- **Sequence of examination:**
    1. **Look (inspection)**: swelling, deformity, scars, pigmentation, muscle wasting and hair distribution.
    2. **Feel (palpation):** anatomical landmarks (bones + muscles), temperature, pulse and tone of the muscle.
    3. **Move**: pay attention to range of movements. Movement can be active, passive or against resistance. You always start your examination with active movement.
    4. **Special tests.**

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SHOULDER

(examined from 6 aspects: anterior, posterior, medial, lateral, superior & inferior)

- **Anatomical landmarks:**
    - **Bones**: sternal notch, sternoclavicular joint, clavicle, acromioclavicular joint, acromion, spine of the scapula, medial angle of scapula, lateral angle of scapula and inferior angle of scapula.
    - **Muscles**: trapezius, deltoid and latissmus dorsi.
- **Range of movements:**
    - **Flexion**: 170 degrees.
    - **Extension**: 45-50 degrees.
    - **Abduction**: 170 degrees.
    - **Adduction**: 50 degrees (you must cross the midline of the body).
    - **External rotation and internal rotation**: 70 degrees (stabilize the elbow joint and then move your forearm and hand internally or externally using the shoulder joint).
- **Special tests:**
    - **Apprehension test**: this is done to check if there is dislocation of the shoulder. Patient is in the supine position → arm is positioned in 90 degrees abduction and external rotation → if there is dislocation of the shoulder the head of the humerus will pop-out.
    - **Drop arm test**: this is done to check the supraspinatous muscle. Shoulder fully abducted by the examiner → patient actively lowers the arm → if the test is (+) the arm will drop between 30-15 degrees.
    - **Speed test**: this is done to check the biceps tendon. Elbow is filly extended → forearm supinated → ask the patient to flex the shoulder against resistance (hand of the examiner).
    - **Yergeson test:** this is done to check the biceps tendon. Elbow flexed → forearm pronated → examiners hold the and ask the patient to supinate (against resistance).
    - **There are 3 tests to examine rotator cuff muscles (YOU HAVE TO KNOW ONE OF THEM ONLY):**
        - ✓ Neer's test: examiner performs maximal passive abduction in the scapula plane, with internal rotation, whilst stabilizing the scapula.
        - ✓ Hawkins test.
        - ✓ Obrien's test.

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ELBOW

(it is examined from 4 aspects: anterior, posterior, medial and lateral)

- **Anatomical landmarks:**
    - **Bones**: medial and lateral epicondyles, olecranon, ulna, head of the radius.
    - **Muscles**: flexors, extensors, biceps, triceps and brachioradialis.
- **Range of movement:**
    - **Flexion**: 140-170 degrees.

- **Extension**: 0-(-10) degrees.
- **Supination**: 70-90 degrees.
- **Pronation**: 70-90 degrees.

  Note: these ranges depend on the weight of the person and how muscular he is.

- **Special tests:**
  - **To check the collateral ligaments of the elbow:**
    - ✓ Stress verus: checking for the lateral collateral ligament by stabilizing the distal end of the humerus with one hand and applying verus stress on the elbow by the other hand (pushing toward the midline of the body).
    - ✓ Stress valgus: checking for medial collateral ligament by stabilizing the distal end of the humerus with one hand and applying valgus stress on the elbow by the other hand (pushing away from the midline of the body).
    - ✓ Tennis elbow: the examiner passively extends the patient's elbow, wrist and fingers or in the same position, placing his hand over the hand and asking the patient to flex the wrist (against resistance). If the test is positive, there will be pain in the lateral epicondyle.
    - ✓ Golfer's elbow: the examiner passively flexes the patient's wrist and fingers or in the same position, placing his hand over the dorsum of the hand and asking the patient to extend his wrist (against resistance). If the test is positive, there will be pain in the medial epicondyle.
    - ✓ Tinel's sign: this is done to check for the ulnar nerve by tapping on the ulnar nerve behind the medial epicondyle while the elbow is semi-flexed. If the test is positive, the patient will feel tingling or numbness.

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WRIST AND HAND

- **Anatomical landmarks:**
  - **Bones**: radial and ulnar styloid processes, distal radius, scaphoid bone, metacarpals and phalanges (Note that the thumb has only proximal and distal phalanges). Radial pulse can also be felt.
- **Range of movements:**
  - **Flexion**: 70-90 degrees.
  - **Extension**: 70-90 degrees.
  - **Radial deviation**: 20-30 degrees (due to large styloid process).
  - **Ulnar deviation**: 40 degrees (more than radial deviation).
- **Movements of the thumb:**
  - **Flexion-extension.**
  - **Abduction-adduction.**
  - **Opposition.**
  - **Circumduction.**
- **Special tests:**
  - **Carpal tunnel syndrome**: in which there is compression on the median nerve leading to thenar muscle wasting and loss of sensation in $3^1/_2$ lateral digits of the hand.
    - ✓ Phalen's test (wrist flexion test): done for 1 minute. The test is positive if the patients feels numbness.
    - ✓ Compression test: the examiner compress the carpal tunnel for 1 minute. The test is positive if the patient feels numbness.
    - ✓ Another test which can be done is tapping on the median nerve at the carpal tunnel.
  - **Integrity of flexor digitorum superficialis**: normally, leads to flexion of the digits at the middle phalanges.
  - **Integrity of flexor digitorum profundus**: normally, leads to flexion of the digits at the distal phalanges.

