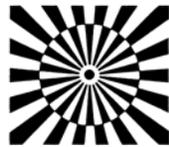


PREFERRED PRACTICE PATTERN®



**Vision
Rehabilitation
for Adults**

Prepared by the American Academy of
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Committee

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true medical excellence is achieved only when the patients' needs are the
foremost consideration.

All Preferred Practice Patterns are reviewed by their parent panel annually or
earlier if developments warrant and updated accordingly. To ensure that all
guidelines are current, each is valid for 5 years from the "approved by" date
unless superseded by a revision.



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INTRODUCTION

The Preferred Practice Pattern® (PPP) guidelines have been written on the basis of three principles.

- ◆ Each Preferred Practice Pattern should be clinically relevant and specific enough to provide useful information to practitioners.
- ◆ Each recommendation that is made should be given an explicit rating that shows its importance to the care process.
- ◆ Each recommendation should also be given an explicit rating that shows the strength of evidence that supports the recommendation and reflects the best evidence available.

In the process of revising this document, a detailed literature search of Medline and the Cochrane Library for articles in the English language was conducted on the subject of vision rehabilitation for the years 2000 to March 2007. The results were reviewed by the Vision Rehabilitation Committee and used to prepare the recommendations, which they rated in two ways.

The committee first rated each recommendation according to its importance to the care process. This “importance to the care process” rating represents care that the committee thought would improve the quality of the patient’s care in a meaningful way. The ratings of importance are divided into three levels.

- ◆ Level A, defined as most important
- ◆ Level B, defined as moderately important
- ◆ Level C, defined as relevant but not critical

The committee rated each recommendation on the strength of evidence in the available literature to support the recommendation made. The ratings of strength of evidence also are divided into three levels.

- ◆ Level I includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.
- ◆ Level II includes evidence obtained from the following:
 - ◆ Well-designed controlled trials without randomization
 - ◆ Well-designed cohort or case-control analytic studies, preferably from more than one center
 - ◆ Multiple-time series with or without the intervention
- ◆ Level III includes evidence obtained from one of the following:
 - ◆ Descriptive studies
 - ◆ Case reports
 - ◆ Reports of expert committees/organizations (e.g., PPP committee consensus with external peer review)

The evidence is that which supports the value of the recommendation as something that should be performed to improve the quality of care. The committee believes that it is important to make available the strength of the evidence underlying the recommendation. In this way, readers can appreciate the degree of importance the committee attached to each recommendation and they can understand what type of evidence supports the recommendation. When reviewing the literature for vision rehabilitation, the committee identified very little level I and level II evidence.

The ratings of importance and the ratings of strength of evidence are given in bracketed superscripts after each recommendation. For instance, “[A: II]” indicates a recommendation with high importance to clinical care [A], supported by sufficiently rigorous published evidence, though not by a randomized controlled trial [II].

The sections entitled “Orientation” and “Background” do not include recommendations; rather they are designed to educate and provide summary background information and rationale for the recommendations that are presented in the Care Process section.



ORIENTATION

ENTITY

Moderate to total impairment in visual acuity in the better eye or specific visual field loss. This includes patients with the following ICD-9-CM classifications:

- ◆ 369.0 Total, near-total, and profound visual impairment in better eye
 - ◆ 369.01 Better eye: total impairment; lesser eye: total impairment
 - ◆ 369.03 Better eye: near-total impairment; lesser eye: total impairment
 - ◆ 369.04 Better eye: near-total impairment; lesser eye: near-total impairment
 - ◆ 369.06 Better eye: profound impairment; lesser eye: total impairment
 - ◆ 369.07 Better eye: profound impairment; lesser eye: near-total impairment
 - ◆ 369.08 Better eye: profound impairment; lesser eye: profound impairment
- ◆ 369.1 Severe or moderate impairment in better eye
 - ◆ 369.12 Better eye: severe impairment; lesser eye: total impairment
 - ◆ 369.13 Better eye: severe impairment; lesser eye: near-total impairment
 - ◆ 369.14 Better eye: severe impairment; lesser eye: profound impairment
 - ◆ 369.16 Better eye: moderate impairment; lesser eye: total impairment
 - ◆ 369.17 Better eye: moderate impairment; lesser eye: near-total impairment
 - ◆ 369.18 Better eye: moderate impairment; lesser eye: profound impairment
- ◆ 369.2 Severe or moderate impairment in both eyes
 - ◆ 369.22 Better eye: severe impairment; lesser eye: severe impairment
 - ◆ 369.24 Better eye: moderate impairment; lesser eye: severe impairment
 - ◆ 369.25 Better eye: moderate impairment; lesser eye: moderate impairment
- ◆ 368.46 Homonymous bilateral field defects (blind spots in the right or left halves of the visual fields of both eyes: hemianopsia, quadrantanopia, altitudinal)
- ◆ 368.47 Heteronymous bilateral field defects (blind spots in opposite halves of the visual fields of both eyes: binasal, bitemporal)
- ◆ 368.41 Scotoma involving the central area (within 10 degrees of fixation)
- ◆ 368.45 Generalized contraction or constriction

The following definitions apply:

- ◆ Moderate visual impairment: best-corrected visual acuity is less than 20/60 (including 20/70) to 20/160
- ◆ Severe visual impairment: best-corrected visual acuity is less than 20/160 (including 20/200) to 20/400, or the visual field diameter is 20 degrees or less (largest field diameter for Goldmann isopter III4e, 3/100 white test object, or equivalent)
- ◆ Profound visual impairment: best-corrected visual acuity is less than 20/400 (including 20/500) to 20/1000, or the visual field diameter is 10 degrees or less (largest field diameter for Goldmann isopter III4e, 3/100 white test object, or equivalent)
- ◆ Near-total vision loss: best-corrected visual acuity is 20/1250 or less
- ◆ Total blindness is no light perception

DISEASE DEFINITION

Low vision is vision impairment that is not correctable by standard spectacles, medical treatment, or surgical treatment and that impacts patients' daily function. It may result from many different ocular and neurological disorders.

The ICD-9-CM definitions of low vision consider visual acuity and visual field. However, it should be emphasized that aspects of visual impairment other than acuity and field may be independent contributing factors to patient functioning^{1,2} and that even at levels of visual acuity better than 20/70 function can be significantly impacted. For example, contrast sensitivity loss, glare, scotomas, or field loss can interfere significantly with day-to-day tasks. An unrestricted driving license is threatened at visual acuities of 20/50 to 20/70 in many states. In addition, relatively good visual acuity may be a greater disability when it co-exists with other health

problems, such as when a patient with a hearing impairment requires good vision to be able to lip read.

Patients with severe, profound, near-total, or total vision impairment are classified as legally blind, which has traditionally determined disability benefits in the United States,³ qualification for extra dependent status for federal income tax purposes, and additional benefits that vary from state to state. The term legal blindness causes confusion, because patients with legal blindness can have partial vision and are candidates for low vision rehabilitation. There are many differences between blind rehabilitation using sight substitutes and low vision rehabilitation optimizing the use of residual vision. For rehabilitation services, the term blindness should be reserved for total vision loss.

PATIENT POPULATION DEFINITION

Although low vision can occur at any age, the prevalence of eye disease increases significantly with age. This document addresses primarily older adults.

ACTIVITY

Identification, evaluation, and rehabilitation of individuals with functional disabilities due to low vision in order to maximize quality of life.

PURPOSE

To reduce the functional impact of the vision loss on patients' lives to maintain independence, productive activity, safety, and life satisfaction.

