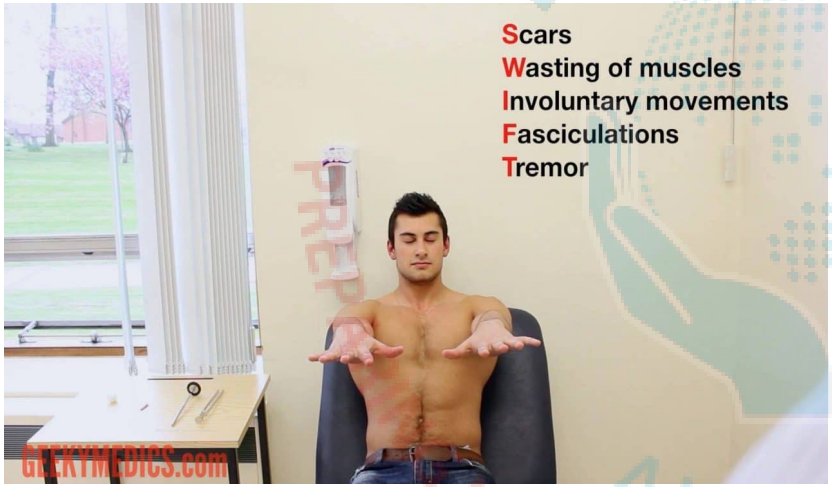
- UPPER AND
- LOWER LIMB
- NEUROLOGY

- **Peripheral neurological examina**tion
- • It is most important to have a set order of examination of the limbs for
- neurological signs so that nothing important is omitted. The following scheme is a
- standard approach.
- • General inspection SWIFT
- •**ITPRCS**
- Inspection (Posture, Muscle bulk, Abnormal movements, Fasciculations)
- • Tone
- • Power
- • Reflexes
- • Coordination
- • Sensory system(Pain and temperature, Vibration and proprioception, ±Light
- touch)


Scars
Wasting of muscles
Involuntary movements
Fasciculations
Tremor
GEEKYMEDICS.com


Pronator drift
(UMN pyramidal pathology)
GEEKYMEDICS.com

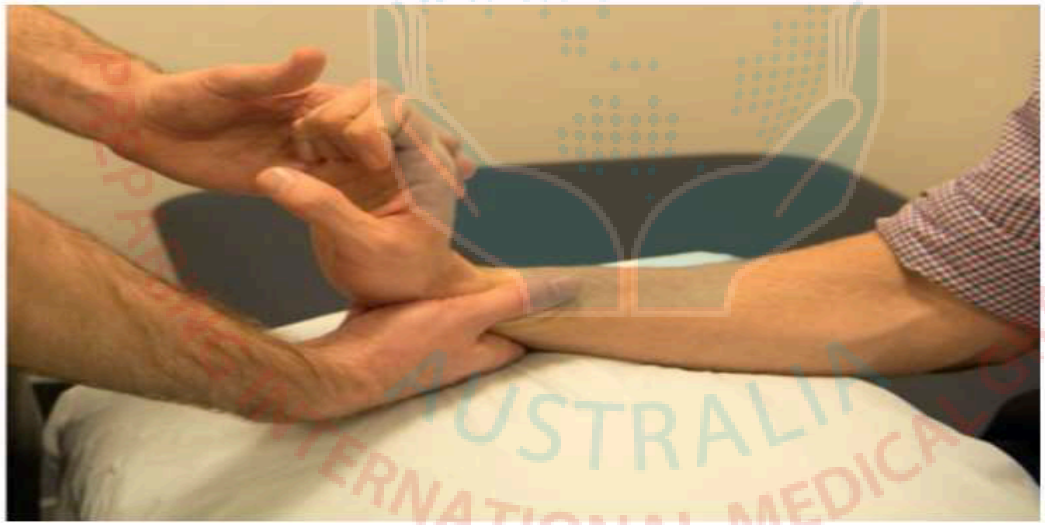
- **Upper limbs**
- • General inspection: SWIFT (Swelling, wasting, involuntary movements,Fasciculations, tremors)
- • **Tone:**
- Tone is tested at both the wrists and the elbows. Rotation of the wrists with supination and pronation of the elbow joints (supporting the patient's elbow with one hand and holding the hand with the other) is performedpassively (the examiner does the work), and the patient should be told to relax to allow you to move the joints freely.


Cog-wheeling & rigidity
(Parkinsons disease)

- • **Power:**
- • Shoulder
- Abduction—mostly deltoid and supraspinatus—(C5, C6)
- Adduction—mostly pectoralis major and latissimus dorsi—(C6–C8)

- • **Elbow**
- Flexion—biceps and brachialis—(C5, C6)
- Extension—triceps brachii—(C7, C8)

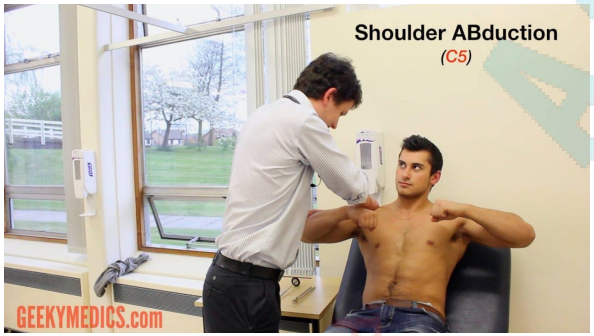
- • **Wrist**
- Flexion—flexor carpi ulnaris and radialis—(C6, C7)
- Extension—extensor carpi group—(C7, C8)