- **Integrity of the median nerve:**
  - ✓ Okay sign test: asking the patient to do OK sign and checking its strength.
  - ✓ Pointing index: asking the patient to make a fist → if abnormal → there will be no flexion of the index and middle finger.
- **Integrity of the ulnar nerve:**
  - ✓ Fromen's test: holding a paper by using the thumb of both hands to check for adductor muscle (which is innervated by the deep branch of ulnar nerve).
  - ✓ Claw hand: there will be extension of metacarpophalangeal joint, flexion of proximal and distal interphalangeal joints (of the medial 2 digits).
  - ✓ Ask the patient to do abduction and adduction of the fingers (to check the power of interossei muscles which are innervated by the deep branch of ulnar nerve).
- **Integrity of the radial nerve:**
  - ✓ If it is injured, the patient will be presented with wrist drop: ask the patient to extend his wrist while the fingers are extended.
  - ✓ Ask the patient to do extension of the thumb.

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HIP

- **Anatomical landmarks:**
  - **Bones**: ASIS, PSIS, iliac crest, greater trochanter.
  - **Muscles**: quadriceps and hamstrings.
- **Range of movements:**
  - **Flexion**: 70-90 degrees (when the knee is extended); 120-150 degrees (when the knee is flexed).
  - **Extension (you examine this movement while the patients is in the prone position, you stabilize the hip with one hand and place the other hand on the knee to raise the lower limb)**: 20-30 degrees.
  - **Abduction (you have to stabilize the hip):** 40-50 degrees.
  - **Adduction (you have to cross the midline of the body):** 30 degrees.
  - **External rotation (hip is flexed):** 45-90 degrees.
  - **Internal rotation (hip is flexed):** 45-90 degrees.
  - **Circumduction.**
- **Special tests:**
  - **Thomas test**: this is done check for flexion deformity. Keep one hand under the patient's back → fully flex on hip → test is positive if the other leg lifts off the couch.
  - **Ortolani test**: the examiner places his thumb on the medial side of the thigh and his fingers on the greater trochanter → flex the hip (90 degrees) and flex the knee (90 degrees) → pull up→ push the greater trochanter with your fingers → abduct the hip.
  - **Barlow's test**: the examiner places his thumb on the medial side of the thigh and his fingers on the greater trochanter → flex the hip (90 degrees) and flex the knee (90 degrees) → adduct the hip → and push (to dislocate the hid of the femur posteriorly).
  - **Galeazzi test**: this is done to check for difference in knee height which will indicate dislocation if present. Bending both knee of the patient and keeping the toes at the same level → then observe the height of both knees. Note that this test is done after 6 months (while Ortolani and Barlow's tests are done before 6 months of age of the baby).
  - **Trendelenburg test:** this is done to check for injury of the superior gluteal nerve which is innervating gluteus medius and gluteus minimus. If the problem is on the right side, you ask the patient to stand on his right leg → consequently the left side will drop.

KNEE

- **Anatomical landmarks:**
  - **Bones**: medial and lateral femoral condyles, medial and lateral tibial condyles, head of the fibula, patella and tibial tuberosity.
  - **Muscles and ligaments**: calf muscle, quadriceps, tendons of hamstrings, patellar and quadriceps ligaments and popliteal fossa.
- **Range of movements:**
  - **Flexion**: 145-160 degrees.
  - **Extension**: 0-(-10) degrees.
  - **External and internal rotation**: you flex the knee of the patient → holding his leg near the ankle → and rotating the tibia internally and externally.
- **Special tests:**
  - **Testing the collateral ligaments (knee must be flexed at 30 degrees):**
    - ✓ Stress verus: checking the lateral collateral ligament.
    - ✓ Stress valgus: checking the medial collateral ligament.
  - **Testing the anterior and posterior cruciate ligaments (you bend the knee of the patient → stabilize the foot by sitting on it → place your fingers in his popliteal fossa and thumbs on tibial tuberosity → then perform the following 2 tests):**
    - ✓ Anterior drawer sign: pulling the tibia anteriorly to check the anterior cruciate ligament.
    - ✓ Posterior drawer sign: pushing the tibia posteriorly to check the posterior cruciate ligament.
  - **Testing the menisci:**
    - ✓ McMurray test (for medial meniscus. To test the lateral meniscus just do the opposite): patient supine and knee flexed to 90 degrees → with one hand hold the heel of the patient and do external rotation → flexes the patient's knee maximally → and then extend the knee again.
  - **Apprehension test (stability of the knee):** push the patella laterally by your fingers while bending the knee → watch for facial expressions for any tenderness (if it is present, stop doing the test otherwise you might dislocate the patella because it is unstable).
  - **Patellar tap test:** milk (to shift fluid inferiorly while the patient is in the supine position) → then push the patella down → if it is bouncing the test is positive.

