

Leprosy

Training Manual for TLCAs



BANGLADESH

9th Edition
August 2008

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1. BURDEN OF LEPROSY

The global (excluding Europe) registered prevalence of leprosy at the beginning of 2008 was 212 802 cases; the number of new cases detected during 2007 was 2,54,525.

There are 17 countries where ≥ 1000 new cases were reported during 2007. These 17 countries account for 95% of the global total of the new-case detected globally during 2007. These countries are Angola, Bangladesh, Brazil, China, DR Congo, Cote d'Ivoire, India, Ethiopia, Indonesia, Madagascar, Mozambique, Myanmar, Nepal, Nigeria, Philippines, Sri Lanka and Sudan.

(Ref: WHO Weekly Epidemiological Record; No 33, 2008, 83, 293 - 300)

In 1991 World Health Assembly passed a resolution to eliminate leprosy as a public health problem by the year 2000. Elimination of leprosy as a public health problem is defined as a registered prevalence rate of less than one case per 10,000 populations. Globally, the leprosy elimination goal was achieved in 2000. Bangladesh achieved elimination during 1998.

Between 1985 and 2006, more than 15 million leprosy cases were cured globally. Of these, about 12.8 million were from the SEA Region, of which India accounted for about 11.8 million. At the beginning of 2008 the Democratic Republic of the Congo and Mozambique reached the Leprosy elimination goal (defined as a registered prevalence rate < 1 case/10 000 opulation). A total of 3 countries - Brazil, Nepal and Timor-Leste have yet to achieve the elimination goal. Though the goal of elimination of leprosy as a public health was globally attained by the end of 2000 however, new cases of leprosy would continue to occur.

The detection of leprosy cases, their treatment, and management of complications and integration of cured persons into the community will require continuing for an undetermined period. Early case detection and treatment with multi-drug therapy (MDT) remains the cornerstone of leprosy control.

Although not a killer disease, but more than one third of all patients are at risk of developing permanent physical handicaps.

At the same time, because of the strong stigma attached to the disease, all patients face social and professional ostracism as well as serious psychological problems.

2. HISTORY

2.1 History of leprosy

Leprosy is often referred to as the oldest disease known to Human. The first known written records of leprosy come from India in about 600 B C. From India, Leprosy spread to China in about 500 B C and there to Korea and Japan. Leprosy was also recognized in the ancient civilizations of Egypt. All countries of the South-East Asia Region were known to be endemic for leprosy. Throughout history, the afflicted have often been ostracized by their communities and families. This situation has changed in recent years since leprosy is completely curable and there is better awareness about the disease. The term Leprosy is derived from the Greek word "Leptos" which means "Scaly". The name "Kustha" was derived from "Kushnati" which means "eating away" in Sanskrit.

- Leprosy is an ancient disease known from middle of the second century.
- Sufferers were regarded as dead, and segregated from the society.
- 1873 Dr. Armuer Hansen discovered that a microorganism (Mycobacterium leprae) is responsible for the disease
- 1991 World Health Assembly targeted Elimination Leprosy as a public health problem.

2.2 History of treatment

The first breakthrough occurred in the 1940s with the development of the drug dapsone, which cured the disease. But the duration of the treatment of leprosy was many years, even a lifetime, making it difficult for patients to be regular in their treatment. In the 1960s, *M. leprae* started to develop resistance to dapsone, the world's only known anti-leprosy drug at that time. In 1981, a World Health Organization (WHO) Study Group recommended multi-drug therapy (MDT), a combination of two / three drugs. MDT effectively kills the pathogen and cures the patient.

- 1940s Dapsone replaced Chaulmoogra oil.
- 1981 WHO introduced MDT for all cases of Leprosy

3. NATIONAL LEPROSY ELIMINATION PROGRAM - BANGLADESH (NLEP)

3.1 Organogram and GO-NGO Collaboration

The National Leprosy Elimination Programme (NLEP) under the Directorate General of Health Services, Government of the People's Republic of Bangladesh, functions under the direct leadership of the Director Mycobacterial Disease Control (MBDC) & Line Director TB & Leprosy and Programme Manger Leprosy, Mohakhali, Dhaka. The Leprosy programme was accelerated by the Govt. of Bangladesh in 1993, the wish was expressed that activities of the Leprosy & Tuberculosis NGOs become an integral part of the National Programmes, thereby pooling all available resources and avoiding duplication of work, signed a Memorandum of Understanding (MOU) between the Directorate of Health Services and LTCC (A consortium of 11 national and international NGOs)in July 1994, under which specific areas were allocated to NGOs for working as partner of the Govt in leprosy elimination activities and implementing DOTS strategy for TB control. MOU has been periodically revised and extended up to June 2011.

3.2 Milestones of achievement in Bangladesh

1985- Introduction of Multi Drug Therapy (MDT) in 120 high endemic upazilas (sub-districts)

1993- Intensification of leprosy elimination activities through integration of the leprosy control services into the general health services

1994- 100% MDT coverage of registered patients

1996- 100% geographical coverage through 600 MDT centers

1998- Achievement of elimination goal at national level.

Damien Foundation:

The Damien Foundation, founded in 1964, is a Belgian NGO dedicated to the fight against Tuberculosis & Leprosy. The Foundation is active in 16 countries of Asia, Africa and Latin-America.

Damien Foundation has been engaged in Bangladesh since 1972, initially in the field of leprosy and since 1994 also involved in the fight against Tuberculosis. The foundation works in close collaboration with the National Tuberculosis and Leprosy Programme of the government of Peoples' Republic of Bangladesh. At present the Foundation covers 14 districts with over 29 million inhabitants. These districts are brought under four administrative areas: namely - Tangail (covers Tangail, Jamalpur, Sherpur) Mymensingh (covers Mymensingh, Kishoreganj, Netrakona), Rajshahi (covers Rajshahi, Nawabganj, Naogaon) and Faridpur (covers Faridpur, Shariatpur, Gopalganj, Rajbari & Madaripur) TB and leprosy control project.

Now, the project is operational in the 110 upazilas through 170 diagnosis and treatment centers. Besides these, 261 sputum collection centers are established at the hard to reach areas. To facilitate TB treatment under direct supervision over 6000 fixed DOT providing centers are in place at the community level through voluntary participation of village doctors, cured patients, community elite, religious leaders and GOB H & FP staff. Three hospitals with a total of 234 beds are supporting to guarantee quality services for the complicated TB (including MDR TB) and Leprosy patients. More over a lot of research activities are going on both in the field of TB & Leprosy.

4. ANATOMY AND PHYSIOLOGY

4.1 Anatomy of the skin

The Skin is the largest organ of the body. It is composed of three layers: Epidermis, Dermis, and the subcutaneous tissue.

4.1.1 Epidermis:

It is the outer most layer of skin and consists of five layers of keratinocytes. The outer layer of the epidermis consists of dead cells and makes a waterproof and antibacterial covering.

In the epidermis we have a special cell called Melanocytes-which produce color for our skin. Where color producing cells dies or fails to produce color, the area of the skin becomes milky white. The disease is known as vitiligo. Many people consider it as Leprosy. Remember Leprosy lesions are never milky white. The color of the skin is regulated by race, climate, sun exposure etc.

4.1.2 Dermis:

The dermis consists of fatty tissue and fibrous tissue in which we find sweat glands, sebaceous glands, hair follicles, nerves and blood vessels.

The sebaceous glands are producing oil which plays an important role in keeping the skin in a moist and smooth.

The oil production is controlled by the autonomic nerves. When this nerve is damaged (leprosy can damage this nerve) the skin becomes dry.

4.1.3 Sub-cutis:

The sub-cutis is composed of fat cells, which gives shape to the body and serves as a store. It also serves as a shock absorber for blows.

Skin in disease condition: Skin is the mirror for many internal and external diseases. Skin diseases usually manifests with different type of skin lesions: Macule, Papule, nodule, plaque, blister etc.

In leprosy, skin manifestation will be discussed later in this handout. The signs are mostly related to the damage of sensory nerves of the skin, and its autonomic nerves. When the sensory nerve fibers are damaged by *M. Leprae* there will be loss of temperature, pain and touch sensation. If the nerve fibres are not all damaged, the patient is still able to feel something, but not like a normal person. This we call partial loss of sensation. If the nerve fibers are completely destroyed, the patient can not feel any type of sensation, this we call anaesthesia. When the bacilli attack the autonomic nerve fibers, the sweat glands will no longer produce perspiration, because the order to produce sweat can no longer reach the cells of the glands. Therefore they stop working. The sebaceous glands no longer receive the order to produce oil. The skin becomes dry and hard. The hair in the affected area may fall out, the blood supply is less because the nerves do not regulate this any more. The hair no longer gets enough food and oxygen to grow and to stay alive. The hair will die and fall out.

The skin is constantly being renewed by new cells that grow up from the basal layer and replace those which are worn off and this is how an ulcer or cut injury heals.

4.2 Nervous system

The brain and spinal cord together makes our central nervous system. The branches that come out from brain is called cranial nerve and branches that come out from spinal cord is called spinal nerve. The cranial nerves and the spinal nerves together form our peripheral nervous system. Leprosy bacilli never affect central nervous system but it can affect peripheral nerves. The results of nerve damage are the deformity and disability we see in leprosy.

Every nerve contains many fibres which all carry different messages.

There are 3 types of nerve fibres:

- (a) **Motor nerve fibres:** These carry messages from brain to the muscles. All body movements are due to the action of the muscles.
- (b) **Sensory nerve fibres:** These carry messages to the brain about different types of sensations e.g., touch, pain, temperature, pressure.
- (c) **Autonomic nerve fibres:** These carry only special messages which are sent without us knowing about them.

Nerve trunks: Large nerves which contain all 3 types of nerve fibres (motor, sensory & autonomic) are called nerve trunks. A nerve trunk gives off branches just as a tree gives off branches. Some branches contain motor fibres and go to muscles; other branches go to the skin and are called cutaneous nerves.

Cutaneous nerves: contain no motor fibres but only autonomic and sensory fibres. In the skin the cutaneous nerves divide into very small cutaneous branches.

4.3 Bones

The bones form the hard framework of the body.

Skull and mandibule make the head.

The backbone or the spinal column.

It is the main support for the body and a protective case for the spinal cord and the roots of the spinal nerves. It comprises many vertebrae.

The skeleton of the thorax.

Several vertebrae, along with the sternum and the ribs form the skeleton of the thorax. The sternum is the breastbone.

The upper limb.

The shoulder has a shoulder blade and a collar bone.

The bone of the upper arm is called the humerus, it extends from the shoulder (joint) to the elbow (joint).

The forearm has two bones: the ulna and the radius.

The bones of the hand comprise 3 parts:

- o The carpals, the bones of the wrist,
- o The metacarpals, the bones of the palm of the hand,
- o The phalanges of the fingers.

The pelvis.

The pelvis is formed by the two hipbones and the sacrum.

The lower limb.

The femur is the bone of the thigh. The joint between pelvis and femur is called the hip.

The knee is the joint between the thigh and the leg. The small bone is called the knee cap or patella.

The leg has two bones: the tibia and the fibula, the tibia is the big medial one and the fibula is the thin lateral one.

The ankle is the joint between the leg and the foot.

The ankle bone is called the talus.

The heel bone is the calcaneus.

The foot bones are the tarsals, metatarsals and the phalanges of the toes.

4.4 Joints

A joint is a junction between two or more bones, or between cartilage and bones, e.g. elbow, knee, wrist.

Cartilage is a tissue, which makes a cushion between bone ends in a joint.

Ligaments are strong white fibres to hold bones together, crossing the joints.

4.5 Muscles and tendons

The muscles are the fleshes of the body. They make the bones move at joints, by contracting. Most of the muscles are

attached to the bones by tendons at their end, one of them at both sides of a joint.

When a muscle is used regularly, it keeps its shape. When a muscle is not used properly it becomes weak and thin, we talk of muscle wasting or atrophy.

4.5.1 Voluntary and involuntary muscles:

Voluntary muscles are those muscles which we can command ourselves. e.g. When we want to take something from the table, we can command the muscles of our arm and hand to move and to pick it up. Voluntary muscles can be commanded by our own will.

Involuntary muscles are those muscles which we cannot command ourselves. e.g. The muscles in the guts (intestines) that push the food forwards, cannot be commanded at will.

Our heart-muscle also cannot be commanded to start or stop beating, but this is a special type of involuntary muscle.

5. THE EYE

The eye is one of our sense organs, that inform us of what is going on outside our body. Other senses are hearing, smell, taste and touch.

5.1 Anatomy and physiology of the eye:

Light enters the eye through a small hole ("the pupil") in the coloured ring, called the "iris". It then is centred by the lens to fall upon the rear wall of the eye, that is covered by light-sensitive cells (the "retina"). These cells analyse the light, and send information to the brain via the optic nerve. The brain sees this information as an image.

