

CLINICAL SKILLS: NEUROLOGICAL EXAMINATION OF THE LOWER LIMBS

- Wash hands
- Introduce and explain the purpose of the examination
- Permission
- Expose - patient preferably in underwear, will legs exposed
- Reposition - standing initially, then lying on the bed
- Ask if the patient has any pain in their legs
- (Note: during this examination, always compare 'like with like' throughout - e.g.: examine tone of left arm and then right arm)
- Follow the 'IG ToP CaRS' structure for the examination

Inspect:

- Inspect around patient for walking aids, such as a wheelchair or zimmer frame
- Inspect body for 'DWARFS':
 - Deformities
 - Wasting
 - Asymmetry
 - Rashes or redness
 - Fasciculations, which are very small movements/twitches made by the muscle
 - Swelling and Scars

Gait:

- Ask patient to walk to end of room and turn. Assess for even arm swing, smooth turning, level iliac crests, symmetry of movement, size of steps taken etc.
- Ask patient to walk heel to toe 'as if you are walking along a tight rope' - assessing ataxia (e.g.: from a cerebellar lesion)
- Ask patient to walk on tip toes (testing the S1/S2 myotomes)
- Ask patient to walk on heels (testing the L4/L5 myotomes)
- Perform Romberg's test:
 - Ask the patient to stand with their legs together and eyes open
 - Then ask them to close their eyes (but be ready to catch them if they have balance issues)
 - If they are able to maintain balance with eyes open and closed then this is Romberg negative - ie. normal
 - If they have difficulty maintaining balance with eyes open then there could be any number of musculoskeletal/cerebellar/psychological issues
 - If they can stand with eyes open but are very unsteady with eyes closed then this is Romberg positive, indicating proprioceptive dysfunction

Tone:

- Ask patient to lie flat on the bed with one pillow for comfort
- Roll both legs - look for **spasticity and rigidity**
- Lift up knee quickly and then put down slowly
- Roll ankle and then tilt upwards quickly - assessing for clonus. >3 beats indicates abnormal clonus, suggestive of an upper motor neurone lesion

Power:

- Assess each myotome in turn
 - Ask patient to put up leg. Push up towards the ceiling with your leg, don't let me push your leg down

- Push down towards the bed, don't let me push your leg up
 - With knee bent, push foot towards the ceiling (while I apply resistance)
 - With knee bent, push foot towards your bottom (while I apply resistance)
 - Push your toes upwards, don't let me push them down
 - Push your toes downwards, don't let me push them up
- Assess each movement with MRC grade 0-5:
 - 0 - No movement
 - 1 - Flicker of movement
 - 2 - Movement with gravity eliminated
 - 3 - Movement against gravity
 - 4 - Movement against resistance but incomplete
 - 5 - Normal power for age and sex

Co-ordination:

- With legs flat, ask patient to lift up one leg, apply the heel of that leg to the front of the knee of the other leg, run the heel down the shin of the other leg, kick up and then repeat the movement

Reflexes:

- Knee reflex - L3/L4: leg relaxed, take the weight of the knee with one hand, and use the tendon hammer to percuss the patellar tendon just inferior to the patella, watch for quadriceps movement
- Achilles' heel reflex - L5/S1: leg slightly bent and relaxed outwards, use tendon hammer to percuss the achilles tendon and watch for calf muscle movement
- Babinski reflex/plantar response - assess by running an orange stick or the tip of your fingernail firmly (but not causing pain) up the lateral aspect of the foot and around to under the toes in an arc. A 'downgoing' or 'equivocal' (not moving) big toe response is normal. An 'upgoing' big toe response is abnormal and is suggestive of an upper motor neurone lesion
- Grading reflexes:
 - 0 No reflex
 - +/- Present with reinforcement
 - + Just present
 - ++ Brisk normal
 - +++ Exaggerated response

Sensation:

- 5 parts: light touch, pain, temperature, vibration and proprioception
- **Light touch:**
 - Using a ball of cotton wool (dab the cotton wool - DON'T rub it on the skin as this stimulates vibration sense, not light touch)
 - Touch on sternum and ask if they can feel the light touch
 - Ask patient to close eyes and say when they feel the same touch on their legs
 - Check in dermatomal distribution of leg (L1-S1)
- **Pain:**
 - The same as above but with a 'neurotip'
- **Temperature:**
 - The same as above but with the metal tuning fork - ask the patient if they feel a cold sensation
- **Proprioception:**
 - Ask patient to close eyes

- Isolate top big toe joint by holding either side of the interphalangeal joint with one hand
- With your other hand, move the distal phalanx up and down by holding *either side* of the phalanx
- Show patient feeling of up, down and neutral first, then ask them to close their eyes
- Ask them to tell you which way you are moving the joint
- If they cannot correctly identify the movements (beyond chance guessing) then move to the next joint - e.g. ankle)
- **Vibration:**
 - Use 128 Hz tuning fork
 - Start the tuning fork vibrating, then put on sternum and ask if they can feel a vibration
 - Apply to bony prominence on big toe first
 - Ask patient to tell you if they feel the vibration and if they feel it when you stop the vibration
 - If they can't correctly identify the vibration then move the tuning fork to the next bony prominence (e.g. medial malleolus, tibial plateau...)

To conclude the examination:

- Thank the patient and offer to help them get dressed
- Offer to complete your assessment with a full neurological examination of the upper limb and cranial nerves