The Philadelphia Meeting
Clinical Examination of the Elbow
March 2015

Lab Components:
Inspection/Palpation/ROM/End Feel
Passive Accessory Motion Testing Jason Suda, MOT
Strength/Reflexes/Irritability Marie Sayers, OTR/L, CHT
Stability/Instability/Lat/Med Marianne Dunphy, OTR/L, CHT
Special Tests—Bicep/Neurologic

Evaluation:
Remember to localize source of pain and dysfunction throughout the entire upper extremity. During the eval you want to reproduce the patient’s symptoms.

An upper quarter screen should be performed secondary to the potential of referred symptoms from the cervical spine manifesting itself as weakness and pain near the elbow.

The baseline exam, followed by regular re-evaluations, is the keystone to determining whether a treatment plan is effective.

Precautions/Considerations: identify any potential intrinsic joint limitations that may impact eval and treatment (Fx/instability)

Anatomy (specific to evaluation techniques):
Bone
Humerus
Radius
Ulna

Joints
Humeroulnar
Humeroradial
Proximal radio-ulnar

Muscles

Elbow flexion
  Biceps brachii
  Brachioradialis
  Brachioradialis—assist
  Pronator Teres—assist

Elbow extension
  Triceps
  Anconeous

Pronation

Ligaments
  Ulnar collateral ligament
  Radial collateral ligament

Vascular Supply
  Basilic (medial)
  Cephalic (lateral)
  Medial Cubital

Nerves
  Median
  Radial
  Ulnar

Diagnostic Imaging Studies:

Findings must be correlated with Clinical Exam and Symptoms:
  Routine radiography: Anterior/Posterior/Lateral views are standard; may be used to rule out injuries to the radial head, radiohumeral joint and proximal radioulnar joint
  Stress radiography: Fluoroscope; varus/valgus force to dx a ligament injury
  Ultrasound: usually pediatrics; allows imaging of cartilaginous structures; dx dislocations, fractures, physeal injuries, soft tissue interposition
**Tomography (CT):** Noninvasive; useful for evaluation of complex intraarticular fractures; bone and soft tissue (tumors/masses)

**Arthrography:** injection of radio contrast into the joint enables visualization of intraarticular detail; defines synovial abnormalities, cartilage defects or loose bodies; not used frequently due to improvement in other imaging techniques

**Double contrast:** small amount of contrast is followed by injection of air; useful for defining partial undersurface ligament tears

**Magnetic Resonance Imaging (MRI):** excellent visualization of soft tissue structures; may determine the severity of a common extensor tear; posterolateral instability, loose bodies, ligament injuries and articular cartilage irregularities, soft tissue masses

**History and Patient Factors:**
- History of injury/condition
- Nature, length and evolution of symptoms
- Co-morbidities
- Prior treatments
- Hand dominance
- Daily Activities:
  - Work/Body positions/History of repetitive trauma/Sleep position
- Avocation
  - Sports/Music/Dependent care/Family issues
- Other aspects of patient’s life affected
  - Economic issues/Psychological issues

**Pain and Self Report Outcome Measures:**

*Patient Rated Elbow Evaluation (PREE)*: measures pain and disability in patients with elbow pathology; 5 pain questions scored 0-10; 15 function questions scored 0-10; high reliability


*American Shoulder and Elbow Surgeon’s Exam (ASES)*: measures pain, disability and pt. satisfaction in patients with elbow pathology; Pt. rating scales for pain scales for pain ranked 0-10 for 5 pain items, 0-3 for 12 function items, and 0-10 for 1 satisfaction question; high reliability


*Patient-rated Tennis Elbow Evaluation (PRTEE)*: condition specific for lateral elbow pain, 5 questions measure pain in the affected extremity over the past week; also assesses functional disability for specific and usual activities; high reliability


Mayo Elbow Performance Index (MEPI): looks at pain, motion, stability and function possible on a 100 point scale; Score greater than 90= excellent less than 60 poor (Morrey)

