

LOCOMOTOR - HAND

STEPS OF EXAMINATION

Step 1: Approach the patient

- Read the instructions carefully for clues
- Introduce yourself
- Ask the patient “Are you quite comfortable? Do you have any pain? Where do you feel the pain? Can you point to it?”
- Ask permission to examine him “I would like to examine your hand, if it is all right with you”

Step 2: General inspection:

- **Bedside:** walking stick, shoes-callipers, built-up heels
- **General appearance:** scan the patient quickly looking for:
 - Nutritional status (under/average built or overweight)
 - Paget’s (enlargement of skull, bowing of tibia or femur, kyphosis)
 - Marfan’s (tall stature with disproportionately long limbs, arachnodactyly, dislocated lens)
 - Systemic sclerosis (expressionless facies, adherent shiny skin, sometimes with telangiectasis)
 - Ankylosing spondylitis (stooped posture and rigid spine)
 - Acromegalic facies (prominent supraorbital ridges and large lower jaw)
 - Cushingoid facies (steroid changes in a patient with rheumatoid arthritis), exophthalmos (thyroid acropachy)
 - Horner’s syndrome (T1 lesion)
 - Muddy iris (iritis)
 - Gouty tophi or psoriasis (ears)
 - Peripheral arthropathy (knees, ankles)

Step 3: Look at the hands: let the patient sit over the edge of the bed and place the hands over a pillow. Expose the hands and forearm including the elbows. Study first the dorsal and then the palmar aspects of the hands.

- **Nails:**
 - Nail pitting (psoriasis or fungal infection)
 - Onycholysis (psoriasis, fungal infection or thyrotoxicosis)
 - Clubbing (with painful swollen wrists in hypertrophic pulmonary Osteoarthropathy)
 - Nail-fold infarcts (vasculitis – usually rheumatoid)
 - Splinter haemorrhages (unlikely)
- **Skin:**
 - **Colour:**
 - Erythema (suggests acute inflammation caused by soft tissue infection, septic arthritis, tendon sheath infection or crystal-induced disease)
 - Abnormal pigmentation (particularly skin crease pigmentation)
 - **Consistency:**
 - Tight, shiny and adherent (sclerodactyly)
 - Papery thin, ± purpuric patches (steroid therapy)
 - Thick greasy (acromegaly)
 - **Lesions:** psoriasis, vasculitis, purpura, telangiectasis (systemic sclerosis), tophi, neurofibromata, surgical scar (joint replacement)
- **Muscles:**
 - Isolated wasting of the thenar eminence (median nerve lesion)
 - Wasting of the hypothenar eminence and first dorsal interosseous, and guttering of the dorsum of the hand but sparing the thenar eminence (ulnar nerve lesion)
 - Generalized wasting of the thenar and hypothenar eminences and the other small muscles of the hand (T1 lesion, brachial plexus lesion, combined ulnar and median nerve lesions, arthritis leading to disuse atrophy, cachexia)
 - Bilateral wasting of the small muscle with dorsal guttering (RA, syringomyelia, MND)
- **Joints:** observe the distribution of any abnormalities – symmetrical (RA) or asymmetrical (seronegative arthritides); and proximal or distal
 - **Swelling:**
 - Rheumatoid arthritis: soft swelling of the proximal joints (**MCP & PIP**)
 - Osteoarthritis: bony swelling at the base of the **DIP**
 - **Deformity:**
 - Rheumatoid arthritis: swan neck deformity at the **DIP** joint, boutonniere deformity at the **PIP** joint, Z deformity of the thumb, ulnar deviation of the **MCP** joint, anterior subluxation of **MCP** joints, dorsal subluxation of the ulna at the **carpal** joint
 - Scleroderma: sclerodactyly with tapering of the fingers and may be flexion deformities (sometimes with gangrene of the fingertips)
 - Claw hand: hyperextension at the MCP joints with flexion of the IP joints in the fourth and fifth fingers (ulnar nerve lesion)
 - Arachnodactyly: The fingers are long and thin (Marfan's syndrome)
 - Dupuytren's contracture: flexion deformity of the fingers, usually the ring and little fingers, caused by thickening and shortening of the palmar fascia (familial, alcoholism, chronic antiepileptic therapy, operators of vibrating machines)
 - Mallet finger: flexion deformity at the DIP joint which is passively correctable. This is usually caused by minor trauma disrupting the terminal extensor expansion at the base of the distal phalanx, either with or without bony avulsion
 - Rotational deformity: indicates phalangeal fracture, best detected by asking the patient to flex the fingers together and then in turn (normally, the fingers should not cross and should all point to the scaphoid tubercle in the wrist, while fractured finger crosses over its fellows and points away from the scaphoid tubercle)
 - **Nodules:**
 - Heberden's nodes at the DIP or Bouchard's nodes at the PIP (osteoarthritis)
 - Rheumatoid nodules over the extensor tendons and in the palms
 - Gouty tophi
 - Calcified nodules in systemic sclerosis (usually localized to finger tips but may involve extensor aspects of forearm or elbows)
 - Vasculitic nodules in SLE and systemic vasculitis