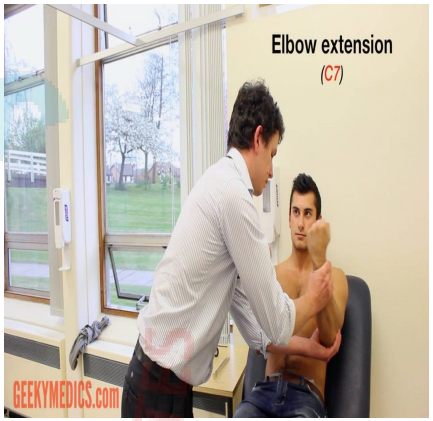
Testing power—wrist extension: 'Stop me bending your wrist'

- • **Fingers**
- Extension—extensor digitorumcommunis, extensor indicis and extensor digiti minimi—(C7, C8)
- Flexion—flexor digitorum profundus and sublimis—(C7, C8)
- Abduction—dorsal interossei—(C8, T1)
- Adduction—volar interossei—(C8, T1)

- **LET’S MAKE IT SIMPLE!!!**
- • CHICKEN WINGS – C5
- • ELBOW FLEXION – C6
- • ELBOW EXTENSION – C7
- • SQUEEZE YOUR FINGER – C8
- • FINGER ABDUCTION AGAINST RESISTANCE – T

