Elbow Dislocations and Fractures

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Disclosures

• None
Objectives

- Correctly diagnose elbow fractures and dislocations
- Classify elbow fractures and dislocations
- Treatment strategies for elbow fractures and dislocations

Anatomy

- Trochoid ginglymoid joint
  - Trochoid (Rotating/Pivoting)
    - Radiocapitulum
    - Proximal radioulna
  - Ginglymoid (Hingelike)
    - Ulnohumeral
Ulna Anatomy

- Greater Sigmoid Notch
  - Trochlea
  - Olecranon Process
  - Coronoid Process
    - Tip
    - Body
    - Anterior Medial Facet
    - Anterior Lateral Facet
    - Sublime Tubercle
      - MCL

Ulna Anatomy

- Lesser Sigmoid Notch
  - Radial Head

- Crista Supinatoris
  - LUCL
Radius Anatomy

• Radial Head
  – Covered in articular cartilage
  – Safe zone

Biomechanics

• To support the hand in lifting objects the elbow must be stable to VARUS and resist the near-constant posterior force from biceps, brachialis, and triceps = CORONOID
• When shoulder abduction begins varus stress starts
• Must have coronoid-trochlea & LCL intact

Greens Hand 6th ed
Ligament Anatomy

• LCL
  – LUCL, RCL, Annular
  – Isometric Point Lateral Epicondyle
  – Crista supinatoris
  – Varus Restraint

Ligament Anatomy

• MCL
  – Anterior, Posterior, Transverse
  – Medial Epicondyle
  – Sublime Tubercle
  – Valgus Restraint
Anatomy

• Primary Stabilizers
  – LUCL
  – Coronoid-trochlear joint
  – Anterior bundle of MCL

Anatomy

• Secondary Stabilizers
  – Radialhumoral joint
  – Common flexor and extension origins
  – Joint Capsule
MOI

- **PLRI**
  - Supinated Forearm
  - Axial Force
  - Valgus
  - PL Ulna rotation in relation to Humerus

- **PMRI**
  - Pronated Forearm
  - Axial Force
  - Varus
  - PM Ulna rotation in relation to Humerus

Radiographs

- Reduced?
  - Just the Tip?
- Dislocated?
  - Fracture?
Radiographs

• CT
  – 3-D Recons can be helpful

Classification

• Complex
  – PLRI
  – PMRI
  – Transolecranon
Classification

• PLRI
  – Horii circle

Classification

• PLRI
  – LCL complex is first injured
    • Usually avulsed from the lateral epicondyle
  – Anterior band of the MCL last structure injured
    • Elbow may dislocate with it intact
  – The flexor and extensor origins have a variable degree of injury
Classification

• PMRI
  – May not be true dislocations in that the relationship of the articular surfaces is maintained
  – A fall on an outstretched arm with the shoulder in flexion and abduction creates a varus posteromedial rotational force on the forearm

Classification

• PMRI
  – LCL complex tear from the lateral epicondyle
  – Medial coronoid process is forced against the medial trochlea and results in an anteromedial facet fracture of the coronoid
    • Anteromedial rim (subtype 1)
    • Tip with comminution (subtype 2)
    • Sublime tubercle and the attachment of the anterior band of the MCL (subtype 3)
  – Anteromedial facet fractures are rarely associated with radial head fracture
Classification

• Posterior Olecranon Fracture-Dislocation
  – Older osteopenic women after a low-energy fall onto the elbow
  – Posterior radial head dislocation/fracture
  – Proximal ulna fracture
  – Coronoid fracture (variable)
  – Ulnar-humeral instability
  – LCL may be injured
  – MCL is typically spared

Classification

• Anterior or Transolecranon Fracture-Dislocation
  – Complex olecranon or proximal ulna facture, anterior dislocation of the forearm, and maintenance of the proximal radioulnar relationship
    • In distinction to anterior Monteggia fractures, in which the radioulnar relationship is dissociated
    • Typically, the capsuloligamentous structures are maintained, and there is rarely a radial head fracture
Treatment Algorithm

• Simple Elbow Dislocation
  – Nonsurgical treatment is the norm

• Complex Elbow Fracture Dislocation
  – Restore stable, useful motion, thru surgery
    • Not going to be a normal or high-performance elbow
  – Ulnar nerve is vulnerable during surgery
  – Recovery is months, not weeks
Outcomes

• As fracture patterns have been more clearly appreciated and appropriately stabilized, outcomes are generally favorable and residual instability is rare
• Some degree of arthrosis and stiffness is expected

Ring 2010

Thank you

QUESTIONS?