[www.orthopaedicscore.com/scorepages/mayo_elbow.html](http://www.orthopaedicscore.com/scorepages/mayo_elbow.html)

**P4:** uses the 11 point numerical pain rating scale and asks the patient to rate pain under 4 conditions morning, afternoon, evening and with activity the past two days; scores added together for a total possible score of 40 (indicating worst pain); change of 9 points is clinically
important; makes intuitive sense because of the varying demands on the elbow under different circumstances of daily life (Spandoni)

www.jospt.org/members/getfile.asp?id=1816

* Reliability/Validity of these pain scales is high and has been validated specifically for patients with elbow problems

**Inspection and Palpation:**

- Medial epicondyle: medial epicondylitis
- Cubital fossa: cubital tunnel syndrome
- Lateral epicondyle: Lateral epicondylitis
- Radial head---pronate and supinate forearm to insure radial head palpation: Radial head fracture or arthritic changes
- Radial tunnel—4 fingers breadths from lateral epicondyle: Radial nerve compression
- Olecranon in flexion and extension (Triangle to straight line): fracture abnormality
- Distal Biceps Tendon- Hook Test (O’Driscoll) and squeeze test (Rutland) to identify distal biceps rupture
- Nerve palpation--Ulnar, Median and Radial Nerves: Nerve compression
  - Posterior interosseous nerve: most easily palpated 4-5 cm. distal to the lateral epicondyle as it courses around the proximal radius
  - Lateral antebrachial cutaneous nerve: purely sensory continuation of the musculocutaneous nerve into the forearm; nerve emerges from behind the lateral border of the biceps at the level of the interepicondylar line and continues distally into the anterolateral forearm
- Infracondylar recesses—posterior elbow, medial and lateral to olecranon with elbow in extension: Absence indicates edema in the joint capsule
- Carrying Angle--Cubitus Valgus vs. Cubitus Varus (Gunstock Deformity)
  - Evaluate with the joint in full extension and the forearm in full supination
  - Normal Valgus: 11˚-14˚ in males; 13˚-16˚ in females
  - Compare sides, increased angle on one side may indicate collateral ligament laxity or fracture malunion
- Palpation—crepitus with joint (arthritic changes) or soft tissues (inflamed tissues or tissues exposed to internal fixation), pain with joint compression (arthritic), boggy edema (inflamed tissues/tendons), abnormal contours (malunion/ectopic bone)

**Range of Motion:**

Qualities of motion and pattern loss are also important for insight into diagnosis; Preconditioning the joint before PROM assessment is important for reassessment consistency—should document pre-tx vs. post-tx

**Flexion/Extension:** Lateral placement of goniometer using lateral epicondyle as a landmark, lateral midline of humerus pointing towards acromion, lateral midline of radius toward radial styloid (Normal ROM: 0˚/140˚)
Supination/Pronation: MacDermid and Michlovitz demonstrated that using one arm of the goniometer as a plumb line and the moving arm to indicate the position of the mid-forearm either using the proximal wrist crease (supination) or just proximal to the ulnar head (pronation) as landmarks; reliable measurements could be made by both experienced and inexperienced therapists; Functional rotation can be measured using a marker held in hand, but is a composite of forearm/carpal rotation (Normal ROM 80°/85°)

When passive forearm rotation is measured—care should be taken to ensure that rotatory force is not applied distal to the wrist, but at the level of the distal forearm

**Functional Elbow AROM:** 30°/130° extension/flexion  
50°/50° pronation/supination

Reliability of ROM: Armstrong et. al reported when standardized methods are used reliable measurements of elbow and forearm movements are obtainable regardless of the level of experience. Measurement error was least for repeated measurements taken by the same tester with the same instrument and most when different instruments were used.

