Communicable diseases

Leprosy

By:

Marwa Gaafar

Objectives:

- Causative agent.
- Background.
- Epidemiology
- Clinical features & complications.
- Diagnosis.
- Reservoir, incubation period & transmission.
- Treatment .
- Control .
- Elimination.

What is leprosy?

- A infectiuos bacterial disease of the skin, peripheral nerves and mucosa of the upper airway.
- Chronic, granulomatous.
- Only few from who exposed to infection develop the disease.

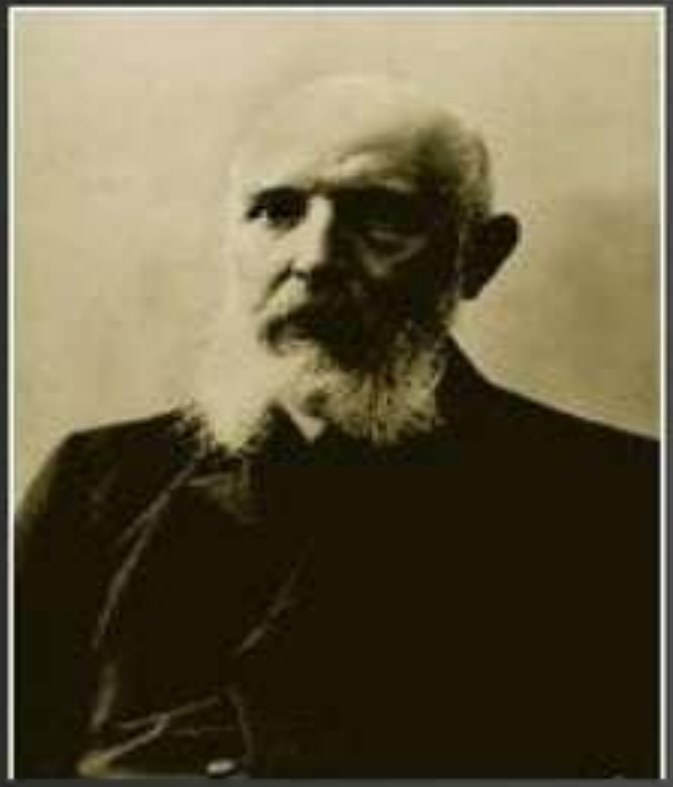
Causative agent:

- *Mycobacterium leprae*
- Acid fast, rod shaped bacillus
- Stain with Ziehl Neelsen carbol fuchsin.
- cannot be grown in bacteriological media or cell cultures.
- Present intra and extracellularly, forming characteristic clumps called Globi.

Background:

- Leprosy has afflicted humanity, left behind a terrifying image in history and human memory of mutilation, rejection and exclusion from society.
- Lots of people have suffered its chronic course of incurable disfigurement and physical disability.

Background- discovery



- By G.A. Hansen in 1873.
- First bacterium to be identified as causing disease in man.
- Treatment only appeared in 1940s (using promin).

Background:

- Many countries in Asia, Africa and Latin America with a significant number of cases.
- About 1 – 2 million people disabled due to past and present leprosy who need to be cared for by the community.

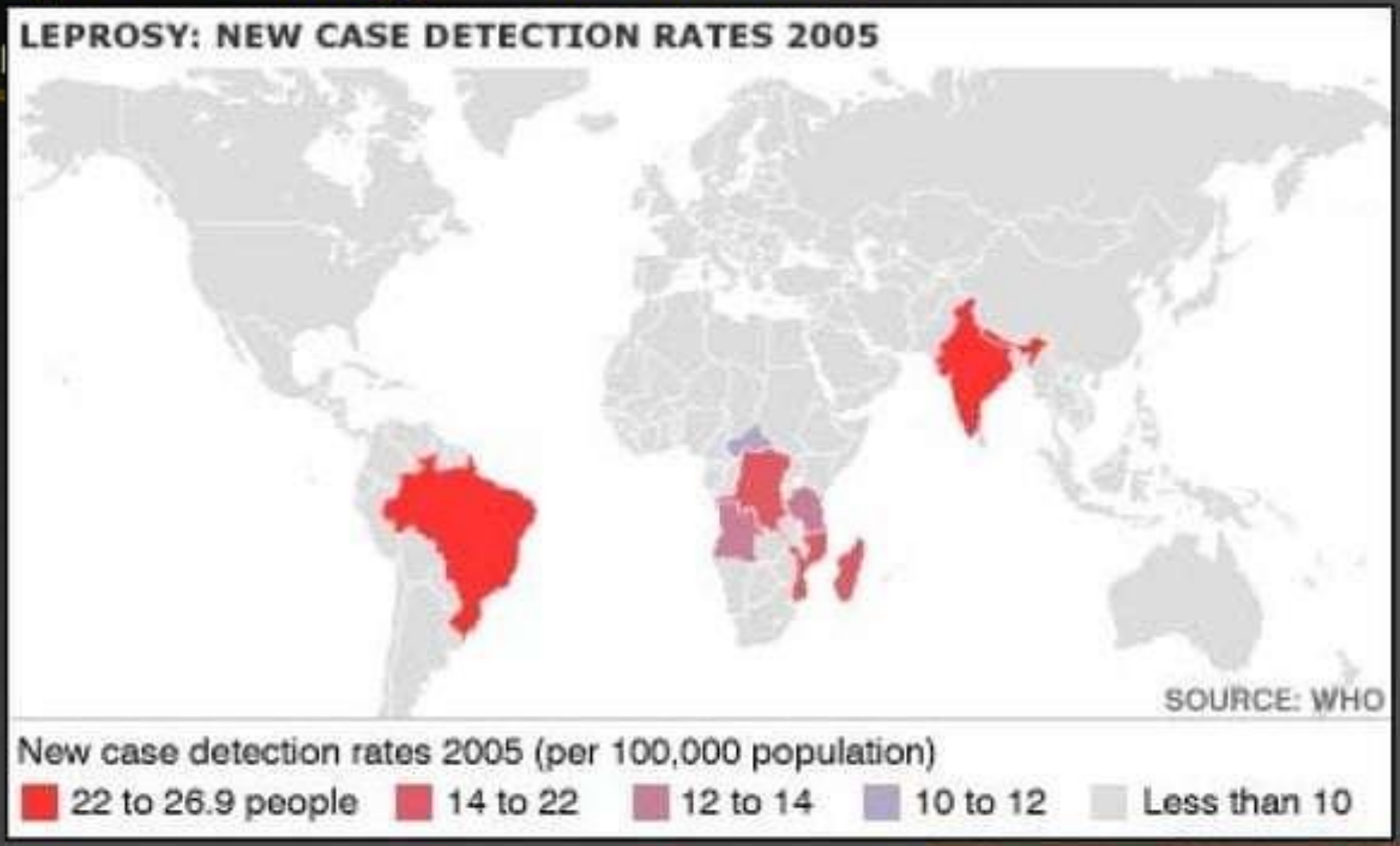
Epidemiology:

- **Age**:
- All ages, from early infancy to very old age.
- Youngest age reported is 1 and a half months.
- **Sex**:
- Both.
- Males more than females, 2:1 (equal in Africa)

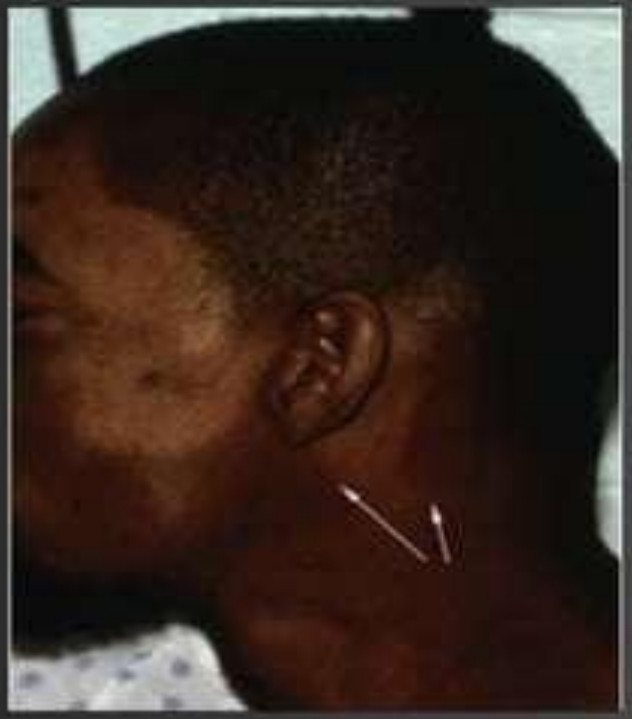
Epidemiology:

- **Prevalence pool**:
- Constant flux resulting from inflow and outflow.
- Inflow: new cases, relapse, immigration.
- Outflow: cure, inactivation, death, emigration.
- Global prevalence rate is less than one case per 10,000 persons.
- Elimination achieved in 2000.

Epidemiology - distribution



Clinical features:



1. Skin :

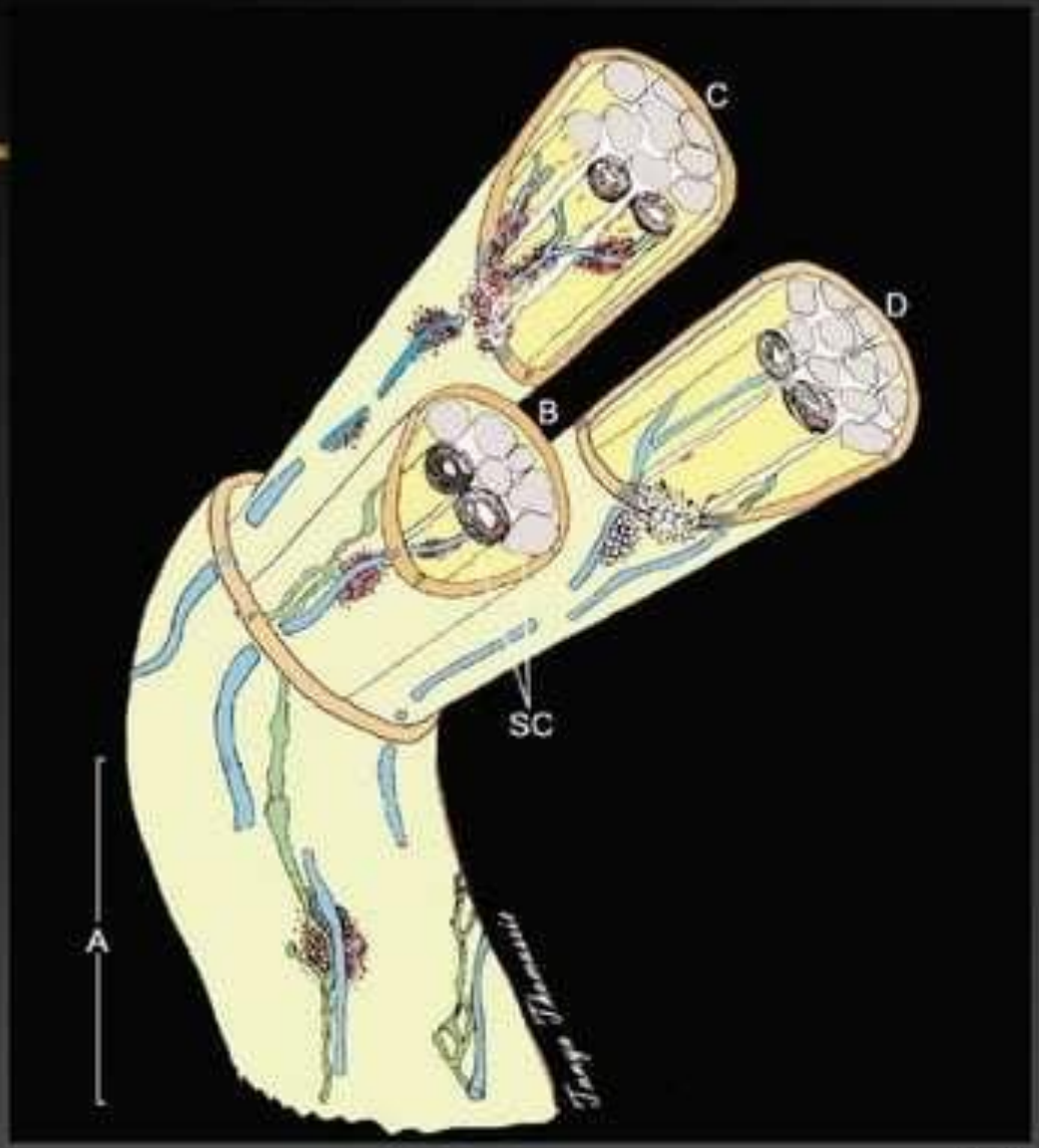
- Variable lesions: Macules, papules, nodules.
- Single / multiple.
- Hypopigmented, sometimes reddish.
- Sensory loss typically (anaesthesia/hypothesia).