GOALS

- ◆ Identify patients with low vision and quantify their visual loss
- ◆ Assess functional impairments due to low vision
- ◆ Evaluate the potential to use residual vision
- ◆ Educate patients about vision loss, the potential benefits of rehabilitation, and rehabilitation options
- ◆ Inform patients about the parameters of training and its potential benefit
- ◆ Engage patients in their rehabilitation
- ◆ Maximize patients' independent completion of activities of daily living, safety, and participation in their community
- ◆ Address the emotional and psychological adjustment to vision loss
- ◆ Provide information to patients about community and national resources and social supports



BACKGROUND

EPIDEMIOLOGY

The Eye Disease Prevalence Research Group estimated that 2.4 million Americans over the age of 40 had low vision (defined as visual acuity less than 20/40 in the better-seeing eye) in 2000 and that 937,000 had less than or equal to 20/200 visual acuity, which is classified as legal blindness. Therefore, 1 in 28 adults in the United States had low vision or blindness.⁴ Vision impairment disproportionately affects the elderly. Adults over the age of 80 account for almost 70% of individuals with severe vision impairment, yet they represent only 7.7% of the population.⁴

The aged sector of the population is rapidly expanding. It is estimated that approximately 3.5% of individuals over age 65 are candidates for low vision rehabilitation and that this age group is anticipated to increase from 33.2 million in 1994 to 80 million in 2050.⁵

The most common cause of low vision in the United States is age-related macular degeneration (AMD), which accounts for approximately half of the vision impairment.⁴ Other causes of low vision in the United States include glaucoma, diabetic retinopathy, and cataract. Current estimates are that more than 1.75 million Americans have AMD, and it is estimated that this will rise to 2.95

million by 2020 due to the aging of the population. At least one in every 10 persons over the age of 80 has advanced AMD.⁶

Acquired brain injury and neurological disease, including trauma, stroke, Parkinson disease, and tumors, are often associated with significant functional limitations that result from visual impairment and may be overlooked in the vision rehabilitation referral process.^{7,8} The vision rehabilitation specialist can play a vital supporting role for this group of patients.⁹

While some patients with low vision successfully minimize the impact of their vision loss without formal rehabilitation, most are unable to read standard print, unable to maintain their safety and independence in daily living activities, and require extensive assistance from family members or extended-care facilities.^{10,11} This leads to loss of productive activity and quality of life. Not all patients who may benefit from low vision rehabilitation access services.¹² Barriers to accessing low vision services include lack of awareness of services, lack of appreciation of what services provide, and lack of appreciation that one can benefit from available services.¹³

RATIONALE FOR TREATMENT

Vision impairment has a major impact on quality of life.¹⁴⁻²⁰ Individuals with vision impairment have twice the risk of falling and four times or more increased risk of sustaining a hip fracture.²¹⁻²³ Controlling for confounding variables, people with impaired vision are admitted to nursing homes three years earlier²⁴; make greater use of community services¹¹; have increased social isolation²; three times the prevalence of depression^{9,25-27}; and great difficulty reading, which causes problems in accessing information and errors in self-administering medications. Thus, vision impairment has an impact on healthy aging and social interaction.

Comprehensive vision rehabilitation enhances quality of life for patients whose function is compromised by vision loss by addressing the following:

- ◆ Reading
- ◆ Activities of daily living
- ◆ Safety
- ◆ Community participation
- ◆ Well-being

Recent systematic reviews of the vision rehabilitation literature support the provision of services to enhance patients' quality of life; key findings are listed below.

The Vision Rehabilitation Evidence-Based Review group²⁸ conducted a comprehensive search of the research literature and assessed study quality using the Downs and Black criteria²⁹ to assign levels and strength of evidence to the literature retrieved. The conclusions of the report include the following:

- ◆ “Despite weak evidence from one smaller study, there is moderately strong evidence that LVA [low vision aid] provision (optical aids) plus training is effective for individuals with AMD, diabetic retinopathy, glaucoma, optic atrophy, myopia, retinitis pigmentosa, and hemianopsia.”²⁸
- ◆ “Based on the results of two studies that included subjects with AMD, there is moderate evidence indicating that computer task accuracy and performance is linked with certain measures of visual function, icon sizes, and other graphical user-interface design considerations.”²⁸
- ◆ “Despite conflicting evidence from one previous and smaller study, there is strong evidence that prism spectacles [yoked prisms intended for the purpose of redirecting the image to avoid a scotoma] are no more effective than conventional glasses for individuals with AMD.”²⁸ The study did not consider level of compliance in wearing the prism glasses.³⁰
- ◆ “There is moderately strong evidence showing that there is no significant [additional] benefit to implementing an enhanced [device-focused] low vision rehabilitation program which incorporates home visits [exclusively directed towards using the optical device for spot reading] from a low vision rehabilitation specialist, as measured by vision and health-related outcomes (VCM1 and SF-36).”^{28,31}

A report by the U.S. Agency for Healthcare Research and Quality⁵ reviewed the recent literature relevant to vision rehabilitation and rated evidence strength and internal validity using standard criteria as proposed by the U.S. Preventive Services Task Force. It identified four systematic

reviews, four randomized controlled trials, two nonrandomized controlled studies, and seven before-after studies that met their criteria for inclusion. The review noted the following:

- ◆ “Group intervention improves patient outcomes.”^{5,32-34}
- ◆ “Although methodologically weak (using standard criteria as proposed by the U.S. Preventive Services Task Force 2001),³⁵ three studies suggest that individuals with low vision do benefit from exposure to comprehensive vision rehabilitation service.”^{5,36-38}
- ◆ “Studies with small sample sizes have shown that the prescription of optical devices and low vision aids improves reading performance.”^{5,39-42}

An evidence-based review of stroke rehabilitation⁴³ surveyed relevant literature and evaluated the methodological quality of each study using the Physiotherapy Evidence Databases Scale, developed by the Centre for Evidence-Based Physiotherapy in Australia. It reported the following findings:

- ◆ “There is strong evidence that treatment utilizing primarily enhanced visual scanning techniques improves visual neglect [of one side of the body] post-stroke with associated improvements in function.”⁴³
- ◆ “There is strong evidence that treatment with prisms is associated with an increase in visual perception scores in stroke patients with homonymous hemianopsia and visual neglect, but is not associated with improvement in activities of daily living scores.”⁴³
- ◆ “There is moderate evidence that monocular, opaque patching to improve neglect produces inconsistent results. However, there is also moderate evidence that the use of bilateral half-field eye patches improves visual neglect and functional ability.”⁴³
- ◆ “There is moderate evidence that computer-based visual scanning training does not remediate visual neglect.”⁴³

Other research has demonstrated the following:

- ◆ Patients have shown improvement on two subscales of the Inventory of Vision Impairment, reading and emotional well-being, 6 months after multidisciplinary vision rehabilitation²⁰
- ◆ Twelve hours of rehabilitation intervention as part of a two-center, randomized wait-list controlled trial when aids are provided at no cost has a positive effect on patient-perceived reading ability in a Veterans Administration patient population with visual acuity ranging from less than 20/100 to greater than 20/500 (severe visual impairment)⁴⁴
- ◆ Fall risk is best addressed using a multidisciplinary approach that includes vision and exercise⁴⁵
- ◆ Multifocal eyeglasses impair depth perception and edge-contrast sensitivity at critical distances for detecting obstacles and increase the risk of falls in older persons^{46,47}
- ◆ More than 25% of glaucoma patients with relatively minor binocular field loss experience severe restriction in mobility⁴⁸
- ◆ Even moderate vision loss decreases function and correlates with depression in up to 30% of patients.²⁶

These reviews of relevant, well-designed research demonstrate that there is increasing evidence that supports vision rehabilitation but acknowledge an overall current paucity of methodologically strong research.



