

# PREVENTION OF DISABILITIES IN PATIENTS WITH LEPROSY

A  
PRACTICAL  
GUIDE

H. SRINIVASAN



WORLD  
HEALTH ORGANIZATION  
GENEVA

# Prevention of disabilities in patients with leprosy

---

## **A PRACTICAL GUIDE**

H. Srinivasan

former Director  
Central JALMA Institute for Leprosy  
Agra, India

World Health Organization  
Geneva  
1993

WHO Library Cataloguing in Publication Data

Srinivasan, H.

Prevention of disabilities in patients with leprosy : a practical guide.

1.Leprosy — complications 2.Leprosy — therapy I.Title

ISBN 92 4 154456 2 (NLM Classification: WC 335)

The World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full. Applications and enquiries should be addressed to the Office of Publications, World Health Organization, Geneva, Switzerland, which will be glad to provide the latest information on any changes made to the text, plans for new editions, and reprints and translations already available.

© World Health Organization 1993

Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. All rights reserved.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

The author alone is responsible for the views expressed in this publication.

TYPESET IN INDIA  
PRINTED IN ENGLAND  
92/9512 — Macmillan/Clays — 7000

---

## Foreword

Leprosy continues to be of major concern in developing countries, not only because of the large numbers of people affected by it and their potential for communicating the disease to others, but also because of the occurrence of deformities in a proportion of patients. While the introduction and widespread application of multidrug therapy over the past decade has resulted in significant reductions in the incidence of the disease, the impact on the associated disabilities and deformities has been very limited. Action is needed in order to prevent, limit and correct deformities among individuals who have or have had the disease. It is in this context that this guide, outlining the measures and actions for disability prevention that need to be undertaken at field level, has been prepared.

The guide is based on the recommendations of a WHO Consultation on Disability Prevention and Rehabilitation in Leprosy, which met in Geneva from 9 to 11 March 1987. The manuscript and illustrations were prepared by Dr H. Srinivasan, whose contribution is gratefully acknowledged. Acknowledgement is also due to those who reviewed the manuscript and provided many useful suggestions and criticisms. The reviewers included: Dr P. Bourrel, formerly Professor at the Institute of Tropical Medicine, Marseille, France; Dr P. Brand, formerly of the Department of Health and Human Services, Gillis W. Long Hansen's Disease Centre, Carville, LA, USA; Dr F. Duerksen, Lauro de Souza Lima Hospital, Bauru, São Paulo, Brazil; Dr L. N. N'Deli, formerly of the Raoul Follereau Institute, Adzope, Côte d'Ivoire; and Dr D. D. Palande, formerly of the Sacred Heart Leprosy Centre, Sakkottai, Kumbakonam, India.

Even though this guide is not a formal training manual, it can still be used as a teaching aid. It does not address a specific category of health worker, since it is expected that the responsibility for disability prevention will vary in different countries and in different areas in a country. Because of the diversity of the audience, only a very limited amount of theoretical information considered essential for understanding the rationale of the

procedures has been included. Methods of eye care have not been included, since there are already a number of excellent guides covering this area.

It should be realized that this guide is not intended to provide an exhaustive review of techniques in disability prevention; however, it does highlight the essential principles of disability prevention in patients with leprosy and describes various simple techniques that can be adapted to meet local needs. It is hoped that, with increasing practical field experience, it will be possible to improve our techniques in disability prevention. If this guide helps in that direction, to any extent, it will have fulfilled its purpose.

