

Elbow Muscle Power Deficits

ICD-9-CM code: 726.32 Lateral epicondylitis

ICF codes: Activities and Participation code: **d4300** Lifting, **d4452** Reaching, **d4401** Grasping
Body Structure code: **s73012** Muscles of forearm
Body Functions code: **b7300** Power of isolated muscles and muscle groups

Common Historical Findings:

Unaccustomed repetitive occupational or recreational activity involving gripping objects (e.g., tennis)
Lateral elbow and forearm pain with resumption of activity

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

Extensor carpi radialis brevis (ECRB) or extensor carpi radialis longus (ECRL): weak and painful
Tenderness and reproduction of symptoms with palpation/provocation of ECRB or ECRL (slightly superior to lateral epicondyle)

Physical Examination Procedures:



Manual Resistive Test

Extensor Carpi Radialis Brevis



Manual Resistive Test

Extensor Carpi Radialis Longus

Performance Cues:

ECRB inserts into third metacarpal, ECRL inserts onto 2nd metacarpal
Isolate ECRB by 1) full flexion of elbow (make ECRL insufficient), 2) ulnarly deviate wrist, and 3) resist 3rd metacarpal



Palpation/Provocation of Extensor Tendons

Performance Cues: 1 = Lateral epicondyle
2 = ECRB
3 = ECRL

Elbow Muscle Power Deficits: Description, Etiology, Stages, and Intervention Strategies

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

Description: Inflammation of the tendon attaching the common wrist extensors to the lateral epicondyle of the humerus. The pathology most commonly occurs in the extensor carpi radialis brevis musculo-tendinous junction.

Etiology: More prevalent in men than women between the age of 40-50 years old. Repetitive wrist and finger extension during occupational and recreational activities constantly stretches the extensor tendon, causing microscopic tears. Thus, the physiological healing process is triggered. Normally, with adequate rest, the initial inflammatory stage subsides rather quickly and tissue repair follows. However, when the normal healing process is repeatedly interrupted by overloading the tissue too early, the tendon remains chronically inflamed and unrepaired. Consequently, the tendon is weakened and becomes vulnerable to more severe tears. Eventually the tendon becomes fibrotic and ruptures due to the lack of extensibility to the tensile force.

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

ICF Body Functions codes: **b7300.3** SEVERE impairments of muscle power

- Swelling in the lateral epicondyle region
- Increased temperature in the lateral epicondyle region
- Active wrist extension limited by pain
- Pain with passive wrist flexion, finger flexion, forearm pronation and elbow extension
- Pain and weakness with resisted wrist extension and 3rd MCP joint extension
- Tender (symptoms reproduced) with provocative palpation of the superior-lateral portion of the lateral epicondyle

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

ICF Body Functions codes: **b7300.1** MILD impairments of muscle power

- Mild to no pain with palpation of the lateral epicondyle
- Full and pain free active wrist extension although mild discomfort may occur at end range
- Painfree or mild discomfort with full passive wrist flexion, forearm pronation, and finger flexion
- Mild pain with resisted wrist extension combined with ulna deviation and forearm supination – strength is near normal

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Decrease pain

Decrease swelling

Restore normal elbow, wrist, and forearm active range of motion

- Physical Agents
Ice packs or ice massage
- Manual Therapy
Soft tissue and joint mobilization to co-existing impairments contributing to the symptoms, such as radial nerve entrapments near the elbow, superior radioulnar joint dysfunction, or C5-C6 segmental motion restrictions
Friction massage to soft tissue restrictions in the lateral epicondyle area
- Therapeutic Exercise
Passive and active movements of the the elbow, forearm, wrist and fingers into alternating flexion, extension, supination, pronation, ulnar and radial deviation to gradually regain normal muscle length without triggering overstress to healing tissues
- External Devices (Taping/Splinting/Orthotics)
Consider using a joint counterforce brace to remove the tensile force from the healing tissue and prevent premature overstress
- Re-injury Prevention Instruction
Educate patient to avoid activities that aggravates the elbow pain

Sub Acute / Moderate Condition

Goals: Restore normal muscle flexibility in the involved extremity

Restore normal strength in the involved extremity

Regain prior level of function with minimal discomfort

- Approaches / Strategies listed above
- Manual Therapy
Friction massage to soft tissue restrictions in the lateral epicondyle area
Soft tissue mobilization and manual stretching to shortened forearm myofascia
- Therapeutic Exercise
Passive and active movements of the the elbow, forearm, wrist and fingers into alternating flexion, extension, supination, pronation, ulnar and radial deviation to

gradually regain normal muscle length without triggering overstress to healing tissues

Gradual progression of resistive exercises for weak forearm and wrist myofascia –
Modify exercise difficulty according to patient's tolerance – using pain as a guide to gauge resistance progression.

- Re-injury Prevention Instruction
 - Avoid long duration of aggressive activities to prevent re-injury.
 - Incorporate regular stretching and rest periods during the day's activity
 - Apply ice if the pain returns with activity

Settled Stage / Mild Condition

- Approaches / Strategies listed above

Intervention for Higher Performance / High Demand Function in Workers or Athletes

Goals: Return patient to optimal level of occupational and recreational performance
Avoid re-injury

- Therapeutic Exercise
 - Simulate the similar movement patterns required by the patient's job or sports with appropriate number of repetition and resistance to help patient become independent in recognizing the appropriate activity dose for preventing future injuries
 - Emphasize on eccentric and plyometrics exercises, commonly involved in daily activities, to return muscles to its optimal level of performance
- Ergonomic Instruction
 - Assess patient's work environment to decrease risks of re-injury

Selected References

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