WHO/CDS/CPE/CEE/2001.26a
Distribution: General
Original: English

Lymphoedema Staff Manual

Treatment and Prevention of Problems Associated with Lymphatic Filariasis

G. Dreyer, D. Addiss, J. Bettinger,
P. Dreyer, J. Norões, F. Rio

Part 1. Learner's Guide

World Health Organization
Geneva

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World Health Organization
Geneva, Switzerland
November 2001

PREFACE

This training module on the treatment and prevention of lymphoedema due to lymphatic filariasis (LF) consists of two separate parts: Part 1 (this part), the Learner's Guide, contains all the technical information needed by health workers involved in disability alleviation and prevention. Part 2, the Tutor's Guide, outlines the main learning points and provides guidance on the learning process for those responsible for conducting training programmes.

This document is part of a series on several topics related to lymphatic filariasis that will be produced by the World Health Organization to assist national elimination programmes on the different aspects of the disease.

Addressing the social hardships and alleviating of the physical suffering of individuals affected by the chronic manifestations of lymphatic filariasis (lymphoedema, hydrocoele, elephantiasis of the limbs or genitals, and the secondary infections associated with damaged lymphatics) are vital elements of the strategy to eliminate lymphatic filariasis.

This training module is the first attempt to address the needs of patients affected by lymphoedema and is based on experience from small-scale interventions in limited areas in Brazil and Haiti.

Lessons learned from the scaling-up of these interventions in other countries will provide the critical information required to define an effective, affordable and simple approach to the management of lymphoedema at community level. This information will ensure a solid basis for the production of new training materials for health personnel and different levels of the health system in order to scale-up the public health interventions of this essential component of LF elimination in national programmes.

Contributions from all concerned health professionals, particularly from the fields will be essential to succeed in this challenge.

PRINCIPAL AUTHORS

The text of Part 1, Learner's Guide, was written by Dr Gerusa Dreyer, Federal University of Pernambuco, Recife, Brazil and Dr David Addiss, Centers for Disease Control, Atlanta, USA, in collaboration with Dr Joaquim Norões, Hospital das Clinicas, Recife, Brazil, Ms Patricia Dreyer, non-governmental organization Amaury Coutinho, Recife, Brazil and Ms Julie Bettinger, Center for Disease Control, Atlanta, USA; Part 2, Tutor's Guide, was written by Dr Francesco Rio, Lymphatic Filariasis Elimination Programme, Control, Prevention and Eradication, World Health Organization, Geneva.

ACKNOWLEDGEMENTS

The World Health Organization wishes to acknowledge the financial support provided by the Ministry of Health and Welfare of the Government of Japan.

CONTENTS

INTRODUCTION

The World Health Organization's Programme to Eliminate Lymphatic Filariasis has two major objectives: (a) to stop the spread of filarial infection; and (b) to alleviate and prevent the suffering and disability of affected individuals. The purpose of this module is to address the technical component of the second objective, by providing technical information for those involved in the management of the clinical manifestations of lymphatic filariasis at community level.

Objectives of the Learner's module

At the end of the training programme, based on the Learner's Guide, the learners should be able to:

- Describe the consequences of filariasis on the lymphatic vessels
- Stage lymphoedema based on physical signs
- List the components of lymphoedema management
- Identify the benefits of these components
- Apply the components to the various stages of lymphoedema
- Decide when a patient needs to be referred to a health centre
- Establish how to manage acute attacks
- Identify urogenital problems in lymphatic filariasis
- Teach proper hygiene for genital lymphoedema
- Advise on an appropriate diet for patients with chyluria.

How this subject will be taught

Facilitators

Facilitators are people who work with the Tutor to achieve the objectives outlined above. They lead the discussions and help learners generally, especially when working in small groups.

Presentations

Presentations in the form of lectures are usually kept to a minimum and each lecture will be kept as short as possible. The information given in the lectures is already in the Guide so there will be little need for the learners to take notes. A lecture presentation will usually be combined with a practical demonstration.

Demonstrations

Demonstrations will be used to illustrate and reinforce activities that the learner will carry out later. A great degree of interaction between the Tutor, facilitators and learners is expected.

Practical sessions

Practical sessions are intended to help the learner to gain as much practical experience as possible (e.g. in the case of Learning Unit 3: "Assessment of Lymphoedema"). Each facilitator works with a small group of 4-5 learners in order to pay a great deal of attention to individuals.

Role play

In a role play exercise the learners are asked to pretend to be a person in a situation that might arise during his or her job. For example, the learners may be asked to play the part of a recalcitrant patient with chyluria asking for information about the appropriate diet to follow in order to minimize the effect of the disease. The learners should then discuss their observations. Much can be learned from this kind of exercise.

Small group discussion

In this exercise a facilitator leads a discussion on a particular subject. Such discussions provide good opportunities for the learners to give their opinions, develop ideas and learn from one another.

Use of the Learner's Guide

The Learner's Guide provides instruction on prevention and treatment of lymphoedema in lymphatic filariasis and is designed to enable the learners to achieve the objectives stated above. It is divided into six Learning Units, each consisting of a number of learning objectives. Learners will achieve these objectives by consistently following the Tutor's instructions and by close interaction with the latter. The learners must have assimilated the knowledge of one unit before proceeding to the next. If they require clarification on any point in a unit they should ask their Tutor or fellow learners.

Presentation

Learners are expected to have read the section of the learning unit to be covered before the start of the session and formal presentation of information will be limited to introductory remarks by the Tutor at the beginning of each subject. All the information that the learners will need is contained in the Guide and they will not need to take notes during the sessions.

Evaluation

Evaluation of the learner

The evaluation of individual progress will be carried out by the Tutor and by the learner. It will include:

- Spot tests – at regular intervals a series of questions aimed at testing the learner's knowledge will be asked by the Tutor. They are designed to help the learner and Tutor to assess the competence gained. Correct answers will be provided after the spot tests and discussion will take place to ensure that activities requiring further practice are highlighted.

- Multiple-choice/true-false quizzes – each question is provided with a list of possible answers from which the learners must select the correct one(s). At the end of these quizzes it will not be necessary to give the answers to each question but the Tutor will analyse the results to identify topics that were not clearly understood and they will be discussed in plenary.

Evaluation of the training by the learner

By means of a questionnaire distributed at the end of the training course, the Tutor will ask the learners for their opinion of the training activity. It is important to receive this type of feedback for improvement of future training activities. The learners are able to complete the evaluation questionnaire anonymously if they wish; however, each one should complete it and should feel free to make suggestions for improvements, whether it concerns the Tutor, the course content, the training facilities or all three.

Notes

LEARNING UNIT 1

Mass Drug Administration for Lymphatic Filariasis

Learning objectives

By the end of this unit you should be able to:

- describe how lymphatic filariasis is spread
- describe how mass drug administration can prevent the spread of filariasis

Lymphatic filariasis

More than 120 million men, women and children suffer from lymphatic filariasis and its lasting effects. It is a leading cause of disability in the world.

Lymphatic filariasis is caused by parasitic worms. The adult worms (Fig. 1) live in human lymph vessels. They release millions of very small worms (microfilariae) , which live in the blood and can only be seen with a microscope (Fig. 2). The disease is spread from person to person by mosquitoes. When a mosquito bites a person with microfilariae in his blood, the mosquito takes up the microfilariae and can spread lymphatic filariasis to other people (Fig. 3).

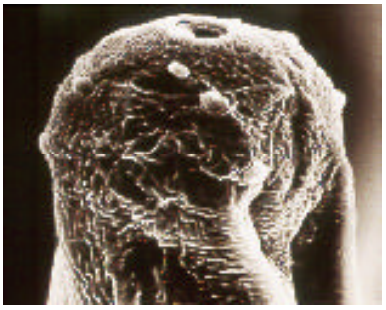


Fig. 1 - Head of female adult worm seen by electron microscopy. The adult worms live in lymphatic vessels.(Courtesy of Dr A. C. Araújo).

Fig. 2 – Small worms (microfilariae) can be seen only with a microscope. They live in the blood of the people with filarial infection.

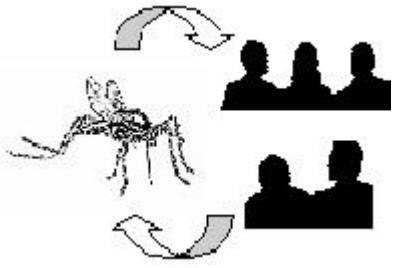


Fig. 3 - Microfilariae are taken up by mosquitoes, where they develop into filarial worms that can once again infect people.

Lymphatic filariasis causes swelling (lymphoedema) in the legs (Fig. 4), arms (Fig. 5), and breasts (Fig. 6), and in the genitals of men (Fig. 7). Advanced lymphoedema is known as elephantiasis (Fig. 8).

Fig. 4 - Patient with lymphoedema of the left leg.

Fig. 5 - Patient with lymphoedema of the right arm.

Fig. 6 – Patient with breast elephantiasis.

Fig. 7 - Patient with lymphoedema of the scrotum and penis.

Fig. 8 - Patient with elephantiasis

Until recently, there was no treatment or help for people who suffered from the disease, but it is now possible to rid communities of lymphatic filariasis and prevent children from becoming sick. While there is still no cure for those who already have the disease, there are now new ways to manage the disease that are easy, inexpensive and effective (Fig. 9). The complete booklet mentioned in Fig. 9 can be found in Annex 1.

Fig. 9 - The cover of the booklet for patients developed and currently used in Recife, Brazil.

Mass drug administration

The primary goal of providing drugs to affected communities is to eliminate microfilariae from the blood of infected individuals so that transmission of the disease by mosquitoes can be interrupted. The use of a single-dose of 2 drugs administered concurrently (albendazole plus diethylcarbamazine (DEC) or albendazole plus ivermectin) is 99% effective in removing microfilariae from the blood for a full year after treatment. It is this level of treatment effectiveness that has made feasible the effort to eliminate lymphatic filariasis.

A day or two after treatment with antifilarial drugs, people with high microfilaraemia may suffer from fever, headache, fatigue and muscle aches. These symptoms usually do not last more than 48 hours, and are the result of the drug killing the microfilariae in the blood. Rest and medicine for pain and fever (e.g. paracetamol) may be helpful.

In addition to killing microfilariae, DEC also kills some of the adult worms. This produces no symptoms in many patients, but some people complain of tenderness and a hard lump at the location of the dead worms. Men may feel tenderness in the scrotal area because that is where most adult worms live in men. In women, worms live in the upper leg or arm, groin, or breast, and adult worm death may cause tenderness and a hard lump in these sites. Pregnant women may feel very sick.

The inflammation around the dead worm can spread towards the foot or hand, causing a tender cord, or streaking (retrograde lymphangitis, Fig. 10). Rarely, the filarial adult worm death causes lymphoedema, but this is transitory. When adult worms die, either naturally or after treatment with DEC, the patient may feel unwell, but can usually continue normal activities. Patients can be instructed to use a cool compress on the painful area, to rest, and to take pain medicine (e.g. paracetamol).

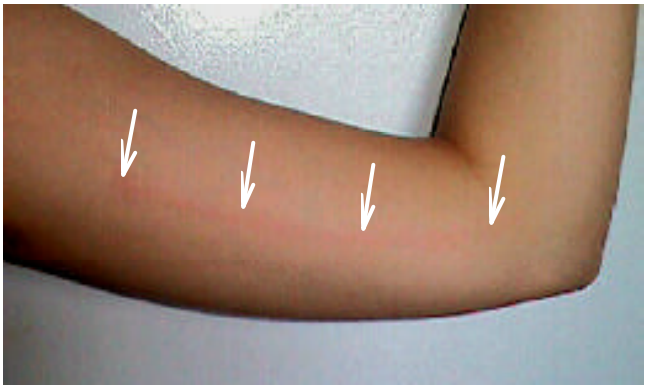


Fig. 10 - Retrograde lymphangitis (arrows) after filarial adult worm death. The white arrow shows the starting point of the process, which moves towards the elbow.

Notes

LEARNING UNIT 2

The Lymphatic System

Learning objectives

By the end of this unit you should be able to:

- describe the functions of the lymphatic system
- list the consequences of filariasis for the lymphatic vessels

The lymphatic system

The lymphatic system has two important functions:

1. it keeps the body's fluids in balance by taking away the waste and the excess fluid produced by tissues throughout the body; and
2. it combats bacteria that cause infections.

