Back to Sports After an Elbow Injury

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Objectives

• Describe the phases of elbow rehabilitation.
• Define the functional range of motion and strength necessary for return to participation in PE or sport activities.
• Identify precautions and contraindications for return to sport following an elbow injury.
• Describe principles of injury prevention.
Our job is to get our athletes from here...

And here...
"The ultimate goal of elbow rehabilitation is to return the athlete to his or her previous functional level as quickly and safely as possible"

Wilk et al.
Phases of Elbow Rehabilitation

- Phase 1: Protection
- Phase 2: Motion
- Phase 3: Strengthening
- Phase 4: Functional Training

**Phase 1: Protection**

- Patient education
- Pain control
- Edema control
- Keep other joints moving
Phase 2: Motion

• Thermotherapy
  – Modalities vs active warm-up
• Soft tissue mobilization
• Joint mobilizations
  – Grade I and II oscillations to decrease pain and promote relaxation
• Neuromuscular re-education
• Isometric strengthening

Range of motion

• Normal arc of motion
  – Elbow extension/flexion: 0-140 degrees
  – Forearm supination/pronation: 80/85 degrees
• Functional range of motion
  – Elbow extension/flexion: 30-130 degrees
  – Forearm supination/pronation: 50/50 degrees
• What are the implications for our athletes?
Phase 2: Motion

• Passive range of motion
  – Aggressiveness should be dictated by the healing constraints of the tissues and end feel of the joint
  – Pain is counterproductive

Phase 2: Motion

• Active/Active assist range of motion
  Supine with shoulder adducted and flexed to 90 degrees
    • Stabilizes the trunk and scapula
  – Elbow flexion with supination
  – Elbow extension with pronation
Phase 2: Motion

• Can’t I just hold a weight in my hand and make my elbow straight?
• Page et al.
  – Electromyographic activity in elbow muscles during active elbow flexion and extension
  – Concern for sustained contraction of the elbow flexors after elbow fracture or dislocation
• Subjects
  – 10 normal elbows
  – 10 subjects that had sustained an elbow fracture or dislocation
    • Developed a loss of flexion and/or extension of at least 30°

Phase 2: Motion

• Method
  – Surface EMG of the biceps, brachialis, brachioradialis, and triceps (long head)
  – Max volitional isometric contraction (MVIC)
    • 2 trials of 5 second MVIC for both flexion and extension
Phase 2: Motion

• Method
  – Elbow extension
    • Sustained passive maximum elbow extension
    • Recorded EMG activity for the first 9 seconds of each minute for 10 minutes and 9 seconds
      – Forearm un-weighted
      – 3 pound cuff weight

Phase 2: Motion

• Results
  – During elbow flexion and extension, all 4 muscles showed greater EMG activity
  – Elbow extension
    • Both groups had significantly greater EMG activity in all 3 elbow flexors in the weighted condition compared with the un-weighted condition

• Treatment implications
  – Adding 2-3 pound weights to the distal forearm may increase co-contraction of the elbow flexors and be counterproductive when the goal is to increase elbow extension
Phase 2: Motion

• Orthotic Intervention
  – Static progressive vs Dynamic
  – Low load, long duration
    • Produce deformation (creep) of the collagen, resulting in tissue elongation
Phase 3: Strengthening

• Concentric contractions progressing to eccentric control exercises
• Neuromuscular control exercises
  – PNF
  – Rhythmic stabilization
• Thrower’s Ten
  – Illicit activity of the muscles that provide dynamic stability

Phase 4: Functional Training

• Preparation for sport participation
• Gradual increase in strength, power, endurance, and neuromuscular control
  – Weight-bearing exercises
  – Plyometric drills
  – Sport specific activities
  – Interval sports programs
Return to Sports

- MD clearance
- Activity specific (PE vs sports)
- Functional vs full return to pre-injury

Injury Prevention

- Year-round sports participation
- Number of teams athlete is on
- Level of sport participation
- Position played
- Pitch count (don’t forget the catchers!)
- Proper mechanics
References

- https://www.youtube.com/watch?v=uAueW0jkL-s.
- Mulligan E. Elbow and Shoulder Injuries and Rehabilitation for Management of the Young Athlete. 2014.