The iris contains muscle fibres to change the size of the pupil, in order to adapt to more or less light. The pupil becomes smaller in bright light: this is the "pupillary reflex".

The eye has an outer white wall called the "sclera". In the anterior part, where the light comes in, it is transparent. This part is called the "cornea". The sclera is again covered by a membrane, the "conjunctiva" that continues upon the inner part of the eyelids.

The eyelids are there to protect the eye. The muscle, which forms the eyelid, is named "Orbicularis Oculi". Orbicularis Oculi is a circular muscle with three different parts and functions. The part, which is attached with the eyelid, is responsible for blinking. Blinking brings the tear fluid over the cornea and keeps it clean and moist. Tear fluid is secreted from the lacrimal gland situated in the upper and outer eyelid. In the medial side of the lid margin are two small openings known as puncta. At the time of blinking tear fluid passes through this opening into a sac. This sac also has some muscle fibres from Orbicularis Oculi which pump the tear fluid from the sac down into the nasolacrimal duct.

The stronger, outer fibres of Orbicularis Oculi are attached with the orbital margin. This closes the lids firmly as in a conscious intentional blink.

The muscle "Orbicularis Oculi" may paralyse in Leprosy.

The small hairs on the edge of the eyelids are called "eyelashes", the ones above the eyes on the forehead are the "eyebrows".

Nerve damage of Hand/Feet/Eye and Relation with Leprosy

Leprosy mainly affects the Peripheral nerves, as a result we observed loss of sensation, muscle weakness/paralysis and wasting of muscles in hands, feet and eyes. Because of damage to the Ulnar nerve, we see clawing of little and ring finger and damage of muscles which causes damage of outward and inward movements of the all fingers. With damage to the Median nerve, clawing occurs in Thumb, Index and Middle fingers. With the damage both of these nerves, a person loses his/her capacity of pinching, grasping and holding. As a result, the person lost his/her capacity to maintain his/her personal life; like - to holding a glass of water properly to drink, buttoning of shirt, holding a pen to write, working with instruments in the field. In case of foot, damage to the Posterior tibial nerve causes paralysis of the intrinsic muscles of the foot leading to clawing of the toes and collapse of arches of foot and anaesthesia of plantar surfaces. As a result plantar surface become flat and changes occur in the weight bearing areas of the foot, which may lead to formation of ulcer in the plantar aspects. These will be discussed later under ulcer management part.

6. THE IMMUNE SYSTEM.

This is the defence system of the body.

The immunity are natural and acquired. As for natural ones, saliva, tear fluid, the skin etc acts as an important barrier.

Acquired immunity can work in 2 ways:

via antibodies, called **humoral immunity**

or via cells, called **cell-mediated immunity (C.M.I.)**

Antibodies are chemical substances produced against antigen (organism or other harmful substance)

Immunity in leprosy:

In general Immunity is responsible to protect our body from any harmful attack. In case of Leprosy, body immunity plays a very important role whether a person will get the disease or not. If somebody gets the disease, what will be the extend of the disease is also be determined by the body immunity.

There are two different types of the Immunity:

Humoral - Works through making antibody (Chemical substance) against the organism.

Cell Mediated Immunity (CMI) - This usually aims to kill organism. In case of Leprosy, CMI plays very important role as for disease pattern and immunological reaction during the treatment. If a person has 100% intact CMI against Leprosy, the person will not be affected by the disease, although he/she inhaled the bacilli (99% of our population have such strong immunity against Leprosy). On the other hand if someone has very little or no CMI specific to Leprosy - he/she will get generalized disease, which we called Leproamtous Leprosy. Again in Leprosy, we observed some immunological reactions (Reversal - RR and Erythema Nodosum Leprosum - ENL), both these reactions are related to the immunological reaction of the body against the Leprosy organism - which will be discussed in chapter under "Reactions in leprosy".

7. BACTERIOLOGY

7.1 Introduction and Characteristics

Bacteriology is the study of the bacteria.

We find bacteria everywhere: in soil, water, air, in the bodies of animals and plants, living and dead, in the intestines of human beings.

Bacteria multiply by cell division, they split into two.

The time which is required for one bacterium to split into two is called **generation time**. It is different for each kind of bacterium.

Certain bacteria divide every 20 to 30 minutes.

TB bacteria multiply every 15 to 20 hours.

The Leprosy-bacillus has a generation time of 10 to 14 days.

Bacteria are usually stained to make them more visible under the microscope. They are then often grouped according to how they stain. For most bacteria, the Gram stain gives the main division into **Gram-positives** (blue-black after this staining) and **Gram-negatives** (become red).

For the Leprosy and TB bacilli, this is not so important (they are Gram-positive). They are different from nearly all other families in another staining, the one of **Ziehl Neelsen**. With this staining, they appear as **acid-fast bacilli (AFB)**: the red stain, fuchsine, which was used first, is not washed out by the acid that is poured over the bacilli afterwards. This is typical for their family, the Mycobacteria (and for very few others). In medical practice, we consider AFB found in the skin as Leprosy bacilli, and those found in sputum as TB-bacilli.

All those differences in staining are caused by differences in the cell-wall of the various families. The family of the Leprosy and TB bacillus is called "**Mycobacteria**", since their cell wall contains a lot of special fat, "mycolic fat", and this makes them AFB.

Bacteria are sometimes divided in another way, according to their shape: long and slender ones are then called "bacilli", while short & rounded ones are "cocci".

Most bacteria are harmless or have a useful function, free-living in nature. Others may at times also cause disease, or they are parasites (they live at the expense of another being). But a few are always causing disease, and those are sometimes called "obligatory pathogens", which means exactly that they always cause disease in their host. Among them are the Leprosy and TB bacilli.

They are also special because they prefer to live inside cells (intracellular). The Leprosy bacillus cannot live outside a cell, even within the human body. In fact, they live inside macrophages: they are swallowed up by those, but are not easy to kill, and can even multiply inside those killer cells. In this way, they are protected from antibodies, and also from some drugs we use to kill bacilli.

Many pathogenic bacteria have a limited choice of "hosts", that means the living being which it can infect. For the Leprosy and TB bacilli, this is mainly man.

The drugs we use to kill bacteria are called "**antibiotics**". They are very important and very widely used (and misused) drugs. Nowadays, we know many different ones, although only a few are used frequently in daily practice, f.i. the group of the penicillins. Each of them has its own way of killing bacteria, and so none will kill all possible bacteria at the same time. This is why we use some antibiotics for certain diseases, others for other diseases. Very few antibiotics are active against the Mycobacteria, because of the special properties of these bacilli. Moreover, especially M. tuberculosis easily becomes "**resistant**" towards even these antibiotics. That means that at first they are being killed by them, but not all, and the survivors afterwards turn out to have become insensitive to the antibiotic. If this happens for some important antibiotics, then we may not be able anymore to cure the patient infected by such bacilli.

7.2 Lab investigation

Only Slit Skin Smears (SSS) are done routinely.

7.2.1 Slit Skin Smears

Sites:

Take at least 3 smears, two from ear lobes (right and left) and one from the edge of active skin lesion. It is more rewarding

to look for active lesions: choose the one that look most red, elevated. If possible take smear from nodules.

Frequency:

- **At Diagnosis:** For all new cases, OBS (if possible also children) and suspected relapse.
- **During CT:** Only those who had smear positive at start.

Technique:

- Record date and smear number on the bottom of the slide, and on the request form, which must have all other details, completed.
- Make the patient comfortable and explain what you are going to do.
- Clean the patient's skin at the sites you are going to smear using spirit.
- Take smears using a new blade. Make a cut 2mm deep and 5mm long.
- Scrap to collect "Tissue pulp"; not just juice.
- Spread the material on the slide, starting from the periphery to the center, making a diameter of 5-7 mm.
- Put the used blade and other possible infective waste materials (e.g. bloody cotton wool) in a container for later safe disposal - burning or burial.
- Use benzoine seal on the cut surface of the skin.

Recording and reporting of result:

- **Negative:** No AFB in 100 HPF
- **Positive:** From single to uncountable AFB expressed as 1+ to 6+.
- Record the highest BI result in patient's card and register.
- **BI:** Means bacteriological index - It indicates the total number of bacilli in a smear (dead or alive).
- **MI:** Morphological index - It is the percentage of living bacilli in a smear.

8. DIAGNOSIS OF LEPROSY

8.1 Signs/Symptoms of Leprosy

Skin manifestations:

The skin manifestation in Leprosy varies from single to uncountable lesions; the lesions are generally hypo-pigmented, but can be erythematous (red) as well depends on the individuals skin colour. The Leprosy lesions can be patch, infiltration or Nodules. The patch can be very well defined, dry with loss of hair and sensation. Patch can also be very ill defined with uncountable in number and intact sensation.

- Skin patch/patches without itching.
- Nodules in the skin of face or other body parts.
- Thickening of the skin of face or other body parts.

Neurological Manifestations:

Neurological manifestations are due to damage of nerve trunks or cutaneous nerves. These can be observed with loss of sensation in Hands, Feet or muscle wasting or with clawing.

- Loss of sensation in hands or feet.
- Painless blister or ulcer in hands or feet.
- Wasting of muscles of hands or feet.
- Clawing of fingers or toes.
- Shortening of fingers/toes/hands/feet.
- Depressed nose.
- Loss of eyebrows.
- Lagophthalmos.
- Wrist drop or foot drop.

8.2 Cardinal signs of Leprosy

Definition of Leprosy: Leprosy is a chronic, least infectious disease caused by Mycobacterium Leprae, affecting mainly the skin and peripheral nerves.

Diagnosis of leprosy can be confirmed if one or more of the cardinal signs are present.

In a few cases the diagnosis can only be possible after a smear examination. To diagnose leprosy a common procedure has to be followed to ensure that a case of leprosy is not missed. We also have to take care that people are not wrongly diagnosed as having leprosy.

Cardinal signs of leprosy:

- Hypo pigmented or erythematous skin patch(es) with impairment of sensation.
- Enlarged peripheral nerve trunk, with evidence of nerve damage (anesthesia, muscle weakness / paralysis etc.)
- Finding of Acid-Fast Bacilli (AFB) in skin smears.

Accurate and complete examination of the patient is essential in the management of leprosy and its complications.

8.3 History taking

Listen carefully to what the patient tells you. This helps you not to miss important problems and to give the best management.

After asking the Biodata of the patient (name, age, sex, occupation, address) the following history should be taken:

Present complaints:

An inquiry should be made why and how the person came to the clinic, the duration of the complaint(s), how and where it started and its evolution.

Contact History:

Leprosy is found more in families where there are cases of leprosy. The contacts are at a greater risk of getting leprosy. Ask whether any family member(s) has or had leprosy.

The person is also asked whether he ever came in contact with a known case of leprosy, outside the family, such as neighbours, colleagues etc.

Treatment history:

Whether he took any anti-leprosy treatment previously or not with duration and drugs used.

8.4 Clinical examination

During clinical examination following points have to be remembered always:

1. Explain the patient about what you are going to do.
2. Place the patient in good, natural light.
3. Examine the patient from head to foot (systematically).
4. Expose the patient as much as possible.

5. Maintain privacy of the patient.
7. The female patient should be examined by a female TLCA/CA/female staff nurse or at least a relative of the patient should be present during the examination by a male staff.

8.4.1 Examination of the skin

The inspection of the skin should be done with the clothes stripped to the extent possible, the light falling from behind the examiner.

It is essential to examine as much of the body surface as possible.

What to look at the skin: Are there Patches? Nodules? Ulcers? Infiltration? These are the possible sign of leprosy but very often are the patches.

Leprosy patches may occur on any part of the body but rare on scalp, palms, soles, axilla.

When patches are present, their number, size, distribution, colour, margin, surface, satellite lesion, central healing etc have to be assessed.

Palpate the skin with your fingers: Is there a macule/plaque, a nodule or diffuse infiltration? Is there a local cutaneous nerve?

The most common sign of leprosy is a hypopigmented (pale) or erythematous (red) patch on the skin in any part of the body.

Detail features of the patches are described below:

- **Number:** may be single, few, many or innumerable. The presence of few patches (three or less) is an indication that the disease is localized. When there are many to innumerable patches the disease is generalized.
- **Size:** The size of the patches may be small or large. Large patches appear in localized disease. Small patches are seen more often in the generalized disease.

