

# RAPID NEUROLOGICAL - EVALUATION OF LEPROSY PATIENTS IN FIELD.

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Nerve trunk damage is an usual accompaniment of leprosy though few cases can escape this altogether. Nerve damage may be a presenting symptom or appear while the patient is undergoing treatment. It can increase even under chemotherapy and may recover partially or completely with effective treatment<sup>1</sup>. The patients who develop reactions are at significant risk. Involvement of nerve trunk becomes obvious when pain is complained of or the deformity appears. However, in certain proportion of patients nerve damage progresses insidiously without any painful episodes<sup>2</sup>.

The sensory-motor evaluation of the patient in MDT programme is essential to monitor the progress of patients. Baseline data about nerve trunk thickening and its functional status is needed for monitoring nerve function, to prevent onset and progress of deformities and for the final evaluation of the success of therapy.

There is a greater emphasis now on prevention of deformities and monitoring nerve function deficits in National leprosy eradication programme. Lack of trained staff and large number of patients to be attended make the task difficult. The routine assessment procedures are complicated and time consuming, at times discouraging the staff to make efforts for neurological examination of the patients. For each extremity it requires not less than 15 minutes for complete evaluation; one case therefore, needs about an hour. The whole exercise is thus

laborious, time consuming and does not serve the very purpose efficiently for which it is to be performed.

There is an overwhelming need for simpler methods of testing in view of large number of leprosy patients which require to be tested. These assessment procedures should be easily understood by the staff and patients both, simple to perform, easy to interpret and record, and give reproducible results. In order to collect and record this information one need not have a detailed anatomical knowledge of nerve supply of extremities, muscle innervation etc. Since only very little time available for each case a working knowledge, which can help to detect the nerve involvement and damage in quickest possible way, seems adequate.

## TECHNIQUE

A rapid neurological examination must test sensibility, mobility and trophicity i.e. function of autonomic nerve fibres<sup>3</sup>. Only sensory and motor functions need to be evaluated till better methods are available for testing the functions of autonomic nerve fibres.

Main nerve trunks involved in leprosy and the common sites of involvement are shown in figure 1. The cases who does not follow the common pattern can be sorted out for the detailed evaluation. There are only six main nerve trunks affected in leprosy. The tests should be performed on both sides but in a preset sequence to save time.

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### Testing the sensibility

The back of the finger and thumb of the patient is carefully supported so that the joints are not moved while testing. Using the tip of an upright ball point pen, the skin of patient is gently dented with his eyes open asking him to point the spot. This is to explain the test to the patient. The test is then repeated with his eyes closed. The tip of a sharp pin can also be used for testing.

Representative areas to be tested on the palm and sole are shown in figure 2 and respectively. No sensory testing is required for facial, radial and common peroneal nerves. Even if the skin of sole is thickened, if it is pressed hard enough to dent the skin, the patient with normal sensations can feel<sup>4</sup>. The records can be written as present, partially present or absent.

Testing for thresholds of sensory perception is not required. Only detection of protective sensations is sufficient. It has been found by experience that if a patient can recognise exactly where he has been touched, using the tip of ball point pen pressing hard enough to dimple the skin, he will have protective sensation and painless injuries will probably, not occur<sup>4</sup>.

### Testing for motor functions

The motor assessment involves testing of some function carried out by muscles specifically innervated by the nerve under examination. The test should be specific enough so that trick movements are excluded. A set of quick tests assessing the relevant function for each nerve trunk has been summarised in table 1.

To ensure accuracy of tests, the part to be put to test should be adequately supported. The patient's own flexed thigh or a table can provide this support. For feet, ground will give the desired

support. The examiner has to stabilise the proximal part while the test is being performed.

Usually the tests are done against gravity in field conditions. The resistance should be applied gradually so that muscle under test can build up its strength. A quantitative grading is not required; only three grades can be considered:

Grade I	Total paralysis.
Grade II	Muscle weakness.
Grade III	Normal power.

