



**National Leprosy Eradication Program**

**Disability Prevention & Medical Rehabilitation**

**(DPMR)**

**2007**

# **OPERATIONAL GUIDELINE**

**(Tertiary Level)**



**Central Leprosy Division**

Directorate General of Health Services, Government Of India  
Ministry of Health & Family Welfare, New Delhi, India.

# DISABILITY PREVENTION & MEDICAL REHABILITATION

## OPERATIONAL GUIDELINE TERTIARY LEVEL CARE

### *Includes the following institutions*

Central Government Institutes  
(CLTRI Chingalpettu & RLTRI at Aska/Gouripur/Raipur)  
ICMR institute JALMA, Agra  
ILEP supported Leprosy Hospitals  
All PMR Institutes and department of Medical colleges

**2007**

### **NATIONAL LEPROSY ERADICATION PROGRAMME (NLEP)**

DIRECTORATE GENERAL OF HEALTH SERVICES  
MINISTRY OF HEALTH & FAMILY WELFARE  
GOVERNMENT OF INDIA

NIRMAN BHAWAN, New Delhi 110011

Tele/Fax: 91(11) 23062401 email: ddgl@nb.nic.in Gram: Hospital

# CONTENTS

List of Acronyms .....	III
Glossary .....	IV
Foreword .....	V
Operational Guidelines on DPMR - Tertiary Level Care (Third Level) - Introduction .....	VI
Preamble .....	1
1. Source of patient .....	1
2. Service Components .....	1
2.1 Paralytic deformities for reconstructive surgery .....	2
Physiotherapy .....	4
2.2 Facial deformities for cosmetic / plastic surgery .....	5
2.3 Abscess, wounds / complicated ulcers needing surgical intervention .....	6
2.4 Severe lepra reactions / neuritis : .....	7
2.5 Eye complications unmanageable at secondary level .....	12
2.6 Other complications like severe adverse effect of drugs .....	13
2.7 Suspected relapse cases referred for confirmation / investigation .....	14
2.8 Undiagnosed associated diseases .....	15
2.9 Laboratory facilities for smear examination & histopathology .....	16
3. Training Requirements .....	19
4. Logistics & Supplies .....	20
5. Records & Reports .....	22
6. Supervision & Monitoring .....	33
7. Coordination and Linkages .....	33

## LIST OF ACRONYMS

<b>ANM</b>	Auxiliary Nurse Midwife
<b>ASHA</b>	Accredited Social Health Activist
<b>ASLO</b>	Assistant State Leprosy Officer
<b>AWW</b>	Angan Wadi Worker
<b>BCP</b>	Blister Calendar Packs
<b>BEE</b>	Block Extension Educator
<b>CHC</b>	Community Health Centre
<b>CLTRI</b>	Central Leprosy Training & Research Institute
<b>CMO</b>	Chief Medical Officer
<b>DLO</b>	District Leprosy Officer
<b>DDRO</b>	District Disability Rehabilitation Officer
<b>DPMR</b>	Disability Prevention & Medical Rehabilitation
<b>DRPD</b>	District Rehabilitation Programme for Disabled
<b>DRPA</b>	Disability Rights Protection Act
<b>DLS</b>	District Leprosy Society
<b>EHF Score</b>	Eye Hand Feet disability Scoring
<b>GOI</b>	Government of India
<b>GHCS</b>	General Health Care System
<b>IAL</b>	Indian Association of leprologists
<b>JALMA</b>	Japanese Leprosy Mission for Asia
<b>LT</b>	Laboratory Technician
<b>LTC</b>	Leprosy Training Centre
<b>MB/PB</b>	Multi Bacillary / Pauci Bacillary
<b>MDT</b>	Multi Drug Therapy
<b>MO</b>	Medical Officer
<b>MOHFW</b>	Ministry of Health & Family Welfare
<b>MPHW</b>	Multipurpose Health Worker
<b>NGO</b>	Non-Governmental Organisation
<b>NLEP</b>	National Leprosy Eradication Programme
<b>NRHM</b>	National Rural Health Mission
<b>PCR</b>	Polymerase Chain Reaction
<b>PHC</b>	Primary Health Centre
<b>PMW</b>	Paramedical Worker
<b>PMR</b>	Physical Medicine and Rehabilitation
<b>PWD</b>	Persons With Disability
<b>POD</b>	Prevention of Disability
<b>POWD</b>	Prevention Of Worsening of Disability
<b>PR</b>	Prévalence Rate
<b>PRI</b>	Panchayati Raj Institutions
<b>PT</b>	Physiotherapist / Physiotechnician
<b>RCS</b>	Reconstructive Surgery
<b>RFT</b>	Release from treatment
<b>RLTRI</b>	Regional Leprosy Training & Research Institute
<b>RSU</b>	Reconstructive Surgery Unit
<b>SC</b>	Scheduled Caste
<b>SHG</b>	Self Help Group
<b>SLS/O</b>	State Leprosy Society/Officer
<b>SIHR &amp; LC</b>	Schieffelin Institute of Health - Research and Leprosy Centre

## GLOSSARY

<b>Accompanied MDT:</b>	Provision of more than 1 BCP of MDT at a time.	<b>Multi-bacillary:</b>	A leprosy patient with six or more skin patches.
<b>Anaesthesia:</b>	Loss of sensation	<b>Nerve function impairment:</b>	a loss of normal nerve functioning, demonstrated by loss of sensation in the skin or less muscle power in its area.
<b>Blindness:</b>	refers to a condition where a person suffers from any of the following conditions, viz., (i) total absence of sight; or (ii) visual acuity not exceeding 6/60 or 20/200 (Snellen's method) in the better eye with correcting lenses; or (iii) limitation of the field of vision subtending an angle of 20 degrees or worse.	<b>New case:</b>	A case of leprosy who has never been previously registered / treated with anti-leprosy chemotherapy
<b>Case of leprosy:</b>	A case of leprosy is a person with clinical signs of leprosy, who requires chemotherapy (MDT)	<b>Orthotics:</b>	a treatment device especially for foot
<b>CBR:</b>	A Strategy within general community development for the rehabilitation, equalization of opportunities and social inclusion of all people with disabilities	<b>Pauci-bacillary Case:</b>	Upto 5 skin patches, with definite loss of sensation.
<b>Clawing:</b>	Deformity wherein there is hyperextension of the joints between the fingers and the palm and flexion of the joints of the fingers.	<b>Passive movement:</b>	movement produced by assistance / an external force.
<b>Corticosteroids:</b>	A group of drugs known for their ability to suppress inflammatory response	<b>Person with low Vision:</b>	refers to impairment of vision even after treatment or standard refractive correction but who uses or is potentially capable of using Vision for the planning or execution of a task with appropriate assisted device. / having vision less 6/18
<b>Defaulter:</b>	An individual who fails to complete treatment within the prescribed time frame	<b>Lepra Reaction:</b>	The sudden appearance of symptoms and signs of inflammation in the skin of a person with leprosy
<b>Deformity:</b>	abnormal appearance, disfigurement	<b>Rehabilitation:</b>	includes all measures aimed at reducing the impact of disability for an individual, enabling him or her to achieve independence, social integration, a better quality of life and self-actualization.
<b>Disability:</b>	is a broad term covering any impairment, activity limitation or participation restriction affecting a person.	<b>Relapse:</b>	The re-occurrence of the disease at any time after the completion of a full course of treatment
<b>Foot-Drop:</b>	inability to move the fore foot up ie., dorsiflexion, caused by the paralysis of the muscles which lift the foot.	<b>RFT:</b>	Release from treatment; this occurs when treatment with MDT has been successfully completed
<b>Indicator:</b>	Measurable aspect of a programme, which can indicate the level of performance and/or changes in performance	<b>Self-Help Group:</b>	"A small, economically homogeneous and affinity group of rural/urban poor, voluntarily formed to save and contribute to a common fund to be lent to its members as per the groups decision and for working together for social and economic uplift of their families and community".
<b>Impairment:</b>	any loss or abnormality of anatomical structure or function caused by the disease or injury. It may be visible or invisible, temporary or permanent and progressive or regressive.	<b>Social integration:</b>	has been defined as the active participation of disabled and handicapped people in the mainstream of community life.
<b>Lagophthalmos:</b>	Inability to close the eye	<b>Ulcer:</b>	discontinuity of the skin or mucous membrane
<b>Leprosy cured person:</b>	any person who has completed a prescribed course of MDT (6 months PB/12 months MB Regimen).	<b>Wrist drop:</b>	inability to move the wrist into extension
<b>MDT:</b>	Multi-drug therapy		





**Government of India**  
**Ministry of Health & Family Welfare**  
**Dr. P.L. Joshi, MD, F.A.M.S.,**  
**Dy. Director General (Leprosy)**  
**Nirman Bhawan, New Delhi**

## **Foreword**

National Leprosy Eradication Programme is one of the most successful national health programme in India. After achieving the goal of 'leprosy elimination' at national level i.e. reaching the prevalence rate below 1 per 10,000 population, thus overcoming Leprosy as a public health problem, the next priority is Disability Prevention & Medical Rehabilitation (DPMR) of all leprosy affected persons.

Operational guidelines on DPMR related functions are simple to follow and it covers all the essential components. The purpose is comprehensive care of leprosy cases, including rehabilitation. I believe that these operational guidelines will be useful in implementing DPMR related activities at all tertiary care level health institutions.

