*Biomechanics lab*

Lab1

GONIOMETRY UPPER AND LOWER EXTREMITIES

Eng. Aya Talib

principles for ROM test

- Install the patient comfortably and in the correct testing position

- As the patient relaxes

- Place your fixation hand

- Mobilize the limb, avoiding compensatory movements

- REMEMBER: test one joint, one movement, one direction

- Identify lion's is the end of motion: soft end, hard end, pain limitation

- Compare with the other side

- The ROM is measured by using a goniometer

- Measures are reported on the clinical sheet, in degrees

- lie attentive to your body dynamic

shoulder flexion
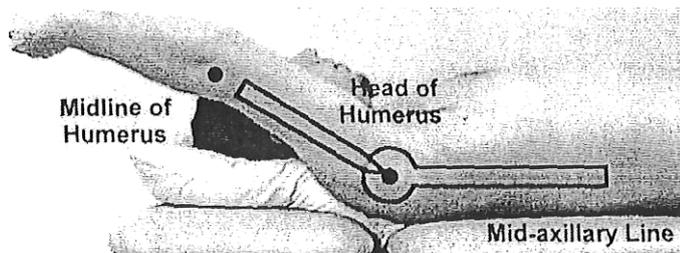
Test Position

- Subject supine
- -flatten lumbar spine (flex knees)
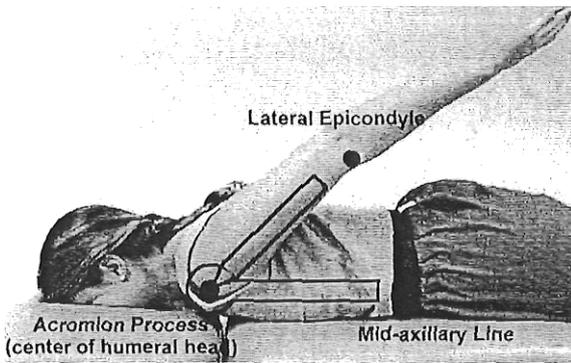- Shoulder no abduction, adduction, or
  rotation.

Goniomater Alignment

- Axis — center of the hurrieral head near
  acromion process
- Stationary arm - parallel mid-axillary line
- Moving arm - aligned wilh midline of the humerus (lateral epicondyle)

Normal Range
(for shoulder complex flexion)

- 180°

Normal End Feel

- Muscle Stretch

Shoulder extension

Lateral Epicondyle

Acromion Process
(center of humeral head)

Mid-axillary Line

Test Position

- Subject prone
- Shoulder no abduction, adduction, or rotation
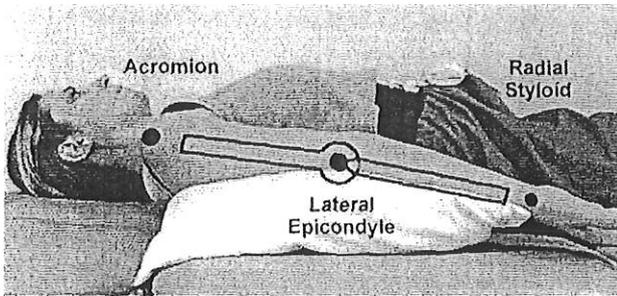- (note to measure gleno-humeral motion, stabilize scapula)

Goniometer Alignment

- *Axis* - center of the Numeral head near the acromion process
- Stationary arm — parallel mid-axillary line
- Moving arm — aligned with midline of humerus (lateral epicondyle)

Normal Range
(for shoulder complex flexion)

- 60°

Normal End Feel

- Capsular or ligamentous

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Elbow extension

Test Position	Normal *Range*
	• 0°
• Subject supine	
• Shoulder neutral (arm at side)	
• Forearm supinated	
• Elbow extended	
• Stabilize arm	

Goniometer Alignment	Normal End Feel
• Axis — lateral epicondyle of humerus	• Bone on bone
• Stationary arm — aligned with humerus (center of acromion process)	
• Moving arm — aligned with radius (styloid process)	

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Forearm
supination

Axis Medial to Ulnar Styloid
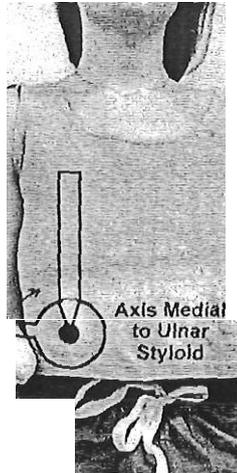
Test Position

- Subject sitting
- Shoulder neutral (arm at side)
- Elbow flexed to 90."
- Stabilize arm
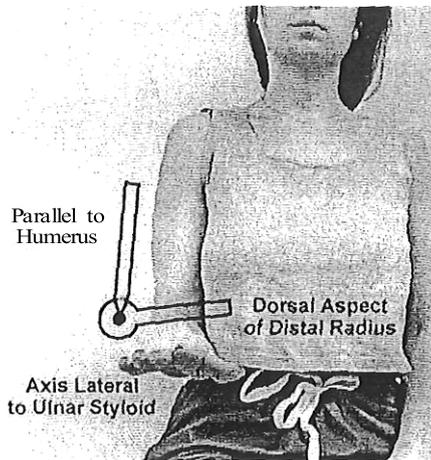- Supinate forearm

