

Elbow Movement Coordination Deficits

ICD-9-CM code: 841.1 Ulnar collateral ligament sprain

ICF codes: Activities and Participation code: **d4401** Grasping, **d4451** Pushing, **d4452** Reaching, **d4454** Throwing
 Body Structure code: **s73013** Ligaments and fasciae of forearm
 Body Functions code: **b7601** Control of complex voluntary movements

Common Historical Findings:

Medial elbow pain
 Blunt trauma or strain to the medial elbow

Common Impairment Findings - Related to the Reported Activity Limitation or Participation Restrictions:

Symptoms reproduced with:

1. Valgus stress test
2. Ulna collateral ligament palpation

Physical Examination Procedures:



Elbow Valgus Stress Test

Performance Cues:

Fully supinate forearm
 Firmly stabilize humerus into internal rotation
 Determine symptom response and mobility - compare with uninvolved elbow

Elbow Movement Coordination Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term “Pitcher’s Elbow”

Description: Progressive medial elbow pain, edema, and lost of functional activities.

Etiology: The ulnar collateral ligament (UCL) is the major stabilizing factor against valgus stress, especially in 90° of elbow flexion. This structure is vital in helping generate enough varus torque to resist excessive medial elbow tension, lateral joint compression, and posteromedial impingement. With the exception of trauma, UCL injuries are usually associated with the throwing athlete as a consequence of repetitive valgus overload on the elbow joint. Avulsion fracture of the sublime tubercle of the ulna is a potential cause of chronic medial elbow pain in the throwing athlete. Diagnosis of UCL injury has been based on clinical findings of medial joint pain and valgus instability. Pain is localized to the medial side of the elbow, especially during the late cocking or acceleration phases of the throwing motion. The history typically is further characterized by one of three scenarios: (1) an acute “pop” or sharp pain on the medial aspect of the elbow with the inability to continue to throw; (2) the gradual onset of medial elbow pain over time with throwing; or (3) pain following an episode of throwing with the inability on successive attempts to throw above 50 to 75 percent of full function.

Physical Examination Findings (Key Impairments)

Acute Stage / Severe Condition: Physical Examination Findings (Key Impairments)

ICF Body Functions code: b7601.3 SEVERE impairment of motor control/coordination of complex voluntary movements

- Complaints of medial elbow pain during throwing can be reproduced by palpation over the anterior band of UCL
- Complaints of medial elbow pain during throwing can also be reproduced by a valgus stress to elbow with the elbow in 30° of flexion
- General weakness of the muscles about the elbow secondary to pain – this includes the muscles attaching to the medial epicondyle of the elbow – the wrist flexor group
- Patient are unable to throw in this stage
- Inflammation involving the UCL can secondarily affect the ulnar nerve as it crosses the elbow. Ulnar nerve compression can result from entrapment by thickened or inflamed tissue in the cubital tunnel and by hypertrophied musculature in the brachium and forearm. Symptoms of ulnar nerve irritation are present in over 40 percent of patients with UCL insufficiency

Sub Acute Stage / Moderate Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions code: b7601.2 MODERATE impairment of motor control/coordination of complex voluntary movements

As above, except:

- Resisted wrist and elbow motions are less painful
- Possible pain at the lateral elbow due to the compensation of lateral ligament secondary to the UCL laxity
- The patient may report associated recurrent pain or paresthesia radiating into the ulnar aspect of the forearm, the hand, and the forth and fifth fingers, especially with throwing
- At this state patients are unable to throw over 50% capacity because of the pain

Settled Stage / Mild Condition: Physical Examinations Finding (Key Impairments)

ICF Body Functions code: **b7601.1** MILD impairment of motor control/coordination of complex voluntary movements

As above, except:

- Pain with resisted motions are minimal
- Excessive valgus stress can also lead to posteromdial olecranon impingement on the olecranon fossa producing pain, osteophyte and loose body formation. Patients may have symptoms of ulnar nerve irritation, medial epicondylitis, or symptoms of loose bodies
- At this state patients are unable to throw over 75% capacity because of the pain