Yours sincerely

**Dr. P. L. Joshi**

# OPERATIONAL GUIDELINES ON DPMR

## Tertiary Level Care (Third Level)

### **Introduction:**

National Leprosy Eradication Programme (NLEP) is implemented with major objectives of reducing the disease burden, preventing disabilities and to improve awareness about leprosy in the country through a vertical programme. Multi Drug Therapy is used as an important instrument to reduce the burden of active cases of leprosy. Some new cases have presented with deformities of hands, feet and eyes. Vertical services have been integrated into General health care system, following which, the Leprosy services are being provided through all Govt. hospitals, Primary Health centres and other health care facilities. Services, for Diagnosis & Multi Drug Therapy, drug procurement and Simplified Information System, have been established and are available in general health care system. Prevention of disability (POD) and the concept of comprehensive care are to be strengthened now. Deformities in leprosy cases affect the image of leprosy and impact of health program in the minds of people hence, the priority to POD. While millions, of cases of leprosy have been treated, there still remain a considerable number of cured leprosy patients with disabilities who will need physical and socio-economic rehabilitation.

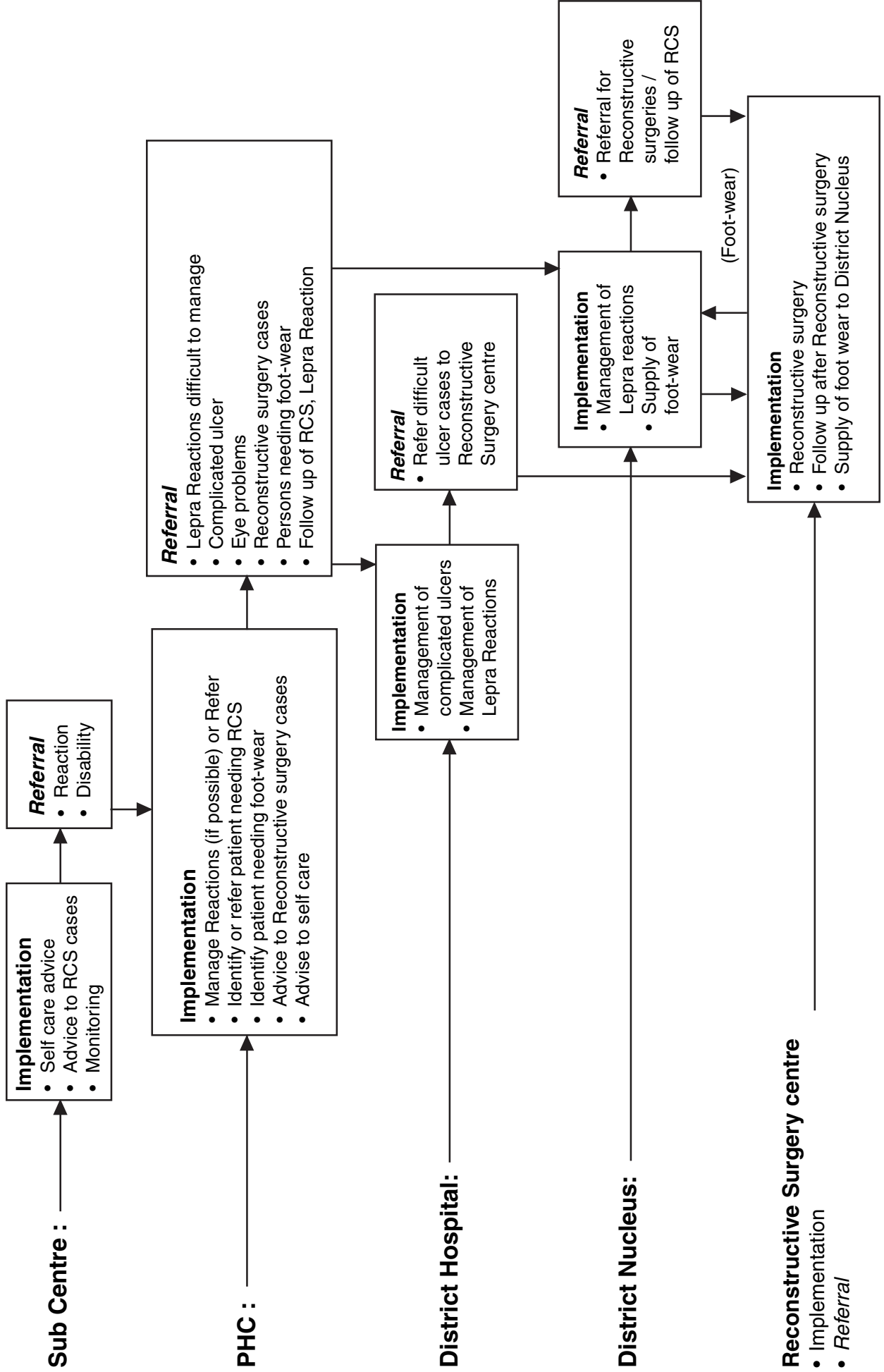
The actual number of cured leprosy patients with disabilities is not known. It is estimated that around one million leprosy patients with disabilities exist in the country. There will be around 2000 cured leprosy patients with disabilities in a district. To institute care for individual leprosy patients with disabilities, it is essential to identify each patient and his/her disability status in a given area. This will also help in preparing the action plan and resource allocation. At present there is no organized system in place to identify cured leprosy patients with disabilities. Therefore, there is a need to develop a strategy at the national level.

Now, that the country has achieved the primary goal of eliminating leprosy as a public health problem, it is felt that prevention of deformities and disabilities need to be given higher emphasis during the 11<sup>th</sup> Five Year Plan period (2007-2012). The services are to be provided through the infrastructure already existing in the country.

### **Objectives of DPMR (Disability Prevention & Medical Rehabilitation)**

- (i) To prevent disabilities and worsening of existing deformities in all needy leprosy affected persons cases, both patients on treatment and those released from treatment.
- (ii) To develop a referral system for providing POD services to all leprosy disabled persons in an integrated set up.

# REFERRAL SYSTEM





# **OPERATIONAL GUIDELINES ON DPMR**

## **Tertiary Level Care (Third Level)**

### **Preamble:**

Govt. of India circulated the plan for Disability Prevention & Medical Rehabilitation (DPMR) for the 11<sup>th</sup> plan period (April 2007 – March 2012) vide letter No. Z.16025/4/2006-Lep. Coordn. dated 29<sup>th</sup> June 2006.

The DPMR activities are planned to be carried out in a three-tier system i.e. the primary level care (First level), Secondary level care (Second level) and the Tertiary level care institutions (Third level).

The tertiary level care institutions are :

- 1 Central Government Institutes (CLTRI Chingalpettu & RLTRI at Aska/Gouripur/Raipur)
- 2 ICMR institute JALMA, Agra
- 3 ILEP supported Leprosy Hospitals
- 4 All PMR Institutes and department of Medical colleges

Other Support Units :

- 1 Orthopaedics and plastic surgery Department of Medical Colleges
- 2 Identified NGO institutions
- 3 All National Institutes under Ministry of Social Justice & Empowerment
- 4 Contractual surgeons skilled in RCS and Rehabilitation Programme

Operational guidelines on each component and activities are indicated in this document. This operational guideline has been prepared to facilitate proper implementation of the DPMR activities at the third level.

### **Components at the tertiary level care (third level) :**

## **1. Source of patient**

Patients referred by Primary & Secondary care units of the district allotted for each tertiary care institute and voluntarily reported direct patients.

## **2. Service Components**

Tertiary care centres may get the following cases referred from secondary / primary levels.

- 2.1 Paralytic deformities for reconstructive surgery
- 2.2 Facial deformities for cosmetic / plastic surgery
- 2.3 Abscess, wounds / complicated ulcers needing surgical intervention
- 2.4 Severe lepra reactions / neuritis
- 2.5 Eye complications unmanageable at secondary level

- 2.6 Other complications like severe adverse effect of drugs
- 2.7 Suspected relapse cases for confirmation / investigation
- 2.8 Undiagnosed associated diseases
- 2.9 Laboratory facilities for smear examination / histopathology

## **2.1 Paralytic deformities for reconstructive surgery**

The tertiary centres will be known as “RCS and Rehabilitation Program units” and will carry out reconstructive surgery operations on leprosy disabled patients.

Reconstructive surgery aims to restore function and form as far as possible and to prevent further disability. It also plays an important role in the prevention of disability and rehabilitation process. Some patients can benefit from reconstructive surgery but not all patients are suitable. Pre and post-operative physiotherapy is essential for a successful outcome of surgery and needs to be arranged.

The conditions which require reconstructive surgery are –

1. **Claw hand:** due to paralysis of ulnar, median or both nerves
2. **Foot drop:** due to paralysis of lateral popliteal nerve
3. **Claw toes:** due to the paralysis of posterior tibial nerve
4. **Lagophthalmos:** due to paralysis of branch of ophthalmic nerve. It is a sight threatening condition because of the risk of recurrent conjunctivitis and corneal damage. Patients, irrespective of age, who have a lagophthalmos with lid gap, particularly when there is loss of corneal sensation, should be operated. Patients with lagophthalmos but not fitting the criteria for reconstructive surgery can be considered for simple procedures such as tarsorrhaphy, which can be performed even on an outpatient basis.
5. **Wrist drop:** due to paralysis of radial nerve.

### **Criteria for referral for reconstructive surgery:**

The detailed criteria will vary between reconstructive surgeons and it is important that surgeons make the referring centre aware of their local policy for referring people. The criteria have been grouped into three categories: social and motivation, physical, and the leprosy treatment.