Dr S. K. Noordeen  
Chief Medical Officer, Leprosy Control  
World Health Organization

---

# Contents

Foreword	vii
Introduction	1
<b>Chapter 1 Consequences of leprosy</b>	<b>3</b>
1.1 Impairments	3
1.2 Secondary impairments	3
1.3 Disability	4
1.4 Handicaps, rehabilitation and destitution	4
1.5 Disability prevention	5
<b>Chapter 2 Nerve trunk involvement and its consequences</b>	<b>6</b>
2.1 Stages of nerve involvement	6
Stage of involvement	6
Stage of damage	6
Stage of destruction	7
2.2 Types of nerves affected	8
2.3 Effects of damage to nerve trunks	8
Composition of nerve trunks	8
Effects of damage to nerve trunks	8
Secondary impairments following nerve trunk damage	12
<b>Chapter 3 Disability prevention</b>	<b>16</b>
3.1 Goals and aims of disability prevention	16
3.2 Actions by health care workers	16
Assess and record the risk status of the patient	17
Assess and record the disability status	19
Treat treatable conditions	20

	Instruct and train patients	20
	Monitor and support patients	21
3.3	Actions by patients	22
3.4	Summary	22
<b>Chapter 4</b>	<b>Preventing damage to insensitive hands</b>	<b>24</b>
4.1	Examine to ascertain the risk status	24
	Sensibility testing	24
	Skin condition	24
	Stiffness of joints	25
	Deformity	25
4.2	Assignment of risk status	26
4.3	Record the risk status of the hand	26
4.4	Assess and record the current impairment status	26
4.5	Treat treatable conditions	28
	Priorities	28
	Raw areas in the hand	28
	Callosities	38
	Swelling of the hand	40
	Deformity	44
<b>Chapter 5</b>	<b>Preventing damage to insensitive feet</b>	<b>50</b>
5.1	Examine to ascertain the risk status	50
	Sensibility testing	50
	Skin condition	50
	Deformity	50
	Muscle weakness	51
	Swelling	51
5.2	Assignment of risk status	54
5.3	Record the risk status of the foot	55
5.4	Assess and record the current impairment status	55
5.5	Treat treatable conditions	56
	Priorities	56
	Callosities and thickened skin	57
	Blisters	61
	Raw areas in the foot	65

	Muscle weakness in the leg	70
	Recent swelling of the foot	74
<b>Chapter 6</b>	<b>Preserving nerve function</b>	<b>80</b>
6.1	Recognize damage early	80
	Recognize onset of nerve damage	80
	Recognize worsening of nerve damage	81
	Recognize loss of sweating	82
	Recognize loss of sensibility (sensory loss)	82
	Recognize muscle weakness	84
6.2	Recognize damaged nerve trunks	84
	Recognize ulnar nerve damage	85
	Recognize median nerve damage	88
	Recognize damage to the posterior tibial nerve	91
	Recognize damage to the common peroneal nerve	95
	Recognize damage to the radial nerve trunk	97
	Recognize facial nerve damage	98
6.3	Onset and worsening of nerve damage	100
	Onset of nerve damage	100
	Worsening of nerve damage	101
6.4	Preserving nerve function	102
	Actions required	102
	Assess and record the risk status of the nerve trunks	102
	Assess and record the degree of nerve involvement	105
	Nerves at low risk of damage	106
	Nerves at risk of damage	106
	Nerves in danger of destruction	107
	Treatment of nerves in danger of destruction	107
6.5	Instructing patients about preserving nerve function	112
	Aims of instructions	112
	Knowledge of consequences of nerve damage	112
	Recognizing onset and worsening of nerve damage	113
	Report without delay	114
	Explain treatment	114
	Summary	115



<b>Chapter 7</b>	<b>Instructing and training patients in disability prevention</b>	<b>116</b>
7.1	Patient participation essential	116
7.2	What patients should know about disabilities	116
7.3	What patients should know about disability prevention	117
7.4	What patients should do to preserve insensitive hands and feet	118
	General precautionary measures	118
	Special care procedures	123
7.5	Instructing and training patients	125
	Instruction and training	125
	Purpose of instructing and training patients	126
	Target persons	126
	Some hints on instructing and training patients	127
	Training patients to carry out specific tasks	129
<b>Chapter 8</b>	<b>Monitoring and supporting patients</b>	<b>134</b>
8.1	Importance of monitoring and supporting patients	134
8.2	Purpose of monitoring	134
	To motivate patients to practise disability prevention	135
	To correct wrong practices	135
	To detect new problems	135
	To learn from patients	135
8.3	Actions required	135
	Assessment for monitoring	136
	Verifying patients' practices	136
8.4	Supporting patients	137
	Material support	138
	Moral support	138
	Social support	139