High interrater and intrarater reliability was demonstrated when two experienced therapists identified the type of end feel for elbow flexion and extension (Palta)

Paris Classification of Normal End Feel (Palta):  
Soft tissue approximation—a soft and spongy resistance  
Muscle---elastic resistance  
Cartilage---sudden hard stop  
Capsule---firm arrest of movement with creep*  
Ligament—firm arrest of movement with no appreciable creep*  
* Creep is a time dependent phenomena

**Normal End Feel for the Elbow Joint:**
Flexion Soft tissue approximation  
Extension Bony  
Supination Firm/Tissue Stretch  
Pronation Firm/Tissue Stretch

Patterns of motion loss possibilities: (There could be a lot more)  
Loss of flexion: Osteoarthritis, loose bodies, posterior capsule tightness, or tricep tendonosis  
Loss of extension: Post-trauma olecranon fracture  
Loss of rotation: Radial head fracture

Significant loss of motion without weakness may indicate heterotopic ossification

Sources of loss of passive motion: Must identify tissue structure limiting motion to treat appropriately:
Extrinsic contractures are extraarticular and involve contracture of the soft tissue or when ectopic bone forms across the joint, muscle or capsule. Intrinsic contractures are intraarticular (ie loss of cartilage, malunion, bony block). Mixed contractures (both) are difficult to treat and carry a poorer prognosis.

<table>
<thead>
<tr>
<th>Intrinsic</th>
<th>Extrinsic</th>
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<tbody>
<tr>
<td>Articular Deformity</td>
<td>Joint capsular Contracture</td>
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<td>Cartilage Loss</td>
<td>Muscular Contractures</td>
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<tr>
<td>Malunion/Nonunion</td>
<td>Joint Fluid/Edema</td>
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<tr>
<td>Osteophytes/Loose bodies</td>
<td>Skin/Subcutaneous Tissue Contractures</td>
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<td>Internal Hardware</td>
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Sources of loss of active motion:
- See above +
- Nerve lesion leading to partial or complete denervation
- Scar that limits tissue gliding

Strength:

Manual Muscle testing (MMT): Most useful in identification of distribution in motor nerve function that causes profound loss of strength from either compression neuropathy or acute nerve trauma; rarely adequate for orthopedic problems; All strength measurements should be taken with the elbow flexed to 90˚; Compare bilaterally

Test retest reliability coefficients are generally good for isometric elbow strength tests across different studies and instruments (Desrosiers)

Evaluate MMT for: Biceps, BR, Brachialis, Triceps, Pronator Teres, Supinator, Wrist Flexors and Wrist Extensors.

Consider clinical corollaries for pain with contraction;
- Biceps- Distal biceps tear, bicipital tendinitis, cubital bursitis
- Triceps- tendonitis, partial tear, olecranon bursitis
- Brachialis- Anterior elbow capsular issues
- Pronator Teres- Pronator syndrome- pain due to compression of the median nerve between two heads.
- Wrist Flexors- Medial Epicondylitis/Epicondylosis, distal tendinopathies
- Wrist Extensors- Lateral Epicondylitis/Epicondylosis, distal tendinopathies
- Anconeus- resisted elbow extension, small population will reproduce ulnar nerve symptoms at cubital tunnel.
In general: Mean extension strength was 61% of flexion and pronation was 86% of supination (Askew)
Men are 50% stronger than same age females (McAuliffe)
The dominant extremities are 7% stronger than non-dominant

Grip strength can be measured (if appropriate):
  --Elicited pain noted
  --Pain free with submaximal performance
Expectation is that as symptoms resolve with treatment submaximal grip strength will improve and maximum grip strength will be less painful (Fedorczyk).

Irritability:
Irritability tests: Can be used for diagnosis and prognosis and less commonly to determine effectiveness of intervention. Increased symptoms of pain and/or paraesthesia can be indicative of need for further evaluation and are typically used to differentiate tendinopathies and compression neuropathies.

