Community Vision Rehabilitation Model: An Orientation

Gregg Baldwin, OD
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This orientation to the community vision rehabilitation model is intended for the following rehabilitation professions within the Virginia Department for the Blind and Vision Impaired, (DBVI):

Vision rehabilitation teacher or counselor, (RT)
Vocational rehabilitation, (VRT)
Teacher of the blind and visually impaired, (TBVI)
Certified orientation and mobility specialist, (COMS)

Other such community vision rehabilitation models may employ other professionals to provide vision rehabilitation, (for example, the government of Quebec exclusively trains social workers to provide this service), and they may also find this orientation useful.

The various professions comprising a community vision rehabilitation team each bring specific strengths to the model. However, each profession also brings gaps in training and education that can affect the success of the model. These gaps must be addressed in an adequate orientation program, but in practice they are intended to be filled using the team approach on which the model depends. This orientation is simply intended to introduce the model, as well as address what the team should expect from participating optometrists.

The community vision rehabilitation model provides services over a relatively large geographic area. It can provide services in the home, school, and workplace, as well as provide for visits to contracting optometric offices. It is often funded through taxation, which of course allows it to become a service rather than a business. The model involves a relatively small number of contracted optometrists, and receives referrals from an even smaller number of ophthalmologists. This results in a team member structure that resembles a pyramid, with a small number of referring ophthalmologists on top, a larger group of contracted optometrists in the middle, and the majority of the team members consisting of rehabilitation professionals comprising the bottom of the pyramid.

While referrals **to** this system can come from ophthalmology, optometry, or the community; referrals **within** this system are from the bottom of the pyramid up, rather than from the top of the pyramid down. This model therefore involves a team driven by vision rehabilitation professionals, not medical providers, and not optometrists. In this way, referrals within the system are based on visual functional needs, rather than medical, or even optometric information.

The other common model providing for vision rehabilitation is the medical model. Within this model, vision rehabilitation is generally provided in a clinic setting by occupational therapists. These occupational therapists refer outside the model for such services as vision rehabilitation teaching or counseling within the home, vocational rehabilitation in the workplace, classroom evaluations and accommodations in the school, as well as for orientation and mobility evaluations and training in the community.

The medical model is of course also a team approach, but one that is driven from the top down, rather than from the bottom up. Visual measurements in an ophthalmology or optometry setting therefore drive the process.

Ophthalmology

Optometry

Occupational Therapy

Outside Vision Rehab

Both models are imperfect, and work *in spite of themselves* when staffed sufficiently by dedicated professionals with the freedom and resources to work in the best interest of the visually impaired. However, since each model has its own inherent shortcomings, it is always best to be aware of the service model used for previous or future care.

In general, the community vision rehabilitation model allows for more vision rehabilitation with less associated financial roadblocks. However, since the process is not directed from the top down, extra care at all levels must be given to ensure compliance with medical follow ups.

While the medical model prioritizes ocular health and the resulting maintenance of visual potential, it can do so at the expense of visual function, since much of meaningful vision rehabilitation occurs outside of a professional office. Also, since this model is usually not directly funded through taxation, much of this vision rehabilitation can be financially out of reach.

If a community vision rehabilitation model receives a referral from an occupational therapist **after** the patient has been given a medical model fee-for-service low vision exam, that is unfortunate because:

1). The patient will have been billed for a low vision exam covered by the community vision rehabilitation model.
2). The low vision exam may not focus on needs or functional visual potential uncovered directly in the home, school, or workplace.

In these cases, a second low vision exam will be needed.