- **Distribution:** The distribution of the patches may be symmetrical or asymmetrical. Compare both sides of the body. Symmetrical means that the patches are distributed in the same way on both sides of the body. Asymmetrical means that the distribution of the patches is not the same on both sides of the body. In the localised disease the patches are asymmetrical. In the generalised disease the patches are symmetrical.
- **Colour:** Leprosy lesions are either hypopigmented or erythematous. Leprosy patches are never depigmented(white).
- **Surface:** The surface of a leprosy lesion may be dry, rough, scaly, smooth, and shiny. Some patches may show wrinkling, which indicates a previous infiltration.
- **Infiltration:** Infiltration means thickening of the affected skin. The infiltrated skin looks shiny. Infiltration may be localized like a patch or diffuse (undefined area).
- **Margin:** The border of the patch may be well defined, ill defined (vague), or partially defined. A margin is well defined if it can be traced clearly on the skin with the pen. Is it raised?
- **Satellite lesion:** Are there satellites? Satellite lesions (also called daughter lesions) are small lesions close to a big one. If satellite lesions are present it means that the disease tends to spread.
- **Central healing:** Is there a healing center (an immune center)? A patch can start healing in the center if patient has some immunity. The colour has already come back but there is still anaesthesia. This is called a healing centre.

- **Sensory changes:** Sensory testing on the lesions has to be done by the thin points of cotton wool. Is there complete or partial loss of sensation? Test several lesions. If a lesion is large enough, test several places on it. Anaesthesia may be found only in some lesions but not in others or only in some parts of a lesion, but not in other parts. Sometimes it can be difficult to be certain whether there is anaesthesia especially if it is only slight. Be patient, repeat the test several times; compare it with the same place on the other side of the body. With young children do the test as quickly as you can so that they will remain interested and will respond well.

Note: Lesions on the face are not usually anaesthetic. Thickened scaly lesions of any skin disease and any scars will be anaesthetic when tested with cotton wool.

Other signs of leprosy, which can be detected while inspecting the skin:

- **Face:** Complete or partial loss of eyebrows, loss of eyelashes, depressed nose, lagophthalmos, swollen earlobes or face.
- **Chest:** Males may develop gynaecomastia (the development of breasts).
- **Hands and feet:** Wasting of muscles, deformed fingers or toes, ulcers or blisters, scars, absorption of digits, foot drop or wrist drop, mobile or fixed claws.

With the patients facing you, in anatomical position:

Look at the face paying special attention to the ear lobes, the nose and the eyes. Look at the chest and abdomen.

Look at the anterior aspect of the arms, forearms and palms of the hands, first right then left. Look at the anterior aspect of thigh & legs. Lift up the patient's arms and look at his sides.

Ask the patient to turn around. Look at the neck, the back, and the buttocks, the posterior aspects of arms, forearms, thighs and legs.

Ask the patient to lift his right foot and then his left foot and look at the soles of the feet. If you see lesions on the skin, never just look. Touch them. Palpation is necessary in order to evaluate the texture of the lesions, whether they are dry or infiltrated or warm etc.

8.4.2 Examination of the nerves

Once the nerve is affected by leprosy it gets enlarged (thick)-which can be recognized through palpation. However, the palpation of nerve is very subjective. Consider only definitely thick nerve as enlarged one. When there is doubt don't consider it enlarged. It is important to compare nerves on the both sides of the body. **Enlarged Nerve and associate function loss is one of the cardinal sign of leprosy.**

Both Nerve trunks and cutaneous nerves can be affected by leprosy and nerve damage usually occurs at place where the nerves lie close to the skin and pass over a bone or joint.

What can leprosy do to nerves?

1. Make nerves tender & painful.
2. Make nerves thicker than normal.
3. Damage some or all of the fibers within a nerve, causing weakness, paralysis of muscles or anesthesia and dryness of skin.

Remember all palpable nerves are not necessarily thickened nerves!!! some normal nerves are often palpable and also show some tenderness on hard pressure.

Important nerves affected in leprosy are:

- (a) **Cranial nerves:** - Trigeminal nerve (5th cranial nerve)
- Facial nerve (7th cranial nerve)
- (b) **Spinal nerves:**
Nerve trunks
 - Radial nerve
 - Ulnar nerve
 - Median nerve
 - Lateral popliteal nerve
 - Posterior tibial nerve

Cutaneous nerves

- Supra orbital nerve
- Great auricular nerve
- Radial cutaneous nerve
- Ulnar cutaneous nerve
- Superficial peroneal nerve
- Sural nerve

How to examine nerves?

1. **The Supra Orbital nerve:** Above the eyes, often palpable with patients who have lesions above or around the eye. Put both the thumbs in-between the eyebrows and move them laterally.
2. **The Great Auricular Nerve:** At the side of the neck, below the mandible. Ask the patient to turn his head and to stretch his neck. Palpate the nerve by 3 fingers from lateral to medial side of neck horizontally one by one.
3. **The Ulnar Nerve:** Above the bend of the elbow, inner side, between two bony bulges. Ask the patient to bend his arms. Feel with 3 fingers and go upwards.
4. **The Median Nerve:** Anterior side of the wrist, between the tendons. Ask the patient to hyper-extend his hand. If you look on eye height there is a depression between the muscles at the base of the palm, but if the median nerve is enlarged, the depression will disappear.
5. **The Radial Nerve:** On the upper arm, posterior aspect. Ask the patient to bend his arm. Put the anterior median side of your palm (hypothenar) on the elbow of the patient and feel with index and middle fingers on the posterior side of the arm.
6. **The Radial Cutaneous Nerve:** This is a cutaneous branch of the radial nerve, which can be palpated on the lateral aspect of the wrist. The nerve lies around the radius.
7. **The Ulnar Cutaneous Nerve:** This is a cutaneous branch of the ulnar nerve. It can be palpated on the dorsum of the hand with the thumb.
8. **The Lateral Popliteal Nerve:** Around the neck of the fibula, at the back of the knee. Ask the patient to bend his legs lightly and feel with 3 fingers.
9. **The Posterior Tibial Nerve:** At the inner side of the ankle, below and behind the anklebone. Feel with your index, middle and ring fingers.
10. **The Superficial Peroneal Nerve:** On the lower lateral aspect of the leg.

11. **The Sural Nerve:** Posterior aspect, lower third of the leg, lateral to the tendo calcaneus. Palpate with 3 or 4 fingers.

Table shows results of damage to the specific nerves:

| Nerve | Nerve Damage |
|---|---|
| Trigeminal (5 th Cranial) | Corneal anaesthesia (loss of blink reflex) anaesthesia of the face |
| Facial (7 th Cranial) | Lagophthalmos Facial paralysis (rare) |
| Ulnar | Anaesthesia of the ulnar part of the hand and clawing of 4 th & 5 th fingers |
| Median | Anaesthesia of the median part of the hand clawing of 2 nd & 3 rd fingers, paralysis of the thumb |
| Radial | Anaesthesia small area on dorsum of hand; Wrist drop |
| Lateral Popliteal | Anaesthesia dorsum of foot and outer side leg; Foot drop |
| Posterior Tibial | Anaesthesia of the sole; Clawing of the toes |

9. CLASSIFICATION OF LEPROSY

9.1 Introduction

For the purpose of treatment leprosy is classified as PB and MB. However, it is important to understand the classification in relation to immunological status of the patients for the management of complications and to understand the disease in depth. As explained in the immunology chapter, If a person has strong CMI against Leprosy, the person will not be affected by the disease or will get localized disease. On the other hand if someone has very little or no CMI specific to Leprosy - he/she will get generalized disease, which we called Leproamtous Leprosy. In between these two poles immunity varies person to person and present with different forms of leprosy based on their immunological status as explained below:

| | | |
|--|--------------------------|----|
| Natural defence (100% intact CMI) | No disease | |
| High defence | Localized disease | TT |
| Moderate defence | Disease fairly localized | BT |
| Moderate defence, but less than BT, Unstable group | Borderline | BB |
| Low Defence | Fairly widespread | BL |
| No defence | Wide spread disease | LL |

9.2 Brief clinical description of the different types

9.2.1 Indeterminate:

- One or a few vague, hypo-pigmented macules.
- Normal or slight sensory impairment.
- BI negative.

9.2.2 Tuberculoid:

- Single or few well defined lesions (1 - 3), flat or raised, hypo-pigmented or erythematous.
- Anesthesia in the lesions.
- BI negative

9.2.3 Borderline:

- Several to many lesions.
- Flat or raised, well or ill defined, hypo-pigmented or erythematous.
- Loss of sensation or impairment of sensation or normal.
- BI usually negative; some times positive.

9.2.4 Lepromatous:

- Diffuse infiltration or many flat or raised, ill defined, shiny, smooth, symmetrically distributed lesions.
- BI positive.

9.2.5 Pure Neuritic:

- Nerve involvement present but no lesions observed on the skin. (Thickened nerve trunk with associated functional impairment)
- BI usually negative.

9.3 PB / MB distinction

According to the National Programme instructions, distinction between Paucibacillary (PB) and Multibacillary (MB) is made as follows: PB or MB is dependent on the number of skin lesions, involvement of nerve trunk and the skin smear result.

| CLASSIFICATION | CRITERIA | Treatment regimen |
|--|--|----------------------|
| PB with single skin Lesion (SLPB) | Single skin lesion, No nerve involvement and Skin smear negative | -MDT-PB for 6 months |
| PB with 2-5 skin Lesions | 2-5 skin lesions, one nerve trunk involvement and Skin smear negative. | MDT-PB for 6 months. |
| MB with 6 or more skin lesions or clearly enlarged two nerve trunk | 6 or more skin lesions and /or two or more clearly enlarged nerve trunk and/or Skin smears positive. | MDT-MB for 12 months |

Please note also:

- A smear positive case is always MB irrespective of number of skin or nerve lesions.
- A relapse case should always be treated as MB and must be confirmed by MO.
- For BI results always consider the highest result, not the average.
- For skin lesions, only typical Leprosy lesions should be considered.
- MO should always verify the new cases during supervision visit to check the correctness of diagnosis & management.

10. DIFFERENTIAL DIAGNOSIS OF LEPROSY

10.1 General Principles

When in doubt about the diagnosis of Leprosy, **always search for cardinal signs**, rather than relying on the absence of some characteristics. It is often said that Leprosy patches do not itch or scale, and that they are not darker than the normal skin. This may be true very often, but there are exceptions, as in reactions.

So look for proof of Leprosy that is one of the cardinal signs:

- **Anaesthesia or hypo-aesthesia in a patch**
- **Thickened nerves with evidence of nerve damage**
- **AFB in the skin smear**

10.2 Differential Diagnosis from Skin diseases

Only some of the common skin diseases, looking most likely Leprosy, will be discussed here briefly.

Some signs, frequent in skin diseases, are unusual in Leprosy, but as stated above they occasionally do occur. However, in these cases one should first look for other skin disease:

- if the lesions are itching
- if they are scaling
- if they are hyper-pigmented
- if they are inflamed

10.2.1 Flat lesions:

(1). Birthmark:

A light-coloured patch without symptoms, in children. Ask the mother: she will say that it has been there since birth, that it does not change. Look closely: the edges are too sharp and irregular, as if drawn with a fine pencil. No treatment needed.

(2). Vitiligo and leucoderma:

Loss of pigmentation. For vitiligo it is total. For leucoderma, partial and following upon another skin disease. Lesions are too white, the edges too sharp in comparison with Leprosy. It may recover without treatment.

(3). Nutritional dyschromia:

Light colored patches, usually in children, often in the face. There are fine white scales. And may be other signs of malnutrition present: anemia, sore tongue, cracks in the corners of the mouth. Differential diagnosis with Leprosy may be difficult if there is no scaling, since loss of sensation in the face is not demonstrable in Leprosy. Look for contact-history, thick nerves...

(4). Ringworm:

Fungal infection of the skin. Patches, with inflammation, itch and scaling especially at the edge of the lesion. The center may be healing. Scrapings of scales and examining them in KOH under the microscope (x 10) must show the fungus as winding thick threads.

(5). Pityriasis versicolor:

A superficial fungal infection of the skin. Many small round patches, sometimes coming together to make up big ones. Slightly itchy and scaling. Most often in the face, neck, on the upper part of the trunk (chest, back central parts).

10.2.2 Raised lesions: papules, plaques

(6). Psoriasis:

Chronic disease characterized by sharply defined erythematous raised patches covered by white silvery scales. Bleeding point becomes visible on removal of scales. Commonly occurs on the extensor surface. Nails are involved in about 50% cases.

(7). Lupus Vulgaris (Skin TB):

Extend slowly. Ulceration or scarring in the center. More common in face.

10.2.3 Raised lesions: nodules or swellings

(8). Post Kala -a zar Dermal Leishmaniasis (PKDL):

Many small patches or nodules may appear in the face or trunk, extremities after kala azar. In face mostly on chin and around the nose while the ears are less affected. They look very much like Lepromatous Leprosy, but: skin smear for AFB is negative. Often history of Kala a zar and incomplete treatment present.

