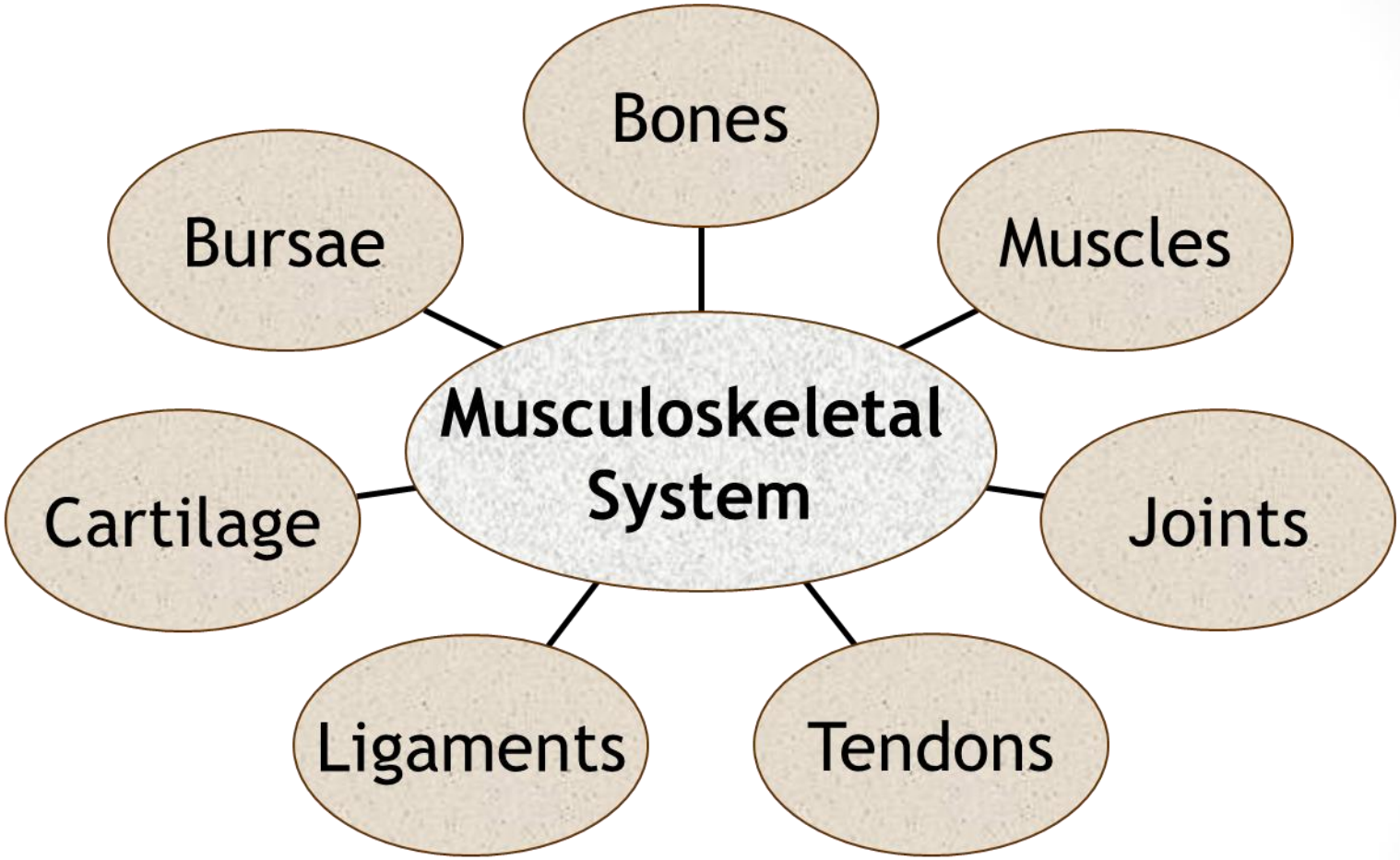
Locomotor System

Mohammad Abu Hilal

System that gives humans the ability to move while providing support, stability.


Bones
Bursae
Muscles
Musculoskeletal System
Cartilage
Joints
Ligaments
Tendons

Symptoms

- Pain
- Stiffness
- Swelling
- Redness
- Deformity
- Weakness
- Instability
- Loss of function

Pain

- Onset
- Duration
- Course
- Timming
- Character
- Location
- Radition
- Severity
- Aggravating and relieving factors
- Associated symptoms

Stiffness

- Limited Range of motion
- Generalized or localized
- Timing and duration
- Locking???

Swelling

Redness

Deformity

Valgus and Varus

- When taking a history for an acute problem always inquire about the mechanism of injury, loss of function, onset of swelling (< 24 hours), and initial treatment
- When taking a history for a chronic problem always inquire about past injuries, past treatments, effect on function, and current symptoms.

Review of system

- Fever
- Weight loss
- Pain in other joint
- Related positive , other organ as part of rheumatological disease.

Past History

- Past medical history
- Past surgical history
- Prior injuries or operations

Medication and Allergies

- NSAIDs
- Anti-Biotics
- Steroids
- Narcotics

Family history

- Rhematological disorder(R.A)
- Pain joints (OA)
- Congenital diseases (DDH)

Social History

- Occupation

  Working / Retired

  Manual labor / Desk job
- Living situation

  Alone / Spouse / Other supports

  which floor, elevator
- Ambulatory status

  How far can they walk

  Do they use a walker / cane
- Smoking/ Alcohol/ Drug Use

Examination

Principles of MSK Exam

- Do not forget the patient
  - General exam, Vital signs
- Two sides: right and left
- Two joints: above and below
- Two surfaces: front and back

Examination

- The patient should be gowned and exposed as required for the examination
- Some portions of the examination may not be appropriate depending on the clinical situation (performing range of motion on a fractured leg for example)

- The musculoskeletal exam is all about anatomy

- Think of the underlying anatomy as you obtain the history and examine the patient

- Always begin with inspection, palpation and range of motion, regardless of the region you are examining (LOOK,FEEL, MOVE)
- Specialized tests are often omitted unless a specific abnormality is suspected
- A complete evaluation will include a focused neurological exam of the effected area
- In case of trauma Vascular exam is the most important

Inspection(look)

- Look for scars, rashes, or other lesions like abrasions/open wounds
- Look for asymmetry, deformity, or atrophy
- Always compare with the other side
- Look for swelling
- Look for erythema (redness)
- Posture/position of the joint or limb

Percussion

- Typically, we don't percuss things in orthopedics however the one exception is nerves

- If tapping over a nerve causes pain or electric shock sensations, this is called Tinel's sign
- Present when nerves are compressed or irritated
- Also used to monitor nerve recovery after injury (in the form of an "advancing Tinel's sign")

Palpation(Feel)

- Examine each major joint and muscle group in turn
- Identify any areas of tenderness

  Joint line,Tendinous insertions,bone or soft tissue
- Palpate for any crepitus (fracture or osteoarthritis)
- Identify any areas of deformity
- Warm or cold including pulses
- Fluctuation/fluid collection
- Compartments – soft or firm and painful
- Sensation
- Always compare with the other side

Move

- Active first then passive
- Ask the patient to move each joint through a full range of motion
- Note the degree and type of any limitations (pain, weakness, etc.)
- Note any increased range of motion or instability
- Always compare with the other side

Passive ROM

- Ask the patient to relax and allow you to support the extremity to be examined
- Gently move each joint through its full range of motion
- Note the degree and type (pain or mechanical) of any limitation
- If increased range of motion is detected, perform special tests for instability as appropriate
- Always compare with the other side