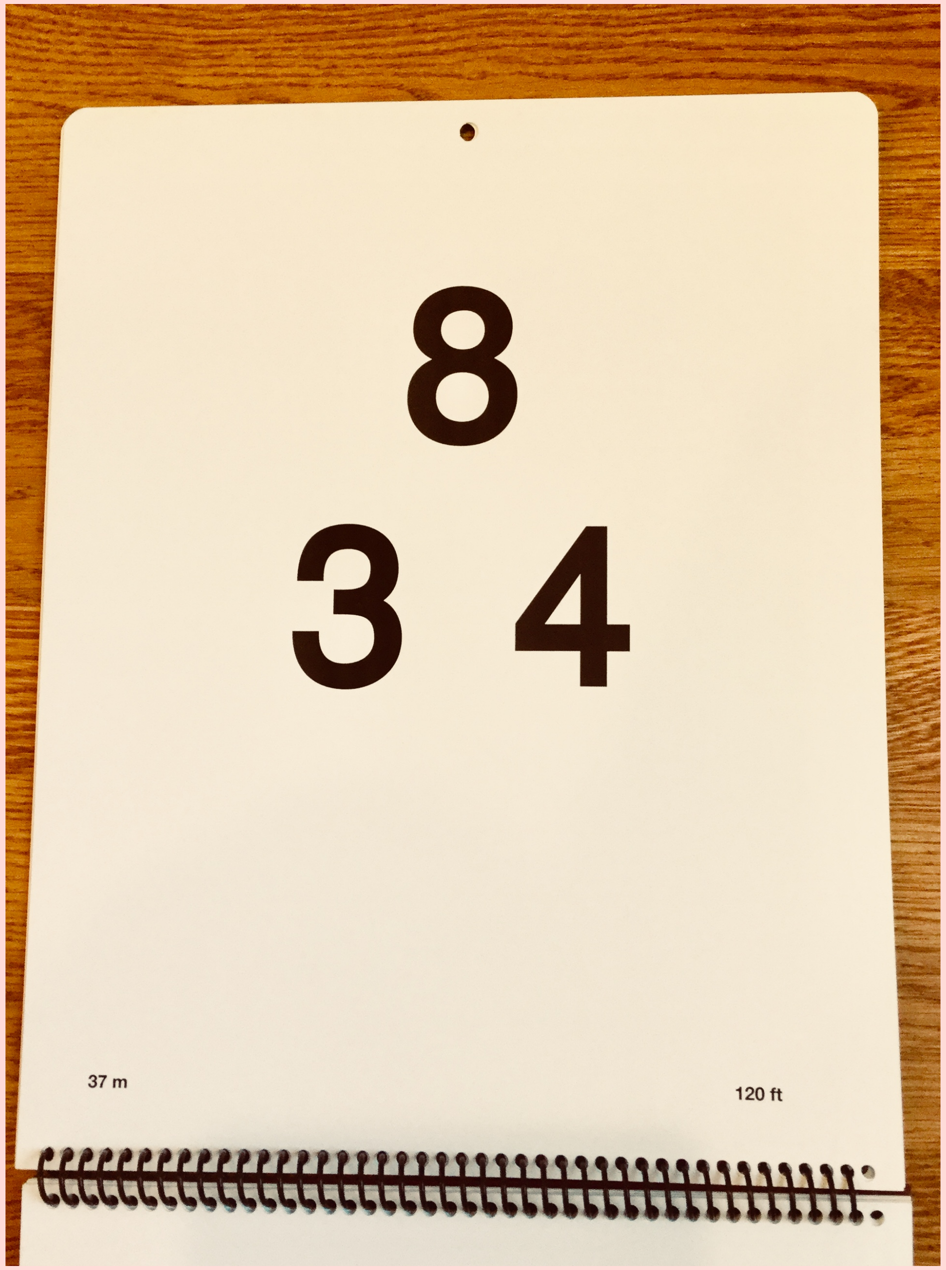
Low Vision Exam Expectations Within The Community Vision Rehabilitation Model

DISTANCE ACUITY

The "best corrected" distance acuity measurement is an example of a medically oriented test. Although this provides an important measurement under more or less standard conditions, (maximum contrast), and is therefore useful for following eye disease and refractive change, the projected (or backlit) distance chart used does not represent common contrasts found during daily or classroom functional tasks. For functional distance acuity evaluations, vision rehabilitation professionals and low vision optometrists often use the Feinbloom Distance Chart. Because this cardboard chart allows for testing with various contrasts, these non-standard measurements are not used to determine driving eligibilities, even if mathematically adjusted after the fact for the "standard" twenty foot testing distance.

One advantage of the Feinbloom chart is the triangular single-number arrangement on several cards. When a patient consistently misses a number to the right, left, or top of several of the cards with the triangular single-number arrangement, we can assume a central blindspot is located there. This allows for a discussion of eccentric fixation, as well as an easily explained strategy to maximize acuity by "looking toward the blind spot." This teaching technique is especially helpful when demonstrated in front of family members, who can later coach the patient.