Social and motivational criteria: The surgery should have the potential to make a difference to patients' acceptance in their society and their family and to improve their socio-economic situation. Patients must be well motivated and have demonstrated that they can be responsible for their own health and follow instructions on treatment and care of their eyes, hands, and feet before surgery. Patients who are not well motivated in self-care are not likely to be willing to participate in essential pre and postoperative physiotherapy.

Financial support or compensation for loss of income and travel may need to be considered for patients who may have dependent families. The surgery may involve loss of economic activity for a period of several months. Patients who are the main breadwinner in a household may be unable to undergo surgery unless assistance is provided.

**Physical criteria:**

The best age for referral for tendon transfer is between 15 - 45 years, but patients younger than 15 years or older than 45 years may be operated depending upon the particular circumstance.

The muscle paralysis should be present for at least one year and preferably not longer than 3 years. There may be exceptional cases where there has been muscle paralysis for longer than 3 years and the individual has kept the joints supple through passive exercises. The patient may not remember accurately how long muscle paralysis has been present, so suppleness of the joints may be a more useful criterion.

Patients with severe contractures or stiff joints are not suitable, although physiotherapy or surgery can reverse some contractures.

There should be no infection of the skin such as scabies, and any deep cracks, wounds or ulcers at time of referral.

**Leprosy treatment criteria:**

Patients should have completed the scheduled course of MDT or at least a minimum of 6 months MDT. Patients should be free from reactions and symptomatic neuritis for at least 6 months. Patients should not have taken steroids during the past 6 months unless the surgery is for neuritis. There should be no tenderness of any major nerve trunk in the limbs.

For most patients there is a period of a few years in which surgery is most likely to be beneficial. This starts when the disease is stable (free of reactions and neuritis), MDT is established, and the muscle paralysis is not likely to progress or to recover. Motivation is a key factor as patients may need to be in hospital for at least 6 weeks and will have to work at physiotherapy.

The proposed surgical procedure and its positive consequences should be balanced against the consequences of not doing surgery. This should be discussed with the patient and the decision whether to undergo surgery should be taken by the patient. Methods of managing to live with the deformities without causing further damages to the affected parts should be explained to patients who do not want or are not suitable for surgery.

**Priorities for reconstructive surgery:**

Operations for lagophthalmos are usually considered as a high priority because of the possibility of secondary damage to the eye. Feet are usually considered the next priority followed by hands, but this may depend on the needs of individual patients.

### **Guidelines for Tendon Transfer surgery of the hand/foot.**

1. The patient should have Ulnar paralysis or Median Paralysis or Radial Paralysis or a combination of two or three nerve paralysis to be eligible for Tendon Transfer surgery
2. The patient should have Common Peroneal (Lateral Popliteal) nerve paralysis or posterior tibial nerve paralysis or a combination of two nerve paralysis to be eligible for Tendon Transfer surgery
3. The patient can undergo multiple procedures or have two procedures at the same sitting depending on the judgement of the surgeon after due consultation with the patient
4. The minimum duration of the paralysis should be for 6 months
5. The patient should have completed MDT PB or at least 6 months of MDT MB to be considered for surgery
6. The patient should not be in Type I or Type II reactions
7. The patient should not be undergoing steroid therapy and should have completed steroid therapy at least six months prior to being taken up for surgery
8. There should be no ulcer or blister on the limb to be operated
9. The patient should not have any complicated ulcers of the other limbs or in another part of the body
10. The patient should be willing to be admitted for the surgery, be willing to spend three weeks in plaster cast and later be admitted for a period of four weeks for post operative physiotherapy
11. The patient should have at least one week of pre-operative physiotherapy
12. The patient can be discharged two or three days after surgery if afebrile and asked to return on the 21<sup>st</sup> post operative day for the four weeks admission. Or the patient may be admitted for the entire period of seven weeks
13. Only mobile deformities can be taken up for such surgery
14. In cases of contractures or restricted mobility, the surgeon may decide on surgical and or non surgical to release these contractures and then take the patient up for tendon transfer surgery
15. If necessary the patient may be admitted for the release of these contractures. (surgical release or release by splinting)
16. After performing the surgery patient should be advised, encouraged and counselled for post operative care

### **Physiotherapy**

Physiotherapy is helpful in:

1. Restoring the normal tone of muscles and preserving the physiological properties of paralysed muscles
2. Preventing muscle atrophy and the over stretching of paralysed muscle
3. Preventing contractures and keeping joints mobile by improving the range of movements
4. Maintaining and improving blood circulation
5. Making the skin soft and supple

Physiotherapy comprises exercises, oil massage, wax baths, hydrotherapy, splinting, electrical stimulation of muscles, short-wave diathermy, ultrasonics. Physiotherapy is very useful in the management of deformities and is essential in both pre as well as post-operative care of deformity patients. RCS requires the patient to use a different muscle in place of the paralysed muscles. The operated part is still vulnerable, and patient needs post operative muscle training and instructions in the use of anaesthetic extremities

Instructions given by surgeon at the time of discharge should be followed. In general, the common post operative muscle exercises are as follow:

- Active Exercises - The patient uses his/her weak muscles to do the exercise. This will prevent contracture and strengthen the weak muscles.
- Passive Exercises - The patient is helped to move the paralysed part. This will prevent contracture but cannot strengthen the weak muscles.

Type of paralysis	Active Exercises	Passive Exercises
Claw hand	<ul style="list-style-type: none"> <li>• Stabilize the MCP (Meta Carpo-Phalangeal) joint between the hand &amp; the fingers at 90 degrees with palm of other hand.</li> <li>• Keep the wrist straight</li> <li>• Extend the fingers keeping the same position.</li> <li>• Repeatedly bend and straighten the fingers of the weak hand.</li> </ul>	<ul style="list-style-type: none"> <li>• Straighten the clawed fingers repeatedly using his other hand.</li> </ul>
For the thumb	<ul style="list-style-type: none"> <li>• Use other hand to hold the weak thumb steady at the (MCP) joint between hand and thumb.</li> </ul>	<ul style="list-style-type: none"> <li>• Straighten the weak thumb at the distal joint (IP) and hold it straight for a few seconds. Straighten the paralysed thumb using his other hand and pull it away from the first finger towards the palm.</li> </ul>
Foot drop	<ul style="list-style-type: none"> <li>• Practice lifting the fore foot upwards and holding it for a few seconds.</li> </ul>	<ul style="list-style-type: none"> <li>• Sit with the leg straight.</li> <li>• Pull the foot up using a towel.</li> <li>• Repeat this movement several times.</li> </ul>
Lagophthalmos	<ul style="list-style-type: none"> <li>• think &amp; blink</li> <li>• close the eyes as strongly as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• With the index finger on the skin at the corner of the eye, gently pull outwards, so that the eye closes. Do this procedure as often as possible.</li> </ul>

## 2.2 Facial deformities for cosmetic / plastic surgery

- **Madarosis:** The loss of lateral parts of eye brows is due to lepromatous infiltrate destroying the hair follicles. Free graft from scalp or a temporal artery island flap usually gives satisfactory result
- **Sagging face / Mega lobule:** This is due to rapid disappearance of the lepromatous infiltrate following treatment with chemotherapy and destruction of elastic and collagen fibres in the dermis. The defect produces an appearance of premature ageing. Pre auricular or naso-labial face-lift is indicated in selected cases
- **Nasal deformity:** These are due to the invasion and destruction of the nasal tissues by M. Leprae. Depressed nose is mainly due to the destruction of the nasal septum. The septal perforation is caused by non-specific infection destroying the cartilage. Nasal deformities are the most prominent stigma of leprosy. In advanced

cases, the nasal mucosa is replaced by scar tissue which pulls the nose inwards. In a saddle nose defect, if the tip of the nose is in the normal position, a bone or cartilage graft would be the operation of choice. In advanced cases, a post-nasal inlay graft over a stent mould is to be preferred. In rare cases, with total destruction of nose, a forehead rhinoplasty is the method of repair

- **Gynaecomastia or enlargement of male breast:** This causes a lot of embarrassment to the patient. In lepromatous leprosy, destruction of seminiferous tubules of the testis by lepromatous granuloma results in hormonal imbalance producing gynaecomastia. It may follow testicular atrophy resulting from the orchitis of type II reaction. This deformity can be corrected by a modified Webster's technique

### **2.3 Abscess, wounds / complicated ulcers needing surgical intervention**

All wounds are the result of tissue stress. Common causes of tissue stress include:

- Sudden injury (e.g. sharp objects that cut or pierce through the skin like thorns or broken glass)
- Repetitive pressure, friction or shear forces (e.g. foot ulcers from walking or hand ulcers from using unprotected hand tools)
- Burns
- Secondary infection in macerated skin of web space with candidiasis can lead to deep abscess
- Rarely rat bite can also lead to ulcer

#### **Recurrent wounds of hands and feet**

Patients who have recurrent wounds of the hand or foot are referred for surgical advice. Such patients may have sequestra (pieces of dead bone) in the hand or foot which require removal. An X-ray of the affected part can help confirm the diagnosis. Sometimes in severe cases of recurrent wounds, amputation is the only solution – this should only be considered as a last resort.

#### **Complicated ulcers**

If an ulcer is found to be broken down tissue only in the dermis and epidermis, it is termed a “simple ulcer”. If the breakdown of tissue goes deeper than the dermis and other body parts are affected (i.e. tendons, tendon sheaths, bones and joints) the wound is termed a “complicated ulcer”.