Muscle strength

TABLE 41-2	Grading Muscle Strength
GRADE	**DESCRIPTION**
0	No contraction; paralysis
1	Contraction felt, but no limb movement
2	Passive ROM
3	Full ROM against gravity
4	Full ROM against some resistance
5	Full ROM against full resistance

Vascular(pulses)

Upper extremity

- Check the **radial** pulses on both sides
- If the radial pulse is absent or weak, check the brachial pulses

Lower extremity

- Check the **posterior tibial and dorsalis pedis** pulses on both sides - if these pulses are absent or weak, check the popliteal and femoral pulses

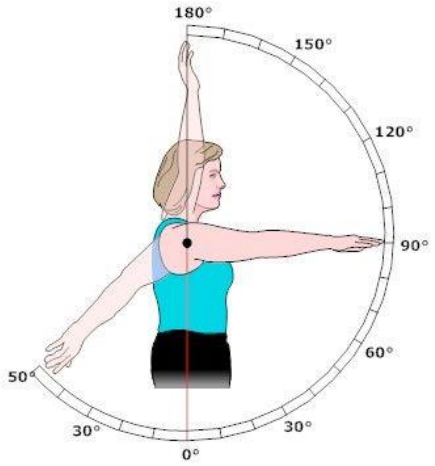
Vascular (Capillary Refill)

- Press down firmly on the patient's finger or toe nail so it blanches
- Release the pressure and observe how long it takes the nail bed to "pink" up
- Capillary refill times greater than 2 to 3 seconds suggest peripheral vascular disease, arterial blockage, heart failure, or shock

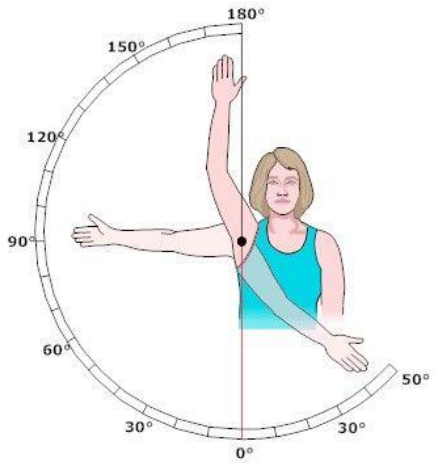
Special Joint and Special Test

Range of Motion: Shoulder

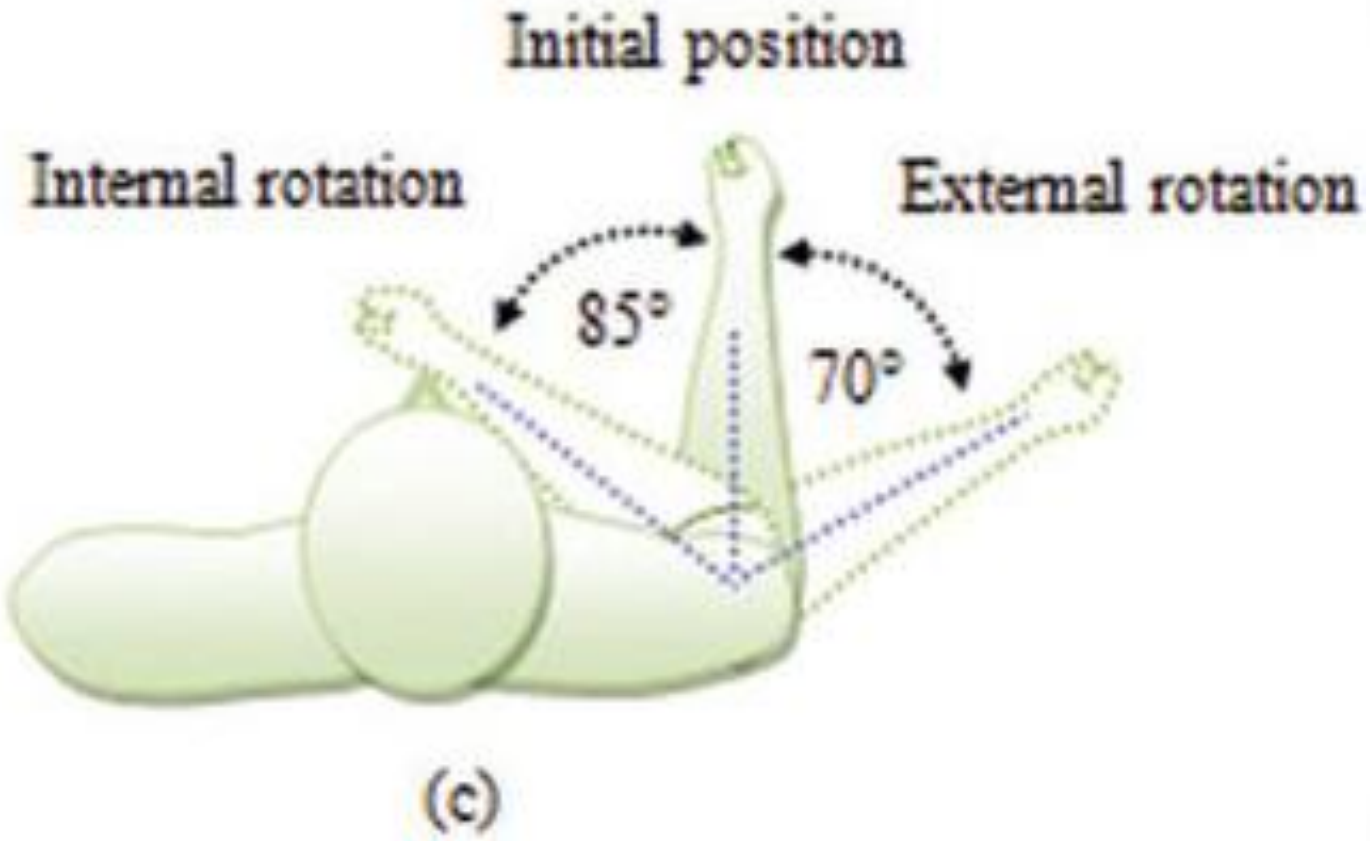
SmartDraw



Shoulder Flex/Ext:
Lateral view of woman exhibiting normal range of movement in the flexion and extension of the arm at the shoulder joint.



Shoulder Abd/Add:
Anterior view of woman exhibiting normal range of movement in the abduction and adduction of the arm at the shoulder joint.


