Paramedical worker in leprosy

a. Background

In some settings, paramedical workers in leprosy (PMW) are responsible for over 100 leprosy patients. They have extensive training in leprosy while they usually have little training in eye care. The PMW is generally responsible to a medical officer. As full-time leprosy workers, the PMWs can assume responsibility for management of cases of ocular leprosy, provided they receive appropriate training.

b. Tasks

The PMW will educate the patient and family about the dangers of eye complications of leprosy and about preventive measures. Upon completion of training, the PMW should be able to perform the diagnostic and therapeutic tasks listed on the next page.

c. Training

The PMWs should be taught, as part of their general training in leprosy control, by a medical officer with extensive ophthalmic experience, an ophthalmic assistant, or by an ophthalmologist with experience in leprosy. In certain African and other countries the ophthalmic medical assistants or clinical officers may be responsible for this training. The training is best conducted in a setting where leprosy patients are treated. The initial training course, conducted over a 3-day period, should consist of lectures and practical clinical exposure. Yearly refresher sessions should then update this information. Both phases of training need to be integrated within existing leprosy training programmes. Training aids should include task-oriented manuals, posters, flip-charts and booklets and, where possible, videos, slides, and ‘model’ eyes. In addition, training teams should accompany the PMWs for supervision in the field.

d. Equipment

Equipment for examination and therapy include:

- card or chart for visual acuity testing
- pinhole (if trained in use)
- torch and loupe (magnifying lens)
- tetracycline (or other antibiotic)
- cotton-wool (for testing corneal sensation)
- short-acting mydriatic (phenylephrine 5%)
- corneal protection devices (e.g. sunglasses)

Major signs of ocular leprosy to be recognized by an Paramedical Worker in Leprosy

Clinical sign	Diagnostic criteria	Therapeutic intervention
Visual acuity		
Visual impairment	< 6/18	Refer, if causing reduced visual function/quality of life
Severe visual impairment	< 6/60	Refer
Blindness	< 3/60	Refer
Facial patch	Red & raised patch on the face	Refer
Lagophthalmos		If present for < 6 months: refer for steroid treatment
Gap on gentle closure, as in sleep	Lids drift open	Exercise, and eye ointment at night; refer
Gap on forced closure	Globe exposed	Protect cornea; use eye ointment; refer
Trichiasis	Lashes rubbing on globe, with irritation	Apply ointment and refer
Cornea		
Surface	Dull or rough	Ointment and refer
Sensation	Diminished	Ointment; blinking exercises Protective (sun)glasses Patient instruction Refer corneal damage
Red eye		
Discharge - clear cornea		Clean; antibiotic eye ointment
Pain and photophobia		Refer

Ophthalmic assistant or ophthalmic nurse

a. Background

In many leprosy endemic countries ophthalmic assistants or ophthalmic nurses are the backbone of eye care services in rural areas. Their training often includes surgery for extra-ocular conditions (e.g., bilamellar tarsal rotation procedure for trichiasis) but not for intra-ocular conditions (e.g., cataract). In most settings their training in management of eye conditions of leprosy is either insufficient or non-existent. Standard curriculums which include cosmetically acceptable management of lagophthalmos, referral procedures for other conditions, and training and supervision of IHWs are needed. Promotion of integration of leprosy patients within district/regional VISION 2020 programmes should also be included.

b. Tasks

The ophthalmic assistant may be the most appropriate person to train and supervise IHWs in diagnosis and basic primary eye care management. Ophthalmic assistants should also assist in encouraging the use of eye care facilities by leprosy patients and help to reduce the stigma associated with leprosy. Furthermore, the ophthalmic assistant should be prepared to do simple surgical correction of lagophthalmos and trichiasis. In both cases, it is important that the outcome of surgery should be monitored.

c. Training

Ophthalmic assistant training curriculums, although generally well-developed, have minimal information on managing eye disease in leprosy patients and no information on training and supervision of IHWs in their activities. It is critical that these curriculums be updated to include relevant sections on eye care in leprosy. Furthermore, ophthalmic assistants need training in procedures, other than the cosmetically unacceptable tarsorrhaphy, for correction of lagophthalmos and ectropion. Monitoring of the outcome of surgery, currently not part of ophthalmic assistant training programmes, needs to be included.

Ophthalmologist

a. Background

The ratio of ophthalmologists to the population in most leprosy endemic countries is very low; in addition, most ophthalmologists are located in urban areas, far distant from most leprosy and ex-leprosy patients. It would be most helpful if regional or national referral ophthalmologists were identified for leprosy control programmes. There are standard recording forms (Annex 4) for clinical examination in leprosy, which may be helpful in monitoring ocular conditions in these patients. Some ophthalmologists may wish to add other ocular signs to the form.

b. Tasks

The primary role of the ophthalmologist in management of eye disease in leprosy is to be the tertiary referral for patients in need of more detailed examination and in need of surgical intervention. In some settings well-trained cataract surgeons can provide IOL implantation surgery to non-complicated cases. Ophthalmologists who conduct outreach eye care services should include leprosy settlements in their annual schedule.

c. Training

Ophthalmologists and other relevant surgeons need to be trained in good quality lagophthalmos and cataract surgery. Training should include monitoring of the outcome of surgery.

CHAPTER 5

RESEARCH NEEDS IN OCULAR LEPROSY

Epidemiological research

Epidemiological research is important in elucidating risk factors for ocular morbidity and blindness from leprosy. Findings from the Longitudinal Study of Ocular Leprosy (LOSOL) and other studies are answering some of the questions related to demographic and clinical characteristics of leprosy that influence the development of ocular lesions during MDT. Continued follow up of these study subjects after completion of MDT would help elucidate the progression of ocular disease and vision loss; this information is important to help determine which patients require long-term active ophthalmologic follow up. Additional research into the contribution of local production of antibodies, genetic variations and reactions (ENL and reversal reactions) to ocular pathology would also be useful. Current research from the LOSOL study cohort provides information about patients who have undergone two years of MDT; there is no information on how a shortened duration of MDT affects the incidence of eye disease.

At a national or regional level in leprosy endemic countries it is important that epidemiologic methods be used to assess the eye care needs of the leprosy (and ex-leprosy) population. This information, if gathered in a standardized fashion, can be used for prioritizing eye care activities within and between areas. Prevalence information, when combined with information on utilisation of services, barriers to use, and socio-demographic data, can also be essential for identifying the specific activities required for reducing the risk of disabling and stigmatizing ocular conditions. While the LOSOL study set up standard criteria for data collection, there are still areas of difficulty, principally in the assessment of corneal sensation.

Different epidemiological methods (cross-sectional studies, longitudinal studies, case-control studies, and clinical trials) are needed for different questions. For example, there is still a need for conducting a clinical trial of different procedures for surgical correction of lagophthalmos (and co-existent conditions such as ectropion and reduced corneal sensation).

Operational research

Operational research is concerned with the application of scientific methods, techniques and tools to find solutions to problems that may arise in the operations of a system. It provides to those managing a health system alternative strategies to improve effectiveness. Prevention of blindness from leprosy, like the control of leprosy itself, involves a complexity of medical, social, and economic problems.

Considerable planning and analysis would need to be undertaken to achieve the stated objectives for control, having time and quality parameters, and being accomplished with optimum benefit in relation to costs. Operational research and systems analysis thus provide tools to optimise the strategies for prevention of blindness due to leprosy as well as the prevention of blindness due to other causes in leprosy and ex-leprosy patients. The three main activities in the management of eye conditions in leprosy are 1) case detection, 2) treatment, compliance, monitoring, and surveillance, and 3) health education.

The following operational research topics are of particular importance:

Case detection

What are the critical signs that integrated health workers must recognize in order to ensure that most patients at risk of vision reducing eye disease are found in a timely fashion?

What degree of lagophthalmos should signal to health workers the need to encourage patients to seek ophthalmologic assessment?

Is there a gender bias in case detection in leprosy and does this influence prevalence or incidence of complications?

Treatment, compliance, monitoring, and surveillance

Routine monitoring of lagophthalmos surgery is critical to decision making regarding surgical procedures, quality of surgery, and post- operative care. Systems for routine monitoring of lagophthalmos surgery are needed. Routine cataract outcome assessment programmes are needed wherever leprosy patients are receiving cataract surgery. In particular, data on the outcome of IOL implant surgery in complicated cataract cases is needed. There are considerable barriers preventing use of surgical services (lagophthalmos and cataract): these need to be assessed locally and nationally to develop practical programmes to promote acceptance of surgery.

Most research into surgical treatment includes only clinical outcomes. It is important to include patient assessment of outcome, particularly for conditions such as lagophthalmos and ectropion.

Research is needed into determining the best indicators for monitoring programme efficiency, effectiveness, and sustainability.

Health education

'Think-blink' is routinely recommended as an activity for individuals with mild lagophthalmos and impaired corneal sensation. While it seems intuitively useful, there is no evidence of its effectiveness. This activity should be evaluated both from the perspective of patient acceptance and efficacy. It is suggested that blinking exercises will reduce lid gaps by 1-2 mm, by strengthening the orbicularis, but efficacy has not been tested.

Study of the skills necessary within the health system (at all levels) is needed to help refine job descriptions and training activities.

Basic research

There is evidence that *M. leprae* reaches the eye predominantly via the blood stream. The clinical ocular manifestations may be secondary to nerve involvement, either from direct infiltrative lesions or as a result of cellular immune response in the tissues. Basic histopathologic research has been hampered by:

The paucity of material that can be obtained from the human eye and the adnexal structures at any stage of the disease

The lack of centres and trained personnel whose special interest is research in ocular leprosy at places where the clinical material is available

The loss of valuable material, discarded from surgical procedures.

Anterior uveitis, both acute and chronic, is a clinical problem that is potentially sight threatening. There are, however, few immunopathological studies to substantiate the general view that the acute ocular reactions are mediated by immune reactions or that chronic uveitis is the end-result of multiple, low-grade episodes of acute uveitis.

EXECUTIVE SUMMARY

Guidelines for the management of eye care in leprosy:
Recommendations from an ILEP supported meeting

July 3-5. 2001
Broxbourne, UK

Multidrug therapy (MDT) has greatly reduced the incidence of eye disease in leprosy. Nevertheless, people who are affected by leprosy or who have previously had leprosy, continue to have eye complications as a result of the disease or as a result of other causes, such as cataract.

Recent research has shown that at the time of their leprosy diagnosis approximately 10% of people with multibacillary (MB) leprosy have lagophthalmos, uveitis, or trichiasis related to their disease. Cataract related vision loss is higher in leprosy patients than in the general (age-matched) population. During MDT, around 2% of MB patients develop lagophthalmos and 7% develop uveitis. Research on the incidence of ocular disease following completion of MDT suggests that uveitis may still develop. The prevalence of eye disease in patients released from treatment (cured patients) varies considerably, primarily as a result of previous anti-leprosy treatment.

In many settings there are significant barriers preventing the use of eye care services by leprosy patients, either during or after anti-leprosy treatment.

Globally, leprosy control programmes have become more integrated into general health care services. At the same time, our understanding of eye disease in leprosy has increased. These two developments have highlighted a need for revising global prevention of blindness guidelines. The quality of eye care received by those affected by leprosy should at least equal the quality available to other people; therefore it is to the benefit of leprosy patients that general eye care programmes are supported. Based on our current knowledge of eye disease in leprosy and upon the changing structure of leprosy control programmes, the following recommendations for eye care management in leprosy are proposed:

1. It is critical that leprosy patients (during their anti-leprosy treatment and after release from treatment) are accepted into general health and eye care programmes. Integration will require close collaboration between leprosy control and prevention of blindness programmes. At national, regional, and local levels, strong political commitment (including professional organisations) is needed to integrate leprosy patients into general health and eye care programmes.

2. Integration of leprosy and eye care will reinforce and complement VISION 2020 initiatives and strengthen leprosy control activities.

3. Cataract is the leading cause of blindness in leprosy affected persons and many do not have access to general eye care services. All persons affected by leprosy should have equal access to general eye care services. Education of health workers (including eye care staff) is required to ensure that leprosy patients gain access to eye care facilities.

4. Visual acuity and lagophthalmos should become the primary indicators for monitoring disability. Corneal hypoesthesia, corneal opacities, and uveitis should be removed from the leprosy disability grading scheme.

5. At the time of disease diagnosis all patients should be examined for lagophthalmos (any gap), visual acuity, a red eye, and the presence of a facial patch. All people with lagophthalmos, decreased vision, persistent red eye, and/or a facial patch in reaction should be referred by the peripheral general health worker to a higher level.

6. At the end of anti-leprosy treatment all patients must be educated regarding the risk of eye disease and informed that they should return for examination if they develop lagophthalmos, diminished vision, a red eye, or a facial patch in reaction. All patients with lagophthalmos should receive continued follow up. Explicit instructions regarding referral must be given to each discharged patient.

7. A training component that addresses the skills and activities of health workers in relation to care of eyes in leprosy should be introduced into national plans. The plan should address the needs at different levels and should include the needs of existing health workers through supplementary courses and of health workers currently in training through medical, nursing and paramedical curriculums. In every setting with a leprosy control programme, a practical referral system needs to be clearly defined. All staff at referral points need to be educated regarding the eye care needs of leprosy patients.

8. In settings where there are leprosy colonies/villages, it is recommended that annual (as a minimum) screening eye examinations and treatment are conducted. Furthermore, patients who have completed MDT but still suffer from the consequences of the disease should have, as a minimum, annual eye care examinations and management.

9. Lagophthalmos surgery should be provided to patients who need it. Evaluation of the need for lagophthalmos surgery should be based on one or more of the following conditions: size of lid gap, corneal exposure, corneal hypoaesthesia, visual acuity, and/or cosmetic difficulties. There are a number of surgical procedures being used for lagophthalmos surgery. Research is needed to determine the best possible surgical procedures to correct lagophthalmos and to improve functional and cosmetic outcomes. Standardised routine monitoring of the outcome of lagophthalmos surgery is recommended. There are many barriers that prevent patients from accepting lagophthalmos surgery, which need to be identified; programmes need to be developed to increase the uptake of lagophthalmos surgery. Finally, ophthalmologists and other relevant surgeons need to be trained in good quality lagophthalmos surgery.

10. Research shows that cataract surgery with IOL implantation, even in patients with evidence of chronic uveitis, can provide good quailty outcomes. IOL implantation, where available, should be promoted among leprosy patients who need cataract surgery. The outcomes of cataract surgical services need to be routinely monitored in all patients.

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Annex 1: List of participants
Annex 2: Lagophthalmos form
Annex 3: Modified lateral tarsal strip procedure
Annex 4: Standardized clinical examination

Annex 1: Eye Care Workshop Participants

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Annex 2: Lagopthalmos/Ectropion Surgery Outcomes Assessment

Patient Enrolment & Pre Operative Form

Patient Name: _____ **Patient Number:** _____
(family, given)

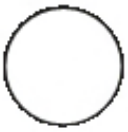
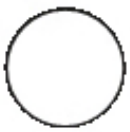
Date of Surgery: ___/___/___ **Surgeon:** _____ **Location:** _____
Mo. Day Yr. City & country of surgery

Demographics

1. Date of Birth: ___/___/___ Mo. Day Yr.	2. Patient Gender: ☐ Male ☐ Female	3. Village of residence	4. Township of residence:

Clinical Information

5. Primary patient complaints: (check all that apply)	6. Other vision reducing pathology:	7. Duration of lagophthalmos:
☐ Tearing ☐ Blurred Vision ☐ Pain ☐ Disfigurement ☐ Foreign Body sensation	☐ Chronic uveitis ☐ Cataract ☐ Other	☐☐ years

	Right Eye	Left Eye
8. Visual acuity:		
(a) Presenting	_____	_____
(b) Corrected or with pinhole	_____	_____
9. Facial patch involving the malar region:	☐ + ☐ - ☐ Unknown	☐ + ☐ - ☐ Unknown
10. Drooping of the mouth:	☐ + ☐ -	☐ + ☐ -
11. Condition of the lids:		
(a) Exposure of globe (open gaze)	☐☐ mm	☐☐ mm
(b) Exposure of globe (with gentle closure)	☐☐ mm	☐☐ mm
(c) Exposure of globe (with forced closure)	☐☐ mm	☐☐ mm
(d) Ectropion of lower lid	☐ Severe ☐ Moderate ☐ Mild ☐ None	☐ Severe ☐ Moderate ☐ Mild ☐ None
12. History of previous lagophthalmus surgery	☐ + ☐ -	☐ + ☐ -
If yes, type of surgery	_____	_____
13. Ectropion of lacrimal puncts:	☐ + ☐ -	☐ + ☐ -
14.Trachomatous trichiasis:	☐ + ☐ -	☐ + ☐ -
15. Cicatricial trachoma:	☐ + ☐ -	☐ + ☐ -
16. Condition of the cornea:		
(a) Exposure keratitis	☐ + ☐ -	☐ + ☐ -
(b) Corneal hypesthesia	☐ + ☐ -	☐ + ☐ -
(c) Corneal opacity not involving visual axis	☐ + ☐ -	☐ + ☐ -
(d) Corneal opacity involving visual axis (e)	☐ + ☐ -	☐ + ☐ -
Diagram of corneal opacity		
▬ Extent of opacity		

Patient Name: _____ **Patient Number:** _____

Surgery

Surgery:

- ☐ Tarsal strip/horizontal shortening of lateral edge of lid
- ☐ Temporalis muscle transfer
- ☐ Lid suspension
- ☐ Tarsorrhaphy
- ☐ Other

Surgical complications:

- ☐ Overcorrection _____
- ☐ Undercorrection _____
- ☐ _____
- ☐ None

Surgeon Name _____:

- ☐ Ophthalmologist
- ☐ Team leader
- ☐ Other

Clinical History of Leprosy (from patient file)

Age at leprosy diagnosis:

Duration between leprosy diagnosis & onset: (in months)

Leprosy type: Ridley-Jopling System:

☐ **LL** ☐ **BL** ☐ **BB** ☐ **BT** ☐ **TT**

Simplified:

☐ **MB** ☐ **PB**

Leprosy chemotherapy:

- ☐ Prior history of dapsone monotherapy
- ☐ MDT only

Compliance to regimen:

- ☐ Compliance good (define: _____)
- ☐ Compliance poor (define: _____)

MDT regimen included:

- ☐ Rifamplein Duration _____ months
- ☐ Clofazimine Duration _____ months
- ☐ Other: Duration _____ months

Current status:

- ☐ Dapsone alone
- ☐ MDT
- ☐ Released from treatment (year of release _____)
- ☐ Other
- ☐ None

Steroid use:

☐ Reported ☐ Not reported

History of reactions:

- ☐ No reactions (Type I or Type II) reported
- ☐ Type I reaction reported (year of last reported reaction _____)
- ☐ Type II reaction reported (year of last reported reaction _____)

Annex 3: Steps in the modified lateral tarsal strip procedure

1. Inject local anesthetic (3-5 ml of xylocaine, 1% or 2 %) into the lateral part of both upper and lower lids. Clean and drape the area with a sterile drape. Instill one drop of topical anesthesia in the eye.

2. With scissors, make a cut to separate the upper from the lower lid (a lateral canthotomy). **(Figure 1)**

3. Direct the scissors downwards and laterally to cut the lower part of the lateral canthal tendon, thus separating the lower lid from its attachment to the bone (the lateral orbital rim). One or two cuts may be necessary to free the lower lid completely. **(Figure 2)**

4. Pull the lower lid laterally and upwards in the desired position so that the lower lid margin covers the lower part of the cornea by about 1-2 mm. There will be a slight relaxation after the surgery so mild overcorrection is required.

5. Mark the excess skin (a triangular- shaped piece) and cut it off with scissors. **(Figure 3)**

6. Use the tarsus at the lateral end of the lower lid to fashion a new ligament (lateral tarsal strip). This is done by removing of the overlying skin and muscle, cutting away the lashes and their follicles, and scraping off the conjunctiva on the back surface of the tarsus. **(Figures 4 & 5)**

7. Suture the newly fashioned strip to the periosteum of the lateral orbital wall using a 5/0 suture (a non-absorbable suture like ethibond is preferred over absorbable materials). **(Figure 6 a,b,c)**

8. Use the same suture (several interrupted sutures) to close the layers of skin and muscle making up the new lateral canthus. **(Figure 7)**

9. Throughout the procedure, bleeding can usually be controlled with pressure. Using epinephrine 1:100,000 mixed with the local anesthetic will markedly reduce the bleeding . The eye can be patched for 24 hours if needed.

Figure 1

Figure 2

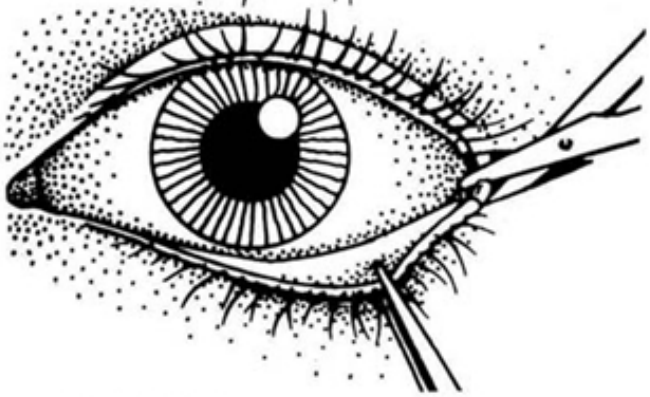


Figure 3

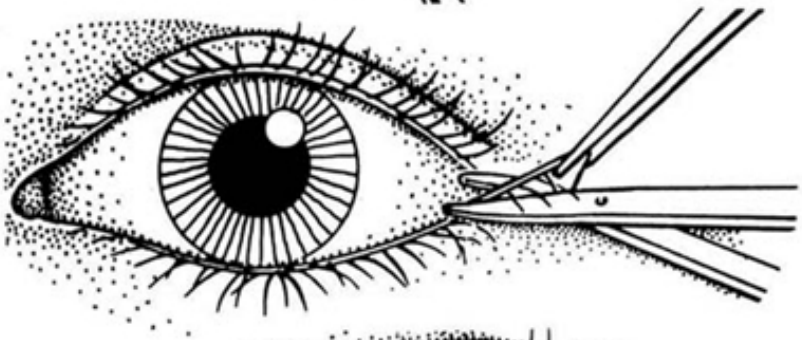
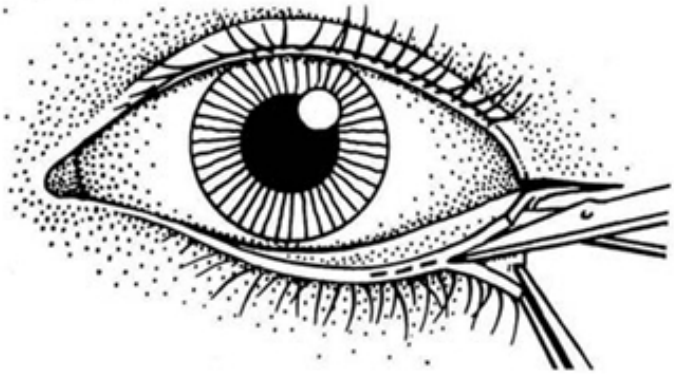


Figure 4



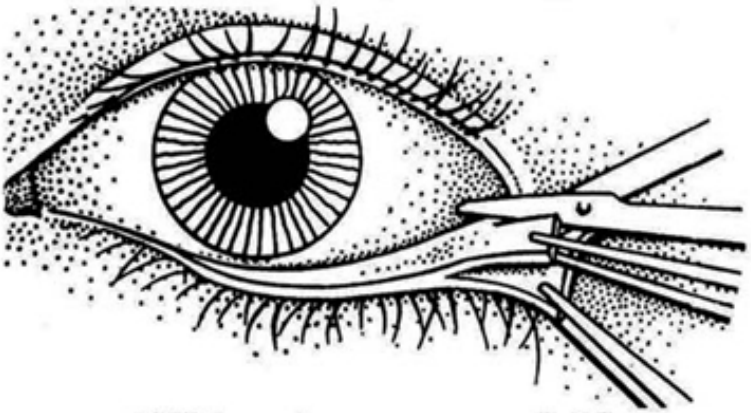


Figure 5

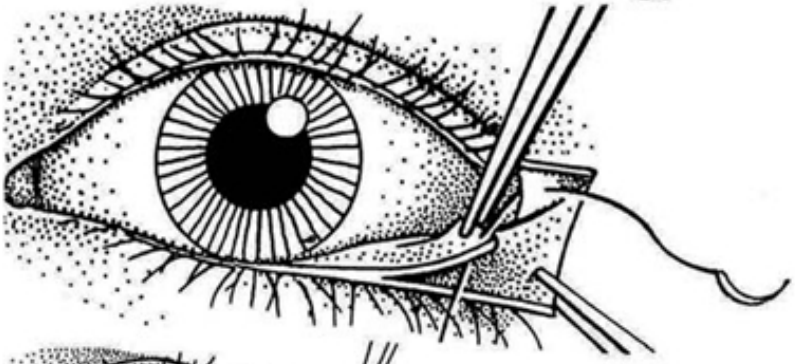


Figure 6a

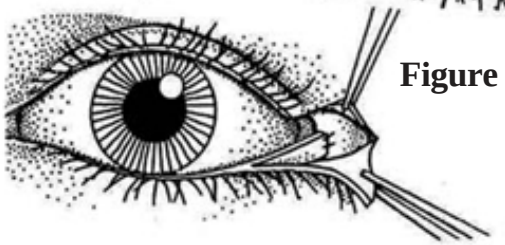


Figure 6b

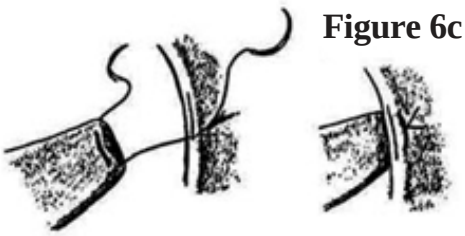


Figure 6c

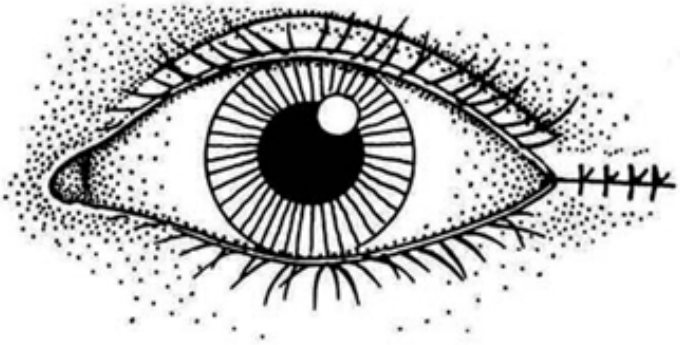


Figure 7

Annex 4: Standardisation of Clinical Examination

It is recognised that there is a multiplicity of lesions in ocular leprosy, but only those that threaten sight and are amenable to preventive measures or therapeutic intervention are considered here. The examination consists of the measurement of visual acuity and the objective examination of the various components of the face, lids and the eye that may be affected in the disease.

VISUAL ACUITY MEASUREMENT

Visual acuity should be measured and recorded in each eye independently using standard optotypes. Cases with visual acuity of less than 6/I8 should he evaluated with correction or pinhole vision. The visual acuity should be sub-divided into four entities:

1. Satisfactory vision defined as visual acuity of 6/18 or better
2. Visual impairment defined as visual level less then 6/I8 but equal to or greater than 6/60
3. Severe visual impairment or moderate blindness (less than 6/60 but equal to or greater than 3/60)
4. Severe blindness defined as visual acuity less than 3/60.

FACE

Pale flat maculae: reversal reactions in the face, with red and raised lesions.

LIDS

Abnormalities of function and lid deformity should be evaluated:

1. Lid closure (unforced). Ask the patient to close the eyes as in sleep and maintain the position for ten seconds - assess unforced closure. Measure (in mm) the lid gap.
2. Lid closure (forced). Ask the patient to close the eyes with force and maintain the position for ten seconds - assess forced closure. Measure (in mm) the lid gap.
3. Blink pattern. Incomplete and/or asymmetric blinking should be recorded.
   a. Normal
   b. Incomplete and/or asymmetric
4. Lid deformity: should be evaluated by recording the presence of.
   a. No deformity
   b. Ectropion - eversion of the lid margins
   c. Entropion - inversion of the lid margins
   d. Trichiasis - one or more eyelashes rubbing on globe
   e. Dermatochalasis
5. History of previous lid surgery

DISCHARGE

The presence or absence of discharge in the conjunctival sac should be noted (additionally, if increased by pressure on the lachrymal sac):

a. No discharge
b. Discharge: unchanged with pressure
c. Discharge: increased with pressure

ACUTE RED EYE

The following differentiation should he made:

a. No red eye
b. Conjunctivitis - characterised by peripheral diffuse redness, discharge, mild discomfort; vision unaffected
c. Episcleritis or scleritis - characterised by a focal redness and tenderness with vision unaffected
d. Corneal ulcer or abrasion - characterised by haziness or opacity of cornea with focal redness and pain; positive fluorescein staining; vision affected
e. Iridocyclitis - characterised by circumcorneal redness, pain, photophobia, with no stickiness, small pupil; blurred vision
f. Acute glaucoma - characterised by pain, redness, corneal haze, fixed dilated pupil, hard eye, no stickiness; severely reduced vision.

CORNEA

Evaluation of sensation and the presence or absence of corneal opacities should be undertaken. Normal sensation is indicated by an involuntary blink when the centre of the cornea is touched with a wisp of cotton-wool.

1. Sensation is either:
   a. Normal, or
   b. Diminished
2. Opacities - these should be graded according to their effect on central vision:
   a. No opacities
   b. Generalised dullness (dull or rough) of the cornea; pupil visible
   c. Central opacity; pupil partially visible
   d. Opacity through which there is no view of the pupil
   e. Peripheral opacity, central cornea clear
   f. Corneal or limbal leproma or nodule

PUPIL

The iris and pupil reaction should be examined in subdued light and the following signs recorded:

1. Pupil size
   a. Normal and reacting
   b. Constricted and non-reacting
   c. Dilated
2. Pupil shape
   a. Regular
   b. Irregular (posterior synechiae)
3. Colour of pupil
   a. Black
   b. Grey or white (indicating cataract with visual acuity <6/I8)
4. History of previous cataract surgery

GLOBE

a. Normal
b. Hard eye (digital palpation)
e. Soft eye (digital palpation)
d. Staphyloma
e. Shrunken eye (phthisis) (regardless of intraocular pressure)
f. Absent eye