When the tissue around bones (periosteum) becomes infected the condition can lead to inflammation of bones (osteomyelitis). Osteomyelitis is very difficult to treat and can cause chronic, non-healing lesions in bones. Without enough nutrients and oxygen the infected bone dies. Small pieces of dead bone break away. These loose pieces of dead bone, called sequestra, will cause irritation in the wound which will not heal until the sequestra are removed or fall out. If the normal process of granulation is continuously interrupted by the irritation of sequestra the wound responds by producing hypergranulation tissue. Hypergranulation will be seen as masses of bright red tissue that bulge out of an ulcer. Wherever hypergranulation is seen it indicates that there is something irritating the wound and should be taken as a sign that further investigation is necessary.

#### **‘Charcot’s foot (Hot foot):**

The clinician should remember that the most common problem affecting the anaesthetic foot and ironically the most commonly overlooked diagnosis is that of acute neuropathic disintegration of the foot or chronic neuropathic disintegration of the foot. The patients do not complain of any problem or it may be only of swollen foot. On palpation, if the foot is warm or ‘hot’ this is the earliest sign of the hot foot. The condition should be suspected whenever a swollen anaesthetic foot is seen and is confirmed by palpation.



Regardless of X ray findings treatment should be immediately instituted otherwise the ankle may dislocate and present with a ugly abnormal foot which may finally end up in an amputation.

### **Management of Charcot's foot**

- Total contact POP cast for 2-3 months
- Followed by graduated walking (Partial Weight Bearing-full Weight Bearing)
- Watching for recurrence of swelling or heat
- If recurs, then POP should be reapplied
- Will probably require a Fixed Ankle Brace (FAB)

### **Management in brief**

1. Examination of general condition of a case and local wound area. Probe the wound gently to search pus collection. Drain the pus, if any
2. Flush the wound cavity by saline solution
3. Pack the wound with gauze and bandage it
4. Elevate the part to facilitate healing
5. Start systemic antibiotics
6. Change the dressings daily and check for any further pus collection
7. Surgical debridement after 3 days when inflammation is reduced, pus discharged is controlled and wound is clear. All the dead tissues and avascular tissues are removed. Wound space is packed with gauze soaked in Betadine solution. Dressing on alternate day after checking any more collection of pus, to be done
8. Plaster cast may be considered after two weeks when wound is totally clear. Healing has started and no signs of inflammation are there
9. Wide spread use of antiseptics and topical antibiotics are to be avoided
10. Oral preparation of zinc, vitamin C and vitamin A may be supplemented
11. Proper counselling of patient is required for better compliance and coordination

### **Guidelines for soft tissue reconstructions of the limbs:**

1. Patients with soft tissue defects or those developing such defects after de-bridement of sinuses or chronic ulcers can be selected for such surgery
2. Underlying bone pathology or bony prominence should be dealt with during the surgery
3. The patient may be in any stage of the disease or its treatment and can still merit this surgery
4. The patient should not be in Type I or Type II reactions
5. The patient should not be undergoing steroid therapy and should have completed steroid therapy at least three months prior to being taken up for surgery

### **2.4 Severe lepra reactions / neuritis**

There are two types of reaction: Reversal Reaction (or Type 1) and Erythema Nodosum Leprosum (ENL or Type 2). Both types can occur before the start of treatment, during treatment, or after treatment has been completed. Both types can be divided into mild or severe.

Lepra Reactions are usually diagnosed by clinical examination only. Inflammatory changes in skin lesions or appearance of new lesions, patches or nodules with acute onset, draw the attention of patient to report. Some cases develop signs of nerve damage without obvious changes in skin lesions. Cases which can not be managed at secondary level, are referred to tertiary care units.

### Differentiating features of two types of Reactions are –

Distinguishing between the two types of reaction is usually not difficult: in a reversal reaction, the leprosy skin lesions themselves become inflamed, red and swollen; in an ENL reaction, new inflamed, red nodules (about 1 – 2 cm across) appear under the skin of the limbs or trunk, while the original leprosy skin patches remain as they were. In addition, ENL reactions cause a general feeling of fever and malaise, while reversal reactions cause less systemic upset. Common differentiating features are as follow –

Type I (Reversal Reaction)	Type II (ENL)
1. Delayed hypersensitivity	1. Antigen antibody reaction
2. Occurs in both PB & MB type of cases (Borderline group) i.e. in unstable types like BT.BB.BL.	2. Seen in MB cases only (BL & LL type)
3. Skin lesions suddenly becomes reddish, swollen, warm, painful, and tender. New lesions may appear.	3. Red, painful, tender, sub cutaneous nodules (deep) ENL may appear commonly on face, arms, legs, bilateral symmetrically. They appear in groups and subside within few days even without treatment (Evanescent skin nodules). Nodules are better felt than seen and these are recurrent (episodic)
4. Nerves - close to skin may be enlarged, tender and painful (neuritis) with loss of nerve function (loss of sensation and muscle weakness) and may appear suddenly or rapidly	4. Nerves may be affected but not as common or severe as in Type I
5. Other organs - Not affected	5. Other organs like eye, testis, and kidney may be affected.
6. General symptoms - Not common	6. Fever, joints pain, Red eyes with watering

### Signs of a severe reversal reaction

If any of the following signs is found, the reaction should be treated as severe:

- Loss of nerve function – that is, loss of sensation or muscle weakness
- Pain or tenderness in one or more nerves
- Silent neuritis
- A red, swollen skin patch on the face, or overlying another major nerve trunk
- A skin lesion anywhere that becomes ulcerated
- Marked oedema of the hands, feet or face

Severe reversal reactions should be treated with a course of steroids, usually lasting 3 – 6 months. There are a number of important side-effects associated with steroids, so a careful assessment must be made of any patient requiring them.

## Signs of a severe ENL reaction

If any of the following signs is found, the reaction should be treated as severe:

- Pain or tenderness in one or more nerves, with or without loss of nerve function
- Ulceration of ENL nodules
- Pain and or redness of the eyes, with or without loss of visual acuity
- Painful swelling of the testes (orchitis) or of the fingers (dactylitis)
- Marked arthritis or lymphadenitis

ENL reactions are complex medical problems requiring careful management by experienced clinicians. Short courses of steroids are often used, but other drugs are also useful.

## Treatment of Lepra reactions (moderate to severe cases) –

It includes Prednisolone, bed rest, rest to affected nerves by splint, analgesics. Each case of reaction should be assessed for fitness using check list given on next page.

Prednisolone regimen	Added with Clofazimine in ENL
40 mg O.D. for first 2 weeks 30 mg O.D. for weeks 3 & 4	One capsule (100mg) 3 times a day x 4 weeks
20 mg O.D. for weeks 5 & 6 15 mg O.D. for weeks 7 & 8	One capsule (100mg) 2 times a day x next 4 weeks
10 mg O.D. for weeks 9 & 10 5 mg O.D. for weeks 11 & 12	One capsule (100mg) once a day x third month
For <b>neuritis</b> , treatment with Prednisolone should be prolonged to four weeks from 20 mg onwards	

Prednisolone tablets given should be entered in 'Prednisolone Card' also. Tapering of Prednisolone may be done according to its response. Its intake on empty stomach and salt restricted diet during its course should be insisted to minimise its side effects. Any adverse effect or complication such as malena/gastric ulcer, secondary infection in ulcer or lungs, fungal infection in body folds should be detected & treated early.

Added Clofazimine for Type II reaction may be extremely useful for reducing or withdrawing corticosteroids in patients who have become dependent on them; though it is less potent than steroids and often takes 4-6 weeks to develop its full effect in such cases. Total duration of Clofazimine therapy should not exceed 12 months.

Cases of lepra reaction where Prednisolone is contra indicated or ineffective may be put on alternative drugs such as Thalidomide. It is an effective drug in the treatment of severe ENL in leprosy. It has serious teratogenic risks. The risks of teratogenic effects must be balanced against the benefits of Thalidomide in treating severe, disabling and potential life threatening ENL. Thalidomide should be considered for the treatment of severe ENL reaction when the use of steroids is contraindicated or non- effective. Each patient selected for thalidomide therapy should give informed consent after explanation of the risks and benefits. Thalidomide is started at 200 mg twice daily or 100 mg four times daily and ENL is usually controlled within 72 hours and the dose can then gradually be tapered off. Maintenance dose of 50-100 mg daily may be required for prolonged period in some cases. Thalidomide must be administered under the strictest possible supervision

If a patient develops lepra reaction during the treatment, do not stop MDT (rather complete the course of MDT) Lepra reactions, which occur after completion of treatment, should also be managed as mentioned earlier. MDT should not be restarted for such cases.

### **Possible side effects**

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

### **Follow-up after treatment with steroids**

People who have been given a course of steroids for reaction or nerve damage should be followed up closely because of the risk of recurrence.

Each person must understand that a reaction or new nerve damage may recur. They must know how to recognize the early signs of nerve damage and be aware of how important it is to return promptly to the clinic for treatment. These signs include pain or tingling sensations, further loss of feeling or loss of muscle strength and inability to close the eye.

People still on MDT should have their nerve function checked monthly by the health worker when they come to collect their treatment. Any deterioration should be noted and the person referred.

People who have already completed MDT by the time they come to the end of a course of steroids should be asked to come back three months and six months after the end of the course for review and nerve function assessment.

People who still have lagophthalmos (weakness of eyelids) after completion of treatment with steroids should be considered for reconstructive surgery.

Groups requiring special precautions when prescribing steroids.

The following groups of people require special precautions when steroids are required. One must not give steroids to people with tuberculosis, diabetes, deep ulcers, osteomyelitis, Corneal Ulcer or other serious conditions without starting treatment for the underlying condition.