Initial position
Internal rotation
External rotation
85°
70°
(c)

Muscle strength

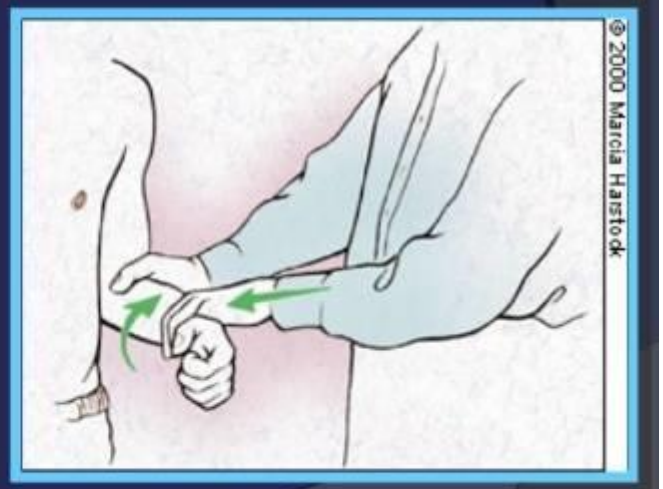
- Internal rotation — subscapularis
- External rotation — infraspinatus, teres minor
- Abduction — supraspinatus and deltoid
- Abduction with thumbs down and 30° horizontal adduction ("empty can test") — isolates supraspinatus

Biceps

Palms up with elbows bent to 15° flexion and resisted upward motion (Speed's test) — biceps

Biceps Tendon/Labrum
Yergason's Test

- Elbow flexed to 90° with thumb up
- Grasp hand (hand shake)
- Patient supinates against resistance



Simultaneous resisted supination and elbow flexion (Yergason's test) — biceps

Impingement Signs/Impingement Test

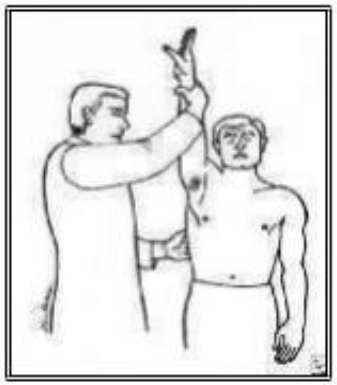
- Neer's sign — extreme forward flexion with the forearm pronated

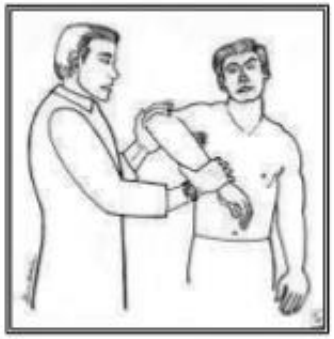
- Hawkin's sign — 90° forward flexion of the shoulder with the elbow flexed to 90° then internal and external rotation movements of the shoulder