Goniometer Alignment

- Axis — medial to ulnar styloid
- Stationary arm — parallel to humerus
- Moving arm — aligned with the ventral aspect of the radius

Normal Range

- 80°

Normal End Feel

- Capsular

Pronation

Parallel to Humerus

Dorsal Aspect of Distal Radius

Axis Lateral to Ulnar Styloid

Test Position

- Subject sitting
- Shoulder neutral (arm at side)
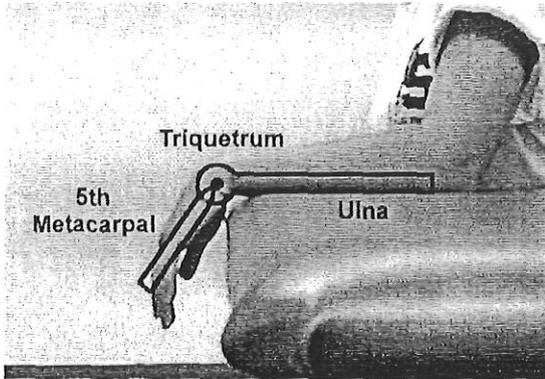- Elbow flexed to 90^0
- Stabilize arm
- Pronate forearm

Goniometer Alignment

- Axis - lateral to ulnar styloid
- Stationary arm — parallel to humerus
- Moving arm — aligned with the dorsum of the radius

Normal Range

- 80°

Normal End Feel

- Capsular

Wrist flexion

Test Position

- Subject seated
- Forearm stabilized on the table
- Flex wrist (fingers relaxed)
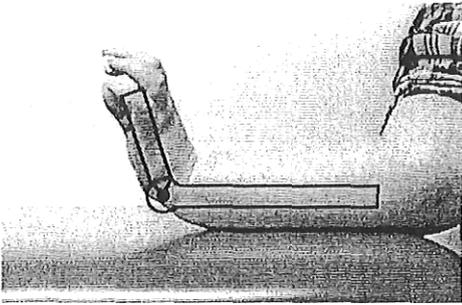
Normal Range

- 80°

Goniometer Alignment

- Axis — lateral wrist (triquetrum)
- Stationary arm — aligned with ulila
- Moving arm — aligned with the fifth metacarpal

Normal End Feel

- Capsular

Wrist extension

Test Position

- Subject seated
- Forearm stabilized on the table
- Extend wrist (fingers relaxed)

Goniometer Alignment

- Axis — lateral wrist (triquetrum)
- Stationary arm — aligned with ulna
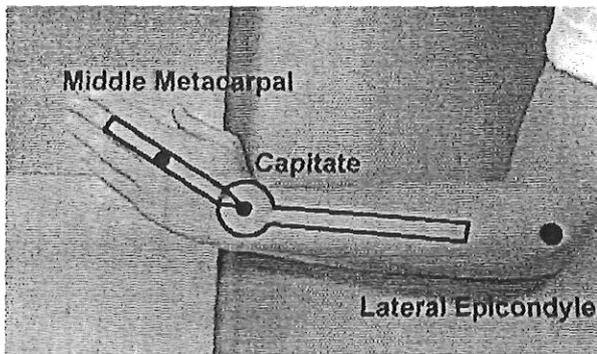- Moving arm — aligned with the fifth metacarpal
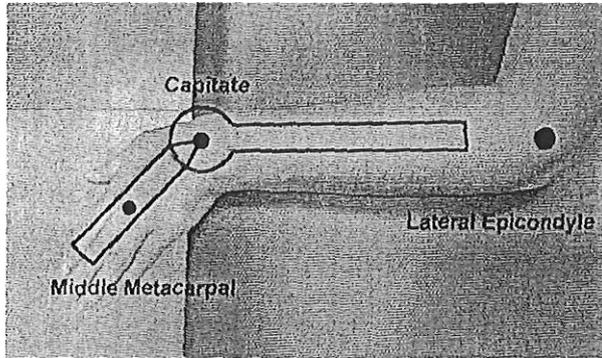
Normal Range

- 80°

Normal End Feel

- Capsular

Wrist radial deviation (adduction)

Test Position	Normal Range
• Subject sitting with forearm resting on table • Stabilize the forearm to prevent pronation or supination	• 20°

Goniometer Alignment	Normal End Feel
• Axis - capitate • Stationary arm — aligned with forearm (lateral epicondyle) • Moving arm - aligned with the metacarpal of the middle finger	• Ligamentous (ulnar collateral ligament)

Wrist ulnar deviation (abduction)