### **Pregnant women**

All pregnant women should be treated at referral level, so as to minimize the steroid dose they are given and thus avoid harmful effects, such as growth retardation, on the foetus. If steroids are given in the third trimester, this may cause adrenal suppression in the newborn infant; ideally, such infants should be monitored in a referral centre for a few days after birth. Here are the doses of Prednisolone you should give during pregnancy:

- PB cases: give the normal course, but start at 30 mg daily instead of 40 mg and limit the course to ten weeks rather than the normal twelve
- MB cases: this should be double the PB course – that is, also starting at 30 mg daily but lasting for twenty weeks

**Children** - to minimize the effects of steroids on their growth, children can be given a course similar to that for pregnant women, but the starting dose of Prednisolone should not exceed 1 mg per kilogram of body weight per day.

If it can be arranged, giving children steroids on alternate days may reduce the effect on their growth. A suitable regimen for PB cases would be 30 mg of Prednisolone daily for two weeks, then 30 mg on alternate days for two weeks, with a gradually reducing dose over the total course of ten weeks. For MB cases, one should double the duration of each stage of the course.

### **Tuberculosis**

If you suspect that a person has tuberculosis, the diagnosis must be confirmed and treatment started before giving steroids. A sputum specimen should be examined for acid-fast bacilli. If tuberculosis is diagnosed. Steroids can be started as soon as effective anti-TB treatment is begun; always follow the national guidelines for the diagnosis and treatment of tuberculosis.

### **Diabetes**

People who show symptoms that suggest diabetes or whose urine tests positive for glucose should be referred to confirm whether the diagnosis is correct and, if it is, for management of the condition. Steroids may increase the diabetic's requirement for insulin.

A person taking steroids may also develop diabetes for the first time; this possibility must be considered when people develop typical symptoms of diabetes during treatment with steroids – these symptoms include excessive thirst, increased urination and fluid intake.

If sugar is found in the urine, serial blood sugar examinations must be made, firstly to establish the diagnosis and then to monitor the response to treatment. Insulin may be required in the first instance, but the condition usually resolves itself when steroids are stopped.

### **Ulcers or osteomyelitis**

People with deep or dirty ulcers or osteomyelitis should be referred for septic surgery and antibiotics. Starting steroids before such treatment may lead to a worsening of the sepsis and more permanent damage, including the need for amputation. You should suspect osteomyelitis if the person's hand or foot is warmer than normal, with or without swelling. Any person with a wound discharging pus should be referred for surgical advice and debridement (removal of dead and infected tissue) before taking steroids, or osteomyelitis may develop.

### **Eye involvement**

People who have corneal damage or iritis should be referred for specialist diagnosis and management at a centre properly equipped for eye care. Corneal ulcers and keratitis are inflammatory conditions of the cornea. They are often caused by exposure, as a result of the person being unable to close the eye properly: there is pain, redness and often some loss of vision. The treatment usually consists of local antibiotics, sometimes with a pad to keep the eye closed.

Steroids, whether taken by mouth or locally applied, may make these conditions worse.

Iritis, uveitis, iridocyclitis and scleritis are all types of inflammation inside the eye and they can all occur as part of a Type 2 reaction. These conditions cause pain, redness, photophobia and loss of vision, although the symptoms are not always severe. The treatment includes atropine eye ointment to prevent adhesion.

Chronic nerve pain and nerve abscesses Patients who have chronic pain and swelling in peripheral nerves which does not respond to analgesics and a course of steroids should be considered for nerve decompression.

**Guidelines for nerve decompression surgery:** (This can be done even if the patient is on steroids)

Nerve decompressions need to be done

1. If the nerve is painful and tender.
2. If the nerve has an abscess or a draining sinus.
3. If in spite of steroids, there is nerve function deterioration.
4. The patient may be on MDT or may have completed MDT.
5. The patient may or may not be on steroids.
6. The patient may or may not be in reaction. (Type I or Type II)

## **2.5 Eye complications unmanageable at secondary level**

### **Lagophthalmos:**

The muscles which close the eye can become weak or paralyzed, if the facial nerve is damaged in a leprosy reaction. The result is that the eye cannot close completely. There may be watering of the eye. Sometimes there is loss of sensation in the cornea (the clear part at the front of the eye) also, which leads to loss of normal blinking.

In the early stages, lagophthalmos can be treated like any other case of neuritis, with steroids. When the condition is permanent, surgery to the eyelids may help to prevent corneal damage.

Regular blinking and complete closure of the eyes at night keep the cornea healthy. In lagophthalmos, the cornea is at risk of damage which makes it less and less transparent. Blindness is a common end result.

### **Mild Lagophthalmos:**

When asked to close eyes lightly the person has a slight gap between the eye lids. In such cases ask the person to try and close their eyes with force. If the face muscles are still strong enough, the person will be able to close the gap. They should keep the eye forced closed while counting to 10. They should do this exercise as often as possible every day.

### **Severe Lagophthalmos:**

When asked to close eyes lightly the person has a large gap between the eye lids. In such cases, ask the person to try and close their eyes with force. Sometimes the face muscles are too weak to force the eyes closed. If the person still has a gap between the eye lids, they will need to do passive exercises to prevent the deformity from worsening and help keep the eye as healthy as possible. when eyes cannot be forced closed, the person should place their fingers at the outer corner of the eye and gently pull outwards until the eye closes. This exercise should be done to a count of 10 as often as possible through the day. All people who are unable to close their eyes, or who do not blink should wear glasses.



**Visual acuity:**

Check how well people can see by using a Snellen chart or by asking the person to count fingers at six meters distance. If there is recent visual loss in one or both eyes, so that the person cannot count fingers at six meters (visual acuity of  $< 6/60$ ), they should be referred to an eye clinic. Cataracts are the most common cause of significant vision loss in the community and this is especially true in older people. People who have had leprosy can have their cataracts operated on in exactly the same way as those who have not had leprosy, with an intra-ocular lens implant.

**Red eye:**

A much less common complication of leprosy is inflammation inside the eye itself. The main signs of inflammation are pain and redness of the eye. Conjunctivitis and corneal exposure cause redness of the eye: they can be treated in a general clinic with antibiotic eye ointment and an eye pad. However, if the redness persists after a few days of treatment the person should be referred to an eye clinic. An eye that is persistently red may have exposure which needs surgical treatment or there may be inflammation inside the eye which requires special treatment beyond the scope of this book. When the cornea does not have sensation it is at risk of damage from objects like sand, insects or eyelashes. These can cause ulcers on the cornea. If the cornea (the clear front of the eye) has a white spot on it and the eye is red, a corneal ulcer should be suspected. In such cases the person should be referred to a specialist immediately. Corneal ulceration is an emergency. If it is not treated very quickly the person may become blind.

**Managing permanent corneal anaesthesia:** People who do not blink should develop the “think blink” habit. They should be encouraged to force themselves to blink whenever they see a common object, such as a mango tree, a cow or a motorcycle. If they exercise “think blink” for long enough, the action will become a habit.

**2.6 Other complications like severe adverse effect of drugs**

MDT is remarkably safe and serious adverse effects are very rare.

Minor problems	Drug	Management
Red urine	Rifampicin	Reassurance
Brown discoloration of the skin	Clofazimine	Counselling
Gastro-intestinal upset	All three	Give drugs with food
Anaemia	Dapsone	Give iron & folic acid

More serious problems	Drug	Management
Itchy skin rash	Dapsone	Stop Dapsone, refer
Allergy, urticaria	Dapsone or Rifampicin	Stop both, refer
Jaundice	Rifampicin	Stop Rifampicin, refer
Shock, purpura, renal failure	Rifampicin	Stop Rifampicin, refer

**Dapsone poisoning** – Case should be hospitalized, gastric lavage is done, Oxygen is started. Vital functions are assessed, if there is need 1% Methylene blue is given in doses of 2 mg per kg body weight. Activated Charcol 25 mg 8 hrly is given orally, Ascorbic acid 500 mg 8 hrly may be added. Detailed clinical assessment is required frequently. Laboratory aids maybe asked to assess Hepato-Renal functions.

Occasionally cases with exfoliative dermatitis or Steven Johnson Syndrome may be referred for management. These drug reactions are serious & life threatening there fore such cases should be hospitalized for the maintenance of vital functions, electrolytes & fluids and close observation.

Gastric ulcer, secondary infections, fungal infections, osteoporosis, secondary cataract or any other complication of Prednisolone therapy should be managed without delay.

### **Complications of advanced disease**

Most late complications are easily prevented by MDT, so are rarely seen these days, but it is important to deal with unusual complications

### **Facial and other deformities**

The sunken nose, loss of eyebrows and the so-called 'leonine' face, which used to be characteristic of untreated MB leprosy, are cosmetic problems leading to severe stigma and discrimination. Fortunately, these are now rare. Plastic surgery is needed to correct these lesions.

### **Internal medical conditions**

Chronic untreated leprosy (fortunately no longer seen) and chronic ENL reactions (still a serious complication in a small proportion of patients) may lead to internal medical complications. Such patients need referral to the appropriate specialists.

### **Psycho-social problems**

Psycho-social problems are related to widely-held beliefs and prejudices concerning leprosy and its underlying causes, not just to the problem of disability. People with leprosy often develop self-stigma, low self-esteem and depression, as a result of rejection and hostility of family and community members. Such negative attitudes are found also among staff in the health services, including doctors. These need to be addressed with urgency. People with psycho-social problems may need to be referred for counselling or other help.

## **2.7 Suspected relapse cases referred for confirmation / investigation**

Relapse is defined as the re-occurrence of the disease at any time after the completion of a full course of treatment. Relapse is indicated by the appearance of new skin lesions and, in the case of an MB relapse, by evidence on a skin smear of an increase in BI of 2 or more units. It is difficult to be certain that a relapse has occurred, as new lesions may appear in leprosy reactions also.