Eccentric fixation can sometimes improve distance acuity by a line on the chart, and provide a significant functional improvement. Although eccentric fixation is also taught with near targets, the potentially successful strategy is best demonstrated and discussed early in the exam, during distance acuity testing. If the patient consistently reads all of the triangularly arranged single-numbers equally well, it has been my experience that eccentric fixation training does not improve acuity at far or near.



The familiar "M" notation used to measure the font size of near print, (where 1M can be considered newsprint, and 2M is twice newsprint, etc.), is used to label each line in the Feinbloom distance chart, so that the chart can be held at any distance, and the acuity recorded as the smallest "M" font size legible at that distance, specified in feet, inches, meters, or centimeters.

Feinbloom distance acuity can also be expressed using the labeled "feet" notation, which when used as the denominator of a fraction with the test distance in feet as the numerator, indicates the inverse of the minutes of arc detail seen. For example, an acuity notation of 10/20 indicates that with a test distance of 10 feet, the patient could see the Feinbloom "20 foot" number, which indicates 2 minutes of arc detail can be seen. (There are 60 minutes of arc in a degree of arc). Although 10/20 Feinbloom distance acuity mathematically corresponds to 20/40 distance acuity, it does not correspond functionally, since testing distance changes often don't produce predictable acuity changes for the visually impaired. There are many reasons for this, but the simplest one is the non-linear effect of glare over distance.

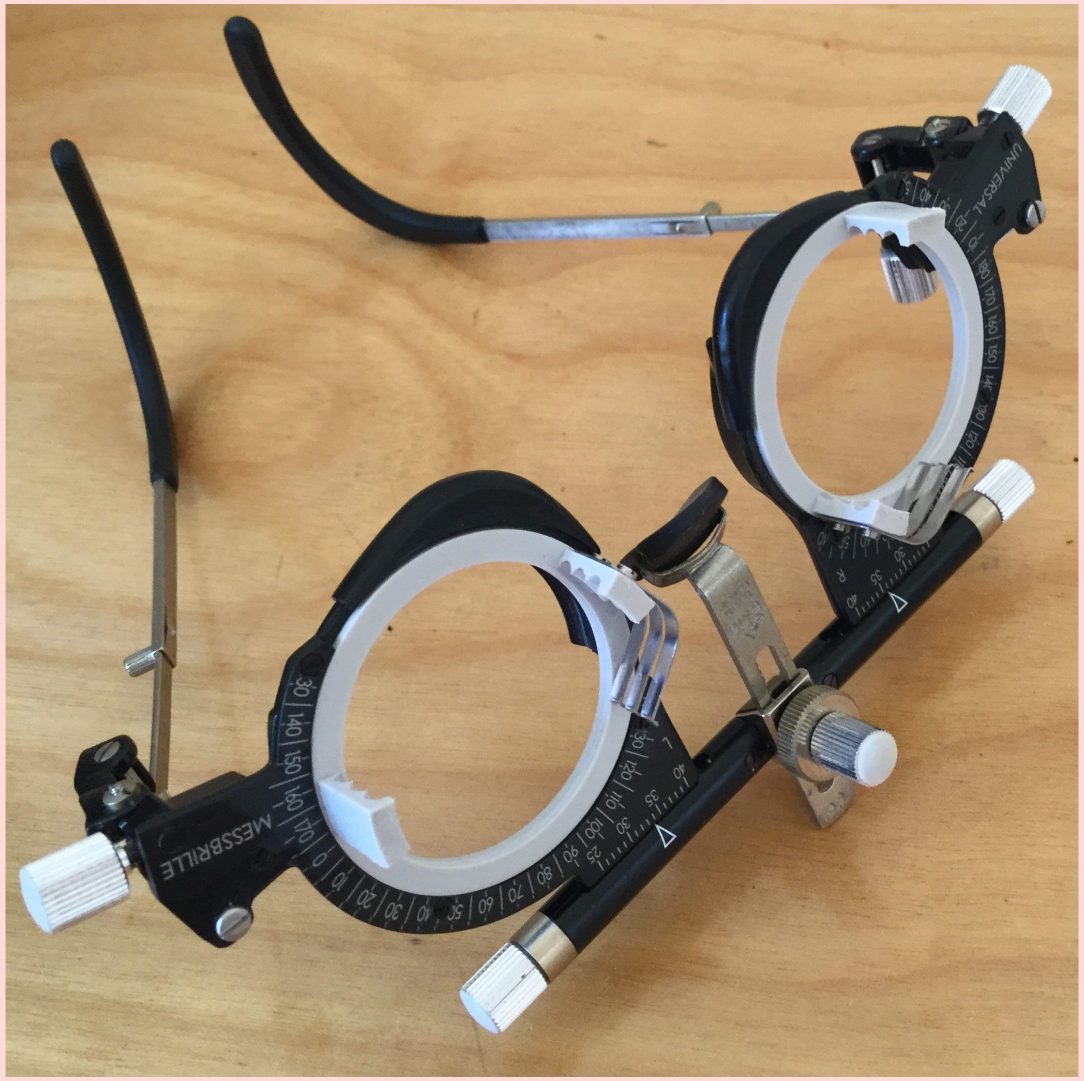
To keep things simple, it is always correct to simply express any acuity, distance or near, as the "M" font size legible at a specified distance, (in the distance units of your choice). The Feinbloom chart allows for this.

