

# Physical Examination of The Elbow

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## OVERVIEW

### 1. Function of the elbow

- 1) to position hand to perform its action
- 2) change height and length of the arm to position hand correctly
- 3) to position hand most effective by rotation

### 2. History & Physical Examination

: is most valuable diagnostic tool available in elbow lesion

: knowledge of anatomy is the key a good physical examination

- 1) Organization of the history
- 2) Selective physical examination
- 3) Framework for physical examination

### 3. Elbow lesions

- Overuse elbow injury

#### Causes of Overuse Elbow Pain

##### Anterior elbow

Biceps tendinosis  
Pronator syndrome  
Anterior capsule strain

##### Posterior elbow

Triceps tendinosis  
Olecranon impingement  
Olecranon stress fracture  
Olecranon bursitis

##### Lateral elbow

Lateral tennis elbow  
Radial tunnel syndrome  
Radiocapitellar chondromalacia  
Posterolateral rotatory instability

##### Medial elbow

Medial tennis elbow (golfer's elbow)  
Ulnar collateral ligament sprain  
Ulnar nerve entrapment

Fig. 1.

- Angular deformity - cubitus varus, cubitus valgus
- Stiff elbow - posttraumatic, degenerative
- Arthritis - degenerative, infectious, RA

## HISTORY TAKING

1. Chief complaint
  - pain, deformity, limited motion, apprehension
2. Age & sex
3. Hand dominant
4. Occupation & recreation

Activity	Injuries
Bowling	Biceps tendinosis, radial tunnel syndrome
Boxing	Triceps tendinosis
Friction in football, wrestling or basketball	Olecranon bursitis
Golf	Golfer's elbow (trailing arm), radial tunnel syndrome
Gymnastics	Biceps tendinosis, triceps tendinosis
Posterior dislocation	Posterolateral rotatory instability
Racquet sports	Pronator syndrome, triceps tendinosis, olecranon stress fracture, lateral tennis elbow, radial tunnel syndrome, golfer's elbow, ulnar nerve entrapment
Rowing	Radial tunnel syndrome
Skiing	Ulnar nerve entrapment
Swimming	Radial tunnel syndrome
Throwing	Pronator syndrome, triceps tendinosis, olecranon impingement, olecranon stress fracture, radiocapitellar chondromalacia, ulnar collateral ligament sprain, golfer's elbow, ulnar nerve entrapment
Weight lifting	Biceps tendinosis, triceps tendinosis, anterior capsule strain, radial tunnel syndrome, ulnar nerve entrapment

Fig. 2.

5. Symptom
  - onset, duration, neurologic sx.
6. Symptom agravating or alleviating factors
  - activity, position, degree of disability
7. Injury mechanism

## PHYSICAL EXAMINATION

- Inspecton
- Palpation
- Range of motion
- Neurological examination
- Special tests

## 1. Inspection

### 1) Axial alignment

- carrying angle  
: formed by the long axis of the humerus and the long axis of the ulna and is most evident when the elbow is straight and the forearm is fully supinated
- man (average :  $10^\circ$ ), women (average :  $13^\circ$ )
- cubitus valgus :  $> 15^\circ$
- cubitus varus :  $< 5^\circ$

### 2) Lateral aspect

- intraarticular swelling
- thin, taut, adherent skin with/without discoloration

### 3) Posterior aspect

- prominent olecranon : posterior subluxation or dislocation
- prominent subcutaneous olecranon bursa

### 4) Medial aspect

- ulnar nerve anterior subluxation during flexion

## 2. Palpation

### 1) Bony landmark

- medial & lateral epicondyle & olecranon process  
:  $90^\circ$  flexion --> normally form an isosceles triangle (triangular sign)  
: full extension --> normally form a straight line

### 2) Anterior aspect

- brachial artery & median nerve
- biceps tendon (lacertus fibrosis)
- coronoid process

### 3) Posterior aspect

- olecranon tip & triceps aponeurosis (spur or bony prominence)
- olecranon fossa

### 4) Lateral aspect

- lateral supracondylar ridge (lateral column)  
: surgical landmark of the lateral approach

- radial head & LCL
- ECRL & ECRB & EDC
- arcade of Frohse (posterior interosseous nerve)  
: 2 cm anterior & 3 cm distal to lateral epicondyle

### 5) Medial aspect

- cubital tunnel (ulnar nerve) : swelling, subluxation, dislocation
- wrist flexor-pronator muscle group
- MCL (slightly anterior & inferior to medial epicondyle)

## 3. Range of Motion

### 1) Active motion

- flexion/extension : 0~140° ( $\pm 10^\circ$ )
- pronation/supination : 80~90°/90°
- functional ROM for daily activity : 30°/130°/50°/50°

### 2) Passive motion & normal end feel

- elbow flexion : tissue approximation
- elbow extension : bone-to-bone
- forearm supination : tissue stretch
- forearm pronation : tissue stretch

### 3) Resisted isometric movement

- elbow flexion & extension
- forearm supination & pronation
- wrist flexion & extension

## 4. Neurological Examination

### 1) Reflex

- biceps reflex : C5
- brachioradialis reflex: C6
- triceps reflex : C7

### 2) Cutaneous distribution

## 5. Special Tests

- ▶ Tests for Lateral Epicondylitis

1) Cozen' s test

- The patient' s elbow is stabilized by the examiner' s thumb, which rests on the patients lateral epicondyle. The patient is then asked to make a fist, pronate the forearm, and radially deviated and extend the wrist while the examiner resists the motion.