TESTS FOR IMPINGEMENT

- **Neer's sign**
- **Neer's test**
- **Hawkins test**

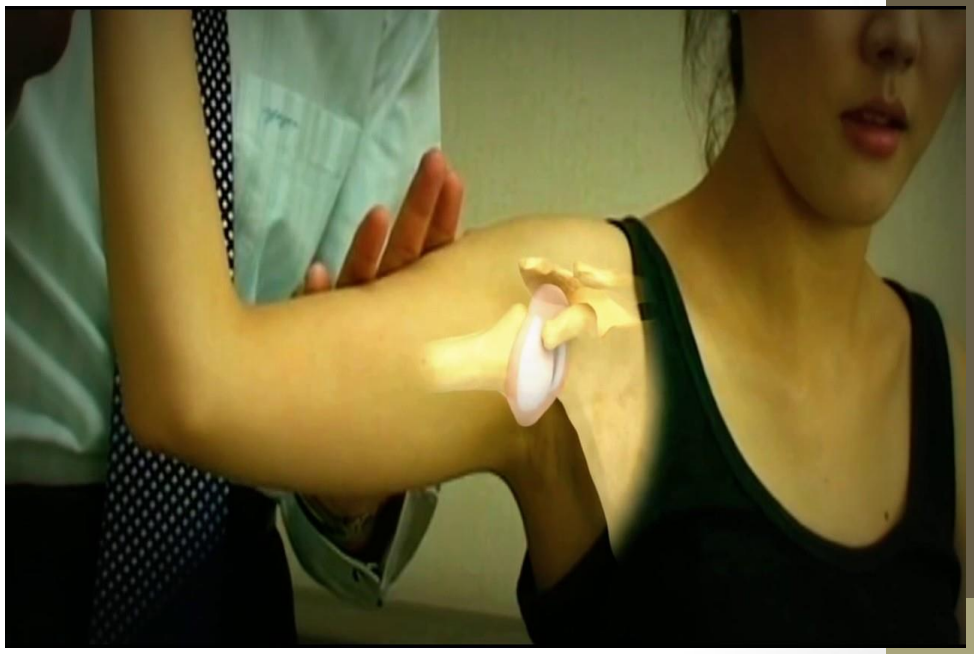
Neer's sign



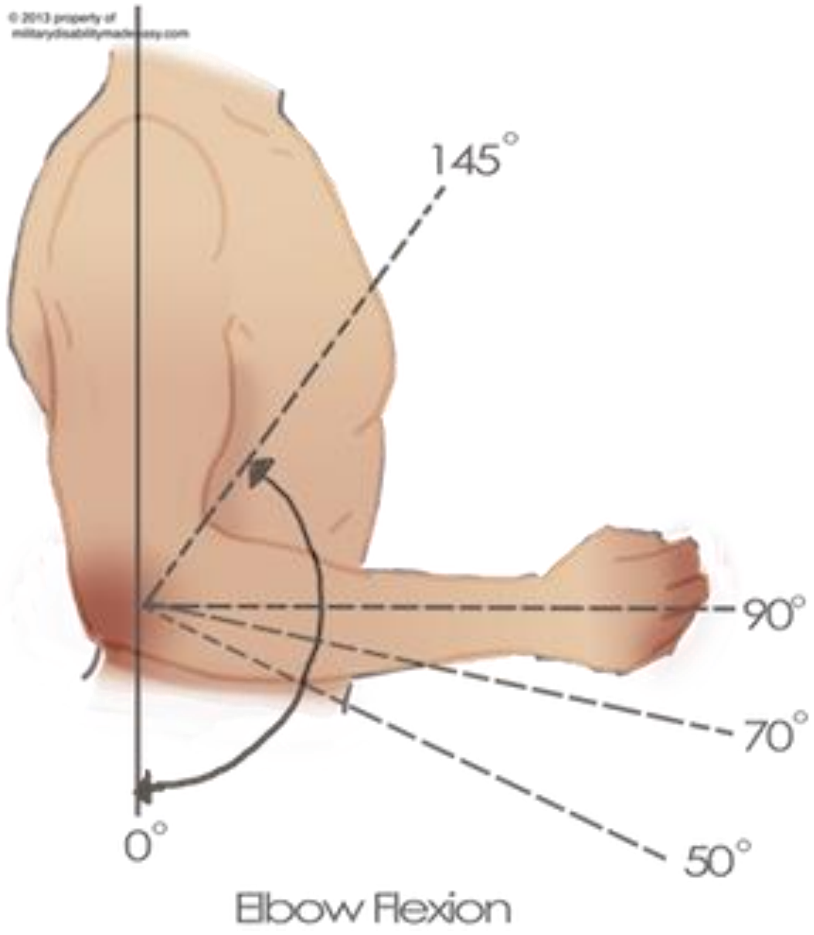


Instability Tests

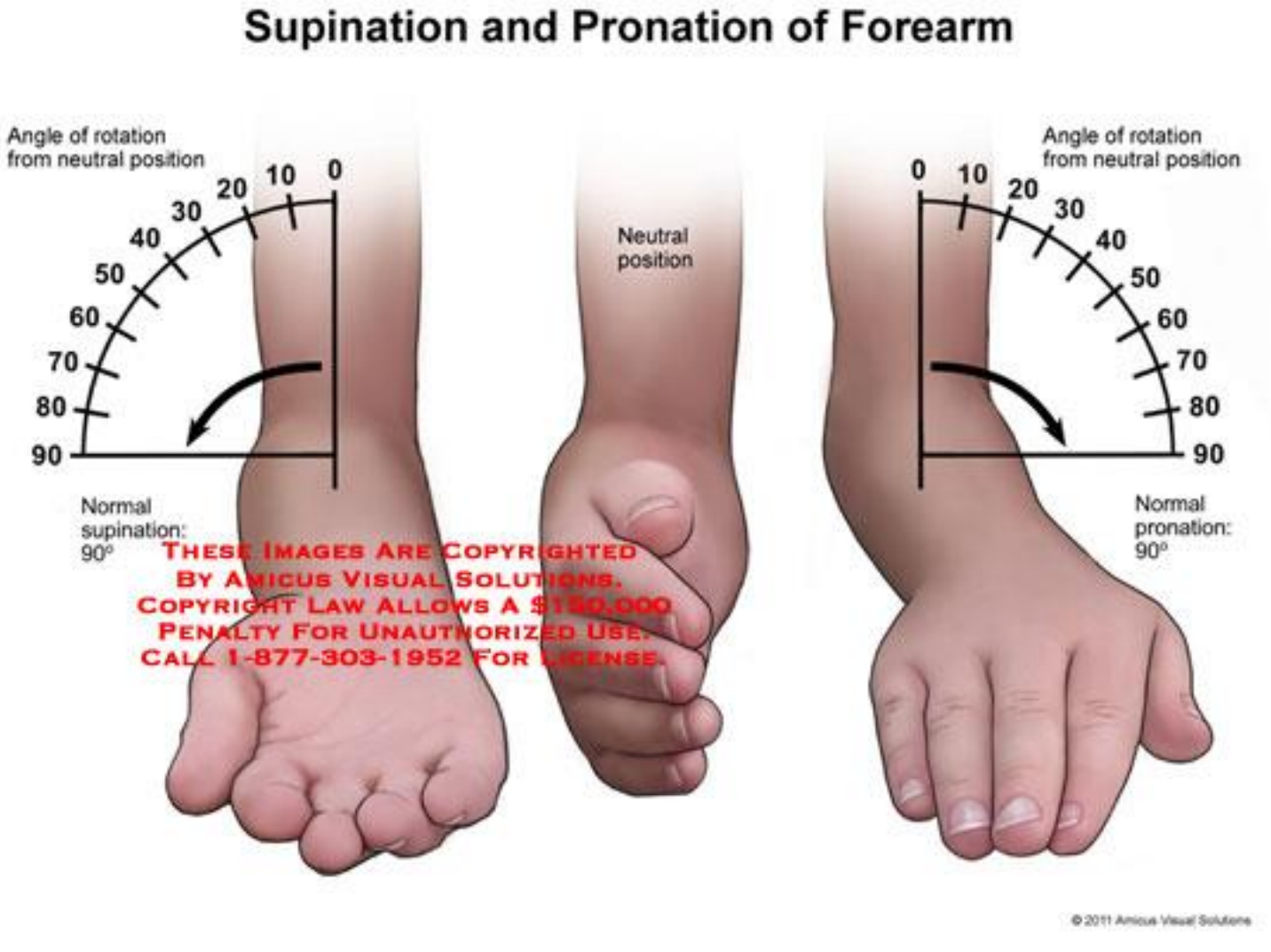
- Anterior apprehension — performed with shoulder and elbow at 90°; apply an anterior force to the posterior shoulder pushing the humeral head anteriorly



Elbow Flexion Extension