(9). Neurofibromatosis:

A disease in which tumors (fibroma's) develop in the skin and nerve-sheaths. Hereditary. These swellings occur mostly on the trunk, and have a typical distribution in down-going lines from the center. The nodules have a too narrow base compared

with Leprosy. There may also be flat, brown patches. In some cases, the nerves are enlarged: refer those to the doctor.

NEGATIVE SKINSMEAR FOR AFB = IMPOSSIBLE IN REAL LEPROSY NODULE

10.3 Differential Diagnosis from other Diseases

10.3.1 Diabetic foot-ulcers:

There is loss of tendon-reflexes, and urine and blood glucose are abnormal

10.3.2 Büergers disease:

Narrowing of peripheral arteries leading to death of the body-part (gangrene). There is loss of distal arterial pulse. The tissue-death is not according to innervation areas but too bloodflow.

11. TREATMENT OF LEPROSY

11.1 MDT

Dosage will be according to age groups (see table in annex)). MB patients will receive 12 pulses of 4 weeks and PB patients 6 pulses of 4 weeks. Treatment can be started without waiting for the skin smear result. If later reported positive, the MDT will be changed accordingly.

MB-cases with DDS or Lamprene (clofazimine) intolerance will be given no alternative drugs. The non-tolerated drug will be omitted. **In PB, DDS will be replaced by Clofazimin; the monthly supervised and daily doses will be same as MB doses with out DDS for rest of the months.** Patients not tolerating Rifampicin (PB or MB) will be given daily Clof. 50 mg + Ofloxacin 400 mg + Minocycline 100 mg for the first 6 months. To be continued by 18 months of Clofazimin + either Ofloxacin or Minocycline.

11.2 When to stop MDT?

- **Jaundice:** Stop MDT (or do not start it) and refer to MO
- **DDS Allergy:** This can be very serious, and usually occurs 4-8 weeks after starting MDT. Patients usually complain of a widespread itchy rash , fever and sometimes jaundice . If

the patient has a known allergy to sulphur drugs do not start DDS. If you suspect DDS allergy, **stop MDT immediately** and refer the patient to the MO urgently. Hospital admission is usually required. In severe case start dose of 40 mg Prednisolone, it should be given before referring to Hospital. **If DDS allergy is confirmed the patient must never get DDS** (or any other sulphur drugs) **again**.

It should be noted in the patient card, and any referral slip must be clearly marked "**DDS Allergy**", and the patient must understand this . Give a written card stating this for the patient to take home.

● **Anaemia** : *If anaemia is severe , stop MDT* (or do not start it) and refer to MO . Some signs of severe anaemia are: extremely pale, shortness of breath, faster heart rate (>100 beats/min), swollen feet etc.

11.3 Anti Leprosy Drugs - Individual Description

11.3.1 Dapsone:

Is safe and cheap drug. It is bacteriostatic against *M. leprae*. Available as 100mg tab. Dapsone is rapidly and completely absorbed when taken orally.

Side effects: Hemolytic anemia. Fixed drug eruption, exfoliative dermatitis, Psychosis, hepatitis etc.

11.3.2 Rifampicin:

Rifampicin is the most powerful drug known for killing *M. leprae*. An infectious adult patient become non infectious just a few days after taking 600mg of Rifampicin. The drug is available in 450, 300 and 150 mg capsules.

Side Effects: Red urine, Hepatotoxicity - Hepatitis (anorexia, nausea, vomiting and jaundice).

Flu-like syndrome (fever, headache, muscle pain),

Collapse: With in few hours of taking Rifampicin, is rare but very serious. The patient who faints and recovers never give Rifampicin again, he may die.

Purpura - Red patches due to minute bleeding under the skin.

Reduces the effectiveness of oral contraceptives and steroids.

11.3.3 Clofazamine:

Besides killing *M. Leprae* it also work as anti-inflammatory. Available as 50 & 100 mg capsules.

Side effects: Abdominal complaints: Abdominal pain and nausea. It is helpful to give the drugs with food.

Colouring: Body fluids and skin gets colour from the drugs. The colouring of the skin disappear within six months after stopping treatment. Dry skin because of diminished sweating.

TABLE: Leprosy Treatment Regimen

| TYPE | AGE GROUP | MONTHLY SUPERVISED DOSES | DAILY ADMINISTERED DOSES | SELF ADMINISTERED DOSES |
|--|---------------------|--|---|-------------------------|
| PB with 1 - 5 skin Lesions (Duration 6 month) | Adult >14 Years | Rifampicin 600 mg Dapsone 100 mg. (Once in 28 Days) | Dapsone 100 mg. (Daily) | |
| | Child 10 - 14 Years | Rifampicin 450 mg Dapsone 50 mg. (Once in 28 Days) | Dapsone 50 mg. (Daily) | |
| | Child 5 - 9 Years | Rifampicin 300 mg Dapsone 25 mg. (Once in 28 Days) | Dapsone 25 mg. (Daily) | |
| MB 6 or more skin lesions or SSS +ve (Duration 12 month) | Adult >14 Years | Rifampicin 600 mg Clofazimine 300 mg. Dapsone 100 mg. (Once in 28 Days) | Clofazimine 50 mg. Dapsone 100 mg. (Daily) | |
| | Child 10 - 14 Years | Rifampicin 450 mg Clofazimine 150 mg. Dapsone 50 mg. (Once in 28 Days) | Clofazimine 50 mg. (Alternate Day) Dapsone 50 mg. (Daily) | |
| | Child 5 - 9 Years | Rifampicin 300 mg Clofazimine 100 mg. Dapsone 25 mg. (Once in 28 Days) | Clofazimine 50 mg. (Twice per week) Dapsone 25 mg. (Daily) | |

Note: Monthly Supervised doses mean that the patients are supposed to swallow the drugs in front of TLCAs / ATLCA's.

12. REACTION IN LEPROSY

12.1 Introduction

Reactions in leprosy are due to immunological activities of the body against M. Leprae. In the Tuberculoid pole of the disease (BT, BB and some case of BL) the reaction is due to the acute exacerbation of the CMI against leprosy bacilli. However, in the lepromatous pole (LL and BL) this reaction is due to antigen antibody reaction.

About 25-30 percent of all people with leprosy experience reactions or nerve damage. The reaction can occur before treatment, during treatment and even after treatment has been completed. A patient can also present with reaction at diagnosis.

Most reactions occur during the first year after diagnosis. In people with MB leprosy, reactions may continue for several years after the end of treatment.

There are two types of reactions:

Type I Reaction = Reversal Reaction. (RR)

Type II Reaction = ENL Reaction. (Erythema Nodosum Leprosum)

12.2 Reversal Reaction - Type I Reaction (RR)

They are caused by the increased activity of the body's immune system (CMI) in fighting the Leprosy bacillus. This leads to inflammation wherever there are leprosy bacilli in the body, mainly in the skin and nerves.

Type I reaction is usually seen in BT, BB and in some BL cases- (immunologically unstable type of leprosy cases). The polar forms (TT & LL) are immunologically stable, so RR does not occur in these types.

12.2.1 When do Type 1 reactions occur?

The most common time is *just after starting treatment*. Some people experience a Type 1 reaction *before starting treatment*. The reaction is often the first sign of the disease and is the reason why the person looks for help.

A few patients get reactions later in the course of their treatment, or even after the treatment has been successfully completed.

Reactions occurring after treatment are sometimes mistaken for a leprosy relapse.

12.2.2 Signs of a reaction:

In the skin - inflamed skin patches- The most common clinical feature of a Type 1 reaction is inflammation in the skin lesions, with swelling, redness and warmth.

- In addition to the existing inflamed patches new patches may appear or existing patches may enlarge.

- The patches may ulcerate.

- Edema of the face, hands and feet may also occur.

12.2.3 In the Nerves- inflamed nerve (Neuritis)

Acute neuritis is characterized by severe pain and tenderness with enlargement of the nerve trunk affected. There is shooting pain down the course of the nerve and in the area supplied by the nerve.

Within the nerves there is oedema, infiltration of lymphocytes and these cause pressure on the nerve fibres leading to anaesthesia, muscle weakness and paralysis.

Acute neuritis is a medical emergency and the patient has to be treated immediately. If not, nerve damage may become permanent.

New nerve damage may occur without obvious symptoms, so you must search carefully for it each time you see a leprosy patient in the clinic. Test the sensation and muscle strength of each patient, at each routine visit.

Compare the results of the nerve examination you are doing now with the examination carried out one month or three months ago, as recorded on the QMT/ST form.

There is new nerve damage if:

- There are places on hands or feet where the patient could feel before but cannot feel now (sensory loss).
- Any muscle has lost strength compared with the previous examination (motor loss).
- Any nerve has become obviously enlarged, more painful or tender to touch.

Any new sensory loss or motor loss means that the nerves are being affected by a reaction. Even if there is no pain in the nerve, urgent treatment is needed to restore the lost sensory or motor function.

12.3 Erythema Nodosum Leprosum (ENL)- Type II Reaction

They occur when large numbers of leprosy bacilli are killed and gradually decompose. Proteins from the dead bacilli provoke an allergic reaction. Since these proteins are present in the bloodstream, a Type 2 reaction will involve the whole body, causing generalized symptoms.

ENL is a chronic disease that can persist for several years, getting better or worse from time to time. Without treatment, a person with the disease would feel very ill much of the time and could even die. Other organs besides the skin and nerves may be involved, such as the eyes, joints, testes and kidneys, Lymphnodes and all these could be permanently damaged if the person is not treated.

Precipitating factors of ENL are:

- Mental or physical stress,
- Pregnancy,
- Underlying infections (worms, TB),
- The anti-leprosy treatment itself.

Who is likely to get a Type 2 reaction?

ENL occurs in LL cases and is sometimes seen in BL cases.

Clinical features of ENL (Type 2 reaction): ENL is characterized by appearance of erythematous nodules together with fever, headache and malaise.

These are nodules under the skin: if you palpate them, it feels as if there is a small coin under the surface. There is also inflammation, so that the nodules are painful and red. These nodules may be few or many in number, and can occur on the legs and arms, and less frequently on the trunk. They are not associated with the leprosy skin lesions. Tenderness of the nodules is an important clinical sign of ENL.

Is the reaction mild or severe?

- Mild reactions occur in the skin only; there may be mild fever and slight swelling (oedema) of the limbs.
- Severe reactions affect the nerves and other organs like eyes, joint, lymph node etc

Consider the reaction as severe if any one of the following is present:

- Pain or tenderness in the nerves, new NFI (weakness or anaesthesia).
- Ulceration in the skin patch or ENL nodule.
- General symptoms - High fever, malaise etc.
- Signs of inflammation in the eye (Iridocyclitis).
- RR in the skin lesion on face (facial RR).
- RR in a skin lesion over nerve trunk.
- Severe oedema (swelling) of the limbs.
- Involvement of other organs, such as testes, lymph nodes or joints.

| | Mild ENL: | Severe ENL: |
|--------|------------------|----------------------------|
| Fever: | Slight fever. | High fever, the patient if |

| | | |
|------------------------|--------------------------------------|---|
| | | feeling very ill. |
| Skin lesions: | A few new nodules which are painful. | Many new nodules which are very painful. They appear on the face, forearms, legs, thighs and back. |
| Ulceration of nodules: | No. | Possible. |
| Other complications: | None. | <p>Neuritis: The nerve may be swollen, painful and tender. Nerve damage is slow.</p> <p>Iridocyclitis: Patient has severe pain in his eye , he cannot open it, he has headache.</p> <p>Enlargement of lymph nodes.</p> <p>Arthritis: inflammation of the joints.</p> <p>Oedema: on hands and feet.</p> <p>Orchitis: painful swelling of the testes.</p> |

Patient education:

Patients should be informed about the signs of possible ENL and they should know that they have to go on with taking treatment.

12.4 Management of RR and ENL

12.4.1 Reaction-treatment in the field

In DF-projects, reactions preferably are treated in the field by means of a standard prednisolone course that is given by TLCAs under the guidance of MO UHC.

If the reaction is mild as determined by thorough examination including QMT/ST (i.e. only the skin is involved), the TLCA will give **aspirin 2 tabs Three times per day (TDS) with antacids for two weeks.**

If the reaction is more severe (as per criteria above), or mild reaction does not respond after 2 weeks with aspirin, prednisolone course can be given as above. When a complicated

or recurrent reaction in a leprosy patient is suspected, refer him to doctor or hospital.

12.4.2 Patient hospitalization

Patient with following criteria should be hospitalized:

- Very severe general symptoms (fever, sickness, ulcerations)
- Child or patient < 20 kg,
- Pregnant woman
- Cases with recurrent reactions.