The network of lymphatic vessels is like a system of small streams, which flow together to form ever larger streams which eventually flow to the heart. The smallest vessels are located throughout the skin, including the skin of the feet, penis, and scrotum. These smaller vessels merge together into larger ones. Inside the larger vessels, the fluid can move in only one direction, towards the heart (Fig. 11). Exercise helps move the lymph fluid through the lymphatic vessels. When a muscle tightens, it pushes the fluid through the lymphatic vessel towards the heart.

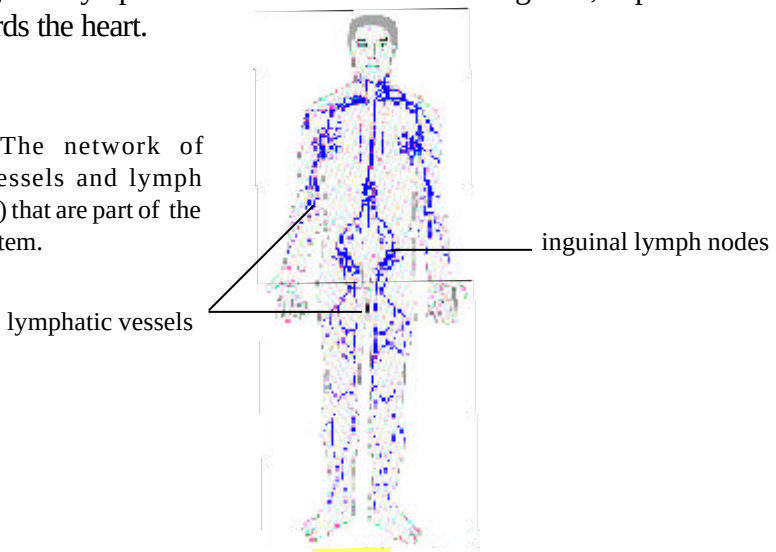


Fig. 11 – The network of lymphatic vessels and lymph nodes (in blue) that are part of the lymphatic system.

Lymph nodes, found at certain points along the lymphatic vessels (Fig. 11), filter bacteria from the lymph fluid. When the lymph nodes trap bacteria they grow large and tender, giving rise to swellings under the skin.

Consequences of filariasis for the lymphatic system

Adult filarial worms live in lymphatic vessels and cause the vessels to dilate. This dilation slows the flow of the lymph fluid.

When only a few bacteria enter the skin, the lymph nodes can kill them quickly. When adult worms have caused dilation of the lymph vessels, the vessels do not function very well.

Patients with damaged lymphatic vessels and lymphoedema often have more bacteria on the skin than usual (Fig. 12) because they are unable, or do not know how, to wash properly. They also usually have small cuts, breaks, or scratches in the skin (Fig. 13) and between the toes (Fig. 14) (entry lesions). These allow bacteria to enter the skin and multiply quickly. The lymph fluid moves slowly and the lymph nodes cannot filter the large numbers of bacteria. The large numbers of bacteria under the skin cause the inflammation that is characteristic of an acute attack (Fig. 15). Inflammation damages the tiny lymphatic vessels in the skin, reducing their ability to drain fluid. After the initial acute attack, the skin becomes hard. Repeated acute attacks cause the arm or leg to increase in volume and the skin to become harder (Fig. 16). A "vicious cycle" begins, as the chronic swelling makes the skin more at risk for repeated bacterial infection.

Fig. 12 - Lymphoedema and dirty skin. Many bacteria are found when patients do not wash the leg properly.

Fig. 14 - An example of an entry lesion between the toes.

Fig. 13 – A break in the skin. Bacteria can enter and cause an acute attack

Fig. 15 - Patient with inflammation of the skin, in the early phase of an acute attack.

Fig. 16 - A patient with elephantiasis. After repeated acute attacks, the skin becomes harder and harder.

Good hygiene (Fig. 17) and treatment of entry lesions reduce the number of bacteria and their ability to enter the skin. These are extremely important measures for managing lymphoedema.
If the adult filarial worms live in lymphatic vessels that are not directly linked to the skin, the patient may develop other forms of filarial disease, including milky urine (chyluria, Fig. 18) - and collection of fluid inside the scrotal sac (hydrocoele).

Fig. 17 - A health care worker teaching good hygiene.

Fig. 18 . A patient with chyluria can have urine as white as milk.

Notes

LEARNING UNIT 3

Assessment of Lymphoedema

Learning objectives

By the end of this unit you should be able to:

- recognize the physical signs for each stage of lymphoedema
- stage lymphoedema using these physical signs.

According to the Fifth WHO Expert Committee on Filariasis, lymphoedema can be classified as follows:

- Grade I lymphoedema: mostly pitting oedema; spontaneously reversible on elevation.
- Grade II lymphoedema: mostly non-pitting oedema; not spontaneously reversible on elevation.
- Grade III lymphoedema (elephantiasis): gross increase in volume in a grade II lymphoedema, with dermatoscelerosis and papillomatous lesions. The 7 stages of classification given below are clinical-based and are derived from experience carried out in Brazil and Haiti. The classification still needs to be field-tested in different settings in order to correlate it with standard clinical management, especially in areas where a simple clinical approach is needed, for implementation by community health workers who often have only basic education and/or for implementation by the patients themselves.

Assessment of chronic lymphoedema

It is important to know the stage of the lymphoedema in order to provide the correct treatment and to tell your patients how their disease may progress. With correct treatment, patients will improve. The following classification for lymphoedema of lymphatic filariasis uses 7 stages.

Features to be checked:

- Is the swelling reversible overnight?
  (i.e., disappears spontaneously overnight)
- Are there any shallow skin folds?
  (i.e., the base of the fold is visible with patient's own movement)
- Are there any deep skin folds?
  (i.e., the base is visible only when the edges of the fold are separated by hand)

- Are knobs present? (i.e., small bumps, lumps or protrusions of the skin)
- Is mossy foot present? (i.e., clusters of small knobs on the surface of the foot with a wart-like appearance)
- Is the patient disabled? (i.e., unable to adequately or independently perform routine daily activities)

In addition to using these features, each lymphoedema patient should be assessed for the following conditions:

- Entry lesions in the skin folds (Fig. 19) or between the toes (Fig. 20) and fingers (Fig. 21)
- Wounds of any kind on the surface of the leg or foot (Fig. 22)
- Bad odour

Fig. 19 - Entry lesion in a deep fold in a patient with stage 5 lymphoedema. To see entry lesions in deep folds, it is necessary to open the folds by hand.

Fig. 20 - Entry lesions between the toes, caused by a fungal infection. Entry lesions between the toes or fingers are the most common skin lesions that cause repeated acute attacks.

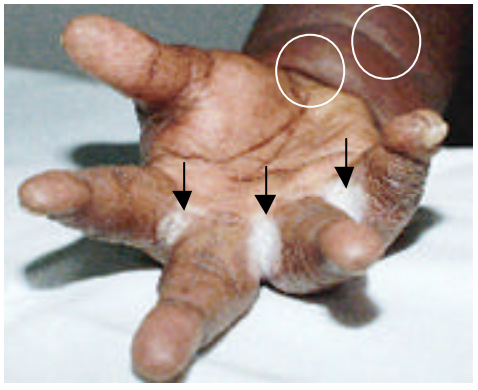


Fig. 21- Entry lesions between the fingers (black arrows) in a patient with stage 3 lymphoedema of the arm. Note the skin folds (white circles), which are shallow (the base of the fold is visible when the patient moves the arm). Note also the similarity of entry lesions with those between the toes (Fig. 21).

Fig. 22 - Wound of the skin in a patient with stage 5 lymphoedema of the leg (white circle). Note the two isolated knobs (arrow).

Although these conditions are not used for staging, they are used, together with the frequency of acute attacks, to monitor patient progress. The size of the leg (leg volume) tends to increase with higher stages, but even patients with severe disease can still have a leg that is almost normal in size.

This classification applies to lymphoedema of the arms or legs. Because the legs are the most common site of lymphoedema in filariasis-endemic areas, we will refer here primarily to the leg. Lymphoedema also occurs in the breast and male external genitalia, but the stages presented here for the legs or arms do not apply to lymphoedema elsewhere. However, the basic principles of treatment are the same.

The following information will help you to stage lymphoedema correctly:

1. Stage the right side and left side separately. They often are not at the same stage.

2. On each side, stage the foot and the leg together.

3. If signs of more than one stage exist, the leg and foot are classified by the higher stage. For example, if the leg has shallow skin folds (stage 3) and there is a mossy foot (stage 6), the leg will be classified as stage 6.

4. During an acute attack, it may not be possible to accurately stage the lymphoedema. Ideally, the lymphoedema should be staged only after recovery (usually 30 days after an acute attack).

5. Stages can change with treatment. To document improvement of the lymphoedema stage, the patient should be classified before treatment.

Stage 1

The feature of stage 1 lymphoedema is:

- **Swelling is reversible overnight.**


Fig. 23 -

In stage 1 lymphoedema, the swelling increases during the day and disappears overnight, because of the patient lying flat in bed, not because of any treatment (Fig. 23). To accurately classify lymphoedema in patients with stage 1 disease, it is preferable to examine the leg in the late afternoon, when the swelling has most visible, and again early in the morning, to see that the swelling is gone. For patients with stage 1 lymphoedema in both legs, it is necessary to rely on the patient's report of normal-size legs in the morning, because direct comparison is more difficult.

A patient with stage 1 lymphoedema rarely has acute attacks, entry lesions, or a bad odour. Repeated acute attacks will make the disease progress.

Stage 2

Fig. 24 -

The feature of stage 2 lymphoedema is:

- **Swelling is not reversible overnight**.

The main difference between stage 2 lymphoedema (Fig. 24) and stage 1 (Fig. 23) is that the swelling does not disappear without lymphoedema management.
Occasionally, patients with stage 2 lymphoedema have acute attacks. Patients may have entry lesions, or mild bad odour.

Stage 3

The features of stage 3 lymphoedema are:

Fig. 25 -

- Swelling is not reversible overnight.
- **Shallow skin folds.**

The principal feature of stage 3 lymphoedema is the presence of one or more shallow skin folds (Fig. 25 - arrow, Fig. 30 – arrows, and Fig. 31).

The difference between stage 3 and stage 2 lymphoedema (Fig. 24) is the presence of shallow folds.

Patients with stage 3 lymphoedema may have occasional acute attacks. Entry lesions between the toes and bad odour are more common than in stage 2.

Stage 4

The features of stage 4 lymphoedema are:

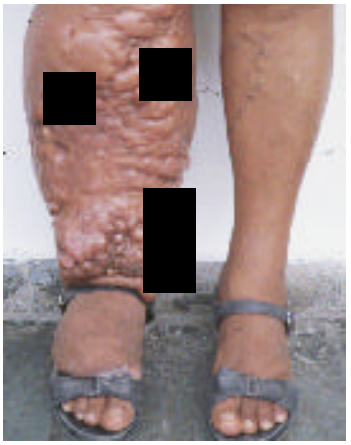


Fig. 26 -

- Swelling is not reversible overnight.
- **Knobs.**

The main feature of stage 4 lymphoedema is the presence of knobs (Fig. 26 – arrows, and Fig. 32), i.e., bumps, lumps, or protrusions on the skin.

Patients with stage 4 lymphoedema experience occasional acute attacks. Many patients will have entry lesions between the toes and a bad odour.

Stage 5

The features of stage 5 lymphoedema are:

- Swelling is not reversible overnight**.**
- **Deep skin folds.**

The presence of one or more deep skin folds is the main feature of stage 5 lymphoedema (Fig. 27).

Fig. 27 -

Patients with stage 5 lymphoedema experience occasional to frequent acute attacks.
Most patients have entry lesions between the toes and/or folds and a bad odour. Lymphoedema can extend above the knee.

Stage 6

The features of stage 6 lymphoedema are:

- Swelling is not reversible overnight.
- **Mossy foot.**

Fig. 28 -

On the surface of the foot (especially the toes), very small elongated or rounded small knobs can be clustered together, giving rise to the peculiar appearance of "mossy foot".

Patients with stage 6 lymphoedema (Fig. 28 and Fig. 34) have acute attacks. Almost all these patients have entry lesions between the toes and bad odour. Wounds in the skin are frequently present.