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ANKLE AND FOOT

- **Anatomical landmarks**: medial and lateral malleoli, tibia, talus, calcaneus, metatarsals, phalanges, tendon of calcaneus and tibialis anterior tendon.
- **Range of movements:**
  - **Plantar-flexion**: 30-40 degrees.
  - **Dorsi-flexion**: 20 degrees.
  - **Inversion**: 30 degrees.
  - **Eversion**: 20 degrees.
    Note: both inversion and eversion occurring at the subtalar joint.
  - **Supination**: 30 degrees.
  - **Pronation**: 20 degrees.
    Note: supination and pronation movements are a combination of movement in subtalar joint and tarsal-metatarsal joints.
- **Special tests:**
  - **Testing the collateral ligaments of the ankle:**
    - ✓ Stress verus: checking the lateral collateral ligament of the ankle.
    - ✓ Stress valgus: checking the deltoid ligament of the ankle.

- **Thompson test**: this is done to check the integrity of Achilles tendon. Patient is in the prone position → examiner squeezes the calf muscle → plantarflexion will occur in the foot. Note: if there is rupture to Achilles tendon there will be no movement.

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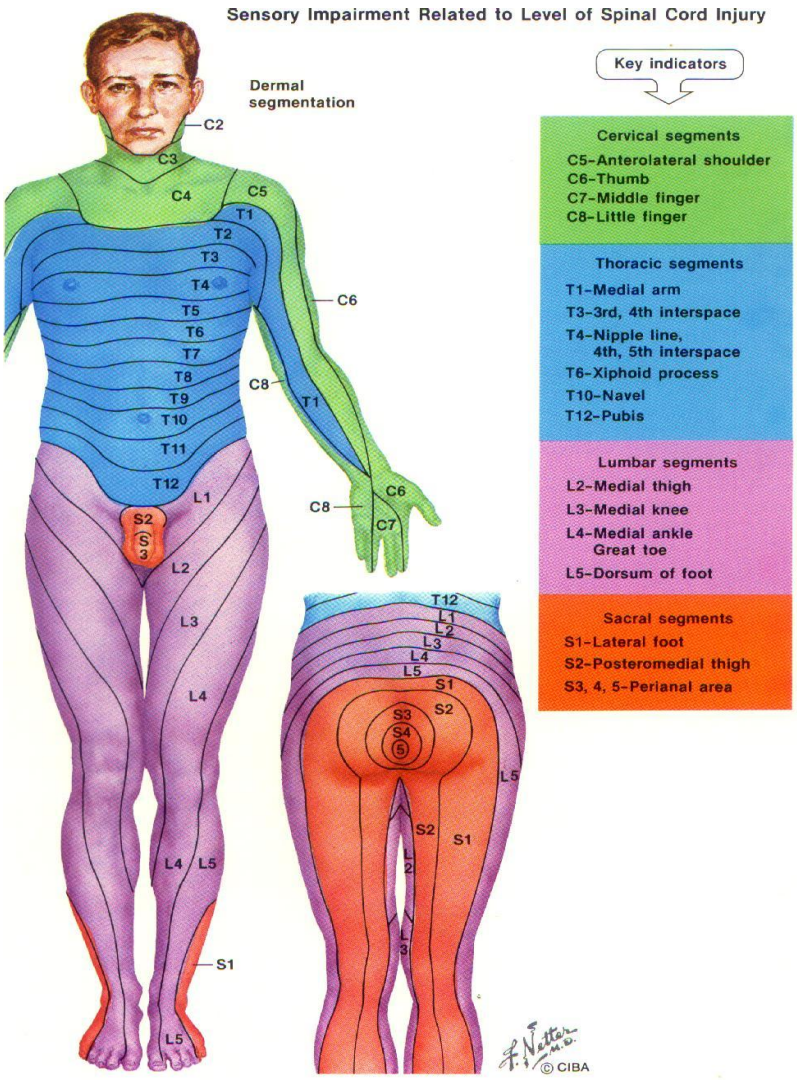
SPINE

- **Anatomical landmarks:**
  - **Posteriorly**: occiputs, mastoid, spinous processes and iliac crest.
  - **Anteriorly**: thyroid cartilage, cricoids ring and hyoid bone.
  - **Muscles**: trapezius and latissmus dorsi.
- **Range of movements:**
  - **Flexion-extension.**
  - **Lateral bending to left and right sides.**
  - **Rotation to left and right sides**.
- **Dermatomes, myotomes and reflexes:**



Upper Limb Myotomes

Shoulder abduction	C5
Elbow Flexion	C5,6
Elbow Extension	C7
Wrist Extension	C7
Wrist Flexion	C8
Finger Extension	C7
Finger Flexion	C8
Finger Abduction	T1

Lower Limb Myotomes

Hip Flexion	L1,2
Hip Extension	L5, S1
Knee Flexion	L5, S1
Knee Extension	L3,4
Ankle Dorsiflexion	L4
Ankle Plantarflexion	S1,2
1st Metatarsal Extension	L5

Reflexes

Ankle	S1,2
Knee	L3,4
Biceps	C5,6
Triceps	C7,8

- **Special tests:**
  - **Straight leg raising test**: stretching the sciatic nerve.