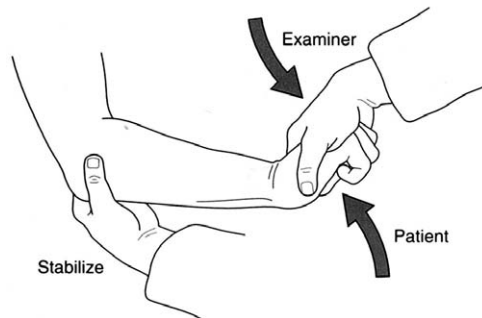


Fig. 3.

2) Mill' s test

- While palpating the lateral epicondyle, the examiner passively pronates the patient' s forearm, flexes the wrist fully, and extends the elbow.

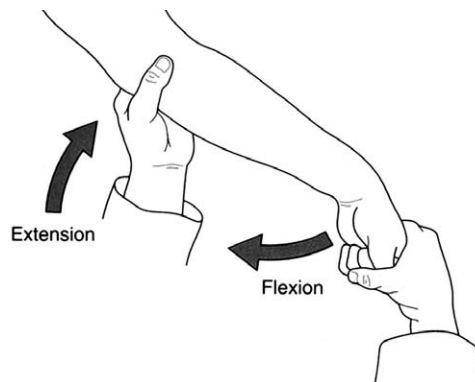


Fig. 4.

3) Maudsley' s test

- The examiner resists extension of the third digit of the hand distal to the proximal interphalangeal joint, stressing the extensor digitorum muscle.

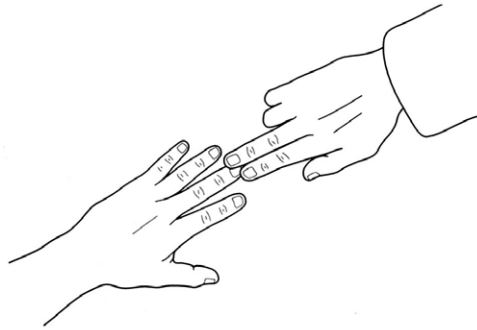


Fig. 5.

▶ Test for Medial Epicondylitis

- While the examiner palpates the patient's medial epicondyle, the patient's forearm is passively supinated and the elbow and wrist are extended by the examiner.

▶ Tests for Cubital tunnel syndrome

1) Tinel's sign

- The area of the ulnar nerve in the groove is tapped. A positive sign is indicated by a tingling sensation in the ulnar distribution of the forearm and hand distal to the point of compression of the nerve.

2) Elbow flexion test

- The patient is asked to fully flex the elbow with extension of the wrist and shoulder girdle abduction and depression and to hold this position for 3 to 5 minutes. A positive test is indicated by tingling sensation or paresthesia in the ulnar nerve distribution of the forearm and hand.

▶ Test for Pronator Teres Syndrome

- The patient sits with the elbow flexed to 90°. The examiner strongly resists pronation as the elbow is extended. A positive test is indicated by tingling or parasthesia in the median nerve distribution in the forearm and hand

▶ Test for Anterior Interosseous Nerve Syndrome

1) Pinch grip test

- The patient is asked to pinch the tips of the index finger and thumb together.

- normal : tip to tip pinch

- AIN entrapment : pulp to pulp pinch

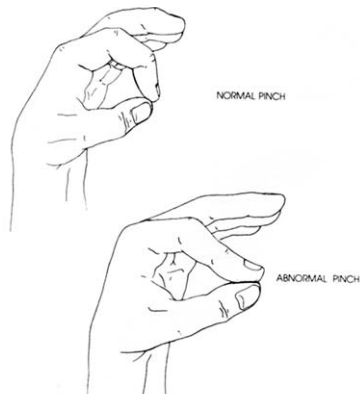


Fig. 6.

▶ Test for Valgus Instability

1) Jobe test

- is evaluated with the humerus in full external rotation while a valgus stress is applied to the slightly flexed joint

▶ Test for Varus Instability

- is evaluated with the humerus in full internal rotation and a varus stress applied to the slightly flexed joint

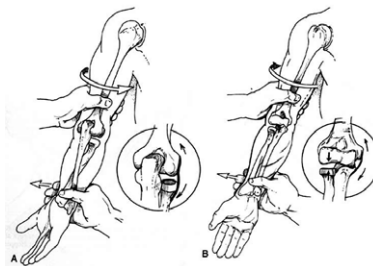


Fig. 7.

▶ Test for Posterolateral Rotatory Instability

1) Lateral pivot shift test

- A mild supination force is applied to the forearm at the wrist
- The patient's elbow is then flexed while a valgus stress and compression is applied to the elbow.
- If the examiner continues flexing the elbow at about 40~70°, there is sudden reduction of the joint.

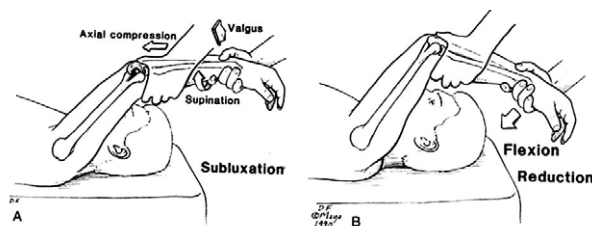


Fig. 8.

## 2) Active apprehension test

(1) Test using the arms to rise from a chair

(2) Push-up test

: forearm supination + valgus stress + axial loading

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