Stage 7

The features of stage 7 lymphoedema are:

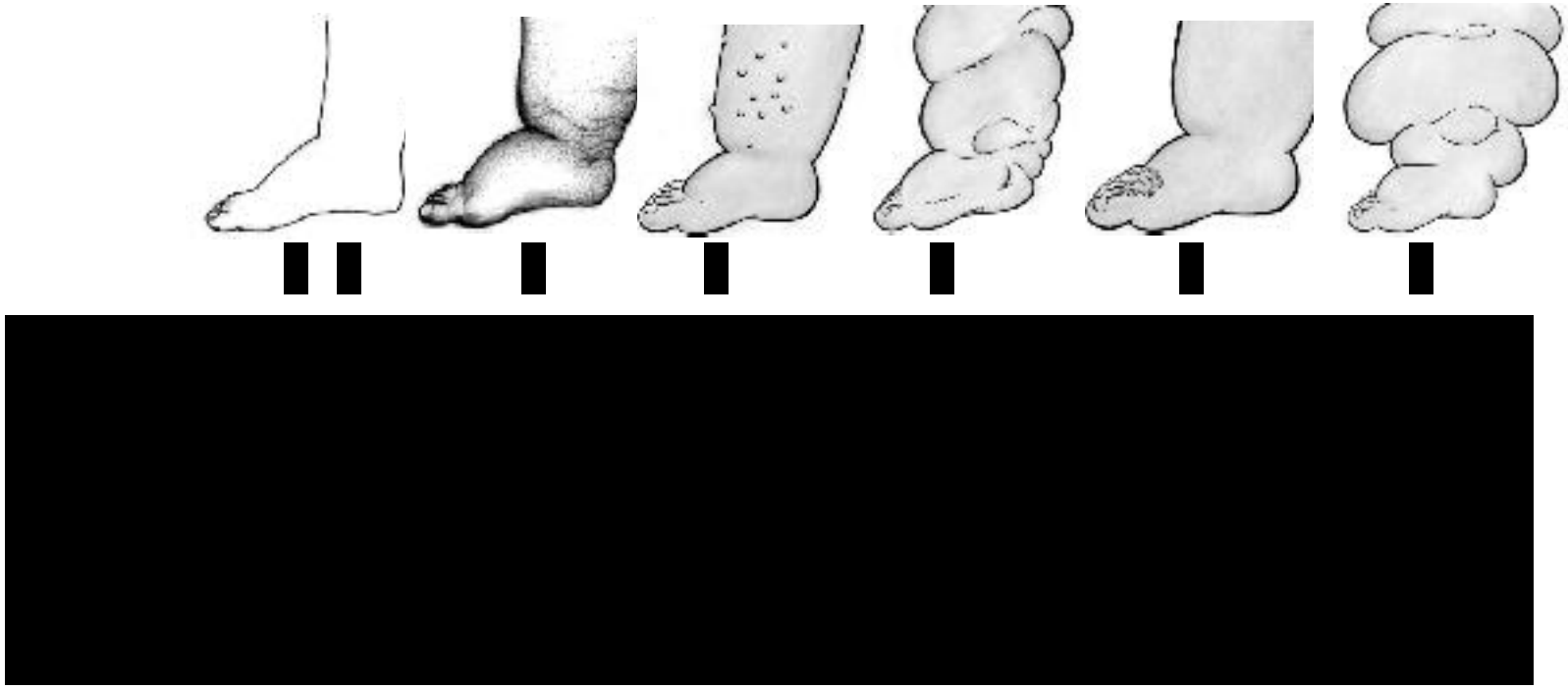
- Swelling is not reversible overnight.
- **The patient is unable to adequately or independently perform routine daily activities such as walking, bathing, cooking, etc.**

Fig. 29 -

- **The patient needs help from the health care system.**

Patients with stage 7 lymphoedema (Fig. 29 and Fig. 35) have frequent acute attacks and large legs or arms with deep folds. They always have entry lesions between the toes and skin folds. Bad odour is strong. Wounds in the skin are commonly present, and lymphoedema extends above the knee in most patients.
The principal feature of stage 7 lymphoedema is that the patient cannot perform daily activities. Assistance from the family and the health care system is needed.

OVERVIEW OF FEATURES USED TO STAGE LYMPHOEDEMA



For the WHO lymphoedema classification see page 9 (paragraph 1).

Fig. 30 - Shallow skin folds in a patient with stage 3 lymphoedema of the legs. Shallow folds are seen at the ankles (arrows).

Fig. 31 - When the patient moves the toes, the base of the shallow folds is visible (arrows).

Fig. 32 - Multiple knobs in a patient with stage 4 lymphoedema.

Fig. 33 - Patient with large leg volume and multiple deep folds. The stage of lymphoedema in this patient depends on whether the patient is disabled (stage 7) or not (stage 5).

Fig. 34 - Patient with mossy foot (stage 6 lymphoedema), as well as multiple folds (arrows). To classify the folds as deep or shallow, the patient needs to move the foot.

Fig. 35 - Patient with stage 7 lymphoedema. This patient has elephantiasis of the leg and lymphoedema of the abdomen (*) and breast (**). Lymphoedema of the abdomen is not staged.

Warning: In many tropical areas other diseases besides lymphatic filariasis can cause problems in the legs and arms (Figs. 36, 37). Special attention should be given to patients with knobs, to make sure they will not benefit from other kinds of treatment. This varies from country to country, especially in the African continent.

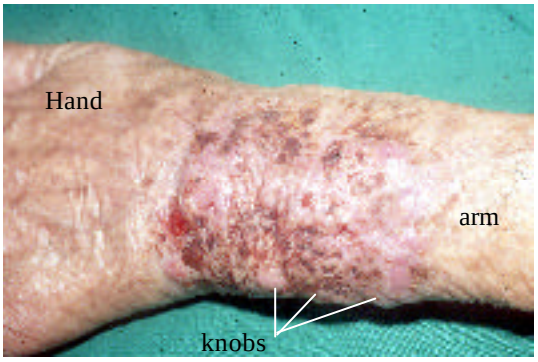


Fig. 36 - Knobs in an arm from a patient with a disease called chromoblastomycosis (a special kind of fungus) (courtesy of Dr Valdir Bandeira).

Fig. 37 - Knobs in the foot of a patient with a disease called mycetoma (a kind of fungus).

LEARNING UNIT 4

Management of Lymphoedema

Learning objectives

By the end of this unit you should be able to:

- list the components of lymphoedema management
- identify the benefits of each management component
- apply recommended components to each stage of lymphoedema
- decide when a patient needs to be seen by a doctor

Some of the technical terms used in this learning unit are explained in the Glossary.

The need for management of lymphoedema

Once adult worms have damaged the lymphatic system, this damage is permanent. Antifilarial drugs will not cure lymphoedema. However, lymphoedema can be managed. Management can stop acute attacks (Fig. 15 in Unit 2 and Fig. 68 in Unit 5) and keep the disease from getting worse. Without management, most people with lymphoedema will have a slow worsening of their problem. Every acute attack will make the disease worse. As the disease worsens, patients will find it more difficult to work or to go school. They frequently will feel alone and sometimes will lose their friends, family and jobs. Lymphoedema management gives patients new hope for a better life.

Lymphoedema management also gives other benefits:

- It eliminates the bad odour.
- It prevents and heals entry lesions.
- It helps patients' self-confidence.
- It often reduces the size of the arm or leg or the affected area.
- It improves patients' ability to work or to go school.

The basic components of lymphoedema management

The management of lymphoedema has five components: hygiene (Fig. 38), prevention and cure of entry lesions (Fig. 39), exercise (Fig. 40),elevation (Fig. 41), and wearing appropriate footwear (Fig. 42).

Fig. 38 - Daily hygiene will prevent the acute attacks and only take a small amount of time.

Fig. 39 - The helper is applying the medicated cream to heal the entry lesions.

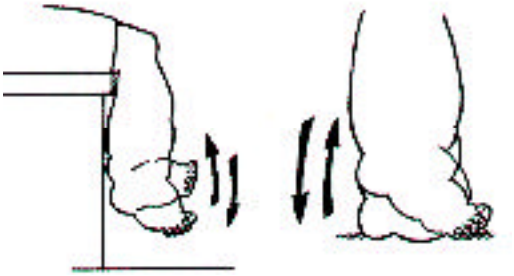


Fig. 40 - Exercises can be done everywhere and they do not cost anything.

Fig. 41 - Leg elevation can be done in many ways, for example, while you rest or feed your baby.

Fig. 42 - Comfortable footwear is an important component of lymphoedema management.

How do these components work?

Good hygiene (washing the legs to keep them clean) prevents acute attacks. Washing removes most of the bacteria from the skin (Fig. 43). If entry lesions exist between the toes and folds, or if there are wounds of the skin (e.g., cuts, scratches or cracks), bacteria can enter and cause an infection leading to an acute attack (Fig. 44). If patients cure and prevent entry lesions, then bacteria cannot enter and acute attacks do not occur. Reducing the extra fluid in the leg also helps to prevent bacterial infections. Exercise and elevation will help move the fluid from the affected limb. Footwear will protect the feet. Patients can add these simple measures to their daily routines.

Fig. 43 - A health care worker showing a patient how to remove most of the bacteria from the skin.

Fig. 44 - A patient with a severe acute attack of the leg. This is very painful.

The following pages explain the treatment steps and put them together into management plans for patients with each stage of lymphoedema. The treatment depends on the stage of lymphoedema. Patients who follow the treatment steps will notice an improvement in their condition (Fig. 45).

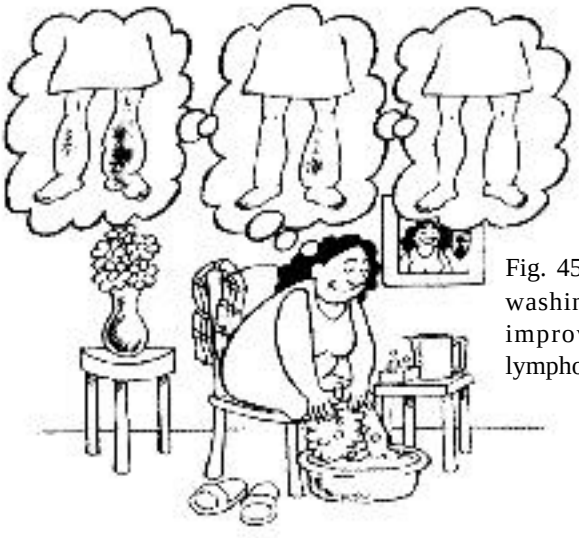


Fig. 45 - The patient believes that by washing her legs every day she will improve the condition of her lymphoedema.

1. Hygiene - washing

Although the following steps refer to the leg, washing or hygiene should also be used for lymphoedema of the arms, breasts, and genital area (see Unit 6). In addition, even if a patient has lymphoedema of only one leg, both legs must be washed.

Prepare a place to wash the legs. The supplies needed are:

- Clean water at room temperature
- Soap
- A basin
- A chair or stool
- A towel
- And footwear, placed within easy reach.

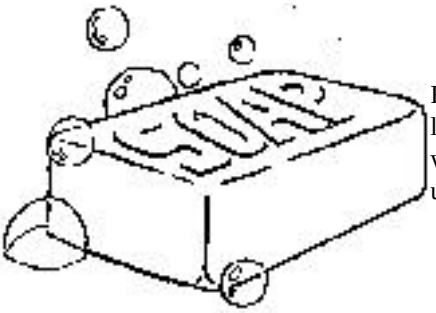


Fig. 46 - Soap. The least expensive soap without perfume is usually the best.

Check the skin for**:**

- Entry lesions, including very small lesions between the toes (Fig. 47) that can hardly be seen.
- Entry lesions between the toes may cause itching. Scratching can further damage the skin and provoke an acute attack; tell patients to avoid scratching.

Fig. 47 - Another example of an entry lesion between toes. This one can hardly be seen.

- Toenails that need trimming. Do not try to clean under the nails with sharp objects as this can cause entry lesions.

It is important to check the skin every time the leg is washed because entry lesions allow bacteria to enter the skin, and this will cause acute attacks. If entry lesions are found, they should be cleaned carefully.

Wash the affected leg.

- Wet the leg with clean water at room temperature.
- Begin soaping at the highest point of swelling (usually around the knee) (Fig. 48).
- Wash down the leg towards the foot.