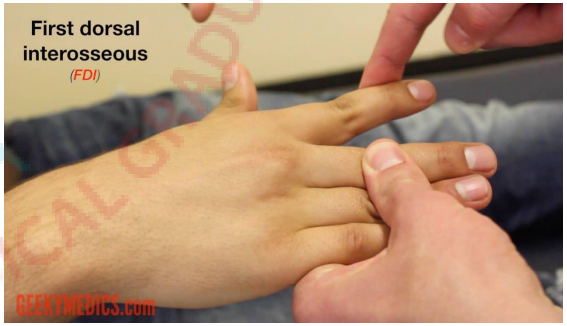

Shoulder ABduction
(C5)
GEEKYMEDICS.com


Elbow flexion
(C5/6)
GEEKYMEDICS.com


Elbow extension
(C7)
GEEKYMEDICS.com

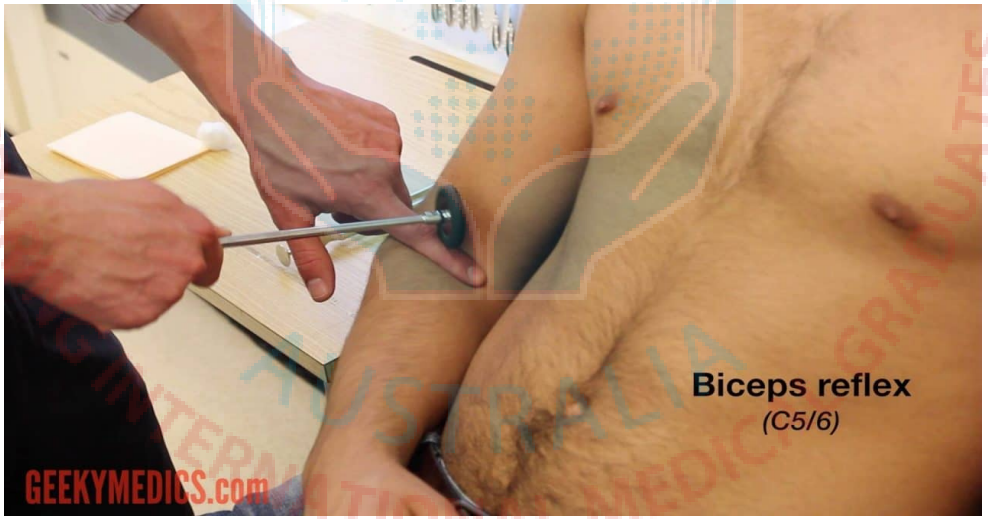

Wrist
flexion
(C6/7)
GEEKYMEDICS.com


Wrist
extension
(C6)
GEEKYMEDICS.com

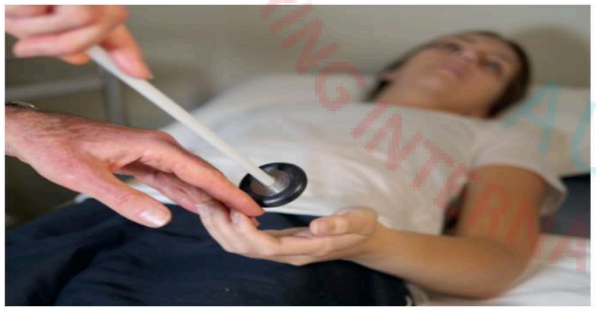

First dorsal
interosseous
(FDI)
GEEKYMEDICS.com

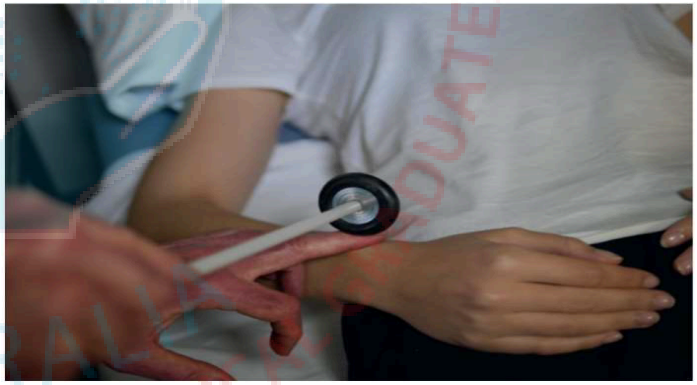
- • Reflexes
- • TRICEPS C7, C8: flexing the elbow,
- directly tap on the triceps
- brachialis muscle tendon above
- the olecranon process of the ulna.
- Normal response is elbow
- extension and contraction of the
- muscle

- Biceps reflex C5, C6
- Normal response – contraction of
- The muscle and flexion of the elbow



- **Brachioradialis Reflex**
- The examiner prompts the brachioradialis reflex
- by tapping the brachioradialis muscle tendon at
- A pointy 2-cm proximal to its insertion
- onto the styloid process of the radius.
- A normal reflex would produce
- Flexion of the wrist.



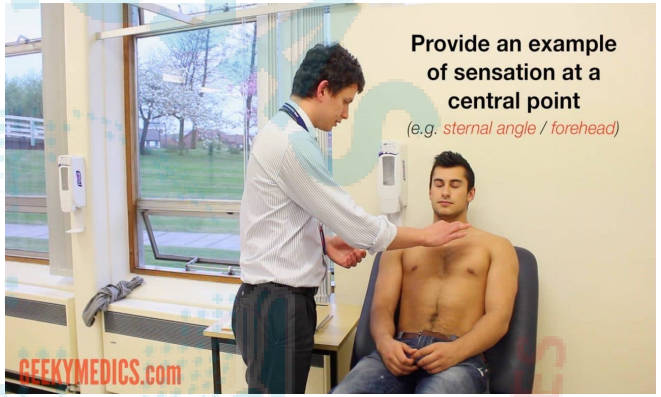


- • Coordination
- Finger–nose test

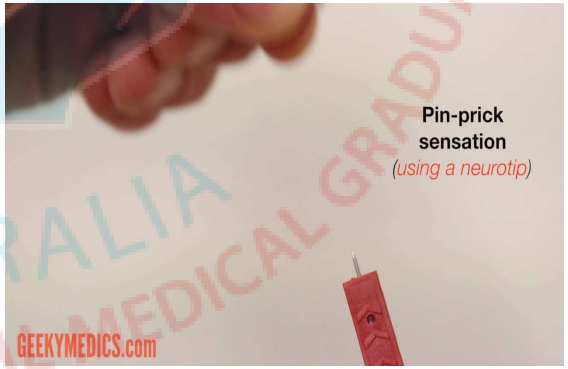
- • Rapidly alternating movements - Disdiadochokinesia

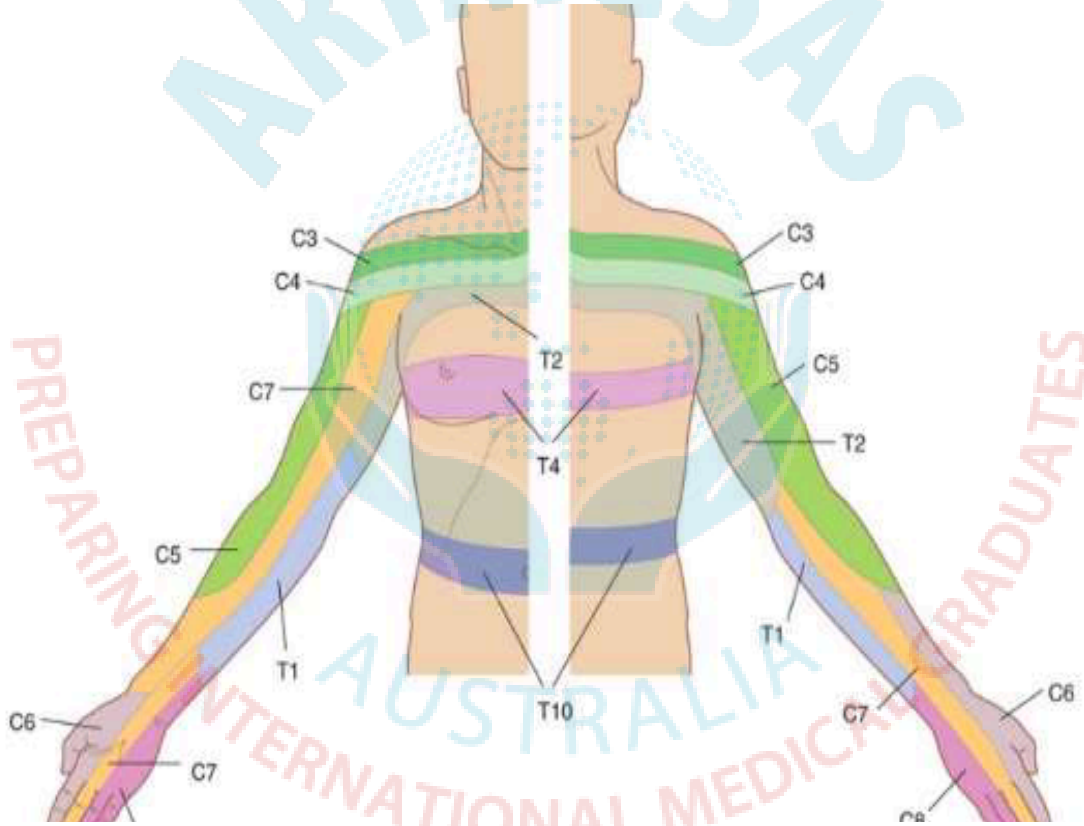
- **The sensory system**
- • When examining the sensory system, less is more. The more time spent, the
- more that subjective and irrelevant subtle differences will be noticed, and the
- more confused you will become.
- • Start distally and work proximally.
- **• Light-touch testing**
- • Test light touch by touching the skin with a wisp of cottonwool. Ask the patient
- to shut the eyes and say ‘yes’ when the touch is felt.
- **• Pain (pinprick) testing**
- • Using a new pin, demonstrate to the patient that this induces a relatively sharp
- sensation by touching lightly a normal area, such as the anterior chest wall.