<u>Test Position</u>

- Subject sitting with forearm resting on the table
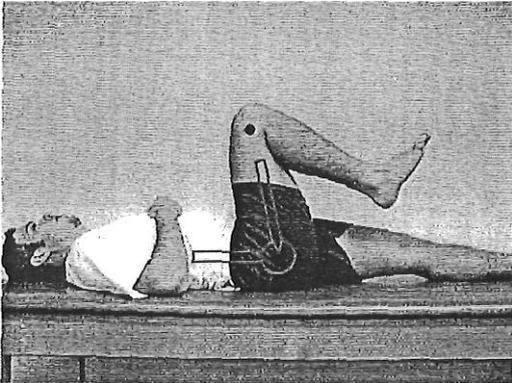- Stabilize the forearm to prevent pronation or supination

<u>Goniometer Alignment</u>

- Axis - capitate
- Stationary arm — aligned with forearm (lateral epicondyle)
- Moving arm — aligned with metacarpal of the middle finger

<u>Normal Range</u>

- **35**

<u>Ñormal End Feel</u>

- Ligamentous (radial collateral ligament)

Hip flexion

Test Position

Normal Range

- Subject supine
- Allow knee to flex (to avoid limitation by tight hamstrings)
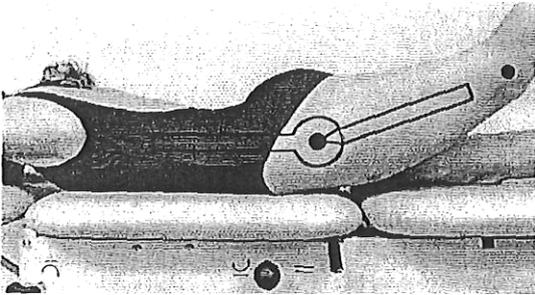- Stabilize pelvis to prevent rotation
- Flex hip

- 120°

Goniometer Alignment

Normal End F-eel

- Axis — greater trochanter
- Stationary arm - aligned with the midline of plevis
- Moving arm —aligned with femur (lateral epicondyle)

- Capsula

Hip extension

Test Position	Normal Range
• Subject prone • Stabilize pelvis to prevent rotation • Extend tip	• 30°

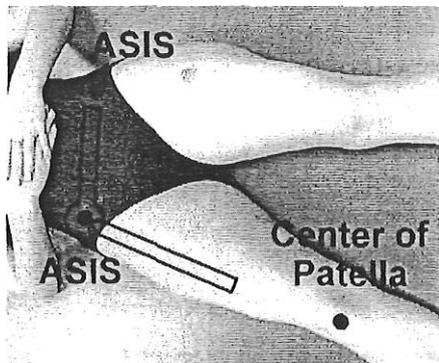| Goniometer Alignment	Normal End Feel
• Axis - greater trochanter • Stationary arm — aligned with the midline of plevis • Moving arm — aligned with femur (lateral epicondyle)	• Capsular or ligamentous

Hip abduction

Test Position

- Subject supine
- Stabilize pelvis to prevent pelvic list
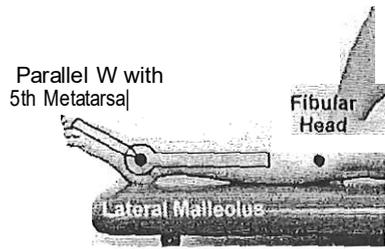- Abduct hip

Goniometer Alignment

- Axis — anterior superior iliac spine (ASIS)
- Stationary arm — aligned with opposite ASIS
- Moving arm — aligned with femur (center of patella)

Normal Range

- 45

Normal End Feel

- Capsular or ligamentous

Ankle plantar flexion

Parallel W with
5th Metatarsal

Fibular
Head

Lateral Malleolus

Test Position
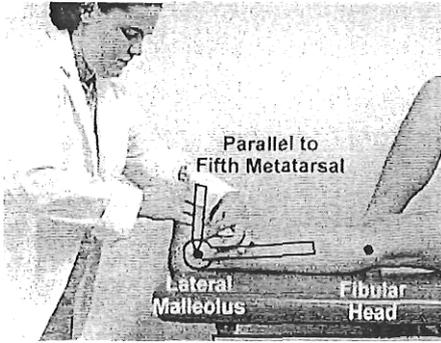
- Subject supine
- Extend knee
- Stabilize leg
- Plantarflex ankle

Goniometer Alignment

- Axis — lateral malleolus
- Stationary arm —aligned with fibular head
- Moving arm — aligned with the fifth metatarsal

Normal Range

- 45°

Normal End Feel

- Capsular

Ankle dorsiflexion

Test Position | Normal Range

- Subject supine
- Extend knee
- Stabilize the sub-talar in neutral
- Dorsiflex ankle by pushing through 5th tarsal head

Normal Range
- 30^0

Goniometer Alignment

- Axis - lateral malleolus
- Stationary arm — aligned with fiôrilar head
- Moving arm —aligned with the fifth metatarsal

Normal End Feel
- Capsular

Ankle /eversion / Ankle inversion