Elbow


Supination and Pronation of Forearm
Angle of rotation from neutral position
0
10
20
30
40
50
60
70
80
90
Neutral position
Normal supination: 90°
Angle of rotation from neutral position
0
10
20
30
40
50
60
70
80
90
Normal pronation: 90°
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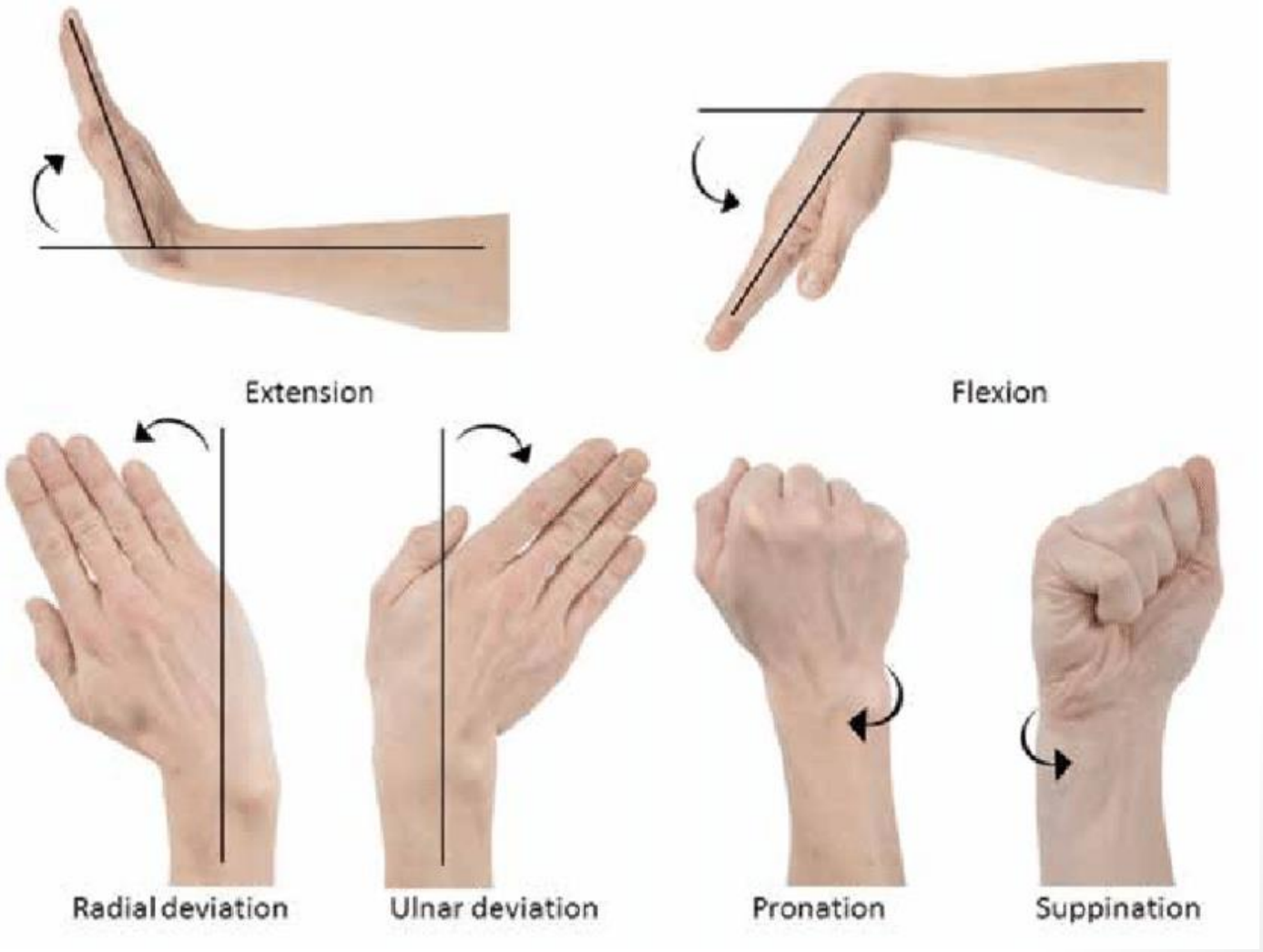
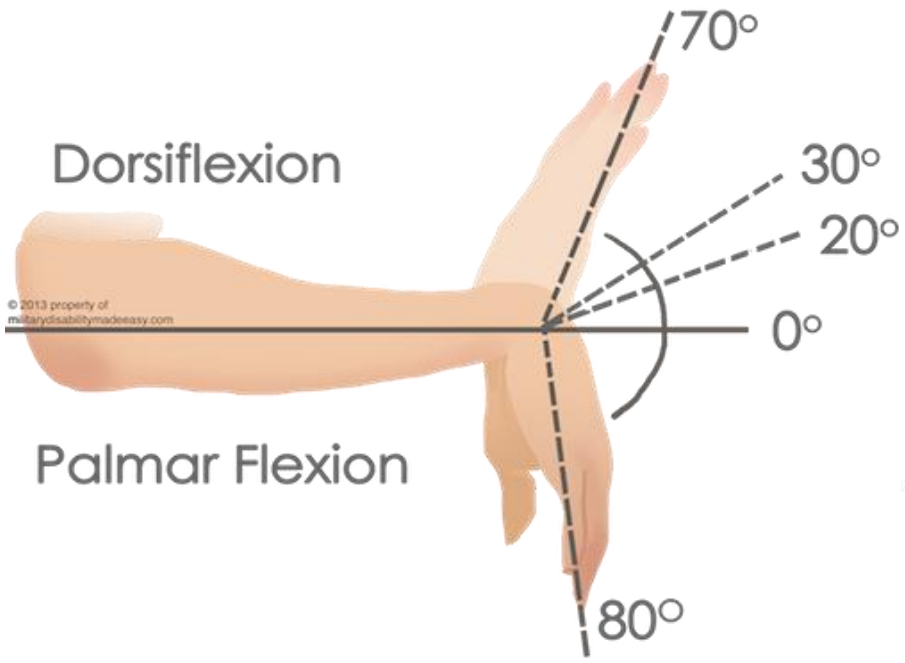
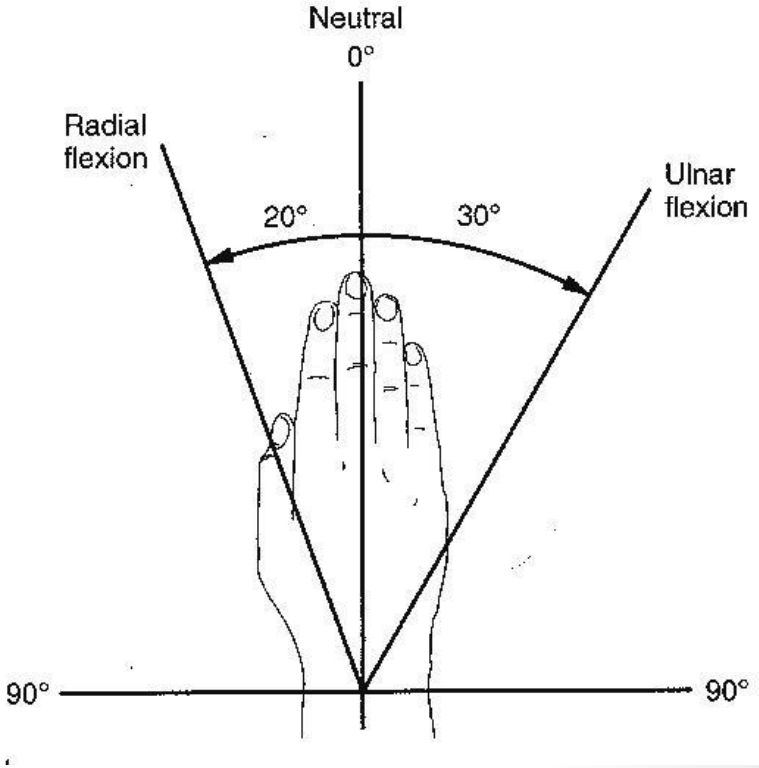
Elbow