CARE PROCESS

Vision rehabilitation trains patients to use their residual vision or alternate compensatory techniques effectively and to make practical adaptations in their environment to facilitate reading, activities of daily living, ensure safety, support participation in their community, and enhance emotional well-being. All ophthalmologists have a minimum responsibility to recommend vision rehabilitation as a continuum of their care and to provide information about rehabilitation resources for patients with vision loss that impacts function.^[A:III] Eight American Academy of Ophthalmology Preferred Practice Patterns (Comprehensive Adult Medical Eye Evaluation, Age-Related Macular Degeneration, Cataract in the Adult Eye, Bacterial Keratitis, Primary Angle Closure, Primary Open-Angle Glaucoma, Diabetic Retinopathy, and Idiopathic Macular Hole)

include recommendations for referral to vision rehabilitation when appropriate. A handout for patients created by the Academy's SmartSight Initiative in Vision Rehabilitation (see Appendix 1) is available on the Academy web site (<http://www.aao.org/smartsight>) and a patient education brochure on low vision is available from the Academy (<http://www.aao.org/store>). The role of the treating ophthalmologist is to evaluate and treat eye disease before referring a patient to vision rehabilitation. The treating ophthalmologist also will reassess a patient's condition periodically to prevent further vision loss because many conditions that result in low vision are progressive. Patients who report vision loss during the course of rehabilitation should be referred to the treating ophthalmologist for evaluation.^[A:III]

Because the largest group of patients requiring rehabilitation is over 65 years of age and Medicare patients are eligible for vision rehabilitation to improve functioning, the care process outlined in this document aims to be consistent with the Medicare Program Memorandum Transmittal AB-20-078, which outlines rehabilitation services that may be provided by a physician or an occupational therapist. The Center for Medicare and Medicaid Services (CMS) reimburses for occupational therapy training for patients with visual impairments under medical rehabilitation codes. A current CMS demonstration project is examining rehabilitation services provided by other vision rehabilitation professionals.

Many factors may influence the success of rehabilitation. Patients who are searching for a cure for their disease and a restoration of vision to "the way it was" may perceive rehabilitation as an intense disappointment and may present a difficult challenge to the therapist. Cultural factors may influence goals and expectations, and some patients may have limited financial resources to obtain aids. Many patients have other physical impairments that impact the rehabilitation process or enhance dependency. Hearing, mobility, and neurological deficits, for example, can alter the patient's ability to utilize some standard devices and to participate in some rehabilitation techniques. Patients with low endurance and limited energy may have difficulty participating fully in rehabilitation. It is important to realize that any of the above factors may contribute to a lower success rate in the rehabilitation process, but they do not constitute a rationale for denying a visually impaired patient the opportunity to participate.

The vision rehabilitation care process includes a history, a clinical evaluation of visual functions, an assessment of functional implications, recommendations for rehabilitation interventions, and patient education. Vision rehabilitation must be individualized to meet each patient's particular goals, limitations, and resources (e.g., age, finances to purchase devices, and caregivers) and must address reading, activities of daily living, safety, participation in the community, and well-being.^[A:III]

PATIENT OUTCOME CRITERIA

Patient outcome criteria for vision rehabilitation include the following:

- ◆ Minimized functional impairment
- ◆ Improved ability to complete activities of daily living
- ◆ Improved knowledge of available supports
- ◆ Improved psychosocial status and understanding of emotional and psychological adjustments to vision loss
- ◆ Improved quality of life

INITIAL EVALUATION

History

An initial history should include the following elements:

- ◆ A medical and ophthalmic history outlining the patient's understanding of the diagnosis, duration of vision loss, and symptoms of visual hallucinations (Charles Bonnet syndrome), falls, and depressed mood^[A:III]
- ◆ A functional history including difficulties with near, intermediate, and distant vision-related tasks; mobility; falls; fear of falling; driving; vocational and avocational activities; independence; and participation in community activities^[A:III]

A functional history may include, but not be limited to, the following questions:

- ◆ Problem areas and their significance to the patient:
 - ◆ How has your life changed since the onset of vision loss?
 - ◆ What bothers you most about your vision?
- ◆ Near and intermediate vision-related tasks:
 - ◆ Can you use a telephone and read your mail, directions, or medication labels?
 - ◆ How do you pay your bills and manage your checks?
 - ◆ Can you find what you want when you are shopping and count your money to pay for it?
 - ◆ Can you prepare meals?
 - ◆ Can you use your computer?
 - ◆ What magnifying devices do you use and for what purpose?
 - ◆ Can you distinguish people's faces?
- ◆ Distant-vision-related skills:
 - ◆ Can you see the TV?
 - ◆ Can you see traffic signals at intersections?
 - ◆ Can you see a car stopping in front of your house to pick you up?
 - ◆ Are you still driving?
- ◆ Mobility:
 - ◆ Do you miss steps or curbs, trip, or bump into things?
- ◆ Glare:
 - ◆ Are you bothered by glare?
- ◆ Participation in community activities:
 - ◆ How do you get to the store or the bank?
 - ◆ Does your vision affect job performance or your hobbies?

The history should also identify the patient's stated goals, priorities, and values.^[A:III] It should include a review of physical impairments relevant to rehabilitation (e.g., tremor, loss of hearing, cognitive deficit, and restricted mobility) and medications.^[A:III] The evaluation should also consider the patient's psychosocial history, including his or her living situation, supports, responsibilities, adjustment to vision loss, depression, and fear of the future, and a social history, which includes driving, vocational activities, and avocational activities. The patient may elect to have a friend or family member present during the evaluation process to confirm information and to serve as coach or helper.^[A:III]

Examination

A comprehensive adult medical eye evaluation⁴⁹ is conducted by the referring ophthalmologist before referring for the low vision evaluation. Elements of the ocular examination relevant to vision rehabilitation may be done as part of the vision rehabilitation care process.^[B:III] Specific elements included in a low vision evaluation are visual function, functional implications of visual impairment, and psychological status.

Evaluation of Visual Function

A review of relevant clinical notes, previous diagnosis, and previous ancillary testing such as retinal photographs or visual fields is helpful in evaluating visual function.^[A:III] Other components of the evaluation are the following:

- ◆ Visual acuity and refraction^[A:III]
- ◆ Contrast sensitivity^[A:III]
- ◆ Visual fields, scotomas, and preferred retinal loci^[A:III]

Visual Acuity and Refraction

In low-vision, precise measurements in the lower ranges of visual acuity are necessary to appreciate ocular function fully and to recommend devices and interventions.^[A:III] For people with visual acuity less than 20/100, the measurement range can be extended by using a portable test chart at a closer testing distance, such as 1 meter (3.3 feet), eliminating the "count fingers" notation. At 1 meter, the letters subtend an angle six times larger than at 6 meters (20 feet) and this

extends the measurable range by a factor of six. Distance visual acuity measurement is an angular measurement and, thus, 20/200 is equivalent to 1/10 or 2/20. When testing at 1 meter and using the M units, the denominator represents the theoretical diopters of add necessary for reading 1M print. This is known as Kestenbaum's rule (diopters needed = 1/VA).⁵⁰ When using the metric system, it is important to remember that the numerator of the fraction (indicating the test distance) must be expressed in meters and the denominator (indicating the letter size) must be expressed in M units.

For near visual acuity measurements, the reading add used, letter size, and reading distance should be specified, since near visual acuity will vary with the power of the reading add used.^[A:III] Much information can be gained by assessing the quality of the patient's continuous reading. Reading speeds with larger and smaller print and errors made when reading can confer information about central and paracentral fields. For example, missing the last letters in words may indicate a scotoma to the right of fixation, or difficulty with large print and more ease with smaller print can indicate a small central field. If the patient reads larger print better than smaller print, magnification is likely to restore effective reading. If the patient reads slowly at the largest sizes, reading may remain difficult even with high magnification. Continuous text charts are essential for this evaluation.

Clinical observations during visual acuity testing can be informative. Head turns, deviated gaze or searching eye, and head movements should be noted and may indicate that a patient is navigating around scotomas when reading the acuity chart and that an eccentric viewing location may not be well established. As patients shift fixation, measured visual acuity may vary. Difficulty identifying very large letters, with better performance in the middle-size range, may indicate a small central island of vision surrounded by a ring scotoma or a small residual central island in a patient with extensive peripheral field constriction.