Palpation and provocative maneuvers:
**Ulnar**- Palpate the course of the ulnar nerve, palpate at cubital tunnel while flexing and extending. The nerve can be subluxing or getting irritated while coursing in and out of the tunnel.
**Median**- Palpate along the possible compression sites by elbow and proximal forearm.
Ligament of Struthers- proximal to elbow
Bicipital aponeurosis or lacertus fibrosis (bicipital fossa)
Between superficial and deep heads of the pronator. May also resist pronation.
FDS arch

Provocative Tests
  - Resisted elbow flexion (lacertus fibrosis)
  - Resisted forearm pronation with elbow extended. (Pronator)
  - Resisted PIP flexion of long digit (FDS arch)

**Radial nerve**- Bifurcates into PIN and DRSN
Compression sites of PIN
Arcade of Frosche
Two heads of Supinator
Between septum of ECRB and EDC
Vascular leashes of radial artery

Provocative Tests
  - Resisted long finger extension
  - Resisted forearm supination
  - Resisted wrist extension
  - Radial nerve tension test (combined scapular depression, shoulder abduction, elbow extension, forearm pronation, wrist flexion, and ulnar deviation)
**Compression of DRSN** (sensory branch of Radial nerve)
Between BR and ECRL muscles when pronated with wrist flexion and ulnar deviation.

**Provocative Tests**
- Positive Tinel’s sign at intersection between BR and ECRL (4 cm. proximal to Lister’s tubercle.)
- Resisted wrist extension with radial deviation in supination.
- Passive wrist flexion with ulnar deviation in pronation.

**Tendon**- Maneuvers to assess provocation of increased pain to differentiate diagnosis. Rule out joint, ligament, instability issues first.
- Resisted elbow flexion/extension (attempt to isolate specific tendons)
- Resisted pronation/ supination
- Resisted wrist extension and flexion
- Palpation

**Dynamic Stabilization positions**
- Measure girth for edema
- Consider Imaging Findings/ Communicate appropriately with physician when findings indicate further evaluation.

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**Deep Tendon Reflexes:**
**Deep tendon reflexes are measured using the following scale;**

- 0 = Absent
- 1+ = Trace (hypo-reflexive)
- 2+ = Normal
- 3+ = Brisk (hyper-reflexive)
- 4+ = Non-sustained clonus
- 5+ = Sustained clonus

Deep tendon reflexes are considered normal if they are 1+, 2+, or 3+ unless they are asymmetrical. DTRs of 0, 4+, and 5+ are usually considered abnormal. Abnormally increased reflexes are considered an upper motor neuron defect.

Use each patient to establish what is normal and judge by symmetry. Some people have very good reflex responses, while others have very poor reflex responses. If these responses are symmetrical (side to side, upper/ lower extremities) then it may be normal for that person.

If a person has good responses in most muscles, but one muscle provides a decreased response, it is a sign that it is hypo reflexive. If a person has minimal responses in most muscles, but one muscle provides a greater response, it is a sign that it is hyper reflexive.
Technique for reflex testing: Each tendon should be struck three to four times with a steady rhythm. This is required because a muscle involved in a lower motor neuron lesion may have a good initial reflex that fades or disappears with succeeding strikes. This cannot be detected using a single strike.

A single response "beat" is expected with each hammer strike. More than one beat from a single strike is termed clonus. This is an indicator of upper motor neuron pathology, especially if the beats exceed three in number.

Reflex Testing:
Biceps (C5-C6): The examiner places thumb over bicep tendon in the cubital fossa and strikes it with a reflex hammer while the patient’s arm is relaxed and partially flexed; the bicep muscle should be felt or seen to jerk slightly.
Brachioradialis (C5-C6): Radial jerk elicited by tapping the brachioradialis tendon at the distal end of the radius
Triceps (C7-C8): Can be elicited with the patient’s arm relaxed and partially flexed; triceps muscle should jerk when the triceps tendon is tapped where it crosses the olecranon fossa. Depressed, exaggerated or absent upper extremity reflexes are noted and compared with reflex testing of the contralateral elbow.