MDT is very effective treatment for leprosy. If a full course of treatment has been taken properly, relapse is generally rare fortunately; the use of a combination of drugs has prevented the development of drug resistance in leprosy, so relapse cases can be treated effectively with the same drug regimen – MDT.

A reaction may be treated with steroids, while a relapse will not be greatly affected by a course of steroids, so using steroids as a 'therapeutic trial' can clarify the diagnosis.

Various criteria may help in distinguishing a relapse from a reaction:

Criteria	Relapse	Reaction
Time since completion of treatment	More than 3 years	Less than 3 years
Progression of signs and symptoms	Slow	Fast
Site of skin lesions	In new places	Over old patches
Pain, tenderness or swelling	No	Yes – skin & nerves
Damage	Occurs slowly	Sudden onset
General condition	Not affected	Inflammation

### **How to confirm the diagnosis of Leprosy in difficult cases?**

Some cases of leprosy don't manifest by visual skin patches or nodules but some changes in the skin for example redness and swelling may be noticed if examined carefully such cases (with infiltration) are always multi-bacillary with positive skin smear, they are cases of consequences. In such suspected cases skin smear examination will help in confirmation of diagnosis.

Some cases of leprosy manifest with thickening / enlargement of peripheral nerves with sensory impairment along the course of affected nerves. Careful sensory testing in the area supplied by the thickened nerve will help in establishing the diagnosis.

Some cases may present with deformity such as 'planter ulcer', claw hand, foot drop or lagophthalmos with no confirmatory nerve thickening and no definite sensory loss. In such cases investigations like skin smears, histopathology (biopsy from the skin or nerve) or PCR will help in arriving at conclusion

Sometimes hypo-pigmented lesions on face (? indeterminate leprosy) especially in children with no definite loss of sensation are referred for confirmation, such cases may be kept under observation if no cardinal signs are elicited.

If there is no loss of sensation in the skin lesions and no enlarged nerves, but there are suspicious signs, such as nodules or swellings on the face or earlobes, or infiltration of the skin, it is important to try and get a skin smear test done. In these circumstances a positive skin smear confirms the diagnosis of leprosy, while a negative result (in the absence of other cardinal signs) would, in practice, rule out leprosy. An alternative diagnosis should then be considered. Many skin diseases such as Post Kalazar Dermal Leishmaniasis (PKDL), Psoriasis, treated fungal infections, Lupus Vulgaris, other forms of cutaneous tuberculosis, sarcaoidosis, may mimic leprosy. Histopathological examination of lesion will help in establishing alternative diagnosis.

### **2.8 Undiagnosed associated diseases**

Sometimes leprosy cases report with fever (of unknown origin), pain abdomen (gastric ulcer? Gastritis? abdomen infection?) back ache (osteoporosis?), low vision (secondary cataract) or symptoms suggestive of tuberculosis. Such cases need investigation to diagnose and treat diseases other than leprosy.

## 2.9 Laboratory facilities for smear examination & histopathology

### How to do a skin smear examination for leprosy

Wash hands and put on gloves.

#### Step 1: Preparation of slide

Take a new, clean, unscratched microscope slide. Using a slide marker, write the patient identification (ID) number at the bottom of the slide. This number must be on the request form.

#### Step 2: Collection of Specimen

- Clean the skin at the smear sites with a cotton wad drenched in alcohol or spirit. Allow it dry
- Light the spirit burner. Put a new blade on the scalpel handle. If you put the scalpel down, make sure the blade does not touch anything
- Pinch the skin firmly between your thumb and forefinger; maintain pressure to press out the blood
- Make an incision in the skin about 5 mm long and 2 mm deep. Keep on pinching to make sure the cut remains bloodless. If bleeding, wipe the blood away with cotton wad
- Turn the scalpel 90° and hold it at a right angle to the cut. Scrape inside the cut once or twice with the side of the scalpel, to collect tissue fluid and pulp. There should be no blood in the specimen, as this may interfere with staining and reading
- Stop pinching the skin and absorb any bleeding with a wad of cotton
- Spread the material scraped from the incision onto the slide, on the same side as the ID number. Spread it evenly with the flat of the scalpel, making a circle 8 mm in diameter
- Rub the scalpel with a cotton wad drenched in alcohol. Pass the blade through the flame of the spirit burner for 3 to 4 seconds. Let it cool without touching anything
- Repeat the steps above for the second site. Spread this smear next to, but not touching, the first one
- Discard the scalpel blade safely
- Dress the wounds and thank the patient

#### Step 3: Fixation of smear on slide

- Let the slide dry for 15 minutes at room temperature, but not in direct sunlight
- Fix the smears by passing the slide, with the smears upwards, slowly through the flame of a spirit burner, 3 times. Do not overheat. The slide should not be too hot to touch
- Put the slide in a slide box & send to the laboratory with the skin smear request form

#### Step 4: Staining the smear

Ziehl-Neelsen stain is used in common, other stains are - Fite Ferraco stain and florescent stains used in histopathology

1. Stain the smears using the hot Ziehl-Neelsen method
2. Stain with 1% carbol fuchsin, which colours everything red
3. Wash out the stain with 1% acid-alcohol, which removes the stain from everything except *M. leprae*
4. Counter-stain the slide with 0.2% methylene blue

The leprosy bacilli will be seen as red rods on a blue background

**Material required:**

Sink with running water

1% carbol fuchsin solution Pipette

1% acid-alcohol Staining rods

0.2% methylene blue solution Slide rack

Spirit lamp Tissue paper

Clock or watch Gloves

**Staining:**

- Just before use, filter the 1% carbol fuchsin solution through ordinary filter paper
- Cover the whole slide with 1% carbol fuchsin solution
- Heat the slide gently by holding a burning spirit lamp underneath it until vapour begins to rise from the carbol fuchsin. Repeat this 3 times during a period of 5 minutes. Make sure the stain does not boil. If the stain dries, add some more reagent and heat again
- Wash gently under a running tap. Rinse until the run-off water is colourless, although the smears will remain dark red
- Register the slide in the lab register
- Put the slide on the staining rack with the smeared side upwards. Up to 10 slides can be stained together. Make sure that the slides do not touch one another

**Decolorising:**

- Cover with 1% acid-alcohol for 10 seconds. An alternative method is to cover with 5% sulphuric acid for 10 minutes
- Rinse gently with water

**Counter-Staining:**

- Cover with 0.2% methylene blue for 1 minute
- Rinse with water, and let the slide dry in the drying rack in an inclined position, with the smeared side downwards
- The slide is now ready to be read

**Examination under microscope:**

Look for the presence of acid-fast bacilli under oil immersion lenses. They appear as fine red rods against a blue background. They can be straight or curved, and the red colour can be uniformly distributed (solid bacilli) or unevenly distributed (fragmented and granulated bacilli). Clumps of bacilli are called globi. Solid bacilli may suggest the presence of viable organisms and may be seen in new, untreated cases or in relapse cases. After examining the first field, move to the next field. Examine approximately 100 fields per smear.

- Put the slide under the microscope with the smears upwards and the ID number to the left
- Focus the image using the 10x objective
- Put a drop of immersion oil on the smear
- Switch to the 100x objective. This will touch the immersion oil (if necessary, move the coarse adjustment screw to make sure that the oil immersion lens just touches the oil)
- Open the diaphragm completely and raise the condenser to its highest position
- Focus precisely with the fine adjustment screw

**How to read a skin smear:**

You need a microscope with a 10x eye piece and 10x and 100x objectives. Start the examination using the 10x objective. If acid-fast bacilli are seen, quantify them according to the following scale for the Bacteriological Index (BI). Calculate the BI for each smear separately:

Bacteriological Index (BI)

0, No bacilli seen in 100 fields

1+, 1 to 10 bacilli in 100 fields

2+, 1 to 10 bacilli in 10 fields

3+, 1 to 10 bacilli, on average, in each field

4+, 0 to 100 bacilli, on average, in each field

5+, 100 to 1000 bacilli, on average, in each field

6+, > 1000 bacilli, on average, in each field

The bacilli may be in the following forms solids, globi, fragmented & granular

- Write the result of both smears in the lab register
- Rinse the slide in xylene. Do not wipe it
- Store the slide in a slide box for future quality control
- Slides that are not kept for quality control should be destroyed, or disinfected, boiled and washed for re-use in routine examinations (of stool or urine, for example). Slides should not be re-used for other skin smears or for sputum examinations
- Give the result in the referral slips

Note: Report the BI for both smears on the slide. For smear-positive patients, either the average BI or the highest BI will be taken as the BI for that patient.

**Histopathology**

Some cases may need investigations to confirm the diagnosis of leprosy OR confirmation of relapse. Punch (5mm) biopsy or incision biopsy for histopathological examination may help in reaching the conclusion if analyzed along with clinical criteria. Specimen is taken from just inside the edge of the lesion / cutaneous branch of peripheral nerve near suspected lesion and processed. It is examined under microscope after proper staining. Presence of lepra bacilli in or around the nerve is diagnostic, but only granuloma or infiltration without support of clinical signs may mislead. It is probably advisable to give preference to the clinical presentation over the histological picture. If the two are at variance, a situation that is not uncommon.

Fine Needle Aspiration Cytology (FNAC) from the lymph glands is usually helpful if patient is in suspected lepra reaction type II.

**Radiological examinations**

X-rays are helpful in diagnosing osteoporosis, fractures of small bones, absorption of bones, sequestra. Ultrasonography of internal organs e.g. testes, reticulo-endothelial organs may help in judging the diagnosis and prognosis of complicated cases.