Retinoscopy may be done in a phorometer or with loose lenses, with the prescription confirmed in a trial frame. Prescription for new eyeglasses is best delayed until completion of occupational therapy training, when the potential benefit of new eyeglasses can be reassessed, unless the refraction varies substantially from the current, e.g., by over 1.5 diopters.

Contrast Sensitivity

Contrast sensitivity testing is an important part of a low vision evaluation because it provides insight into patient function and assists in planning rehabilitation interventions.^{51 [A:II]} In visual acuity testing, targets are high-contrast dark letters against a white background. The only variable being tested is the size of the letter or the separation between the lines that make up the letter. However, the ability of the human visual system to resolve objects depends not only on the size or separation of the objects but also on the contrast or luminance difference between the object and its surround. In daily visual tasks, many targets do not have high contrast or sharp edges. Recognizing a face or light-colored foods on a white plate requires sensitivity to low-contrast targets. For example, patients with poor contrast sensitivity are at increased risk of missing steps and of falling.^{52,53}

Contrast sensitivity tests include the Pelli-Robson chart and the Mars Letter Contrast Sensitivity Test, which have letters of one size with decreasing contrast. Low-contrast acuity can be assessed with charts such as the Colenbrander Mixed Text Near Card.

Patients with severe contrast loss may require devices that supply high levels of contrast enhancement, such as an illuminated stand magnifier or a video magnifier. Video magnifiers may be particularly advantageous for some patients because they can produce reverse-contrast text (white letters on a black background).

Visual Fields, Scotomas, and Preferred Retinal Loci

Measurement of the visual field includes the peripheral field, the central field, scotoma characteristics, and location of the preferred retinal locus (PRL). The size, shape, and position of the central scotoma and the position of the PRL relative to the scotoma impact function, choice of device, and patient training. Assessment of the scotoma and PRL are therefore necessary for optimal rehabilitation.”

Peripheral field can be assessed with traditional field tests; however, inadequate or nonfoveal fixation limits the use of automated field assessment in vision rehabilitation to assess central field loss. Fixation behavior is difficult to ascertain or monitor if a traditional Tangent Screen is used to assess central field. Both fixation and central scotoma details can be precisely mapped using scanning laser ophthalmoscope macular perimetry that monitors fixation. This method has been the gold standard for central field assessment in vision rehabilitation research. A newer device (Micro Perimeter; Nidek Co., Ltd., Fremont, CA) for macular perimetry is also available. While not as sensitive as a scanning laser ophthalmoscope, a Fletcher Central Visual Field test on an 8.5-inch by 11-inch piece of paper and a laser pointer can provide valuable information to aid in eccentric viewing training and to educate patients about how to avoid their scotomas.

In comparison with the more accurate scanning laser ophthalmoscope macular perimetry test, the Fletcher Central Visual Field test will underestimate the number and size of scotomas that are actually present. The patient's fixation can be monitored during the testing if the test is held between the patient and the examiner, although clinically it is difficult to discern an eccentric viewing angle of less than 5 degrees. Any missed stimuli are significant, and areas of inconsistent response often represent small scotomas that are moving over the area of the retina being tested. It is important to remember that scotomas move with movement of the eye. One centimeter on the report form corresponds to 1 degree when a 57-centimeter test distance is used.

It is often appropriate to move immediately from testing for scotomas to educating the patient about the presence of scotomas. It is useful to explain how the principles of perceptual completion and visual closure result in the patient not being aware of field defects. Even though the page looks white and complete to the patient, it effectively has areas that are missing. The patient's knowledge of the presence of scotomas facilitates effective compensation.⁵⁴ Patients can also be trained to locate scotomas with central confrontation fields using single-letter targets mounted on flash cards used to outline the position and size of the scotoma and identify the clearest alternate spot.⁵⁵ Observing obscured and clear areas on a clock face or human face may also identify scotomas, although this is possibly less precise than letter flash cards. The Worth 4-dot test can be used to confirm which eye is perceiving centrally presented stimuli under binocular conditions.

Assessment of Functional Implications

The low vision evaluation includes an assessment of the functional implications that correspond with the patient's visual function and eye condition. This includes overall visual impairment with respect to distance and near acuity, contrast sensitivity, and visual field and other relevant physical or cognitive impairments.^[A:III] Assessing functional implications should include consideration of the following:^[A:III]

- ◆ Risk of medication errors, label misidentification/product misuse, diabetic mismanagement, nutritional compromise
- ◆ Risk of injury from accidents, including falls, cuts, burns, fractures, or head injuries
- ◆ Risk of errors in financial management and/or writing/recordkeeping errors
- ◆ Risk of social isolation, depression, or economic hardship
- ◆ Potential to benefit from rehabilitation training

Assessment of Psychological Status

The patient's psychological status is important to assess. Factors to consider include:

- ◆ Motivation, responsibilities, and supports^[A:III]
- ◆ Mood, affect, depression, and adjustment to vision loss (Geriatric Depression Scale, Depression, Anxiety and Stress Scale, or other screening question may be used)^[A:III]
- ◆ Cognitive ability^[A:III]
- ◆ Stamina, energy, and activity level^[A:III]

REHABILITATION INTERVENTIONS AND DEVICES

It is important for patients to be aware of the large array of options and alternatives for rehabilitation, because more than one device may be appropriate for a given task and different tasks may require different devices. In general, objects at near can be enlarged or magnified for

viewing at a closer distance. Objects at distance can be enlarged by moving closer or by viewing them with a telescopic device. Visual acuity levels offer some prediction of the power of an add that will be required; however, this estimation will be modified by varying levels of contrast sensitivity and central field disruptions. Video magnification is very commonly used and is an excellent means to achieve both magnification and contrast enhancement. Audio and tactile alternatives can be useful. The clinician can guide a patient's optical and nonoptical options, but each patient will make his or her individual selection. Once the patient can use a device in the clinical setting, it is essential to provide training to insure confidence and successful use in the patient's environment. The rehabilitation team should provide continued opportunities for training and reinforcement, as appropriate, to accomplish sustained success with rehabilitation interventions and devices and must offer hope to patients whose lives have been significantly affected by vision loss.^[A:III]

The effectiveness, ergonomics, and appropriateness of the following interventions and devices should be considered and the patient response to each should be noted:^[A:III]

- ◆ Spectacles, including high plus reading eyeglasses
- ◆ Handheld magnifiers
- ◆ Stand magnifiers
- ◆ Video magnifiers
- ◆ Telescopic devices⁵⁶
- ◆ Lighting
- ◆ Glare control
- ◆ Magnification
- ◆ Nonoptical aids, including lighting, contrast enhancement, daily living aids, glare control, large print, and signature templates
- ◆ Sight substitutes such as audio books, talking watches, tactile markers, Braille
- ◆ Computer adaptations using magnification and audio output
- ◆ Support cane or long cane for safe mobility

When considering recommendations for low vision rehabilitation, the clinician and patient should discuss the following topics:^[A:III]

- ◆ Potential for rehabilitation interventions
- ◆ Training, including eccentric fixation, scotoma avoidance, and practical adaptations in activities of daily living
- ◆ Mobility instruction and fall prevention
- ◆ Driving and transportation alternatives
- ◆ Charles Bonnet visual hallucinations
- ◆ Home safety and adaptations
- ◆ Family concerns
- ◆ Support groups and counseling
- ◆ Community state programs and other local, national, and online resources

Rehabilitation professionals and staff are facilitators who can provide continued encouragement and support in addition to training and recommendations, but the patient must be an active participant and actually do the work to ensure success and sustained benefit.^[A:III]

Scotoma Identification and Eccentric Fixation Training

Patients with central scotomas may benefit from the efficient use of an alternate, "next-best," spot on the retina. While some patients find the PRL and use it spontaneously, many require training in scotoma awareness and training to develop steady fixation with a PRL.⁵⁷ Clinicians use scanning laser ophthalmoscope perimetry or methods described earlier to map scotomas. Once the patient understands the position of the scotoma and the PRL, reading rehabilitation and line-and-figure tracing are used to train the patient to maintain steady fixation and scan effectively with the PRL to enhance both reading performance and eye-hand coordination with the eccentric PRL. Occasionally, patients use more than one locus, depending on the task being performed.⁵⁸

The location of a scotoma relative to fixation is important.^{59,60} Scotomas to the right of fixation may obscure the end of words or impact saccades required for reading, whereas scotomas to the left of fixation more often impede finding the beginning of the next line of print. Scotomas positioned above or below the PRL may impact reading columns of numbers, for example, or navigating a page of text.

