Examination of the Nerves

Assessment of nerve Function
Nerve thickening
Tenderness
Nerve Damage (Loss of function)

Reactions

Bacterial invasion and granuloma formation

Visibly thickened or Palpable Nerves

Leprosy

Neuritis
Suspect nerve involvement

Autonomic function: Dry skin – decreased sweating, brittle skin, cracks

Sensory Function: Loss of sensation / abnormal sensation in hands and/or feet

Motor Function: Weakness in hands or feet
Weak grip / pinch etc
Movement hands / feet
Walking / running
Suspect Nerve lesion

- Numbness or tingling of hands or feet
- Lesional changes like shiny skin / loss of hair / loss of sweating in an area
- Painful and tender/ palpable nerves (especially near elbow, wrist, knee, ankle)
- Weakness of hands and/ or feet
- Painless cuts or burns on hands and feet
- Visible deformities of hands, feet & eyes
Suspect Nerve lesion

• Inability to retain chappal (foot wear without back strap)

• Ocular complaints – Lagophthalmos / reduced or absent of blinking of the eye
Presence of Disability or Deformity Confirms involvement of the nerves

Nerves are examined to assess:

- Extent of involvement of nerve
- Extent of disability
Examination of Nerves

Nerve

Autonomic function

Sensory testing

Motor function

Palpation

Thickness
Tenderness
Consistency

• Diagnosis
• Classification/grouping
• Assessment of risk of disability
• Grading of Disability
• Follow-up
• Interventions for POD
Involvement of Nerves

Normal: No nerve involvement

Thickened: With / with out any symptom / sign

Tender: Acute neuritis

Partially damaged: With / without tenderness gradually increasing functional deficit)

Complete N. destruction: (Complete paralysis for more than one year)

Thin / fibroserd: Damaged nerve healed with fibrosis
Examination of nerves

Assess for-

Thickening: Palpable/ Visibly thickened

Tenderness: Acute inflammation/ ischaemia

Autonomic function: Sweating, hairs, dry brittle skin, Cracks – smooth shiny skin

Sensory deficit: Sensory Test (ST).

Motor Function: Power of muscles: Strength of movement Voluntary Muscle Tests (VMT)
Examine – Face Hands Feet
Skin condition - Hands & Feet

Blisters, dryness and wounds
Enlarged/ tender nerves with / without nerve function impairment

- Ulnar nerve
- Greater Auricular nerve
- Supratrochlear nerve
- Dorsal Cutaneous branch of ulnar nerve
Sensory Cutaneous nerves:
Commonly affected nerve with motor function

Facial
Ulnar
Median
Radial
Lateral popliteal
Posterior tibial
Testing For Sensory Deficit

Hands / Feet
Sensory Testing – Hands & Feet
Recording results of sensory test
Ballpen test – wrong technique

Ballpen test – correct technique
# Sensory supply of commonly affected nerves

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Area of sensory distribution</th>
<th>Motor supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulnar nerve</td>
<td>Median - Ulnar</td>
<td>Interossei and lumbricals of hand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muscles of hypo-thennar eminence</td>
</tr>
<tr>
<td>Median nerve</td>
<td></td>
<td>Adductor policis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muscles of the thennar eminence</td>
</tr>
<tr>
<td>Radial nerve</td>
<td>Radial</td>
<td>Muscles at the back of forearm which extend the wrist and thumb</td>
</tr>
<tr>
<td>Common peroneal</td>
<td></td>
<td>Muscles of anterior tibial compartment</td>
</tr>
<tr>
<td>(lateral popliteal) nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior tibial nerve</td>
<td></td>
<td>Interossei muscles of foot</td>
</tr>
<tr>
<td>Facial nerve</td>
<td></td>
<td>Muscles of face</td>
</tr>
<tr>
<td>(Usually the upper and lower branches)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interpretation of test for loss of sensation:

- Loss of sensation if no response
- Reduced sensation >3cm away
- Normal sensation within 3cm
Quick Muscle Test

• Face
  Blinking of eyes                                      Trigeminal nerve
  Lid lag or lagophthalmos                              Facial Nerve

• Hand
  Book test, fromet sign,
  Card test                                            Ulnar
  Oschner’s clasping hand,
  Pen test                                              Median
  wrist extension                                       Radial nerve

• Foot
  Stand on Toes                                        Lateral popliteal nerve
  Spreading of toes                                     Posterior Tibial nerve
Quick Muscle Test