Stability:
Observation
Joint Examination/Stability (Magee)
None
Mild <5mm <5°
Moderate <10mm <10°
Severe >10mm >10°
Weight bearing
Push off test: quantify a patient’s ability to weight bear through the upper extremity; reliability high; dominant and non-dominant hand values were equal side to side; dynamometer is modified by reversing the grip handle to be convex and patient bears weight into dynamometer (Micholivitz)

Imaging findings

Biomechanics of Stability:
Resisted isometric flexion generates elbow forces up to four times body weight
Ulnohumeral joint primary varus-valgus stabilizer of the elbow
Radiocapitellar joint is secondary stabiilizer
Anterior band MCL and LUCL key ligamentous stabilizers
Posterior subluxation resisted by both coronoid and radial head
Common extensor origin important secondary varus stabilizer on lateral side
Common flexors may contribute to valgus stability on the medial side
Radial head tensions lateral ligaments, excision of radial head contributes to PLRI
Repair or reconstruction of the LUCL prevents varus and posterolateral rotator instability of the elbow
Instability:

Valgus test: Purpose: to assess MCL/UCL stability
Pt. seated or supine with the elbow slightly flexed 20°-30°; the humerus is stabilized proximal to the elbow, examiner applies a valgus force to the wrist while palpating the MCL; Positive test indicated by pain or joint gapping/instability; Compare to the uninvolved elbow

Clinical Examination for Valgus Instability:

Recurrent elbow subluxation following closed reduction of an elbow dislocation—usually seen in association with LCL injury in the acute setting
Chronic medial pain with throwing, particularly the late cocking and early acceleration phase of the baseball pitch or on release of the javelin
50% of patients recall a “pop” with a rapid onset of pain
Medial tenderness and pain on valgus stress
Gross instability on valgus stress testing is uncommon, even in chronic cases
Milking maneuver and moving valgus stress tests are best for dx
Ulnar neuritis is commonly associated
Must differentiate from medial epicondylitis
Radiographs may show some medial calcification
Stress fluoroscopy with valgus load at 30 degrees is more useful that MRI to confirm instability
CT arthograms or MRI with contrast are useful to confirm complete tear, less useful for partial tear
Arthroscopy can be useful in patients with an unclear diagnosis and to rule out associated lesions such as osteochondritis dissecans and loose bodies

Varus test: Purpose: to assess LCL/RCL stability
Pt. seated or supine with the elbow slightly flexed 20°-30°; the humerus is stabilized proximal to the elbow, examiner applies a varus force to the wrist while palpating the LCL; Positive test indicated by pain or joint gapping/instability; Compare to the uninvolved elbow

Lateral Pivot Shift Test: Purpose: to assess posterolateral rotatory instability (PLRI):
Test performed while pt. is sedated or locally injected; forearm is fully supinated; valgus stress is applied as elbow is moved from fully extended position to flexed position. The humerus is locked in full external rotation; as the elbow is extended from a semi-flexed position, posterior subluxation of the radial head can be appreciated and often causes a dimpling in the skin on the
lateral aspect of the joint; extension deficit in 30% of patients with a positive test; instability occurs dynamically or with provocation, not at rest

Clinical Examination for PLRI:
Patients may present with persistent pain, snapping, clicking or locking
Usually a component of lateral elbow pain and inability to push up from a chair
ROM often normal—may hyperextend
Varus instability tests commonly negative
PLRI test (lateral pivot shift test of the elbow) usually elicits apprehension and reproduction of symptoms
Posterolateral rotator drawer test may be positive. Anterior and posterior forces are applied to the lateral aspect of the elbow at 90 degrees with the forearm supinated
Forced supination of the forearm with the elbow at 90 degrees may result in posterolateral subluxation of the elbow more readily than the pivot shift test
Chair pushup test may also be useful

Assessment of Passive Accessory Motion for the Elbow: Used for evaluation purposes to evaluate degree of capsular involvement limiting passive range of motion of the elbow.