---

# Introduction

This is a practical guide for peripheral health personnel to help them deal with the task of preventing disabilities and deformities in leprosy patients in their care. Most leprosy patients do *not* have disabilities or deformities when the disease first appears, and develop them later. Even when patients develop disabilities and deformities, they are mild and reversible to begin with and become severe and permanent only later on. Indeed, many conditions leading to disability and deformity can be cured if action is taken at an early stage, and the development of disabilities and deformities can be prevented.

Prevention of disabilities and deformities is easier during the early stages of their development and the actions necessary for such prevention can be taken at that stage in the field, by peripheral health personnel.

Disabilities and deformities can be prevented  
under field conditions

Disabilities and deformities progress and worsen only gradually in most patients. Timely action can prevent such worsening. Again, this can be achieved under field conditions.

Worsening of disabilities and deformities can be  
prevented under field conditions

It is most important to realize that the peripheral worker cannot prevent disabilities in leprosy patients simply by giving them pills or distributing pamphlets among them. Disability prevention requires active collaboration between health care personnel on the one hand and patients and their

families on the other. Only then can the goal of prevention of disability in leprosy patients be realized.

Disability prevention requires health care personnel and patients to work together

How to achieve this goal is described in this manual. In Chapter 1 the consequences of leprosy are outlined, while Chapter 3 describes the goals and aims of disability prevention. Further details of how to achieve these goals are described in subsequent chapters, which also describe the specific actions needed to prevent disability in patients with insensitive hands and feet (Chapters 4 and 5) and to preserve nerve function (Chapter 6).

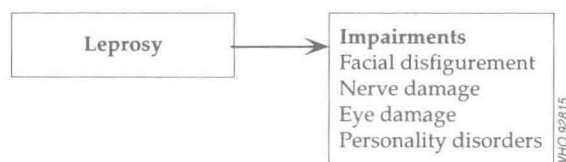
---

**CHAPTER 1**

# Consequences of leprosy

## 1.1 Impairments

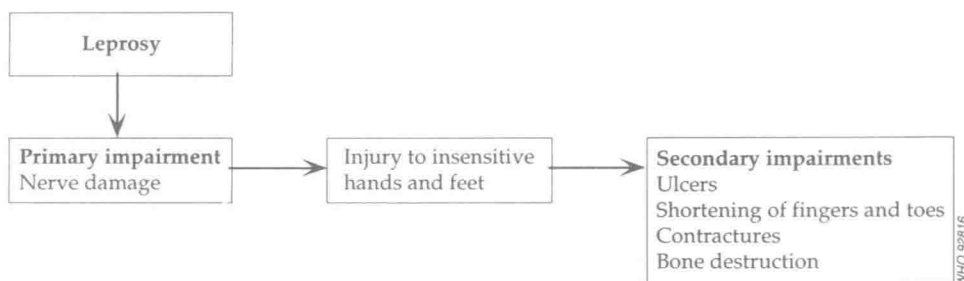
Disease produces changes in the structure and functioning of certain parts of the body. These changes are called **impairments**. In the case of leprosy they occur in: (i) the face, giving rise to facial disfigurement and deformities; (ii) the nerves, damaging their structure and function; (iii) the eyes, causing defective vision; and (iv) the minds of patients, giving rise to personality disorders. Facial disfigurement, nerve damage, eye damage and personality disorders are impairments directly resulting from leprosy.



A deformity is a visible impairment or a visible consequence of an impairment inside the body.