Clinical features:

2. Nerves :

- Thickened.
- Loss of sensation.
- Muscle weakness.

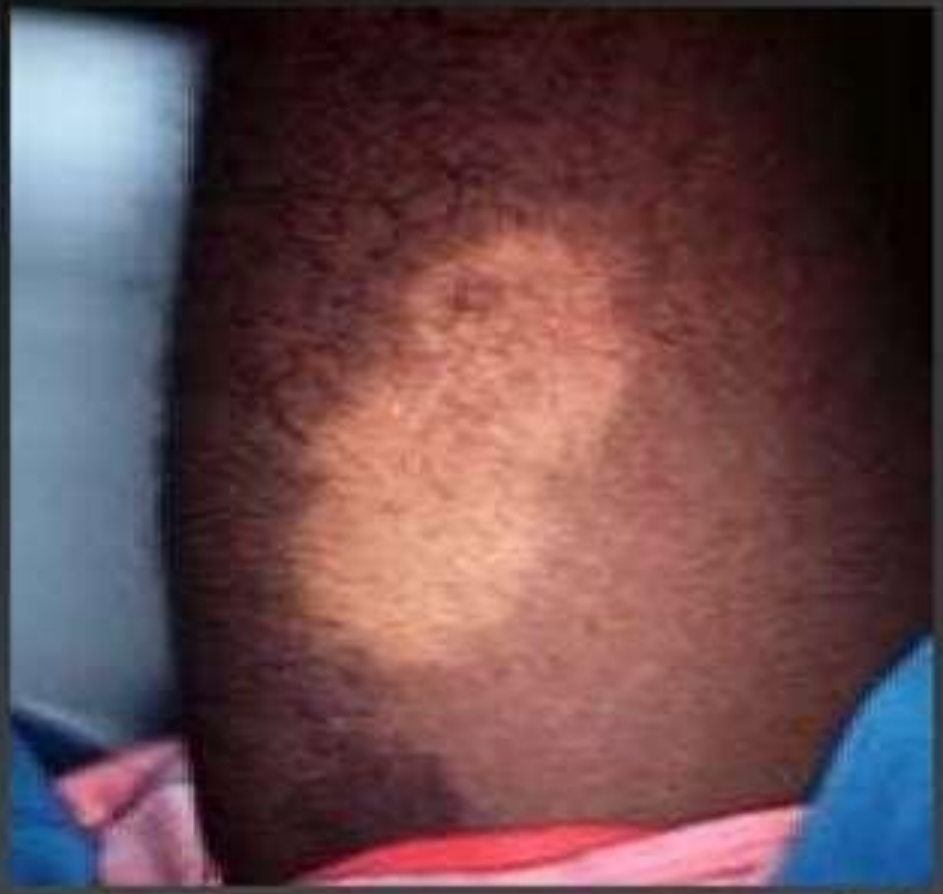
Mechanism of Nerve Damage



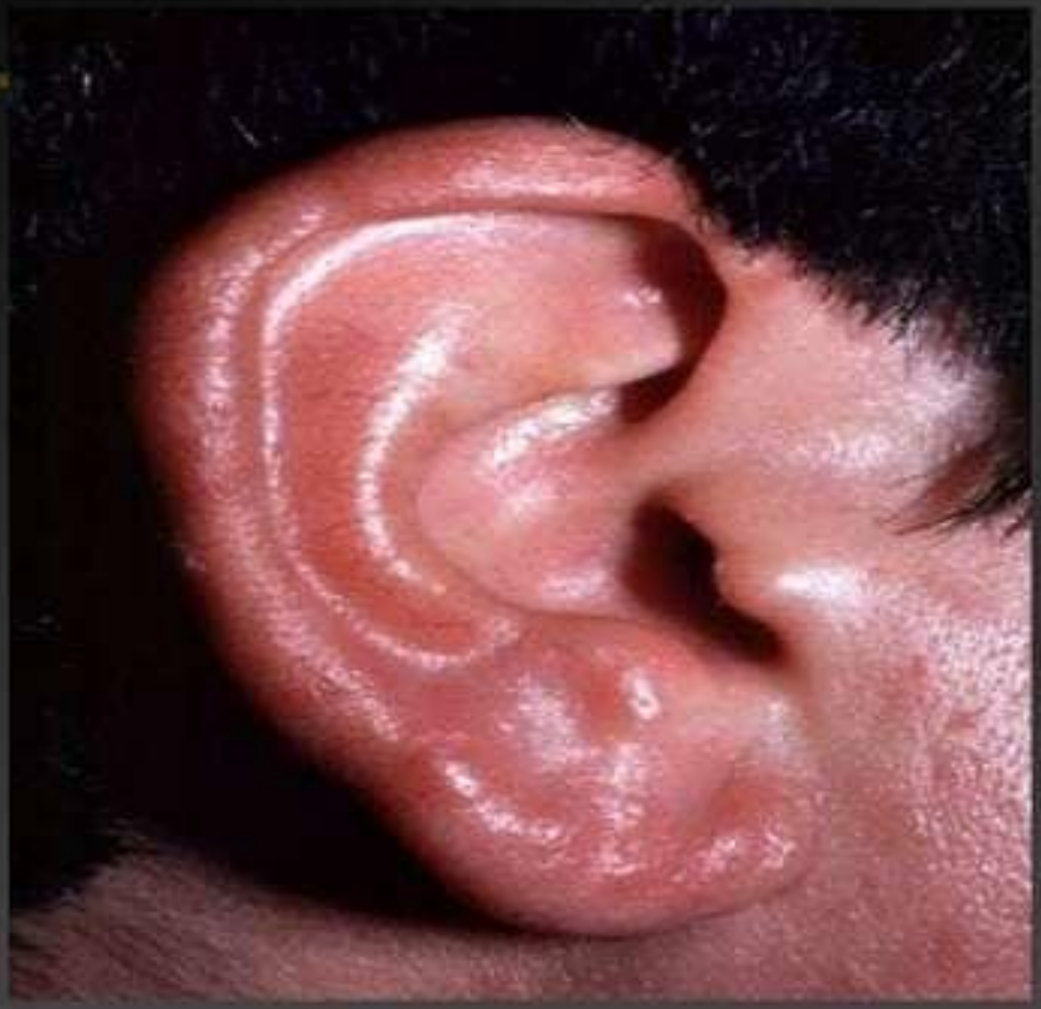
1. Entry Through Blood Vessels
2. Inflammatory Response
3. Demyelination

