

A simple guide to examine suspects & diagnose leprosy

with the help of three confirmatory cardinal signs

Examine the person from **Head to Toes** presenting with **symptoms in three groups**, in a well lit place avoiding direct sunlight and honouring privacy with dignity.

Bacteriological Examination

Physical Examination

1 SUSPECT CHANGES IN SKIN
Texture & Nodule

2 LOOK FOR SKIN PATCHES
Flat or Raised

3 PALPATE trunk NERVES
For Thickening and / or Tenderness



Smooth, Oily, Shiny and **Thickened skin**



Thickened **earlobes**



Nodules: Skin colour / erythematous



Light colour patches (Hypo-pigmented)



Reddish patches (Erythematous)

Test patches for sensory loss

Many / innumerable patches without sensory loss

A few number of patches with sensory loss

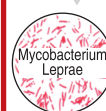
- 1 to 5 patches **PB** Pauci-bacillary
- > 5 patches **MB** Multi-bacillary

Skin Smear Examination



AFB NEGATIVE
Not **Leprosy**

Rule out other conditions



AFB POSITIVE
MB Multi-bacillary

Infectious Case:
Untreated person with infectious type of disease (skin smear positive) is the **main source for spread of leprosy.**

Involvement, Disability & Deformity



Autonomic changes

Dryness & Cracks



Sensory changes

Sensory loss & Injury



Motor changes

Muscle Weakness & Paralysis
Pure Neuritic (PN)*

Assess for **Nerve Function Impairment (NFI)**

Sensory loss in the area of distribution of the nerve

Confirmed Leprosy

Presence of **anyone of the THREE cardinal sign** is confirmatory.
Initiate Multi Drug Therapy (MDT)
MB-12 months (treat all the cases with trunk nerve involvement as MB) & **PB-6 months.**

*In India, 5 - 7% cases are **without skin patches** but with thickened nerve and sensory loss in the area of its distribution is termed as **Pure Neuritic (PN)** form of **leprosy.**

Physical Examination

confirms first two cardinal signs

Testing for sensation

Testing for sensation is mandatory to confirm the first two cardinal signs to diagnose leprosy precisely.

Tools for testing sensation

Tip of ballpoint pen is recommended for testing sensation in leprosy under NLEP as it is widely available and cheap.

Weight of light weight plastic pen by holding and touching vertically can be applied as standardised pressure at site.

- **Thermal:** Hot (38° - 40°C) and cold (normal 32° - 34°C) tap water in two test tubes
- **Light touch:** Wisp of cotton wool
- **Pressure:** Tip of ballpoint pen
- **Touch:** Graded nylon mono-filament (palm: Purple colour-2 gm & sole: Red colour-10 gm)

Specified mono-filaments for testing various skin areas are more sensitive for detecting sensory loss.

Method for testing sensation

With open eyes

Demonstrate the testing procedure with open eyes to individual being examined.



- Apply stimulus gently.
- Individual can see the site stimulated by examiner.
- Ask individual to point out stimulated site with the tip of index finger where stimulus was felt.

With close eyes

• **Ensure** that patient understands the procedure to indicate stimulated site while individual's eyes closed.



- **Observe** the response to stimulus at different sites to detect sensory loss.
- **Test** for other sites randomly.

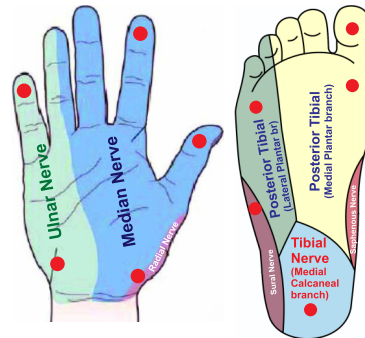
Record a response to stimulus as 'normal' when the patient is able to point out the tested site within the range of 2 cm in a span of 3 seconds.

Take following precautions

- 1 Test the normal skin first, then affected skin (skin patch and or area supplied by nerve) in random order by changing the sites of stimulus.
- 2 Maintain sufficient distance (preferably more than 10 cm) between two stimulated sites to differentiate distance & locate precisely the sites of stimulus.
- 3 Give adequate pause before giving the next stimulus. Observe the time taken by the patient to locate the site of stimulus. Delay in response of more than 3 seconds to locate the site of stimulus also indicates sensory impairment.
- 4 Compare testing on other corresponding normal skin areas.

Testing sites

Normal skin, skin patch & skin area with sensory supply by commonly affected peripheral nerves in leprosy.



Always do consider appropriate tool for regional variation in skin sensitivity of body parts.