DISTANCE REFRACTION

In most such situations, distance refractions are performed with a phoropter, which is placed against the face, and is shaped like two saucers.

The phoropter contains hundreds of small test-lenses that are rotated in front of each eye to determine the preferred distance correction lens for each eye. However, each test lens has a small diameter, and is embedded in a dark tube within the instrument. This does not allow for eccentric fixation.

For that reason, distance refractions for low vision patients should be performed with the old-fashioned "trial frame," using larger diameter loose trial lenses.



THE FOLLOWING ARE EXAMPLES OF VARIOUS DISTANCE REFRACTION RESULTS, (WHICH MAY OR MAY NOT REPRESENT THE DISTANCE GLASSES PRESCRIBED):

Nearsighted distance prescription:
(Right eye) OD -2.00
(Left eye) OS -3.00
(Pupil distance) PD 60mm

Nearsighted distance prescription with astigmatism:
OD -2.00 +/-1.00 (axis)X 073
OS -3.00 +/-1.50 (axis)X 112
PD 62mm

Farsighted distance prescription:
OD +2.00
OS +3.00
PD 66mm

Farsighted distance prescription with astigmatism:
OD +2.00 +/-1.00 X 090
OS +3.00 +/-1.50 X 180
PD 72mm

It is rare, but possible, to be nearsighted in one axis, and farsighted in the other (90 degree rotated) axis. This "mixed astigmatism" condition is not of functional significance, in and of itself. It occurs when the astigmatism number, (the second number), is further from zero than the first, and has an opposite sign:

OD +2.00 -4.00 X 063
OS -3.00 +5.00 X 042
PD 64mm

FUNCTIONAL/MEDICAL SIGNIFICANCE OF THE DISTANCE PRESCRIPTION

Some distance prescriptions are functionally significant, (or even medically significant in the case of young children at risk for permanent "lazy eye"), and some are not. It is impossible to make this judgement based on the numbers alone. Therefore, it should be up to an optometrist or ophthalmologist to explain the functional/medical significance of a distance refraction. If that interpretation is difficult to obtain directly, any low vision optometrist should be able to provide it when given access to the eye record.

DISTANCE MAGNIFICATION

Distance acuities are generally measured with and without the best distance refraction. There may be times that unaided distance acuities are not functionally relevant. However, distance acuities with the best distance refraction are always functionally relevant, and must be recorded. The effects of distance magnification for each eye separately should be measured with the best distance refractions. If the astigmatism isn't functionally relevant, this can be accomplished with focusable distance monoculars. As distance magnification increases, it is normal for there to be diminishing returns on increased distance acuity. In other words, at some point, increasing optical distance magnification no longer significantly improves distance acuity.