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Reduce inflammation and pain
Promote tissue healing

- Physical Agents
 - Ice packs or ice massage
 - Ultrasound
 - Phonophoresis (with an anti-inflammatory drug such as dexamethasone)
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- Therapeutic Exercises
 - Painfree active mobility exercises for wrist and elbow extension and flexion; forearm supination and pronation. Motions that do not create a valgus force at the elbow, such as midrange upper body ergometry, may be indicated if they can be performed without pain
- Re-injury Prevention Instruction:
 - Rest the joint with avoiding painful movements (e.g., gripping)

Sub Acute Stage / Moderate Condition

Goals: Improve flexibility
Increase muscular strength and endurance
Increase tolerance to perform functional activities

- Approaches / Strategies listed above
- Therapeutic Exercises
 - Stretching exercises for muscles with flexibility deficits
 - Strengthening exercises for muscles with strength deficits – include wrist, elbow, and shoulder exercise (where deficiencies are noted)
- Re-injury Prevention Instruction:
 - Initiate gradual return to stressful activities
 - Gradually reintroduce previously painful movements

Settled Stage / Mild Condition

Goals: Improve muscular strength and endurance
 Maintain and enhance flexibility
 Gradually return patient to sport or high-level activities

- Approaches / Strategies listed above
- Therapeutic Exercises
 - Progress strengthening exercises (emphasize eccentric and concentric exercises)
- Re-injury Prevention Instruction:
 - Initiate gradual return to sport activity
 - Recommend equipment modifications (e.g., grip size, string tension, playing surface)
 - Emphasize maintenance program
 - Modification of work activities

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goal: Return to optimum level of patient function with occupation or sport

- Approaches / Strategies listed above
- External Devices (Taping/Splinting/Orthotics)
 - Taping procedures may be used to reduce stress on the UCL during strenuous activities (or to remind the patient to avoid end range stresses)
- Re-injury Prevention Instruction:
 - Slowly return to 75-100% capacity with sport or occupational activities
 - Modification of work and sport activities as needed

Selected References

Andrews JR, Jelsma RD, Joyce ME, Timmerman LA: Open Surgical Procedures for Injuries to the Elbow in Throwers. *Operative Techniques in Sport Medicine* 4(2): 109-113, 1996

Badia A, Stennett C: Sports-related Injuries of the Elbow. *J Hand Ther* 2006;19:206-27.

Joneston J, Plancher KD, Hawkins RJ: Elbow Injuries to the Throwing Athletes. *Clinics in Sports Medicine* 15(2): 320-329

Potter HG: Imaging of Posttraumatic and Soft Tissue Dysfunction of the Elbow. *Clinical Orthopaedics and Related Research* Jan (307): 9-18,2000

Field LD, Savoie FH, Department of Orthopaedic Surgery: Common elbow injuries in sport. *Sports Medicine* 1998 Sep 26(3): 193-205

Martin SD, Barmgarten TE: Elbow Injuries in the Throwing Athlete: Diagnosis and Arthroscopic Treatment. *Operative Techniques in Sports Medicine* 4(2): 1000-108, 1996

Mirowitz SA: Ulnar Collateral Ligament injury in baseball pitchers: MR imaging evaluation. *Radiology* 1992 Nov; 185(2): 573-6

Frank W. Jobe and Neal S. Elattrache: *The Elbow and Its Disorders*. Morey 2000, pg. 549-555

Conway, J.E., Jobe, F.W., Glousman, R.E., and Pink, M.: Medial instability of the elbow in throwing athletes: Surgical treatment by ulnar collateral ligament repair or reconstruction. *J. Bone Joint Surg.* 74A: 67, 1992

Freddie H. FU; Marc R. Safran: *The Orthopedic Clinics of North America: Elbow problems in the athlete*. *Sport Medicine* (26)3 1995

Wilk KE, Arrigo CA, Andrews JR: *J Orthop Sports Phys Ther* 17:305, 1993