There is potential for confusion between the terminology of vision rehabilitation and the various terms for addressing reading difficulties of normally sighted children. In the latter, the terms vision therapy, visual training, visual therapy, or vision training are used. These activities are not the same as training to use a PRL in vision rehabilitation. The Academy has published a statement about vision therapy for learning disabilities.⁶¹ This subject is not related to training conducted in vision rehabilitation for partially sighted individuals to learn eccentric fixation and to develop steady fixation with alternate areas of retina when they fovea is diseased.

Safety

Home safety assessment is important to ensure that older low-vision patients adapt their living environment to optimize safety and function. It is important to ensure safety, including the ability to self-administer medication, dial emergency help, and use knives and stove elements safely. Fall prevention can be addressed by encouraging physical exercise in addition to environmental modifications and by avoiding bifocal eyeglasses.⁶²

Driving

Driving requires a blend of visual, cognitive, and motor functions.⁶³ The ophthalmologist has a role in formally assessing visual function in drivers; in discussing findings, driving restrictions, driving cessation, or driving alternatives with patients; and in reporting according to state requirements outlined in the American Medical Association's (AMA) Physician's Guide to Assessing and Counseling Older Drivers.⁶⁴ Further evaluation and adaptive training with a driver rehabilitation specialist may be appropriate for some patients. Patients who are not eligible to drive may benefit from referral to transportation alternatives. Driving retirement can be associated with depression and social isolation, each of which may require intervention. The AMA Physician's Guide lists the requirements for drivers' licenses in each state, which vary considerably.

PATIENT EDUCATION AND SUPPORT

Patient Well-Being

The evaluation and assessment in vision rehabilitation is framed by the patient's individual goals, skills, and responses to aids and concludes with a comprehensive discussion.⁵⁴ The psychological factors that should be discussed include independence, importance of activity, family interactions, communication, patient attitudes, patient concerns (e.g., fear of blindness), and patient questions, which may include questions about legal blindness, driving status, or how to prevent further vision loss.⁶⁵ ^[A:III] Patients with any amount of vision loss often experience fear, frustration, and anger. Even moderate vision loss decreases function, and loss of functional ability directly correlates with depression in up to one-third of patients.²⁶ Many communities and organizations offer support groups for people who are discouraged and frustrated by their vision loss to provide them with positive role models of successful rehabilitation and help them realize that they are not alone. Professional assessment should be recommended for patients who report severe change in mood.^[A:III]

Internists, family practice physicians, and geriatricians should be informed that when vision loss is not reversible, a patient with vision loss is at high risk for depression.^[A:III]

Family members are often very appreciative of education to avoid misunderstanding the nature of the vision loss and can, in addition, be positive team players in a rehabilitation process.⁶⁶

Charles Bonnet Hallucinations

Patients with any level of vision impairment may also experience recurrent hallucinations of Charles Bonnet syndrome (CBS) in which they see images of objects that are not real. Distinguishing features of CBS are the pleasant nature of the images and the individual's recognition that they are not real. Patients who have CBS should be reassured that this phantom vision is common in visually impaired people and occurs in up to one-third of patients with visual acuity, contrast sensitivity, or visual field loss.^{67,68}

Atypical features that should raise suspicion of a diagnosis other than CBS and require a neuropsychiatric evaluation for accurate diagnosis include increasing frequency of hallucinations, lack of insight into the unreal nature of the images in spite of an explanation of CBS, or other associated neurological signs or symptoms.

Other Resources

Many patients will benefit from referral to or information about community resources, including services for seniors or people with disabilities, transportation alternatives, radio or telephone reading services for newspapers and magazines, free dialing services from telephone companies, large-size high-contrast personalized checks from most banks, large-print bills, large-print newspapers, shopping assistance, sources for voice-activated cell phones, state agencies serving the legally blind that may provide home visits to mark appliance dials, and national services, including the Library of Congress Talking Books Program available to anyone unable to read standard print. National organizations, Internet resources, self-help books, sources for large-print materials, and other resources are listed in the SmartSight Handout (see Appendix 1).

PROVIDERS

The physician makes a referral, as indicated, for evaluation and rehabilitation training by an occupational therapist. The referral indicates the diagnosis, level of impairment, statement of need for rehabilitation, functional problems, recommendations for therapeutic activities, techniques and devices; assessment of the patient's potential to benefit from rehabilitation; and a statement of the expected duration of treatment. Occupational therapists or other professionals use therapeutic activities, environmental modifications, and compensatory strategies that may incorporate the use of adaptive and optical devices to enable persons with vision impairment and other disabilities to complete daily living activities in the home and community.⁶⁹ Other professionals include low vision therapists, orientation and mobility specialists, technology instructors, rehabilitation therapists (formerly teachers of the blind), social workers, psychologists, and nurses. A multidisciplinary team approach is recommended to effectively address the functional and psychological problems caused by vision loss.^[A:III] The physician is the team leader and directs the rehabilitation program, and the patient is an active participant in the rehabilitation process.^[A:III]

ACADEMY SMARTSIGHT™ MODEL OF VISION REHABILITATION

The rehabilitative needs of patients vary considerably. The setting, level of care, and disciplines required depend on the complexity of the functional problems, psychosocial status, and personal attributes. The Academy outlines a spectrum of clinical care in its SmartSight Initiative three-level model of vision rehabilitation (<http://www.aaopt.org/smartsight>).⁷⁰ The most important part of the SmartSight model is Level 1, which asks all ophthalmologists seeing patients with less than 20/40 acuity, contrast sensitivity loss, scotoma, or field loss to Recognize and Respond. They should Recognize the functional impact of partial vision loss and Respond by assuring the patient that much can be done to improve their function and giving them the SmartSight Handout rather than letting the patient assume that nothing more can be done. (See Appendix 2.)

SmartSight Level 2 asks comprehensive ophthalmologists to provide assistance at early levels of impairment when visual acuity may be near normal but when visual function is affected by scotoma or contrast sensitivity loss. This can be done quickly and easily by providing accurate refraction, increased spectacle adds, separate single-vision reading glasses, supplemental lighting, low-power magnifiers, and other simple devices that can often solve patients' problems. (See Appendix 2.)

SmartSight Level 3 model is used when vision loss is at a moderate level and scotomas are more symptomatic and more extensive evaluation and training by an ophthalmologist with expertise in low vision may be required to assess scotoma patterns and to provide more complex devices with higher magnification and more comprehensive resources. (See Appendix 3.) Optimal services for many Level 3 patients and for those with severe vision loss include the multidisciplinary assessment and interventions of occupational therapists and, in cases of significant field loss, orientation and mobility specialists.



APPENDIX 1: SMARTSIGHT™ INITIATIVE IN VISION REHABILITATION – HANDOUT FOR PATIENTS AND FAMILIES

SMARTSIGHT™ MAKING THE MOST OF REMAINING VISION

Is it difficult to read newspapers and price tags, set dials, or manage glare? If so, SmartSight can help, with tips about lighting, contrast, and the tools, techniques and resources of vision rehabilitation. Losing vision does not mean giving up your activities, but it does mean applying new ways of doing them.