- Varus test: Tests for ligamentous stability of the lateral collateral ligament
- Valgus test: Tests the medial collateral ligament
- Cozen's test: (Lateral Epicondylitis / Tennis elbow test) Patient makes fist and pronates the forearm radially deviates and extends the wrist against resistance. Positive if pain in the lateral epicondyle area.
- Golfer's elbow test: While palpating the medial epicondyle, the forearm is supinated and the elbow and wrist are extended. Positive if pain over the medial epicondyle.
- Tinel's of the elbow: Percussion of the ulnar nerve in the grove. Positive if radiating sensation down arm into hand.

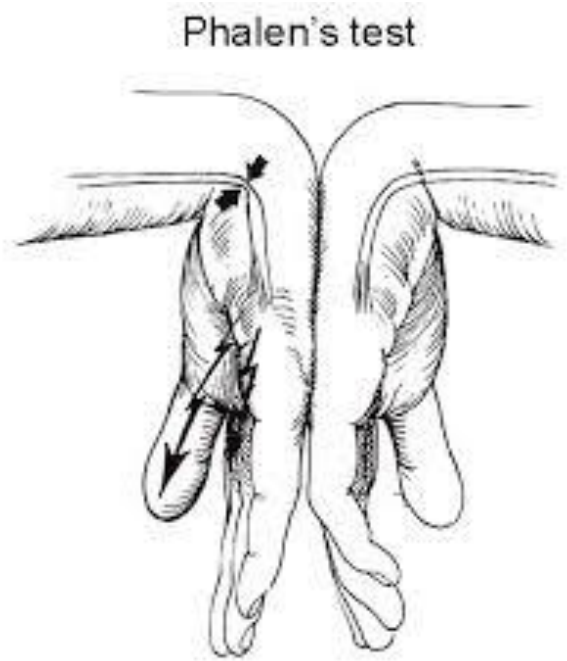
Hand and wrist



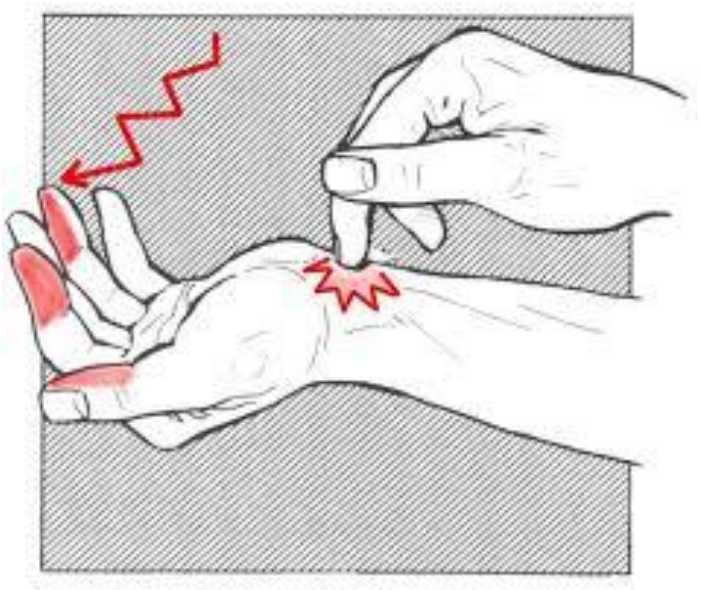

70°
Dorsiflexion
30°
20°
0°
Palmar Flexion
80°


Neutral
0°
Radial
flexion
Ulnar
flexion
20°
30°
90°
90°

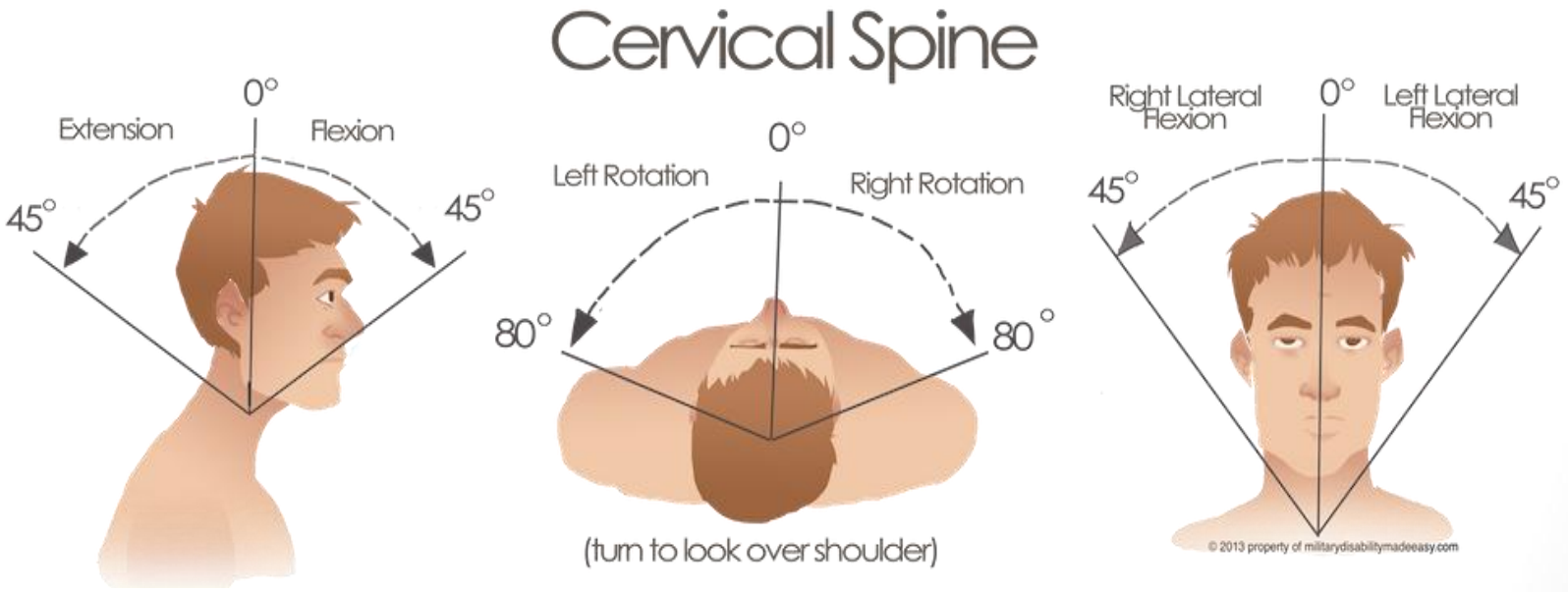
Phalen's test



Tinel test



Spine


Cervical Spine
0°
Extension
Flexion
45°
45°
0°
Left Rotation
Right Rotation
80°
80°
(turn to look over shoulder)
Right Lateral Flexion
0°
Left Lateral Flexion
45°
45°
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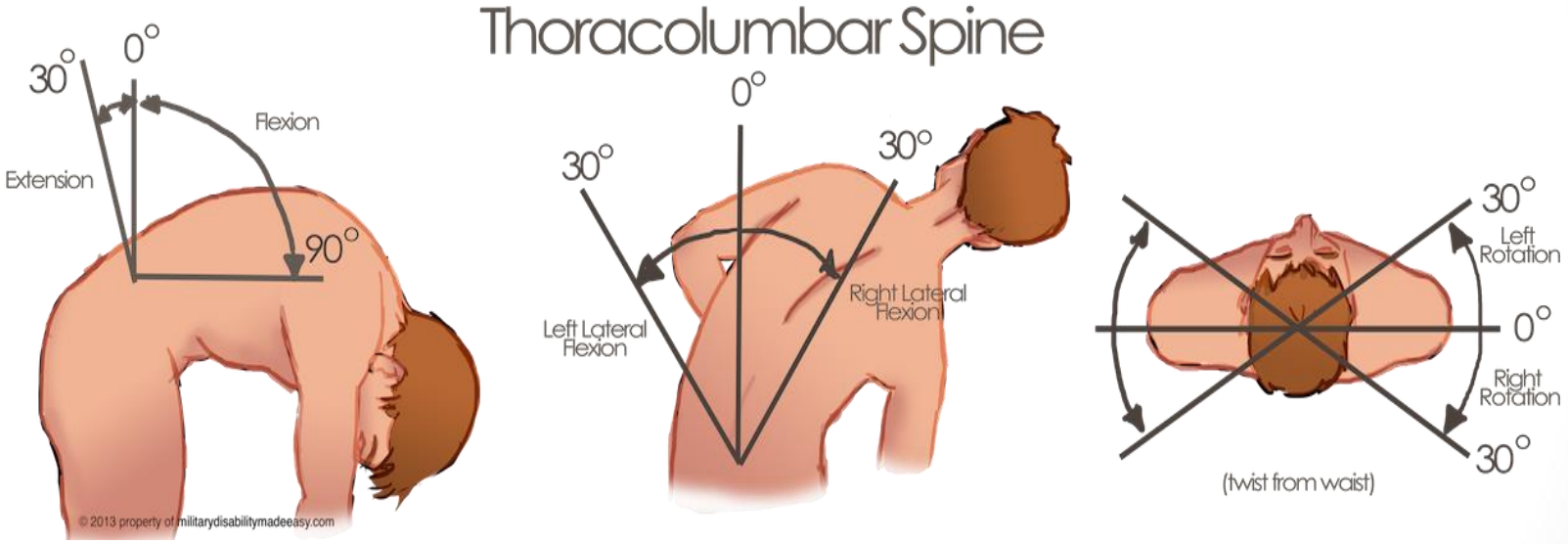
Spine


