Jennifer Brower FBDO (Hons)LVA Cert.Ed

A practical guide to low vision assessment and dispensing

Nowadays, few optometrists are involved with spectacle dispensing. Many prefer to concentrate on the clinical aspects of practice, others are simply constrained by time and/or finance. Modern day dispensing opticians are highly skilled professionals, with an enormous range of spectacle frames and lenses at their disposal, able to produce cosmetically pleasing spectacles from the most complex optical prescriptions.

However, the dispensing optician is not purely a technician. The skill required to interpret an optical prescription and dispense it in the best possible form is based on a firm foundation of optical knowledge – ocular anatomy and physiology, optics, visual optics and ophthalmic lenses, frame properties, materials and manufacture, and essential frame and facial measurements. Unlike the pharmacist, who carries out the doctor's explicit instructions, the dispensing optician must assess the patient's requirements before being able to make the most suitable type of spectacles. Many optometrists do not become involved in low vision work either, preferring to refer the patient elsewhere. Assessment of the low vision patient is, however, a natural part of the dispensing optician's work, being the only other professional to possess the optical qualifications and legal entitlement.

People are living longer and with old age comes the increased incidence of ocular pathology. Macular degeneration, diabetes and glaucoma are typical causes of low vision, together with non-operable cataract and other eye problems. Although many low vision clinics are centred in HES hospitals, shared care schemes are increasing and more low vision patients are being assessed in private practice.

The Eschenbach Rido-Med has a longer working distance than the equivalent spectacle magnifier

(Photograph reproduced by kind permission of Eschenbach)

There are many well-meaning amateurs in the low vision field, prevented by law from dispensing spectacles or spectacle mounted aids to the partially sighted and blind, so the spectacle prescription may be ignored as the sympathetic "vision therapist" hands the patient a 6x illuminated magnifier cooing, "These are really good, I use one myself".

Modern day thinking is that the best care of the low vision patient is provided by a multi-disciplinary approach involving the ophthalmologist, GP, optometrist, dispensing optician and social worker or rehabilitation officer, each with his/her own area of specialisation.

These areas will naturally overlap and communication between the different professionals is to be encouraged if the patient is to receive the very best care.

Patients may be referred for assessment by the ophthalmologist, GP, optometrist, social services or self-referred. When a patient walks into the practice and simply asks for "a magnifier", the receptionist should be trained not to make assumptions, i.e. the best thing for this patient is a magnifying glass, because one was requested. Why is this patient asking for a magnifier? Has there been a recent eye examination? Does the patient have broken reading spectacles?

If a magnifier is required, which one is going to be suitable? This is the key question and where the dispensing optician comes in. It should become obvious very quickly if the patient is normally sighted but needs reading spectacles, requires something temporarily or has a need to see smaller than N5, and in these situations a simple hand magnifier may be given. In cases of low vision however, it is not possible to recommend the right type and the right power without proper investigation.

Private low vision assessment will attract a fee as there is no provision under the NHS for this, only the eye examination. The GOS3 spectacle vouchers cannot be used for magnifiers, except high addition spectacles. The aids will also be charged for privately, unlike under the free loan system operated by the Hospital Eye Service, but an exchange system may be operated for redundant aids in good condition.

Disabled people do not pay VAT on appliances specific to their disability so patients who are registered blind or partially sighted do not pay VAT on optical or non-optical low vision aids.

When an appointment is made for low vision assessment, the patient should be asked to bring along any spectacles and aids they use and where possible, examples of things they are having difficulty seeing. Sufficient time must be allocated for the assessment and ideally, it should be carried out in a private room or a quiet area, away from the public gaze.

A sympathetic but positive attitude should be maintained by the practitioner, but promises should never be made. Some patients, particularly those newly registered, may have difficulty coming to terms with their problem and may have low expectations of what can be done to help. An apparent unwillingness to co-operate may simply be the patient's way of not accepting the situation.

ASSESSMENT ROUTINE

Observation

Observe patients as they enter the room to see whether they walk unaided or are supported, whether they feel for a handrail or easily recognise open doorways. Wearing dark spectacle lenses or holding the head down may imply sensitivity to light, although this head position could be due to arthritis. There may be an obvious hearing problem and a white or red and white-banded cane may be used. Other signs to look for are difficulty holding things or tremor. Many elderly low vision patients will attend with a carer or relative.

History and symptoms

Details of the patient's general and ocular health, symptoms and whether registered partially sighted or blind should be recorded from information supplied by the referring practitioner and/or from questioning the patient.

The patient's visual needs and wishes should be discussed and practical problems considered. A child who travels to school alone may have to read bus numbers and information signs then cope with different visual demands in the classroom.

