Elbow and Forearm

Chapter 18
Half this game is ninety percent mental.
Danny Ozark, Philadelphia Phillies Mgr.

Characteristics of the Elbow
- Most muscles crossing the elbow are two-joint muscles
- Angular velocity at the elbow during pitching is 2300 degrees/second
- Biceps and triceps co-contract to provide weight bearing stability
- Elbow instability occurs mainly due to medial collateral ligament tears (UCL)

Joint Stresses at Elbow
- Acceleration: lateral compressive forces and medial distraction forces applied to elbow joint
- Deceleration: high demands on bicep, brachioradialis, brachialis
- Lateral stresses – osteochondritis dessicans in young, osteophytes and osteoarthritis in older adults
- Medial stresses – neuritis, tendinitis, medial joint sprains, muscle strains

Specific Sport Stresses
- Baseball: medial distraction and lateral compressive stresses; increase in medial joint stresses with inflexibility of hips, trunk shoulder or if elbow drops due to tightness, weakness, fatigue
- Tennis: lateral epicondyle stress (backhand); medial epicondyle stress (overhead and late-hit forehands); increase in elbow stress if elbow leads on backhand

Unique Structure of Elbow
- High degree of congruency in ulnohumeral joint, making it a stable joint
- Muscle traverses joint; adhesion problems can occur with immobilization
- Anterior capsule is thin; can be damaged with aggressive stretching
Joint Mobility

- Loose packed position:
  - Ulnohumeral: 70 degrees flexion; 10 degrees supination
  - Radiohumeral: full extension with full supination
  - Radioulnar: 70 degrees flexion; 35 degrees supination

Concave-Convex Rules for Elbow

- Ulnohumeral: concave ulna, convex humerus
- Radiohumeral: concave radius, convex humerus
- Radioulnar: convex radius, concave ulna

Force Applications

- Lifting weights in elbow extension – more stress anteriorly
- Lifting weights in elbow flexion – more stress posteriorly
- Lever-arm lengths: forces up to 3 times body weight when elbow flexed 30 degrees

Force Applications: Reducing Stress

- Lighter weights or cuff weights attached to mid-forearm
- Widening hand position in push-ups
- Low resistance, high repetitions in early rehab program

Soft Tissue Mobilization

- Elbow movers: trigger point release, ice and stretch
- Wrist and finger movers: trigger point release, ice and stretch
- Cross friction massage for tendinitis

Joint Mobilization

- Use if greater loss of flexion than extension
- Use mild techniques
- Use loose packed position
- Force applications in same direction as restricted motion except proximal radioulnar joint
- Caution due to brachialis; contraindicated with hypermobile joint
Flexibility Exercises

- Preventing loss of motion: CPM, early mobilization, abbreviated immobilization
- Regaining loss of motion: short, active stretches early; prolonged time later
- Prolonged stretches – night splints
- Active stretches
- Assisted stretches

Aggressive Stretching Precautions

- Brachialis attaches to anterior capsule, anterior capsule susceptible to injury if aggressive stretching techniques for anterior elbow are used

Strengthening Exercises

- Isometrics – held 6 sec, frequently through day
- Isotonics in straight-plane motions advancing to diagonal-plane motions
- Plyometric exercises
- Functional exercises before return to sport participation

Functional Activities

- Warm up and cool down
- Begin overhead progressions with easy activities at diminished distances, forces and speeds; gradually increase one component at a time no more often than every third exercise session
- If there is pain, return to previous level of activity for 3 days

Epicondylitis

- Lateral: tennis elbow
- Medial: golfer’s elbow
- Correct cause; relieve inflammation and scar tissue adhesions; improve flexibility, strength and skill execution
Little League Elbow
- Caused by excessive medial traction forces at epiphyseal plate during acceleration
- Curve and breaking pitches create greatest forces
- Avoid aggressive exercises in rehabilitation of young people

Sprains
- Hyperextension sprain; anterior capsule injury; can cause bone bruise in olecranon region
- MCL sprain; injures primary stabilizing unit of elbow
- Cross friction massage to adhesions should not occur for first 7-10 days after injury

Ulnar Nerve Injury
- Ulnar nerve can become stretched with medial force
- Commonly 4th and 5th digit numbness or tingling
- Rehabilitation of surgical nerve transposition follows 12-16 week course
Elbow Dislocation
- Most dislocations are posterior with hyperextension and abduction force
- Injury is obvious due to deformity
- Splint is worn for 2 weeks with motion beginning after first week
- Rehabilitation may take 16-26 weeks

Arthroscopy
- Usually performed for debridement
- Sling is worn 1-3 days
- Rehabilitation may take 8 weeks