Scollard, DM et al. 2006. "The continuing challenges of leprosy." Clinical microbiology reviews 19, no. 2: 338-81.

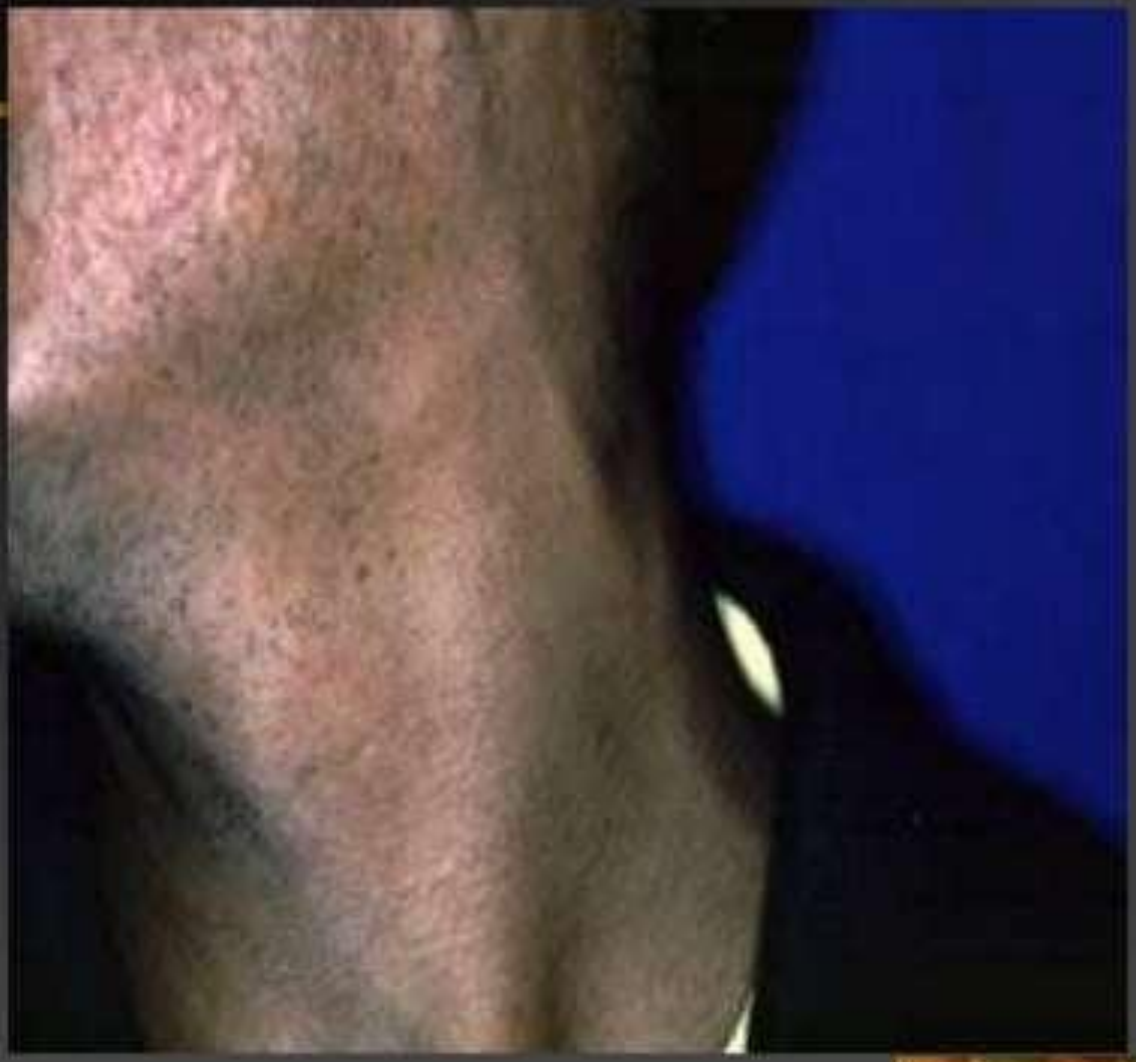
Clinical features:hypopegmented patch



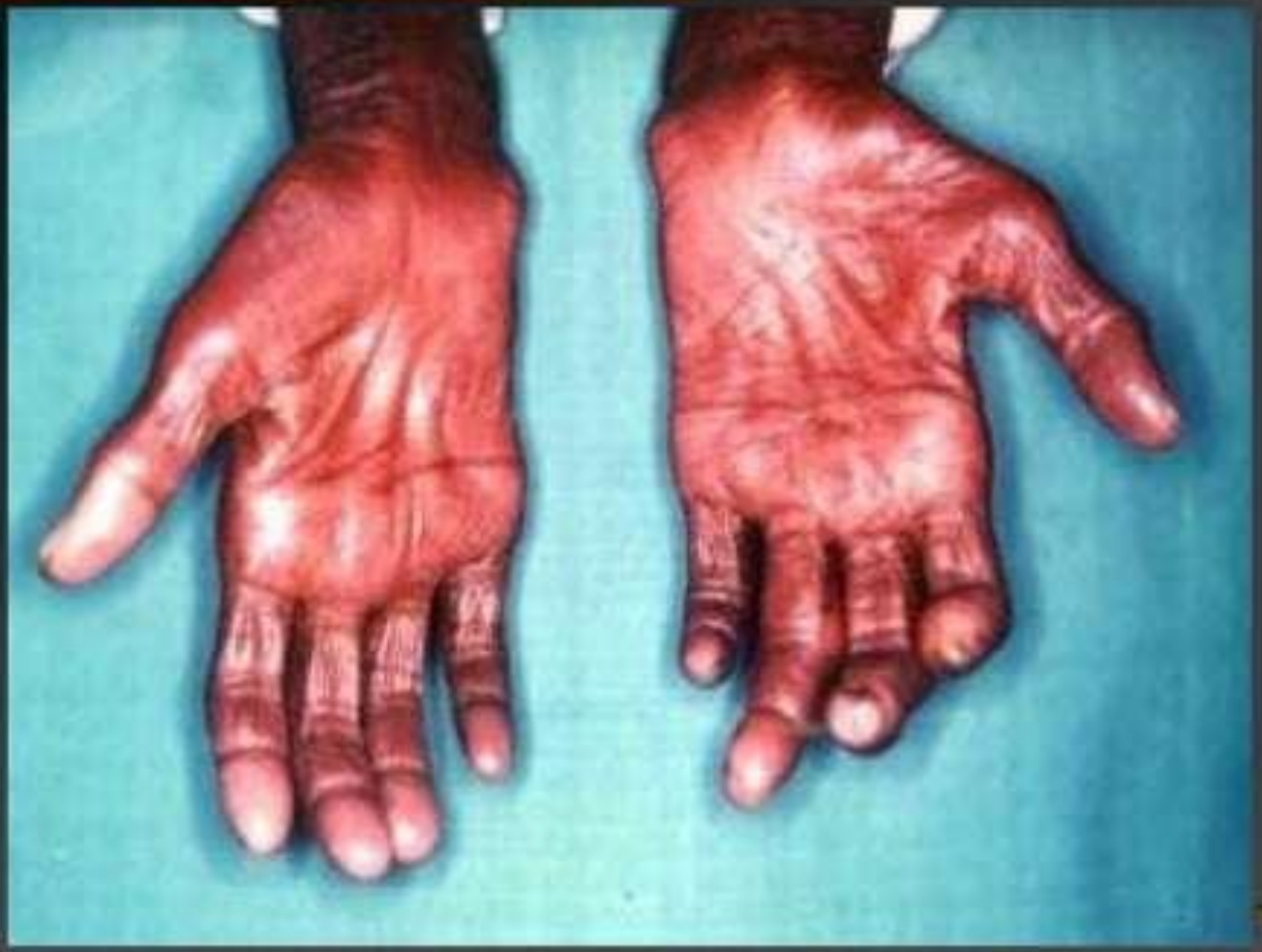
Clinical features: ear nodules



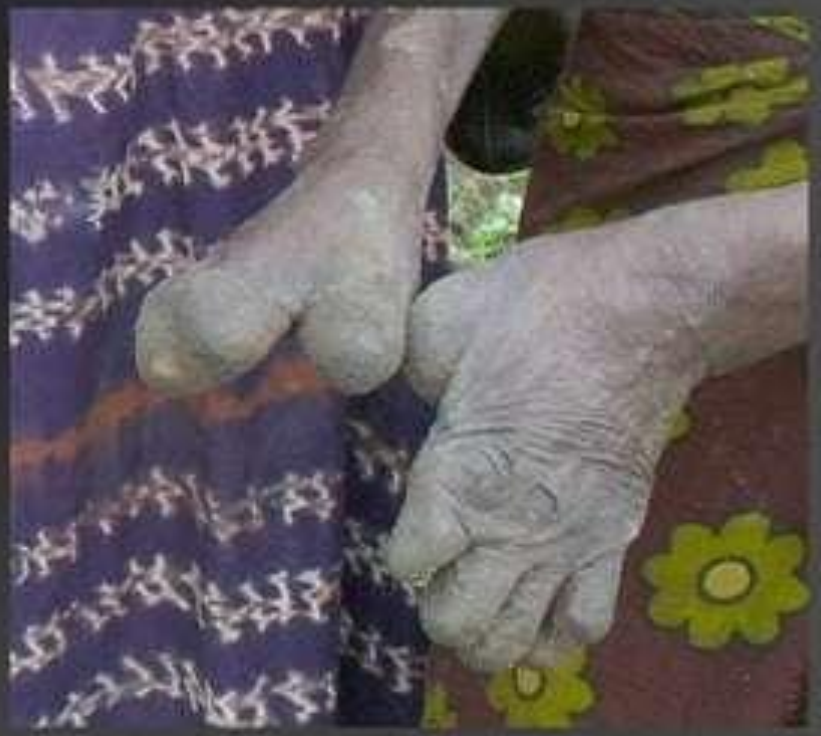
Clinical features: nerve enlargement



Clinical features: neurological defecit



Sensory Loss Can Lead to Secondary Infections and Severe Deformities



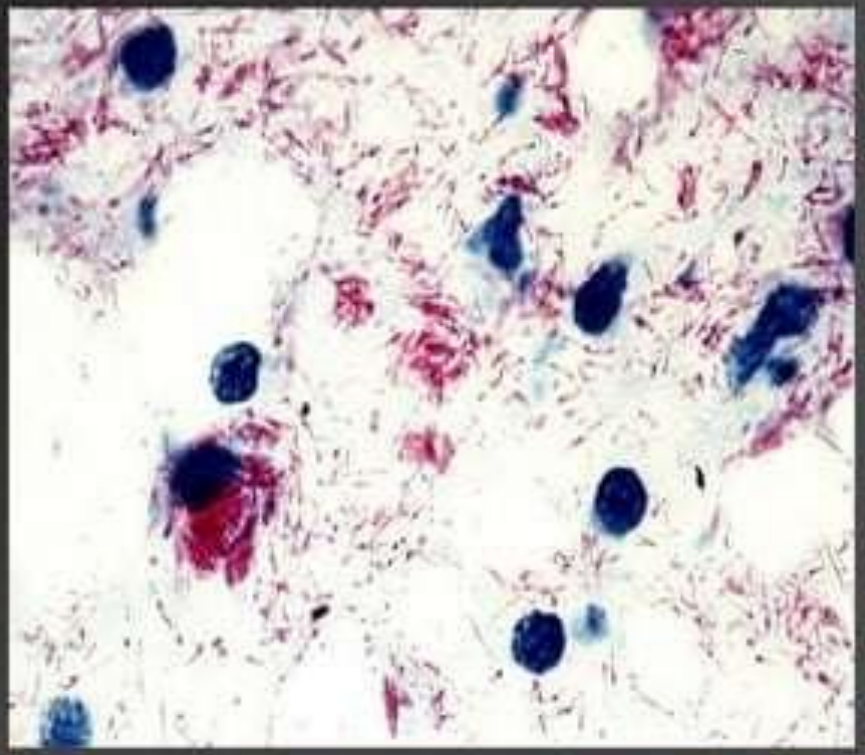
International Federation of Anti-Leprosy Associations (ILEP)
http://www.ilep.org.uk/en/

Diagnosis:

- Mainly clinical, based on signs and symptoms.
- Laboratory:

Positive skin smears/ nasal smears/scrapings.

- lepromin test.



Lepromin test:

- Used to determine type of leprosy.
- Injection of a standardized extract of the inactivated bacilli intradermally in the forearm.
- Positive reaction: 10 mm or more induration after 48 hrs/ or 5 mm or more nodule after 21 days.
- Negative In lepromatous leprosy because of humoral immunity not cell mediated.

What is not leprosy !!

- Skin patches which
  - have normal feeling
  - are present from birth
  - cause itching
  - are white, black, dark red or silver coloured
  - show scaling
  - appear and disappear periodically
  - spread quickly

What is not leprosy (cont.)

- Signs of damage to hands/feet/face without loss of sensation