- Gently clean between all skin folds and between the toes, preferably using a small cloth or cotton swab, and paying particular attention to entry lesions.
- Brushes should not be used, as they can damage the skin.
- Rinse with clean water.
- Repeat this careful washing until the rinse water runs clear.
- Wash the other leg in the same way, even if it looks normal.

Reminder: Do not use hot water to wash the leg; use water that is cool or at room temperature.

Fig. 48 - The health care worker instructs the patient to wash the leg from the knee down.

Dry the skin well.

- Pat the area lightly with a clean towel. Do not rub hard because this can damage the skin.
- Carefully dry between the toes and between skin folds using a small cloth, gauze or cotton swab (Fig. 49).
- In some patients, such as those with mossy foot, drying may be difficult. For these patients, air-drying with a fan may be helpful.

Fig. 49 - Here, the health care worker is showing the patient how to dry the leg and foot after washing.

2. Prevention and cure of entry lesions

Entry lesions are particularly common in patients with lymphoedema. The most frequent entry lesions are located in warm, moist places: between the toes and deep skin folds and around the toenails. Entry lesions, such as wounds, can also be found on the surface of the skin. Use a magnifying mirror, if possible, to examine places that are difficult to see. Both fungi and bacteria can cause entry lesions.

Fungal infections frequently damage the skin and create entry lesions, especially between the toes, and may cause itching. These entry lesions allow bacteria to enter the body through the skin and this can cause acute attacks. Fungi and bacteria can cause a bad odour.

After washing the area, look again carefully between the toes and in the deep skin folds for entry lesions. Between the toes, the colour of fungal infections is usually white (Fig. 50) or pink (Fig. 51). Fungal infections usually do not leak fluid. In contrast, bacterial infections may leak fluid that is thin and clear or thick and coloured (Fig. 52).

Fig. 50 - Fungal infections, white in colour, are very common between the toes.

Fig. 51 - A pink entry lesion is shown here. Teach the patient how to identify the entry lesions between toes.

Fig. 52 - An infected skin wound with a yellow secretion (pus).

A variety of antiseptics and antifungal and antibacterial agents are effective in treating entry lesions that do not heal with hygiene alone. Their availability and cost vary in different regions, and the doctor in charge of the lymphoedema treatment programme will recommend the most suitable ones.

If the patient has infected wounds or entry lesions in deep skin folds, use an antiseptic (e.g., potassium permanganate).

Potassium Permanganate

How to use potassium permanganate:

- Potassium permanganate solution should be made fresh every day by adding a tablet or powder to clean water and shaking well (Fig. 53). Use 0.5 – 1 litre of the permanganate solution for each leg. The correct concentration is 100 mg of potassium permanganate for each litre of water.

The tablets or powder and the solution should be stored in a dark container, as sunlight reduces the strength of potassium permanganate.

Fig. 53 – The potassium permanganate should be shaken well and stored in a dark container.

Place the leg in a tub or basin

1. Soak any thin, clean, cotton fabric or gauze with the solution. Place pieces of the gauze or fabric inside the deep skin folds and between the toes (Fig. 54). If there are wounds on the skin surface, loosely wrap the fabric around the leg.

Fig. 54 - Cotton fabric is soaked with potassium permanganate and placed between the folds and toes.

2. Pour the potassium permanganate over the cloth-covered leg already soaked with antiseptic. As the solution collects in the basin, pour it over the leg again (Fig. 55).

Fig. 55 - The leg is now covered with a soaked cloth. The health care worker is pouring the antiseptic over the leg.

3. Leave the potassium permanganate on the skin for a few minutes. Continue to pour the solution over the leg. Do not let the fabric dry. The patient's nails may look brown from using potassium permanganate. The discoloration disappears when the patient stops using this antiseptic.

4. It is best to fan-dry the leg and foot (especially in patients with mossy foot) rather than towel-dry.

Other antiseptics may be used provided that they kill bacteria without irritating or hurting the skin, and provided that the instructions for their use are carefully followed.

Medicated creams

If potassium permanganate does not heal entry lesions in deep skin folds, or if the patient has infected wounds, it will be necessary to use medicated creams. Small amounts of medicated cream should be rubbed into the skin at the site of the lesion, until the cream disappears. In severe lesions between the toes or fingers, this process may need to be repeated one or two times.

The availability and cost of antifungal and antibacterial creams vary in different regions, and the doctor or nurse in charge of the lymphoedema treatment programme will recommend the most suitable ones. Antifungal and antibacterial creams may be purchased separately, or, in some places, combination cream is available. If both types of cream are necessary but combination cream cannot be found, antifungal and antibacterial creams can be mixed and applied together.

Antifungal creams

If there are fungal infections at the site of any entry lesion, they should be treated with an antifungal cream or solution. It is very important to rub the cream in well for several minutes at the site of the fungal infection and on to the surrounding skin. Usually, fungal infections between toes must be treated daily for several weeks.

Antibacterial creams

Antibacterial cream is used to treat bacteria-infected entry lesions (Fig. 52). Treatment of entry lesions (Fig. 14 in Unit 2) will prevent acute attacks (Fig. 68 in Unit 5).

Warning: Keep all supplies for treating entry lesions out of the reach of children. Potassium permanganate solution has a pleasant purple colour that may attract children, but if swallowed it can be harmful.

Advice on hygiene and skin care

- Remember to wash both legs. This is easier to remember if the normal leg is washed first.

- If both legs are affected, wash the leg with more advanced lymphoedema first because it will take more time.

- If antiseptics or medicated creams are not available, a final light soaping can be left in the deep skin folds or wounds, and the skin dried as described above.

- Usually the first week of hygiene is the most difficult. After the first week, less time is needed to wash the legs, so less water will be used.

- Tell patients with advanced disease that hygiene gets easier with time.

- In cases of advanced lymphoedema, adequate hygiene is only possible if the patient has a helper (a friend or a family member). The helper can clean places that are difficult for the patient to reach.

- Waring rubber gloves or using a plastic bag can help the fingers slide between the deep skin folds. Unless the patient has other diseases that can be spread by touch, gloves are not necessary to prevent infection. The bacteria on the skin of the patients are the same as those found on the skin of people without lymphoedema.

- Entry lesions may attract flies. Special attention is required for lesions or wounds on the surface of the skin, especially in patients with stage 6 or stage 7 lymphoedema.

- In filariasis-endemic areas, hygiene is important for everyone – even those who do not have lymphoedema. Hygiene is so simple that children can learn and practise it (Fig. 56), and this will prevent them from getting entry lesions.

Fig. 56 - A child is practising hygiene of the leg after having learned it from the health care worker.

Important: Usually patients with lymphoedema in filariasis-endemic areas do not need lotion. If their skin becomes too dry, which can increase the risk of entry lesions, refer them to a health clinic where they can get advice from the nurse and medical staff about the most appropriate and affordable lotion for them. Remind them not to use it in deep folds, between the toes or fingers, or on mossy foot. These areas should be kept as dry as possible.

3. Elevation

Elevation is important for patients with lymphoedema of the leg. It helps prevent fluid from accumulating in the leg. For patients to receive the full benefit when they elevate their legs, the correct position is very important, especially for large, heavy legs.

Fig. 57 - Elevation while sitting. A pillow supports the leg from the knee down.

Sitting

1. Raise both legs, if possible.
2. Ideally, raise the feet almost as high as the hips. If this is not comfortable, particularly for patients with advanced lymphoedema, raise the feet as high as is comfortable.
3. The knee should be slightly bent; a pillow should be placed under the knee for support.
4. The lower leg and the ankle should be well supported on a stool or chair.

Do not use a support with sharp edges that put pressure on, or dig into, the elevated leg. Patients should avoid sitting with the legs crossed at the knees.

Sitting on the ground or lying down

1. Extend the legs straight in front, while resting the back against a wall or other surface.

2. Place a small pillow under the knees for comfort (Fig. 58).

3. Patients can exercise one leg or both legs at the same time.

Fig. 58 - A health care worker is explaining to the patient the right way to exercise while sitting on the ground. It is best to rest the back against a wall.

If patients have to kneel for short periods of time, they should **not** sit back on their legs.

Lying down

1. Elevate the foot of the bed.

2. Place a support (bricks, pillows, etc.) under the mattress to raise the foot of the bed evenly.

3. Raise the foot of the bed to about the chest height (Fig. 59).

4. Place a pillow under the knees to bend the knees slightly.

5. Raise the entire leg, not just the foot. For example, a pillow under the foot is incorrect. If the foot falls off the pillow, the benefit of elevation will not be realized.

Fig. 59 - Correct way to elevate the leg while sleeping

Warning: Patients with heart problems should not elevate their legs, unless advised to do so by a doctor.

4. Exercise

Exercise is useful for patients with lymphoedema. In general, the more patients exercise, the more they benefit. They can exercise anywhere and at any time. Besides walking short distances for exercise, patients can do the exercises explained below. There are three positions for doing leg exercises: sitting, standing, or lying down.

Patients should never exercise during an acute attack.

1. "Up on the toes" exercise.

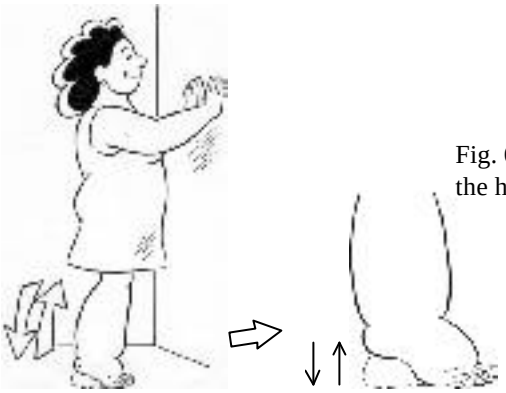


Fig. 60 - Up on the toes with the hands on the wall.

- Stand on both feet with feet slightly apart, holding on to a person or other type of support (Fig. 60).
- Rise up on to the toes of both feet at the same time, and then sink back down on to flat feet.
- Repeat 5-15 times, or as many times as comfortable.

If the patient is unable to rise up on both feet at the same time, this exercise can be done one foot at a time.

2. "Toe point" exercise

Fig. 61 - While on the bus the patient does the toe point exercise.

- While sitting or lying down, point toes towards the floor (Figs. 61 and 62).
- Then bend (extend) the toes upwards.
- Repeat 5-15 times, or as many times as comfortable.
- Repeat with the other leg.

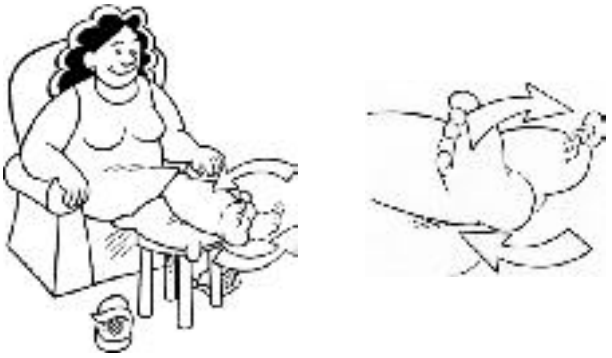
This exercise can also be done while standing if the patient does not have advanced disease.

Fig. 62 - Toe point exercise

3. "Circle" exercise

- While sitting or lying down, move the foot in a circle to the right and to the left.
- Repeat with the other leg.
- If sitting on the floor, protect the heel with a flat pillow (see Fig. 58).

This exercise can also be done while standing if the patient does not have advanced disease.



5. Wearing appropriate footwear

Footwear protects feet from injury. Protecting the bottom of the foot is very important. For some patients, protecting the sides and top of the foot is also important. Patients should avoid footwear that makes their feet hot and sweaty, or that are too tight.

What kind of footwear?

Footwear should

- Protect the feet from injury
- Protect the feet from dirt on the ground
- Be comfortable (not too tight)

- Allow air around the feet
- Have low heels, if any

Canvas or cloth footwear allows more air around the feet than plastic or leather wear.

Sandals are better than closed shoes for most patients (Fig. 64). Patients with early-stage lymphoedema may be able to wear closed shoes.

Fig. 64 - An example of a sandal suitable for patients with lymphoedema. Other models can also be created.

Patients should not wear footwear that causes blisters (Fig. 65) or sore places on the feet. These blisters may cause entry lesions, which can lead to acute attacks. If blisters do occur, hygiene is especially important. Do not pop the blisters.

