Elbow Dislocations

What Are The Issues

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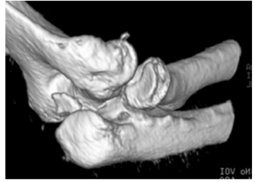
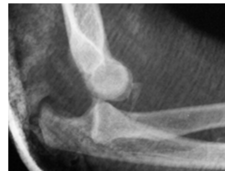
Fracture Dislocations of the Elbow



- Learn from the mistakes made by OTHERS

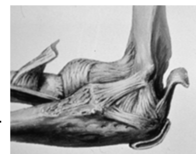
Elbow Dislocations Introduction

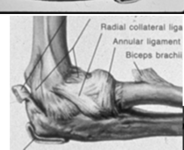
- 2nd most common dislocation in adults
- Most common in child
- Highest incidence age 10-20



Elbow Dislocations Pathoanatomy

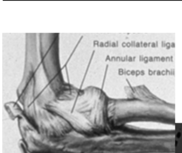
- Primary static constraints
  - Ulnohumeral articulation
  - MCL
  - LCL complex including LUCL





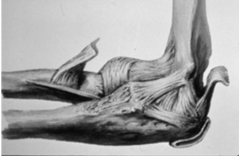
Elbow Dislocations Pathoanatomy

- Secondary static constraints
  - Capsule with elbow extended
  - Radiocapitellar articulation – valgus
  - Common flexor/ext origin
- Dynamic – muscles crossing elbow



Elbow Stability

- Valgus stress
  - MCL primary stabilizer
  - Radial head secondary*

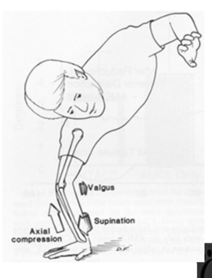


Elbow Stability

- Valgus stress
  - MCL primary stabilizer
  - Radial head secondary
- Varus stress
  - Articulation primary stabilizer
  - LCL and capsule provide the remainder
- LUCL controls pivot shift

Elbow Dislocations Mechanism of Injury

- Axial load, valgus, supination
- Probably more than one mechanism



Elbow Dislocations Classification

- Simple – dislocation without bone injury

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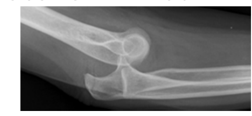
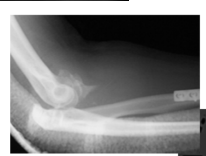


- Complex =
  - dislocation + fx



Elbow Dislocations Classification

- Simple – dislocation without bone injury
- Complex – dislocation + fx
  - Terrible triad
    - Dislocation
    - Radial head fx
    - Coronoid fx
  - Varus posteromed rotational instablility
    - LCL, med facet coronoid, or comminuted coronoid fx
- Direction: post., PL, PM

Evaluation

- NV exam
- R/O compartment syndrome
- AP & lat XRs
- Postreduction XRs

Elbow Dislocations Treatment

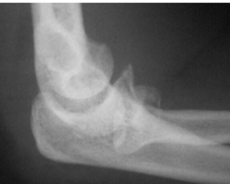
- Simple dislocations
  - Most all can be treated nonop
  - Great deal of literature support
  - Association between longer immobilization and ultimate loss of ROM
- Complex
  - Most will need surgery

Elbow Dislocations Treatment

- Nonoperative – simple dislocations
  - Check postred stability
  - Redislocation at 60° or more flexion, indication for surgery
  - Splint ≥90°, appropriate rotation (LUCL injury more stable in pronation)
  - Concentric reduction on postred xrs
  - ROM at 5-7 days,+/- extension block depending on stability

Elbow Dislocations Treatment

- Surgical indications
  - Complex dislocation
  - Instability @ ≥60° flexion
  - Nonconcentric reduction



Dislocation with Radial Head Fx

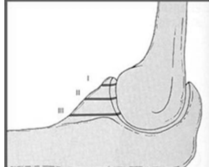
- Nondisplaced or minimal fx may be treated as simple dislocation
  - Check elbow stability
- Displaced fx needs ORIF vs replacement
  - Usually 2 fragments = ORIF
  - 3 or more usually = replacement
- CAVEAT: Do not excise radial head with concomitant dislocation

Dislocation with Coronoid Fx

- Not common to have coronoid alone
- Anteromedial facet is important stabilizer
- CT helps evaluate
- Often combined with radial head fx = Terrible Triad