*Facial Nerve* - Eye occlusion test is satisfactory and can be easily performed (Figure 4). Three grades are as follows:

Grade I can not close the eye.

Grade II can close the eye with effort but very few wrinkles are there around the affected eye. Grade III can close the eye normally with 'Squeeze'.

*Ulnar nerve*- Asking to perform abduction and adduction of middle finger, tests the interossei and is reliable (Fig. 5). Tests for flexor digiti minimi (Fig. 6) and adductor pollicis (Fig. 7) can also be added if required.

*Median nerve*- A request to abduct and oppose the thumb can be made and it is to be seen that the movement is properly performed. While rotating and abducting the thumb its nail should point upwards and not sideways (fig. 8). Little finger will need support while performing the test. The resistance should be applied to the radial side of thumb while testing power in the muscle.

*Radial nerve*- Test for dorsiflexion of wrist against gravity will be impaired in high radial palsy (Fig. 9). However in cases who have low radial palsy (dorsiflexors of the wrist intact) independent extension of index finger is lost (Fig.10).

*Common peroneal nerve*- Patient can be asked to stand on his heel (one side at a time) or else he can be asked to dorsiflex his foot. Sometimes only great toe extensor is paralysed (Fig. 11).

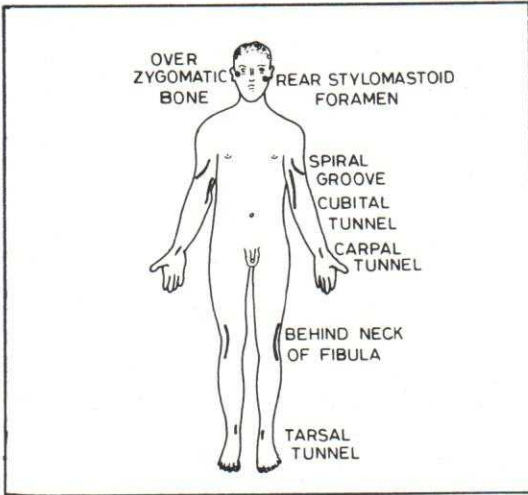


Figure 1 - Nerve Trunk Involvement in Leprosy.

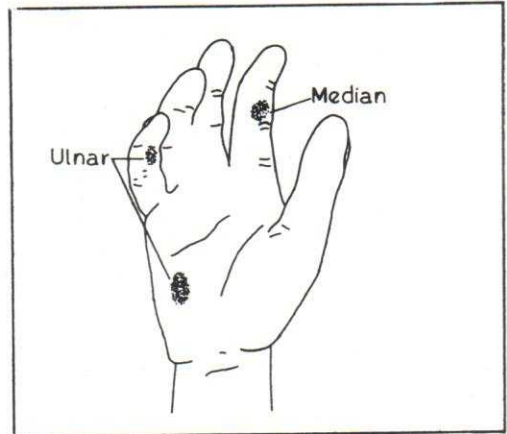


Figure 2 - Sites of sensory testing in palm.

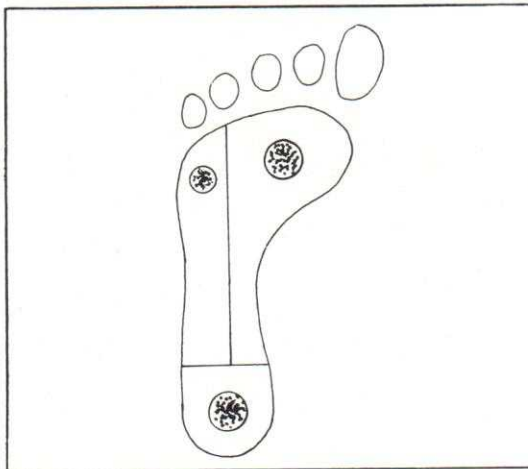


Figure 3 - Sites of sensory testing in sole.



Figure 4 - Eyelid occlusion test.