Fig. 65 - This is an example of a blister (arrow) after the patient wore uncomfortable tennis shoes.

Patients should avoid shoes that make the feet hot and sweaty.

Fig. 66 - Patients with various lymphoedema staging with inappropriate (a and b) and appropriate footwear (c, d and e).

Adjunct Measures

Bandaging, when indicated and used correctly by individual patients, may provide good short-term results. With bandaging, the legs may become smaller more quickly, but there are several disadvantages:

- Proper bandages are very expensive and difficult to keep clean.
- Bandages can be hot or uncomfortable, and can cause itching.
- Bandages can keep patients from exercising.
- It may take many clinic visits for patients to learn how put on the bandages correctly. Some patients will always need help from a skilled person to put the bandages on properly.
- Applying bandages properly can take a lot of time.

If bandages are not put on correctly:

- Uneven or excessive pressure can cause more damage to the lymphatic vessels, which can worsen the condition of the leg rather than help it improve.
- If bandages are placed over an entry lesion, they can cause pain and keep it from healing.
- Using bandages too soon after an acute attack, while there is still some inflammation, may damage the lymphatics and the skin.
- If the use of bandages is discontinued, swelling of the leg may return rapidly, even in the absence of an acute attack. This can be discouraging for patients.

For these reasons, bandaging is not recommended as a public health measure. For certain individual patients, if resources are available, bandaging may be used, but should be used with care:

- Cotton or other soft material should be placed in the folds, especially in the deep folds, to avoid uneven compression and damage to the lymphatics.
- Bandages should be put on first thing in the morning and taken off at night.
- Bandages should be kept clean.
- Old bandages should be replaced with new ones at regular intervals, as needed.

Warning: Bandages should never be used during an acute attack.

Other compressive measures

In addition to bandaging, other compressive garments are available, such as stockings. Compared to bandages, stockings have certain advantages:

- They make it easier for the patient to exercise
- They may be easier and take less time to put on and take off
- They are thinner and more comfortable
- Special training is not necessary to use compressive garments. The patient merely has to learn how to put them on and take them off.

However :

- They are expensive and they need to be replaced often
- They often must be specially fitted to the patient's leg
- They can be difficult to keep clean.

Prophylactic antibiotics

The use of hygiene, antiseptics, and medicated creams will decrease the frequency of acute attacks in all patients. In patients with early-stage lymphoedema, these measures will prevent acute attacks. Patients with more advanced lymphoedema and many entry lesions, however, may continue to have some acute attacks. If acute attacks continue, it may be necessary for the patient to take antibiotics prophylactically, to help prevent bacterial infections. Antibiotics can be given by mouth or by injection (Fig. 67). Patients who continue to have repeated acute attacks should be referred to a doctor, who can evaluate each one and prescribe appropriate antibiotics.

Fig. 67 - A patient in the clinic having an antibiotic injection.

Cosmetic surgery

Patients may ask about surgery as an option for treatment. Surgery to remove the swelling of the leg is not appropriate as a public health measure: it is expensive, difficult, and the results are often not good. However, cosmetic surgery, to remove knobs or to help improve the appearance of the skin of the leg, may be recommended for the individual patient. This surgery is usually done at an outpatient clinic. Before surgery can be considered, however, the patient should be under treatment for several months, and should not have had acute attacks. If you think individual patients may benefit from cosmetic surgery, you can refer them to a hospital or clinic for consultation.

LYMPHOEDEMA MANAGEMENT, BY STAGE

For the WHO lymphoedema classification see Learning Unit 3, page 9 [paragraph 1]

[redacted]

Notes

LEARNING UNIT 5

Assessment and Management of Acute Attacks

Learning objectives

By the end of this unit you should be able to:

- describe acute attacks
- establish how to manage acute attacks
- decide when patients with acute attacks should be referred to a doctor or a nurse

Assessment of acute attacks

Patients with damaged lymphatic vessels and lymphoedema usually have small cuts, breaks, or scratches in the skin and between the toes (entry lesions, Figs. 19-21). These allow bacteria to enter the skin and multiply quickly. The large numbers of bacteria under the skin cause the inflammation that is characteristic of an acute attack (Fig. 68). The skin becomes painful, warm, swollen, and red, and the patient develops a fever, headache, chills and sometimes nausea and vomiting. Occasionally, bacteria get into the blood and may cause a life-threatening illness. This can be a problem in elderly people, who can be very sick without obvious signs of severe illness. For example, they may not have a high fever.

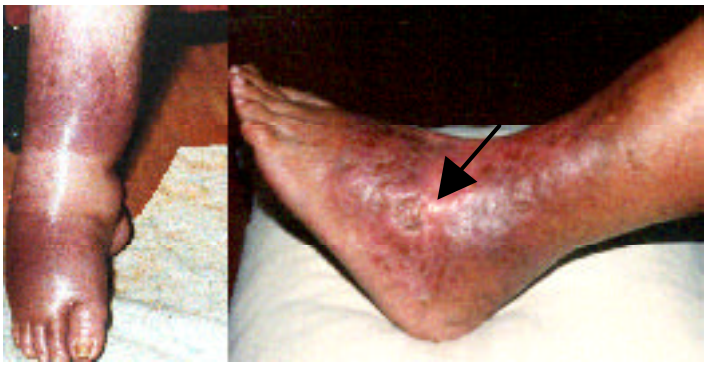


Fig. 68 - Two examples of an acute attack. The patient on the left had entry lesions between the toes (not shown). The patient on the right had a wound (arrow).

In many patients, the first sign of an acute attack in the leg is an enlarged, tender, and painful lymph node in the inguinal area. Afterwards, inflammation appears in the leg. Most patients will have three to five days of redness, severe pain, and swelling. They may say that they could not walk or get out of bed. Sometimes the skin is so tender that it will hurt even when a breeze blows across the leg.

Even if you do not see a patient during the acute attack, in addition to the patient's story, certain physical signs will tell you that the patient recently had one. After an acute attack, dry, peeling skin is commonly seen (Fig. 69).

Fig. 69 - Signs of a recent acute attack. Note the peeling skin.

After the acute attack subsides, the patient may develop a darkening of the skin in the area where it occurred. It may take a long time for the skin to return to its original colour.

Acute attacks always make lymphoedema worse. If patients can prevent acute attacks, they can keep their lymphoedema from getting worse and prevent elephantiasis.

Management of acute attacks

The first step in managing an acute attack is to relieve pain.

To relieve pain:

- Apply a cloth compress soaked with water (the cooler the better). The compress should go all the way around the leg (Fig. 70). Put plastic under the leg to keep the bed or chair dry.

Fig. 70 - Apply and change a cold compress during an acute attack. Water at room temperature or cooler should be used.

- Change the compress when it becomes warm. A fan placed near the compress will help keep it cooler. The compress should not get dry.

- You can also soak the leg in a tub or bucket of cold water.

- Cool the leg until the pain goes away. If hot/cold theories of disease are part of your culture, then be sure you address this issue and stress that water at room temperature or cooler is needed for the "hot" leg or affected area.

- Give medicine for fever as necessary (e.g., paracetamol). Aspirin should not be given in areas where dengue is common, unless prescribed by a doctor. It is recommended that medication be taken every 6 hours until the fever lessens.

- The patient should rest and elevate the leg comfortably as much as possible.

- The patient should not exercise during an acute attack – exercise is painful.

- **The patient should drink plenty of water**

- Oral antibiotics can shorten the attack and are recommended if the patient can be seen by a doctor or nurse, the drug are available, and the patient can afford them.

Most patients can easily care for their acute attacks at home. The patient should cool the leg as soon as an acute attack starts. This prevents further skin damage.

Hygiene and treatment of entry lesions

Hygiene is important. During an acute attack patients should:

1. Wash the leg with soap and clean water, but more gently and more carefully than usual.
2. Dry the leg, also more gently and carefully than usual.
3. Identify and care for any entry lesions
   - Apply an antiseptic to the skin.
   - Apply medicated cream to any entry lesions.

Danger signs

Patients with any of the problems listed below should be seen by a doctor or nurse.

- Very high fever, confusion, headache, drowsiness, or vomiting.

- Fever, shaking, chills, or pain in the leg that do not respond to treatment within 24 hours.

- Splitting of the skin because of a rapid increase in the size of the leg.

- Pus in the area affected by the acute attack.

- Other signs or symptoms that you are not familiar with and you think may need special attention.

Systemic antibiotics and other measures, including staying in the hospital overnight, may be necessary for these patients. Although rare, patients have died from acute attacks.

People who require special attention

The following groups of people should see a doctor or nurse when they have an acute attack:

- The elderly, especially if they do not have a high fever with their acute attack.
- Alcoholics.
- Pregnant women and children who do not improve within 24 hours.
- People with other chronic diseases, such as heart and lung problems, high blood pressure, or diabetes.

Harmful practices

In every country with filariasis, people have ways to deal with acute attacks. Some of these treatments may help, others make no difference, and others are harmful. Examples of practices that should be discouraged because they are harmful include:

- Putting anything that is warm or hot on the skin (Fig. 71)
- Cutting the skin to remove excess fluid or blood
- Bandaging the leg
- Rubbing herbs, ashes, or anything unclean on to the skin
- Popping open or cutting blisters
- Burying the leg.

Fig. 71 - Anything warm or hot harms a patient's leg during an acute attack.

Further advice on the management of acute attacks

If the mother feels able to do so, she can breast-feed during an acute attack – this will not harm the baby. The acute attack is not contagious. Do not be afraid to touch the patient.

Once the acute attack subsides you should discuss with the patient what factors led to the acute attack and help the patient to overcome them. Among these factors are:

- Finding clean water may be difficult.
- Lack of time for washing every day.
- Patients may feel that hygiene is too simple a solution, and many may want more dramatic or more rapid medical treatment.
- Recognizing hidden or small entry lesions can be difficult.
- Some patients may not be able to afford some or all of the supplies needed to treat entry lesions.
- Some patients cannot afford specially fitted footwear.
- Lack of a skilled shoemaker who can make simple, protective footwear to fit large feet.
- Some patients may need help and do not have someone to wash their leg.

Notes

LEARNING UNIT 6

Urogenital Problems in Lymphatic Filariasis

Learning objectives

By the end of this unit, you should be able to:

- identify urogenital problems
- manage these problems
- distinguish between problems of the genital skin and problems inside the scrotal sac
- teach proper hygiene for genital lymphoedema
- manage acute attacks in the skin of the penis and scrotal area
- refer patients for medical care
- suggest a low-fat, high-protein diet for patients with chyluria

Types of urogenital problems related to filariasis

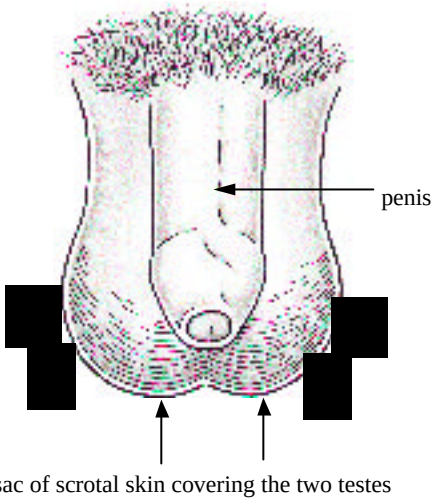
As mentioned earlier, filariasis causes problems in the legs, arms, and breasts. Filariasis also causes chronic genital problems (in the penis, scrotum, and tissues inside the scrotum), and chronic urinary tract problems. Men with filariasis most often develop genital problems, while urinary tract problems affect both men and women. These problems have a huge emotional and social impact. Treatment varies depending on the type of genital or urinary tract problem. Therefore, correct diagnosis is important.

In men, lymphatic filariasis can cause the genitals to become enlarged and deformed. Even when men suffer from these problems, you may not see their suffering. Their problems are often hidden, but their lives are deeply affected. These men feel ashamed and embarrassed and they become socially isolated.

This learning unit explains how to recognize the different types of genital disease in males; what kinds of treatment are available; and how you can help.

First, a reminder of the normal appearance of the genitals in adult men (Fig. 72).

Fig. 72 - A drawing of the normal male genitals (scrotum and penis).



A thin sac of skin (the scrotum) covers and holds the testes. The size of the normal scrotum varies from man to man. The skin of scrotum and penis is normally thin and soft.