Patterns of Vision and Vision Loss

- ◆ **Central vision** is the detailed vision we use when we look directly at something. Macular degeneration (AMD) affects central vision. Diabetic retinopathy can affect central or peripheral vision.
- ◆ **Peripheral vision** is the less detailed vision we use to see everything around the edges. Glaucoma affects peripheral vision first. Strokes can affect one side of the peripheral vision.
- ◆ **Contrast sensitivity** is the ability to distinguish between objects of similar tones like coffee in a black cup or facial features. All eye problems can decrease contrast sensitivity.
- ◆ **Depth perception** is the ability to judge the position of objects. New vision loss in one eye can affect depth perception.
- ◆ **Visual processing:** The lens in our eye, like a camera lens, focuses the image onto the retina, like camera film. Our optic nerve carries those images to our brain, which “develops” them. Impairments in each of these affect our vision differently.

The Experience of Vision Loss

It is always a shock to learn that your vision loss is irreversible. It is important to acknowledge the anger and frustration you may feel, to get help working through these feelings, and to apply the strategies of vision rehabilitation to stay active. Doing all of these will help you avoid depression, which may appear as fatigue or lack of interest. If depression occurs, address it with treatment and counseling. A good support group can help you recognize that your value to yourself and others does not depend on your vision and that you are worth the effort it takes to make the most of the vision you have.

The Phantom Visions of Charles Bonnet Syndrome (CBS)

About 20 to 30 percent of people with vision loss see lifelike images they know are not real. This is called Charles Bonnet Syndrome and it is not a loss of mental capacity, but just part of vision loss for some.

Making the Most of Remaining Vision

Finding and Using Your “Next-Best Spot”: Scotomas and PRLs

When the center of your vision is obscured by a blind spot (scotoma), it is helpful to locate your “next best spot” (the Preferred Retinal Locus, PRL). To find your PRL, imagine that the object you want to see is in the center of a large clock face. Move your eyes along the clock numbers and notice when you see the center object most clearly. Use that same viewing direction for other objects.

Making Things Brighter

- ◆ **Improve lighting.** Use a gooseneck lamp directed onto your task. Carry a penlight.
- ◆ **Reduce glare.** Indoors, cover wood tables and shiny counters; wear yellow clip-on or fitover glasses. Outdoors, try dark yellow or amber glasses. Visors can be useful indoors or out.

- ◆ *Increase contrast.* Use a black ink gel or felt pen, not a ballpoint. Draw a dark line where you need to sign. Use a white cup for coffee, for example.

Making Things Bigger

- ◆ *Move closer.* Sit close to the TV, and up front at performances.
- ◆ *Enlarge.* Get large checks, large-print playing cards, bingo cards, crosswords, phone dials, TV remotes, calendars, keyboards, and books.
- ◆ *Magnify.* Magnifiers come in many powers and types, suited to different people and different tasks: hand-held for price tags and menus, stands and video magnifiers (CCTVs or closed circuit TVs) for sentences, magnifying computer mouse.

Organizing

Designate spots for the items in your refrigerator, and for your keys and wallet. Minimize clutter. Separate black clothes from blue.

Labeling

Mark thermostats and dials with high contrast markers from a fabric store; label medications with markers or rubber bands; safety-pin the labels of similar-colored clothing.

Substituting: Let's Hear it for Ears!

Get books and magazines on tape free on loan, also talking watches, clocks, calculators, glucometers, and computers. Use reading services. (See Resources.)

Participating

Don't isolate yourself. Keep your social group, volunteer job, or golf game. It might require lighting, large print cards, a magnifier, a ride, or someone to watch your ball. Ask for the help you need. There is nothing independent about staying home to avoid asking for help.

Driving

Pick your times and map routes carefully. Consider yellow or amber sunglasses for glare. Ask yourself: Do cars appear unexpectedly? Do drivers honk at you? Are you having fender-benders? If "yes," consider the following transportation alternatives.

Transportation Alternatives: Creative Solutions

Hire a driver, share your car, arrange for a taxi, buy gas for a friend who drives, use senior and public transit systems. Try a three-wheel bike or battery-powered scooter at walking speed. Walk if you are able. Set the pace for your peers by using these alternatives now. The future will offer even more solutions.

For Family and Friends

Your loved one with vision loss needs to be empowered to do as much as possible independently. Recognize the challenge of vision loss, but don't take over their tasks. Instead, help identify the adjustments they need to make to maximize their independence.

Vision Rehabilitation

A low vision evaluation and rehabilitation training can help you make the most of your vision. To locate services near you, contact VisionConnection (see Resources). Ask if services include:

- ◆ A low vision evaluation by an ophthalmologist or optometrist
- ◆ Prescription for devices. Are some devices loaned before purchase, or returnable?
- ◆ Rehabilitation training: reading, writing, shopping, cooking, lighting and glare control?
- ◆ Home assessment? Mobility? Resources and support groups?
- ◆ Are services free, billed to Medicare or other insurances? If not, what is the charge? (Note: Medicare covers most services, but not devices.)

Resources

Books and magazines on tape loaned by mail free; tape player provided:

- ◆ U.S. National Library Service: 800-424-8567, <http://www.loc.gov/nls>
- ◆ In Canada: Canadian National Institute for the Blind Library: 800-268-8818, <http://www.cnib.ca>

Books and magazines on tape, to keep, free:

- ◆ American Printing House for the Blind: 800-223-1839, <http://www.aph.org>
- ◆ Choice Magazines (bimonthly articles, unabridged): 888-724-6423

Large print books and checks:

- ◆ Books on loan by mail, free: National Association for Visually Handicapped (NAVH): 212-889-3141, <http://www.navh.org>
- ◆ Large print checks and registers (from your bank or check catalog)

Large print materials – crosswords, bingo cards, address books, calendars:

- ◆ National Association for Visually Handicapped (NAVH): 212-889-3141, <http://www.navh.org>
- ◆ Optelec: <http://www.shoplowvision.com>
- ◆ Eschenbach: <http://www.eschenbach.com>
- ◆ LS&S: 800-468-4789, <http://www.lssgroup.com>
- ◆ MaxiAids: 800-522-6294, <http://www.maxiaids.com>
- ◆ Independent Living Aids: 800-537-2118, <http://www.independentliving.com>
- ◆ New York Times Large Print Weekly: <http://homedelivery.nytimes.com>

Computer enlargement:

- ◆ Accessibility features built into your computer
- ◆ Magnifying mouse: Microsoft, <http://www.microsoft.com>
- ◆ Magnification software: Ai Squared, <http://www.aisquared.com>

National organizations, for support, information, and research updates:

- ◆ AMD Alliance International: <http://www.amdalliance.org>
- ◆ American Foundation for the Blind's "Senior Site": <http://www.afb.org/seniorsitehome.asp>
- ◆ Are You Aware?: <http://www.visionaware.org>
- ◆ Association for Macular Diseases: 212-605-3719, <http://www.macula.org>
- ◆ Macular Degeneration Partnership: 888-430-9898, <http://www.amd.org>
- ◆ MD Support: <http://www.mdsupport.org>. Also video: *Learning to Live with Low Vision*
- ◆ National Eye Health Education Program of National Institutes of Health: <http://www.nei.nih.gov>. Offers free materials (e.g., *What You Should Know About Low Vision*, also in Spanish)
- ◆ National Federation of the Blind: <http://www.nfb.org>. News by phone, 866-504-7300

Vision Rehabilitation Self Help Books:

- ◆ *Making Life More Livable*, M. Duffy, NY: American Foundation for the Blind, 2001; 800-232-3044
- ◆ *Macular Degeneration: The Complete Guide to Saving and Maximizing Your Sight*, L. Mogk, MD, & M. Mogk, PhD, NY: Ballantine 2003; available in bookstores and at <http://www.amazon.com>
- ◆ *The First Year – Age-Related Macular Degeneration*, D. Roberts, NY: Marlowe 2006; available in bookstores and at <http://www.amazon.com>
- ◆ *Overcoming Macular Degeneration: A Guide to Seeing Beyond the Clouds*, S. Solomon, MD, & J. Solomon, NY: Avon 2000; available in bookstores and at <http://www.amazon.com>

To Locate Vision Rehabilitation Professionals and Services:

- ◆ **Veterans:** U.S. Department of Veterans Affairs: 877-222-8387, <http://www.va.gov/blindrehab>
- ◆ **Everyone:** Contact SmartSight's partner, VisionConnection, for directory of services at <http://www.visionconnection.org>. In the "Help Near You" section, search under both "low vision services" and "vision rehabilitation," or call 800-829-0500. Also <http://www.afb.org>. Ask the questions listed under Vision Rehabilitation above, and ask them also when making an appointment for services.

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APPENDIX 2: SMARTSIGHT™ INITIATIVE IN VISION REHABILITATION – LEVEL 1 AND LEVEL 2

SMARTSIGHT™ MAKING THE MOST OF REMAINING VISION

Academy Initiative in Vision Rehabilitation

For use with all patients <20/40 or with scotoma, field loss or contrast loss

Level 1 Guide for All Ophthalmologists: *Recognize and Respond*

- ◆ **Recognize** the great impact on patients' lives of even a little vision loss.
- ◆ **Respond** by assuring patients they can live fully in spite of vision loss, and give them the information to do so, provided by the American Academy of Ophthalmology.

Refer for low vision/vision rehabilitation services, as available. You may direct patients to <http://www.visionconnection.org> or 800-829-0500.

Level 2 Guide for Comprehensive Ophthalmologists: *Add Record – Refract – Rx – Report*

Recognize and Respond plus:

- ◆ **Record precise visual acuity**, to 20/1600 with easy, inexpensive charts. “Count fingers” does not distinguish among acuities with very different functional implications and incorrectly implies no useful vision. See chart sources below.
- ◆ **Refract.** Retinoscope with a phorometer or loose lenses in dark room with short working distance for accurate results. Manifest in trial frame to allow viewing around scotoma.
- ◆ **Rx: Adds to +5** allow many with 20/50 to 20/100 to read, with closer focal distance. Separate readers or clip-ons may be preferred. Upper clip-ons for computer use or for those with inferior scotomas. See sources below.

Direct lighting. A gooseneck lamp alone allows many to read, sew, etc. See sources below.

Filters for glare. Yellow, orange, amber, plum, gray per patient preference in fitovers, wraparounds and clip-ons, polarized optional. Visor or brimmed hat. See sources below.

Level 3 evaluation and training when the above does not suffice for reading and activities of daily living (ADLs).

- ◆ **Report to patients' primary care providers.** Central vision loss is invisible to others. Patients' primary care providers need to know that their vision loss is permanent and increases risk for medication mix-ups, falls, isolation and depression, and that Charles Bonnet Syndrome, visual hallucinations in the visually impaired, relates to low vision not cognition.

Sources:

Charts for Distance and Near Acuity	Source
Colenbrander Low Vision Chart (inexpensive, foldable, 1 meter)	http://www.precision-vision.com
ETDRS	http://www.precision-vision.com
Lighthouse near charts, individual letters, and continuous print	http://www.precision-vision.com http://www.shoplowvision.com

Reading Glasses/ Clip-on Adds	Source
Clip-on flip-up adds, one-half lens upper or lower +1 to +4 in one-half D steps	Walters, 800-992-5837
Prism half-eyes ready-made +4 to +6	http://www.shoplowvision.com

Gooseneck Lamps and Bulbs	Source
45-65W indoor floodlight bulb, chromolux bulb, or white light	Hardware stores, fabric stores
OTT-Lite; Brandt lamp with 50W halogen bulb	http://www.shoplowvision.com

Filters	Source
Fitovers	NOIR, 800-521-9746
Solar Shield Ultra	Eschenbach, 800-487-5389
Solarshield	http://www.shoplowvision.com
Clip-ons: Sunshields (flip-up)	http://www.shoplowvision.com
Corning lenses (yellow, orange, amber)	Eschenbach, 800-487-5389

More detailed information on the American Academy of Ophthalmology web site at <http://www.aaopt.org/smartsight>.

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APPENDIX 3: SMARTSIGHT™ INITIATIVE IN VISION REHABILITATION – LEVEL 3

SMARTSIGHT™ MAKING THE MOST OF REMAINING VISION

Academy Initiative in Vision Rehabilitation Level 3 Guide for Academic Programs and Large Group Practices

COMPREHENSIVE VISION REHABILITATION:

Low Vision Evaluation and Rehabilitation Training

Comprehensive vision rehabilitation addresses:

- ◆ Reading
- ◆ Activities of daily living
- ◆ Safety
- ◆ Community participation
- ◆ Physical, psychosocial, and cognitive well-being

It includes, but is not limited to, optical and nonoptical adaptive devices.

PART 1: LOW VISION EVALUATION

History

- ◆ Medical and ophthalmic history
- ◆ Functional history

Identify the patient's needs and goals. Consider functional communication; nutritional issues, including shopping and meal preparation; financial management; medication management; self-care; near tasks; distance tasks; history of falls, accidents, and injuries; mobility; driving and transportation.

Assessment of Physical and Psychosocial Well-Being

Note living situation, responsibilities, and supports. Assess for depression and psychosocial adjustment.

Visual Acuity and Refraction

- ◆ Record distance, near, and continuous reading acuity. To read continuous print without fatigue, one must be able to read two or three lines smaller than the desired text size. Precise individual letter acuity to 20/1600 and reading acuity may be assessed with the charts listed in the Appendix.
- ◆ Retinoscopy may be done in a phorometer or with loose lenses, with Rx confirmed in trial frame. Prescription for new eyeglasses is best delayed until completion of occupational therapy training, when the potential benefit of new eyeglasses can be reassessed, unless the refraction varies substantially from the current, e.g., by over 1.5 diopters.

Contrast Sensitivity

Loss of contrast sensitivity impacts function greatly. There is no current standard of measurement, although the FDA is in the process of developing one. Awareness of contrast sensitivity offers insight into functional problems and potential solutions.

Central Field: Scotoma and Preferred Retinal Locus (PRL)

The size, shape and position of the central scotoma and the position of the PRL relative to the scotoma impact function, choice of device, and patient training. Assessment of the scotoma and PRL is therefore necessary for optimal rehabilitation.

State of the art technology for this assessment includes the following:

- ◆ Scanning Laser Ophthalmoscope (SLO), Fourward Technologies. Most accurate, limited supply until new model available
- ◆ MP-1 Microperimeter, Nidek, Inc.

Less precise methods, also applicable to patient training, are listed in the appendix.

Peripheral Field

Map peripheral field, as indicated, with manual or automated perimetry or confrontation field. Mapping should extend to 140 degrees or more.

Magnification Requirements, Tolerance for Devices, and Application of Devices to Desired Tasks

Power and type of device may vary widely even with identical acuities depending on contrast sensitivity, scotoma/PRL pattern, and the patient's physical attributes and needs. Poor contrast with fair acuity may suggest a brightfield magnifier for desk use, for example, a small PRL surrounded by scotoma may necessitate a screen reader, a tremor or upper limb paresis may preclude the use of a handheld device.

Non-optical Devices

Assess application of the range of non-optical devices.

