Lower Limb Neurological Examination

Prepare patient

- Introduction
- Position lying in bed with lower limbs exposed. Cover groin.

General Inspection

General signs:

- Neurofibromas
- Deformities
- Skin lesions including over spine e.g. scars, shagreen patches
- Note presence of urinary catheter

Motor System Inspection

Posture

Muscle bulk/wasting/tenderness

Abnormal movements

- Fasciculations (LMN lesion, MND, root compression, peripheral neuropathy, primary myopathy, thyrotoxicosis)
- Tremor

Gait

If able to walk.

Types:

- **Hemiplegia:** the foot is plantar flexed and the leg is swung in a lateral arc
- **Spastic paraparesis:** scissors gait
- **Parkinson's:** starting hesitation, shuffling, freezing, festination, pro/retropulsion
- **Cerebellar:** drunken wide-based or reeling on a narrow base gait; staggers towards side of cerebellar lesion
- **Posterior column lesion:** clumsy slapping down of the feet on a broad base
- **Footdrop:** high stepping gait
- **Proximal myopathy:** waddling gait
- **Prefrontal lobe (apraxic):** feet appear glued to floor when erect, but move more easily when the patient is supine
- **Hysterical:** characterised by a bizarre, inconsistent gait

Test heel to toe walking – unable to with a midline cerebellar lesion

Test walking on toes (L4/5) & heels (S1)

Squatting to standing test (L3/4, proximal myopathy)

Romberg test (stand feet together eyes open, when steady close eyes & if becomes markedly unsteady loss of proprioception). Unsteadiness with eyes open (cerebellar)

Tone

Test tone at knee & ankle: roll leg, lift thigh letting knee flex, and flex & extend knee & ankle

Clonus: dorsiflex ankle with knee bent and also move patella sharply down on extended knee.

Power

Grades: 0 – no movement, 1 – flicker of contraction, 2 – movement if gravity eliminated, 3 – can overcome gravity but not resistance, 4 – moderate movement against resistance, 5 – normal power.

Quick screening test: Squat & stand again (L3/4), stand on heels (L4/5), stand on toes (S1/2)

Hip

- Flexion (L2/3)
- Extension (L5, S1/2)
- Abduction (L4/5, S1)
- Adduction (L2/3/4)

Knee

- Flexion (L5, S1)
- Extension (L3/4)

Ankle

- Plantar flexion (S1/2)
- Dorsiflexion (L4/5)
- Eversion (L5,S1)
- Inversion (L5,S1)

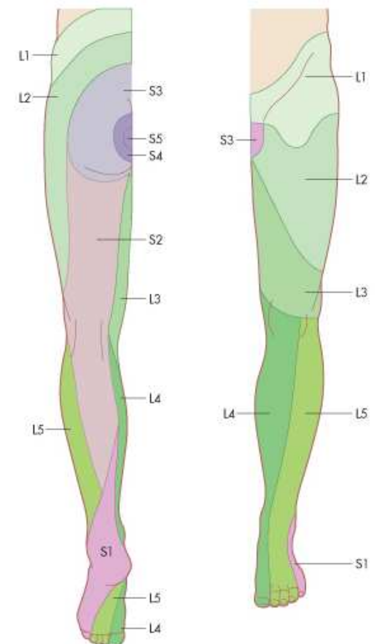
Reflexes

Allow tendon hammer to fall freely. Reinforce with teeth clench/hand interlocking if necessary.
Knee (L3/4)
Ankle (S1/2)
Plantar (L5, S1/2) – up lateral side or sole and curve inwards behind toes.

Coordination

Heel-shin test - run heel up & down opposite shin
Toe-finger test – lift leg short distance to touch examiner's finger with hallux.
Foot tapping – rapid foot tapping with sole against examiners hand.

Sensation



Note hemisensory, dermatomal, peripheral nerve or stocking distribution of any abnormality.
Always test on arm or face first.
Pain (& temperature): With pin (use both blunt & sharp ends) test dermatomes:

- L1 - lateral groin
- L2 - lateral ant thigh
- L3 – medial ant thigh
- L4 – medial ant calf
- L5 – lateral ant calf
- S1 – lateral foot, heel
- S2 – popliteal fossa
- (S3 – central buttock, S4/5 –perianal)

Vibration & proprioception:

- Test vibration sense with 128Hz tuning fork over hallux, if absent test malleolus of ankle, knee, ASIS of hip. Test that cessation of vibration is also detected.
- Test proprioception at DIPJ, holding sides of toe with patient's eyes closed after an open-eyed demonstration. As before test proximally if abnormal.

Light touch: Dab (don't stroke) with cotton wool test same dermatomes. Less discriminating than pain or vibration.