  - due to other reasons like injury, accidents, burns, birth defects
  - due to other diseases like arthritis
  - due to other conditions causing paralysis

Case definition (WHO operational definition)

- Is a person having one or more of the following, who has yet to complete a full course of treatment:
- Hypopigmented or reddish skin lesion(s) with definite loss of sensation
- Involvement of the peripheral nerves (definite thickening with loss of sensation)
- Skin smear positive for acid-fast bacilli.

Classification:

- Based on:
- Skin smear results, or number of skin lesions.

1. Paucibacillary leprosy
2. (PB) Multibacillary leprosy (MB
3. Borderline leprosy- between the two.

- Differ in treatment regimen.

Classification of leprosy

- **Tuberculoid leprosy**
- less than 5 patches of skin lesions.
- Skin tests with lepromin elicit a strong positive response
- Lesions bacteriologically negative.
- strong cell-mediated responses.
- peripheral nerves damaged by host's immune response.

Classification of leprosy

- **Lepromatous leprosy:**
- Numerous poorly defined lesions.
- Symmetrical distribution.
- Positive smear test.

Classification of leprosy

- **Borderline leprosy:**
- Four or more lesions .
- Well or ill defined.
- Bacteriologic positivity is variable.
- If not treated, progresses to lepromatous type.
- If severe, treated with corticosteroids.

Leprosy reactions

- Immunologically mediated episodes of inflammation.