In men with lymphatic filariasis, there are two main ways the scrotum can become enlarged. First, fluid can collect inside the scrotal sac (Fig. 73); and second, the skin of the scrotum can be affected (Fig. 74). These two conditions need to be distinguished, because their treatment is different.

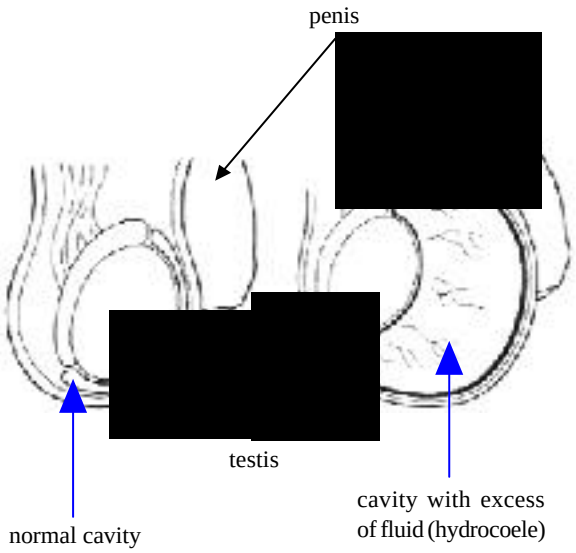


Fig. 73 - A cross-sectional view of the scrotal sac (normal and with a hydrocoele). The blue arrows indicate where fluid can accumulate inside the scrotal sac.

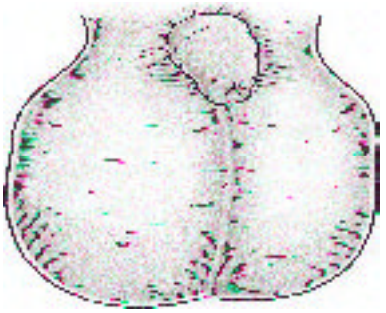


Fig. 74 - The skin of the penis and scrotum is swollen, or has lymphoedema skin.

Hydrocoele

Collection of fluid inside the scrotal sac is the most common genital problem caused by filariasis. The scrotum becomes enlarged because there is excess liquid inside the scrotal sac, around the testicles (hydrocoele, Fig. 73).

The fluid can collect on only one side (Fig. 75 - arrow) or on both sides (Fig. 76).

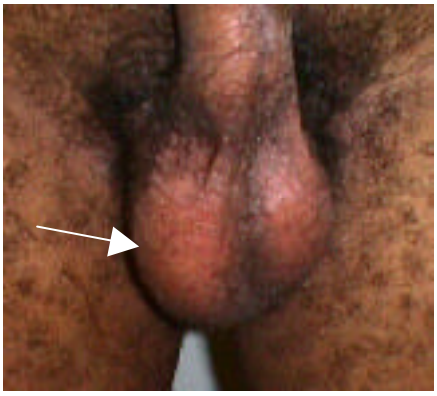


Fig. 75 - Note that the right side is enlarged (arrow). The left side is normal.

Fig. 76 - This patient shows enlargement of both sides. The right side (arrow) shows an early-stage hydrocoele.

Hydrocoeles can be small and may hardly be noticed by the patient (Fig. 77), or very large, causing much disability.

Fig. 77 - An example of a small left hydrocoele. The patient did not even notice.

With hydrocoele, the skin of the scrotum and penis is normal - thin and soft (Fig. 78).

Fig. 78 - When a physical examination is performed on men with hydrocoele, the skin feels normal (soft and thin).

Management of hydrocoele

Hydrocoele can be treated with surgery. This surgery is available in many parts of the world (Fig. 79). If your patient seems to have increased volume inside his scrotal sac, you should advise him to see a doctor. Disease other than hydrocoele can also cause increased volume inside the scrotal sac.

Fig. 79 - Doctors doing surgery to repair a hydrocoele.

Problems affecting the skin

The *skin* of the scrotum and penis can be affected with:

- Lymphoedema (fluid inside the skin) (Fig. 80)
- Elephantiasis (advanced lymphoedema) (Fig. 81)
- Lymph scrotum (vesicles on the skin).

Fig. 80 - This man has lymphoedema of both the penis and the scrotum.

Fig. 81 - A case of elephantiasis of the scrotum. The skin is very hard and thick.

When the skin of the scrotum is affected by lymphoedema, it becomes thicker and harder than normal and loses its normal texture (Fig. 82). Lymphoedema of the scrotum almost always affects both sides.

Fig. 82 - A physical examination of a scrotum with lymphoedema. The skin is hard and thick.

Lymphoedema of the genitals is not staged like lymphoedema in the leg. However, if the genitals are deformed or enlarged, and the skin is very hard, thick, or has knobs or bumps on the skin, the patient has elephantiasis (Fig. 81).

Just as acute attacks cause lymphoedema of the leg to progress to elephantiasis, so do acute attacks in the scrotum or penis.

Lymph scrotum

The third problem caused by lymphatic filariasis in skin is lymph scrotum.

Men with lymph scrotum have vesicles, or small blisters, on the skin of the scrotum. The vesicles are very delicate, and they contain fluid, which may be milky white, straw-coloured, or even pink if blood is present. When vesicles break open, the fluid leaks on to the skin, and the patient's clothes get wet.

In some men with lymph scrotum, the scrotum may be of almost normal size, but in others, the scrotum grows very large. Men with lymph scrotum often have frequent acute attacks. These men also develop lymphoedema of the scrotum and penis.

As already mentioned, good *hygiene* helps prevent acute attacks in patients with lymphoedema of the legs. Good hygiene is even more important for men with lymphoedema of the scrotum or penis to prevent acute attacks. Encourage patients to carefully wash their penis, scrotum, and the areas around the scrotum with soap and clean water every day (Fig. 83). The water should be at room temperature or cooler.

Fig. 83 - A patient with lymphoedema washing his genital area with soap and water.

Before washing the genital area, patients should first wash their hands and then look for entry lesions (Fig. 84).

Fig. 84 - An example of a patient with three entry lesions of different sizes (arrows).

Then they should wash the scrotum and penis with soap and water (Fig. 83), and dry the area well afterwards.

If they find entry lesions, patients should use an antibacterial cream after washing and drying. They should rub a small amount of cream into any area with an entry lesion. To avoid breaking the vesicles, men with lymph scrotum should wash and dry very carefully. If the vesicles are leaking, the patient should apply cream, gently and carefully.

Men with lymph scrotum often will use a dressing or other material to absorb the fluid (Fig. 85).

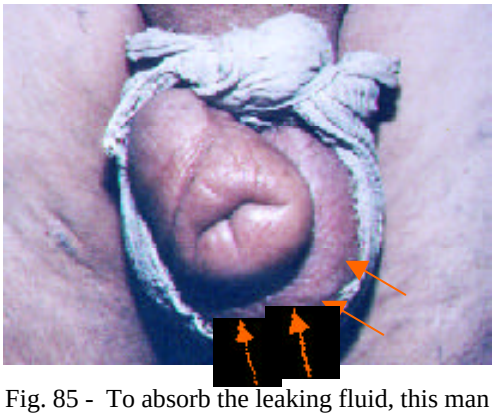


Fig. 85 - To absorb the leaking fluid, this man with lymph scrotum uses a cloth wrapped around the scrotal sac. Note the small vesicles (arrows).

This can be cloth, a plastic bag, or a sanitary napkin. The dressing must be changed often and washed well. After washing, it should be dried in the sun, ironed, and stored in a clean place.

Antiseptic is not routinely used on the skin of the scrotum and penis, because the skin in this area is sensitive and can be irritated by the antiseptic. Only use antiseptic as advised by a doctor or nurse.

The other treatment steps used for lymphoedema of the leg, such as exercise and elevation, will not work for lymphoedema of the scrotum or penis, or for lymph scrotum.

Summary

There are two types of genital disease in men: inside the scrotal sac, and in the *skin* of the scrotum. These can be distinguished by examining the skin.

With hydrocoele, in spite of the large size, the skin is thin and soft, just like the skin of a normal scrotum. No vesicles are present.

Some men may have both hydrocoele and lymphoedema of the skin of the scrotum. In these cases the health worker cannot be sure whether there is also fluid inside the scrotal sac.

Acute attacks in the genital skin

The symptoms of an acute attack in the scrotal area are similar to those in the arms and legs (fever, headache, pain, and increased temperature and redness of the affected area). A lump or swollen gland in the groin area may be the first sign immediately before an acute attack. Bacteria cause acute attacks. Acute attacks in the genital area require the same management, including referral of some patients to a doctor or nurse, as in the case of acute attacks affecting the limbs or breast.

- Use cold compresses to reduce pain and keep the area cool until the pain goes away.
- Patients should be advised to take medicine to control their fever.
- Patients should be warned that if they develop blisters on the skin, they should not break them open, because bacteria can then enter the skin.

- As soon as they can, once the pain improves, patients should continue their good hygiene measures.

- After an acute attack, the skin of the scrotum or penis may peel, or become darker in colour.

- Oral antibiotics are recommended if the patient can be seen by the staff in the clinic, and the drug is available and the patient can afford it. Antibiotics can shorten the length of the attack.

- Patients who still have acute attacks after several weeks of good hygiene should be advised to see a doctor. They may need prophylactic antibiotics to prevent future acute attacks.

With good hygiene, men with lymph scrotum or lymphoedema of the scrotum or penis can abolish or decrease the frequency of acute attacks. However, the volume of the lymphoedema may not decrease as much or as quickly as in patients with lymphoedema in other areas. Even though improvement may be slow, patients can use good hygiene to keep the disease from getting worse.

Adjunct measures

Prophylactic antibiotics. Patients who continue to have recurrent acute attacks despite treatment with hygiene and medicated creams, particularly those with lymph scrotum, should be referred to a doctor or nurse for prophylactic antibiotics (Fig. 67 in Unit 4).

Counselling. Feelings of embarrassment and shame, as well as sexual problems, are common among these patients. Many do not participate in activities and avoid social contact. Some are able to hide their disease, but they need to know that they can keep their disease from getting worse.

Counselling is often necessary for both the man and his partner. If sexual intercourse is still possible, advise the patient and his partner to wash the genital areas carefully both before and afterwards. This will reduce the risk of acute attacks.

Surgery. Your patients with problems of the genital skin might ask you if they can be cured with surgery. For most of these men, hygiene and care of entry lesions are the only treatments available. A special type of surgery, known as "reconstructive" surgery, is now being developed for lymph scrotum and lymphoedema and elephantiasis of the scrotum and penis. This surgery is expensive, and it is not available in most places.

Urinary tract problems

In areas with lymphatic filariasis, people can have problems with their urine. These include:

- Haematuria (red urine, due to the presence of blood)
- Chyluria (urine that is milky, due to the presence of fats)

Filariasis can cause haematuria, but so can many other diseases. Health care workers cannot directly help patients with haematuria. Patients complaining of red urine should be referred to a doctor or clinic.

Chyluria can occur in men, women, and older children. The white colour is caused by fats, which are found in many foods. From time to time the urine appears white, like milk (Fig. 86). If blood is also present, the urine may appear milky, mixed with a pink or red colour (Fig. 87). In addition, patients may pass clots in the urine, which vary in size and colour.

Fig. 86 - The appearance of milky urine in a patient with chyluria.

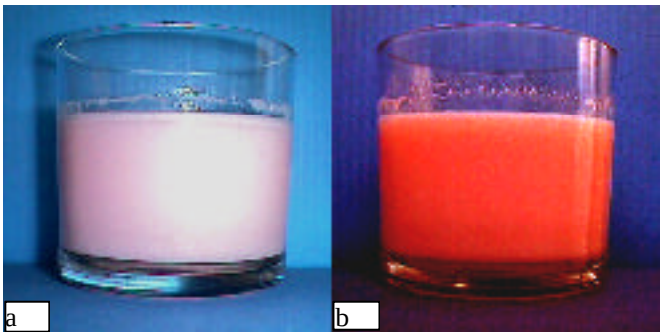


Fig. 87 - The urine in a patient with chyluria may contain blood in small amounts (a) or large amounts (b).

Chyluria may make it difficult for your patients, especially men, to pass urine. Chyluria also causes them to lose weight and feel tired. If they have these problems often, they should see a doctor or nurse to be evaluated. Chyluria does not cause fever. Patients with fever should be referred to a doctor for additional evaluation and care.