An elderly patient, living alone, may have to read medicine labels or food packets. Hobbies should be discussed and the type of illumination currently used. A note of the manufacturer, type and power should be made of any existing aids which the patient is using.

Confirmation of spectacle prescription

The latest refraction details should be confirmed, including the monocular and binocular acuities for distance and near vision, and existing spectacles verified. A three metre chart such as the Keeler 'A' series should be used for patients with visual acuities of 6/60 or less as more letters will be read. Where the acuity is very low, working distances of two metres or even one metre may be necessary.

An Amsler grid may be used to determine the exact position of a central scotoma. If the

patient has not had a recent refraction, or if it is believed that the acuities can be improved significantly, the patient should be referred back to the optometrist at this stage.

To obtain the best results with low vision aids, the patient should start with the best visual acuity achievable; magnifying a blurred retinal image can never be as good as magnifying the sharpest possible.

Assessment of magnification

Assess the magnification required for distance vision for each eye using a distance telescope with the distance prescription and test chart. The method of using the telescope must be explained carefully, to minimise the difficulty in locating the object in the visual field and some perseverance may be required, particularly with older patients.

Assess the magnification required for near vision for each eye using the distance prescription and the appropriate plus lens for focusing at 25cm. The Keeler 'A' series near vision chart is often used as this has a very wide range of print size and shows the magnification required to improve the existing acuity to N8.

Children with normal accommodation may naturally hold the page closer than 25cm and this should be encouraged as it can delay the need for magnifying aids – holding the print at 8.5cm will utilise 12.00D of accommodation and give 3x magnification. The best reading acuity should be recorded, together with the working distance and type of illumination.

Be wary of giving high magnification initially. Suppose a patient has a near visual acuity of N48, improving to N6 with an 8x magnifier. When print is magnified it becomes difficult to read quickly because the field of view is limited and each letter seems so big that the words have to be worked out. It may be better to give 4x which should give N12, enough for large print books and reading letters; patients can move on to higher magnification when they become proficient with lower powers.

When the print is large and slow to read, a common fault is to mistake the patient's "I can't see it" for thinking more magnification is needed, when in fact less is required. This problem will not occur if proper assessment for magnification is carried out rather than trying out magnifiers in a haphazard way.

It is often useful to check the reading acuity with existing near vision spectacles. The patient should be given the reading chart and asked to read the smallest size print which can be seen comfortably at the usual reading distance (often around 40 cm). From this, you can ascertain the acuity at the preferred working distance. Consideration must be given to the ocular pathology which is affecting the vision. Macular patients may look for really large print because of the central problem, yet with a little gentle coaxing, and possibly eccentric viewing, they may see smaller print and thus require less magnification.

Where a macular patient is using progressive power lenses or small segment bifocals, the reading acuity will often be lower than expected because the central scotoma or distortion blocks out most of the reading area.

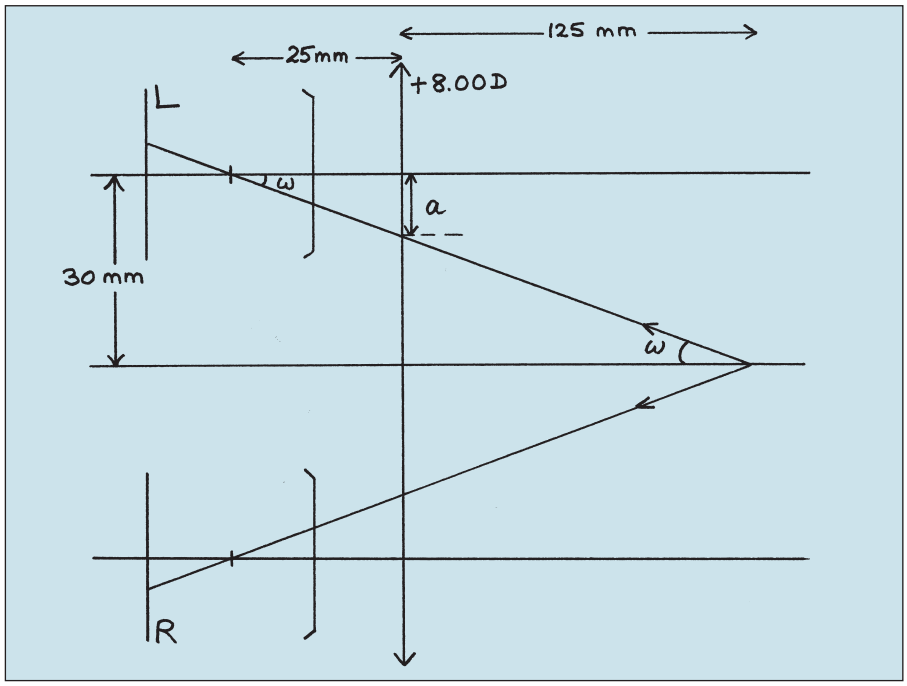

Figure 1:
Calculating the near vision centration distance

Some patients may already be employing an eccentric viewing technique depending upon the position of the scotoma, otherwise this is a good time to introduce the concept to them, together with advice on the advantages of single vision reading spectacles.