- Can affect peripheral nerves causing deformities.
- Diagnosed clinically.
- Not due to treatment.

Leprosy reactions

- **Type 1 (reversal reaction)**
- Delayed hypersensitivity reaction.
- In both pauci/multibacillary.
- Recurrent.
- Inflammation in skin lesions and nerves (nuritis).
- Lesions: edema , ulcer.

Leprosy reactions

- **Type 2 (erythema nodosum leprosum)**
- Humoral response.
- Only in multibacillary.
- Red , painful subcutaneous nodules
- In face, arms, legs bilaterally symmetrical.
- Neuritis also occurs.
- Serious, diffficult to manage.

Transmission- route

- Exactly unknown.
- Contact with cases. Which contact?! (intimate, repeated, skin to skin…. Household contact easily identifed)….related to dose of infection.
- Respiratory route, possibility is increasing.
- Biting Insects, questionable.
- Organisms exit thro skin & nasal mucosa.
- Entry: skin (broken-tattooing needle), respiratory tract (propable)

Transmission - reservoir

- Human being, only known.
- Similar organisms detected in wild armadillo.
- History of handling armidellos reported.

Transmission - survival

- M.leprae from nasal secretions up to 36 hrs.
- Also reported in nasal secretions up to 9 days.
- So contaminate clothing and other fomites.
- Infectivity only 1 day after starting treatment.

Incubation period

- From 9 months to 20 years.
- Average 4 years for tuberculoid leprosy and twice that for lepromatous leprosy.