Radiohumeral joint: Uniaxial hinge joint between capitulum of humerus and proximal end of radial head.
Open pack position: full extension and supination
Closed pack: elbow flexion to 90º and forearm supinated to 5º
Mobilization evaluation: Anterior/posterior glide of the radial head

Ulnohumeral joint: Uniaxial hinge joint between trochlea of humerus and trochlear notch of ulna. Leads to the carrying angle of the elbow.
Open pack position: 70º elbow flexion and 10º supination
Closed pack: Elbow extension and supination
Mobilization evaluation: Inferior glide of the ulna with elbow in 70º flexion.

Proximal radioulnar joint: Uniaxial pivot joint between the radial head and the radial notch on the ulna.
Open pack position: 70º elbow flexion and 35º supination
Closed pack position: 5º supination
Mobilization evaluation: Anterior/posterior glide of the radial head.

Other joint evaluation techniques:
**Radial head distraction:** Long axis distraction of the radius away from the capitulum of the humerus.

See lateral assessment in Stability Testing Section (above)

**Special Tests:**

Muscle—Tendon Unit Length: Difficult to measure quantitatively, but should be compared side to side: If elbow flexion is limited, identify tissue structure limiting motion (joint, biceps shortening, triceps shortening)

- Biceps/Triceps
- Wrist Extensors/Flexors

**Lateral Epicondylitis/Epicondylosis Tests:**

- **Cozen’s:** Patient’s flexed elbow is stabilized by the examiner’s thumb, which rests on the patient’s lateral epicondyle. The patient actively makes a fist, pronates the forearm, and radially deviates and extends the wrist while the examiner resists the motion. Positive sign – sudden, severe pain in the area of the lateral epicondyle.

- **Mill’s Test:** The examiner supports the elbow and palpates the lateral epicondyle. The examiner pronates the patient’s forearm, flexes the wrist fully and extends the elbow. A positive test is indicated by pain over the lateral epicondyle. NOTE: This test also stresses the radial nerve.

- **Resisted long finger:** The examiner resists long finger extension at the proximal phalanx with the wrist in neutral and forearm in pronation. A positive test is indicated by pain provocation in extensor muscle mass bellies or lateral epicondyle. This test has been suggested to differentiate between lateral epicondylitis and radial tunnel syndrome.
Nirschl’s Hand Shake Test: Patient performs a firm handshake with the elbow extended and then supinates the forearm against resistance from the examiner. The elbow is then flexed to 90° and the same maneuver is performed. If pain is decreased in the flexed position, non-operative treatment is more likely to be successful. Surgery is more likely needed if pain is equally severe with the elbow flexed and extended.

Chair Lift Test: Patient is asked to raise the back of chair with the elbow extended and wrist pronated and extended; Positive result if patient demonstrates an apprehensive facial expression (Plancher); examiner may note voluntary weakness caused by pain in the wrist extensors.

Medial Epicondylitis/Epicondylosis Tests:
Golfer’s Elbow Test: While the examiner palpates the patient’s medial epicondyle, the patient’s forearm is supinated and the elbow and wrist are extended by the examiner. A positive test is indicated by pain over the medial epicondyle.

Reverse Mills: The examiner palpates patient’s medial epicondyle, the patient’s arm is passively supinated and elbow and wrist are extended by the examiner. A positive test is indicated by pain over the medial epicondyle.