Light touch
(cotton wool)
GEEKYMEDICS.com


Provide an example of sensation at a central point
(e.g. sternal angle / forehead)
GEEKYMEDICS.com

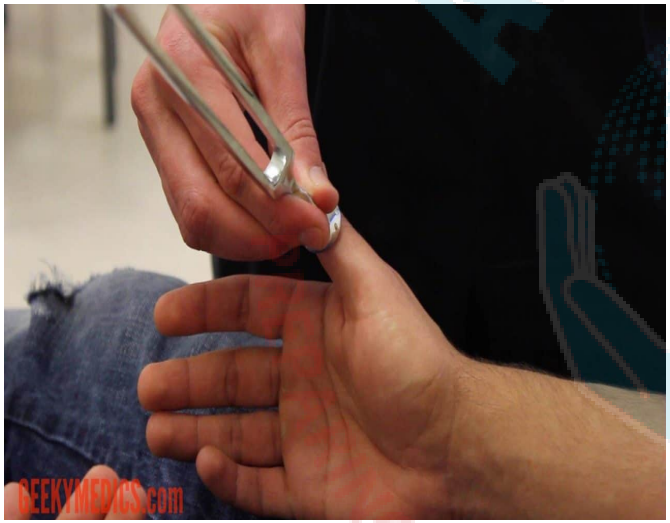

C6
C3,4
C5
T1
C6
C8
C7
L1
GEEKYMEDICS.com


Pin-prick sensation
(using a neurotip)
GEEKYMEDICS.com


C3
C4
T2
C7
T4
C5
T1
C6
C7
T10
C3
C4
C5
T2
T1
C7
C6

- • **Vibration testing**
- • Use a 128 Hz(not a 256 Hz) tuning fork. Ask the patient to close the eyes, and place the vibrating tuning fork on one of the distal interphalangeal joints or ulnar styloid process
- • Although the tuning fork is traditionally placed only over bony prominences,vibration sense is just as good over soft tissues.

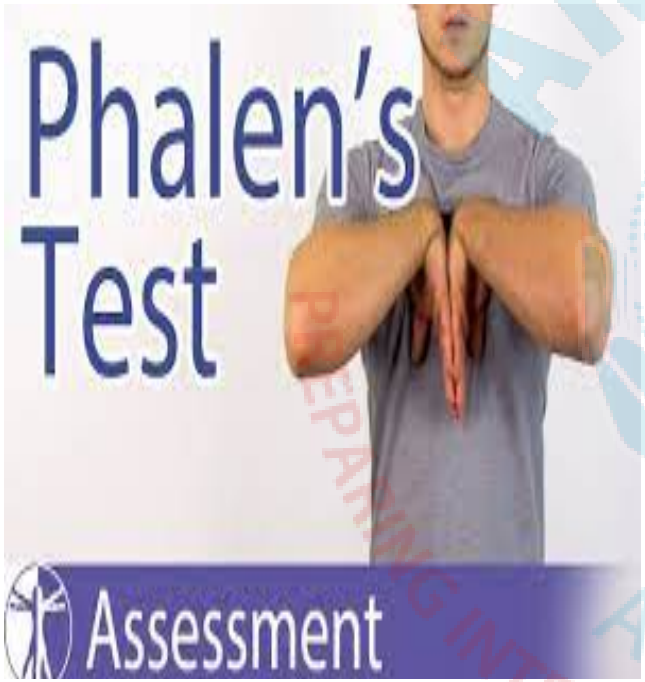
- • **Proprioception testing**
- • Use the distal interphalangeal joint of the patient's little finger or thumb.
- • When the patient has his or her eyes open, grasp the distal phalanx from the
- sides (not the top and bottom) and move it up and down to demonstrate these positions.
- • Then ask the patient to close the eyes while these manoeuvres are repeated
- randomly.