Face is highly sensitive due to multiple nerve supply compared to palm (hand), sole (foot) and callous/scar. Use wisps of cotton or feather or hot & cold water test tube.

Eliciting sensory loss may be difficult in children.

While testing sensation in skin patch on the back which can not be pointed out with finger, ask the patient to count numbers loudly. Follow the same procedure for demonstration with open eyes on normal skin area patient can see.

Examine nerves for involvement

In every suspect examination is not complete without palpating commonly affected nerves in leprosy to rule out second cardinal sign.

Take following precautions while nerve examination

- Palpate the nerve at joint / site in relax position.
- Use pulp of fingers and do not tickle the nerve.
- Palpate nerve gently without applying too much pressure.
- Feel along the possible palpable length / course of nerve.
- Watch the facial expression while palpating nerves for tenderness or pain in nerve.
- Examine for sensory impairment in the area of distribution of the nerve found to be irregular, swollen, thickened / tender.
- Examination of cutaneous nerve feeding / supplying to patch / affected area in skin for nerve thickening helps to confirm diagnosis.



Ulnar nerve



Common peroneal nerve

Compare bilaterally symmetrical nerves Ulnar, Median, Radial, Common peroneal and Posterior tibial for identifying irregularity or Enlargement, thickness / tenderness to record.

Record the findings of nerve function impairment assessment.

Trunk Nerve:	Normal	Enlarged	Tender	Painful
Muscle strength:	Strong	Weak	Paralysed	
Deformity Grade:	Normal - 0	Sensory loss (Palm / Sole) - I	Visible deformity - II	

In the absence of any other signs of leprosy on the skin, nerve thickening alone without sensory loss and / or without muscle weakness is often not a reliable sign of leprosy.

When in doubt, refer to Leprosy Referral Centre ensuring follow-up.

Bacteriological Examination

confirms the third cardinal sign

Skin Smear examination (Slit and Scrape method)

Skin smear examination is the only tool, to diagnose early lepromatous (infectious type) leprosy.

- Patients with suspected signs of infectious leprosy such as multiple bilateral patches without sensory loss, nodules, smooth, oily and shiny skin should be subjected to skin smear test.
- Presence of AFB in skin smear confirms the diagnosis of an infectious case of leprosy and also helps to diagnose bacterial relapse after MDT.
- Skin smear is not necessary when there is definite sensory loss in cases with patches or in an area supplied by nerves commonly affected in leprosy, as it means leprosy can be diagnosed clinically.

Step 1 : Preparing to take skin smear

- Fill details in Skin Smear report form of person to be examined.
- Take a new clean and sterile microscopic slide.
- Label the slide with patient's name / registration number, unique ID number using slide marker / diamond pencil.

Step 2 : Taking skin smear & fixing on microscope slide

Selective sites for smear can be earlobe, affected & normal skin.

1 Fix the blade No.15 firmly on scalpel handle No.3. Clean the blade with spirit and pass over flame for next site.



2 Clean the selected site with cotton swab soaked in spirit.



3 Pinch skin firmly between thumb and Index finger. Apply pressure to squeeze out blood from the skin.



4 Make an incision on skin for 5 mm long & 2 mm depth. Keep pinching to make sure the cut remain blood free.



5 Turn scalpel blade in 90° angle in cut and scrape the cut with blunt tip of blade to collect tissue pulp. If bleeding occurs, wipe the blood.



6 Release the pinch and seal the cut with cotton wool applying Tr. Benzoin.



7 Spread tissue material on the slide evenly with flat edge of blade, making a circle of 8-10 mm in diameter.



8 Air dry and later fix smear by passing the slide with smear upwards over the flame of spirit lamp for 2-3 times. Do not over heat.



Remember

- Label the slides with patient's name / registration number, and sites of smears taken.
- The slide should be examined immediately and stored away from sunlight for cross checking / records.
- Follow guidelines on universal precautions for prevention of HIV and other infections. Dispose-off soiled swabs, blades etc carefully, preferably by burning.

It is advisable to maintain a slit skin smear tray for ready use, and replenished after every use.

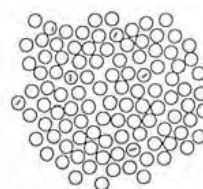
Step 3 : Identify the laboratory where slide is to be sent for staining / reading.

Send skin smear for staining with Zeihl-Neelsen method and examining for presence of AFB under microscope (Oil immersion lens) into the laboratory facilities at Block & District level or to Designated Microscopy Centres (DMC) laboratory under NTEP (National Tuberculosis Elimination Programme).