2.5X focusable "ring" distance monocular

4X focusable distance monocular

6X focusable distance monocular

8X focusable distance monocular

WEARABLE DISTANCE MAGNIFICATION

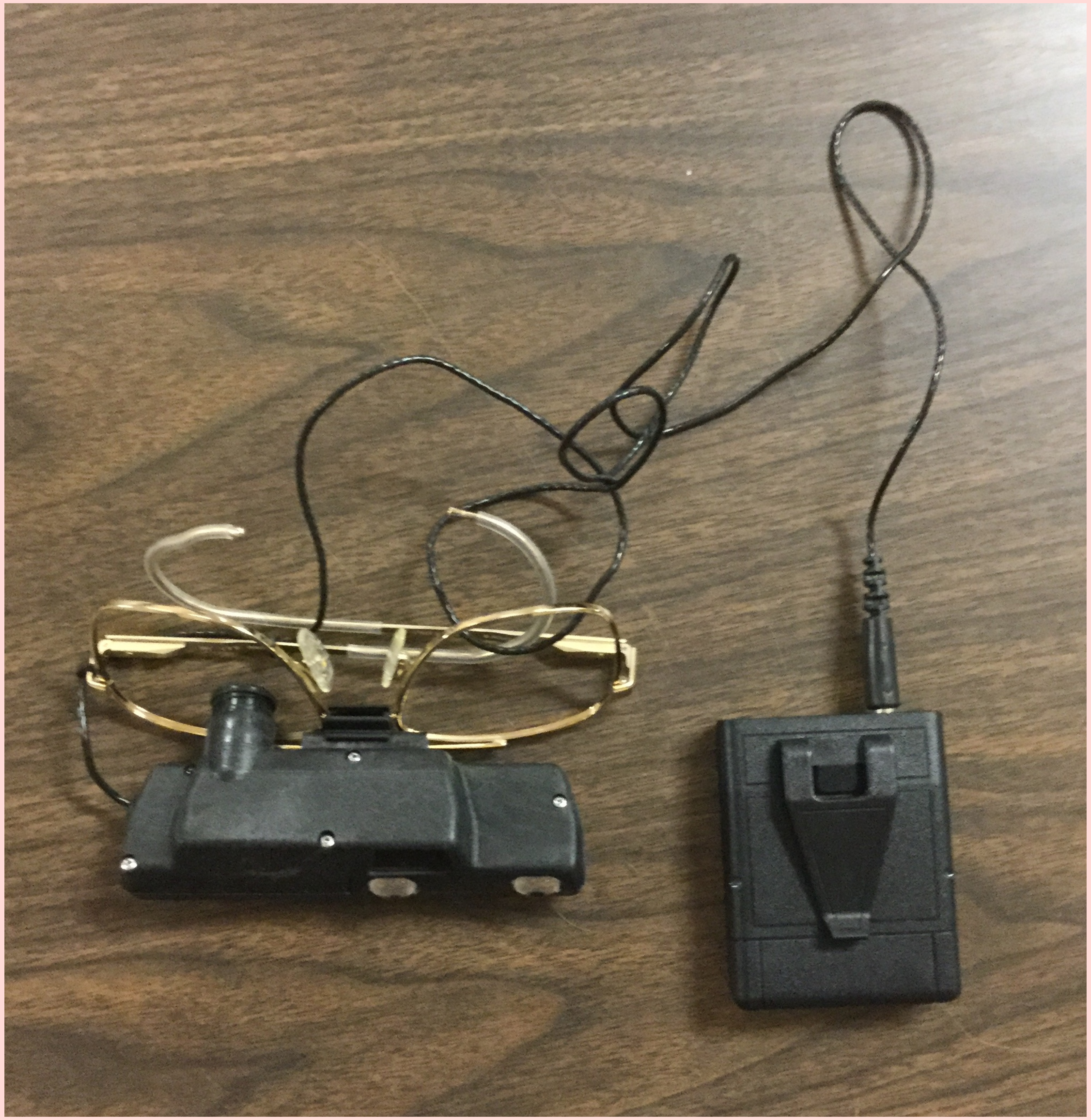
Distance magnification above 7X is not wearable, because the effects of head movements are also multiplied by 7X. The "Beecher 7X 30 degree field" bioptic system shown in the next photo provides the maximum wearable distance magnification with the maximum usable field. All other optical high magnification bioptic systems provide smaller fields with less contrast, and therefore less visual function.

The Beecher system provides magnification for either eye separately, and fits the monocular bioptic criteria because the patient looks above the line of sight to use the magnification. The Beecher system is usable as a driving bioptic where driving bioptics are legal. The following photo also shows its available +3, +4, and +5 reading caps, which optically move targets at 33cm, 25cm, and 20cm respectively to the distance, so that these objects can be seen by the Beecher system, which though focusable, is designed for viewing distant objects if no reading caps are used. Reading caps used with distance magnification produce an optical system known as tele-microscopes.

The Beecher System

Newer wearable electronic systems only provide advantages to those patients who require auditory input or contrast enhancement.

If an auto focus feature is required, the Ocutech 4X bioptic auto-focus system is the simplest to use. Because it is optical, it provides more natural vision than electronic head-borne magnification, and is usually preferred unless a patient requires auditory input or contrast enhancement.



GLARE

Glare not only reduces contrast, but it can also reduce comfort to varying degrees. In the community vision rehabilitation model, the optometrist relies on the vision rehabilitation professional to accurately report the effects of glare and lighting conditions in the patient's home, school, or workplace. Adverse glare and lighting conditions in these locations may have long ago been accepted as normal by the patient, and go unreported in an optometric office.

Vision rehabilitation requires a patient to first accept the visual impairment. Therefore, being given a means to understand that impairment can be immensely important. Metaphors representing the effects of glare can be helpful, especially when its effects vary day to day, or throughout the day. The common “snow globe” can illustrate the effect of glare that varies with time. The effect of “bugs on a windshield” can illustrate glare that is disproportionately worse with direct lighting. Fortunately, sometimes a patient only needs a *way* to understand their condition, in order to accept it.

The optometrist is often preoccupied with collecting numbers that can allow her or him to follow objective change year to year. A contrast sensitivity measurement is one of those numbers. However, unlike the best corrected distance acuity with refraction, the contrast sensitivity number *itself* does not give useful clues to the means of best alleviating symptoms. Therefore, contrast sensitivity testing is not mandatory within the community vision rehabilitation model. A sunwear evaluation with a full range of colors and transmissions in every relevant lighting situation is mandatory. Even optometrists contracted within a community vision rehabilitation model rarely take the time to do this. Therefore, vision rehabilitation professionals should perform full sun-wear evaluations routinely. Besides being comfortable, the frame should minimize light entering the eye from the sides and from above.

Glare is more often wavelength-dependent in those with vision impairments. The difference color makes can be drastic, and is unpredictable; especially in those with optic nerve disease. Again, a metaphor can be a useful way to illustrate an effect. The optic nerve can be presented as if it were a highway with separate lanes for separate colors. The effect of a tinted lens on visual function can be presented as if it simply allows visual information to avoid the blocked or damaged lanes. This is certainly not a scientific explanation, and obviously should not be presented as such. However, a patient often only wants a way to understand the *effects* of their condition, in order to better accept the means to alleviate it.

Optometric low vision residencies train optometrists to dispense relatively expensive specialty items such as bioptics, but also present a community health approach to maximize community functional vision improvements with the least complex and least expensive low vision aids. The community vision rehabilitation model extends this second function throughout a broad geographic area by contracting with general optometrists to perform low vision exams *guided by vision rehabilitation professionals in real time*.

These general optometric offices stock only diagnostic equipment intended to maximize community functional vision improvements with the least complex and least expensive low vision aids. The following is an example of a small diagnostic sunwear kit. The NoIR Universal ("U") frame fits most adults, and will fit over prescription glasses. The next photo presents relatively high transmission sunwear in the center and right columns. These can be used to determine color preference in the exam room. The photo also presents relatively low transmission gray sunwear in the left column. These can be used outdoors to determine if medium, dark, or extra-dark sunlenses are preferred.

CORRESPONDING NOIR NUMBERS

Extra-dark gray	U-23	Light-plum	U-88		
Dark-gray	U-22	Light-amber	U-48	Medium-topaz	U-47
Medium-gray	U-21	Light-gray	U-20	Light-green	U-38

The color preference determined in the exam room can be used when ordering outdoor sunwear.

Medium-plum	U-81	Dark-plum	U-80
Medium-amber	U-40	Dark-amber	U-43
Medium-green	U-30	Dark-green	U-33

When testing for outdoor sunwear with the gray trial sunlenses pictured previously, it may be wise to dispense additional darker or lighter sunwear, depending on outdoor testing conditions.