TLCA will give the drugs (prednisolone) to the patient (attends every 2 weeks), and do QMT/ST each time. ***Before issuing more prednisolone, he must ask the patient for possible side-effects (as listed on the form).***

Patients going acutely worse during the course (for side-effects or reaction itself) must be referred to hospital immediately, by TLCA. Patients 1 week late for their drugs must be visited at home immediately, and got back to treatment.

Refer to doctor in case of side-effects: severe headache, stomach pains, vomiting blood, excessive thirst or passing urine, fits, general weakness

12.4.3 Treatment with prednisolone

Prednisolone reduces the inflammation in the nerves. It begins to take effect after one to two weeks, reducing nerve pain and enabling some recovery of function. However, to obtain maximum benefit and to prevent the inflammation from returning, the person should take a full course of prednisolone.

Prednisolone is a very effective drug, but it can cause serious side effects, including some that are potentially fatal. Prescribing and monitoring prednisolone must always be done with great care.

Patients in need of Prednisolone having the following conditions should be referred to MO or hospital:

Pregnancy

Refer women who are pregnant; to avoid harming the foetus, prednisolone is given in lower doses during pregnancy.

Children

Refer everyone under the age of 12 years; to minimize the effect of steroids on their growth.

Diabetes

Steroids also make diabetes worse. You should suspect diabetes in anyone who shows symptoms of excessive urination and extreme thirst, usually accompanied by tiredness and lethargy, over a period of a few days to a few weeks. Before giving them steroids, refer people with such symptoms for diagnosis and treatment.

Eye involvement

People who have pain and redness in the eyes, should also be referred to exclude corneal ulcer.

Ulcers or osteomyelitis

People who have deep or dirty ulcers or osteomyelitis should also be referred to hospital.

Instruction to patients with steroid

Tell everyone receiving steroids that the drugs may have side effects, and advise them to report any unusual symptoms as soon as possible, so that further complications can be prevented.

Common conditions requiring treatment when steroids are given

- **De-warm** your patient by giving a single dose of Alben 400 mg
- **Diarrhoea, with blood and/or mucus**

Refer patient to UHC doctor

- **Fungal infections**

Fungal infections such as Tinea corporis are common and may be worsen by steroid treatment. Refer patient to UHC doctor

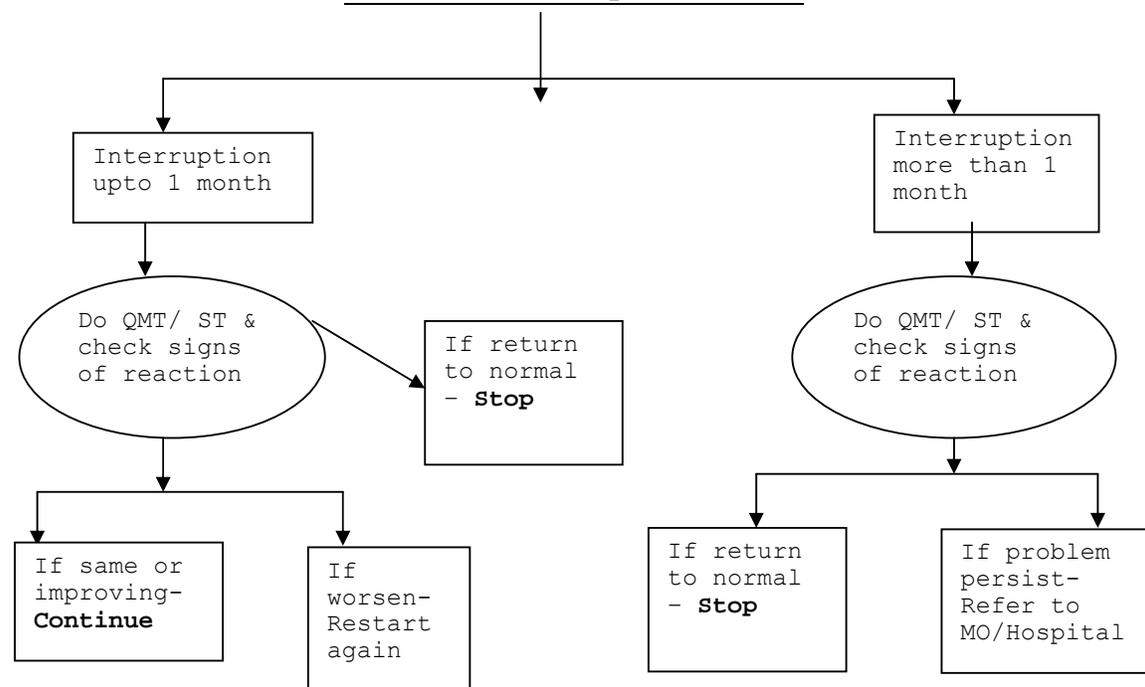
12.4.4 Contraindications of prednisolone

- Active peptic ulcer,
- Corneal ulcer

- ❑ Diabetes,
- ❑ Hypertension,
- ❑ Infected ulcer,
- ❑ Tuberculosis,
- ❑ Pregnancy and
- ❑ Children less than 12 years old

Note: Start Prednisolone when at least 2 new points are anesthetic, If only one point is anesthetic with or without resistance reduced (R) of muscle power keep the patient under observation and check QMT/ST two weekly to confirm whether it was due to true neuritis or not.

Steroid interruption table



Note: Patient under steroid must be visited with in 1 week of absentee.

13. LEPROSY AND OTHER COMPLICATIONS

13.1 Leprosy and Pregnancy:

The pregnant women / mothers can safely take all the drugs used in leprosy treatment.

Women with Leprosy, particularly MB leprosy, tend to develop reaction and neuritis during pregnancy, and for several months after delivery. They should be warned of the risk, and to be advised for check-up if they develop new problem.

The new baby will not get leprosy from his mother if she has been taken correct treatment regularly.

13.2 Leprosy with Hepatitis:

Rifampicin and Dapsone both are toxic for liver. So, if you suspect hepatitis stop treatment and treat for hepatitis (**refer to DF doctor**). After subsiding jaundice start treatment again and keep him under observation.

13.3 Leprosy with TB:

Sometimes you may see a case that has been suffering from both TB and Leprosy. In such cases refer the patient to DF doctor for management.

13.4 Leprosy and anaemia:

Dapsone may sometime cause haemolytic anaemia. If a patient has anaemia from other cause, dapsone may make it more severe. Mild anaemia. Give anti helminthic, and Iron tablets for at least 1 month. Ask to take more vegetables.

Severe anaemia. This is not common. Severe anaemia is usually shown by very pale skin and conjunctivae, severe weakness, and rapid pulse (>100) with or without palpitations. **Stop MDT (or do not start it) and refer to MO.**

14. EYE PROBLEMS

TLCA will examine eyes as a routine, by inspection using a pen-light, and by means of the eye-closure test.

14.1 Eye problems and management:

14.1.1 Lagophthalmos :

Inability to close the eyelids (gentle closure) is known as Lagophthalmos.

This is a very common condition in Borderline cases where peripheral nerve paralysis is common.

A Leprosy lesion on the skin around the eyelids often lead to Lagophthalmos because the facial nerve is very superficial in this region.

Lagophthalmos can be unilateral or bilateral.

Because the patient does not blink properly, the tear film is not smeared normally over the eye. As a result the lower part of the cornea remains dry and may show opacity (Exposure Keratitis).

Opacity of the lower part of the cornea may slowly spread upwards to the pupil area producing partial or complete blindness.

There is lack of protection of the eye by normal lid closure and corneal ulcers are common in unprotected eyes.

In an advanced stage there is redness of the lower conjunctiva.

Tears roll down the cheeks.

Treatment of Lagophthalmos :

The cornea must be kept moist.

This can be done by putting moistening drops in the eye e.g. liquid paraffin / Artificial tear fluid.

During the day sunglasses should be used to protect the eyes.

While sleeping the patients should protect his eyes with a clean cloth.

The patient need to be educated to do active blinking exercises.

A patient with early lagophthalmos or new weakness of the eyelids (<6 months) start immediately a course of prednisolone. In case of deterioration patient should be referred to the hospital.

The first complaint of a patient with a beginning lagophthalmos is that his eyes are burning and watering. Do listen to what the patients are telling you & note his complaints in his treatment card.

14.1.2 The red eye.

A leprosy patient with a red eye can become blind and he/ she must be referred to the hospital immediately.

A red eye can be caused by:

a. Conjunctivitis :

This is an inflammation of the conjunctiva. It is not dangerous, but it is often difficult to distinguish from other complications. It can be unilateral or bilateral.

Signs and symptoms:

- Red eye
- Pain, as if there is sand in the eye
- Watering of the eye
- Pus discharge

b. Iridocyclitis :

Inflammation of the iris and the ciliary body is known as iridocyclitis.

It occurs in the lepromatous spectrum of the disease, especially during ENL. It can be unilateral or bilateral.

Signs and symptoms:

- Photophobia
- Pain in the eye
- Watering of the eye
- Redness around the cornea
- small pupil & irregular
- diminished sight

c. Scleritis :

Inflammation of the sclera is known as scleritis.

It occurs in the lepromatous spectrum.

The sclera is red and the patient has pain in the eye.

d. Corneal ulcer :

Ulcer on the cornea and it can lead quickly to blindness. Patients with lagophthalmos or corneal anaesthesia are more vulnerable to get corneal ulcers.

Signs and symptoms of a corneal ulcer:

- photophobia
- pain
- watering of the eye
- redness
- constricted pupil
- sloughs over the cornea / Opacity
- diminished sight
- sometimes pus discharge

Prevention of blindness in leprosy patients is an important aspect of rehabilitation and treatment.

When these patients have lost the sensation of touch on their hands and feet, which also may be, deformed severely, blindness adds an almost intolerable burden.

Periodic examination of the eyes is important to detect early eye problems.

Patients must learn to care for their eyes. They must look into a mirror to detect redness of the eyes.

Active blinking exercise must become a part of their habit if lagophthalmos is present.

Eyes must be protected from injuries by using protective glasses.

Patients should be taught to come to the clinic if there is any problem.

People with weakness of eye closure muscles, can easily damage the front of the eye. This can be prevented to some extent by wearing glasses and by using eye drops to prevent drying. At night, the eyes can be covered with a cloth or bandage, to keep them closed.

Note: Corneal ulcer and Iridocyclitis cases should be referred to Hospital immediately.

15. QUICK MUSCLE TEST (QMT) AND SENSORY TEST (ST)

15.1 Introduction

Tests for nerve function in hands, feet and eyes, they are most useful to detect early signs of reaction. In DF-projects, **these tests must be done quarterly as a routine for PB cases & monthly for MB cases**, but also any time the patient complains about new functional loss or if there is suspicion of reaction. For sensitivity 1st in hands and feet, a ball pen-point may be used.

15.2 Key facts:

1. Nerve function impairment (NFI) in leprosy is the main cause of deformity, disability and stigma in leprosy.
2. NFI in leprosy usually improves with early treatment, if it is given within 6 months of onset of the NFI.
3. NFI due to leprosy is more common in MB cases, in those who already have NFI, and those with enlarged nerves.
4. New NFI develops ` in over 60% of cases.
5. A few people have many recurrences of NFI.
6. Main treatments are Prednisolone, rest in the acute stage, specific exercises, and occasionally surgery.

15.3 Risk Groups:

1. MB cases with known old NFI at diagnosis are at **high risk** of further NFI. (65% risk over 2 years)
2. MB cases with no NFI and PB cases with old NFI at diagnosis are at **medium risk** of further NFI (up to 16% risk over 2 years)
3. PB cases with no prior NFI but having enlarged nerves are at **low risk** of further NFI (2% risk over 2 years)

4. PB cases with no known NFI at diagnosis, and no enlarged nerves are **at very low risk** of NFI. (<1% risk over 2 years)

In DF projects all MB cases are defined as high-risk group, QMT/ST will be done for such cases monthly during the course of treatment.

15.4 Aim of QMT/ST

- To detect early/silent neuritis.
- To monitor nerve function and to help for the modification of doses of steroid.
- To design appropriate care for individual patients.

15.5 Time schedule of QMT/ST

- At the time of Diagnosis and CT
- Monthly for UT MB patients
- Quarterly for UT PB patients
- During the start of Prednisolone and in each visit with change of doses.
- Any time patients complain signs/ symptoms related to nerve functions impairment.

15.6 How to do QMT /ST

- Explain to the patient WHAT you are going to do, WHY and HOW.
- Patient & examiner both should be physically & mentally relaxed

15.6.1 To test the sensation (ST):

- Test 10 points in hand and 10 points in foot (see QMT/ST form)
- Ask patient to close his eyes during the test
- Use ball pen point to test the sensation

- Give pressure at right angle to make a small dimple on the tested point
- Use √ for normal sensation, × for loss of sensation

DF does not recommend field staffs to check corneal sensation, however we recommend to check blink reflex.