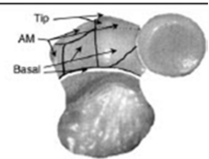
Coronoid Fractures Classification

- Regan and Morrey 1989
- Based on lat XR pre CT
- Type I – tip avulsion
- Type II - < 50%
- Type III - >50%
- Obsolete with CT



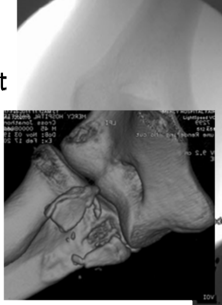
Coronoid Fractures Classification

- O'Driscoll ICL 2003
- I – transverse tip fx
  - Seen in TT
- II – anteromed facet fx
  - Varus posteromed injury
- III – base fx



Varus Posteromedial Rotational Loading

- Fall backwards on outstetched hand
- Rupture LUCL, fx AM facet of coronoid
- Radial head usually intact
- Imaging
  - Narrow medial joint space
  - CT to eval coronoid

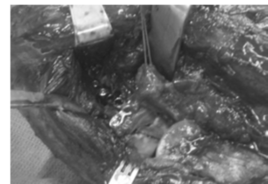


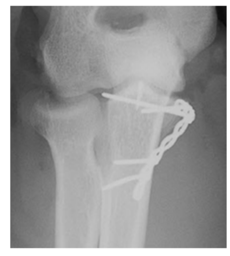
Varus Posteromedial Rotational Loading

Fracture of the Anteromedial Facet of the Coronoid Process. Surgical Technique

David Ring and Job N. Doornberg
J Bone Joint Surg Am. 2007;89:267-283. doi:10.2106/JBJS.G.00059

Dislocation with Coronoid Fx





The Terrible Triad

- Elbow dislocation + radial head fx + coronoid fx
- Almost always unstable and need surgery
- High incidence of complications
  - Recurrent dislocation
  - Arthritis
- CT useful to evaluate coronoid

Terrible Triad Management

Standard Surgical Protocol to Treat Elbow Dislocations with Radial Head and Coronoid Fractures

Surgical Technique

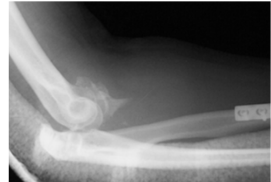
By Michael D. McKee, MD, FRCS(C), David M.W. Pugh, MD, FRCS(C), Lisa M. Wild, BScN, Emil H. Schemitsch, MD, FRCS(C), and Graham J.W. King, MD, MSc, FRCS(C)

Investigation performed at Upper Extremity Reconstructive Service, St. Michael's Hospital, and University of Western Ontario, Hand and Upper Limb Centre, London, Ontario, Canada

The original scientific article in which the surgical technique was presented was published in JBJS Vol. 86-A, pp. 1122-1130, June 2004

Terrible Triad
Surgical Plan

- Supine
- Posterior incision
- Lateral approach
  - Radial head
  - LUCL
- Medial approach
  - Coronoid
  - MCL



Terrible Triad
Surgical Plan

- If still unstable after lateral and medial approaches, need ex fix
  - Static
  - Hinged

Terrible Triad
Post op management

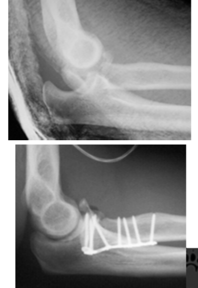
- Note safe arc of motion intraop
- Immobilize at 90° for 2 wks
- Slowly increase terminal extension every 2 weeks
- Goal allow 0° extension at 6-8 wks

Elbow Dislocations Summary

- Simple dislocations can be treated with early ROM
- Complex dislocations are usually operative
- Fix or replace radial heads, never excise only
- Recognize the terrible triad so it can be treated appropriately

Elbow Dislocations Surgical Approach

- Approach - post midline or lateral
- ORIF coronoid
- ORIF or replace radial head
- Repair LUCL
- If still unstable, repair MCL
- Hinge ex fix if still unstable



Elbow Dislocations Complications

- Loss of extension most common
- NV injury
- Compartment syndrome
- Chronic instability
- Contracture, heterotopic ossification
- Arthritis

The End

References

1. Mattew et al, JAAOS, 2009, 137-151, Terrible Triad Injury, Current Concepts
2. Zeiders et al, JBJSA, 2008, 90(sup 4) 75-84, Management of Unstable Elbows Following Complex Fracture Dislocations—The Terrible Triad