### 3. Training Requirements

**3.1** Training will be needed for PMR specialist / Surgeon, Ophthalmologist, Dermatologist, Anaesthetist, Medico Social Worker (MSW).

**3.2** Training curriculum and its duration for each category has been decided by the core committee formed for involvement of the PMR institutes under DPMR.

**3.3** Mobile training teams and institutional training centers are identified region-wise as below:

*South:*

- (i) CLTRI, Chengalpattu, Tamilnadu
- (ii) DFIT Hospital, Nellore, Andhra Pradesh
- (iii) CMC Vellore, Tamilnadu
- (iv) SLR&TC, Karigiri, Tamilnadu

*North:*

- (i) JALMA, ICMR, Agra, Uttar Pradesh
- (ii) TLM Hospital, Naini, Uttar Pradesh
- (iii) TLM Hospital, Shahdara, Delhi

*East/ North East:*

- (i) PMR Deptt., Patna Medical College, Bihar
- (ii) TLM Hospital, Kolkata

*West:*

- (i) J.J. Hospital, Plastic Surgery Department, Mumbai, Maharashtra
- (ii) All India Institute of Physical Medicine & Rehabilitation, Mumbai, Maharashtra

The trainers are to consider the following points -

- a) After training need assessment, plan for preparations, conducting and follow up of training courses would be prepared by the district in consultation with the State Leprosy Officer
- b) Prepare 'learning objectives' according to job / task given to trainee / different category of staff and then design the curriculum
- c) Concentrate on 'how to achieve learning objectives' through active learning process
- d) Select appropriate teaching method for each session e.g. case demonstration, role play, group exercises, case study etc. Select the content and teaching aids required
- e) Try to remove barriers / factors distracting learning
- f) Evaluate the training course, evaluate the participant's reaction & learning at the end of course and later on evaluate the performance on the job and effect of training after few months

#### **3.4 DPMR - Tasks to be carried out at tertiary care institutions**

- Basic Impairment assessment of each case and maintaining its record
- Diagnose reaction including neuritis and iridocyclitis
- Management of difficult cases of reactions including neuritis and Iridocyclitis
- Arrange for lab investigations including skin smears
- Perform surgery with appropriate pre and post operative care

- Review post operative status of patients after RCS at required intervals
- Management of complicated ulcers, eye complications and other difficult cases referred by secondary / primary level institutions
- Refer the patients back to secondary and primary level with instructions
- Maintain register for patient referred, RCS & other surgery done, reaction management and (foot-wear, prosthesis, splints etc.) material provided
- Generate a performance report monthly on DPMR
- Provide occupational therapy services (wherever possible)
- Refer for vocational training and change of activities of daily living
- Refer for socio-economic rehabilitation
- Train staff of primary and secondary level at medical colleges and PMR institutes (where feasible)

### 3.5 Curriculum

On-the-job training of Surgeon and Physio-technician will be given by resource persons from established surgical units. The various techniques of tendon transfer, myo-cutaneous flaps and temporalis transfer are demonstrated and redemonstrated and then assisted by the trainer.

## 4. Logistics & Supplies

All tertiary care institute should have :-

- 4.1 Fully equipped operation theatre and Medical Rehabilitation Centre.
- 4.2 All instruments, gadgets, aids and appliances required.
- 4.3 Adequate stock of Medical supplies like steroids, loose Clofazimine, Thalidomide, POP, dressing material etc.

### Procurement of materials

- The State Leprosy Societies will procure all materials required under DPMR plan and arrange to supply same to the concerned Govt. and Non – ILEP institutions through the concerned District Leprosy Society as decided by the State Implementation Committee.
- Concerned ILEP organization will procure all materials required for their respective tertiary care centres.

**Drugs** – Prednisolone, Loose Clofazimine, Thalidomide and other supportive drugs.

**Prednisolone** – Reactions in Leprosy are medical emergencies. Immediate treatment is essential to prevent disability. Steroids are the drug of choice in managing Leprosy – reactions, usage in the form of Prednisolone is desirable. Total number of 5 mg tablets of Prednisolone, required to treat an episode may be 336 – 462 - 518 tablets as per the recommended schedule of 3-6 months.

**Clofazimine** – should be made available in loose form as 100mg capsules apart from its routine availability in MDT Blister Calendar Packs. It has good anti-inflammatory properties in 300 to 400 mg per day in divided doses. But it takes nearly a month to act hence steroids should be the first line of treatment. Clofazimine is useful especially in weaning a patient from steroid therapy. Also it can be combined with steroids in patients who require prolonged doses of steroids to control repeated reactions. It should be started as thrice daily for one/two months, twice daily for one and tapered off.

**Thalidomide** – It is an effective drug in the treatment of severe ENL in leprosy. Thalidomide must be administered under the strictest possible supervision. Procurement of Thalidomide and its use may be as per GOI directions.

Other supportive drugs - antacids, H<sub>2</sub> receptor blockers, de-worming tablets, calcium supplements, soluble insulin for diabetic patients, antibiotics etc requirement needs to be anticipated and kept ready

**Splints and other materials** – Provision of splints, crutches, grip-aid, etc is also required in most of the cases and these should be arranged . Splints used in patients with leprosy are

- a. Static splints
- b. Dynamic splints

A static splint does not permit either active or passive movement of the joint, e.g. a plaster of Paris splint. A dynamic splint is defined as any splint which incorporates qualities of elasticity, or principles of recoil and permits active and or / passive movements in the joint. Dynamic splints need constant observation and supervision to ensure correct fitting, and require technical skill for their manufacture.

In severe lepra reactions, immobilization of the affected limb with a well – padded splint is helpful to relieve pain and stimulate healing, while unsplinted limbs are prone to develop contractures and deformities. Splints are very helpful in the mechanical correction of the claw hand, a deformity very commonly seen in patients with leprosy. Splints enable tendons of non-paralysed muscles to act effectively and thereby prevent and correct deformities. In patients with a mobile claw hand, the proximal interphalangeal joints can be extended and the fingers can be straightened by flexing the hyperextended metacarpophalangeal joints with assistance. Mobile claw hand are suitable for splinting, exercises and tendon transfer surgery, while tendon transfer surgery is of no use and therefore not indicated in fixed claw hands.

**MCR:** Special MCR foot-wear is not recommended routinely for all patients. Any suitable foot-wear with pre-requisites such as soft inner sole, hard outer sole (to prevent piercing of thorns/nails), that fits snugly and also has an adjustable straps preferably with a back-strap. The foot-wear should be stuck or stitched by thread but not by nails. Also it should be comfortable, locally available, socially acceptable, may be recommended.

However, if there is a provision available for MCR then it should be indented as per the no. of cases with grade 1 & grade 2 disabilities of foot.

### **Surgical instruments for Reconstructive Surgery in leprosy:**

1. Tendon Tunneller 13" - cvd ..... 2 Nos.
2. Tendon Tunneller 13" - St. .... 2 Nos.
3. Tendon Tunneller 7" - cvd ..... 2 Nos.
4. Tendon Tunneller 7" - St. .... 2 Nos.
5. Tendon hooks ..... 2 Nos.
6. Skin hooks ..... 4 pairs (8 Nos.)
7. Metzebaum scissors 5" - cvd., fine ..... 4 Nos.
8. Metzebaum scissors 7" - cvd. .... 4 Nos.
9. Metzebaum scissors 7" - St. .... 4 Nos.
10. Adson's forceps - toothed ..... 6 Nos.
11. Thumb forceps 6" - toothed ..... 4 Nos.
12. SS Spatula (as per sample) ..... 2 Nos.
13. Artery forceps 5" (mosq.- fine) ..... 8 Nos.
14. Artery forceps - 6" cvd, ord. .... 6 Nos.

15.	Artery forceps - 6" St., ord. ....	8 Nos.
16.	Artery forceps 5" (mosq. -rt. angled) .....	2 Nos.
17.	Kocher's forceps 6" .....	4 Nos.
18.	BP Handle No. 3 .....	4 Nos.
19.	BP Handle No. 4 .....	4 Nos.
20.	Fascia lata stripper .....	2 Nos.
21.	Senn's retractor .....	4 Nos. (2 pairs)
22.	Cat's paw retractor .....	4 Nos.
23.	Iris scissors - cvd. ....	2 Nos.
24.	Needle holders .....	8 Nos. (2 fine & 2 blunt)
25.	Plaster cutting scissors (as per sample) .....	4 Nos.
26.	Heath's suture cutting scissors .....	4 Nos.
27.	Engel's Plaster cutting saw .....	4 Nos.
28.	POP Shears .....	2 Nos. (1 Bohler & 1 Guy's POP Shears)
29.	Plaster cast spreader - Henning .....	2 Nos.
30.	Plaster bender - Bohler .....	2 Nos.

## 5. Records & Reports

• Disability Register	Form – T I
• Assessment of Disability and Nerve Function	Form – T II
• Record of Lepra Reaction / Neuritis (LRN) cases	Form – T III
• Prednisolone Card	Form – T IV
• Record of Disabled / Complicated Cases treated at Tertiary Level	Form – T V
• Discharge slip with follows up instructions	Form – T VI
• Postoperative Follow up of RCS in leprosy	Form – T VII
• Monthly report to district leprosy officer (DLO) on major RC Surgery carried out at the centre	Form – T VIII
• Monthly Report- List of Grade II cases Registered directly at Tertiary Level Care Centres	Form – T IX

## Disability Register

Form - T I

Name of the Hospital \_\_\_\_\_ District \_\_\_\_\_ State \_\_\_\_\_

S.No	Name of the patient	Age/Sex	Postal address	Date of Registration	Type of leprosy	Treatment (MDT) status (No. of BCP taken)	Disability Grade
1	2	3	4	5	6	7	8

Column No.