Men with chyluria may also have hydrocele, lymph scrotum, or lymphoedema of the scrotum.

Chyluria cannot be cured, but it can be managed by:

- Eating foods that are low in fat and high in protein,
- Drinking lots of fluids
- Resting
- Not lifting heavy objects
- Not walking up stairs.

The health care worker should explain the new diet to patients and their families. Fruits, vegetables, low-fat meats, white meat, egg whites, and beans are all foods that are low in fat and high in protein. Encourage patients to share recipes and secrets of preparing good-tasting food made without fat.

The foods to be avoided are fatty foods, including, among others:

- Any fried foods (Fig. 88)
- Chocolate
- Coconut
- Avocado
- Pork
- The skin and dark meat of chicken
- Cheese and milk, especially goat's milk
- The yellow part of eggs
- Oil, margarine, or butter (even to cook food).

Fig. 88 - Chyluria patients should avoid all fried foods.

A nurse or nutritionist at the clinic or hospital can advise the health care worker about the best and most affordable local foods for patients. Low-fat food is good for all family members, but young children should also eat some foods that contain fat.

Patients need to be told that if they eat the wrong kinds of foods, the milky urine will reappear or get worse.

Patients need to see a doctor if the milky urine continues for more than 30 days, or reappears one or more times a month, even when they eat the correct food.

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Notes

GLOSSARY

Acute attack: the signs and symptoms caused by a bacterial infection of the skin. These include swelling, warmth, redness, and pain of the affected area, fever, chills, headache, and weakness.

Adjunct measures: treatment measures that may be helpful for some patients, but may not be necessary for most patients. For example, for people with stage 5 lymphoedema of the leg, surgery may be used as an adjunct measure to remove knobs.

Adult worm death: death of adult filarial worms. Symptoms of adult worm death are milder than those caused by bacterial infection.

Adult worms: male and female filarial worms that live in lymphatic vessels.

Albendazole: a drug that is taken by mouth to kill intestinal worms.

Antibacterial cream: a cream that kills bacteria or stops them from growing. Antibacterial creams are used to treat infected entry lesions and wounds. They are also used to prevent infections in deep skin folds.

Antibiotic: a drug that is used to treat bacterial infections. Antibiotics are prescribed by a doctor. They can be given by mouth (tablets or pills) or by injection.

Antifilarial drug: a drug that kills microfilariae in the blood and may kill adult worms in the lymphatic vessels. Antifilarial drugs are used to treat filarial infections.

Antifungal cream: a cream that kills fungi or stops them from growing. Antifungal creams are used to treat entry lesions between the toes. For patients with advanced stage lymphoedema, antifungal creams can help prevent fungal infections in the deep folds.

Antiseptic: a liquid or cream used on the skin to stop bacteria from growing.

Aspirin: a drug taken to reduce pain and fever. Aspirin is not usually given to people who live in areas where dengue is common.

Bacteria: types of germs that can enter the skin and cause acute attacks.

Blister: a small swelling or bump in the skin filled with watery fluid. Blisters can be caused by bacteria, burns, or rubbing the skin.

Chill: a feeling of coldness of the body that can cause shaking or shivering.

Chronic: Persistivy over a long period of time.

Fat: an oily or greasy substance found in food.

Fatigue: a feeling of tiredness.

Chyluria: the milky fluid taken up by the intestinal lymphatics from the food in the intestine after digestion. The presence of chyluria in the urine, gives it a milky appearance.

Clean water: water that is suitable for drinking.

Clot: a semi-solidified mass, as of blood or lymph.

Cluster: a number of persons or things grouped together.

Confusion: inability to think clearly.

Cosmetic surgery: surgery done to improve the way a person looks. Cosmetic surgery to remove knobs may also decrease the risk of entry lesions in some patients.

DEC: diethylcarbamazine, an antifilarial drug which kills microfilariae in the blood and some adult worms in the lymphatic vessels.

Deep skin fold: a skin fold in which the base or bottom can be seen only when the edges of the fold are separated by hand. Deep folds are a sign of advanced lymphoedema (at least stage 5). Because deep folds are often moist, fungi and bacteria grow easily in them.

Dengue: a disease that, like filariasis, is spread by mosquitoes. Dengue causes fever and muscle pain.

Diabetes: a disease which causes too much sugar in the blood.

Diethylcarbamazine: see DEC.

Dilate: to make wider or larger, to expand or swell.

Disability: a condition which makes a person unable to adequately or independently perform daily activities such as walking, bathing, going to the bathroom, etc. Disabled patients need help from the health care system.

Drowsiness: a feeling of sleepiness.

Drug: a medicine used to treat disease.

Elephantiasis: *severe or advanced lymphoedema.*

Elevation: lifting or raising. Elevation of the leg allows lymph fluid to drain. People with lymphoedema of the leg should elevate their legs at night by raising the foot of the bed to chest height.

Endemic area: an area where a disease is common.

Entry lesion: any break in the skin that allows bacteria to enter the body. Wounds on the skin surface, such as cuts, scrapes, or scratches, are entry lesions. Entry lesions also can occur between the toes and fingers or in deep skin folds. Many patients with acute attacks have visible entry lesions.

Exercise: active movement of the muscles. Exercise helps move fluid away from the tissues.

Fever: an increase in body temperature.

Filarial infection: the presence of adult filarial worms in the lymphatic vessels or microfilariae in the blood.

Filariasis: a disease caused by parasitic worms.

Fold: a crease. As lymphoedema gets worse, the swelling and hardening of the skin often occur unevenly, more in some areas than in others. This causes skin folds to appear. Skin folds can be shallow or deep. Shallow folds often deepen as the swelling increases.

Fungi: a type of germ that causes infections, for instance between the toes. Fungal infection is a common cause of entry lesions. Entry lesions let bacteria enter the skin, which causes acute attacks. Fungi alone do not cause acute attacks.

Genitals: reproductive and urinary organs of the body.

Germs: small living organisms, such as fungi and bacteria, which can make people sick. Germs can be seen only with a microscope.

Haematuria: blood in the urine.

Health care system: doctors, nurses, community health workers and other health care workers and resources such as clinics and hospitals.

Hydrocele: a collection of too much fluid inside the scrotal sac, which causes the scrotum to swell or get larger.

Hygiene: cleanliness. Hygiene for the management of lymphoedema involves washing the leg, arm or genital area with soap and water until the rinse water is clean, and then carefully drying the skin.

Infected wounds: wounds in which germs are present and growing, causing disease.

Infection: the presence in the body of any germ that can cause disease.

Inflammation: redness, pain, swelling and warmth. In patients with dark skin, the redness may be hard to see. However, the skin feels warm. Swelling is one sign of inflammation, but swelling can occur without inflammation.

Inguinal: in or near the groin area.

Interdigital: between the toes or between the fingers.

Ivermectin: a drug that kills microfilariae in the blood, and worms in the intestines.

Knobs: small bumps, lumps or protrusions on the skin. Knobs before treatment feel very firm, even hard. With treatment, knobs may become softer and smaller, and may even disappear. Knobs are found in stage

Parasitic worms: worms that live in the body. Filarial worms are one type of parasitic worms.

Peeling skin: the top layer of skin comes off in layers or flakes.

Leg volume: the size of the leg.

Lymph fluid (lymph): the fluid found in the lymphatic vessels. Lymph fluid is made up of water, waste products, and cells that fight germs.

Lymph nodes (also called lymph glands): small, bean-shaped organs along the lymphatic vessels. The lymph nodes trap germs before they reach the blood.

Lymph scrotum: a scrotum that is thick and enlarged, and has vesicles on the surface, which are filled with lymph fluid.

Lymphatic filariasis*: the disease caused by infection with filarial worms and the long-term results of this infection.*

Lymphatic system: the network of vessels, lymph nodes, and other organs that carry lymph fluid, bacteria, and waste products from the tissues. The lymphatic system helps fight infections.

Lymphatic vessels: a system of tubes that carry lymph fluid. They are similar to blood vessels, but instead of blood, they move fluid, waste products, and germs away from the tissues. Adult filarial worms live in the lymphatic vessels.

Lymphoedema: oedema or swelling caused by the collection of fluid in the tissue. Lymphoedema most frequently occurs in the legs, arm, breasts, scrotal skin, and penis.

Lymphoedema of the penis: swelling in the penis caused by damaged lymphatic vessels.

Lymphoedema of the scrotum: swelling in the scrotum caused by damaged lymphatic vessels.

Mass treatment: giving a drug or medicine to all people in a community.

Medicated cream: creams with an antibiotic agents, antifungal agent or both.

Microfilariae: young worms found in the blood. Adult female worms living in the lymphatic vessels produce microfilariae. Mosquitoes are infected with milcrofilaria when they bite a person who has filariasis.

Microscope: an instrument that makes very small things, such as bacteria, which cannot usually be seen, appear large.

Mossy foot: clusters of knobs on the top of the foot, which look like patches of moss, warts, or the head of a cauliflower. Mossy foot is a feature of stage 6 lymphoedema.

Myiasis: a disease caused by flies laying their eggs in wounds or entry lesions.

Oedema: swelling caused by excess fluid in the tissue. It can occur with or without inflammation.

Paracetamol: a drug that reduces fever and pain. Paracetamol, unlike aspirin, can be given in areas where dengue is common.

Penis: the male reproductive and urinary organ.

Physical examination: looking at and touching a patient to find out about a health problem.

Potassium permanganate: a liquid antiseptic that is used on wounds and on deep skin folds to help fight bacterial infections. It is available in the form of purple tablets or powder, and must be mixed with clean water.

Prophylactic antibiotics: antibiotics given to prevent bacterial infections. They are usually given by injection, but they can be taken by mouth. Prophylactic antibiotics should be given by a doctor when the patient continues to suffer from acute attacks in spite of other measures.

Protein: a substance in meat and other foods that helps build strong bodies.

Pus: the yellow-white or greenish material found in a wound. It is produced by an infection.

Reconstructive surgery: surgery that rebuilds part of the body.

Repeated acute attacks: acute attacks that occur again and again.

Retrograde lymphangitis: retrograde means "backwards", or going towards the fingers or toes. Lymphangitis is inflammation of the lymphatic vessels. When the adult worm dies, streaks of inflammation can be seen along the lymphatic vessels, moving *away from the body* towards the fingers or toes.

Reversible swelling: swelling that goes away or comes and goes.

Rotate: to move in a circle.

Scrotal: of the scrotum.

Scrotal sac: scrotum. The sac, or pouch, of skin, located beneath the penis, which holds the testes.

Scrotum: the pouch of skin, located beneath the penis, which holds the testes.

Shallow skin fold: a skin fold in which the base is visible when the leg or arm moves. If a patient has a shallow fold at the ankle, the base of the fold can be seen when he or she points the toes down. Shallow folds occur in persons with stage 3 lympheoedema or higher.

Spontaneously: happening without obvious cause.

Stage: the degree of severity of lymphoedema. Lymphoedema is graded from stage 1 (mild) to stage 7 (very severe).

Stage 1 lymphoedema: swelling is reversible overnight .

Stage 2 lymphoedema: swelling is not reversible overnight.

Stage 3 lymphoedema: one or more shallow skin folds are present.

Stage 4 lymphoedema: one or more knobs are present.

Stage 5 lymphoedema: one or more deep skin folds are present.

Stage 6 lymphoedema: mossy foot is present.

Stage 7 lymphoedema: the patient is unable to adequately or independently perform routine daily activities such as walking, bathing, cooking, etc. The patient needs help from the health care system.

Streak: a long, thin red stripe caused by an inflamed lymphatic vessel, which looks red, and feels tender and warm. Adult worm death causes a retrograde streak.

Systemic antibiotics (see antibiotics): antibiotics that are given by injection or by mouth.

Tender: sensitive or painful when touched.

Testicle: male reproductive organ (testes - plural).

Tissue: a group of cells in the body that perform the same function.

Urinary tract: the organs involved in making and releasing urine from the body.

Urogenital: related to the reproductive or urinary organs.

Vesicle: a blister. A small sac or blister that contains fluid.

Vicious cycle: a situation in which one problem causes another problem, which in turn, makes the first problem worse.

Worm: a long, thin, soft-bodied animal. In humans, intestinal worms live in the intestines, and adult filarial worms live in the lymphatic vessels.

Wounds: Cuts, scrapes, or scratches in the skin caused by injury. Wounds are one type of entry lesion, usually on the surface of the skin. Entry lesions may also be caused by fungal infections between the toes or in between skin folds; these entry lesions are not wounds.

