An Illustrated Guide For Peripheral Nerve Examination

Bedside Teaching for 2\textsuperscript{nd} year medical Students

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Before Examination:

Wash hands
Introduce yourself
Confirm patient details – name / DOB
Explain the examination
Gain consent
Ask patient if they have pain anywhere before you begin!

Peripheral Nerve Examination (upper limb)

Motor System Examination

Patient can be sitting or lying.
Observe the patient’s general condition – aids (e.g., frame, wheelchair) at the bedside.
Look for wasting, asymmetry, fixed position (contractures), fasciculations, abnormal movements, scars.

Examine drift (cerebellar or pyramidal) ask patient to hold both arms out in front of them at shoulder height and close eyes; if one arm drifts down or pronates test is positive and indicates an upper motor neurone lesion

Tone – by passive movement assess in multiple joints (elbow, wrist) bilaterally. Pronate/supinate forearm

Power - Examine systematically (proximal to distal or distal to proximal). Side to side comparison. Examination of different movements are in details in the following pages
The table shows some commonly tested movements, the principal muscle involved with its roots and nerve supply. The column headed UMN indicates those movements which are preferentially weak in upper motor neuron lesions.

**Shoulder abduction (C5)**

Abduct arms against resistance
Elbow flexion (C5,6) and extension (C7)
Wrist extension (C6)

Finger extension (C7, radial nerve)

Finger abduction (T1, ulnar nerve)
Thumb abduction (T1, median nerve) – with palms upwards, point thumbs to ceiling

Finger Flexion (C8, Anterior interosseous nerve)

Flower Digitorum Profundus I and II (Anterior interosseous nerve; C7, C8)
The patient is flexing the distal phalanx of the index finger against resistance with the middle phalanx fixed.

Flower Pollicis Longus (Anterior interosseous nerve; C7, C8)
The patient is flexing the distal phalanx of the thumb against resistance while the proximal phalanx is fixed.
Opponens pollicis

Flexor Digitorum Profundus III and IV (Ulnar nerve; C7, C8)
The patient is flexing the distal interphalangeal joint against resistance while the middle phalanx is fixed.
Thumb Adduction (T1, ulnar nerve)

Adductor Pollicis (Ulnar nerve; C8, T1)
The patient is adducting the thumb at right angles to the palm against the resistance of the examiner’s finger.

**MRC Power Grading 0-5**

0 no movement  
1 brief muscle contraction but no movement  
2 movement with gravity eliminated  
3 movement against gravity  
4 movement against gravity/some resistance  
5 full and normal power

**Reflexes** - examine in upper limbs side to side

**Biceps (C5, 6)** – flex elbow across lap, put your finger on biceps tendon, strike finger and watch biceps contract
Triceps (C7) – flex elbow across lap, strike triceps tendon just above olecranon, watch triceps contract

Supinator (C5, 6) – flex elbow across lap, lower arm with thumb upwards, either strike extensor aspect of wrist directly or rest finger on extensor aspect of wrist and strike finger, watch brachioradialis contract
**Hoffmann’s reflex** – put right index finger underneath distal interphalangeal joint of patient’s middle finger; flick finger down with thumb, watch if reflex flexion of patient’s thumb

**Pathological Reflexes**:

1. **Supraspinatus reflex**: Present only in UMNL (Upper Motor Neurone Lesion)

2. **Finger Reflex**: tap the palmar surface of the middle 3 fingers while they are slightly flexed, if positive flexion of fingers occur. Normally it is absent. It is present in UMNL
Important Remarks about reflexes:

1- In absent reflex, repeat after “reinforcement” or Jenderassik’s manoeuvre. Ask the patient to clench his teeth or clutch his hands together.

2- In hyperreflexia elicit clonus
Ankle Clonus

**Co-ordination**

(dysdiadochokinesis) – supinate/pronate one hand rapidly on the other

Patellar clonus

- Examine finger-nose coordination (intention tremor)
- Examine rapid-alternating movements

Dysdiadocokinesia

Finger to doctor’s finger
Sensory System Examination

Examine light touch comparing limbs systematically in dermatomal pattern (cotton wool, tissue paper; touch not stroke; patient closes eyes), **pin sensation** (as light touch but ask patient to report if feels blunter or sharper) (or length dependent if so instructed) (See ASIA chart on Learning Central)
Examine **vibration** distally, moving proximally only if abnormal. Use 128 Hz tuning fork. Ask patient to tell you when vibration stops.

Examine **proprioception** distally, moving proximally only if abnormal. Start with first finger.
Peripheral Nerve Examination (lower limb)

Patient is generally lying flat.

Observe the patient’s general condition – aids (e.g., frame, wheelchair) at the bedside.

Look for wasting, asymmetry, fixed position (contractures), fasciculations, abnormal movements, scars, sores, note if patient catheterised.