Diagrammatic representation of the Bacteriological Index (BI) of slit-skin smears according to Ridley's logarithmic scale

BI 1+

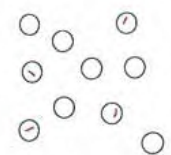
1-10 bacilli, on average, in 100 oil immersion fields



Examine 100 oil immersion fields

BI 2+

1-10 bacilli, on average, in 10 oil immersion fields



Examine 100 oil immersion fields

BI 3+

1-10 bacilli in an average oil immersion field



Examine 25 oil immersion fields

BI 4+

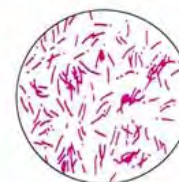
10-100 bacilli in an average oil immersion field



Examine 25 oil immersion fields

BI 5+

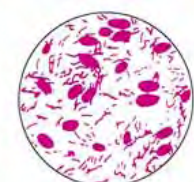
100-1000 bacilli in an average oil immersion field



Examine 25 oil immersion fields

BI 6+

Over 1000 bacilli (many globi) in an average oil immersion field



Examine 25 oil immersion fields

Look for **THREE** group of suggestive symptoms for early leprosy case detection and management.

- 👁️ Sighting symptoms on exposed body parts is very simple and easier than examining covered body parts for patches is the challenge.
- 👁️ Cautious followup of suspect for diagnosis is must for early case detection.
- 👁️ Community awareness about leprosy is the strategy for leprosy eradication.

1. Suspect



Changes in skin texture

- Smooth, Oily, Shiny (SOS skin), thickened skin and earlobe.
- Nodules

2. Observe



Disability & deformity

- **Sensory loss** in hands and feet (palm and sole)
- **Muscle weakness** / paralysis face, hand & foot.

3. Examine



Skin patch/es

- **Pale**/lighter than skin color, **flat**.
- **Redish** than skin color, **raised**.

Symptoms seen on body parts from Head to Toe

Listen to complaints, enquire & take a note

Physical disability and deformity

Listen to complaints, enquire & take a note		Physical disability and deformity	
Face and Eyes	👂 Watering of eye(s).	☀️ Red eye.	👁️ Inability to close eye(s).
	👂 Blurred vision.	☀️ Reduced blink reflex.	👁️ Blindness.
	👂 Photophobia, difficulty to see in strong light.	☀️ loss of Eyebrows (often on lateral side).	👁️ Saddle / depressed nose.
	👂 Stuffing of nose and bleeding	☀️ Thickened earlobe.	👁️ Facial paralysis.
	👂 Hoarseness of voice.		
Hand and Foot	👂 Inability to hold air/water in mouth.		
	👂 Tingling or numbness in fingers or toes.	☀️ Loss of sensation in palm (Hand) or sole (Foot).	👁️ Ulceration in hand(s) / painless wounds or burns on palm or sole.
	👂 Swelling in hand, foot, and joints.	☀️ Dryness of skin in palm and sole, crack and fissure, blister and ulcer.	👁️ Wrist drop / not able raise wrist.
	👂 Pain and /or tingling in the vicinity of the elbow, knee, or ankle.	☀️ Banana fingers (Swelling in hands & feet).	👁️ Foot drop / dragging the foot with high stepping gait while walking.
	👂 Inability to feel pain, sharp or rough surfaces, cold or hot objects in palm or sole is the risk factor for injury.	☀️ Gynaecomastia	👁️ Bending / clawing of finger(s) or toe(s).
	👂 Repeated unnoticed injury due to burn, cuts, sharp object, and friction/abrasions.		👁️ Shortening / absorption of fingers or toes.
	👂 Weakness or inability in hand(s) to grasp or hold objects.		
	👂 Difficulty in pinching and buttoning up shirt/jacket etc.		
👂 Slipping of footwear while walking so it is tied with back strap.			

Clinical Examination:

- 👁️ Examination is not complete until commonly trunk nerves are palpated (Ulnar & Common Peroneal) along with the covered body parts.
- 👁️ Examination of female should be in the presences of female attendant or nurse maintaining privacy.

Leprosy Complications (Lepra reactions):

- 👁️ **Sudden changes** in presentation of leprosy symptoms may occur before, during and after completion of MDT. Symptoms like erythematous skin patches, tender / painful nerves and nodules could be a sign of **lepra reaction** and insidious changes can be **relapse** after MDT.
- 👁️ **High grade fever** with painful nodules appearing in crops that can be due to infection, infestation ulcer and injury.

Say **NO** to Fear and Exclusion End . Leprosy . Together .