Bicep Test:

Distal Bicep Tendinitis: The examiner applies manual resistance while asking the patient to flex elbow and supinate forearm; positive test if it reproduces pain at the insertion of the biceps tendon

Neurologic Tests: (Consider all Upper Limb Tension Tests):

Tinel’s Sign (at vulnerable sites): The examiner taps along the course of the nerve; positive if the patient experiences paraesthesias along the nerve distribution;
- Carpal Tunnel
- Cubital Tunnel
- Radial Tunnel
- DRSN (Wartenberg’s)
Elbow Flexion Test: Pt. holds full elbow flexion for up to 3-5 minutes with wrists extended. Positive test is indicated with reproduction of pain/paraesthesias in the ulnar nerve distribution. McKinnon has elbow flexion test with pressure over the cubital tunnel, more sensitive than elbow flexion alone. Patients may complain of weakness and loss of dexterity, atrophy of intrinsic muscles with clawing of IV and V.

Wartenberg’s Sign: The examiner tests for ulnar neuropathy at the elbow; Positive if the patient’s small finger abducts with extension; Pt. unable to adduct small finger without using finger extensor.

Anterior Interosseous Nerve:
Pt. is asked to touch fingertip of index to tip of thumb creating an “O” sign
MMT of involved muscles (FPL, FDP II/III, Pronator)
Functional loss: Pronation weak especially at 90° elbow flexion, weak opposition and flexion of the thumb, weak finger flexion, weak pinch (no tip to tip)

Pronator Teres Test:
Test for median nerve entrapment between the two heads of the pronator; Pt. sits with UE supported in a relaxed position; Examiner resists pronation of the forearm; Positive test if
pain is indicated along the palmer aspect of the first three digits (median nerve distribution); Pt. reports an ache in the proximal forearm occ. have pain/tenderness over the pronator; typically responds well to activity modification; Sx rarely required

Posterior Interosseous Nerve:
• Test for compression of the radial nerve under the supinator; the pt. sits with the forearm in supination with elbow extended; examiner passively pronates the forearm with the wrist flexed;
• Elbow flexion and forearm supination is resisted
MMT of wrist and digit extensors except ECRL, ECRB, BR
Functional loss: Weak wrist extension, weak finger extension, difficulty stabilizing wrist, difficulty with grasp, inability to abduct thumb; NO SENSORY disturbances—this is what differentiates the syndrome from higher lesions of the radial nerve

Radial Tunnel Test:
Resisted long finger extension with elbow extended; pressure placed over the radial tunnel 5 cm distal to the lateral epicondyle
MMT of involved muscles
Functional loss: pain may be associated with supination, wrist extension or grasping, pt. may have difficulty stabilizing wrist or demonstrate wrist drop; Pain is present
Wartenberg’s Disease:
Compression of the superficial branch of the radial nerve as it passes under the brachioradialis; sensory only branch; Pt. complains of nocturnal pain along the dorsum of the wrist, thumb and web space.

Claw Hand Deformity:
Injury to the median or ulnar nerves (or both) can result in intrinsic minus hand; Examiner observes hyperextension of the MP joints and flexion of the PIP and DIP joints, loss of normal arches of the hand and wasting of intrinsic musculature; examiner should observe and differentiate difference of deformity above and below wrist. Less deformity when above innervation for FDP: the FDP is out so there is less clawing due to less DIP flexion.

Other Tests:

Intersection Syndrome:
Condition may result from activities involving a clenched fist with the thumb abducted (rowing); Crepitus/friction is noted where the muscle bellies of the EPB and APL cross over the radial wrist extensor tendons; Examiner palpates 4-5 cm proximal to the radial styloid during wrist flexion and extension with radial deviation; Can additionally have Pt. move thumb while examiner palpates the muscle bellies of the EPB and APL to further identify tenderness or crepitus; Finklestein’s Test should be performed to rule out Dequervain’s.

Radiocapitellar Chondromalacia Test:
Grind test involving the radiohumeral articulation either the radial head (arthrosis) or capitellum (osteonecrosis); forearm is rotated; examiner applies a valgus stress with lateral compression of the elbow; Positive if crepitus or pain is produced.

Splints Referenced in Neurological Testing Section:

Low Profile Radial Nerve:
Anti-Claw for Median and Ulnar Nerve Dysfunction:

Bibliography:


