

Trachoma

For the Ethiopian Health Center Team



**Ethiopia Public Health
Training Initiative**

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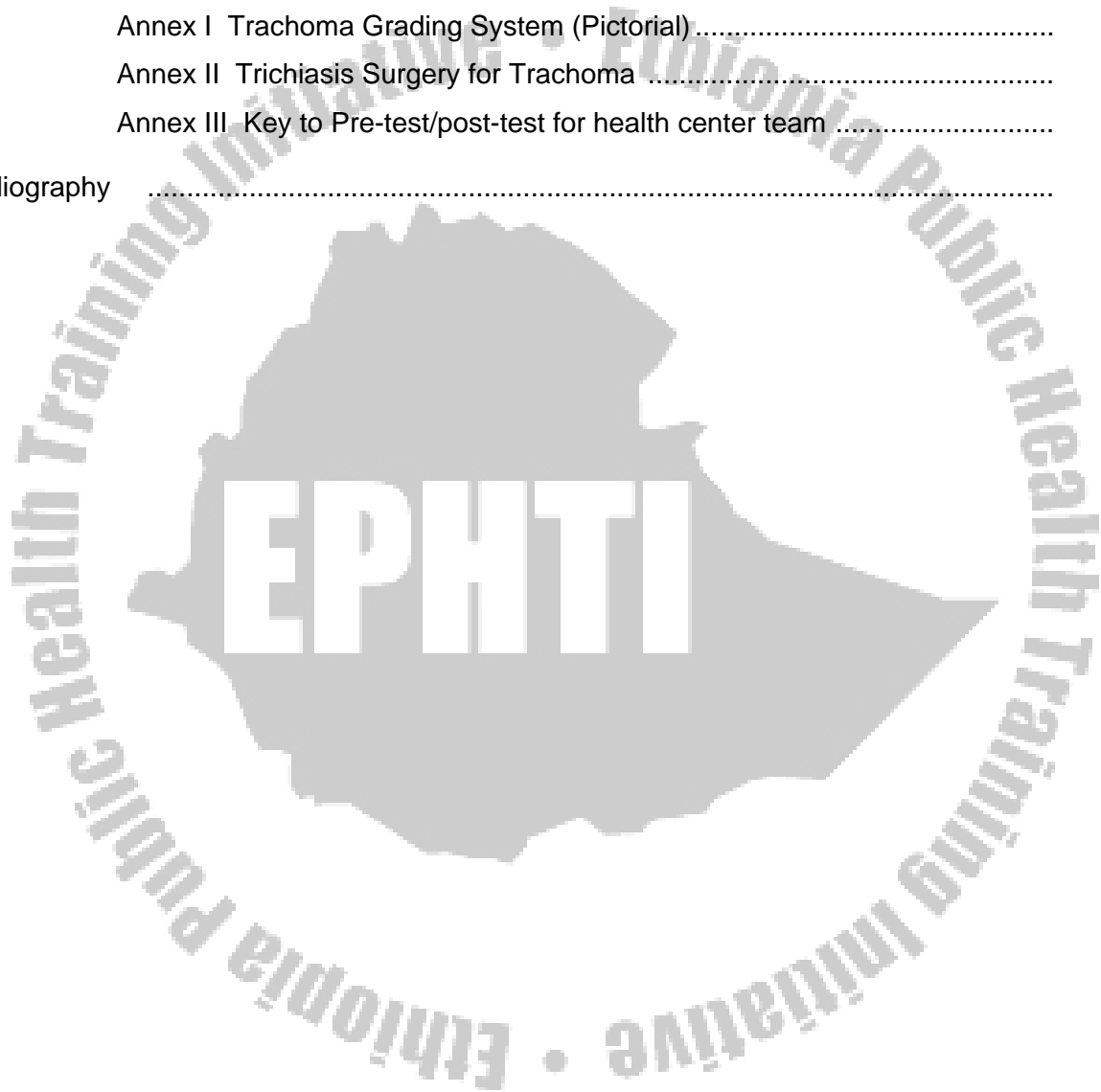
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UNIT ONE

INTRODUCTION

1.1. Purpose and Use of the Module

This module is intended to serve as general learning material about trachoma by the health center team: Health Officer (HO), Environmental Health Technician (EHT/ Sanitarian), Public Health Nurse (PHN), Medical Laboratory Technician (MLT) and Community Health Worker (CHW). It can also be used as reference material for professionals working in health centers. The module may be used as learning material in training workshops, and seminars for members of the health center team, community health workers and caregivers. The basic and general concepts about the disease; its causation, epidemiology, clinical picture, prevention and control strategies are discussed in a simple and quite understandable way. It should be noted, however, that it is not a substitute for standard textbooks.

1.2. Directions for Using the Module

Before starting to read this module, please follow the directions given below

- Study all the contents of the core module by starting with the pre test.
- Use a separate sheet of paper to write your answers and label it “Pre-test answers”.
- The pre- test has two portions, Part - I and Part - II.

Part I The questions are to be answered by all categories of the health center team.

Part II The questions are prepared for the specific categories; Health Officers, Public Health Nurses, Environmental Health Technicians (Sanitarians) and Medical Laboratory Technicians. Select and do the portion indicated by your professional category.

- When you are through with the core module and sure that you have understood it proceed to read the satellite module corresponding to your profession or interest.

- Evaluate your self using the post–test after you have read the modules completely.
- Go through the task analysis for the health center team members in comparison with that of your own.

Note: You may refer to the list of glossary (unit five) and abbreviations (unit six) at the end of the module for terms that are not clear.



UNIT TWO

CORE MODULE

2.1. Pretest

Answer the following questions on a separate answer sheet.

2.1.1. Part I Pretest questions for All Categories of The Health Center Team

Write "True" if the statement is correct or "False" if the statement is incorrect for question 1-7 and the letter of the answer for question 8-10.

1. Trachoma is a disease of the conjunctivae of the eye.
2. Trachoma is a preventable and treatable disease.
3. Trachoma is a major public health problem in Ethiopia.
4. Trachoma is the leading cause of preventable blindness.
5. Repeated rubbing of the cornea with inturned eyelashes is the cause of blindness in trachoma.
6. Surgical management is indicated for patients coming with photophobia (discomfort in bright light) and red eye.
7. Mass treatment is indicated for a community in which trachoma is less prevalent.
8. Trachoma can be transmitted through-----
 - A. Contaminated fingers
 - B. Contaminated towels and clothes
 - C. Flies
 - D. All of the above.
9. Trachoma is caused by
 - A. Bacteria
 - B. Heredity
 - C. Evil-eye
 - D. A and B are correct
 - E. All of the above

10. Components of trachoma control include-----
- A. Surgical correction for trichiasis
 - B. Facial cleanliness
 - C. Environmental improvements
 - D. Antibiotic treatment of active cases
 - E. All of the above

2.1.2. Part II pre test Questions Specific to a Categories of The Health Center Team

2.1.2.1 Questions to be answered by Health Officers

Answer the following questions by stating "True" if the statement is correct or "False" if the statement is incorrect.

- 1. Chlamydia trachomatis is an obligate intracellular parasite.
- 2. Entropion is one of the indications for surgical management (tarsotomy).
- 3. To perform tarsotomy for trichiasis general anesthesia is required.
- 4. Assessment of the community for trachoma is a necessity before implementing mass treatment.
- 5. Follicles on the upper tarsal conjunctivae are the first signs of trachoma.

2.1.2.2 Questions to be answered by Public Health Nurses

Write "True" if the statement is correct or "False" if the statement is incorrect for the following questions.

- 1. There are four stages of trachoma.
- 2. Follicles are the first sign to appear in trachoma case.
- 3. The right procedure to treat trachoma is applying eye ointment in the upper conjunctival sac.
- 4. Public health nurse can equally contribute with other members of the health center team in the prevention and control of trachoma.

2.1.2.3 Questions to be answered by Environmental Health Technicians.

Write "True" if the statement is correct or "False" if the statement is incorrect for questions 1-4 and gives short answers for questions 5-7.

- 1. Flies can transmit Chlamydia trachomatis from the eye of infected person to healthy person.
- 2. Improper waste management has an association with high trachoma prevalence.

3. Trachoma is a water borne disease.
4. Improving water supply of a community does not help to decrease trachoma prevalence.
5. Write the prevention and control measures of trachoma.
6. Write the possible control strategies for flies.
7. List the three basic components of public health approaches to trachoma control.

2.2. Significance and Brief Description of Trachoma

Trachoma is one of the major causes of preventable infectious diseases, which leads to blindness worldwide. It is a disease, which results in conjunctival scarring, corneal ulceration and finally blindness. Trachoma remains a serious problem in dry environments in North America, Middle East, Southern Asia and Africa. It is thought to affect more than 400 million people in the endemic areas in Africa, India and Middle East.

The prevalence of blindness in Ethiopia is estimated to be 1.5 % (about 750,000 people). Of these, approximately 300,000 people are affected by trachoma. Most of trachoma blindness occurs in rural areas, where multiple factors such as illiteracy, poverty, overcrowding, low health service and inadequate water supply coverage prevails. Therefore, to prevent this major public health problem an integrated preventive and curative service with active involvement of the community is of paramount importance.

2.3. Learning Objectives

Upon completion of the module, the reader will be able to:

1. Define trachoma.
2. Describe the magnitude of the problem of trachoma at global and national level.
3. State the causative agent and pathogenesis of trachoma.
4. Describe diagnostic methods of trachoma.
5. Describe the medical and surgical management of trachoma.
6. Apply the different preventive and control measures of trachoma.

2.4. Learning Activity

2.4.1. Case Study

W/o Genet, a 38 years old lady, came from Kersa, which is 30 km away from Alemaya Health Center. She came to the health center on Ginbot 4, 1992 E.C. with her two children. She told the Health Officer that the elder child, Kebede who was four years old, had complaints of itching of the eyes which were red, swollen and painful. He also had fear of light and excessive tearing. These complaints had been present intermittently for the last one year. The other child, Lelise who was two years of age was said to have itching and redness of the eyes for the last two months. W/o Genet told the health officer that she had taken Kebede to the nearby clinic four months ago for which some eye ointment was given. She discontinued the treatment after applying it for only a week because she felt that her child improved. She stated that she had a similar problem in the past, which she associated with her decreased vision.

The family lived in a small room where food was also prepared. They were dependent on one cow and five goats for their income, which lived in a barn adjacent to the house. There was no latrine and they were using an open field. They lived near a market area where people who come to the market usually contaminate the open field around. Children play on this dirty field and many other children in the community had also similar eye problems. The source of water was a protected spring, which is 3 km away from their house so that she could not fetch an adequate amount for their daily use. The available water was usually used for food preparation and the family members rarely washed their face.

The health officer did a physical examination on three of them and detected the following findings. On general appearance, Kebede had uncombed hair, dirty face and mucoid discharge on the sides of the eyes. On eye examination; hyperemic (red) conjunctivae with small pin- head /raised/ swelling on the upper tarsal part. Lelise was also found to have a similar finding as Kebede. The mother had in-turned eyelashes and slight corneal opacity on the right eye with decreased vision.

2.4.2. Based on the Above Case Study Attempt the Following

Questions

1. What do you think the health problem of the children?
2. What are the factors that have contributed to the eye problem of the children?
3. What preventive and control measure would you suggest for the family?

4. What measures would you suggest to reduce the prevalence and incidence of the disease in the community?

2.5. Definition

Trachoma is a chronic and recurrent inflammation of conjunctivae and cornea.

2.6. Epidemiology

Trachoma is the world's leading cause of preventable blindness. It is thought to affect more than 400 million people in the endemic areas in Africa, India and Middle East. In some endemic areas like Tunisia, nearly all the children are infected by the age of two. The infected children then serve as the reservoir for further transmission. At present an estimated 146 million people have active infection with the microorganism *Chlamydia trachomatis* for which antibiotic treatment is indicated. There are approximately 10.6 million adults with inturned eyelashes (trichiasis / entropion) for which eyelid surgery is needed to prevent blindness. An estimated 5.9 million adults are blind from corneal scarring due to trachoma. The prevalence of blindness in Ethiopia is estimated to be 1.5% (750,000 people).

Approximately 80 % of blindness are preventable and curable. In Ethiopia much has remained unknown regarding the etiology, prevalence and the magnitude of ocular disease. However, a number of community based studies in different parts of the country revealed that the leading causes of blindness are trachoma 42% and cataract 29%. The remaining causes are malnutrition, glaucoma and other eye infections. Eye diseases, including trachoma accounted for 5.4% of the leading causes of out patient morbidity in Ethiopia in 1986 / 87 and was also one of the 15 leading causes of hospitalization.

Trachoma associated lesions are major causes of blindness in Ethiopia, accounting for approximately 300,000 blind persons. School surveys conducted in Ethiopia revealed that prevalence of trachoma infection is 62% in Addis Ababa, 83% in Gondar and 73% in Harar.

A study conducted from February to May, 1999 on prevalence and associated risk factors of trachoma among women aged 15 to 49 years in north western Ethiopia showed that the prevalence rate of Trachoma among women and children were 41% and 71.3% respectively. The study also indicated that care takers of children of age 1-7 years were found to be at a higher risk of acquiring the disease than non-care takers and those women without children aged 1-7 years. Further more, the educational status, frequency of face washing, availability of

latrine facilities, ages of women and family size were found to be highly associated with trachoma prevalence.

2.7. Etiology and Pathogenesis

Trachoma is a chronic and recurrent conjunctivitis caused by a bacterium called *Chlamydia trachomatis*. It is transmitted through direct contact with infectious ocular or nasopharyngeal discharge from infected people on fingers. It can also be transmitted indirectly with contaminated fomite such as towels, clothes and other soiled materials. Flies contribute to the spread of the disease.

Trachoma begins as an inflammation of conjunctiva with the formation of small tumor like masses (lymph follicles). Infected cells die and the surrounding areas become filled with discharge. Scar tissue containing fibroblasts develop and can extend into the eyelids. As the disease progresses the eyelids are turned inwards. The eyelashes rub on the conjunctiva causing corneal ulceration. As a result of repeated rubbing of the cornea, loss of vision may occur.

2.8. Clinical Features

The patient may develop progressively the following signs and symptoms.

- The eyes become red and swollen
- Mucoïd or mucopurulent discharge
- Photophobia (discomfort in bright light)
- Bilateral lacrimation (tearing)
- Small lymphoid follicles on the upper tarsal conjunctiva which progressively increase in size (follicles are white/yellow isolated elevation within the conjunctivae)
- Pannus
- Scarring and shrinkage of conjunctiva
- Reduced vision
- Entropion (in-turning of lid margin)
- Trichiasis (rubbing of eyelashes on the cornea)
- Corneal opacity
- Vascularization of the cornea

2.9. Diagnosis

There are two types of diagnosis, these are:

- Based on clinical signs (clinical diagnosis) and
- Laboratory diagnosis, like giemsa stain, serological test and cell culture.

2.10. Case Management

There are two types of case treatment

- Medical Treatment
- Surgical Treatment

2.10.1 Mass Treatment Approach

In areas where the disease is severe and highly prevalent, mass treatment of whole population, especially the children, with topical tetracycline ointment is used with varying schedules, such as twice daily for five consecutive days each month for six consecutive months. Another important approach can also be surgical correction for complications of this disease. Mobile teams, with auxiliary workers trained to correct entropion and trichiasis, can cover a community in a planned schedule to prevent the inevitable progression to blindness caused by these disabilities.

2.11. Prevention and Control

Objectives

- To interrupt transmission of infection by reducing the incidence of the disease.
- To treat patients in order to achieve their cure and prevent blindness.

Based on the current knowledge, a public health approach to trachoma control for endemic and hyper endemic areas should consist of four components:

Four components of trachoma control: **(SAFE)**

- **S**urgical correction for trichiasis
- **A**ntibiotic treatment of cases of active trachoma
- **F**acial cleanliness
- **E**nvironmental improvement

Poor hygienic conditions favor the transmission of trachoma. Different studies have shown that facial cleanliness especially in children decrease the occurrence of the disease. The availability of adequate pure water and sanitation facilities like proper waste disposals as well as fly control strategies have proved to be factors that reduces transmission or severity of the disease.

Health Education and Community Participation

Health education ensures community participation. Health education and community participation are thus two vital factors of any health program to bring long term impact. These help to include concrete activities to promote personal and community hygiene. Health education should be provided to the communities in appropriate sites including teaching of good hygienic practices for school children using various methods.

UNIT THREE

SATELLITE MODULES

3.1 Satellite module for health officers

3.1.1. Directions for using this Module

- Before reading this satellite module be sure that you have completed the pre-test and studied the core module.
- Continue reading this satellite module.

3.1.2. Learning Objectives

After completing this module the reader will be able to:

- Classify the clinical feature of the disease according to the standard set by World Health Organization (WHO).
- Diagnose trachoma.
- Assess trachoma in the community.
- State and perform the different medical and surgical treatments of trachoma.

3.1.3. Pathogenesis

Chlamydia trachomatis, with serotypes A, B, and C, which is an obligate intracellular parasite with a complex intracellular and extra cellular growth, is responsible for causing trachoma. The extra cellular infectious particle is taken to the conjunctiva by the different routes as mentioned in the core module on section 2.7 and will be phagocytosed by host cells.

Small follicles develop in the conjunctiva of the upper lids after seven to ten days. Gradually the follicles increase in size and in number for three to four weeks forming yellow gray semi-transparent “sago-grain” granulation surrounded by inflammatory papillae. During this stage pannus formation begins with invasion of the upper half of the cornea by loops of vessels from the limbus. These two stages may last from several months to more than one year depending on response to therapy.

The entire cornea may ultimately be involved resulting in reduced vision. Rarely, the pannus retrogresses completely and corneal transparency is restored without treatment.

Unless adequate treatment is given, the cicatricial (scarring) stage follows. In this stage the follicles and papillae gradually shrink and are replaced by scar tissue that often causes entropion (in turning of eyelashes) and lacrimal duct obstruction. The corneal epithelium becomes dull and thickened and lacrimation is decreased. Then ulcers form in ischaemic areas of the pannus. On healing the conjunctiva is smooth and grayish white.

3.1.4. Clinical Features

In addition to what is written in core module, WHO has developed the following trachoma grading classification system.

Table 3.2.1. WHO Trachoma Grading Classification System

Sign	Description
TF (Trachoma Inflammation Follicular)	Presence of five or more follicles in the upper tarsal conjunctiva of at least 0.5 mm
TI (Trachomatous Inflammation)	Inflammatory thickening of the upper tarsal conjunctiva that obscure more than half of the normal deep tarsal vessels
TS (Trac-Trachomatous Carring)	The presence of easily visible scarring in the tarsal conjunctiva
TT (Trachomatous Trichiasis)	Evidence of at least one eye lash touching the cornea, evidence of recent removal of inturned eyelashes is also graded as TT
CO (Corneal Opacity)	Presence of easily visible corneal opacity that obscure at least part of the pupilliary margin

WHO has developed simple scheme for grading of trachoma for assessing community based surveys.

The prevalence of active trachoma is represented by proportion of TF and/or TI cases among a specific population.

The population with TI has severe inflammation and needs prompt treatment.

The presence of TT indicates the backlog for surgical services: trichiasis surgery.

The prevalence of CO indicates the impact of trachoma on visual impairment in the community.

N.B. See pictures of the different classifications in annex I.

3.1.5 Diagnosis

3.1.5.1 Clinical diagnosis

The clinical diagnosis of trachoma can be made if at least two of the following signs are present.

- Follicles on the upper tarsal conjunctiva
- Typical horizontal scarring on the upper tarsal conjunctiva
- Presence of vascular pannus at the corneal periphery
- Epithelial keratitis at the periphery of the upper cornea

3.1.5.2 Laboratory diagnosis

- Giemsa stain: Microscopic examination of Giemsa stained smear is relatively cheap and doesn't need special training for the diagnosis of trachoma. Since microscopic examination is a less sensitive and specific test, interpretation of results must strongly be supplemented by clinical findings.
- Serological tests: Are expensive and require skill to be used for routine purpose.
- Cell culture: It is a complex laboratory test, which takes several weeks to yield therefore it is not used as a primary diagnostic method.

3.1.6. Case Management

➤ Case Treatment

▪ Medical Treatment

Topical and systemic antibiotics can be used.

- **Topical Treatment:** This includes
 - 1% Tetracycline eye ointment
 - Sulfonamide topical antibiotic 1% Tetracycline is preferable because evidences show that it is more effective and cheap. Application of ointment to the lower conjunctival sac while the lower lid is pulled away from the eye with the tip of the finger. Patient must close the eye after this for half a minute and must not wipe the eye. The ointment should be applied without interruption according to the recommended treatment schedule.
- Topical treatment: This is mostly accepted because it is cheaper and there is no risk of systemic side effects. The other additional advantage is that it is effective against bacterial conjunctivitis, which may be present together with trachoma.

The schedules for topical tetracycline ointment treatment are:

1. Continuous treatment requires drops or ointment two to four times a day for six weeks.
This is probably best for treatment of an individual
 2. Intermittent treatment requires drops or ointment two times a day for one week each month, for six months. This is probably best for treating the community.
 3. Twice daily for two months.
- **Systemic Treatment:** This is best for severe cases. Two courses of oral Erythromycin, Doxycycline or Tetracycline should be given for two weeks if possible. The new macrolide antibiotic Azithromycin has been found to be very effective against chlamydial infections. This can cure a patient of trachoma simply, successfully and without side effects. However, it is a fairly recent drug and quite expensive. The dose is 1gm as a single dose for adults or 10 mg/kg as a single dose for children. Systemic tetracycline is contraindicated for children less than eight years of age.

- **Surgical Treatment/Tarsotomy/**

Surgical management is indicated for:

- Inward deviation of the lid margin (entropion).
- Rubbing of the cornea by the inward turned eyelashes (trichiasis).

The principles of surgical management of trichiasis and entropion involve rotating the marginal part of the eyelid out wards away from the eyeball so that the eyelashes are no longer in contact with the eye. For detailed procedures, the instrument required and complications see annex I.

3.1.6. Assessment of Trachoma in a Community

➤ **Objective**

The primary objective of a program for the control of trachoma is the prevention of blindness. Control programs should focus on communities with substantial risk of “blinding trachoma” as indicated by the presence of:

- Corneal scarring
- Trachomatous trichiasis and entropion and
- Moderate and severe trachomatous inflammation

Such communities are likely to be found in countries with blindness rates that are above 0.5%. The first task therefore is to undertake an epidemiological survey to identify and delineate communities with blinding trachoma and assess the magnitude and severity of the problem.

➤ Evolutionary Stages of Trachoma

The evolution of the disease typically presents two stages that are separated by several years or often decades.

- Inflammatory (active) trachoma is diagnosed most often in children. In many settings, girls tend to have more frequent and severe active disease than boys do.
- Cicatricial (scarring) trachoma is usually found in adults with ultimate development of trichiasis. This is often found three to four times more commonly in women as compared to men.

Consequently, when assessing trachoma at the community level, it is important to consider both the inflammatory disease in children, and the potentially blinding complications (i. e., trichiasis) in adults:-

- In long-standing hyperendemic areas there would be evidence of active severe trachoma in children, as well as trichiasis and trachoma related visual impairment in older persons. In such situation, mass intervention with antibiotic distribution, health promotion and trichiasis surgery should be provided.
- In certain circumstances, only mild, non-blinding trachoma cases are found in a community. Cases of inflammatory diseases are seen in children and very few cases or no case at all of trichiasis are found. In such circumstances, there is usually no need for mass interventions at the community level and only recognized active cases need to be treated individually.
- By contrast, there are communities where trachoma may have been a severe disease in the past. Very few cases, if any, of inflammatory disease are identified in children. However, cases of trichiasis in adults are still present in the community. Trichiasis surgery needs to be provided without delay in these communities.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

1. Read the task analysis of the different categories of the health center team on unit 4.
2. Do the questions of the pre-test as a post-test.

N.B.: Use a separate answer sheet.

3. Compare your answers of the pre and post-tests with the answer keys given on annex III and evaluate your progress.

3.2 Satellite module for Public Health Nurses

3.2.1. Directions for using this Module

- Before reading this satellite module be sure that you have completed the pre-test and studied the core module.
- Continue reading this satellite module

3.2.2. Learning Objectives

After reading this module the learner will be able to:

- Identify the five stages of trachoma.
- Provide nursing management
- Implement the preventive and control measures.

3.2.3. Clinical Features

In addition to what is written in core module, WHO has developed the following trachoma grading classification system.

Table 3.2.1. WHO Trachoma Grading Classification System

Sign	Description
TF (Trachoma inflammation-follicular)	Presence of five or more follicles in the upper Tarsal conjunctiva of at least 0.5 mm
TI (Trachomatous Inflammation)	Inflammatory thickening of the upper tarsal conjunctiva that obscure more than half of the normal deep tarsal vessels
TS(Trac-Trachomatous Scarring)	The presence of easily visible scarring in the tarsal conjunctiva
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CO (Corneal Opacity)	Presence of easily visible corneal opacity that obscure at least part of the pupillary margin

WHO has developed a simple scheme for grading trachoma for assessing community based surveys.

The prevalence of active trachoma is represented by the proportion of TF and/or TI cases among a specific population.

The population with TI has severe inflammation and need prompt treatment.

The presence of TT indicates the backlog for surgical services: trichiasis surgery.

The prevalence of CO indicates the impact of trachoma on visual impairment in the community.

N.B. See pictures of the different classifications /grading system in annex I.

3.2.4. Nursing Management

➤ Treatment

Topical and systemic antibiotics can be used.

- **Topical Treatment:** This includes
 - 1% Tetracycline eye ointment
 - Sulfonamide topical antibiotic 1% Tetracycline is preferable because evidences show that it is more effective and cheap. Application of ointment to the lower conjunctival sac while the lower lid is pulled away from the eye with the tip of the finger. Patient must close the eye after this for half a minute and must not wipe the eye. The ointment should be applied without interruption according to the recommended treatment schedule.
 - Topical treatment: This is mostly accepted because it is cheaper and there is no risk of systemic side effects. The other additional advantage is that it is effective against bacterial conjunctivitis, which may be present together with trachoma.

The schedules for topical tetracycline ointment treatment are:

2. Continuous treatment requires drops or ointment two to four times a day for six weeks. This is probably best for treatment of an individual
4. Intermittent treatment requires drops or ointment two times a day for one week each month, for six months. This is probably best for treating the community.
5. Twice daily for two months.

The public Health Nurse demonstrates eye ointment application for the patient and family.

- Procedure
 - Pull down the lower lid and apply ointment in the lower conjunctival sac.
 - Instruct the patient not to wipe the eye after application
 - Close the eye for some time after application

In addition, the Public Health Nurse should inform the patient and family to:

- Clean the eye with warm water before applying ointment.
- Wash the hand after touching the affected eye.
- Use separate wash cloths, towels and handkerchiefs.
- Avoid rubbing the affected eye and touching the unaffected eye to prevent cross contamination.
- **Systemic Treatment:** This is best for severe cases. Two courses of oral Erythromycin, Doxycycline or Tetracycline should be given for two weeks if possible. The new macrolide antibiotic Azithromycin has been found to be very effective against chlamydial infections. This can cure a patient of trachoma simply, successfully and without side effects. However, it is a fairly recent drug and quite expensive. The dose is 1gm as a single dose for adults or 10 mg/kg as a single dose for children. Systemic tetracycline is contraindicated for children less than eight years of age.
- **Surgical Treatment/Tarsotomy/**

Surgical management is indicated for:

- Inward deviation of the lid margin (entropion).
- Rubbing of the cornea by the inward turned eyelashes (trichiasis).

The principles of surgical management of trichiasis and entropion involve rotating the marginal part of the eyelid out wards away from the eyeball so that the eyelashes are no longer in contact with the eye. For detailed procedures, the instrument required and complications see annex I.

3.2.5. Prevention and Control

The Public Health Nurse participates in the control and prevention of trachoma individually and as a team with other health professionals in the following aspects.

- Providing health education about personal hygiene especially the need of washing hands and faces of children with soap and water.
- Initiates treatments of early stages of trachoma.
- Early detection of cases with especial emphasis on pre school children.
- Participates in mass treatment of the community with eye ointment especially for children with eye infection.
- Collaborate with other health team members and the community to promote improvement of water supply and proper waste disposal.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

1. Read the task analysis of the respective categories.
2. Do the question of pre-test as a post-test
NB. Use a separate answer sheet.
3. At last compare your answers of the pre and post-tests with the answer keys given on annex III, and evaluate your progress.



3.3 Satellite Module for Environmental Health Technicians (Sanitarians)

3.3.1. Directions for using this Module

- Before reading this satellite module be sure that you have completed the pre-test and studied the core module.
- Continue reading this satellite module.

3.3.2. Learning Objectives

After reading this module the learner will be able to:

- Describe the approaches to prevent trachoma
- Describe the control measures of trachoma.
- Organize and mobilize the community for effective trachoma control.

3.3.3. Prevention and Control of Trachoma

The methods for the prevention of trachoma emanate from the mode of transmission of the disease. The mode of transmission of trachoma is by transfer of the agent from the eye discharge of a sick person to a healthy person through the following means:

- Contaminated fingers.
- Contaminated fomite like towels, eye-glasses, etc.
- Eye-seeking flies.

3.3.3.1. Basic Public Health Approaches to Trachoma Prevention and Control

It is well understood that trachoma remains a blinding disease where living conditions facilitate continuous transmission among family members. The public health approaches to trachoma prevention and control should consist three basic components:

- Education of the public about personal hygiene (hand and facial cleanliness) and environmental sanitation.
 - The provision of safe, effective and affordable antibiotics to reduce the pool of infection in the community.
 - The provision of surgery in equipped health institutions for trichiasis to prevent visual impairment.

3.3.3.2. Prevention and Control Measures of Trachoma

➤ Provision of adequate water supply:

The trachoma organism is present in pus on the face coming from the eye and from the nose. Since trachoma is a water-washed infection, transmission can be decreased by increasing the availability and proper use of water for face and hand washing. Communities with inadequate water supply are more likely to have higher trachoma prevalence. Likewise, poor hygienic conditions due to lack of adequate water have long been associated with the risk of trachoma transmission.

Therefore, the following measures are essential to ensure water supply provisions both at community and household level.

Improve water accessibility by one or more of the following ways:

- Fixing water supply line in the house, preferably in the room.
- Installing a water source at a reasonable distance.
- Installing water supply at an affordable cost.
- Availing water for institutions such as schools and prisons.
- Increasing the abundance of water by:-
 - Developing more reliable sources.
 - Insuring a continuous supply to the community.
 - Constructing contingency reservoirs at the community level and in each family household.
 - Monitoring unnecessary water wastage at the community and family level through education about the efficient utilization of this invaluable resource.

➤ Control of flies:

Dirty faces attract flies. One of the earliest risk factors noted for trachoma is the presence of flies around living and working places. Eye seeking flies can carry *C.trachomatis* on their legs and proboscis. Associations are noted between fly density in the household or on children's faces and the presence and severity of trachoma.

Flies particularly *Musca sorbens* breed on indiscriminately disposed excreta and animal wastes which result in high fly population and high risk of disease transmission. Therefore, control of these eye-seeking flies is one strategy to decrease the risk of transmission. Several methods could be implemented to control and reduce the abundance of fly population. Some of these methods are: -

- Use of appropriate (sanitary) latrines:

Improper design of latrine and indiscriminate defecation in the open field attracts flies. Fecal matter around houses contributes to increased fly population. Therefore, enhancing the proper disposal of excreta into properly designed and well-maintained latrines will avoid the indiscriminate disposal of human excreta. The construction of latrines will promote and improve general hygiene and reduce trachoma prevalence.

- Basic environmental sanitation:
 - Proper management of animal droppings:
 - In arid environments, cattle droppings create an optimal environment for breeding of flies. Therefore, animal wastes need to be frequently cleaned and disposed of in a sanitary manner, and away from human residences.
 - Proper management of other putrescible organic wastes:
 - Putrescible organic wastes of any type including liquid waste containing organic matter attract flies and are also good media for their multiplication. Therefore, proper storage, collection and disposal of such wastes is of paramount importance for the control of fly breeding.
 - The methods of proper waste disposal include burying, burning or incineration of solid wastes, as well as proper drainage and removal of the liquid wastes by using seepage pits or infiltration trenches.

➤ Good personal hygiene practices:

Encourage general improvement of hygiene in the family, especially frequent cleaning of children's faces and hands with water and soap. Children with clean faces are less likely to have trachoma. Therefore, families should have ample water with soap for their household members and they should encourage and motivate their toddlers to create habits of frequent hand and face washing. It is also worth abandoning the use of common towels, handkerchiefs, spectacles, and the likes.

➤ Case finding:

Case finding activities can be facilitated through actions such as:

- Home visiting
- Organizing treatment facilities in health institutions.
- Organizing strategies to decrease the pool of infection in the community by mass treatment.
- Organizing training and refresher programs for health workers at all levels including

health extension workers and community health workers to facilitate the early detection and treatment of cases.

- Organizing integrated daily treatment provisions in all health units and
- Conduct screening programs in schools and communities to detect and treat cases.

➤ Health education:

Health education is a key element to raise the health awareness and to initiate the community for active participation for the prevention and control of trachoma. It encourages the frequent use of water, proper utilization of latrine facility and monitoring of environmental sanitation. More specifically health education helps to promote personal hygiene such as regular face washing, hand washing and to control fly density so as to prevent the transmission of trachoma. Therefore, any health education that aims to control trachoma should deliver information based on the following key points:

- The cause of the disease
- Mode of transmission
- Clinical features
- Complication and
- Prevention and control methods of the disease.

Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

1. Read the task analysis of the respective categories.
2. Do the question of pre-test as a post-test
NB. Use a separate answer sheet.
3. At last compare your answers of the pre and post-tests with the answer keys given on annex III, and evaluate your progress.

3.4 Satellite module for community Health Workers

3.4.1. Introduction

3.4.1.1 Purpose and Uses of The Module

This module is intended to be used by community health workers and is believed to provide them with basic information needed at the grass-root level to serve the community in the prevention and control of trachoma. It helps them to recognize their role in case finding and management necessary in prevention of the disease.

3.4.1.2. Direction for using this Module

- Start with the pre-test questions.

NB. Use a separate answer sheet.

- Study the text including the task analysis.

3.4.2. Pre-test questions to be answered by community Health Workers

Answer “True” if the statement is correct or “False” if the statement is incorrect for the following questions.

1. Trachoma is a disease, which is caused by germs.
2. A person who has itching and burning sensation of the eyes could be suspected of having trachoma.
3. Trachoma is a hereditary disease.
4. Trachoma cannot be treated by medicine.
5. A community health worker has great role in the prevention and control of trachoma.
6. Trachoma can be transmitted from a sick person to a healthy person through contaminated eye discharge.
7. Trachoma can lead to blindness if not treated
8. Flies do not transmit trachoma.

3.4.3. Learning Objectives

After studying this module the learner will be able to:

- Recognize that trachoma is a disease of public health importance.
- Identify causes and modes of transmission of trachoma.
- Identify that trachoma is a preventable cause of blindness.

- Participate in prevention and control of trachoma.

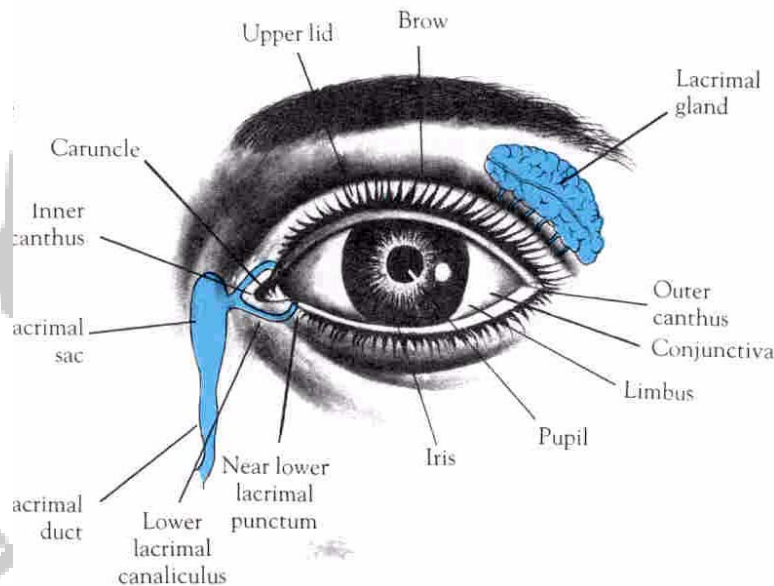
3.4.4. Significance of the Problem

Trachoma is one of the leading causes of blindness in Ethiopia. This is due to poor environmental sanitation, poor personal hygiene, inadequate water supply, illiteracy, over crowding and inadequate health service coverage. This eye disease results in vision problems in large groups of the population. Therefore, to prevent and control this disease an integrated participation of the community and health personnel is very important.

3.4.5. Structure of the Eye, Definition, Cause and Disease

Development Process of Trachoma

3.4.5.1. Structure of the Eye



➤ Eye lid

One of the two muscular fold of skin that cover the exposed part of the eye ball. It can be opened or closed.

➤ Eye lash

A short thick hair which grow on the edge of the eyelid.

➤ Cornea

The clear convex part of the front of the eyeball. It helps strengthen the eyeball and focuses light on to the lens. It is very sensitive to pain and does not contain blood

vessels.

➤ **Sclera**

The outer fibrous coat of eyeball. It is continuous with the cornea at the front of the eye.

➤ **Conjunctiva**

A delicate mucus membrane. It lines the eyelid and the sclera (the white of the eye).

3.4.5.2. Definition and Cause

Trachoma is a disease of the eye. It is caused by germs. Germs are very small living things that cannot be seen by our naked eyes.

3.4.5.3. Disease development Process

The germs that cause the disease come in contact with the eyes. Then, the germs multiply in the eyes and cause itching, burning sensation and damage of the eyelid. If this continues for a long period of time without taking treatment, it may lead to blindness.

3.4.6 Mode of Transmission and How Much the Disease is Common in Ethiopia

Trachoma is transmitted from person to person by contact with the eye discharge. This occurs when a person uses handkerchiefs or towels of the person with eye disease and when flies take the germs from the discharge of the diseased eye to the healthy eye of another person.

In a study conducted among school children in Ethiopia the prevalence of trachoma was found to be 62% in Addis Ababa, 73 % in Harar and 83% in Gonder. This is an indication that the disease is common in Ethiopia.

3.4.7. Factors Favoring Transmission of Trachoma

- Poor personal and environmental hygiene
- Inadequate and poor utilization of water
- Lack of appropriate latrines and waste disposal facilities
- High population of flies.
- Common usage of fomites.

3.4.8. Diagnosis of Trachoma

Identification of suspected trachoma case if the following signs and symptoms are present:

- Redness
- Swelling
- Muroid and mucopurulent discharge
- Itching
- Discomfort in bright light
- Tearing
- Presence of follicles (white/yellow isolated elevation on the conjunctiva)
- Scarring and shrinkage of conjunctiva
- In-turning of lid margin (entropion) - Inward turning of the eye lid leading to inward growth of eyelash that rubs the cornea causing its damage.
- Irritation of the cornea by the inverted lid margin
- Corneal opacity
- Decreased vision

3.4.9. Management of Trachoma

Trachoma is treatable by using modern medicine. But these medicines should be taken for a long period without interruption. This must be done even if the patient feels improved. The medicines are available in health institutions and they should be taken as per order of the health worker.

3.4.9.1. Medical Treatment of Cases

Antibiotic used for treatment is 1% Tetracycline eye ointment.

3.4.9.2. Mass Treatment

In areas where the disease is severe and highly common, application of tetracycline eye ointment can be used for mass treatment of the whole community especially children.

3.4.9.3. How long should a patient take medication?

There are three types of treatment methods.

- Two to four times daily for six weeks continuously or
- Twice daily for two months or
- Twice daily for five to ten days each month for six months. This may be repeated when it is necessary

NB. For further detail consult near by health institution

3.4.10. Prevention and control of trachoma

The most important methods that are used for prevention and control of the disease are mentioned below.

- Proper environmental sanitation
- Avoid common use of fomites
- Frequent washing of hands and face
- Provision of adequate water supply
- Avoiding of over crowding
- Health education
- Early detection and treatment of active trachoma cases with 1% tetracycline eye ointment.

3.4.11. Task Analysis

Table 3.4.1. Knowledge Objectives and activities

Learning Objectives	Activities
- To describe trachoma	- Define trachoma - Mention the cause and mode of transmission
- To describe the structure of the eye.	- Mention the different structure of the eye. - Identify parts affected by the disease.
- To explain factors initiating occurrence of trachoma	- List factors favoring transmission - State how this factors favor disease transmission
- To explain diagnosis and treatment	- Mention the signs and symptoms. - Mention the recommended treatment
- To identify the prevention and control measures	- Describe the importance of personal and environmental sanitation - Tell the importance of fly control. - Explain the importance of mass treatment. - Mention the importance of adequate water supply - Discuss understand the importance of health education

Table 3.4.2. Attitude Objectives and Activities

Learning Objectives	Activities
- To appreciate trachoma is treatable and preventable	<ul style="list-style-type: none"> - Advocate prevention through health education - Emphasize on frequent hand and face washing. - Advocate the need of adequate treatment. - Give emphasis to environmental sanitation. - Stress on the need of adequate water supply.
- To believe that trachoma is a major public health problem.	- Believe that it is a preventable cause of blindness

Table 3.4.3. Practice objectives and activities

Learning Objectives	Activities
- To detect suspected case of trachoma	<ul style="list-style-type: none"> - Perform relevant physical examination. - Participate in screening activities.
- To provide treatment	<ul style="list-style-type: none"> - Administer Tetracycline (TTC) eye ointment. - Refer patients with complication. - Participate in mass chemotherapy. - Demonstrate the way of application of eye ointment.
- To promote preventive and control measures	<ul style="list-style-type: none"> - Give health education. - Mobilize community for personal hygiene and environmental sanitation. - Get involved in water development schemes.
- To organize and maintain proper recording and reporting	<ul style="list-style-type: none"> - Maintain proper recording system. - Keep proper records of patients - Report routinely to higher level health institutions

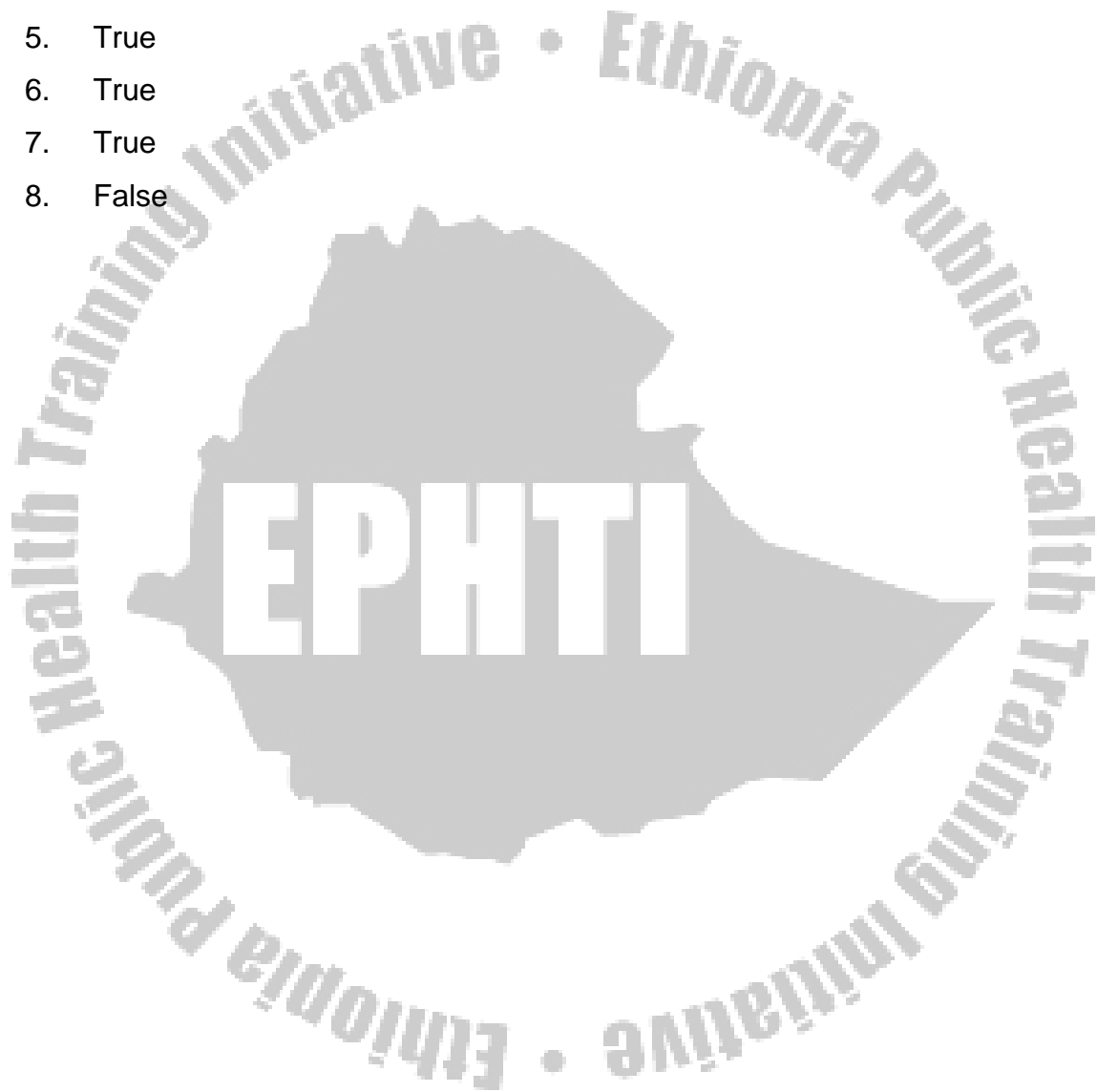
Now you are through with the core and satellite modules, but there are still some activities remaining as stated below:

1. Read the task analysis of the respective categories.
2. Do the question of pre-test as a post-test
NB. Use a separate answer sheet.
3. At last compare your answers of the pre and post-tests with the answer keys given on annex III, and evaluate your progress.



3.4.12. Key to pre and post-tests

1. True
2. True
3. False
4. False
5. True
6. True
7. True
8. False



3.5. Take Home message for care givers / self care

The following points are basic information on Trachoma.

- Trachoma is a disease of the eyes caused by germs. Germs are small living things that cannot be seen by our naked eye.
- If trachoma is not appropriately treated in time, it can lead to blindness.
- The disease is transmitted from person to person by contact with eye discharge:
 - When a person uses handkerchiefs and towels of person with eye disease.
 - When flies and dirty hands take the germs from the discharge of diseased eye to the eye of healthy person.
- The disease may show the following signs and symptoms.
 - Reddening and swelling of the eye
 - Mucoid or mucopurulent discharge
 - Discomfort in bright light
 - Tearing of the eye.
 - Inturning of the eye lids with rubbing of the cornea with eyelashes
 - Decreased vision
 - Blindness
- The disease can be prevented with
 - Proper personal hygiene (washing of hands and face frequently)
 - Proper environmental sanitation (Proper use of latrine and waste disposal for control of flies)
 - Adequate water supply and its proper use.
- Blindness can be prevented by modern medicine.
 - The medicines (drugs) for the treatment of trachoma have to be applied for a long period of time.

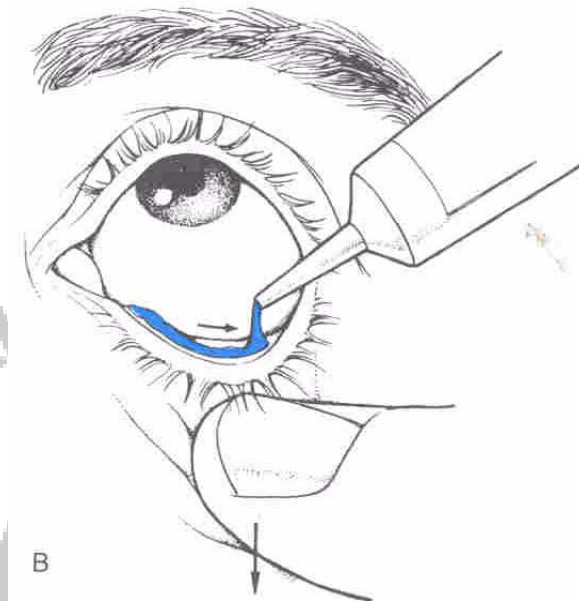
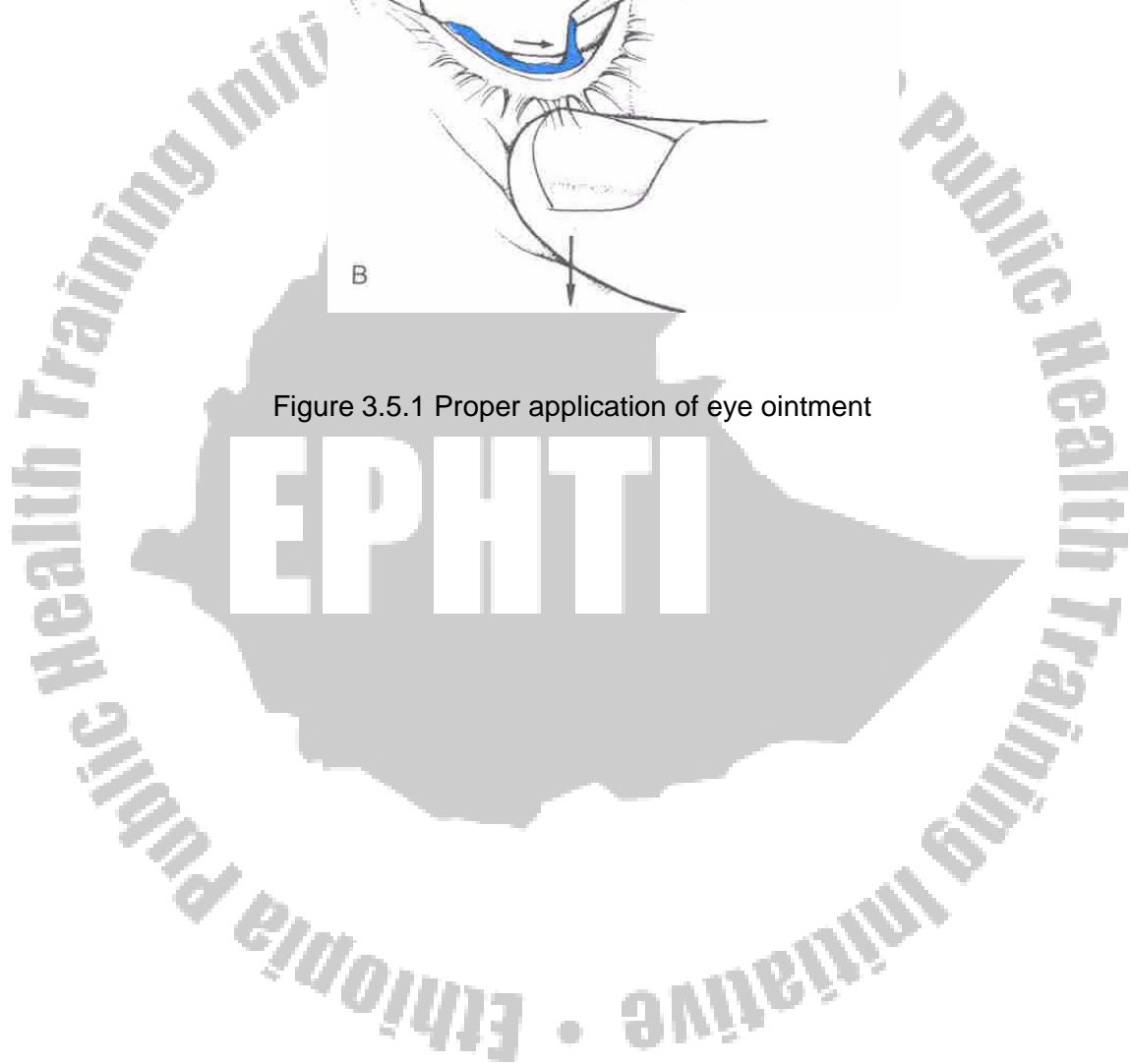


Figure 3.5.1 Proper application of eye ointment



UNIT FOUR

TASK ANALYSIS FOR THE DIFFERENT HEALTH CENTER TEAM MEMBERS

Table 4.1. Knowledge - Objective and Activities

Learning Objective	Learning Activities			
	*HO	*PHN	*EHT	*MLT
- To describe the nature of trachoma	- Define trachoma; mention the cause; study the pathogenesis and clinical manifestation	- Define trachoma; mention the cause; study the pathogenesis and clinical manifestation	- Define trachoma, mention the cause, study the pathogenesis and clinical manifestation	- Define trachoma; mention the cause; study the pathogenesis and clinical manifestation
- To describe the risk factors in the transmission of trachoma	- Identify and enumerate the risk factors	- Identify and enumerate the risk factors	- Identify and enumerate the risk factors	- Identify and enumerate the risk factors
- To state diagnostic approaches of Trachoma	- Study history and physical examination	- Study history and physical examination	- Study the signs and symptoms	- Study the signs and symptoms
- To describe the global and the national magnitude of the problem	- Study the Epidemiology - State the modes of transmission - State reasons for high prevalence of the disease	- Study the Epidemiology - State the modes of transmission - State reasons for high prevalence of the disease	- Study the Epidemiology - State the modes of transmission - State reasons for high prevalence of the disease	- Study the Epidemiology - State the modes of transmission - State reasons for high prevalence of the disease

* Ho = Health Officer; *PHN = Public Health Nurse; *EHT = Environmental Health Technician ; *MLT = Medical Laboratory Technician

Table 4.2. Attitude - Objective and Activities

Learning Objective	Learning Activities			
	Ho	PHN	EHT	MLT
- To accept trachoma as a Major public health problem	<ul style="list-style-type: none"> - Give emphasis to diagnosis and treatment - Give emphasis to prevention and control - Stress on health education 	<ul style="list-style-type: none"> - Give emphasis to diagnosis and treatment. - Give emphasis to prevention and control - Stress on health education 	<ul style="list-style-type: none"> - Give emphasis to prevention and control - Stress on health education 	<ul style="list-style-type: none"> - Give emphasis to prevention and control - Stress on health education
- To consider clinical diagnosis as a key step in diagnosis of trachoma	<ul style="list-style-type: none"> - Give emphasis to the different stages of clinical manifestations 	<ul style="list-style-type: none"> - Give emphasis to the different stages of clinical manifestations 	<ul style="list-style-type: none"> - Give emphasis to signs and symptoms 	<ul style="list-style-type: none"> - Give emphasis to signs and symptoms
- To appreciate trachoma is preventable and treatable cause of blindness	<ul style="list-style-type: none"> - Stress on health education - Early detection and treatment - Prevention of complication 	<ul style="list-style-type: none"> - Stress on health education, - Early detection and treatment - Prevention of complication 	<ul style="list-style-type: none"> - Stress on health education 	<ul style="list-style-type: none"> - Stress on health education
- To appreciate inter-sectorial collaboration in the Prevention and control of Trachoma	<ul style="list-style-type: none"> - Give emphasis on the need of multisectorial collaboration 	<ul style="list-style-type: none"> - Give emphasis on the need of multisectorial collaboration 	<ul style="list-style-type: none"> - Give emphasis on the need of multisectorial collaboration 	<ul style="list-style-type: none"> - Give emphasis on the need of multisectorial collaboration

Table 4.3. Practice - Objective and Activities

Learning Objective	Learning Activities			
	HO	PHN	EHT	MLT
- To participate in the prevention and control measures of trachoma.	<ul style="list-style-type: none"> - Perform diagnosis and treatment - Correct complication early - Give health education - Detect cases - Participate in mass treatment - Involve the community for the prevention and control - Participate in water source development 	<ul style="list-style-type: none"> - Perform diagnosis and treatment - Give health education - Detect cases - Participate in mass treatment - Involve the community for the prevention and control - Participate in water source development 	<ul style="list-style-type: none"> - Give health education - Advice suspected cases to seek medical attention - Participate in mass treatment - Involve the community for the prevention and control - Participate in water source development 	<ul style="list-style-type: none"> - Give health education - Advice suspected cases to seek medical attention - Participate in mass treatment - Involve the community for the prevention and control

UNIT FIVE

GLOSSARY

Cicatrization:- A scar, a fibrous tissue left after the healing of a wound.

Conjunctiva:- The delicate membrane lining the eyelids and covering the eye ball.

Cornea:-The clear, convex part of the front of the eyeball which transmits and focuses light on to the lens.

Endemic:- A disease which is always present within a geographical area or population

Entropion:- Inversion or the turning inward of the margin of an eyelid.

Epithelium:- The cellular covering of internal and external body surfaces, including the lining of vessels and small cavities.

Follicle:- A small, raised, yellowish or grayish, lymphoid tissue visible on the conjunctiva.

Incidence:- The number of new cases of a specific disease occurring during a certain period.

Ischemia:- Deficiency of blood in a part due to functional constriction or actual obstruction of a blood vessel.

Keratitis:- Inflammation of the cornea caused by infection or other irritants.

Limbus:- The edge or periphery of the cornea.

Pannus:- Superficial vascularization of the cornea with infiltration of granulation tissue.

Papilla:- A small nipple shaped projection of a blood vessel with surrounding exudate.

Prevalence:- The total number of existing cases of specific disease in a given population in a specific period of point or time.

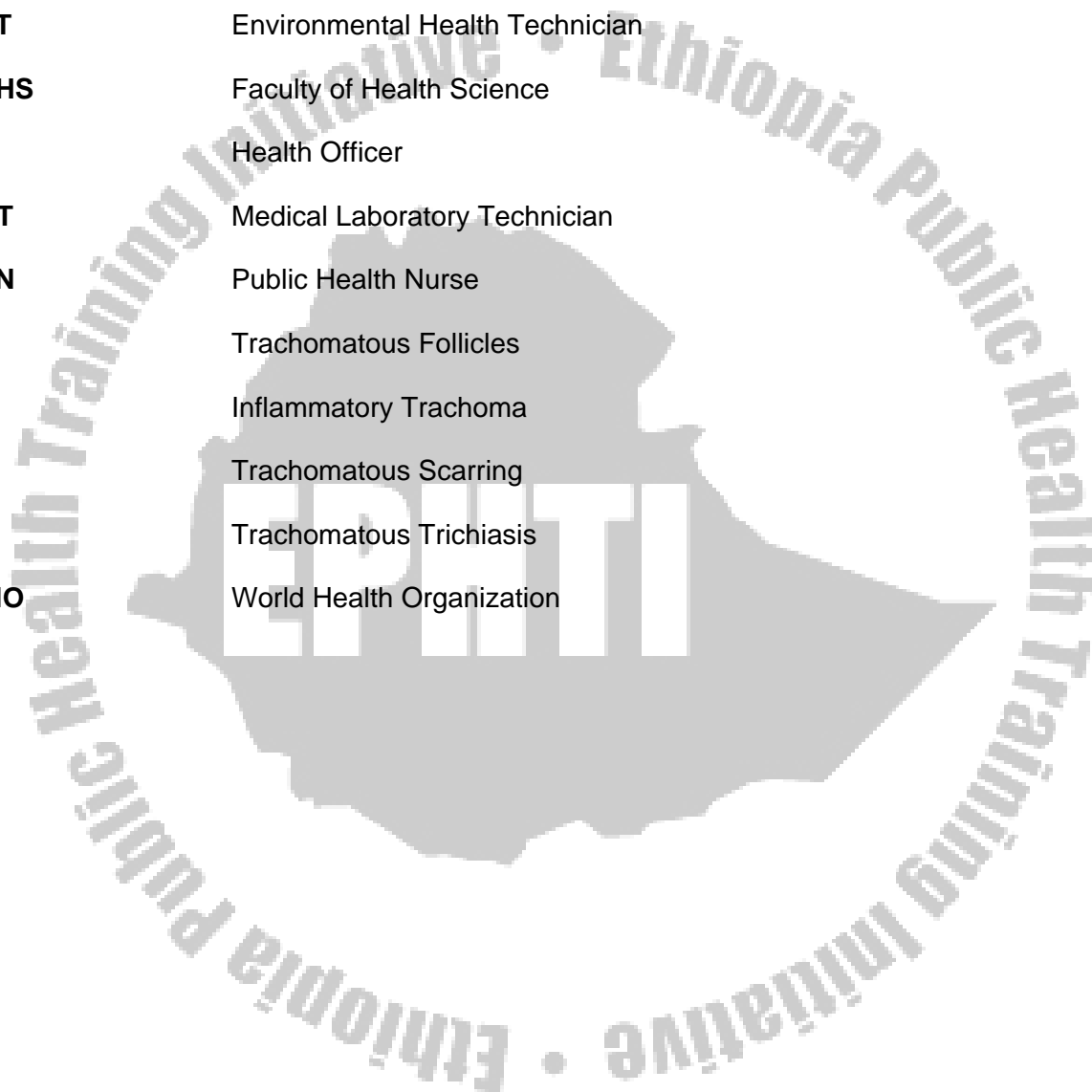
Tarsus (Tarsal plate):- A thick fibrous layer in the eye lid that lies under the muscle and keep the eye lid stiff.

Trichiasis:- A condition where hair grows inwards around an opening. For example in trachoma eye lashes grow inwards and scratch the cornea.

UNIT SIX

ABBREVIATIONS

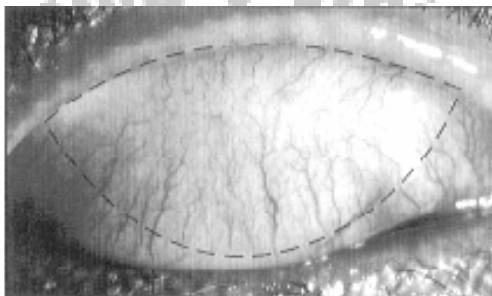
C.O.	Corneal Opacity
C.Trachomatis	Chlamydia Trachomatis
EHT	Environmental Health Technician
FOHS	Faculty of Health Science
HO	Health Officer
MLT	Medical Laboratory Technician
PHN	Public Health Nurse
TF	Trichomatous Follicles
TI	Inflammatory Trachoma
TS	Trichomatous Scarring
TT	Trichomatous Trichiasis
WHO	World Health Organization



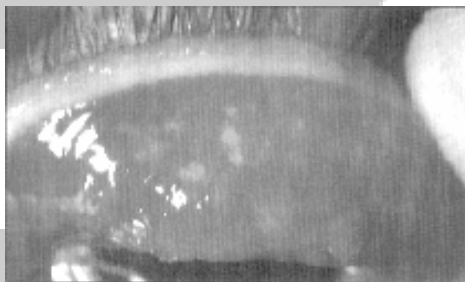
UNIT SEVEN

Annex I: Trachoma Simple Grading System (Pictorial)

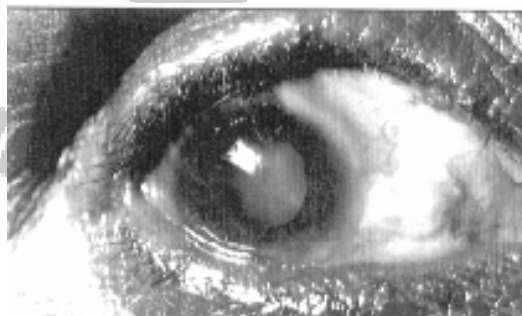
Thylefors B, Dawson CR, Jones BR, West SK, Taylor HR. A simple system for the assessment of trachoma and its complications. *Bull WHO* 1987; 65: 477-483.



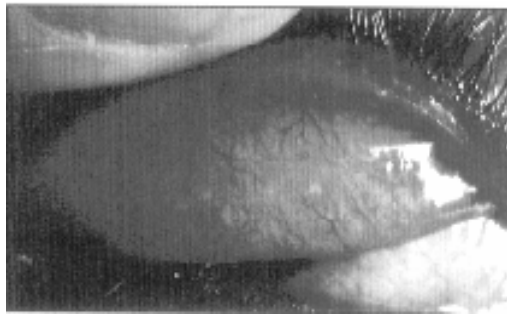
Normal everted upper eyelid (The area to be examined for inflammatory changes is outlined).



TI = Trachomatous Inflammation – Intense: marked inflammatory thickening of the upper tarsal conjunctiva that obscures more than half of the normal deep tarsal vessels.



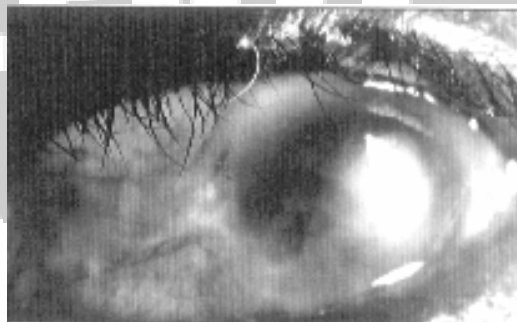
TT = Trachomatous Trichiasis: evidence of one or more eyelashes rubbing on the eyeball. If one eyelash or a number of eyelashes have recently been removed, then the patient's trachoma should also be graded as trachomatous trichiasis.



TF = Trachomatous Inflammation – Follicular: the presence of 5 or more follicles, each of which must be at least 0.5mm in diameter, on the flat surface of the upper tarsal conjunctiva.



TS = Trachomatous Scarring: the presence of scarring of the tarsal conjunctiva.



CO = Corneal Opacity: corneal scarring due to trachoma where the scarring is central and sufficiently dense to obscure part of the pupil margin.

Annex. II. TRICHIASIS SURGERY FOR TRACHOMA

THE BILAMELLAR TARSAL ROTATION PROCEDURE

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This article is based on the World Health Organization / Edna McConnell Clark Foundation document, of the same title, written by the same authors. It is reprinted, in part, courtesy of the authors, the World Health Organization Programme for the Prevention of Blindness and the Edna McConnell Clark Foundation, New York.

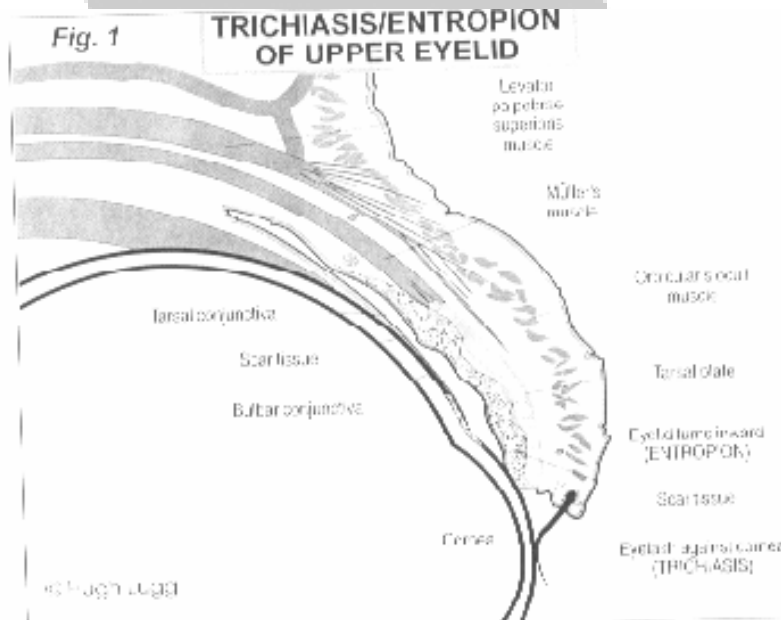
The introduction to the text has been written for **Community Eye Health** by **Murray McGavin MD FRCOphth**.

INTRODUCTION

The surgeon who operates on a patient with trichiasis of the eyelid, following the scarring effects of trachoma, must be skilled in identifying which patients will benefit from this surgical procedure. Those trained in the bilamellar tarsal rotation technique may be eye surgeons, general surgeons, physicians with surgical experience, eye care or surgical nurses, or eye care assistants. Each must have experience in eye examination, giving injections and sterile surgical methods.

The anatomy of the eyelid, eye and the scarring effects of trachoma (Fig. 1) should be well understood.

The eye care worker must assess the fitness of each patient for surgery, especially if surgery is to be done in the community. A good history and general examination should identify heart failure, diabetes, high blood pressure and any bleeding tendency. Allergy to the local anaesthetic, although rare, should be kept in mind.



INDICATIONS FOR EYELID SURGERY

Not all patients require an operation. If there are just one or two eyelashes (either laterally or medially) rubbing on the conjunctiva, particularly in old people, and there are no corneal complications, **repeated epilation** may be sufficient to reduce discomfort and prevent complications. The patient must be instructed to return should epilation prove difficult or unsuccessful.

Definite Indications for Eyelid Surgery

- a. One or more eyelashes which turn in and scratch the cornea when the patient looks straight ahead;
- b. Evidence of corneal damage from trichiasis;
- c. Severe discomfort from trichiasis.

Contraindications to Performing Tarsal Rotation Surgery in the Community

- a. Defective eyelid closure.
- b. Childhood. Children need surgery in hospital, most often with a general anaesthetic.
- c. Poor general health

OPERATING ROOM, SURGICAL MATERIALS AND STERILIZATION

Operating room

The operating room should be:

- a. Close to where patients live to avoid the expense and inconvenience of travel, and to retain a familiar environment;
- b. Clean (free from dust);
- c. Large enough to allow the patient to lie down and the surgeon to work;
- d. Well-lit, using a focused light, powered either by mains electricity or by a battery.

If no suitable room is available within the community, the operation can be performed outside, provided the area is quiet and reasonably clean. Surgery may be performed by daylight, if necessary, but this is less satisfactory.

Surgical Materials

- a. Instruments and sutures required are listed in Table 1.

Table 1:	Instruments and Sutures
1	Large metal bowl or plastic bucket
2	Kidney dishes
1	Galley pot
1	Container for sterile water
1	Scalpel holder for No. 15 blades
1	Packet No. 15 blades
1	Needle holder (without catch)
1	Toothed forceps
2	Scissors (straight with blunt ends)
2	Small haemostats ('mosquitoes')
6	Cutting eyed needles for 4/0 silk suturing of eyelid
1	4/0 silk 90-metre reel (sufficient for 200 operations)

Note: Three double-armed atraumatic 4/0 silk sutures may be used instead of separate needles and silk.

Operating loupes, x2 magnification, are of great assistance if available

Total cost: from US\$ 25 to US\$ 250 approximately.

- b. Consumables and disposables required are listed in Table 2.

Table 2: Consumables and Disposables

Tetracycline 1% eye ointment
Amethocaine 1% eye drops (or similar topical anaesthetic)
Lignocaine 2% (or 1%) local anaesthetic (this can be with or without adrenaline)
Glutaraldehyde 2% solution (for disinfection of instruments)
Sterile distilled water or normal saline
Polyvidone iodine 10% skin preparation
21G disposable needles
5ml disposable syringes
Surgical gloves-appropriate size
Gauze
Zinc strapping ½ inch

A sterile drape, approximately 1 metre by 1 metre in size, with a central hole approximately 10cm by 10cm, made of linen or sterilized paper. If this is not available, the inner paper containing the sterile gloves may be used.

Sterilization of Instruments

Sterilization is defined as the destruction of all viruses, bacteria and spores. High-level disinfection is defined as the destruction of all viruses and bacteria, but spores may survive if initially present in large numbers

Because of the risk of disease transmission, in particular HIV, it is essential that instruments are sterilized or at least receive high-level disinfection before each operation. ***Surgery must not be performed if the instruments cannot be prepared by one of the methods described below.***

a. Sterilization by Steam

Steam sterilization is performed under pressure for at least 15 minutes after the load reaches a temperature of 121 degrees Centigrade (250 degrees Fahrenheit), at a pressure of 1 atmosphere above atmospheric pressure (101 kPa, 15 lb/sq. in.) and after water vapour saturation.

b. Sterilization by Dry Heat

Sterilization in an electric or gas oven is achieved after two hours at 170 degrees Centigrade (340 degrees Fahrenheit), allowing additional time prior to this for the load to equilibrate at that temperature.

c. High-Level Disinfection by Boiling

The instruments are boiled in water, for ***at least 20 minutes***.

d. High-Level Disinfection by Soaking in Glutaraldehyde

Glutaraldehyde is obtained as a 2% aqueous solution to which a powder or liquid buffer (supplied with it) is added to make the solution active. Once activated, the solution should not be kept for more than two weeks. Instruments should be thoroughly cleaned before soaking, to remove clotted blood or tissue. They are then completely immersed for ***at least 30 minutes***. After soaking, the instruments are only handled with sterile gloves, towels, or forceps. They are rinsed with sterile saline or water before use. ***This technique is not acceptable for the needles and syringes used for injection, which must therefore be disposable.***

PREPARATION

Pre-operative Preparation

- a. Explain to the patient why the operation is needed and ask him or her to sign, or to mark appropriately, a consent form.
- b. Wash the patient's face with soap and clean, boiled water, especially the eyelids, forehead, temples, cheeks and nose.
- c. Ask the patient to lie down on the operating table.
- d. Explain further that:
 - i. It is important to lie quietly on the couch during the procedure.
 - ii. There should not be any pain during the operation but, if there is pain, the surgeon should be told.
 - iii. Clean towels will cover the face and chest so that the operation remains a clean procedure.
 - iv. The towels should not be moved and hands must not touch the eye or the surgeon.

Instilling the Local Anaesthetic Drops

The anaesthetic drops used are **amethocaine 1% eye drops** (or similar topical anaesthetic). Ask the patient to look up. Put one drop in the eye, wait one minute, put in a second drop, wait another minute, and put in a third drop. The dropper should not touch the eye.

Sterile Preparation (using Glutaraldehyde for Instruments)

The instruments, the surgeon's (and assistant's) hands and the patient's skin must be prepared.

- a. **Completely Immerse** the two kidney dishes, all instruments and sutures in glutaraldehyde 2% in the large bowl for 30 minutes prior to use. The 4/0 silk can be cut into 18-inch (46 cm) lengths and placed in the solution. The same solution may be used all day.
- b. **Scrub the Hands** (both the surgeon's and the assistant's if present) with soap and water for 5 minutes, then **wash** with 10% polyvidone iodine (or alternative skin antiseptic solution) and **rinse** with sterile water.
- c. **Put on Sterile Gloves** (both surgeon and assistant). Because of the risk of HIV transmission, **gloves must be worn**.
- d. **Remove the kidney dishes**, pouring the glutaraldehyde back into the large bowl, rinse with sterile saline or boiled water, and shake out surplus. Fill one with sterile saline or water.
- e. **Rinse the instruments**, after removing from the glutaraldehyde, by placing them in the sterile kidney dish containing sterile normal saline or recently boiled water. Fresh sterile saline or water must be used for each operation. Remove instruments individually to dry.
- f. **Dry the Instruments** with sterile gauze, and place gently in the second sterile kidney dish. These instruments are ready for use, and this kidney dish is placed by the patient.
- g. **Clean the Patient's Face**, Polyvidone iodine 10% or similar skin preparation is poured into the galley pot. Gauze soaked in the solution is used to clean thoroughly the patient's closed eyelids and surrounding area.

SURGICAL PROCEDURE (left eye, upper eyelid)

Injecting Local Anaesthetic

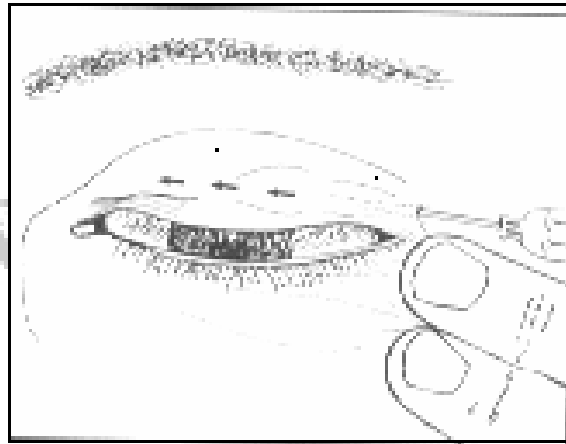
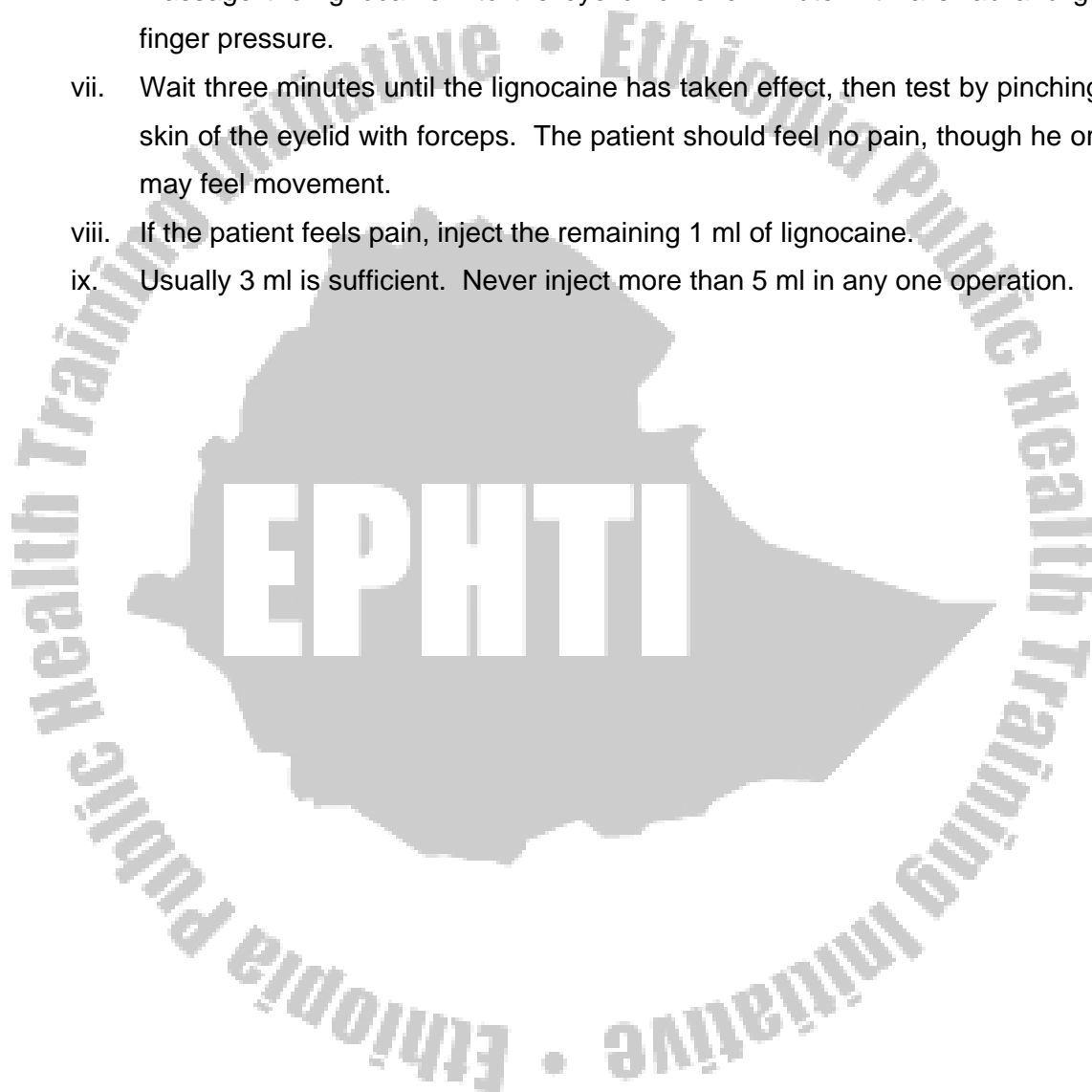


Fig. 2 Injection of local anaesthetic

The anaesthetic usually used for injection is lignocaine 2% (lidocaine).

- a. **Keep the lignocaine in the bottle sterile**
 - i. **Clean** the rubber stopper of the bottle with a sterile swab soaked in antiseptic, e.g. polyvidone iodine 10%.
 - ii. **Use a new sterile needle and syringe** to draw up lignocaine. If you need to draw up more, even for the same patient, use another new needle and syringe.
 - iii. If separate ampoules are used, open a **fresh ampoule for each patient**.
- b. **Draw up 3 ml. (Never use more than 5 ml)** for each eyelid operation.)
- c. **Inject the lignocaine into the Upper Eyelid:**
 - i. Stand beside the patient. **Check** that this is the eye that requires surgery and on which the patient has consented to have surgery.
 - ii. Ask the patient to look down.
 - iii. Draw the eyelid laterally with your fingers
 - iv. Insert the needle **in the plane of the upper eyelid**, about 3 mm above the eyelid edge, beyond the lateral limit of the eyelid (Fig. 2). To draw up more, even for the same patient, use another new needle and syringe.

- v. Slide the needle through the tissues, injecting 2 ml of local anaesthetic as you proceed in a curve **in the plane of the eyelid**, about 3 mm above the eyelid margin, across to the medial end of the eyelid. The needle will lie **over the tarsal plate**, and should slide easily as you inject in front of the needle.
- vi. Massage the lignocaine into the eyelid for one minute with a swab and gentle finger pressure.
- vii. Wait three minutes until the lignocaine has taken effect, then test by pinching the skin of the eyelid with forceps. The patient should feel no pain, though he or she may feel movement.
- viii. If the patient feels pain, inject the remaining 1 ml of lignocaine.
- ix. Usually 3 ml is sufficient. Never inject more than 5 ml in any one operation.



Remember to ask about allergy to local anaesthetic before injecting. Do not inject more than 5 ml for each eyelid. Do not inject into the eyeball.

THE BILAMELLAR TARSAL ROTATION OPERATION

In the bilamellar tarsal rotation operation the eyelid is fixed, incised through all layers parallel to the eyelid margin, and resutured so that the eyelid margin is rotated outwards and the eyelashes are no longer in contact with the cornea. An assistant (to hand the instruments) and a set of x2 magnifying loupes (for better visibility) simplify the operation but are not absolutely necessary. The operation is performed seated at the head of the patient (Fig. 3). A sterile drape is placed over the face revealing the eye through the central opening. The surgeon's wrists may be steadied on the forehead during surgery.



Fig. 3 Position of Surgeon and Patient

Fixing the Eyelid

- a. Place a haemostate at the medial end of the upper eyelid, just lateral to the upper lacrimal punctum, and close with moderate pressure. It should extend 5 mm in from the eyelid margin.
- b. Place another haemostat at the lateral end of the upper eyelid, angled outwards, also extending 6 mm in from the eyelid margin. If the haemostats extend much beyond 5 mm from the eyelid margin it will be difficult to evert the eyelid.
- c. Confirm that the eyelid can be everted without difficulty (Fig. 4). Do not force eversion or the eyelid may tear. Reposition haemostats if eversion is not easy.
- d. The haemostats should not be left closed on the eyelid for more than 15 minutes as they interrupt the blood flow to the eyelid.

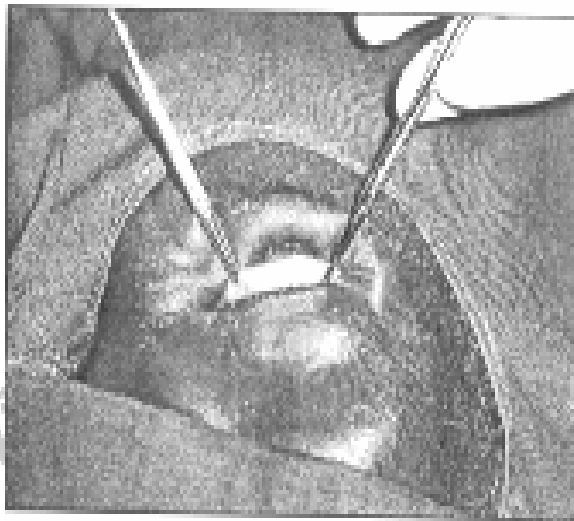


Fig. 4 Placement of the haemostats on the upper eyelid and eversion

Incising the Eyelid

a. **Incise the Skin and Muscle** (Fig. 5)

- i. Hold the haemostats downwards so that the eyelid does not move.
- ii. **Incise** the skin and muscle parallel to the eyelid margin and 3 mm **above it**, the entire distance between the haemostats. The blade is held at right angles to the skin, and enters to a depth just superficial to the tarsal plate.

Remember that the eyeball is below the eyelid and must not be damaged.

b. **Incise the Conjunctiva and Tarsal Plate** (Fig. 6)

- i. **Evert** the eyelid
- ii. **Incise** the conjunctiva and tarsal plate, through its full thickness, parallel to the eyelid margin and 3 mm **above it**, the entire distance between the haemostats.

c. **Unite the Incisions** (Fig. 7)

- i. Elevate the eyelid with the haemostats.
- ii. Insert the points of the closed scissors into the incision in the conjunctivatarsal plate, through remaining intact muscle, and out through the skin-muscle incision.
- iii. Open the scissors while still held across the eyelid: the blunt aspect of the blades will spread apart intact muscle. Repeat along the incision if necessary until it is a full thickness hole.
- iv. Remove the haemostats. Stop the bleeding by firm pressure with a sterile swab for one minute. ***The eyelid may bleed profusely. Pressure with a swab will usually control the bleeding.***

d. Complete the Incision Medially and Laterally

- i. Open the incision by grasping and elevating the skin of the eyelid margin, near where you intend to cut, with toothed forceps.
- ii. Using the scissors, completely divide the medial and lateral edges of the tarsal plate (the portion formerly held in the haemostats), still cutting **parallel** to the eyelid margin.

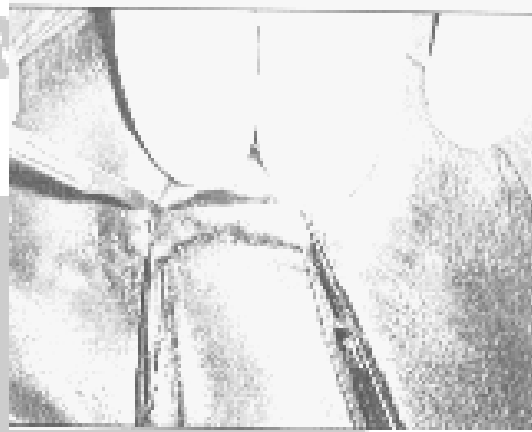


Fig 5. Incising skin and muscle

Do not cut much beyond the edge of the tarsal plate medially as the marginal artery may be cut and bleed.

The eyelid should now be divided through its entire thickness, 3 mm from and parallel to the eyelid margin, remaining connected at both ends.

The 3 mm eyelid margin portion is referred to as the **distal** fragment, the remaining portion as the **proximal** fragment.

Suturing the Eyelid

The purpose of the sutures is to re-attach the distal fragment in an outwardly rotated position, so that the eyelashes no longer rub on the cornea. This is achieved by anchoring sutures on the conjunctival surface of the proximal fragment, and running them over the distal tarsal plate to exit through the skin near the eyelashes, thus drawing the eyelash margin outwards and upwards. 4/0 silk is suitable for suturing. The sutures need a needle on both ends. The sterile needles will need to be threaded onto the suture unless doublearmed sutures are available. Three sutures, that is six needles, are used.

a. Placing Sutures in the Proximal Fragment

- i. Prepare the needle holder: ***mount the needle to point towards you.***
- ii. Draw back the skin of the **proximal** portion of the eyelid with your finger, and grasp the cut edge of the tarsal plate with toothed forceps. The edge can then be everted to insert the sutures. Observe the **pink conjunctiva** on the inner surface of the eyelid. If blood obstructs the view, swab this surface.
- iii. Pass the first needle and its associated suture through a 1 mm bite of tarsal conjunctiva and $\frac{1}{4}$ of the thickness of the tarsal plate, near the middle of the eyelid (Fig. 8). Note that the needle emerges from the cut edge of the tarsal plate.
- iv. Pass the second needle, at the other end of the same suture, through the conjunctiva and tarsal plate in the same way, so that the suture is symmetrically placed at the center of the eyelid (Fig. 9)
- v. Place a haemostat on the two strands of suture. This clip can be drawn upwards to display clearly, and fix firmly, the cut edge for the subsequent sutures.
- vi. Pass double-armed sutures in an identical manner on either side of the first. They must reach the medial and lateral ends of the incision (Fig. 10 and 11). Otherwise trichiasis will return at either end.

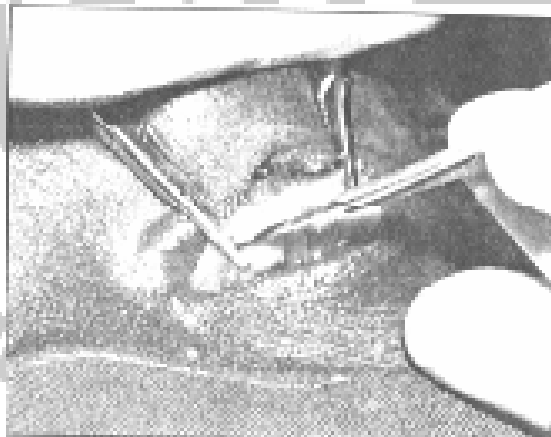


Fig 6. Incising the conjunctiva and tarsal plate

b. Placing the Sutures in the Distal Fragment

- i. Look down at the **skin surface** of the eyelid's distal fragment (bearing the eyelashes).
- ii. Remove the clip from the middle suture and mount one needle in the needle holder.
Mount the needle to point away from you.
- iii. Grasp the skin of the distal fragment of the eyelid (the strip of eyelid margin).
- iv. Pass the needle through the muscle layer **on the front surface of the tarsal plate** to emerge through the skin **about 1 mm above the eyelashes** (Fig. 12). The entry point should correspond with the site of the suture in the proximal eyelid fragment.
- v. Repeat this with a second needle on the same suture, again matching the entry point with the exit on the proximal fragment. Clip the two ends of the suture together again.
- vi. Repeat this with the two other sutures on the medial and lateral sides
(Fig. 13.).

c. Tying the Sutures

- i. **Tie the central suture** with three single knots. Then tie the other two sutures in the same way. They should be tied ***firmly enough to produce a slight over correction.***
- ii. Cut the sutures 3 mm above the knot (Fig. 14). This is long enough to permit ready removal, without being so long as to irritate the eye.

d. Skin Sutures

These sutures need only have a needle at one end. Two or three sutures are placed to close the skin, passing into the skin 1 mm from the cut edge, across the wound, and emerging from the skin again 1 mm from the other cut edge. They are tied without tension and cut.

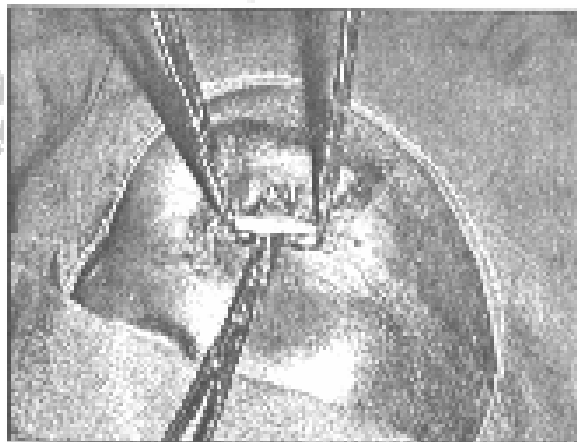


Fig.7. Uniting the incisions

The final result should show an eyelid with a slight overcorrection. The eyelashes should point well away from the eye all along the edge of the eyelid. (Fig.14).

Surgeon's View Figs. 8-13

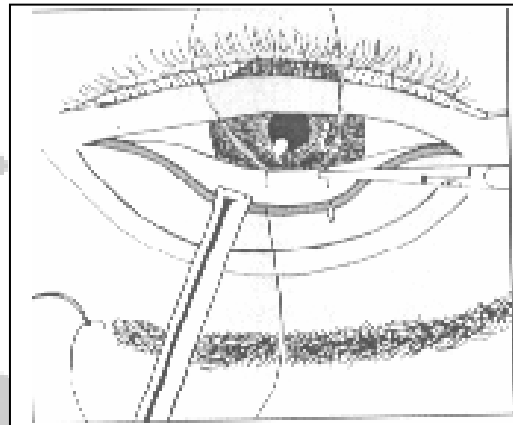
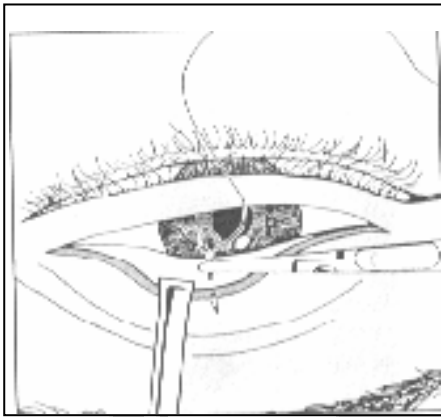


Fig. 8. Proximal fragment: first suture, first needle Fig. 9. Proximal fragment: first suture, second needle

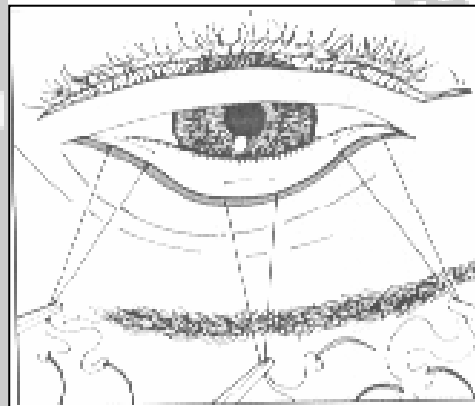
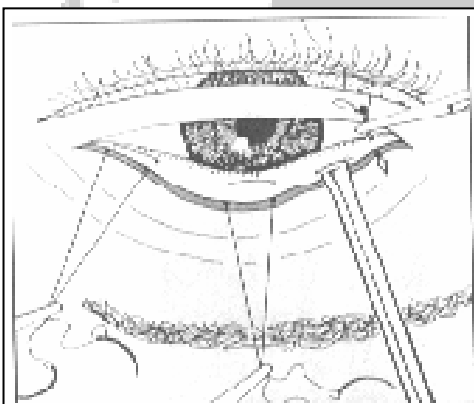


Fig. 10. Proximal fragment: third suture, first needle Fig. 11. Proximal sutures completed

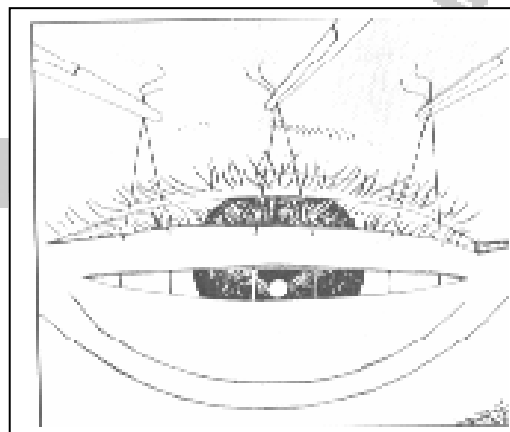
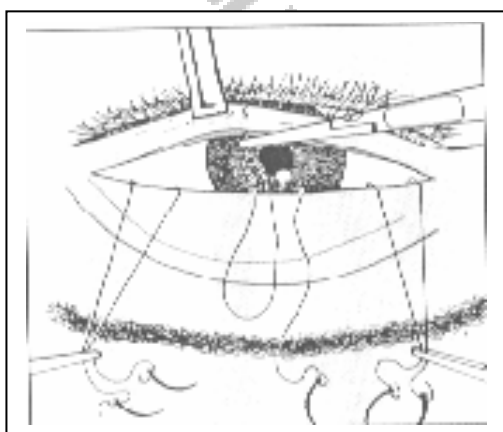


Fig. 12. Distal fragment: first suture

Fig. 13. Distal sutures completed.

Possible Surgical Difficulties

a. Bleeding

If bleeding cannot be controlled by pressure with a gauze swab, the **marginal artery**, which runs along the eyelid margin, may have been severed. This usually occurs medially, and blood will be seen springing from a single source. Locate this source, clip a haemostat onto it, and tie a suture just below the haemostat to close the artery. Otherwise, undersew the area with a suture.

b. Division of the Eyelid Margin

This is most unlikely with careful surgery but, should it occur, the cut portions of the distal fragment must be sutured together. Place one suture in the eyelid margin, so that its edges match exactly.

Tie the suture without tension, with three single knots. Place one or two separate sutures on the outer surface of the tarsal plate. If the skin has also been divided, it may be sutured with one or two separate sutures. If the repair is satisfactory, proceed with the operation. If not, refer the patient to an ophthalmologist at once.

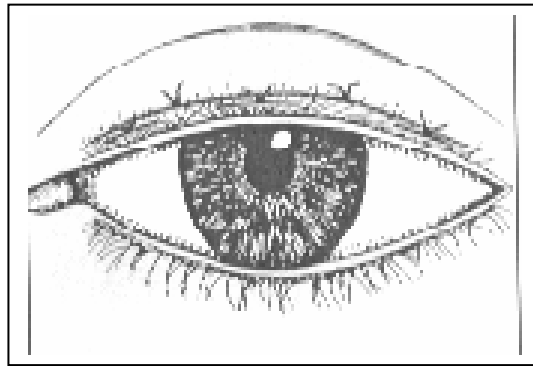


Fig. 14. All sutures tied

c. Overcorrection

If the eyelid margin is grossly everted remove the skin and tarsal plate sutures and repeat the suturing. This time, tie the sutures with less tension to give the proper results, a mild degree of overcorrection.

Applying the Antibiotic and Dressing

- a. Apply tetracycline ointment into the conjunctival sac and onto the wound.
- b. Pad the eye. A bandage may also be applied.
- c. Give two 500 mg tablets of acetaminophen (paracetamol) for pain. The patient may take eight further tablets home, and take two every six hours if required.
- d. The patient is advised to stay quietly at home for one or two days.

Cleaning and Resterilizing the instruments

- a. After the operation has been performed, the instruments are cleaned with water and detergent to remove any blood.
- b. The clean instruments are then replaced in the 2% glutaraldehyde solution if they are to be re-used the same day. If the surgery is finished for the day, the instruments are stored dry.