TWO COMMON NOIR CHILDREN'S FRAMES:

Medium (#KM):

Small (#14):

FOCUSED NEAR ACUITY

When comparing near low vision aids, it is important to make sure that the eye is focused with the spectacle add that corresponds to the image distance. For adults, this ensures that only focused images are compared. For children and young adults, this ensures that they are not required to strain their eyes during testing, which might result in the provision of low vision aids that require them to strain their eyes in order to use them.

The required spectacle add can be provided during testing only if the best distance refraction is determined first. The spectacle add is the plus lens power that is added to the distance refraction lens that corresponds to the target distance. For example:

Target distance	Spectacle add
50cm	(1/.50) = +2.00
40cm	(1/.40) = +2.50
33cm	(1/.33) = +3.00
25cm	(1/.25) = +4.00

NEAR MAGNIFICATION

There are two forms of near magnification:

1) Near magnification from a spectacle add allowing a closer viewing distance than 25cm, (the customary comparison).
2) True optical near magnification, which requires at least a two-lens system, (one of which can be the spectacle add, or ocular focusing).

True optical near magnification allows for a weaker spectacle add, and therefore a longer working distance. There are two forms of true optical near magnification:

1). A distance telescope with a “lens cap” in front that corresponds in power to the desired object viewing distance. This is called a tele-microscope, and a focusable distance telescope works in a similar way.

2). A stand magnifier. Stand magnifiers create enlarged targets at distances beyond the object.

For a complete discussion of near magnification and stand magnifier optics, consult:
Visibility; Vol. 12 Issue 1; "Stand Magnifier Optical Strategies.”

VISUAL FIELDS

1. “Confrontation” visual fields, or "finger counting" visual fields, are done one eye at a time since visual fields overlap. The person doing the testing holds her or his fingers half-way towards the patient at varying degrees away from the central line of eye contact.

2. “Walk-by” visual fields are often done by orientation and mobility instructors, or teachers of the blind and vision impaired, and are done in dynamic situations such as in the classroom or outdoors. This test is done with both eyes open, and is designed to determine peripheral functional fields.

3. There are many tests for central blind spots used by optometrists, but as for a functional approach, none is better than simply observing missed letter patterns on distance or near charts. Eccentric fixation training is no more complex than coaching a patient to habitually look towards their most functionally significant central blind spot.

4. Computerized visual fields generally measure the central 20 to 30 degrees of each eye's visual field separately. This is useful for following eye diseases that affect this portion of the visual field, such as glaucoma and neurological disease. However, rarely do computerized visual fields generate more functionally important information than simple low-tech visual field assessments that can be performed by vision rehabilitation professionals.

For questions of service eligibility or legal blindness, computerized visual field tests are of limited value without an interpretation by the doctor performing them. These tests provide for an almost limitless set of testing conditions. Therefore, what looks like a field loss might be only a slight depression in visual field sensitivity that is being followed for medical reasons by test settings that are too sensitive to be functionally relevant. Also, test result numbers associated with visual field sizes can change from day to day using the same test parameters, so that eye doctors rarely make decisions based on one computerized visual field test.

PRISMS

Following severe peripheral field loss, prisms placed on glasses above (and sometimes below) the line of sight can allow for less required peripheral scanning as the patient looks up or down into the prism. Before these are prescribed, however, a patient should have orientation and mobility training to determine whether such prisms are functionally necessary. If an optometrist outside a community vision rehabilitation model prescribes prism to make peripheral scanning easier in an office setting, safety when traveling should be verified by the patient's certified orientation and mobility specialist, (COMS).

Prisms are sometimes used to reduce the adverse effect of an altered sense of body orientation that can result from stroke or traumatic brain injury. These determinations are best provided by an occupational therapist working with an optometrist in a medical center devoted to recovery from stroke or traumatic brain injury.

In Conclusion

Vision rehabilitation professionals within a community vision rehabilitation model are members of a team that rely on each other‘s expertise. This orientation presentation was intended primarily to orient such professionals to the model in general, as well as familiarize them with what can be expected from a low vision exam performed by an optometrist contracted to work closely with them within the model.