15.6.2 How to check blink reflex:

This should be done without any prior information to the patient that you are checking his blinking (movement of the eye lids). If the patient blinks less than 5 times a minute, then he may have loss of sensation of the cornea. Teach him self-care and give him sunglasses to wear. If he has problem of blinking within 6 months, treat him with steroids. If the sensation normal (N) or impaired/ absent (A).

Note: We recommend to do QMT/ST as a first test before BC and skin smear. It was observed that correct result could be obtained by doing so.

15.6.3 Key for QMT

N = Normal (Full range of movement and resist full pressure)

R = Resistance reduced (Full range of movement and resist less pressure)

W = Weak (Full range of movement but resist no pressure)

M = Movement reduced (Partial movement only)

P = Paralyzed (No movement at all)

| | N | R | W | M | P |
|-------------------|-------------|----------------|-------------|----------------|-----------|
| Movement | Full | Full | Full | Reduced | No |
| Resistance | Full | reduced | No | No | No |

15.6.4 How to test the muscle strength:

| Nerve | Function | Test |
|--------------|-------------------------------------|--|
| Facial Nerve | Eye closure (Gentle & Strong) | Ask the patient to close his eyes gently as in sleep. If there is gap (>2mm) between two |

| | | |
|-------------------------|-------------------|---|
| | | eyelids, measure the gap. If no gap, ask for strong eye closure & try to open the eye by pressing over both upper & lower eyelids. Use 3 Keys = N, W, P |
| Ulnar nerve | Little finger out | Ask the patient to spread his fingers out. If movement OK, give pressure on medial side of 1st part (proximal phalanx) of little finger. |
| Median nerve | Thumb up | Ask patient to lift his thumb If movement OK, give pressure on palmer side of 1 st part (proximal phalanx) of the thumb. |
| Radial nerve | Wrist up | Ask the patient to make his wrist up. If movement OK, Press over dorsum of the hand. |
| Lateral Popliteal nerve | Foot up | Ask the patient to make his foot up. If OK, Press over the dorsum of the foot. |

15.6.5 Exercise:

01. Active exercise for Ulnar muscle weakness:

- A) With the Hand supported dorsum up, abduct and adduct the fingers.
- B) Support the elbow on a firm surface with the forearm upright. Keep the wrist straight and MP Joints bent at 90°, bent and straighten the MP joints of the fingers.

02. Active exercise for Median muscle weakness:

With the Hand supported Palm up and the Thumb resting on the Palm inline with the index finger, lift the Thumb straight up from the Palm, take it across to touch the base of the little finger. Lift it straight up again and rest it down on the Palm in the straight position

03. Passive exercise for Ulnar and Median muscle paralysis:

- A) Rub any Lubricate oil over both side of the Hand. Lay one hand with the Palm facing onward on a soft surface, place other

hand on the top at right angle. Bring the top hand along the underneath hand from wrist to the tip of the fingers with the Ulnar border leading. Give gentle pressure straighten the fingers.

Repeat this ten times.

Bring the affected Thumb across the hand towards little finger using other hand. Repeat it for ten times.

B) With the MCP joint bent at 90° supported on a soft surface and the wrist straight, bent and straighten the IP joints of the fingers. Repeat this ten times.

C) Put the affected hand under buttock keeping finger straight, extend the wrist and release. Repeat this ten times.

04. Active exercise for Radial muscle weakness (Wrist drop):

Support the forearm with the hand-hanging Palm down. Lift the hand up at the wrist joint, hold it fully extended for a short time then slowly lower it down again. Repeat for ten times.

05. Passive exercise for Wrist drop:

Support the affected hand with the other hand, do extension of the wrist joint and then flexion. Repeat ten times.

06. Active exercise for Lateral Popliteal muscle weakness (Foot drop)

Sit with affected leg crossed over other leg, so that the weak foot is hanging free from the ground. Lift the foot up at the ankle joint, hold it up for a short time then slowly lower it down again. Repeat ten times.

07. Passive exercise for Foot drop:

Pull the affected forefoot with cloths at the ankle joint, hold it for a short time and then relax it slowly. Repeat ten times with a short rest at each time.

08. Active exercise for Eye muscle weakness (Lagophthalmos):

Close the eyes strongly for a short time then relax slowly. Repeat ten times with a short rest at each time.

09. Passive exercise for eye muscle paralysis (Lagophthalmos):

Using palm of the hand, bring the hand from lower lid to lateral side of forehead. Repeat ten times with a short rest at each time.

15.6.6 Record keeping :

Write any abnormality with RED PEN.

Write number of normal points out of 10 (ST).

Please write a clinical note for any abnormality, duration of abnormality & management given for that abnormality.

16. ULCER AND DISABILITY GRADING

16.1 Causes of Ulcer:

The ulcer is one of the major problems in Leprosy. Most of the ulcers occur on the planter and palmer aspect of feet and hands. The two most important causes of ulcer formation are:

- 1. Repeated trauma:** In fact when a normal person walking or standing long time he changes his posture frequently because of the presence of pain sensation in his feet. But in case of leprosy where there are anesthetic feet patient can't feel pain. He continue to walk or stand in the same posture, as a result the internal tissues close to the bone get injured what we can see as a red warm area or as a form of blister under the skin of planter surface. If the patient are not aware of this damage he continue to walk or stand in the same posture, the internal damage increases and ultimately the blister or warm area ruptured. We identify as ulcer. But you can see that before developing an open ulcer there was a hidden ulcer under the skin of the planter surface. If the patient would took right care for the hidden ulcer he would not develop this open ulcer. So, it is very important to make patient understand how does ulcer formed in his foot, what he could do to prevent his ulcer.
- 2. Direct Injury:** Penetrating objects and burns are example of direct trauma. This is why patient need to wear shoes

specially made for anesthetic feet to prevent direct penetrating injury.

16.2 Site of Ulcer:

75% ulcers occur on the planter aspect of fore foot, 13% on the heel and 12% on the lateral side of the foot.

16.3 Management of ulcer:

It is very important to know how does this ulcer formed. Talk with the patient to find out the exact reason of his ulcer. This is very important to educate the patient to prevent further ulcer.

Main aim is to prevention of ulcer. What we can do to prevent ulcer ?

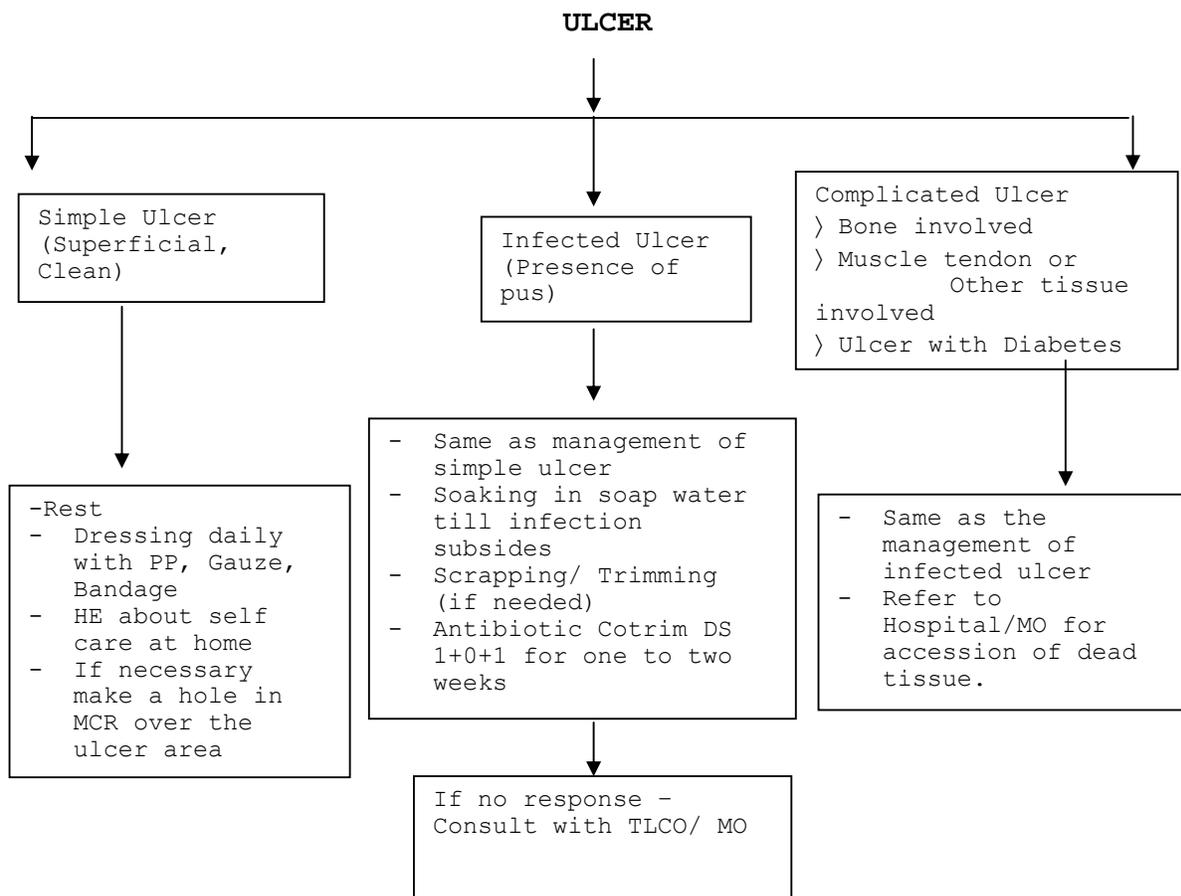
- Emphasize on "**SELF CARE**"

Upon arrival to the clinics check about self-care, shoes and possible barriers. Look to the solutions together. Teach patient how to do dressing. Do trimming if there is hard callous. Give antibiotic (**COTRIM for ONE to TWO WEEKS**) if the ulcer is infected. Refer to hospital if the ulcer is complicated (involvement of bone, joints and other deeper structures).

- Encourage patients who are taking good care. If possible try to invite such patients to educate other patients who have been suffering from same problem.

Algorithm for the management of ulcer

(Use sterile probe to check all types of ulcer)



Note: Patient with ulcer should not leave clinic without dressing.

Use probe to check all type of ulcers

Factors delaying and preventing healing of ulcer:

1. Infection
2. Lack of rest
3. Foreign body/ sequestrum
4. Poor blood circulation
5. Hard callous around the ulcer.

Care of insensitive hands and feet

You should advise on the care of insensitive hands and feet. People should check their hands and feet for damage every day and then soak them in water. They should then rub oil into the skin to prevent it from drying out; the loss of sensation and loss of sweating associated with leprosy make the skin prone to damage. You should also advise people on how to reduce the risk of damage when, for example, cooking or using tools.

16.4 Disability grading:

Nothing higher than wrists and ankles will be included for this. Only ventral side will be tested.

Hands, Feet and Eye:

- **Grade 0:** No feature of nerve damage present.
- **Grade 1:** nerve damage present e.g. anesthesia, muscle weakness, but no visible deformity or damage.
- **Grade 2:** visible deformity or damage present e.g. ulcer, claw hand, drop foot, lagophthalmos, iridocyclitis, corneal opacities.

Note that each hand, foot, and eye is graded separately.

Must be done for all at start and at end of MDT, and recorded on the treatment card as 0, 1, or 2 per foot, hand and eye.

17. FOOTWEAR

People with loss of sensation in their feet must wear protective footwear; suitable examples are often available locally. The footwear should be secure and protect the foot - there should be no seams or buckles that rub the skin. People must check their feet regularly for damage.

If a person detects a new injury (it may be a blister or a small wound), they can stop it getting worse by resting the affected limb for some days, allowing the damage to heal by itself. They should also return to the clinic for advice.

18. GUIDELINES for POD DAY:

Objective:

- To improve the self care of patients.

- To update the knowledge and skills of health workers to prevent deformity and disability due to Leprosy.

Activities:

- Pre - POD visit by HPT (One month in advance of POD day)
 1. To maintain updated POD list.
 2. To plan all POD listed patients are invited.
 3. To ensure the adequate materials / instruments stock for POD day (PP, Gauze, Bandage, Vaseline, Sunglass, Eye shield, MCR Sandal, Artificial tear etc.)
 4. Cross check the list and available materials.
 5. Reminder to TLCAs concerning POD day.
 6. Prioritize the patients who need to be invited.
 7. To discuss with TLCAs / TLCOs regarding patients' management (QMT / ST, exercise, HE, Ulcer care etc.)
 8. Discuss about CBR / VT.
 9. Calculate percentage of patients receive shoes, among those who are need of shoes.
 10. Update list of patients who can be benefited with reconstructive surgery.