Beak Test
- Ulnar
- Median
- Radial Nerve

Standing on toes
Spreading of Toes
Posterior Tibial Nerve

Walk on heels
Common peroneal Nerve
**Detailed Muscle Test – Muscle Strength**

- Eye closure (facial nerve)
  - Blinking of eye: Trigeminal nerve (sensory nerve)
  - Light closer of eyes: Facial nerve
  - Tight closer of eyes: Early weakness

- Little finger abduction: Ulnar nerve

- Thumb up (pen test): Median nerve

- Wrist up: Radial nerve

- Foot up: Lateral popliteal nerve

- Spreading of toes: Postr Tibial nerve

**Range of movement Active / passive / flexed proximal joints**
Grading of Muscle Strength

- S (Strong/ Normal) = Able to perform the movement against full resistance
- W (Weak) = Able to perform the movement but not against full resistance
- P (Paralysed) = Not able to perform the movement at all.
Lagophthalmos
Grading of Muscle Strength

- Make patient comfortable on stool
- Stand by the side of the person
- Raise chin and ask the patient to keep eyes closed lightly (sleep)
- Look for the gap between the two eyelids
- Normal: No gap or < 1mm
Grading of Muscle Strength

Gap > 1mm:
see whether person is able to close the eye completely using other facial muscles.

(Pushing cheek muscles upwards)

To assess early orbicularis oculi muscle weakness:

Ask to close eye tightly and try to pull the lower lid down and see whether the patient is able to keep his eyes closed against resistance
## Grading of Muscle Strength of eyelid

<table>
<thead>
<tr>
<th>Description</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>A gap visible between the upper and lower eyelids (more than 1mm)</td>
<td>Grade ‘P’</td>
</tr>
<tr>
<td>Able to keep his eye closed against resistance</td>
<td>Grade ‘S’</td>
</tr>
<tr>
<td>Not able to keep his eye closed against resistance</td>
<td>Grade ‘W’</td>
</tr>
</tbody>
</table>
Signs of facial nerve involvement

Late stages of involvement of Facial nerve:

- Flat asymmetrical face
- Loss of naso-labial fold and/or all other creases
- Diversion of angle of mouth towards healthy side on smiling or showing teeth
- Inability to raise eye brow on the affected side
- Absence of wrinkling of the forehead on the affected side
Ulnar Nerve
Median Nerve
Lateral Popliteal Nerve
Posterior tibial Nerve

Fig. 159 Clawed toes are prone to injury at the sites marked by arrows.
## WHO Grading of Disability

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hands &amp; Feet</th>
<th>Eye</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Anaesthesia present but no visible deformity or damage.</td>
<td>Not assigned</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Visible deformity or damage present.</td>
<td>• Severe visual impairment ( Vision worse than 6 / 60, inability to count fingers at 6 metres )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lagophthalmos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Iridocyclitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Corneal Opacities</td>
</tr>
</tbody>
</table>
# EHF Score for grading of disability

<table>
<thead>
<tr>
<th>Examination of parts</th>
<th>WHO Disability Grades</th>
<th>Sensory Testing (ST)</th>
<th>Voluntary Muscle Testing (VMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hands</strong></td>
<td>0</td>
<td>Sensation present</td>
<td>Muscle power normal (S)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Sensation absent</td>
<td>Muscle power normal (S)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Sensation absent</td>
<td>Muscle power weak or paralysed (W/P)</td>
</tr>
<tr>
<td><strong>Feet</strong></td>
<td>0</td>
<td>Sensation present</td>
<td>Muscle power normal (S)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Sensation absent</td>
<td>Muscle power normal (S)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Sensation absent</td>
<td>Muscle power weak or paralysed (W/P)</td>
</tr>
<tr>
<td><strong>Eye</strong></td>
<td>0</td>
<td>Vision</td>
<td>Lid Gap</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Can not count fingers at 6 meters</td>
<td>Gap present /red eye/corneal ulcer or opacity</td>
</tr>
</tbody>
</table>

- **Lid Gap**: Present
- **Blinking**: Present
- **No lid gap**: Present
- **Absent**: Present
1. Recognizing neuritis EARLY. (Acute / quite nerve paralysis)

2. Steroids

3. Splinting

4. Monitoring

5. Supportive therapy

6. SURGERY in select cases
Damage of new nerve

- New areas of sensory loss in the hands or feet (could feel before but cannot feel now).
- Loss of sweating in previously normal areas
- Previously normal muscles develop weakness/paralysis
- New nerve becomes painful or tender to the touch.
- Increase in weakness of previously weak muscle
Worsening of existing damage

- Increase in area of loss of sweating
- Increase in area of loss of sensation
- Increase in degree of sensory loss
- Increase in weakness of previously weak muscle