GEEKYMEDICS.com

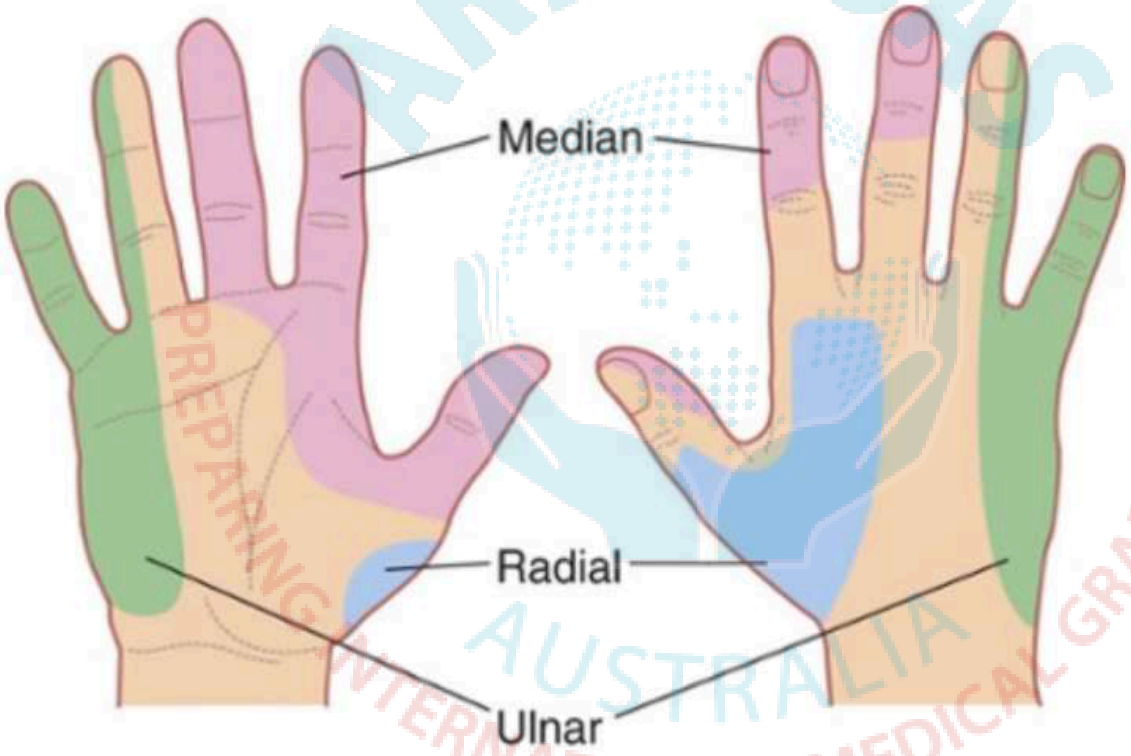

GEEKYMEDICS.com

- **Cubital Tunnel Syndrome:**
- 45 year factory worker comes with tingling and numbness of the right hand
- Examine the elbow.
- **Look , Feel, Move the hand**
- Resisted movements :
- **sensations**
- Grip, Thumb abduction and opposition against resistance – **median nerve**
- Interossei grip or thumb adduction with paper – **ulnar nerve**
- **Power and sensation**
- **Special Tests**:
- **Tinel and phalen** to rule out Carpel tunnel syndrome
- • Tinnel's sign at the cubital tunnel.
- • Elbow flexion test: Passively flex elbow to maximum & hold for 1 minute.
- Patient develops **paraesthesia in small & ring finger.**

- • **If the carpal tunnel syndrome is suspected**,
- ask the patient to flex both wrists for 30 seconds—paraesthesias will often be precipitated in the affected hand if
- the syndrome is present **(Phalen'swrist flexion test)**.
- • The paraesthesias (pins and needles) are in the distribution of the median nerve, when thickening of the flexor retinaculum has entrapped the nerve in the carpal tunnel.
- • **Tinel's sign:** tapping over the flexor retinaculum (which lies at the proximal part of the palm) may cause similar paraesthesias


Phalen's
Test
Assessment


Carpal Tunnel Syndrome
Positive
Tinel's Sign
Light percussion (tapping) over the
irritated median nerve at the flexor retinaculum
elicits a tingling sensation ("pins and needles")
in the distribution of the nerve.


Median
Radial
Ulnar

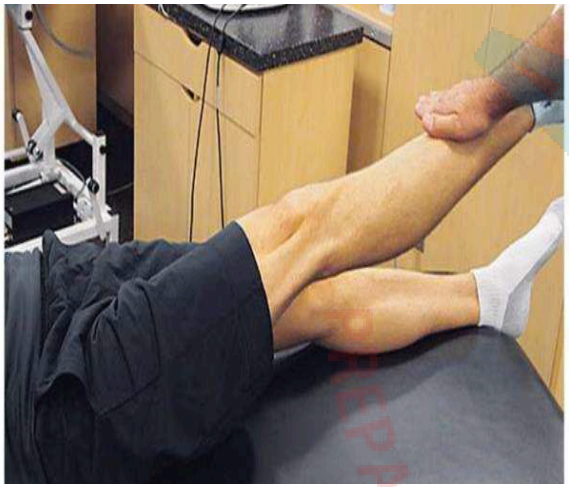
- • **Sensation**
- • **Ulnar:** Sensory loss involves loss over palmar and dorsal aspects of little and the medial half of the ring finger.
- • **Media**n: Sensory loss involves palmar aspect of thumb, index, middle and lateral half of ring finger.
- • **Radial:** around the snuff box.