- On POD day;
 1. To divide the patients in groups for proper / quick management.
 2. Patient to patient education.
 3. General counseling on self care (showing visual aid)
 4. Individual patient management.
 5. To observe and practice exercises.
 6. To ensure proper shoe supply.
 7. To supply self care kit (Gauze, Bandage, Iodine cream, Vaseline, Scraper etc.)
 8. Refer patients - if necessary.
 9. Overall review of the clinic staff.

- Additional supportive materials
 - Eye shield, Sun glass, Artificial tear fluid, functional aids etc.

- Team
 - Doctor, Physio, TLCO, TLCA, CA
- Suggestsions:
 - Among 4 visits of MOs per clinic per year; one visit should be focused on Leprosy POD and other related issues.
 - Participation of HPT should be ensured to TLCO meeting.
 - Quarterly POD day for SK (MTLCP), SP (TTLCP), DOTS Corner (RTLCP) and NW (RTLCP) due to huge number of patients under POD.
 - Car with supportive materials.
 - Box with necessary materials: Surgical instruments several sets, Antibiotics, Bowls (ten pcs), Liquid soap, enough gauze and bandage, Microspore, Footrest, Anti scabies and steroid cream / ointment, anti fungal, Gloves (10 pcs), plastic chair 95 pcs) etc.

19. SURGERY IN LEPROSY

19.1 Introduction

Leprosy would not be considered as a serious public health problem if there was no nerve damage involved. Due to damage of different peripheral nerves, different deformities are seen in hands, feet and eyes. Leprosy patients do not have deformities in the early stage of the disease. So, early diagnosis and treatment can prevent deformity and disability. On the other hand deformities and disabilities can be cured if action is taken at an early stage of the nerve damage. In fact due to missing the patient on this two points (early diagnosis and early detection of nerve damage) a good number of them end up with permanent deformities and disabilities. Some of those patients can get help from **reconstructive surgery**.

19.2 Main deformities correctable by tendon transfer

- Claw hand (4 fingers)
- Claw thumb
- Foot drop

- Wrist drop
- Lagophthalmos

The main idea is to restore the main function of hands, feet and eyes (orbicularis oculi) by replacing the paralysed muscle by an active muscle.

E.g. In case of foot drop the patient can not elevate his foot. Foot elevation is mainly done by a muscle named Tibialis anterior. If this muscle is paralysed due to damage of the Lateral Popliteal nerve, another muscle named Tibialis posterior is transferred to do the function of Tibialis anterior.

19.3 Criteria for selection of patients for reconstructive surgery

All patients who have deformities are not suitable for reconstructive surgery. Patients who fulfil the following criteria can be selected for surgery:

- Indication that surgery will benefit the patient according to his/her felt needs-appearance, function, social acceptance.
- Motivated patient (compliant, give consent knowing everything)
- Patient between 12 and 60 years of age
- At least six months after commencement of MDT
- No reaction or neuritis within the last three months
- No change in nerve function within the last three months
- No steroids taken within the last three months
- Duration of deformity (muscle paralysis) at least one year for feet and six months for hands and eyes
- No or minimal joint contracture / stiffness
- No ulcers or other inter-current infection

Surgery is also often needed for complicated ulcers of feet and hands. This is called "**septic surgery**". In general, the dead bone and other tissues will be removed. If damage is too extensive, amputation may be the only solution left.

20. INDICATION FOR HOSPITALIZATION

1. In case of Reaction and Neuritis:

- No response or worsen after standard course of steroid.
- Recurrence of RR/Neuritis
- Reaction/neuritis associated with
 - Diabetes Mellitus
 - Duodenal Ulcer
 - Hypertension
 - Jaundice
 - Severe anemia
 - Other organ involvement e.g., eye, testis etc.
 - Child less than 12 years old
 - Pregnant women

2. Complicated ulcer where surgical intervention is required:

- Complicated ulcer with bone/ joint and tendon involvement

3. Eye complications: (Red painful eye)

- iridocyclitis
- corneal ulcer

4. Drug side effects:

- Drug hypersensitivity (SJ Syndrome)

5. Surgery:

- reconstructive surgery
- nerve abscess draining
- septic surgery

6. Neuropathic foot

7. Special foot wear e.g., short foot, deformed foot etc.

21. BODY CHARTING (BC):

Definition: A body chart is the drawing of the body of the patient, showing the different skin and nerve lesions and some of their characteristics.

Importance: It is useful especially at time of diagnosis: **a reference document is thus established that allows for comparison of future changes.**

Frequency: In DF-projects, the frequency of routine charting will be limited: to be done at start and at end of treatment & if Relapse is suspected.

The chart must include a drawing of lesions: nerves can be indicated on it, but more details on nerves will be given as a table.

Do a body chart at:

- Diagnosis
- CT
- Relapse
- OBS time

At the time of Body Charting (BC) you must look for PNAD, it means Patch, Nerve, Anesthesia and Deformity/Disability.

The symbols of BC are shown in the annex:

Patients on observation:

There will be many cases where it is not possible to be certain whether the diagnosis is leprosy. The correct thing is to put the patient on observation and do BC & take SSS. Putting a patient on observation is very much right than just making a guess (which may be wrong!).

These patients are just as important as patients on treatment. You need to have proper records of their signs/symptoms and enough information about the patient to make sure that you can find him at home if he fails to come back for check up. They should be kept on observation until it can be certain whether the diagnosis is or is not leprosy with the help of the supervisor.

22. CASE FINDING:

22.1 Leprosy expert pole:

a) Further strengthening the Capacity of DF staff in relation to Leprosy case finding and Holding

Recommendation:

1. "Pole of expert in leprosy" will be formed comprising 2 experienced members. The team will visit different clinic six monthly to ensure proper implementation of recommendation from this workshop. A check list will also

- be distributed to be followed by the team members during assessment of clinics.
2. Team members should be supportive to the staff members during their assessment visit.
 3. It is recommended to expect all patients under treatment and cases under observation on the day of Medical Officer Visit. The MO should discuss cases with the clinic staff aiming to update their knowledge and skill concerning diagnosis and management of leprosy cases.
 4. Staff has no or little exposure on leprosy during the year should have possibilities to visit clinics with several leprosy cases.
 5. It is recommended to discuss topics related to leprosy in each monthly TLCO and TLCA meeting
 6. The DF staff member is requested to write their best experiences in the field of leprosy and send it to DFCO-Mr. Tark- for publication.
 7. Reward to best performing staff by providing certificate/crest.
 8. Leprosy cases missed by DF staff may not be diagnosed by other health care provider, so it is strongly recommended to check all leprosy suspects thoroughly and document in the leprosy suspect register.

b) Strengthening involvement of Dermatologist and Medical Colleges, General hospitals and other stakeholders in leprosy case finding

Recommendations:

1. DOTS and MDT corner are presently functional in all medical colleges/General hospital, it is suggested to organize HE sessions by the TLCA specially in skin out door and establish good relationship with the doctors working in the skin OPD.
 2. All DF doctors are suggested to organize annually at least one Clinical seminar on leprosy / Journal club for MO- skin VD, Medicine, orthopedic and other doctors.
 3. It is recommended to make a list of dermatologist, visit them at least quarterly once and send Eid / new years greetings cards to maintain effective collaboration.
 4. To Provide National leprosy manual to all dermatologist and other departments.
 5. Provide letter of appreciation to referring doctor.
1. Orientation of medical students during field visit in Upazila level and in DF hospitals.
 2. Organize one day orientation in nursing training
 3. Hang binding posters in important departments of medical colleges and general hospitals.

c) Involving Govt. health and family planning staff, Village doctors, Cured patients and other stakeholders in leprosy case finding

Recommendation:

1. IT was requested to Director MBDC and Line Director TB and Leprosy to issue a letter from DG Health & Family Planning to all Civil Surgeons & Deputy Director- Family Planning aiming to involve field force in referral of leprosy suspects.
2. Training /meeting (Health & Family Planning staff, MO, monitoring meeting, VDs, Pharmacy holders, Medical Representative, Imams, Teachers and scouts) should be organized by DF, irrespective of fund source for both diseases.
3. When ever TB club is organized leprosy patients from respective union should also be invited and both diseases should be discussed by the staff.

d) Further strengthening of ongoing Leprosy activities - ECS, Care of patients, ACSM etc.

ECS

1. ECS should be done in prior appointment with patients. ECS timing should be adopted aiming to check all family members. If no female staff is available select a female volunteer on the spot to check female contacts.
New schedule for ECS-
 - PB - At diagnosis and 3rd year of registration.
 - MB negative - For 5 years.
 - MB positive - For 7 years.

Care of patients

1. POD materials (Hand, Feet, Eye, ulcer care) should be available in all clinics
2. POD list must be updated-list of patients in need of shoes.
3. Capacity building of local doctors with the help of Dr. Neigrini of DBLM to perform reconstructive surgery.

ACSM

2. MO MTLCP and TTLCP will prepare an additional action plan for the area where DF is implementing only leprosy programme (Sherpur district, Mymensingh sadar, Trishal, Muktagacha and Phulpur Upazila)

1. All TB patients must also be oriented on availability of leprosy services and early symptoms.
2. A comprehensive flip chart on leprosy showing all possible skin and neurological lesions will be developed soon (under process)
3. Health education on leprosy should be prioritize during OPD, ID, clinic and community health education/training programme
4. Letter to GP/PPs regarding leprosy referral

22.2 Contact checking Leprosy:

All contacts living in the same house (people living around the same yard) should be checked physically and note in the patient treatment card as: number checked/ total number contacts (examp. 5 checked among 10 contacts or 5/10). All family members should have been checked even through repeated visits and be recorded accordingly. Female TLCA / CA should be in the team; if female staffs not available, a Female volunteer (From SCC) should be involved in the team. Contacts checked from other houses (20 houses around) should be mentioned separately in the same way.

New schedule for ECS-

- PB - Once during the year of diagnosis.
- MB negative - For 5 years.
- MB positive - For 7 years.

Contact examination should be done within 2-3 weeks of the diagnosis of index cases. **TLCA/TLCO must respect the privacy of the patient.**

22.3 MODE of Case Detection:

Voluntary:

- Patient reports voluntary as a result of community awareness & efficient Service of the program.
- Patient detected during/after any HE activity (Field HE, OPD, ID, Clinic HE) or Publicity (Radio, TV, Miking, signboard, Leaflet, poster. etc.) if they show/present themselves willingly.
- Patient sent/brought by any community people (Non-Medical).
- Patient sent/brought by any Reg. pt. (TB/LEP.) by their initiatives.

- Pt. detected in clinic from neighbouring house of a known case after ECS.
- Family member of Reg. pt. reports voluntarily without ECS/invitation.

Referred :

- Sent by any medical institution/ person (MO/MA/SACMO/HI/AHI/HA/FWA/FWV/FWI/VD etc)

Contact :

- Case detected during ECS in the known pts family or neighboring house.
- Pt. detected from a family of a known case in clinic after invitation.

Survey :

- Pt. detected on the spot during HE & body examination (Examine whole population of the target group). (Note- in NP report this category will be added with ?other?.).

Other :

- Any other type. Mostly patients sent/found by DF staff without any active/passive case finding activities (result of observant eyes).
 - Pt. came to the health center for other purpose and diagnosed as leprosy by our staff.

23. FOLLOW-UP DURING AND AFTER MDT

23.1 Case holding activities.

Case holding activities are those activities which contribute to the regular drug intake by the patient (= compliance). Even the most effective drug regimens will fail if not administered regularly.

The best case holding activities are:

- To explain a new patient about the disease and its treatment
- To be kind to patients and show interest for their problems
- To inform patients about the possibility of reaction from the start.

Absentee visit:

An absentee or a defaulter is a patient who did not collect his medicines in due time. An absentee visit may then be necessary.

The reason why the patient could not attend the clinic has to be found out, health education has to be given accordingly and the TLCA has to try to solve the problem together with the patient.

The patient and the head of the family should be informed about the prognosis of the disease with and without treatment.

Follow-up of treatment and the different criteria.

The TLCA has to follow a specific routine, at start, during and after treatment.

1. At start of treatment, the TLCA will:
 - draw a body-chart with nerve-palpation and disability-grading
 - do baseline QMT / ST
 - take a skin smear **FOR ALL PATIENTS**
 - fill card and unit-register
 - give basic health education: on the disease and its treatment, on contacts who may be infected: invite them for a check-up
 - give problem-oriented health education when indicated: on care for insensitive limbs or ulcers / paralysis when needed
 - on danger of reaction (for borderline cases)
 - give shoes, sunglasses as needed
 - do a homevisit for **contact-check** if they do not present themselves at the clinic. To be done for all new cases once, for smear-positive new cases to be repeated once a year for 5 years.