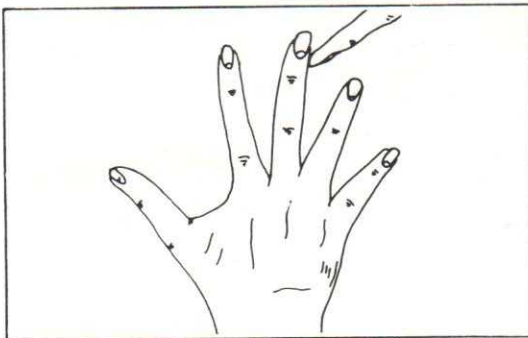


Figure 5 - Middle finger abduction and adduction test.

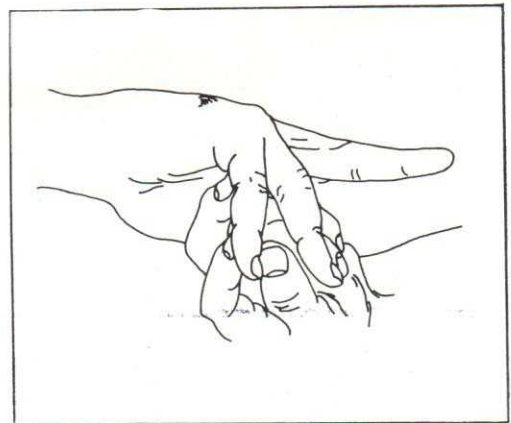


Figure 6 - Test for little finger MCP joint flexion.

Posterior tibial nerve- The patient can be asked to spread his toes or a test for abductor and flexor hallucis brevis can be performed as explained here. The patient while standing attempts to extend all his toes and then selectively depresses the great toe pushing the ground and tries to move it inwards (Fig. 13). The contraction of muscle is confirmed by palpation and at times can be seen as well. However, the patients who wear closed shoes regularly can find difficulty in performing these movements.

## DISCUSSION

Prevention of deformity is the ultimate goal once a patient is made non infectious to the community. The aims in the field are to detect cases with early nerve damage and monitor progress of the cases who have sustained nerve damage. Base line disability records are one of the essential actions to minimise disability in leprosy patients. Detection of the nerve damage in early stage is desirable so that appropriate treatment can be started in time to prevent the progress of nerve damage and in certain proportion of cases reverse the damage. Once a weakness or paralysis is detected patient should be put under supervised treatment and frequently followed up.

Whenever a reduced sensation or strength is noted the patient is asked to think carefully whether these changes occurred within past six months or so. If the patient says that the changes

are recent the part is re-examined to verify the facts from the appearance of the part. There is no need for such details if the changes have occurred more than a year ago. The most important indication for special neuritis treatment is recent loss of sensibility or strength. Deformity grading serves as a guide to the type of care to be given to the patient and also a means of measuring the quality of care being given. It therefore aids in planning and evaluating the programme for patient care.

The indications for special neuritis treatment and peripheral nerve surgery imply that the field staff should have, at their disposal, a technique of neurological examination which is easy to do rapidly, provides reliable information and can be repeated frequently with reproducible results<sup>5</sup>.

Rapid examination is not a protocol with a scoring system expressing nerve damage and nerve recovery quantitatively. Sensory variations are less easy to assess but if we really want to prevent the development of deformity we should start making baseline records and keep regular followups of changes in muscle power<sup>4</sup>.

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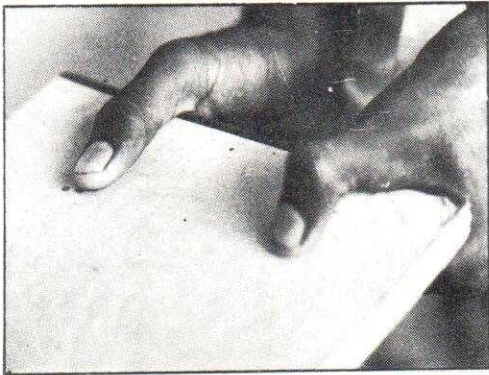


Figure 7 - Froment's sign.