Step 4: Feel the hands (ask the patient if his hands are painful before touching them, and watch the patient face during examination for any sign of tenderness):

- **Hotness and tenderness** are signs of activity
- **Swelling, deformity, nodules:** confirm the findings on inspection and palpate any swelling to detect whether it is soft and boggy or hard and bony (To detect any soft swelling, press both sides of the joint gently with your index and thumb and any swelling will bulge up. Now press on the swelling from top to bottom with the index and thumb of your other hand to test for sponginess):
 - Soft swelling (synovitis): rheumatoid arthritis
 - Hard swellings (often at the base of the DIP) suggests bony outgrowth (osteophytes) characteristic of osteoarthritis, mucous cysts or rarely tumours.
 - Painful swelling over flexor tendon sheaths in the hand and fingers (usually just proximal to the MCP joints): volar flexor tenosynovitis
 - Painful swelling over tendon sheaths of abductor pollicis longus and extensor pollicis brevis (along the radial aspect of the rest): De Quervain's tenosynovitis
- **Crepitus:**
 - Crepitus over the joints are detected by placing your index finger over the joint, while it is moved passively with your other hand. Crepitus over the joints may indicate osteoarthritis or loose bodies (cartilaginous fragments) in the joint space, but should be differentiated from non-specific clicking of joints.
 - Crepitus over the tendon sheaths may be appreciated during passive movement of the fingers in tenosynovitis. It is usually associated with triggering phenomenon.

Step 5: Move the hand

- **Hand grip:** ask the patient to make a fist, then extends (stretch out) the fingers fully. Lack of full extension of one or more fingers may indicate tendon rupture. To test the power of grip, ask the patient "Grip my fingers tightly (insert two fingers from the thumb side into the palm of the patient's hand)".
- **Pincer movement:** tell the patient "Touch the tip of your index finger with the tip of your thumb, like this and don't let me pull them apart"
- **Prayer sign:** to assess extension, tell the patient "put the palms of the hands together and extend the wrist full like this" (normal is 90 degrees of extension)
- **Reverse prayer sign:** to assess flexion, tell the patient "put the backs of the hands together and flex the wrists fully like this" (normal 90 degrees of flexion) Have the patient hold this position for 30 seconds and then comment on how the hands feel. Pain, tingling, or other abnormal sensations in the thumb, index, or middle fingers strongly suggest carpal tunnel syndrome (Phalen's Test). You may wish to confirm median nerve compression at the wrist by doing the Tinel's test (percussion of the nerve at putative site of compression, usually using a tendon hammer, produces paraesthesiae in the distribution of the nerve)
- **Trigger phenomenon:** normally, the tendon moves smoothly in and out of its surrounding sheath as the finger straightens and bends. In trigger finger (flexor digital tenosynovitis), the inflamed tendon can move out of the sheath as the finger bends. However, it cannot easily move back in as the finger straightens and therefore the finger becomes locked in a bent position. Straightening the finger forces the swollen area into the sheath—producing a popping sensation similar to that felt when pulling a trigger. This could be elicited by passive extension of the previously flexed finger. Trigger finger can result from repetitive use of the hands (as may occur from using heavy gardening shears) or from inflammation (as occurs in rheumatoid arthritis).

Step 6: Assess function of the hand: undoing a button and writing

Step 7: Neurological examination of the hand: perform brief neurological assessment focusing particularly on the median and ulnar nerves. Always compare right with left.

