Functional Considerations in Evaluation and Treatment of the Client With Low Vision

Jessica Lampert, Deborah J. Lapolice

Key Words: low vision • rehabilitation

In evaluating and treating clients who have low vision, the occupational therapist must consider factors in addition to typical measures of the client's visual acuity, field loss, and oculomotor control. It is important to consider the functional implications of the client's ocular pathology, including illumination needs, contrast sensitivity, sensitivity to glare, and need for magnification as well as environmental factors such as the amount of pattern in a visual task, the amount of lighting and contrast available, and the conditions under which the task is performed. These factors are all relevant to occupational therapy low vision rehabilitation because each may influence the way in which a client uses his or her residual vision and achieves successful adaptation. This article provides an overview of these factors and presents a suggested protocol for evaluation of the client with low vision.

The term low vision is used to designate visual deficits of varying degrees and etiologies that interfere with daily function "even when the best optical correction (using regular lenses) is used" (Mehr & Fried, 1975, no page number available). Persons who have low vision have some amount of usable vision, but their visual functioning is impaired and interferes with their ability to carry out desired tasks (Fletcher, 1993). Low vision may affect people across the life span. Common causes of low vision in elderly persons include macular degeneration, glaucoma, and diabetic retinopathy (Fletcher, 1993; Nelson, 1987). Some causes of low vision in children include congenital cataracts, optic nerve hypoplasia, retinopathy of prematurity, congenital glaucoma, and trauma (Erin, Fazzi, Gordon, & Isenberg, 1992).

Services for persons who have low vision are available through two primary systems: (a) traditional blindness and low vision service programs (rehabilitation or education systems) and (b) the medical health care system. Funding sources for programs within the traditional blindness and low vision system include federal, state, and charitable organization monies (Fletcher, 1993). Comprehensive services within this system require the involvement of a variety of professionals including optometrists specializing in low vision, orientation and mobility specialists, low vision trainers, rehabilitation teachers, certified teachers of persons with visual impairments, and others, all of whom are specially trained to address needs directly related to vision loss (Quillman, 1993; Weisse, 1989).

The involvement of the medical health care system in providing rehabilitation services to persons with vision loss is relatively new. Traditionally, this system limited itself to addressing a patient's ocular health, which was managed by physicians. Patients with additional needs, when these needs have been recognized, either have been referred to service providers outside the medical system (to the traditional blindness and low vision system) for instruction in independent living skills or have not been referred for any services at all (Fletcher, 1993; Greenblatt, 1988, 1991). Coverage by Medicare for occupational therapy services for persons with primary vision loss has been available only since 1990, when the Health Care Financing Administration's definition of physical disability was expanded to include visual impairment (Code of Federal Regulations, 1994).

Occupational therapists are educated preprofessionally to address needs resulting from neuromotor and cognitive dysfunction, and during recent years their involvement with impaired visual function has been primarily with visual perceptual disorders that have their bases in neurological dysfunction. This background and approach may not include understanding and consideration of factors related to ocular pathology or environmental conditions that affect a patient's use of vision in functional tasks. As a result, needs of occupational therapy patients
directly related to vision loss may be attributed to other causes, may not be recognized, or may be inadequately addressed.

Current Approaches

Current occupational therapy approaches to evaluation of and intervention for visual dysfunction focus on visual perception deficits associated with traumatic brain injury or cerebral vascular accident (Abreu, 1985; Kaplan & Hier, 1982; Neistadt, 1988; Warren, 1993). However, some accounts, descriptions, and suggestions for occupational therapy with "traditional" patients with low vision (those whose visual impairment is the primary disability and most often due to ocular pathology rather than deficits in processing information) have appeared in the literature (Bennett, 1989; Cristarella, 1977; Reichley, 1988.) Occupational therapy models for evaluation of and intervention for this population have not yet been developed and tested.

Needs

Intervention in the area of low vision requires a specific body of knowledge and skill. Areas that require special study include basic optics, functional implications of ocular pathologies, types of optical devices and technology available and how to use them, intervention techniques to maximize functional vision, psychosocial issues of low vision, and availability of community resources (Faye, 1984; Quillman, 1993).

Typical clinical measures of visual skills (acuity and field and oculomotor control) provide only basic information about a patient's vision and may not provide information about the way in which a patient actually uses this vision or factors that may influence the use of vision (Corn, 1986; Fletcher, 1993; Warren, 1993). There may be little correlation between acuity and performance in functional tasks (Corn, 1986). Two patients with the same visual acuity, field, and cognitive and physical ability may function entirely differently. One may be completely independent, whereas the other may be incapacitated. In providing low vision rehabilitation services, the occupational therapist must address issues in addition to acuity, visual field, and oculomotor control that may influence the patient's function in day-to-day tasks.

Occupational Therapy Evaluation

As with evaluation and intervention for any patient population, the therapist must first be aware of substantial factors that may affect or influence the patient's function for complete low vision rehabilitation. Functional implications of the condition (contrast sensitivity, field, sensitivity to light, need for magnification) as well as the patient's motivation and the patient's perceived degree of impairment or interference from the visual condition must be addressed. These are areas that may be addressed by typical clinical measures but here have a different emphasis. Environmental factors include the type and amount of lighting present in a visual task, the amount of contrast in a visual task, the amount of movement present in a visual scene, the pattern or clutter present in the background of a visual target, the length of time involved in a visual task, and expectations by others that the visual task will or will not be accomplished. Minimally, occupational therapy evaluation should include information gathered in all of these areas.