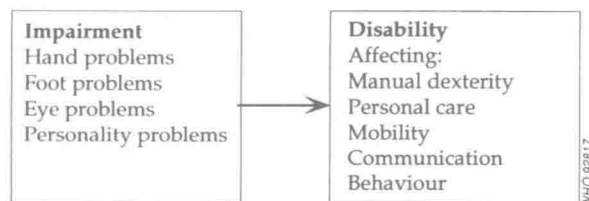
## 1.2 Secondary impairments

An impairment resulting directly from a disease can itself lead to the development of further, secondary, impairments. In leprosy, the conditions grouped as “anaesthetic deformities” are secondary impairments. These are the complications that result from unprotected use of insensitive hands and feet, e.g. ulcers, stiff joints or contractures of fingers, shortening of fingers and toes, and disintegration of bones of the foot. The insensitivity in the hands and feet is due to nerve damage, which is a primary impairment, since it is a direct consequence of leprosy.



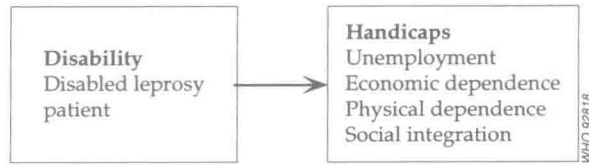
### 1.3 Disability

When there is an impairment (primary or secondary), the affected person finds it difficult or impossible to carry out certain activities; this is a **disability**. Leprosy patients often suffer from a variety of disabilities. For example, manual dexterity (skilful use of the hand) may be affected because of insensitivity and muscle paralysis; walking may become difficult because of ulcers or disintegration of bones of the foot; orientation in space, mobility and many other aspects of living may become difficult or impossible because the eyesight has become very poor; and behaviour may be affected by personality disorders.



### 1.4 Handicaps, debilitation and destitution

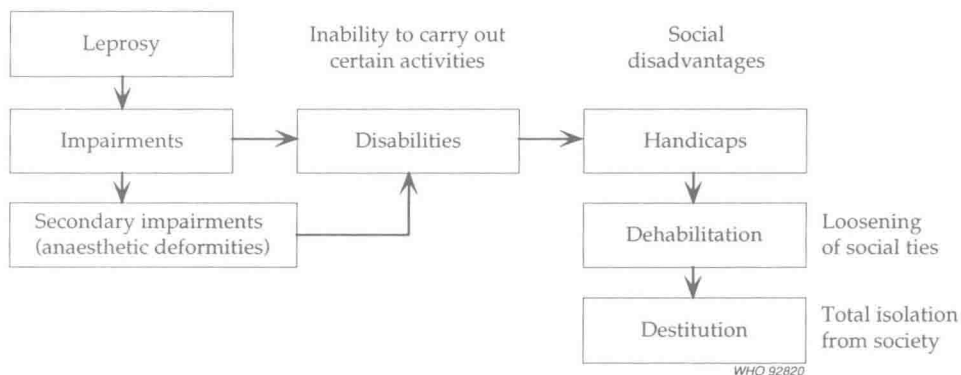
A persistently disabled person experiences many disadvantages that limit or prevent that person from fulfilling his or her normal role in society. These disadvantages are known as **handicaps**. Leprosy patients with disabilities experience and suffer from a variety of handicaps. For example, they may lose their jobs and, therefore, their economic independence, which means that they cannot support their families. In addition, those who are severely disabled may lose their physical independence, since they need others to care for them. In some places the mere diagnosis of leprosy is sufficient to handicap the affected person, even when there is no disability.



Eventually, the leprosy patient loses social status and becomes progressively isolated from society, family and friends. This is the process of debilitation. Debilitation is completed when the patient is forced to leave his or her home and settle in a rehabilitation home or in a leprosy colony with other patients. Some patients eventually find themselves completely isolated from all society and destitute (without food or shelter).



The above-mentioned consequences of leprosy are shown in a schematic form below.



