Ocular deformities in leprosy; a simplified grading system

Ebenezer Daniel
Division of Ocular Immunology
The Wilmer Eye Institute, School of Medicine
The Johns Hopkins University
1620 McElderry Street, Reed Hall, 4th Floor
Baltimore, MD 21205, USA
Introduction

Considering the complexities, both in its manifestations and management, classifying various features of leprosy has always been a difficult task. The WHO classification for grading deformities in the disease has undergone several modifications during the past few decades. In 1987, the WHO Expert Committee on Leprosy substantially simplified the grading of eye deformities into a three-grade system (1). In 1988 a later committee endorsed this grading with an amendment that lagophthalmos, iridocyclitis and corneal opacities should be considered as Grade 2 (2). Whilst the limb deformity classification has found wide use, the grading system recommended for deformity of the eyes does not seem to have received proportional acceptance. A search of the literature between 1987 and 2004 on studies reporting ocular complications of leprosy revealed that eye deformity grading has not used to the same extent as that for the limbs and in several studies it was modified.

The importance of eye deformities in leprosy cannot be overemphasized and the present WHO classification needs to be re-evaluated. After consideration of its major disadvantages, a new simpler but more user-friendly classification is proposed.
The 1998 WHO grading system divides the eye deformities into three broad categories (Table 1). There are several assumptions that are inherent in the present system. The first is that Snellen’s visual acuity charts are readily available in locations where leprosy is still a public health problem. But these locations are often situated in areas that are socio-economically deprived, where primary health care facilities do not measure up to a satisfactory level and where specialized health care centers are scarce. Secondly, it assumes that the examiner, a health care worker in most cases, is able to measure 6 meters accurately, either with a tape measure or calibrated length of string. Thirdly it assumes that the health care worker is proficient at measuring visual acuity with the Snellen’s chart and able to follow the strict guidelines necessary for accurate and standardized recording.

It is however accepted that the measurement of distance vision should be the agreed quantitative reference point for assessing a leprosy patient’s visual ability in the field. Other forms of vision such as color, contrast sensitivity and field of vision are equally important for day to day activities but their accurate recording requires more sophisticated instruments not readily
available in this situation. The wise variety of Snellen’s charts and the manner in which they are employed makes standardization difficult, and newer equipment such as the LogMAR charts have now become essential for scientific work, but these require longer testing time and are more difficult to use (3-9).

Other assumptions to be made with the existing WHO eye deformity grading are associated with the specific nature of the deformities themselves. Grade 1 and 2 are currently defined with the expectation that the examiner can diagnose and distinguish between leprosy related and non-leprosy related eye problems (Table 1), but even for an experienced ophthalmologist working in leprosy, this can be a difficult differentiation. Ocular problems commonly perceived to be due to leprosy could result from other causes. Lagophthalmos may be due to Bell’s palsy, ectropion could be age-related, corneal opacities may have a variety of causes, iritis and particularly cataract may be due to a number of non-leprosy causes. The health care worker, operating in the field without in-depth knowledge or adequate instrumentation can hardly be expected to make these distinctions.
The three specific ocular conditions added to the grading classification in 1998 – lagophthalmos, iridocyclitis (difficult to diagnose without a slit-lamp) and corneal opacities, can certainly threaten sight, but lid problems and intraocular inflammation can respond to treatment and non-axial corneal opacities may never have any effect on vision. There are other potentially sight-threatening conditions in leprosy such as impaired corneal sensation, corneal ulcer, glaucoma and cataract that are of equal significance to those added to the grading, but are not included.

**Objective of a grading system**

What is the objective of a grading system? The objective of a grading system in leprosy should be to facilitate monitoring and evaluation of the progress of individuals and cohorts of patients with the disease, so that interventions and programmes can be planned. A change in the grade of an individual’s eye deformities should also alert the health care worker that a problem has developed that needs referral for a specialist opinion.
There are several criteria to be established before a grading system in leprosy is introduced. It needs to have a quantitative element, it should be easy to carry out by personnel examining patients in any field setting, the recording of information from each case should be kept simple and, if it is to have any comparative value, must confirm to standards used in all countries. Above all it should not require more than a rudimentary interpretation of the clinical signs by the health care worker making the assessment.

The WHO grading in existence for the upper and lower limbs in leprosy is in line with these objectives; not so the deformity grading for the eyes. The ambiguities already mentioned that are inherent in the system and the need for extra equipment necessary to categorize patients into the different grades makes the process much more difficult for ocular deformities than for the limbs.

**Present WHO deformity grading of hands and feet**

In the currently used WHO deformity grading of hands and feet (Table 2) the principal reference factor is anaesthesia, regarded as the most significant underlying pathology. Although in the eye loss of corneal sensation is
considered to be important it cannot be used as the principal reference factor because it is not as easy to evaluate and record as is the sensory loss in the skin. The traditional testing of corneal sensation in the field with a cotton wisp is inaccurate and gives widely variable results. It also has the potential to damage the corneal epithelium, a complication recognized by the WHO who has recommended that the test be abandoned in the field (2). For a more accurate and quantitative method the examiner must use the Cochet and Bonnet aesthesiometer, an expensive and fragile instrument with a significantly longer testing time and not really practical for use in the field.

As an alternative to corneal sensation the obvious reference factor for grading should be visual acuity. Despite the limitations in the accurate measurement of distance vision in the field it still remains the only quantitative assessment of ocular function that can be made in leprosy patients. For all its faults the Snellen chart, using whatever symbols that are appropriate to the location, positioned in a well illuminated site 6 meters from where the patient is being examined, must still be regarded as an essential component of the health care worker’s equipment.
The use of finger counting at 6 meters as a standard measurement, although more convenient, is far less accurate than the Snellen chart. Variables include the size, length and separation of fingers; even the way the hand is held will provide extra clues for the patient. These questions over the unproven validity and reliability of this method have led to its exclusion from the proposed new grading system.

The adoption of 6/60 by the WHO as a cut-off point to distinguish Grade 0 from Grade 1 accords well with the new definitions of visual impairment and severe visual impairment which use this acuity level to distinguish between the two (10). Any further modifications to this may require a readjustment of the cut-off point and in this respect the proposed new grading system must remain flexible.

**Suggested modification to the current eye deformity grading**

The increasing integration of leprosy services into general health care programmes means that health workers will come across a variety of ocular problems, some related to the disease itself, but many having other local or
systemic causes. The proposed new grading for eye deformities in leprosy patients aims to take away from the health care worker the responsibility for determining the differential diagnosis, and to provide clear guidelines on referral.

The main modification of the current grading concerns the specification of eye conditions within it. Leprosy patients are living longer; this is partly due to the effectivity of prevailing anti-leprosy drug regimens, the success of leprosy control programmes and the economic growth in many leprosy endemic nations. Aging and affluence bring their own ocular problems; cataract, glaucoma and age related macular degeneration are more common and the increase in the incidence of diabetes and systemic hypertension also contribute to ocular morbidity. Apart from the eye complications attributed to the disease itself, leprosy patients can therefore lose vision from other conditions, many of which may not be detectable on routine examination by health care workers in the field.
Proposed eye deformity classification in leprosy

The proposed classification is shown in Table 3. The definition of ‘visible’ manifestations embraces those known complications of leprosy that can be observed on routine inspection of the face and eyes and are regarded as potentially sight threatening - erythematous patch over the zygomatic area, lagophthalmos, red eye, ingrowing eyelashes (trichiasis), corneal ulcer, central corneal opacities and mature cataract.

By this simplification the health care worker is able to make a judgment on which cases need referral for a specialist opinion. Movement of a patient from Grade 0 to Grade 1 suggests that a local or systemic treatment for the eye needs to be considered. Movement from Grade 1 to Grade 2 indicates a significant complication requiring rapid referral for ophthalmic intervention to a center dealing with leprosy eye disease, whereas movement from Grade 0 to Grade 2 implies that a non-leprosy cause is responsible for the visual deterioration, also necessitating referral to an eye clinic. Marking the top of the case notes with the grading of the patient would greatly facilitate this and should become a routine practice.
Summary

A simplification of the existing WHO grading system for deformities of the eye in leprosy patients is proposed. The new classification relieves the health care worker of the responsibility of making a differential diagnosis, but still includes a quantitative element in the information that is recorded and provides guidelines on the cases which require referral for specialist opinion.
REFERENCES


6) Philp I, Lowles RV, Armstrong GK, Whitehead C. Repeatability of standardized tests of functional impairment and well-being in older
people in a rehabilitation setting. Disability and Rehabilitation 2002;24:243-249.


### Table 1 Present WHO classification of deformities of the eye

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No eye problems due to leprosy and no evidence of visual impairment</td>
</tr>
<tr>
<td>1</td>
<td>Eye problems due to leprosy are present. Vision 6/60 or better, The patient can count fingers at 6 meters.</td>
</tr>
<tr>
<td>2</td>
<td>Severe visual impairment (vision less than 6/60, the patient is Unable to count fingers at 6 meters), lagophthalmos, iridocyclitis and corneal opacities.</td>
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Table 2 Present WHO Deformity grading of hands and feet.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No anaesthesia: No visible deformity or damage</td>
</tr>
<tr>
<td>1</td>
<td>Anaesthesia present: No visible deformity or damage</td>
</tr>
<tr>
<td>2</td>
<td>Visible deformity or damage present.</td>
</tr>
</tbody>
</table>
### Table 3  Proposed eye deformity classification in leprosy

<table>
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<tr>
<th>Grade</th>
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</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No visible eye manifestations and patient can see 6/60</td>
</tr>
<tr>
<td>1</td>
<td>Visible eye manifestations present but patient can see 6/60</td>
</tr>
<tr>
<td>2</td>
<td>Visible eye manifestations present or absent but patient sees less than 6/60.</td>
</tr>
</tbody>
</table>