30°
0°
Flexion
Extension
90°
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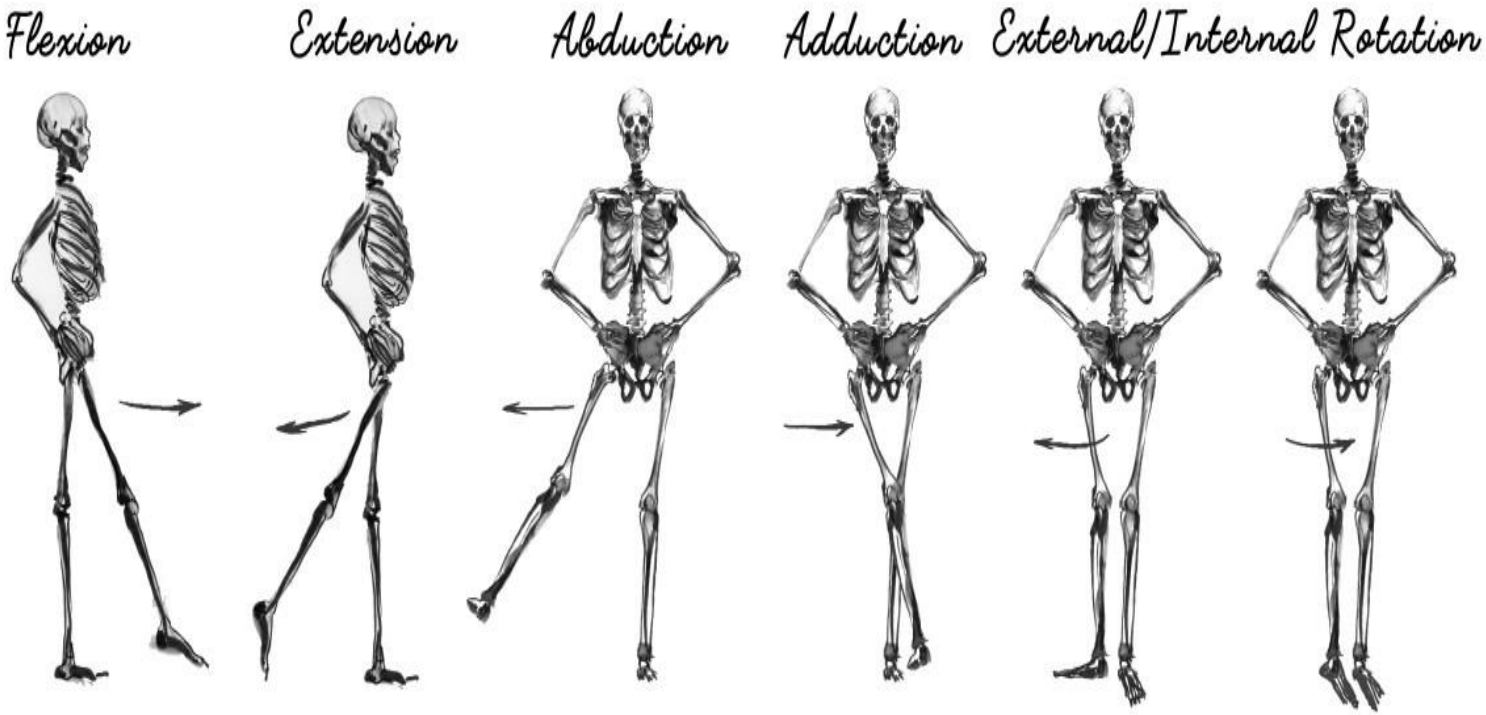
Thoracolumbar Spine
0°
30°
30°
Left Lateral Flexion
Right Lateral Flexion
30°
Left Rotation
0°
Right Rotation
30°
(twist from waist)

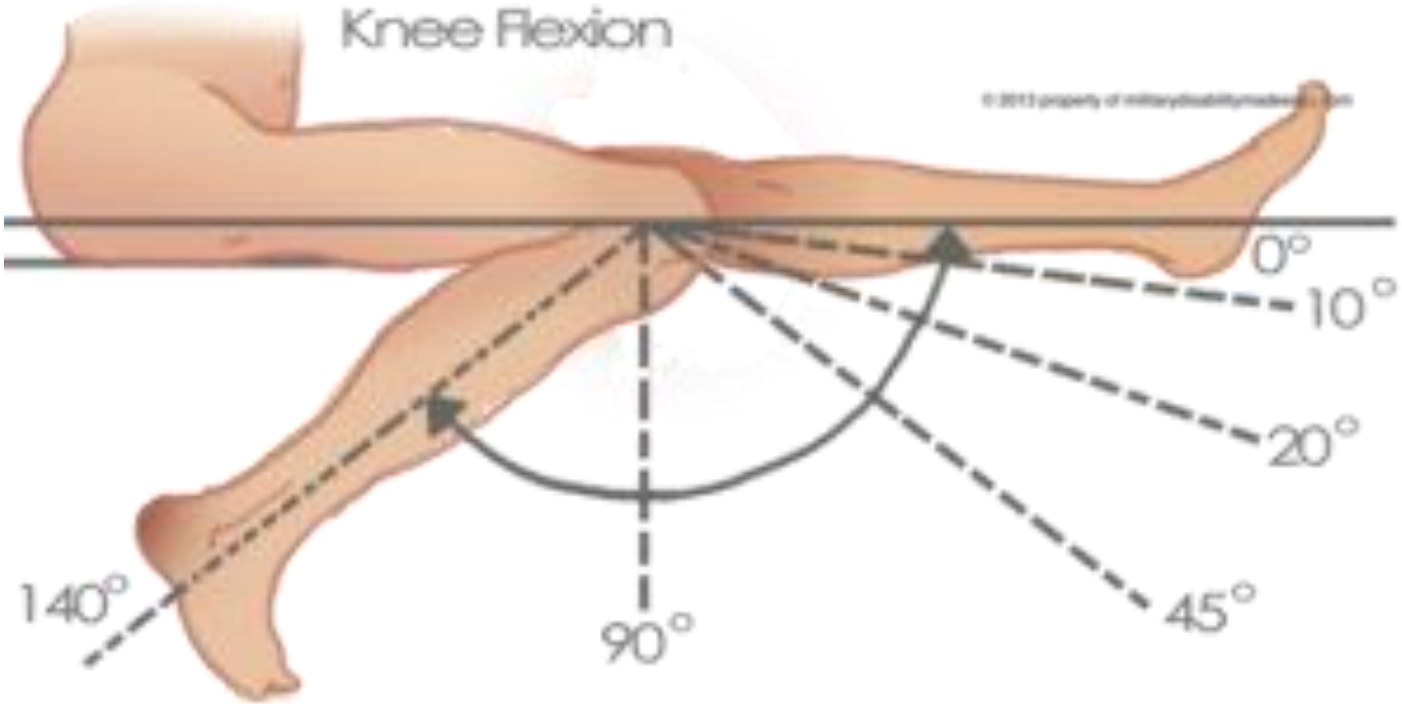
Hip


Flexion
Extension
Abduction
Adduction
External/Internal Rotation

Flexion	0–120°
Extension	0–30°
Abduction	0–45°
Adduction	0–30°
External rotation	0–50°
Internal rotation	0–40°