Decide whether to recommend binocular or monocular aids, whether to occlude an eye and the type of occluder. Although binocular vision may be present, significant differences in the acuities of the two eyes may give too great an image size difference so a monocular aid will have to be considered for the better eye.

Classification of magnification

There are different methods of classifying magnification. Nominal magnification (F/4) is the magnification obtained when the object distance is assumed to be 25cm from the eye and the magnification is a quarter of the dioptric power of the lens (although this may be the back vertex power or the effective power).

Maximum magnification (F/4+1) is the term commonly used by manufacturers of magnifiers, when the image is assumed to be formed 25cm from the eye, the object is positioned at the focal length of the magnifier and the lens unrealistically is assumed to be in contact with the eye.

When noting the power of magnifiers, the most reliable way is to measure the back vertex power of the lens, but where this is not practical the magnification stamped on the unit should be recorded, together with the make and model number.

Choice of aid

The assessment of magnification for near vision must take into account the patient's individual needs. A patient with a near VA of N24 may manage very well with 3x to read N8 in a newspaper, but 4x or 5x may be needed to read cooking instructions or a poorly photocopied knitting pattern. In addition, aids should be considered for intermediate distances. Patients who play the piano, or paint at an easel, will need different aids of varying power from typical reading ones. If the acuity is not too low, photocopying music double or triple size may be sufficient and it can be combined with a Fresnel sheet, although the sheer width of the pages can become a problem.

Patients with very low acuities should be encouraged to bring the music or painting much nearer so that a clip-on magnifier may be attached to their spectacles. Helping patients continue their hobbies rather than telling them to give up results in happier and more co-operative patients.

One of the simplest low vision aids is the high reading addition. Elderly patients in particular are used to wearing spectacles for reading and in fact often ask for "stronger glasses" which they believe will solve their visual problem. The power of the add may be increased to give some magnification. Do not forget to remind them about the closer working distance or they will return to the practice saying the print is blurred. Base in prism should also be included to aid convergence for close working distances, otherwise the patient will complain of tired eyes or diplopia. Another advantage of high add reading spectacles is the hands free aspect. Special bifocals are available with very high reading additions – the Sola LVA bifocal has adds up to +16.00D (4x) – but apart from the disadvantages of the very close working distances and the practical limits of binocularity, the small 25mm round segments mean that macular patients in particular often find these difficult to use successfully.

High power binocular reading spectacles will

require the calculation of the near centration distance **(Figure 1)**. Suppose a patient requires near vision spectacles to give 2x magnification. Using the formula M = F/4, and assuming there is no distance prescription to be corrected, then the power of the lenses will be +8.00D.

The centre of rotation of the eye is assumed to be 25mm behind the +8.00D spectacle plane, the inter-pupillary distance is 60mm and, assuming there is no usable accommodation, the object distance is 1000/8 which is equal to 125mm from the lens. The angle of rotation is ω and the distance, a, is the monocular decentration required for each eye. Assuming thin lens theory, as tan equals opposite over adjacent, then tan ω is equal to 30/150 = 0.2. tan ω = a/25 so a/25 = 0.2 and the distance, a = 0.2 x 25 = 5mm. Therefore, in this case, the decentration for each tens is 5mm, total for the two eyes 10mm, which is equal to a centration distance of 50mm for the spectacles.

A certain amount of base in prism will also be needed to compensate for the eye's inability to maintain convergence at such a short working distance - one common method is to include 1Δ base in per lens for each dioptre of addition over +3.00D, effective at the near centration distance, so for lenses of +8.00D, this patient would require 5 dioptres of base in prism per lens effective at 50mm.

There are ready made half eye prism spectacles available, but these must be used selectively. The Coil range are made in 2 dioptre steps from +4.00D to +14.00D and the +8.00D incorporates 10Δ base in each lens. The frames are made in two sizes, 45x24 and 49x26, so consideration must be given to the patient's PD compared with the optical centre positions of the lenses to avoid inducing large amounts of base out prism. The problem is less significant with lower powers and for patients with wider PDs.

A single aid will not solve every problem. Children and working adults particularly will need a range of aids for different visual tasks. The Department of Education and Employment may provide a CCTV for school or the Training Agency a computer for work. Even the retired patient will benefit from a discreet, portable aid for shopping as well as something more substantial to use at home.