- **Power:** Describe any weakness in terms of the medical research council (MRC) scale from 5 (normal) down to 0 (no visible muscle contraction). Tell the patient: “I am going to test the strength of some of your muscles”:
 - Finger abduction: tell the patient “Spread your fingers wide apart like this and don’t let me push them together” → dorsal interossei (**ulnar nerve; T1**).
 - Finger adduction: tell the patient “Hold this piece of paper between your fingers and don’t let me pull it out” → palmar interossei (**ulnar nerve; T1**).
 - Thumb abduction: tell the patient “Straighten your hand, like this (palm upwards) and point your thumb towards the ceiling, like this. Now keep it there and don’t let me push it down” → abductor pollicis brevis (**median nerve; C8, T1**).
 - Thumb opposition: tell the patient “Touch the tip of your little finger with the tip of your thumb, like this and don’t let me pull them apart” → opponens pollicis (**median nerve; T1**).
- **Sensory (pinprick):**
 - **Demonstrate** the stimuli to the patient by testing on the sternum (use each end of the hat pin): “this is sharp...and this is blunt...now I’m going to test the sensation in your hands and I want you to close your eyes and say “Sharp” if it feels sharp, and “blunt” if it feels blunt”.
 - **Screening test:**
 - Palmar surface of distal phalanx of index finger: **median nerve; C6**
 - Palmar surface of distal phalanx of middle finger: **median nerve; C7**
 - Palmar surface of distal phalanx of little finger: **ulnar nerve; C8**
 - **Assessing a hypothesis:** if you suspect a certain pattern of sensory loss (dermatomal or specific nerve sensory loss), test within the area of interest with great care, particularly noting any difference between the two sides

Step 8: Radial pulse: check for rate and rhythm

Step 9: Elbows: rheumatoid nodules, psoriatic plaques, scar or deformity underlying an ulnar nerve palsy

Step 10: Additional signs: e.g. evidence of carpal tunnel syndrome (if you diagnose rheumatoid arthritis or acromegaly)

Step 11: Thank the patient and cover him (her)

THEORETICAL NOTES

Phases of clubbing: (cardiac causes include cyanotic heart diseases and infective endocarditis)

1. **Swelling of the soft tissues** of the terminal phalanx (→ increased nail bed fluctuation). To detect nail bed fluctuation, place both thumbs under the pulp of the terminal phalanx and attempt to move the nail within the nail bed using your index fingers. A “spongy feel” confirms nail bed fluctuation
2. **Obliteration of the normal obtuse angle between the nail and nail bed** (this defines clubbing). To confirm obliteration of the angle between the nail and nail bed ask the patient to approximate the dorsal aspects of the terminal phalanges (Shamroth's sign)
3. **The nail loses its longitudinal ridges and becomes convex** from above downwards (due to soft tissue hypertrophy). In extreme cases the terminal segment of the finger is bulbous, like the end of a drum stick.
4. **Hypertrophic pulmonary osteoarthropathy (HPOA)** representing the most extreme form, in which beside the clubbing of fingers there is pain and swelling of the wrists and ankles due to periostitis manifested by periosteal thickening and subperiosteal new bone formation (seen on X-rays of distal forearm and lower legs). Isotope bone scanning demonstrates increased activity and often the serum alkaline phosphatase is raised. This is almost always associated with lung cancer, usually squamous cancer.

Causes of clubbing:

- **Idiopathic**
- **Pulmonary causes:**
 - Chronic fibrosing alveolitis
 - Chronic suppuration in the lungs (bronchiectasis, empyema, lung abscess, cystic fibrosis)
 - Bronchogenic carcinoma, mesothelioma
 - Severe chronic cyanosis
 - Pulmonary TB
 - Emphysema
- **Cardiac causes:**
 - Congenital heart disease, e.g. Fallot's tetralogy
 - Infective endocarditis
 - Severe chronic cyanosis
- **Chronic abdominal disorders:**
 - Hepatic cirrhosis
 - Crohn's disease
 - Polyposis of the colon
 - Ulcerative colitis
 - Coeliac disease
- **Familial**

Swelling and deformities of rheumatoid arthritis:

- Swelling of MCP joints produces loss of interdigital indentation, on the dorsum of the hand especially when the MCP and IP are fully flexed → loss of normal “hill-valley-hill-valley” aspect.
- Swelling at the PIP joints produces a “spindling” appearance which is typically seen in rheumatoid arthritis and collateral ligament injuries
- Swan neck deformity: flexion deformity at the **DIP** joint with hyperextension at the PIP joint
- Boutonniere (button-hole) deformity: flexion deformity at the **PIP** joint with hyperextension at the DIP joint (imagine the tip of the finger pressed firmly onto a button)
- Z deformity of the thumb
- Ulnar deviation of the **MCP** joint is typical of rheumatoid arthritis
- Anterior subluxation of **MCP** joints
- Dorsal subluxation of the ulna at the **carpal** joint

Sites of hand or wrist involvement and their potential disease associations