## 1.5 Disability prevention

For many people, leprosy is always associated with deformities. Prevention of disability involves prevention of impairments and so of deformities as well, and their worsening. By successfully implementing disability prevention, and by helping patients to overcome their disabilities, health workers can prevent them from becoming handicapped and debilitated.

---

**CHAPTER 2**

# Nerve trunk involvement and its consequences

## 2.1 Stages of nerve involvement

Most disability problems in leprosy patients occur because nerve trunks are affected by the disease. The affected nerves may be in the stage of involvement, stage of damage, or stage of destruction.

### Stage of involvement

At the stage of involvement the affected nerve trunk is thicker than normal (nerve thickening) and it may be painful to touch (nerve tenderness). There may also be spontaneous pain (nerve pain) of varying severity. However, there is no evidence of loss of function, e.g. anaesthesia or muscle weakness.

#### **I Stage of involvement**

- Thickening of nerve
- Tenderness
- Pain
- No loss of function

### Stage of damage

When an involved nerve trunk becomes damaged, its functions are affected. The area of skin supplied by the nerve does not sweat (loss of sweating) and cannot feel (loss of sensibility or sensory loss or anaesthesia). If the affected nerve also supplies some muscles, they become weak or paralysed (motor paralysis). These signs indicate that the nerve trunk is getting damaged or paralysed.

The stage of damage is diagnosed when there is incomplete nerve paralysis or when the nerve trunk has been completely paralysed for not more than 6–9 months.

### **II Stage of damage**

- Loss of sweating
- Loss of sensibility
- Muscle weakness
- Incomplete paralysis or recent complete paralysis
- Recovery possible

Nerve paralysis is said to be incomplete:

- when sensations are still felt in some areas of skin supplied by the affected nerve;
- when the loss of sensibility is partial, affecting only certain types of sensations;
- when some of the muscles supplied by the affected nerve are not completely paralysed.

Nerve paralysis is said to be complete:

- when the entire area of skin supplied by the affected nerve shows loss of sensibility;
- when the loss of sensibility is total, affecting all types of sensations;
- when all the muscles supplied by the nerve are completely paralysed.

It is important to recognize the stage of nerve damage because these nerves can recover with treatment. By treating patients at this stage, you can prevent permanent nerve paralysis and prevent permanent disability and deformity.

## **Stage of destruction**

This is the end stage when the damaged nerve has been completely destroyed. At this stage, even with treatment, the nerve cannot recover function to any useful degree. This stage is diagnosed when the nerve has been completely paralysed for at least one year.

### **III Stage of destruction**

- Complete nerve paralysis present for at least one year
- Nerve is destroyed
- No recovery possible



The above information regarding the different stages of affection of nerves in leprosy patients is summarized in the scheme shown below.



## 2.2 Types of nerves affected

Three kinds of nerves are affected in leprosy patients. They are: (i) *dermal nerves*, which are very fine nerves in the skin; (ii) *cutaneous nerves*, which are thicker nerves that run just under the skin; and (iii) *major nerve trunks*, which are large nerves. From the point of view of disability and deformity, damage to nerve trunks is far more important than damage to dermal or cutaneous nerves.

The nerve trunks commonly affected in leprosy are shown in Fig. 1. The nerves supplying the hands and feet are frequently affected and that is the reason why these parts are often the sites of impairments and deformities which cause disability.

## 2.3 Effects of damage to nerve trunks

### Composition of nerve trunks

Nerve trunks are mixed nerves, that is they carry nerve fibres supplying the skin as well as those supplying muscles. These fibres convey messages or signals: (i) from the skin to the brain, providing the ability to feel sensations in the skin (sensitivity); (ii) from the brain to the sweat glands in the skin, stimulating these glands to function and keep the skin moist and supple; and (iii) from the brain to the muscles, stimulating the muscles to function (Fig. 2).

### Effects of damage to nerve trunks

When a nerve trunk is damaged at a particular site, messages do not pass across the damaged site. This means that the normal communication between the brain and an area of skin as well as a group of muscles is