**Tone** - assess tone in multiple joints (knee, ankle) bilaterally.
Check for **ankle clonus** – bend leg at knee and quickly dorsiflex foot

**Power** - Examine systematically (proximal to distal or distal to proximal). Side to side comparison.

### COMMONLY TESTED MOVEMENTS

<table>
<thead>
<tr>
<th>Lower limb</th>
<th>Level</th>
<th>Muscles</th>
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</thead>
<tbody>
<tr>
<td>Hip flexion</td>
<td>++</td>
<td>Iliopsoas</td>
</tr>
<tr>
<td>Hip adduction</td>
<td>L2/3</td>
<td>Adductors</td>
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<tr>
<td>Hip extension</td>
<td>L5/S1</td>
<td>Obturator</td>
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<tr>
<td>Knee flexion</td>
<td>+</td>
<td>Iliopsoas</td>
</tr>
<tr>
<td>Knee extension</td>
<td>L3/4</td>
<td>Adductors</td>
</tr>
<tr>
<td>Ankle dorsiflexion</td>
<td>++</td>
<td>Sciatic</td>
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<tr>
<td>Ankle eversion</td>
<td>L5/S1</td>
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<td>Ankle plantarflexion</td>
<td>S1/S2</td>
<td>Sciatic</td>
</tr>
<tr>
<td>Big toe extension</td>
<td>L5</td>
<td>Adductors</td>
</tr>
</tbody>
</table>

The table shows some commonly tested movements, the principal muscle involved with its roots and nerve supply. The column headed UMN indicates those movements which are preferentially weak in upper motor neuron lesions.
**Hip flexion (L1,2)** – ‘lift your leg – don’t let me push it down’

**Hip extension** – ‘now push down with your whole leg’

**Knee extension (L3,4)** – with bent knee ‘kick me away’
Adductors (L2/3)

Hip Abductors (L4/5)
Hip Extension (L5/S1) (Push my hand)

Knee flexion (L5,S1) – ‘bend your knee, don’t let me straighten it’
Ankle plantar flexion (S1) – ‘push foot down’ (against resistance)

Soleus (Tibial nerve; S1, S2)
The patient lies on his back with the limb flexed at the hip and knee and is plantar-flexing the foot against resistance. The muscle belly can be felt and sometimes seen. Arrow: the Achilles tendon.

Ankle dorsiflexion (L4,5) – ‘now push foot up/stop me pushing foot down’
Great toe extensor (L5) – ‘push your big toe up towards your face’

Grade 0-5 as for upper limb

**Reflexes** - examine in lower limbs side to side
Knee/Patellar (L3,4)
Ankle (S1)

**Plantar** – firm stroke blunt instrument along lateral border of foot, starting at heel, if normal first movement of great toe is plantar flexion (moving downwards)
Pathological Reflexes:

1- Adductor Reflex:
Co-ordination

Examine heel-knee-shin coordination – ask patient to slide one heel in straight line down other shin and repeat other side.

Sensory System Examination

Examine light touch comparing limbs systematically in dermatomal pattern (cotton wool, tissue paper; touch not stroke; patient closes eyes), pin sensation (as light touch but ask patient to report if feels blunter or sharper) (or length dependent if so instructed) (See ASIA chart on learning Central)
Examine vibration, start distally and move proximally if negative (big toe then bony malleolus of ankle). Use 128 Hz tuning fork. Ask patient to tell you when vibration stops.
Examination of proprioception in a finger (A) and toe (B). (From Hall T. PAGES for the MRCP with 250 Clinical Cases. 2nd ed. Philadelphia: Elsevier; 2008 [p. 397, Figure 3.31].)
Romberg’s Test – ask patient to stand with feet together, then ask them to close eyes - watch if they wobble (don’t let them fall!!)

Romberg’s test
Assessment of proprioception

Positive test = Loss of balance
This suggests ataxia is sensory in nature

Examine gait
Station 92: Gait

Routine
General inspection
If appropriate ask the patient if they can stand/walk without assistance
Let them use their walking aid if present
Ask them to stand first
Ask the patient to walk a few metres, turn around and walk back
Walk heel to toe/walk on heel/toe on toes
Completion

Gait disorders
Apraxia = frontal lobe problem – foot glued to floor
Cerebellar ataxia
Hemiplegic
Marche à petite pas (widespread cerebrovascular disease)
Myopathic = waddling = proximal muscle weakness
Neuropathic = foot drop = high stepping
Parkinsonian
Dementia ataxia = posterior column loss = stamping of feet
Depressed paraplegic = scissoring

Parkinsonian gait – stooped posture, small hurried shuffling steps (festination)
A wide-based staggering gait – cerebellar or labyrinthine disease
Waddling gait
• Wide-based gait
• Body sway
• Lumbar lordosis and protruberant abdomen
References :

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3- http://geekymedics.com/eye-examination-osce-guide/
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5- Aids to the examination of peripheral nervous system, fourth edition .2000
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