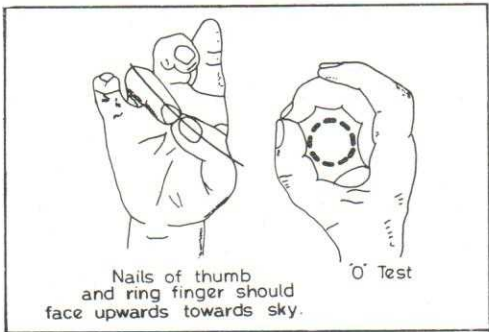


Figure 8 - Thumb abduction and opposition test.

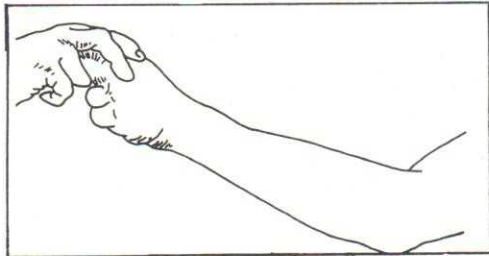


Figure 9 - Test for wrist dorsiflexors.

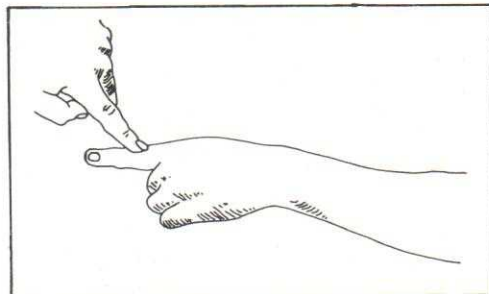


Figure 10 - Test for independent extension of index finger.

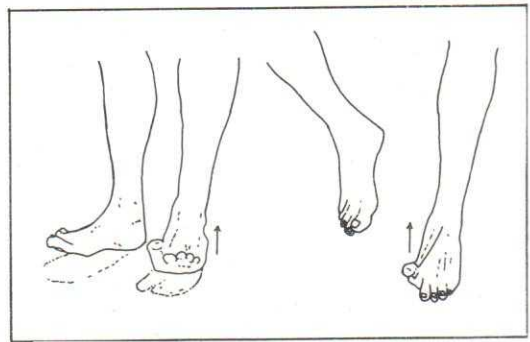


Figure 11 - Test for ankle dorsiflexion and great toe dorsiflexion.

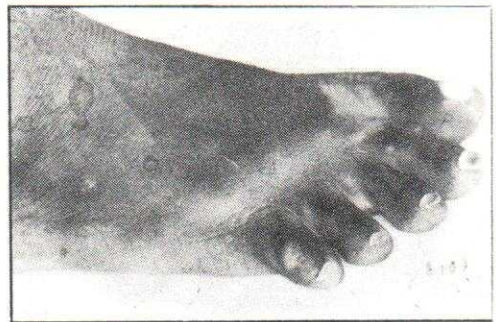


Figure 12 - Spreading of toes.



Figure 13 - Test for abductor & flexor hallucis brevis muscles.

**TABLE :** Tests for evaluation of motor functions of nerve trunks

Nerve Trunk	Site of Damage	Test Procedure	Reference To Figure
FACIAL	At stylo mastoid Foramen	Total facial expressions	
	Over Zygomatic bone	Eye closure Test	4
ULNAR	Forearm	Flexion of distal inter phalangeal joint of little finger	-
	Wrist	1. Abduction and adduction of middle finger	5
		2. Flexion of metacarpophalangeal joint of little finger with interphalangeal joints neutral	6
		3. Adduction of thumb	7
MEDIAN	Forearm	Weakness of all extrinsic flexors of fingers.	-
	Wrist	Loss of abduction/opposition of thumb	8
RADIAL	Upper arm	Wrist dorsiflexion	9
	Forearm	Independent extension of index finger	10
COMMON PERONEAL	Just below knee	1. Dorsiflexion of ankle	11
		2. Dorsiflexion of great toe	
POSTERIOR TIBIAL	At ankle	1. Spreading of toes	12
		2. Test for abductor/flexor hallucis brevis.	13