S.No	Name of the patient	Age/Sex	Postal address	Date of Registration	Type of leprosy	Treatment (MDT) status (No. of BCP taken)	Disability Grade	Hands		Feet		Eye	Services provided with date	Change / progress noticed	Referred to with date													
								Claw hand	Ulcer	Absorption of finger	Any other disability					Anaesthesia sole	Foot drop	Ulcer - Foot	Absorption of toes	Other disabilities (Foot)	Lagophthalmos	Low Vision	Red Eye					
9	Anaesthesia palm							10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26				

Column No.

## How to fill up the Form T I

- Column 1 : Serial no. to disabled cases is to be given  
 Column 2 : Complete name with surname along with son / daughter / wife of should be written  
 Column 3 : If patient is unable to tell the age, age should be assessed  
 Column 4 : Complete postal address with landmark / PIN to be given  
 Column 5 : Date of registration for MDT is to be written  
 Column 6 : PB or MB is to be written  
 Column 7 : Total number of BCP, MDT should be written  
 Column 9 to 21 : Tick mark on disability detected, more than 1 disability may be there.  
 Column 22-23 : Services such as self care training, ulcer care, surgery, issuing MCR shoes, refer to secondary level etc. may be entered along with respective dates.  
 Column 24-25 : Changes like ulcer healed, ulcer recurred, contractual developed, vision deteriorated new nerve damaged noticed etc.

## Disability Assessment form Assessment of Disability & Nerve Function

Name ..... Village ..... Dt. of Regn .....

S/o, W/o, D/o ..... Sub Centre ..... Dt. of RFT .....

Gender/Age ..... MDT No. .... Referred by .....














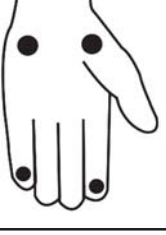






Occupation ..... MB/PB ..... Date of assessment .....

RIGHT						LEFT					
←————— Date —————→											
Vision (0,1,2)											
Light Closure lid gap in mm.											
Blink Present / Absent											
Little Finger Out											
Thumb Up											
Wrist Extension											
Foot Up											
Disability Grade Hands											
Disability Grade Feet											
Disability Grade Eyes											
On date											
Max. (WHO) Disability Grade											
EHF score											
Signature of Assessor											

<p><b>Muscle power:</b></p> <p>S = Strong</p> <p>W = Weak</p> <p>P = Paralysed</p>	<p><b>Score of vision: counting fingers at 6 meters</b></p> <p>0 = Normal</p> <p>1 = Blurred vision</p> <p>2 = Unable to count fingers</p>
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This form should be filled-in at the time of registration and repeated after 3 months (once in 2 weeks in case of neuritis/reaction)

## SENSORY ASSESSMENT

DATE / ASSESSOR	Palm		Sole		Comments
	RIGHT	LEFT	RIGHT	LEFT	
					
					
					
					
					

**Key :** (Put these mark/icon on the site where lesion is seen)

✓ Sensation Present within 3 cms	S Contracture	○ Scar/Callus
X Anaesthesia	⊗ Wound	⊕ Shortening Level
∧ Clawing	▬ Crack	



## Record of Lepra Reaction/ Neuritis (LRN) cases

Name of the Hospital \_\_\_\_\_ District \_\_\_\_\_ State \_\_\_\_\_

Col.No.1	Col.No.2	Col. No.3	Col. No.4	Col.No.5		Col.No.6	
S. No.	Name of the patient	Date of registration	MDT No. / registration No.	Type of leprosy		Lepra Reaction	
				MB	PB	Type	Neuritis
				I	II	Y	N

Col.No.7	Col. No.8	Col.No.9	Col.No.10
Treatment given		New disability developed After start of Prednisolone	Remarks
Prednisolone doses issued with dates			
	Other drugs		

**How to fill up the Form T III**

- Column 1 : Serial no. of reaction cases is to be given
- Column 2 : Complete name with surname along with son / daughter / wife of should be written
- Column 3 : Date of registration of MDT is to be written
- Column 7 : Doses of Prednisolone in milligram with date of issue to be filled
- Column 8 : Enter Clofazimine, Analgesics, Mebandazole, or any other drug given.
- Column 9 : In case of yes, write the nature and site(LT /RT) of disability developed

## Prednisolone Card

(This card should be kept with the patient)

### INSTRUCTIONS

- Take Prednisolone tablets as single dose daily with milk / food but never on empty stomach
- Restrict salt intake till on Prednisolone
- Inform soon if you notice black stool (malena), pain upper abdomen or vomiting
- Inform immediately if discharge in planter ulcer, any focus of infection, persisting cough, mild fever or any deterioration
- Don't stop Prednisolone before completion of regimen, even if there is improvement or deterioration.
- Report for review / check up and next dosage, every fortnight

### NATIONAL LEPROSY ERADICATION PROGRAMME

#### PREDNISOLONE – CARD

Name of the patient .....

Reg. No./ MDT No. ....

Type MB / PB

Date / Due Date of RFT .....

Indication for Prednisolone therapy:  
 .....  
 .....

Date of starting Prednisolone .....

Signature of MO / Supervisor

### PREDNISOLONE RECORD

Dosage	Date of issue	Next due date	Signature
40mg x 2 wk.			
30mg x 2 wk.			
20mg x 2 wk.			
Do (if required)			
15mg x 2 wk.			
Do (if required)			
10mg x 2 wk.			
Do (if required)			
5mg x 2 wk.			
Do (if required)			

Other drugs issued .....

Progress / Remarks .....

Signature of MO .....

Name .....

Place .....

## Record of Disabled / Complicated Cases treated at Tertiary Level

Name of the Hospital \_\_\_\_\_ District \_\_\_\_\_ State \_\_\_\_\_

Date	Sl. No.	Name of Patient	Age/ Sex	Address	Referred by / Direct	Dignosis	Services Provided	Status at discharge, with date/ Referred back to
1	2	3	4	5	6	7	8	9

### Discharge slip with follows up instructions

Name of the institution .....
Name of the patient .....
Age & sex .....
Address .....
.....
Referred from .....
Indication / complication for referral .....
.....
Investigations done & reports .....
.....
.....
Treatment given .....
.....
Instructions to follow .....
.....
.....
.....
Name & signature of MO / Supervisor .....
Date of discharge .....

## Postoperative Follow up of RCS in leprosy

Name of Institute: \_\_\_\_\_ Hosp. / MDT No.: \_\_\_\_\_

Name: \_\_\_\_\_ Sex: \_\_\_\_\_ Age: \_\_\_\_\_ Occupation: \_\_\_\_\_

Date of operation: \_\_\_\_\_ Type of operation: \_\_\_\_\_

Follow-up (date): 3rd month  6th month  Yearly → 1<sup>st</sup>  2<sup>nd</sup>  3<sup>rd</sup>  4<sup>th</sup>  5<sup>th</sup>

<b>HAND</b>			
Fully open hand	Hyperextension of MCP Jts. absent	Yes	No
Fully closed hand possible		Yes	No
Lumbrical position possible		Yes	No
Grasp	Good grasp of opposite forearm possible	Yes	No
Thumb	a. Abduction & Opposition possible	Yes	No
	b. Pulp to pulp pinch possible	Yes	No

<b>FOOT</b>			
Drop foot correction	Heel to toe walking gait	Yes	No
Claw Toes correction	Straight toes	Yes	No

<b>EYE</b>			
Lagophthalmos correction	Able to fully close eye /s	Yes	No

MCP Jts. → Metacarpophangeal Joints

Post operative follow-up:

1<sup>st</sup> : 3months after discharge

2<sup>nd</sup> : 6 months after discharge

3<sup>rd</sup> : 12 months after discharge

Then onwards: Yearly once for 5 years.

Signature of MO

Signature of PT







## 6. Supervision & Monitoring

The state implementation committee for RCS and Rehabilitation Programme set up, consisting of the State Leprosy Officer, Member nominated by Central Leprosy Division, State ILEP Coordinator, PMR Specialist / orthopaedic surgeon, Dermatologist, Plastic surgeon, Ophthalmologist, Dean/ Superintendent/ Principal of the Medical College will monitor the DPMR activities at the institution including record keeping and reporting.

## 7. Coordination and Linkages

**Coordination:** A good Coordination will make the best use of limited human and financial resources; facilitate integration and deliver the DPMR activities through GHCS in a cost-effective manner. To perform various activities of DPMR satisfactorily it is mandatory to closely coordinate with the various divisions and departments of the health services. Coordination with district level through district nucleus is crucial in procurement of drugs, consumables, aids & appliances, consolidate information and reporting.

**Linkages:** should also be established and strengthened, wherever possible, with local and external NGO's who provide services to leprosy cases. There should be linkages with concerned department of Ministry of Social Welfare, empowerment and social justice, and NGOs working for the upliftment of socio-economic weaker section affected by leprosy. Institutions which provide investigations facilities like PCR, serological tests, histopathological examinations and mouse foot pad inoculations to study drug resistance or viability of *M. Leprae* and so on.

7.1 The District Nucleus(s) under the jurisdiction of the tertiary care units will keep coordination and linkages between the centre and primary / secondary centers in their districts and ensure referral of patient for corrective surgery routinely.

7.2 The tertiary centers to refer back cases to the secondary / primary centers for follow up management.