Treatment

- In 1941, promin introduced,but painful injections.
- In 1950s, Dapsone pills, but resistance developed.
- In 1981, WHO recommends multi drug treatment (MDT): Dapsone, Rifampicine, Clofazimine
- Patients under treatment should be monitored for drug side-effects, leprosy reactions and for development of trophic ulcers

1981: WHO Proposes Multi-Drug Therapy (MDT)

- Combination of DAPSONE, RIFAMPICIN, and CLOFAZIMINE

+

+

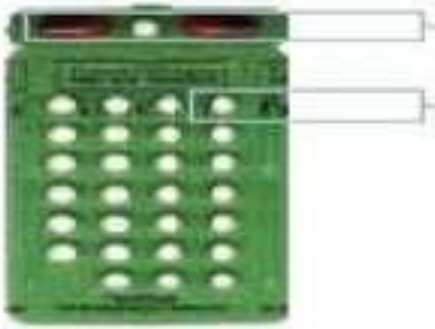
Treatment - regimen

- Adults with multibacillary,MDT for 12 months:
- Rifampicine 600 mg once a month
- Dapsone 100 mg once a day
- Clofazimine: 50 mg once a day and 300 mg once a month.
- Adults with paucibacillary:
- Rifampicin: 600 mg once a month
- Dapsone: 100 mg once a day.

Steps to start MDT

- Classify as PB or MB leprosy
- Inform patient about the disease .
- Explain the MDT blister pack - show drugs to be taken once a month and every day
- Explain possible side effects (e.g. darkening of skin) and possible complications and when they must return to the health centre
- .Give enough MDT blister packs to last until the next visit.
- Fill out the patient treatment card

Treatment – drug presentation



PB adult blister pack

PB adult treatment:

Once a month: Day 1
– 2 capsules of rifampicin (300 mg X 2)
– 1 tablet of dapsone (100 mg)

Once a day: Days 2–28
– 1 tablet of dapsone (100 mg)

Full course: 6 blister packs

MB adult blister pack

MB adult treatment:

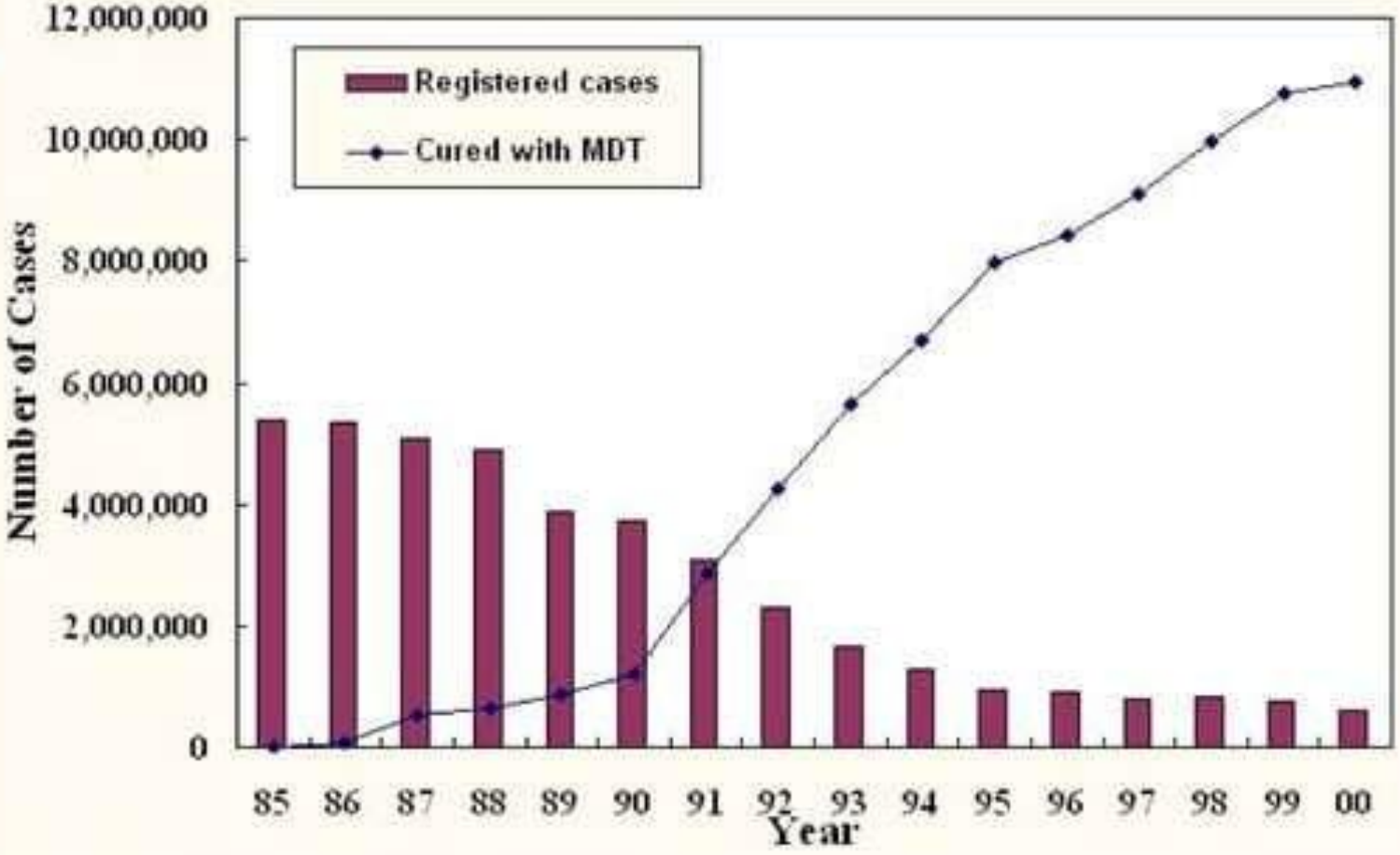
Once a month: Day 1
– 2 capsules of rifampicin (300 mg X 2)
– 3 capsules of clofazimine (100mg X 3)
– 1 tablet of dapsone (100 mg)

Once a day: Days 2–28
– 1 capsule of clofazimine (50 mg)
– 1 tablet of dapsone (100 mg)

Full course: 12 blister packs

1995: WHO Distributes MDT Drugs for Free to Worldwide Patients

Number of Registered Leprosy Cases and Number of Cumulative Cases Cured Globally with MDT from 1985 to 2000



Prepared by the Sasakawa Memorial Health Foundation
N.B. Data for the year 2000 is provisional