-
-
- **Lower limbs neurological**

- General Inspection:
- **Patient is sitting comfortable, no walking around the patient,**
- **No attach to monitor, no pain**
- Any scars,wasting muscles, Tremor, no swelling , no redness , no rash
- **V/S**

- **ITPRCS**
- **• Inspection, Gait**
- • Begin by testing gait, if this is possible
- • **Tandem walking** – to diagnose truncal ataxia
- • Inspect the legs with the patient lying in bed
- **Ramberg test-**Ask the patient to stand
- straight with feet close together
- **• Tone**
- • Test tone at the knees and ankles.
- • Next test for clonus

- • **Power**
- • **HIP**
- • **Flexion**—psoas and iliacus muscles—(L2, L3) : ask the patient to lift up the straight leg and **not let you push it down**
- • **Extension**—gluteus maximus—(L5, S1, S2) : ask the patient to keep the leg down and
- from underneath the calf or ankle
- • **Abduction**—gluteus medius and minimus, sartorius and tensorfasciae latae—(L4, L5, S1): ask the patient **to abduct the** leg and **not let you push it in**
- • **Adduction**—adductors longus, brevis and magnus—(L2, L3, L4): ask the patient to keep the leg adducted and **not let you push it out**



Testing power—hip abduction: ‘Don’t let me push your hip in’

Testing power—hip adduction: ‘Don’t let me push your hip out’; pull hard

- • **Knee**
- • **Flexion**—hamstrings (biceps femoris, semimembranosus, semitendinosus)—(L5, S1): ask the patient to bend the knee **and not let you straighten it**
- • **Extension**—quadriceps femoris (this muscle is three times as strong as its antagonists, the hamstrings)—(L3, L4): with the knee slightly bent, ask the patient to straighten the knee and **not let you bend it.**
- • **Ankle**
- • **Plantar flexion**—gastrocnemius, plantaris, soleus—(S1, S2): ask the patient to push the foot down **and not let you push it** up
- • **Dorsiflexion**—tibialis anterior, extensor digitorumlongus and extensor hallucis longus—(L4, L5): ask the patient to bring the foot up **and not let you push it down**

Testing power—ankle, dorsiflexion: 'Don't let me push your foot down'

- • **Eversion**—peroneus longus and brevis, and extensor digitorumlongus—(L5,
- S1): evert the foot for the patient and ask him or her to hold it there
- • **Inversion**—tibialis posterior, gastrocnemius and hallucislongus—(L5, S1): invert
- the foot for the patient and ask him or her tohold it there

- • Quick test of lower limb **power**
- • 1.stand up on his or her toes (S1)
- • 2.stand up on the heels (L4, L5)
- • 3.squat and stand again (L3, L4)

- • **Reflexes**
- • Knee jerk (L3, L4)

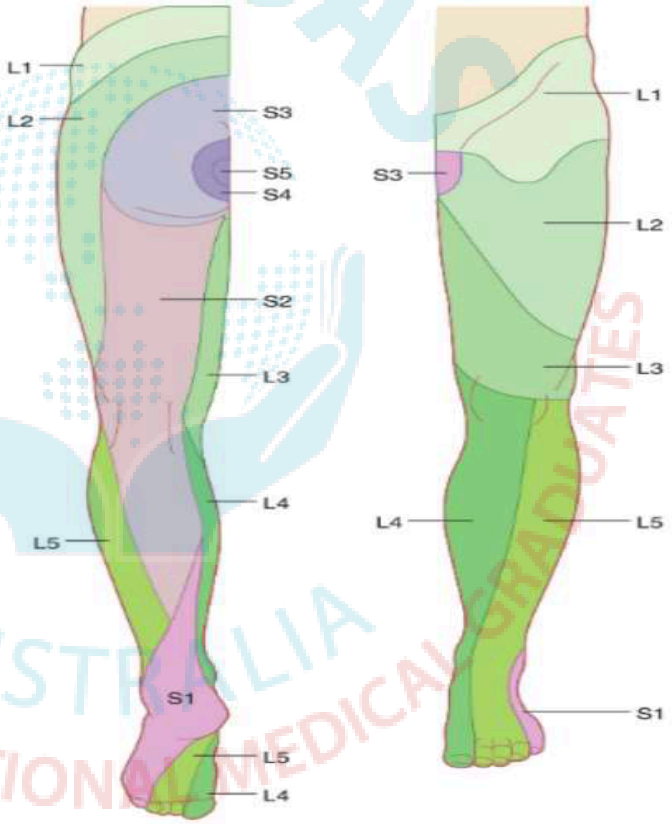
- • Ankle jerk (S1, S2)

- • Plantar reflex (L5, S1, S2)