2. At every monthly attendance, the TLCA will:
 - give MDT-drugs and supervise their intake
 - talk with the patient about his/her problems
 - QMT/ST for MB monthly and quarterly for PB cases
 - treat complications as needed

4. Whenever the TLCA suspects reactions, he must:
 - do a complete check-up (full QMT/ST)
 - refer the patient to TLCO/MO if necessary

5. At the end of treatment:
 - for MB, smear-positive at start of MDT: take a skin smear
 - **for all patients:**
 - Do activity-assessment
 - Repeat disability-grading (+ vision-test, blink-reflex)

- Discharge from MDT and note it on all records
- Give health education on relapse and on care for remaining problems (soaking), or still possible reactions
- Give shoes and sunglasses as needed
- Tell him to report back in case of problems, for shoes....

6. After treatment:

- No systematic follow-up is done in DF-projects but ask them to report if any problem.
- Care for ulcers, reactions... will be given to patients who present spontaneously. Then also check for signs of relapse.

Some Definitions:

New/Leprosy Case: A person is said to be a leprosy case, who has the active clinical signs of leprosy & requiring treatment with or without bacteriological positivity.

Treatment Completion/Cure: PB patients who receive 6 doses of PB-MDT within 9 months & MB patients, who receive 12 doses of MB-MDT within 18 months, are considered to have completed treatment.

Relapse: If a patient who has been released from treatment after adequate MDT develops active signs of leprosy (new skin or nerve lesions, increase in BI by 2+ or more in any site, conversion of negative skin smear to positive in one or more sites) after a minimum period of two years of completion of treatment, he/she should be considered as a case of relapse.

Died: If a patient expires during MDT treatment for any reason.

Default: If a PB patient fails to complete MDT within 09 months or a MB patient within 18 months, he/she should be considered as default.

Not completed: If a patient could not complete his fixed MDT within schedule period due to permanent stop of MDT for severe, uncontrolled drug side effect (drug hypersensitivity, Jaundice, shock, severe haemolytic anaemia etc), his final outcome is to be noted as Not Completed.

Transfer-out: If a registered UT patient is transferred to any project/administrative area (other than DF) from DF Project for continuation of MDT, his outcome of treatment is to be shown as transfer-out.

Transfer-in: If a UT patient after registration is referred from any other project/administrative area to DF project for

continuation of MDT, he should be reregistered in DF area as Transfer-in.

24. RECORD KEEPING

The maintenance and the use of records are an essential part of the work of a TLCA.

Almost all the activities are accompanied by paperwork. Without a well ordered recording system neither clinical care nor leprosy control work can be monitored or controlled.

The Leprosy Treatment Card

Refer to the example in annex. This is the card in use by DF Bangladesh. Other cards exist in other projects or in Government services, adapted to their specific needs.

The card has to be filled in at the registration time, by the person examining the patient (TLCA, TLCO or MO). The card will be completed whenever necessary by additional sheets, f.i. for a prednisolone reaction treatment.

Main parts are:

Front page:

Type of Leprosy. Add clearly "SINGLE LESION" PB if appropriate.

Treatment Unit and registration number

Biodata and addresses

Information on the disease and history

Details on first examination including body chart and disability grading

Inner pages:

Follow-up during treatment: ST, QMT and clinical notes

Backside page:

Records of MDT given. Use PB-space to record single-dose MDT.

Additional Information (shoes, hospitalizations, contacts,...)

Details of last examination (at time of CT)

Registration numbers: these include a code for the district, one for the thana, the year of registration and a serial number. E.g. "TG/KL/95/03": this would be the third patient registered in the Tangail district, Kalihati thana, during the year 1995.

Leprosy Identification Card

See example in annex. At all times to be kept by the patient, and to be brought with him at each visit to a Leprosy-clinic (even if it is not his usual clinic). Differs according to the project.

Leprosy Unit Register

Lists the patients on treatment. It has to be maintained by the TLCA responsible for the clinic or DDP.

It contains on the left hand page essential information on the patient, disease and treatment. The registration number will be as described for the treatment card. The last part is a serial number, starting with "01" for patients starting treatment during that year. Refer to the TB-handbook for more details. This number does not change when copying patients to new pages for a new year of treatment!!

The right hand pages are reserved for noting attendance in periods of weeks. This will be done by putting a mark in the columns corresponding to the no. of the week for which he received drugs (to be identified with a calendar). The week in which he attends has to be identified differently from the others (cross or no. of the MDT-dose). For patients starting treatment in the course of the year, start entering the first mark in the column corresponding to the starting week, NOT IN THE FIRST COLUMN OF THE PAGE. Patients who come a few days late for treatment: attendance will be marked in the column of the corresponding week, if they were less than 4 days late. Otherwise, leave the column empty. For patients who were absent more than 1 week, start ticking the column corresponding to the week in which they attend, on the condition that they receive drugs for at least 4 days of that week. Again, refer to TB-handbook.

At the end of treatment, the outcome and date must be noted behind the last attendance-marks. At the end of a calendar year, ONLY patients who have not yet finished treatment must be copied to new pages.

The "remarks" column will be used for recording side-effects mainly.

At the bottom of the page, there are cases for entering the number of patients (MB or PB) who should have attended, and those who really came. They are not to be used any longer, and will not be there in newly printed registers.

The aim of this register is to:

- provide an easy overview of cases on treatment at any time
- facilitate identification of defaulters and irregular cases without special records
- make accounting for drug consumption possible without too much effort
- provide a basis for the thana registration

Leprosy Thana Register

Must be kept by the TLCO, starting from information in the unit register and completed by some details found on the cards only. It is the basis of all the statistics. It will be taken by the TLCO during his visits to a clinic, otherwise it is available for consultation where the TLCO is posted.

Leprosy suspect case register

Write here all the patients consulting for complaints that are rather Leprosy-related: skin diseases, neurological problems, ulcers and wounds...

Fill only the following:

- sl. no.: start with no. 1 each month
- Date
- Name
- Age and sex
- Address
- Reason for suspect Leprosy: fill here complaints made by the suspect.
- diagnosis: Leprosy or any other disease if known. Otherwise, the main complaint (e.g. "plantar ulcer, no sign of L.")
- commencement of MDT: of course only for Leprosy new cases. Also write reg. no. in that case.

Prednisolone course record sheets

See examples in annex: the standard duration course that can be prescribed also by TLCAs. They will be used whenever prednisolone is prescribed in the field or hospital, for any kind of reaction or neuritis. They give indications, choice of standard course and drugs collected, besides follow-up via QMT and ST.

Please note that different regimens are on the sheets based on body weight, and the applicable one has to be encircled by the prescriber. The TLCA then uses the next columns to enter date of issuing drugs with nr. of tablets and date for return. Before giving new supply, he must check for side-effects as mentioned on the form.

Refer to special instructions for details on the field prednisolone treatment.

BI slip

The BI slip has to be filled in by the one who takes the skin smear (smear technician or TLCA). It must then be sent to the project technician together with the smear, f.i. by the TLCO. The technician will note his results, and return it to the clinic. These results must then be copied to card and register immediately by the TLCA.

Referral/transfer form or slip

The referral slip accompanies the patient who is referred to a supervisor or has to be admitted in the hospital. It may also be used to transfer patients who have to continue treatment in another unit.

It must be filled by TLCA or TLCO responsible for the referral or transfer.

See example in annex.

Defaulter tracing form

The Government form will be used, in case tracing should be done by Government field workers (Health Assistants). It is filled by the TLCA/TLCO, but has then to be signed by UH&FPO. An example is in annex. Normally, tracing will be done by the TLCA himself. No form will be used then, but a record of the visits and its results will be kept on the patient card.

25. ANNEX: forms and registers

26. GLOSSARY

| | |
|-------------|--|
| Abduction | : a movement taking the part away from the middle line |
| Acute | : sharp, having severe symptoms and a short course |
| Adduction | : a movement bringing the part nearer to the middle line |
| Ambulatory | : as outpatient, so not in the hospital |
| Anaesthesia | : loss of feeling, loss of sensation |

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| Anterior/ventral/ Frontal | : front side |
| Antibody | : a substance produced by the immune system as an answer to a stimulus by a specific other substance or organism. The latter is then called "antigen". It can attach itself to this substance or organism. |
| Antigen | : a substance or part of an organism (f.i. bacilli, parasites) that can provoke an immune response of the body (by production of antibodies f.i.) |
| Asymmetrical | : not having 2 halves, which are the same in size and shape |
| Birthmark | : an area of hypo-pigmentation of the skin, present at birth |
| Chronic | : going on for a long time, showing little change or very slow progress over a long period of time |
| Complication | : a pathological process outside the usual progress of a disease |
| Cutaneous | : related to the skin |
| Deformity | : malformation, change from normal |
| Disability | : incapacity, loss of ability to do something, usually because of deformity |
| Distal | : farther away from the centre of the body, farthest from the point of attachment |
| Dorsiflexion | : a movement reducing the angle of the ankle joint, to bend the foot upwards |
| Erythematous | : reddish in colour |
| Eversion | : turning of a body-part outwards |
| Extension | : a movement increasing the angle of the joint, to stretch, to extend |
| External | : outside the body |
| Flexion | : bending the joint, a movement reducing the angle of the joint |
| Gland | : a small organ secreting a particular substance, f.i. Sweat, tears, hormones, |
| Generation time | : the time needed by an organism (usually bacteria) for one multiplication |
| Haematoma | : a collection of blood in the tissues or under the skin. It appears as a bluish, red mark under the skin |

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| Hyperkeratosis | : an excessive thickening of the upper skin layer (keratin). When it is localised we call it a callosity |
| Immunity | : the normal body process of defence against a foreign substance or organism. Several types and mechanisms exist. Main types are humoral immunity (based on antibodies) and cell mediated immunity (CMI, based on different cells) |
| Incubation period | : the time between infection and appearance of the first symptoms |
| Infection | : invasion by a germ and its multiplication in the human body |
| Infectious | : capable of infecting the human body |
| Inferior | : lower |
| Infiltration | : thickening of the skin. Edges often are impossible to find, or the infiltration may be diffuse (= whole skin) |
| Inflammation | : the disease process that is a reaction of the tissues to any kind of irritation (injury, foreign body, infection...). It is characterised by 4 signs: redness, heat, pain and swelling. Sometimes it causes loss of function of the body-part. It may be acute or chronic. |
| Insensitive | : having no feeling |
| Internal | : inside the body |
| Inversion | : position of a body-part that is turned inwards. |
| Lateral | : away from the middle line |
| Lesion | : an abnormal area because of disease changes in the body tissues. |
| Macule | : an area of skin looking different from the skin around it. It may be any size or colour. But it is always flat, not raised, and it feels not thicker or thinner than surrounding skins. |
| Margin | : edge of a skin lesion |
| Medial | : near the middle line |
| Nodule | : a solid swelling in the skin, at least 10 mm across |
| Oedema | : a collection of fluid in the tissues. It causes a soft swelling and when we press the skin, it leaves a mark. |
| Palmer | : related to the palm of the hand |

| | |
|--------------------|---|
| Papule | : a solid swelling in the skin, less than 10 mm across |
| Paralysis | : complete loss of power of voluntary movement |
| Peripheral | : towards the extremities, towards the outer edge |
| Phagocytosis | : the process of swallowing a substance or an organism by a cell. This happens via the cell wall enclosing the organism. |
| Pigmented | : coloured. So hypopigmented is less coloured, hyperpigmented is more coloured |
| Plantar | : related to the sole of the foot |
| Plantar flexion | : a movement increasing the angle of the ankle joint, to bend the foot downwards |
| Plaque | : a lesion, which is completely raised above the surrounding skin. It may be any size. Some parts may be more raised others less. Edges are clear. |
| Posterior, dorsal: | back side |
| Prevention | : to avoid a disease or injury of happening by certain actions (f.i. vaccination) |
| Pronation | : position of the arm in which the palm is turned backwards. |
| Proximal | : closer to the centre of the body, nearest to the point of attachment |
| Pustule | : the same as a vesicle, but it contains pus |
| Scale | : scales of the skin are whitish flakes hanging more or less loose to the skin. Usually small, powdery. |
| Scar | : tough, fibrous tissue that develops sometimes after healing of a deep wound or ulcer |
| Sensitive | : having feeling |
| Stigma | : a mark on the body that has a negative or bad meaning. It may point out a person as sick or socially unacceptable. |
| Subcutaneous | : under the skin |
| Superficial | : on or near the surface |
| Superior | : upper |
| Supination | : position of the arm in which the palm is turned anteriorly. |
| Symmetrical | : having 2 halves, which are the same in size and shape. E.g. symmetrical skin lesions means the same |

distribution on both right and left side of the middle line.

- Transmission : of disease, is the transfer of disease from one person to another. Typical of infectious diseases.
- Vesicle : a small rounded swelling with fluid inside (but no pus). When it is large we simply call it a blister.
- Weakness : partial loss of power of voluntary movement