Counseling and Advice

Counsel and advise the patient and family regarding:

- ◆ The disease process and its functional implications
- ◆ Charles Bonnet Syndrome: Phantom vision associated with visual impairment
- ◆ Minimizing risk: nutritional supplementation, smoking cessation, diet, exposures
- ◆ Fall prevention. Pamphlet available from Center for Disease Control
- ◆ Adjustment to vision loss: Risk of depression with vision loss, association of depression with loss of function, importance of maximizing function.
- ◆ Referral for support group, peer counseling, and/or professional counseling
- ◆ Introduction to local and national resources, for example community transportation and radio reading services, Library of Congress talking books.
- ◆ Introduction of Veterans to VA Vision Rehabilitation Services

Referral to PCP or Psychiatry as indicated.

Order for Rehabilitation Training

The physician's order for Medicare-reimbursed occupational therapy rehabilitation training should include: primary code (impairment), secondary code (disease causing impairment), the patient's need for rehabilitation and potential to benefit, the therapy ordered, frequency and duration of treatment, and safety concerns. The order is good for one month. If therapy extends beyond one month, a new order must be written based on the therapist's monthly progress report, which the physician reviews and signs.

PART 2: REHABILITATION TRAINING

Occupational Therapy Assessment

Rehabilitation begins with the therapist's assessment of the patient's current level of function with respect to desired and necessary tasks, consideration of contributing physical, cognitive,

psychosocial and environmental factors, and setting of clear, achievable therapy goals with the patient.

Rehabilitation Training

Rehabilitation training may include any or all of the following:

- ◆ Scotoma awareness and efficient use of the PRL in the presence of a central scotoma. Efficient use of the PRL may decrease magnification requirements.
- ◆ Scotoma awareness in the presence of peripheral field loss
- ◆ Visual motor skills including scanning, tracing, tracking and target localization
- ◆ Visual perceptual skills: visual closure, part-to-whole relationships, visual perspective, for patients with CVA-related visual impairment, for example
- ◆ Reading and writing techniques and training
- ◆ Performance of activities of daily living with or without optical devices
- ◆ Application of optical devices to specific tasks, care of devices
- ◆ Application of non-optical devices to specific tasks
- ◆ Adaptations to the environment to enhance function and safety: lighting, contrast, organization, labeling, glare control, hazard removal, and other safety measures
- ◆ Workplace assessments and adaptations
- ◆ Use of adaptive computers: enlargement, speech output
- ◆ Safe mobility in home and community: use of support canes, glare filters, and monoculars for orientation and spotting. [Long cane training is done by Certified Orientation and Mobility Specialists (COMS)]
- ◆ Recreational and avocational activities assessment and training
- ◆ Application of local and national resources and services
- ◆ Caregiver support and training
- ◆ Driver evaluation and training (not reimbursable)
- ◆ Counseling (reimbursable when performed by social worker or psychologist)
- ◆ Support groups (not reimbursable)
- ◆ Referral to further services as indicated, for example the Veteran's Administration Visual Impairment Services Team (VIST), Orientation and Mobility Training if not included in program, to other rehabilitation services, e.g. for balance or hearing, to physician for referral to psychology or psychiatry, to a support group, or to community service agencies, e.g. Area Agency on Aging

LEVEL 3 APPENDIX

A. Documentation and Coding

(Please see the Academy Coding Manual for Vision Rehabilitation, Suggested Reading #3, for further details)

◆ Low Vision Evaluation

- (1) Consultation Codes 97741-44. Visual impairment code is primary, disease code is secondary, as consultation is for the impairment, not the disease. May bill by time if half of time is spent counseling and advising patient. Documentation must include a letter to the referring physician. Some HMOs preclude optometrists from using consultation codes.
- (2) Evaluation and Management Codes: 99201-05. Visual impairment code is primary, disease code is secondary. May bill by time if half of time is spent counseling and advising patient.

The correlation between the low vision evaluation and Consultation Codes and Evaluation and Management Codes with respect to complexity, decision-making, and risk is currently being compiled.

◆ Central and Peripheral Fields

Visual field codes: 92081-3

SLO: both fundus photo and field codes may be used

◆ **Rehabilitation Training**

This is standard for all medical rehabilitation for any impairment. Occupational therapists are familiar with regulations and process. Treatment Codes listed below must be accompanied by visual impairment code and a disease code. Precise documentation is critical, as set forth in the Academy’s *Coding Manual for Vision Rehabilitation*, Suggested Reading #3.

◆ **Rehabilitation Codes**

Rehabilitation Activity	Codes (in 15-minute “units”)
Scotoma/PRL training	97530 or 97533
Scanning for peripheral loss	97530 or 97533
Activities of daily living: reading, writing, self-care, household tasks	97535
Environmental adaptations: lighting, increasing contrast, labeling, glare control, fall prevention	97535
Community integration: shopping, counting money, participation, community resources, transportation alternatives	97537

◆ **Reimbursement for Rehabilitation Training**

The May, 2002, CMS Program Memorandum for Visual Rehabilitation (PM) precludes regional carriers from automatic denial of reimbursement and if denied the PM is useful on appeal. Practically, the PM has resulted in national coverage by Medicare of rehabilitation training for visual impairments within the medical system. Reimbursement is restricted to occupational therapists or physicians.

A five-year CMS Demonstration Project began in 2006 in six areas of the country to assess the impact of adding three groups of non-medical vision rehabilitation professionals as providers of Medicare-reimbursed vision rehabilitation services: Certified Low Vision Therapists, Certified Vision Rehabilitation Therapists (formerly Rehabilitation Teachers), and Certified Orientation and Mobility Specialists. The CMS Demonstration areas are Kansas, New Hampshire, North Carolina, Washington State, Atlanta, GA, and New York City.

B. Charts and Sources

◆ **Distance Acuity Charts**

- Colenbrander Low Vision Chart (1 meter)
- EDTRS (letters, E’s, symbols, #s)
- Requires illuminated chart box

◆ **Near Acuity Charts**

- Lighthouse Individual Letter Chart
- Lighthouse Continuous Text Charts (adult and child)
- LEA Symbol screener (preverbal)
- Patti Pics

◆ **Contrast Sensitivity Charts**

- Colenbrander Mixed Contrast Reading Card
- Pelli-Robson Chart
- Mars Contrast Sensitivity Test, available from <http://www.marsperceptrix.com>

◆ **Sources**

- <http://www.precision-vision.com>
- <http://www.shoplowvision.com>

C. Other Methods for Central Field Testing/Training

- ◆ Fletcher Central Field Test: laser pointer method, from <http://www.shoplowvision.com>
- ◆ Flashcard method: Patient fixates on examiner’s nose, reads single-letter flashcards held at surrounding locations. Suggested Reading #14, Ch. 11

- ◆ Clock or face method: Patient fixates on examiners nose, or center of clock face, reports blurred and clearest areas
- ◆ Macular Mapping Test: computer method: Software package, Smith-Kettlewell, e-mail: mm@ski.org
- ◆ Fundus Photography method. Suggested Reading #18

D. Tests for Reading, Quality of Life, Depression, Cognition

- ◆ Reading: MNRead, Pepper Test
- ◆ Quality of Life: NEI Visual Function Questionnaire 25 (NEI VFQ-25), Inventory of Visual Impairment (IVI)
- ◆ Depression: Geriatric Depression Scale (GDS), 15 and 30 question forms
- ◆ Cognitive Status: Mini-mental Evaluation (adapted for low vision, with verbal cues)

E. Suggested Reading

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Eye Fact Sheet

Visual Impairment, Visual Disability and Legal Blindness (2004)

Ophthalmology Monograph

Fletcher, DC. Low Vision Rehabilitation: Caring for the Whole Person. Ophthalmology Monograph 12, 1999

Patient Education Brochure

Low Vision (2007)

To order any of these materials, please call the Academy's Customer Service number, 866.561.8558 (US only) or 415.561.8540 or visit <http://www.ao.org/store>.



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