NEW HOPE

For People With Lymphedema

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

Amaury Coutinho

New Facts

We have new ways to treat lymphedema and prevent elephantiasis.

2

New Hope

The new lymphedema treatment will

- **stop acute attacks,**
- **make your leg healthier, and**
- **perhaps prevent elephantiasis.**

How?

It's all very simple . . .

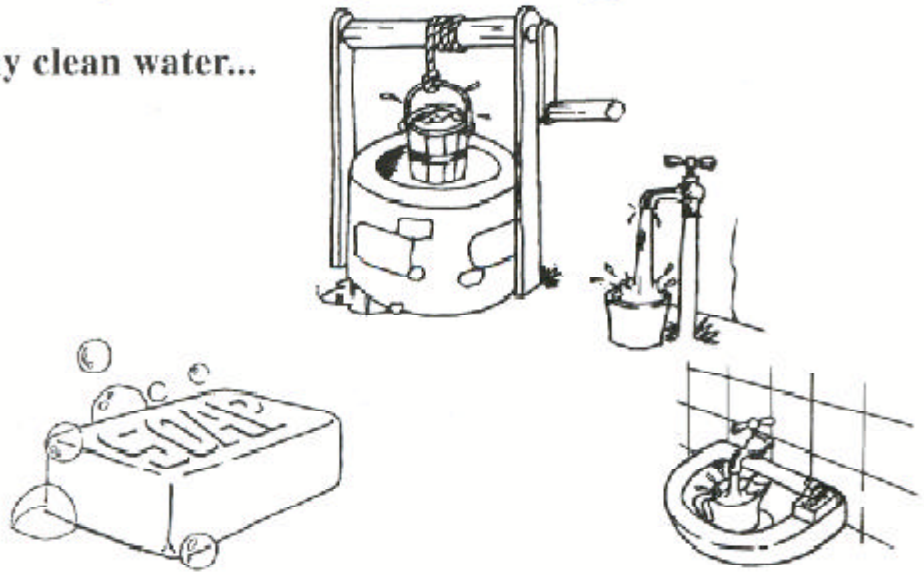
3

Germs are the enemy

Germs cause acute attacks, but we can fight them.

These are your best weapons against germs

Any clean water...

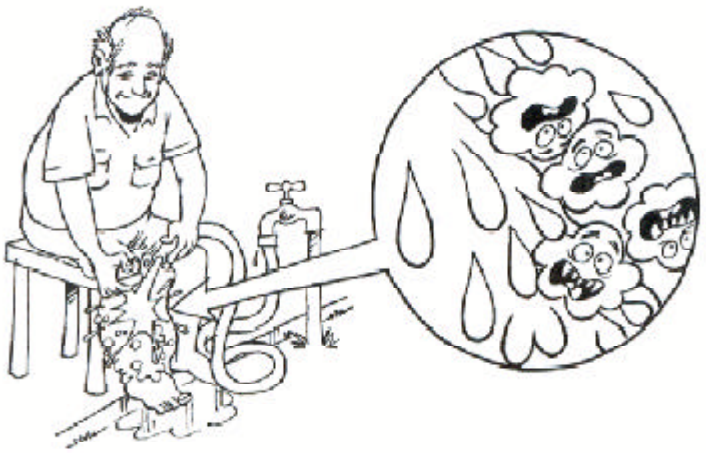


... and plain soap are your best weapons against germs.

4

It is easy!

By washing your legs carefully with soap and water you remove dirt and germs.



Even children can do it!

5

Wash until clean

Wash your leg until the rinse water stays clean.

Some people will need help

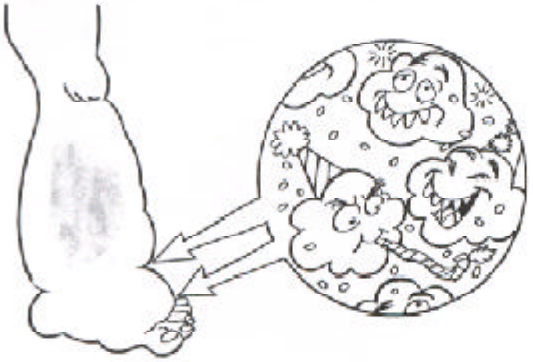
Helpers can sometimes clean places you can't reach.

Get help. The germs won't hurt your helper.

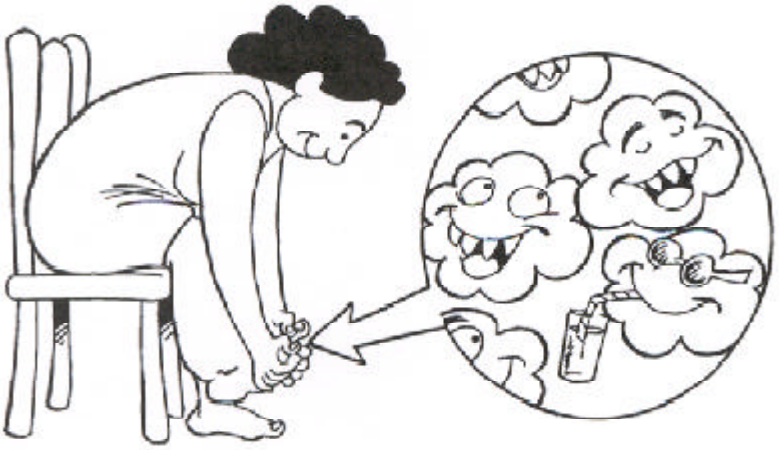
6

Do you have any wounds?

Germs like to grow in warm, moist places. They like to grow between toes and folds of skin.



To find wounds you must search carefully.
To heal them you must wash and dry them well.



Other areas need to be washed with soap and water too. Men, you should wash your genital area. Women, you should wash your armpits and breasts, especially if you are nursing.

7

Wait! You're not done yet

Remember to dry well.
Dry between your toes and skin folds.

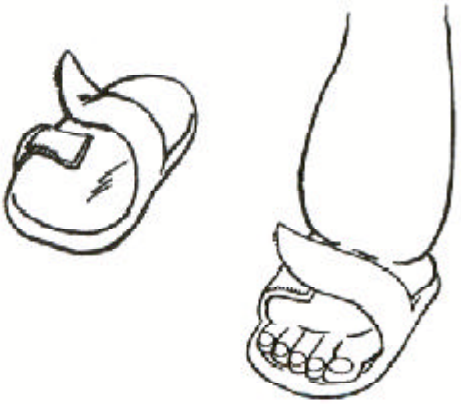
If you have wounds, even small ones, use anti-bacterial cream on them. Rub it in well.

8

Your other leg needs care too

Wash your other leg in the same way and you may prevent lymphedema in that leg too.

Always wear comfortable shoes



Never wear shoes that hurt your feet. Sore places may let germs into your skin and this can cause an acute attack.

9

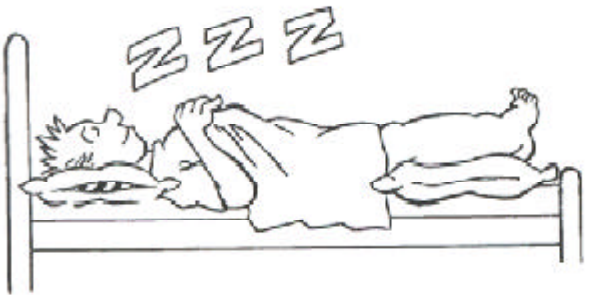
Elevate your leg during the day

Elevate your leg while

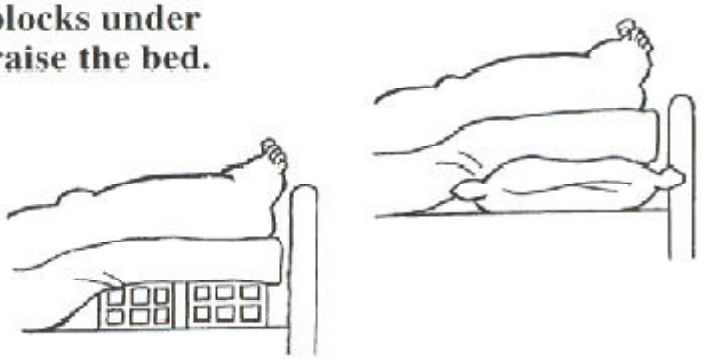
- **cooking,**
- **working,**
- **feeding your baby,**
- **eating,**
- **playing with friends, or**
- **watching TV.**

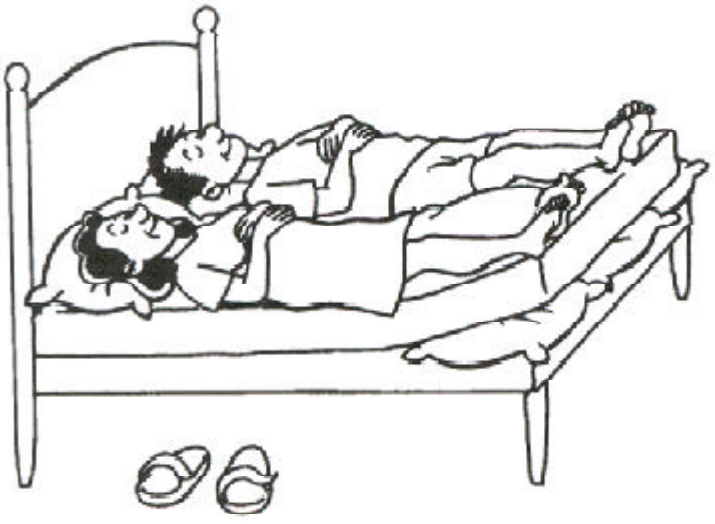
10

Elevate your legs at night



When you sleep, raise your feet, at or slightly above chest level, by adjusting your bed. You can put a pillow or blocks under the mattress to raise the bed.

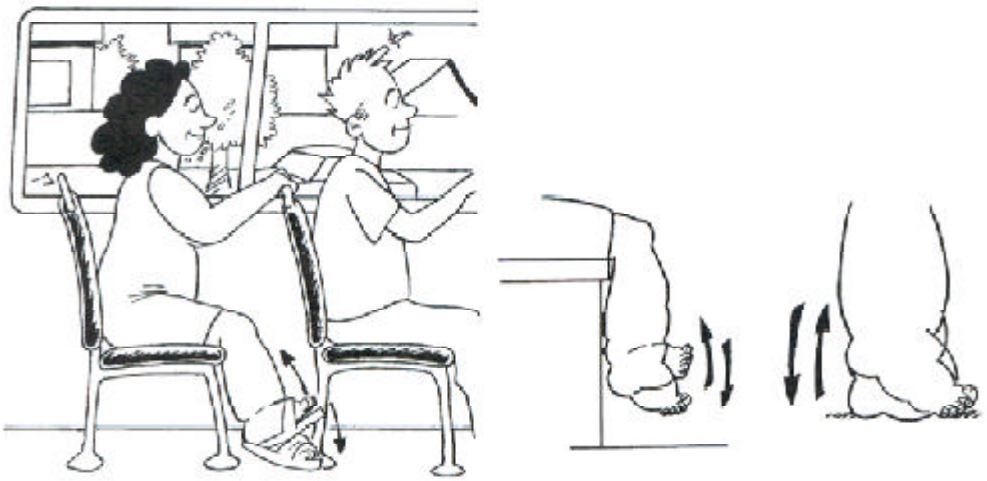




Your partner will benefit too.

11

Do your exercises wherever you are



Move your feet back and forth and around in a circle.

Do your exercises as much as you can and as often as you can. Stop when you are tired and start when you are rested.

12

An acute attack? Don't panic!

An acute attack is painful. It can cause your leg to swell more, and also can cause fever, soreness in your glands, headache, and nausea.

You can relieve your suffering

Cool your leg with cold, clean water. Continue until the pain lessens.

If you have a fever, take medicine for the fever. Drink more water than usual.

Keep washing your legs as usual.

13

Be careful during an acute attack!

Don't do the following:

Never warm the inflamed area.

Do not scratch, or cut your skin.
Do not open blisters.

Do not do the exercises during the acute attack.

Do not use your bandages during the acute attack.

14

Correct, regular, lifelong care will keep you healthy

washing

drying

wound care

elevation

exercise

15

Now, YOU can have a happier life

16

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