Source: WHO

Some patients may develop complications

- Leprosy reactions
- Side-effects
- Disabilities

Leprosy reactions

- 1 or 2 patients in 10 may develop reactions
- Reactions are not a side effect of MDT. They are the body's response to leprosy
- More commonly seen in MB cases
- Signs and symptoms include
  - Skin: patch/s becomes reddish and/or swollen; sometimes painful reddish nodules appear
  - Nerves: pain in the nerve and/or joint; loss of sensation and weakness of muscles (commonly of hands, feet and around eyes)
  - General: fever, malaise, swelling of hands/feet

Managing reactions

- Early diagnosis and prompt treatment of reactions
  - Every patient should be informed about the signs and symptoms of reactions
  - Inform them to go as soon as possible to the health centre
  - Reassure patients that:
    - reactions can be treated
    - they are not a side-effect to MDT
    - does not mean that MDT is not working

Managing reactions

- Rest is very important:
  - Help to get leave from work or school for a few days (e.g. medical certificate)
- Control of pain and fever
  - Aspirin or paracetamol
- Continue MDT regularly

Managing reactions

- **Reactions which only involve the skin:**
  - rest and pain-killers are usually sufficient.
  - If there is no improvement within few days or worsening, then specific treatment is needed
- **Reactions which involves the nerves**
  - start treatment with a course of corticosteroids (e.g. prednisolone) as soon as possible
  - will control all signs/symptoms of reaction

MDT side-effects

- Red coloured urine
  - This is due to rifampicin. Lasts only for few hours Reassure the patient that this is harmless
- Darkening of skin
  - This is due to clofazimine. Reassure the patient that this will disappear after treatment is completed
- Severe itching of skin
  - This is due to allergy to one of the drugs (commonly to dapsone). Stop all medicines and refer to hospital

Treatment of disability

- Why disability occur??
  - Late diagnosis and late treatment with MDT
  - Advanced disease (MB leprosy)
  - Leprosy reactions which involve nerves
  - Lack of information on how to protect insensitive parts

Treatment of disability

- The best way to prevent disabilities is: early diagnosis and prompt treatment with MDT
- Inform patients (specially MB) about common signs/symptoms of reactions.
- Ask them to come to the centre
- Start treatment for reaction, Inform them how to protect insensitive hands/ feet /eyes
- Involve family members in helping patients

Care of feet

- Cracks and fissures
  - Soak in water
  - Apply cooking oil/Vaseline
  - Use footwear
- Blisters
  - Do not open blister
  - Apply clean bandage
- Simple ulcer
  - Clean with soap & water
  - Rest and clean bandage

Care of feet

- Infected ulcer
  - Clean with soap & water
  - Rest & apply antiseptic dressing
- Wounds/injury
  - Soak in water
  - Apply cooking oil/Vaseline
  - Clean and apply clean bandage
  - Protect when working/cooking
- Weakness/paralysis
  - Oil massage
  - Exercises
  - Refer

Care of eyes

- Redness and pain
  - Aspirin or paracetamol
  - Atropine and steroid ointment
  - Cover with eye pad
  - Apply antibiotic ointment
  - Refer
- Injury to cornea
- Difficulty in closing eye
  - Tear substitute eye drops
  - Exercises
  - Dark glasses to protect
  - Refer

Treatment – post completion

- Congratulate the patient
- Thank family/friends for their support
- Reassure that MDT completely cures leprosy
- Any residual lesions will fade away slowly
- Show them how to protect anaesthetic areas and/or disabilities
- Encourage to come back in case of any problem
- Tell that they are welcome to bring other members of family or friends for consultation

Treatment – before & after

Control

1. Preventive measures.
2. Control of cases, contacts and immediate environment.
3. Disaster implications.

Control – preventive measures

- Early dtection and treatment of cases.
- Health education and counselling must stress on the availability of effective therapy, the absence of infectivity of patients under treatment and prevention of physical and social disabilities.

Control – preventive measures

- BCG vaccination for tuberculoid leprosy; this as part of T.B. control , not be undertaken specifically to prevent leprosy, it provides variable levels of protection.
- Currently, no single vaccine that confers complete immunity in all individuals.

Control of patient, contacts and the immediate environment:

1. Report to local health authority.
2. Isolation: is of questionable value and can lead to stigmatization. No restrictions in employment or attendance at school are indicated.
3. Quarantine: Not applicable.
4. Immunization of contacts: Not recommended
5. Investigation of contacts and source of infection.
6. Specific treatment: MRT

Control : disaster implications

- Any interruption of treatment schedules is serious.
- During wars, diagnosis and treatment of leprosy patients has often been neglected.

Elimination

- Leprosy meets the demanding criteria for elimination:

  - Practical and simple diagnostic tools: can be diagnosed on clinical signs alone;

  - Availability of an effective intervention to interrupt its transmission: multidrug therapy

  - A single significant reservoir of infection: humans.

1999: Global Alliance to Eliminate Leprosy As a Public Health Problem

Elimination strategy

- Providing MDT to all communities
- Breaking the chain of transmission by intensive case detection and prompt treatment
- Improving quality of patient care, including disability prevention and management
- Ensuring regularity and completion of treatment
- Encouraging and ensuring community participation
- Providing rehabilitation to the needy patients
- Organising health education to patients , their families and community

Obstacles to Eliminating Leprosy in Endemic Countries

STIGMA

Overcoming Stigma

- Mass Media
- Integrated Primary Health Services
- Education & Training

Leprosy Elimination Progress

The Final Three

- Brazil
- Nepal
- Timor-Leste

FIG. 1. Countries with leprosy less than WHO elimination levels: 1985 and 2008 (used by permission of The Nippon Foundation).

Worobec, Sophie M. 2009. "Treatment of leprosy/Hansen's disease in the early 21st century." Dermatologic therapy 22, no. 6: 518-37.

- Sudan achieved the elimination level, nevertheless incidence of new cases is rising, reporting between 300-900 cases per yr.
- Some districts has not achieved elimination, also in egypt and yemen.
- South sudan is the only in eastern mediterranean region that reports more than 1000 new cases per yr.

Thank you