Dislocations of the Elbow

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INJURIES IN FOOTBALL COURSE 2016
Andrews Institute

NFL Injury Analysis

- 22 NFL Seasons
  - 64 Elbow Dislocations
- Average time loss is 38 days
- Median time loss is 30 days
- All 64 dislocations occurred during a game
- 1 case surgery was performed
  Powell (SIMS)

Anatomy

- Modified hinge with three articulations
  - Ulnotrochlear
  - Radiocapitellar
  - Proximal radioulnar
- All contained within a single synovial lining

Ligament Anatomy

Anterior

- Sectioning of all the lateral ligaments does not cause significant instability if muscular attachments are intact and the forearm is held in pronation
  Cohen et al JBJS 1997

Ligament Anatomy

Lateral

In 90° flexion: lateral view
Ligament Anatomy

Medial

In 90° flexion: medial view

Anatomic Stability

In full extension, 2/3 of valgus elbow stability is provided by the ulnohumeral articulation and the anterior joint capsule. Only in flexion does the anterior band of the MCL become the main stabilizer to valgus stress.

Dynamic Stabilizers

Elbow Dislocations

Classification

- Direction of dislocation
  - position of ulna relative to humerus

- Simple vs. Complex
  - presence or absence of associated fractures
Elbow Dislocations
Associated Fractures
- Incidence – 25%
- Radial head
- Coronoid
- Epicondyles (medial)
- Osteochondral fractures in nearly 100%

Terrible Triad
- Elbow dislocation with coronoid and radial head fractures
- High rate of poor outcome
  - Ring D, Jupiter JB. JBJS, 2002.

Mechanism of Injury
- Result of hyperextension most commonly from a fall. Anatomically, the olecranon impinges in the olecranon fossa levering the trochlea over the coronoid process
  - Andrews et al 2002

Mechanism of Injury
Combination of axial compression, elbow flexion, valgus stress and forearm supination creating a rotational displacement of the ulna on the humerus
  - O’Driscoll et al 1992
Elbow Dislocation
Treatment

- Closed reduction
Elbow Dislocation

Treatment

- Important to check neurovascular status pre- and post-reduction, especially median and ulnar nerves
- Examine the wrist - DRUJ injury/Essex-Lopresti

Elbow Dislocation

Treatment

- Evaluate stability after reduction
- Unlike the shoulder, the elbow joint is inherently stable because of the anatomy of the articulation. Elbow dislocations are usually a high energy episode with severe soft tissue injury. Residual loss of motion is common but recurrent instability is rare. – O’Driscoll et al 1990

Elbow Dislocation

Treatment

- Splint 3 – 4 days
- Early ROM
  - Unacceptable loss of ROM if immobilization > 3 weeks
    - Mathiowetz et al, 1988
    - Broberg and Morrey, 1987
- Follow up x-rays to confirm maintenance of reduction

Elbow Dislocation

Treatment

- Verrall – Australia
- 3 Australian Rules Football players with elbow dislocations

Elbow Dislocation

Treatment

- PROM and AROM 48 hours after injury with no brace or splint
  - Return to sport 13, 21 and 7 days post-injury

Elbow Dislocation

Treatment

- Indications for operative treatment
  - Lack of concentric reduction
  - Gross instability
    - requires flexion > 50-60 degrees to remain reduced
  - Entrapped osteochondral fracture
  - Unstable fractures
**Elbow Dislocation**

**Surgical Treatment**
- First repair medial side
  - MCL and flexor origin
  - retest stability
- If instability persists -
  - Kocher approach laterally to repair LCL/extensors

**Elbow Dislocation**

**Treatment**
- If still unstable -
  - rigid static or hinged external fixation
  - 3 - 4 weeks
- ROM sacrificed for stability and residual stiffness

**Elbow Dislocation**

**Complications**
- Residual Pain
- Loss of extension
- Pain with valgus stress
- Heterotopic ossification
- Arthrofibrosis/Stiffness
- Persistent neurologic deficit
- Recurrent dislocation
  - Posterolateral rotatory instability

**PLRI**

**Pivot Shift Test of the Elbow**
- More sensitive in anesthetized patient
- Analogous to pivot-shift test in knee
- Palpable and visible reduction with flexion beyond 40°

**Case Study**
- 34 yr old tight end/13th season
- R elbow simple posterior subluxation/dislocation
- X-Ray/MRI
- Rehab initiated
- Practice - 16 Days
- Game - 27 Days
Rehab Program

- Hinged Brace/Compression
- NSAIDS
- Ice and Elevation
- Early aggressive PROM avoiding unstable extension and pain
- Rehab is not a cookbook
- Communicate with athlete
- Soft tissue massage techniques
- Working entire kinetic chain
- Stabilization exercises
- Custom fit functional brace upon return

Bracing

- Efflurage
- Soft tissue massage
- Myofascial release
- ART

Passive ROM (2 Days)
- Active ROM (5 Days)
- Hydro therapy (6 Days)
- Stretching (5 Days)

- Sport cord: Bicep/tricep wrist
- Sport cord: Shoulder
- Manual resistance wrist: bicep/triceps
- Manual resistance shoulder
- Weight room: bicep/triceps
- Weight room upper body modified

Closed chain seated
- Closed chain standing
- Closed chain quad/tripod
- Closed chain uneven surface
Ball stabilization for sit-ups/lower extremity

SS stance
SS running
SS blocking
SS catching

Custom Fit Brace

ROM limitations
Custom fit to individual
Provides stability
Protects from trauma
Compact size
Increases confidence

Transitional Rehabilitation

Continue pain modalities
Light A/P mobs
Scale back amount of resistive exercises in TR
Increase progression in weight room
Keep on the field/happy medium
Adapt bracing as needed
Pad opposite elbow

Conclusions from case study

Complete and early diagnosis
Compliant driven athlete
Short immobilization with early rehab
Accelerated rehab protocol
Ability to adjust

CONCLUSIONS

Good or excellent results can be expected in athletes at all skill levels

83% returned to their previous levels

Thank You