Patrick test for Sacroiliiatis

Knee



Knee

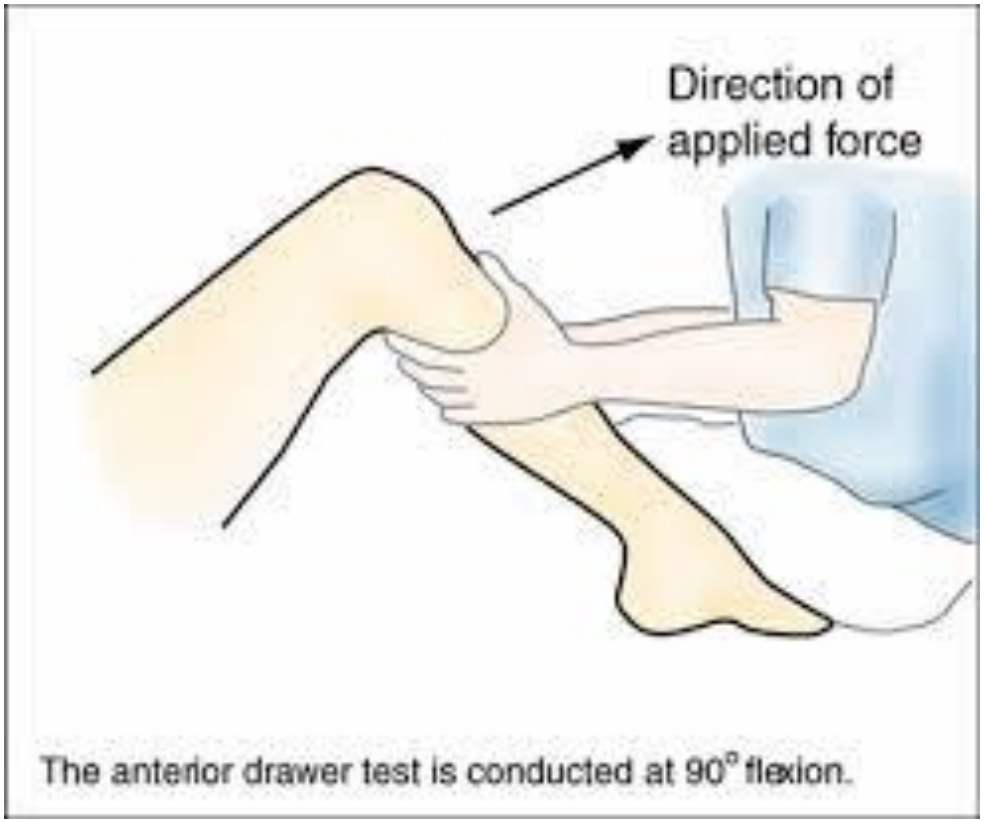
Bulge test (massage test)

- Using your thumb and index finger - milk down any fluid from above the knee.
- Keep this hand in this position.

-Now with the other hand, stroke the medial side of the knee to empty the medial compartment of fluid then stroke the lateral side.
- Observe the medial side of the knee for any bulging? This may indicate an effusion

Anterior drawer test

90 degrees , Anterior Cruciate ligament



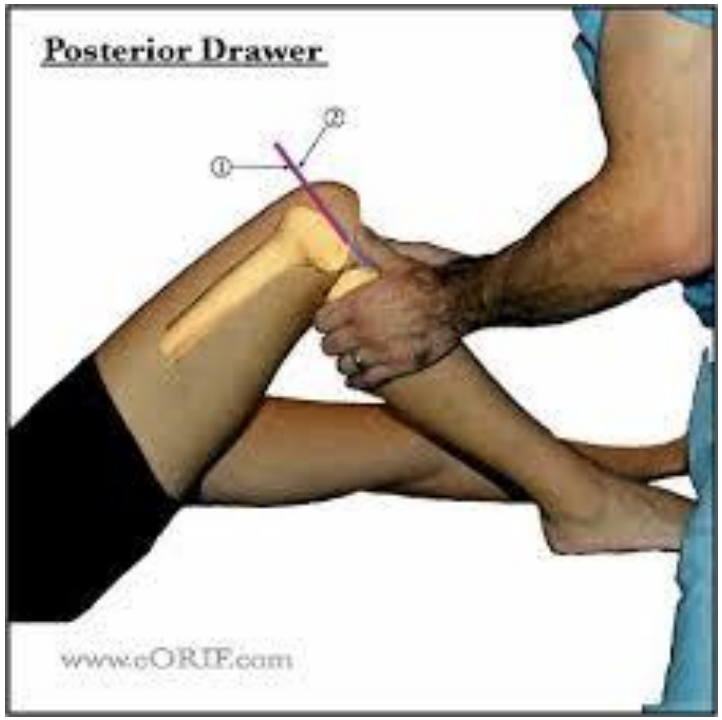
The anterior drawer test is conducted at 90° flexion.

Lachman

30 degrees, Anterior Cruciate ligament

Posterior drawer test

90 degrees, posterior Cruciate ligament



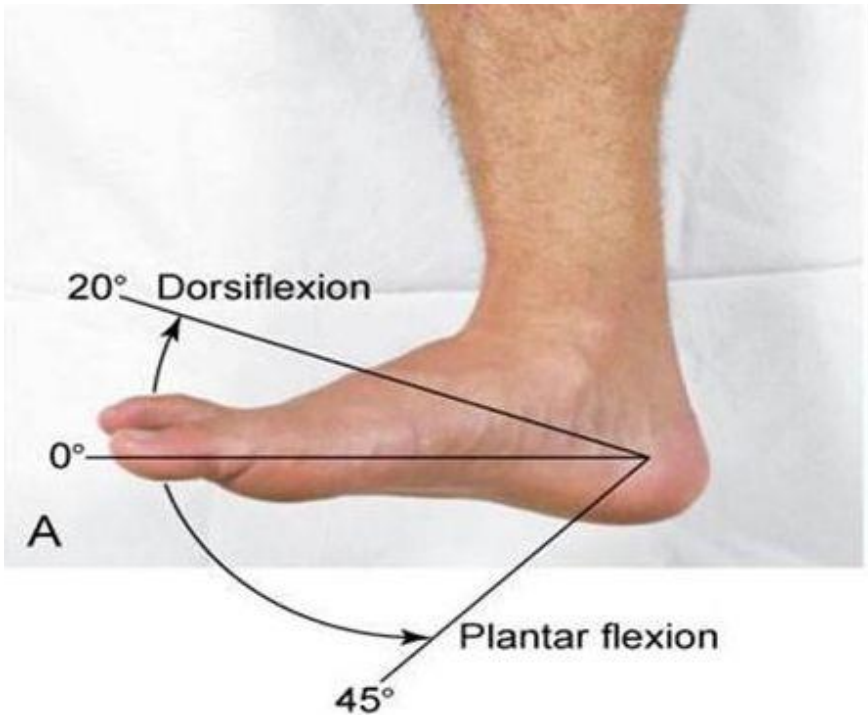
Varus/ Valgus stress test

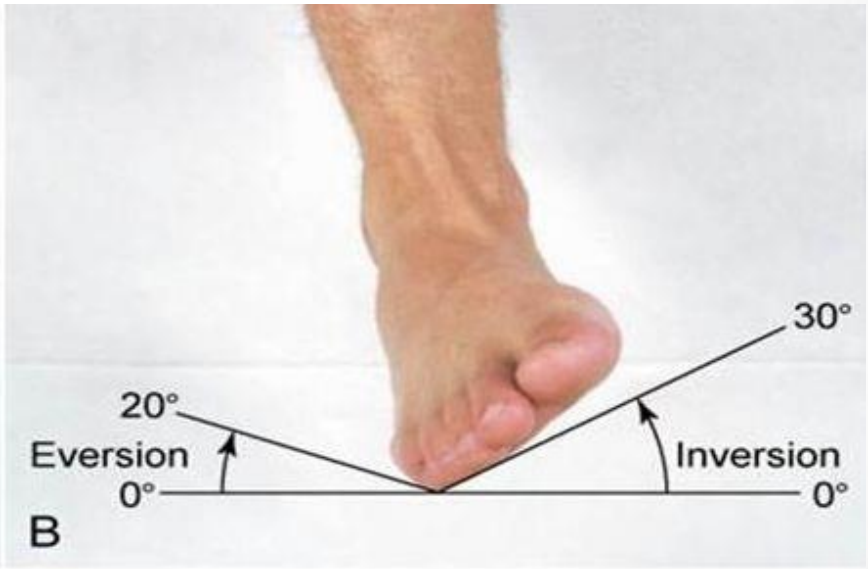
Varus for lateral collateral ligament

Valgus for medial collateral ligament

Mcmurray test for meniscal injury

Ankle and foot





Thank you

Good Luck