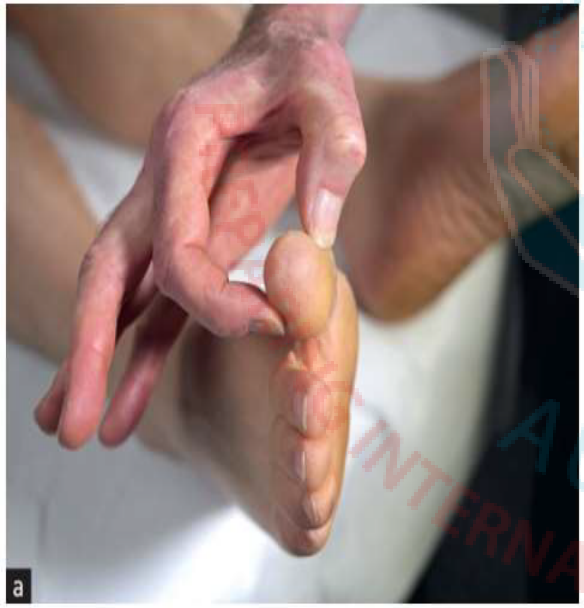
- • **Coordination**
- • Heel–shin test

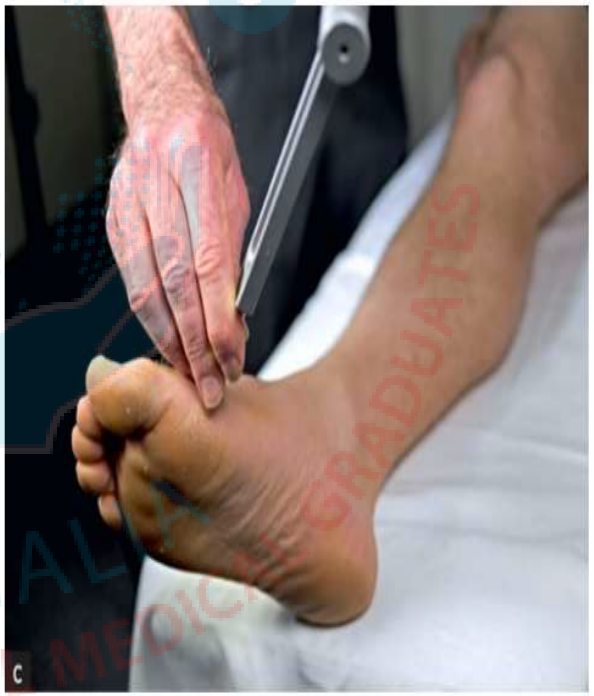
- • **Coordination**
- • **Toe–finger test**
- • The toe-finger test is the equivalent of the finger-nose test
- performed in the examination of coordination of the upper limb.
- • The patient touches the examiner's finger with his big toe. If
- cerebellar disease is present then there will be an intention tremor

– **The Sensory system**



- **Vibration and proprioception**





- **Peripheral neuropathies**
- • Patient comes with unsteady gate, drink alcohol
- • **Romberg's t**est should be assessed after assessing the gait
- • The Romberg test is used to investigate the **cause of loss of motor**
- **coordination (ataxia).**
- • **A positive Romberg test suggests that the ataxia** is sensory in nature,
- that is, depending on loss of proprioception.
- • **If a patient is ataxic and Romberg's test is not positive, it suggests that**
- **ataxia is cerebellar in nature**, that is, depending on localized
- cerebellar dysfunction instead.

- **Romberg's test procedure**
- • Ask the patient to stand straight with feet close together
- • Examiner stands right next to the patient to hold in case the patient
- falls
- • Ask patient to now close the eyes
- • Positive rombergs is when patient starts swaying with eyes closed
- • Tests the proprioception
- • **Positive romberg's + unsteady gait– sensory ataxia**

- **Diabetic neuropathy**
- • Patient comes with complaints of pins and needles in the legs
- • Previously diagnosed with diabetes
- • **General examination**
- • **Vital signs**
- • **Gait** – normal (tandem and heel)
- • Romberg's – negative
- • **Inspection** – swift + pvd signs
- • **Palpation:** Temperature, tenderness, pulse, crt
- • **Sensation – monofilament first then cotton** – glove and stocking
- neuropathy

- • Vibration and proprioception
- • Finish with saddle sensation s3-s5
- • Anal reflex
- • Cremasteric reflex and superficial reflex
- • **Rest of the neurology and fundoscopy**

- **Alcoholic neuropathy**
- • Comes as unsteady gait – alcoholic
- • GGt increased
- • Bsl normal
- • Alcohol induced ataxia can be sensory or cerebellar
- • In alcohol induced cerebellar ataxia patient sways even with eyes
- open – ROMBERG'S CANNOT BE ASSESSED – Cerebellar
- • Then do the coordination tests first in neurology before the sensory

- • General examination - SWIFT
- • Check for truncal ataxia
- • **Gait – broad based**
- • Rombergs test
- Lower limb neurology
- Tone , power – say that you will test it at the end of the examination
- Reflex – pendular knee jerk
- Vibration, proprioception, sensation **– Check first if Romberg's test is positive**
- **Check for coordination – Check first if Romberg's negative or unassessed**
- • Lower limb - heel shin
- • Upper limb – F-N, dysdiadochokinesia
- • Nystagmus
- • Staccato speech – say BRITISH CONSTITUITION or BABY HIPPOPOTOMUS
- • Rebound phenomenon of the hand
- • Finish with cld examination and fundoscopy

- • **DDs**
- • Alc induced cerebellar ataxia
- • Alc induced sensory ataxia
- • Common peroneal nerve entrapment
- • Tibial nerve entrapment
- • Vit b12 neuropathy
- • Diabetic neuropathy
- • Spinal canal stenosis