A common request is for "something to see TV with". Combining distance, size and angular magnification to increase the TV picture size can be useful. Halving the distance from the eyes to the screen, using a TV with twice the screen area and using a 2x telescopic magnifier will produce a picture magnified eight times. Just sitting at half the distance will double the picture size. Better contrast may be achieved with a black and white picture rather than colour. It will not always be possible for the patient to sit nearer to the TV or buy a new set and telescopic aids are not always successful, and in these circumstances, encouraging the patient to develop other hobbies, where distance vision is unimportant, is a positive step.

Young patients usually do better with distance telescopes than older patients, partly because of their lifestyle and the need to see to get to school or work.

Older patients may have hand tremor or arthritis which mars their ability to hold a telescope steady or just be unhappy with the reduced field of view compared with spectacles. Near vision telescopes, however, can be helpful for older patients, as the increased working distances give more freedom. For example, the Eschenbach Rido-Med is made in magnifications of 2.5x, 3x and 4x with working distances of 35cm, 20cm and 25cm respectively and can incorporate a prescription; the equivalent spectacle magnifier (adds of +10.00D, +12.00D and +16.00D) would have to be used at 10cm, 8.5cm and 6cm where there is no usable accommodation.

Demonstration

Several different aids should be demonstrated to show the patient the difference in use and what can be achieved. Encourage patients to try the aids with familiar material such as a newspaper, knitting pattern or school book. Demonstrating the importance of appropriate illumination is particularly important and practitioners will need to satisfy themselves that the advice is taken, otherwise higher magnification may be necessary.

Attention should be given to the patient's ability to hold a magnifier steady, otherwise a head-borne or stand magnifier will be more suitable.

Filters may be shown, the colour and density partly dependent upon the eye condition. Macular patients will often have suffered some degree of colour vision loss so the results with tints may not be as expected. Cataract patients particularly benefit from blue-absorbing filters to reduce light scatter in the eye and tinted over-spectacles with sideshields can give significant relief from glare.

Illumination

One of the most important things to consider is illumination. Normally sighted elderly patients require much higher levels of illumination to read than younger patients and elderly low vision patients, often with small pupils, need even more. There may be problems for cataract patients, however, as flooding the eyes with light will make things worse and here improved contrast should be achieved wherever possible. Patients often describe a 100w lamp in the ceiling or a shaded standard lamp behind their chair as "good" lighting and the practitioner will need to explain the advantages and disadvantages of different types of lamp and the relevance of positioning them correctly, together with the importance of natural daylight.

Non-optical aids

Large print books and newspapers, typoscopes and reading stands are useful aids; in some cases, and with bright illumination, the patient may be able to avoid magnification altogether. Other aids are large print playing cards, talking calculators and large number telephones. The RNIB and other resource centres stock a wide variety of different aids.

Supply

Hand and stand magnifiers, clip-on loupes, flat field magnifiers, low power spectacle magnifiers, distance telescopes, tinted spectacles and reading lamps should be available from stock. Complex magnifiers and those incorporating a prescription will have to be ordered and fitted at a later visit. Accurate fitting and centration measurements must be specified for spectacle mounted aids and checked when received, just as with normal spectacles. When an aid is fitted, the acuity should be confirmed to ensure that the expected standard is achieved.

Patient instruction

Clear instructions on the use of all aids must be given to obtain the best results. Particular attention should be drawn to the relationship between the field of view and working distance so that the patient understands the importance of positioning the aid correctly. A single demonstration may not be enough to ensure that the maximum benefit is being received from an aid. Instruction in eccentric viewing and steady eye strategy should be given where relevant and the practitioner will wish to ensure that the patient knows exactly how to use an aid before it is taken away.

Information

Information should be given to the patient about the help and concessions which are available and to which they are entitled. This may include registration benefits, local authority help and numerous welfare groups. Patients should be encouraged to contact support groups for their particular eye condition, as this will often help to stop them feeling alone with their problem. It is useful to keep a stock of leaflets about the major organisations and contact telephone numbers for the smaller ones. Any written information given to the patient should be in large print.

Aftercare

Patients should be reviewed regularly, to monitor their progress and check whether acuity levels are deteriorating further. Aids may have to be exchanged or modified, or additional ones supplied. Patients should be encouraged to make contact if any problems arise between visits. A check should also be made with registered patients to ensure they are obtaining adequate support from their local health authority and social services.

Dispensing opticians wishing to specialise in low vision work are recommended to obtain the Association of British Dispensing Opticians Honours Diploma in Low Visual Acuity. The course is also open to optometrists. Details are available from the Registrar.

About the author

Jennifer Brower is a dispensing optician and low vision practitioner working in private practice and the hospital eye service. She is a tutor and examiner for the ABDO Honours Diploma in Low Visual Acuity, Chairman of the ABDO LVA Committee, a member of the ABDO Council and the CET Approval Committee.