults
- CT to clarify if complex
- In children, the 2nd ossification centres and cartilage may be problematic
Intercondylar Fracture
Paediatric Lateral
Olecranon Fractures

2A

2B
Fractures of Coronoid Process

- Rare in isolation
- Often occur with posterior elbow dislocation
- Need to be identified in latter as simple reduction of the dislocation may lead to fracture non union and instability
Radial Head Fractures
Mason Type 1
Secondary Ossification Centres

- C  Capitellum
- I  Internal Epicondyle
- R  Radial Head
- T  Trochlea
- O  Olecranon
- E  External Epicondyle
Secondary Ossification Centres

- C  Capitellum
- R  Radial Head
- I  Internal Epicondyle
- T  Trochlea
- O  Olecranon
- E  External Epicondyle
Secondary Ossification Centres

- C  Capitellum
- R  Radial Head
- M  Medial Epicondyle
- T  Trochlea
- O  Olecranon
- L  Lateral Epicondyle
Secondary Ossification Centres

- C Come Capitellum
- R Rub Radial Head
- M My Medial Epicondyle
- T Tree Trochlea
- O Of Olecranon
- L Love Lateral Epicondyle
Beware the child with an ossified trochlea but no medial epicondyle
Elbow Dislocation

- Described by direction of displacement of radius/ulna
- Dislocation may be
  - Radius and ulna
  - Radius or ulna alone
- 80-90% are posterior/posterolateral dislocation of both bones
- Isolated dislocation of radial head may be congenital or associated with ulna fracture
Non Traumatic Pathologies
Arthropathies

- Primary OA rare (as glenhumeral)
- Secondary OA
  - Trauma
- Rheumatoid
Calcific Tendinitis

- Hydroxyapatite deposition disease
Common Extensor Tendinopathy

- Tennis elbow
- Lateral epicondylitis
- Clinical diagnosis unless atypical/complex
- Usually no x-ray findings
- MR or US can diagnose
- US can guide injection
- Imaging features similar for common medial tendon
Common Extensor Tendinopathy

MR
Common Extensor Tendinopathy

US
BICEPS PROBLEMS

- THROWING ATHLETE
- BOXERS
- CAGE FIGHTERS
- ELDERLY MEN
- STEROID ABUSE
- Men over 40
CLINICAL ISSUES

- Forced extension of a flexed and supinated elbow.
- Often obvious clinically.
- Sometimes not obvious.
- Role of lacertus fibrosus.
- LF role in surgery.
SCANNING THE BICEPS TENDON

LT BICEPS
DISTAL BICEPS FLUID

LT BICEPS
DISTAL BICEPS T'PATHY
FABS
SLICE PLANNING
BICEPS RUPTURE ON US
SUPERMAN POSITION

ELBOW BY SIDE
PANNERS VS OSTEOCHONDRODITIS DESSICANS

- Younger child.
- Akin to Perthes(5-12).
- Almost always dominant elbow.
- Initial X rays similar but progress differently.
- Long term outlook excellent.

- OD in older child or adolescent(>13 but 10-16 range).
- Any elbow.
- Accelerated phase of pitching.
- Progress to loose body and/or arthritis.
- Look for UCL laxity.
- CT/MR arthro.
JIA
SYNOVITIS
JIA SYNOVITIS
ELBOW ARTHROGRAM

- CT ARTHRO
- MR ARTHRO
- US ARTHRO
MR ARTHROGRAM

- Lateral or posterior approach
- Radioopaque Contrast injected first to ensure intra-articular needle position.
- Direct injection of Gadolinium
- Terms- Direct and indirect arthrography.
ULNAR NERVE NEUROPATHY

Anconeus epitrochlearis
CALCIFIC TENDINITIS
SPORTSMEN INJURIES

- UCL
- LUCL
- Biceps tendinopathy
- Almost invariably the “throwing athlete”
LITTLE LEAGUE ELBOW

- Throwing athlete
- Pain on throwing
- Limits ability to throw
- Medial side valgus strain
- Compressive pressure on lateral compartment (Radial head & capitellum).
PATHOPHYSIOLOGY

- Medial epicondylar apophysitis/avulsion fractures
- Ulnar collateral ligament sprain
- Osteochondrosis and osteochondritis of the capitellum
- Deformation and osteochondrosis of the radial head
- Olecranon apophysitis, with or without delayed closure
- Hypertrophy of the ulna
WHY MEDIAL

The medial epicondyle is the last ossification centre to close so has the longest exposure to medial distraction forces.
ASSESSMENT

- Pain directly over med ep
- Valgus strain causes pain
- Pain exacerbated by asking the patient to flex a closed wrist against resistance.
Xray shows mild widening of the Medial epicondylar apophysis. Early cases may be normal.
Medial epicondyle avulsion fracture
Chronic UCL tear
LUCL ANATOMY

Annular ligament

Radial collateral ligament

Lateral ulnar collateral ligament
THANK YOU