- **Foot drop due to Common peroneal nerve entrapment**
- • 45 year old strawberry picker complaining of pins and needles
- sensation of the foot since yesterday.
- • Task :
- • 1. Perform pe (neurology of lower limb)
- • 2. Explain dx and ddx

- • 1) 45 year old John is sitting comfortably, I cannot see any walking aids near him
- • 2) John can you please stand up :
- • On inspection of both lower limbs,
- • they are symmetrical,
- • there’s no muscle wasting no fasciculations
- • no swelling or trauma to the legs or feet,
- • the normal curvature of the back is preserved

- Gait

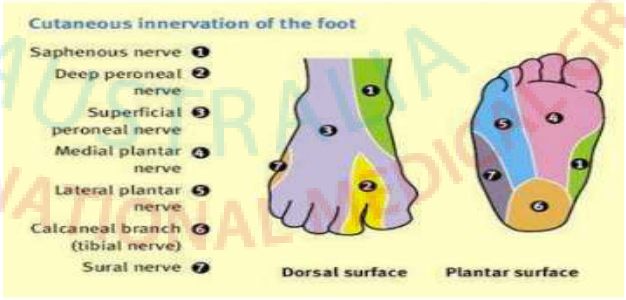
Gait of Foot Drop

- Gait of foot drop gait is high stepping gait
- The patients lift the knee high and slaps the foot to the ground on advancing to the involved side

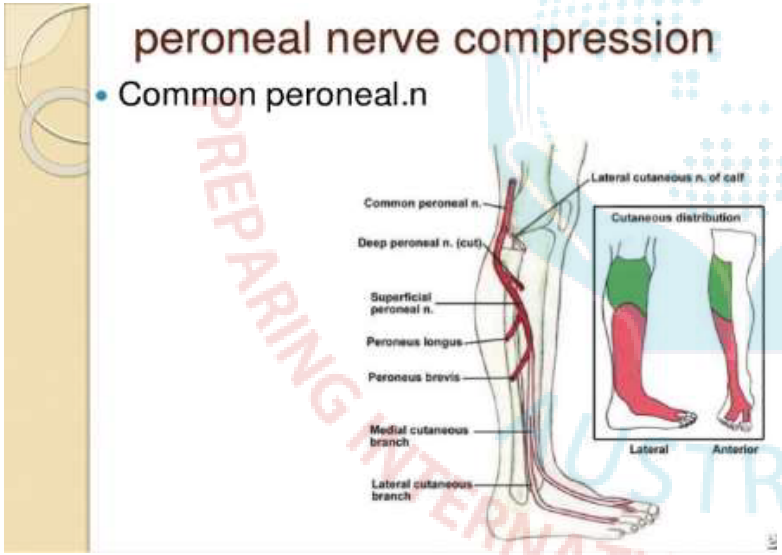
- **ITPRCS**
- • 4) Can you please lie down now-
- • I’m going to check the tone of your legs now please relax your legs.
- **Tone** of the hips is normal , and so is that of knees and ankle.
- • John can you push your thighs up against my hand, can you push
- them below against my hand
- • Bend your knees, push your legs against my hands, now pull them
- backwards against my hand

- • Now let me check **the power** at the ankle, put your feet towards you against my hands- patient is unable to dorsiflex the right foot.
- • Can you push the feet down against my hand- plantar flexion is intact
- • Can you turn your feet inwards?-inversion is intact
- • Turn the feet outwards against my hand- unable to do eversion of the foot
- • **Peroneal – Eversion** (superficial) and **dorsiflexion** (deep) (affected)
- • **Tibial – Inversion and plantar flexion**
- • **Reflexes** : **Knee jerk** (L3, L4) , **Ankle jerk** (S1, S2) – Intact
- • **Plantar reflex** – (L5, S1, S2) - Normal

- **Sensations:**
- • 5) John this is a cotton wool, you will feel the sensation like this
- (place on sternum) I will place this on different parts of the leg, close your
- eyes and let me know when you feel it.
- • L1 intact L2 intact L3 intact L4 intact L5 (absent) S1 intact
- • 1st web space **(between big toe and second toe-deep peroneal nerve)**
- **cannot feel**
- • Dorsum of foot (superficial peroneal) cannot feel



- • 6) I will do some **special tests** now;
- • Can you please raise your leg as much as you can- SLR is negative
- • TAP TEST - I am going to tap at this point (head of fibula) please let me know if
- you can feel pins and needles- positive.
-



7) I would like to finish my PE with full back exam

- • Dx---
- John the difficulty in your walking is called foot drop and I'm suspecting that it is most likely due to injury or **entrapment of the common peroneal nerve.**
- • (Foot drop is a gait abnormality in which the dropping of the forefoot happens due to weakness, irritation or damage to the common peroneal nerve including the sciatic nerve, or paralysis of the muscles in the anterior portion of the lower leg).
- • **Let me explain.**
- • There is a long nerve arising from the back called the sciatic nerve.

At the level of thigh it is called the peroneal nerve. This nerve twists at the head of the small leg bone called **fibula,** as it runs down. It tends to get entrapped or compressed following prolonged squatting as in your case, or when sitting cross legged, following surgeries, in diabetics.

- • Other causes for this condition are disorders of muscles such as muscular dystrophy due to progressive weakness of muscles, or due to brain conditions such as stroke causing paralysis. • We will arrange further investigations to assess you.