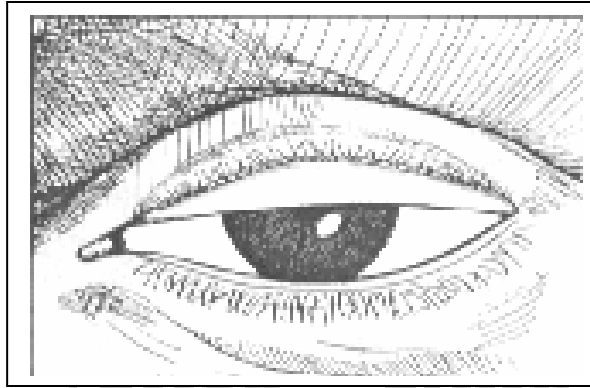


Fig. 15 Excessive rotation of the tarsus

POST-OPERATIVE CARE

DAY 1: Check the Wound

- a. Remove the pad and clean the eyelids with gauze and saline. The eyelid may be swollen.
- b. Instil tetracycline ointment between the lower eyelid and the eyeball. Show the patient how this is done, so that he or she can instill ointment three times daily for seven days at home.

DAY 8: Remove the Sutures

- a. Clean the eyelids with gauze and saline.
- b. Remove the skin sutures and the tarsal rotation sutures. They are removed by cutting one loop only and drawing outwards on the knot.

RESULTS

Complete success is defined as ***no eyelashes rubbing on the eyeball*** (in the absence of epilation or further surgery), ***with no complications***. If a few inturning eyelashes at the medial or lateral edge of the eyelid persist despite surgery, they may be managed by epilation. If any eyelashes continue to rub on the cornea, if there is still sufficient trichiasis to cause severe discomfort, or if there is renewed corneal damage from persistent misdirected eyelashes which have been epilated, further surgery is required. **Refer the patient to an ophthalmologist** for further surgery. As the disease process continues, trichiasis may recur a year or more later in an eye which has had successful surgery. The patient may then have a second bilamellar tarsal rotation operation on the eyelid in question, performed in the community. This procedure is also suitable for lower eyelid trichiasis, which will occasionally be seen. If trichiasis is present in both the upper and the lower eyelids, the upper eyelid should be operated upon first, and an interval of two weeks allowed before surgery to the lower eyelid.



Fig. 16 Suture for correction of excessive rotation of the tarsus

COMPLICATIONS

Immediate Post-operative (0-48 hours)

a. Renewed Bleeding

This can always be controlled by firm pressure with the heel of the hand, through the dressing, on the eye. The patient and relatives should be told to do this if bleeding occurs at home. If the bleeding is mild, the community worker can apply a firm pad and a pressure bandage and visit again. If it is severe or persistent, refer to a doctor.

b. Local Infection

If pus is seen on the wound, remove any involved sutures and clean with gauze and cooled boiled water three times daily.

c. Cellulitis

If there is pain, spreading redness, fever and raised pulse: **give antibiotics**, for example **penicillin, by mouth, and refer to a doctor urgently. Hospital admission may be needed.**

d. Excessive Rotation of the Tarsus

The distal strip of eyelid margin may be so rotated that it has turned right up (Fig. 15). A distinct rim of pink conjunctiva is apparent at the distal part of the eyelid, instead of skin.

The rotation is considered excessive if eyelid closure is no longer complete.

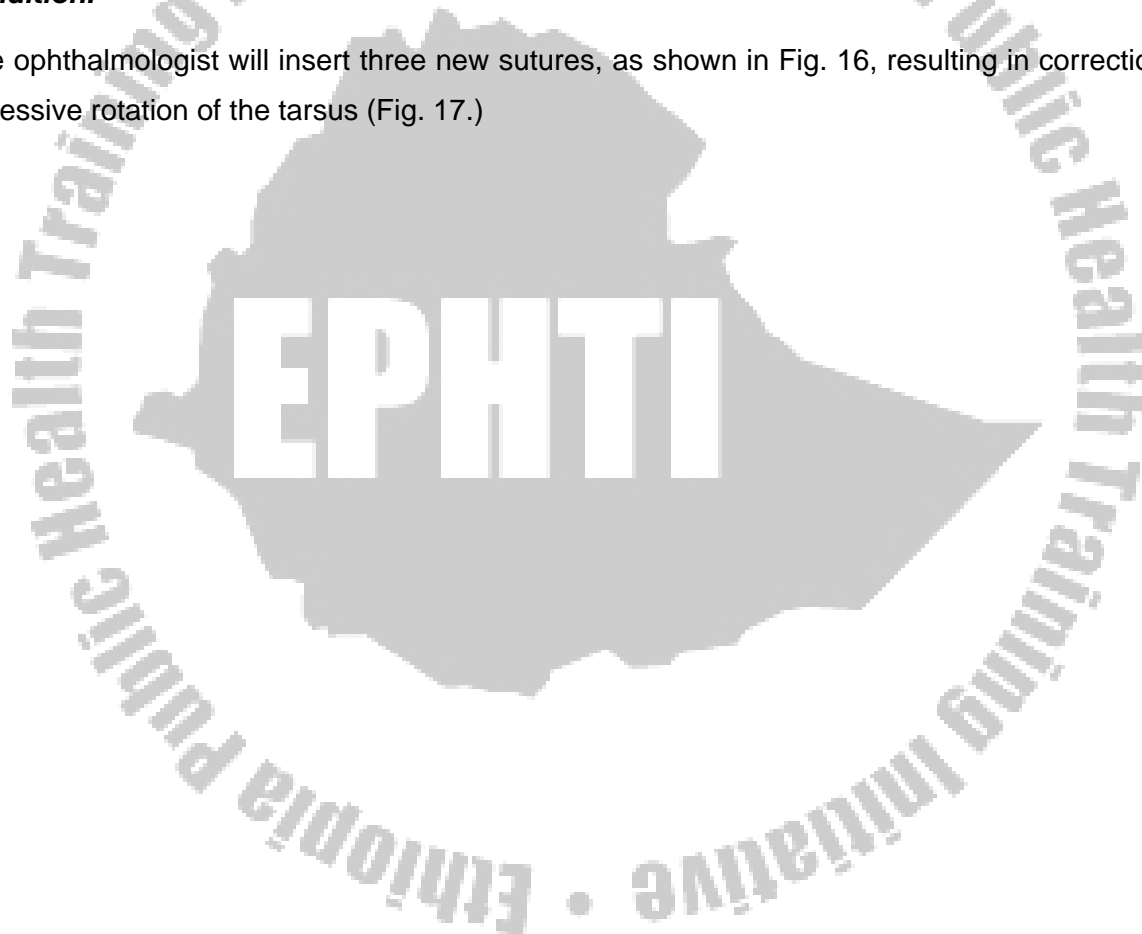
If the eyes do not close properly, the cornea can be damaged. Discomfort and poor appearance may also cause concern.

The cause may be:

- i. **Too big a distal fragment**, that is, an incision much more than 3 mm from the eyelid margin.
- ii. Excessive tension on the tarsal rotation sutures.
- iii. The sutures emerging within the eyelashes instead of above them.

If the eyelids do not close properly when the patient tries to close them gently, as if in sleep, or the cosmetic appearance is very distressing, **remove the sutures and massage the upper eyelid downwards**. If this does not correct the problem, refer the patient to an ophthalmologist for a second operation to correct the excessive rotation. **Defective eyelid closure is a serious condition.**

The ophthalmologist will insert three new sutures, as shown in Fig. 16, resulting in correction of excessive rotation of the tarsus (Fig. 17.)



Later

(After 48 hours)

a. Granuloma Formation

This looks like a red lump on the conjunctiva over the wound. It can be excised with a scalpel or scissors after applying anaesthetic drops. Remove any remaining suture at the site.

b. Necrosis of the Eyelid Margin

This is a defect in the central eyelid margin, the result of poor blood supply caused by too narrow a distal fragment. It will gradually heal without any treatment.

SUMMARY OF IMPORTANT POINTS

1. **Operate on the Correct Eye** – the one for which surgery is indicated, and on which the patient has consented to have surgery.
2. **Local Anaesthetic.** Ask about allergy. ***Do not inject into the eyeball.***
3. **Haemostat Application.** Advance 5 mm in from the eyelid margin. If eversion is not easy, reposition the haemostats or the eyelid may tear. Avoid pressure on the eyeball when everting the eyelid. Avoid damage to the upper lacrimal punctum and canaliculus. ***Do not leave haemostats on the eyelid for more than 15 minutes.***
4. **Scalpel Use.** Incise 3 mm from the eyelid margin. ***Do not damage the eyeball. Do not cut through the eyelid margin.***
5. **Use Scissors.** ***Do not damage the eyeball. Do not cut through the eyelid margin. Do not cut much beyond the end of the tarsal plate medially, as the marginal artery will bleed.***
6. **Sutures.** ***Do not damage the eyeball with the needle. Do not leave a needle in the conjunctival sac.*** Place the sutures symmetrically, so that eyelid eversion is regular. Be sure that the medial and lateral edges of the tarsal plate are included in the sutures, to avoid recurrence of trichiasis at these sites. Tie sutures sufficiently tight to cause a ***slight overcorrection***, as scarring will reverse the procedure a little.

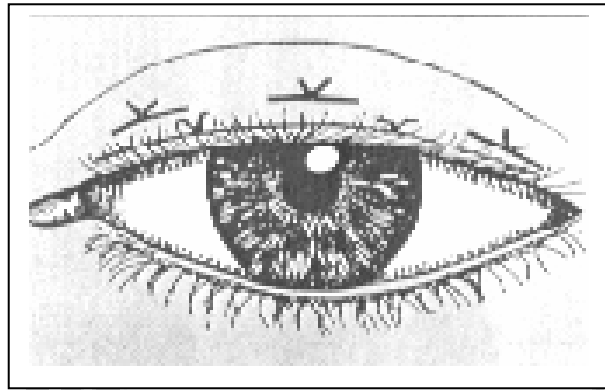
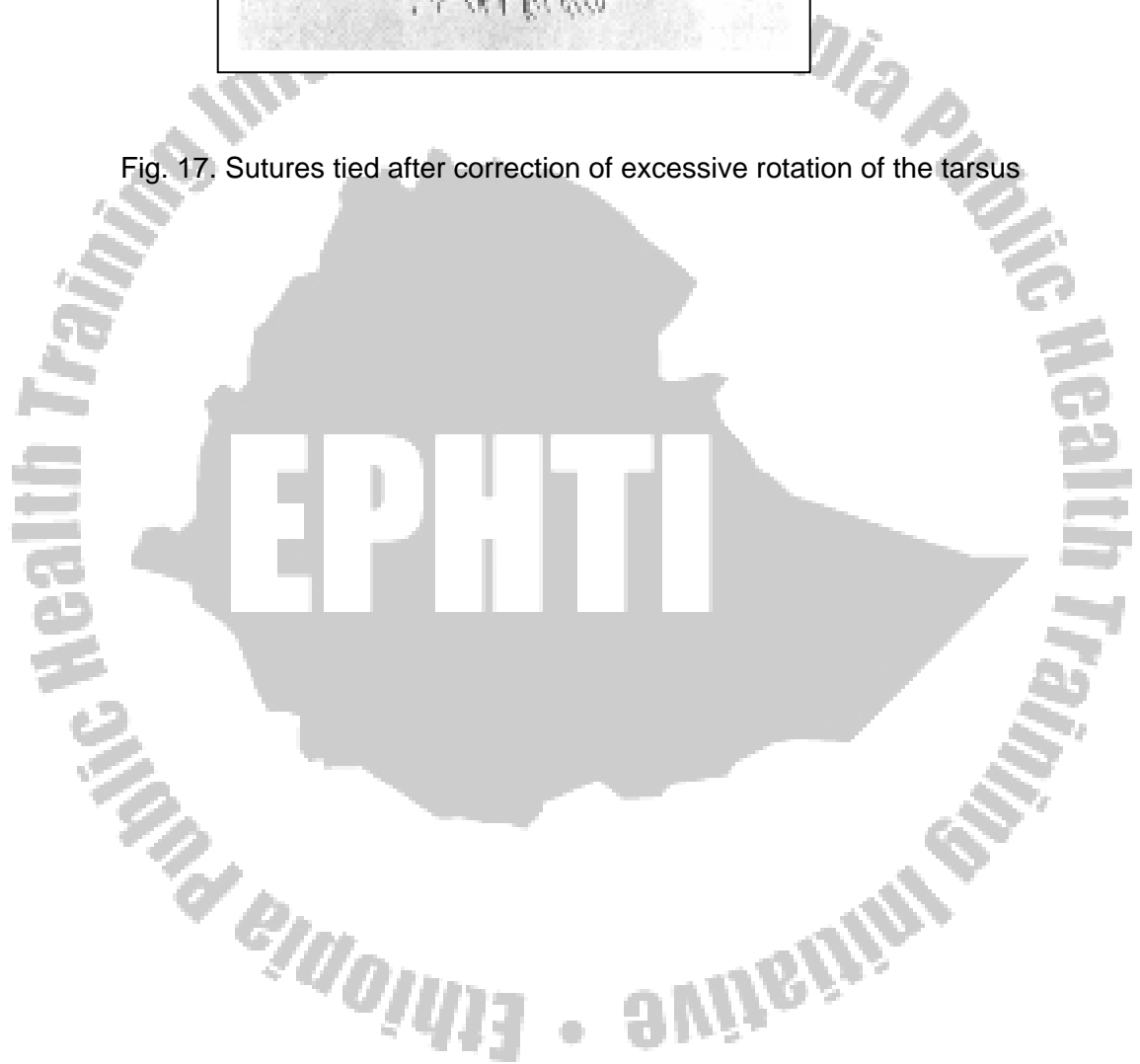


Fig. 17. Sutures tied after correction of excessive rotation of the tarsus



Annex III: Key to Pre-test / Post-test

Part I

- **Answer for all categories of the health center team**

- 1 True
- 2 True
- 3 True
- 4 True
- 5 True
- 6 False
- 7 False
- 8 D
- 9 A
- 10 E

- **Answer for Health Officers**

- 1 True
- 2 True
- 3 False
- 4 True
- 5 True

- **Answer for public health nurses**

- 1 True
- 2 True
- 3 False
- 4 True

- **Answer for environmental health technicians**

- 1 True
- 2 True
- 3 False
- 4 False
- 5 Provision of adequate water supply, control of flies, good personal hygiene practice, case finding and health education.
- 6 Use of appropriate (sanitary) latrines and basic environmental sanitation.

- 7 A. Education of the public about personal hygiene and environmental sanitation.
- B. Provision of safe effective antibiotic educe the pool of infection in the community.
- C. Provision of surgery in equipped health institution for trichiasis.



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