Functional Implications of Eye Conditions

Acuity and need for magnification. Acuity refers to the sharpness of vision. Measures of acuity compare the patient's performance under optimal conditions to a standard. Most therapists are familiar with the commonly used Snellen notation (such as 20/20, 20/200). In Snellen notation, the numerator indicates the distance at which an item was seen. The denominator indicates the distance at which a person with standard vision could see the same line (Colenbrander & Fletcher, 1992a). For example, an acuity of 20/200 with both eyes means that the patient could see at 20 ft. what a person with standard vision could see at 200 ft. Although measures of acuity are important in providing information about at what distances a patient may see objects of various sizes under optimal conditions, it is important to recognize that most daily activities do not occur under optimal conditions (Colenbrander & Fletcher, 1992b; Warren, 1993).

When traditional eyeglasses do not permit the achievement of a desired visual task, the ophthalmologist or optometrist determines the amount of magnification a patient needs, if any, and often suggests the method of magnification and type of magnifier or optical device to be used. There are methods of producing magnification other than the use of lenses, including video magnification (closed circuit television), enlarging the size of the target (use of large print), and moving closer to the visual target (sitting close to a television or chalkboard). The devices or methods of magnification are chosen on the basis of the task for which they will be used. For instance, a 10 × pocket magnifier may be useful for reading price tags but would not be efficient for reading continuous text in a newspaper article. Stronger is not always better. The therapist should be aware that the higher the power of a magnifier, the smaller the field of view and the shorter the working distance it provides. For instance, a 1.5 × magnifier may allow a patient to see several words in several lines on a page at one time at a distance of approximately 14 in., whereas a 12 × magnifier may allow the patient to see only a portion of a word at 1 in. Additionally, increasing the power of the device decreases the contrast and increases the need for light. It is important for therapists to
working in low vision rehabilitation to familiarize themselves with the many types of devices and their uses, advantages, and disadvantages (Colenbrander & Fletcher, 1992b).

**Contrast sensitivity function.** Most acuity charts assess the ability to function with high contrast only. However, most daily visual tasks require contrast discrimination (the ability to detect varying levels of contrast) (Owsley, Sekuler, & Seimens, 1983; Warren, 1993). A person may have measurable visual acuity of 20/40 (considered adequate for most tasks) yet still have difficulty with performing daily tasks if he or she has decreased contrast sensitivity or problems with contrast discrimination (Pitman & Yolton, 1986). Contrast sensitivity testing may be carried out by the physician or therapist and involves presenting a series of samples of varying spatial frequencies or Snellen letters at different levels of intensity until a threshold is determined. In general, patients with decreased contrast performance (frequently those with central scotomas) will require increased contrast or lighting or both in the environment to enhance visual function. Functional tasks that may be difficult include detecting curbs that are not marked, detecting ramps or distinguishing stairs from ramps, locating a white towel on a white bedspread or counter, or reading gray print on newsprint paper (Warren & Lampert, 1994).

**Field loss and sensitivity to light and glare.** Patients require varying degrees of illumination. The amount of light needed is influenced by a patient's eye condition. For instance, patients with central and pericentral scotomata may experience functional difficulties in reading, recognition of people, and scanning (Plas, Fletcher, & Schuchard, 1995; Fletcher, Schuchard, Livingstone, Crane, & Hu, 1994). They may require high levels of illumination for optimal function (Fletcher et al., 1994), whereas patients with glaucoma are often sensitive to light and glare (Jose, 1983) and may experience difficulty with tasks requiring peripheral vision and adaptation to changing light conditions. Because of the variability of the need for light and the relationship of this need to the patient's eye condition and the task at hand, it is important to develop familiarity with the needs and functional difficulties often associated with a patient's ocular pathology and to evaluate the patient's performance during functional tasks.

**Environmental Factors**

**Type and amount of light present in a visual task.** Usually the challenge in providing adequate lighting is to provide optimal illumination without producing glare. Methods of increasing light on a task include bringing the light closer to the task, adding more lights, and changing the background of the task so that contrast is increased (for example, with a solid white or light-colored placemat under a dark mug) (Watson & Berg, 1983). Many low vision specialists recommend that for near tasks the light used be placed on the side of the best eye or opposite the working hand. This placement is a guide, however, and individual needs may vary. For home lighting, choices for light sources (in addition to sunlight, which may or may not be available) include incandescent bulbs, fluorescent bulbs or tubes, and halogen bulbs. Because halogen lights tend to produce bright but diffuse light (decreasing glare), they are often the light of choice. Fluorescent lights are often useful and are preferred by some patients, although older bulbs may produce a strobing effect (Carter, 1983) that may be distracting or annoying to some. Incandescent bulbs may require high wattage to produce the same brightness as halogen lights of lower wattage. Often increasing the wattage of incandescent bulbs additionally increases glare (Carter, 1983). In practice, illumination preferences and needs are highly individual, and patient report is the best guide. Light meter readings may be taken so that preferred illumination levels can be reproduced accurately. It should be kept in mind, however, that vision and visual needs may fluctuate from day to day. The therapist should be aware of glare control techniques while evaluating and treating the patient. Glare control techniques include positioning the patient, light sources, or the task to minimize glare (for example, placing one's back to the light source often reduces the effect of glare), using nonreflective background surfaces, using filters, increasing contrast (for example, using a typoscope to help read a line of print), or any combination of these methods (Watson & Berg, 1983).

**Amount of contrast in a visual task.** Different visual targets have varying amounts of contrast. Because contrast can be manipulated to enhance visual function, the therapist must be aware of the contrast present in visual tasks. For instance, it may be difficult for a patient to locate an off-white electrical outlet against a white wall. Outlining the outlet with black or other dark-colored electrical tape may facilitate this activity. Similarly, a patient may have difficulty pouring coffee into a dark mug; providing a white or light mug for this purpose may enable the patient to complete the task without spills (Warren & Lampert, 1994).

**Amount of movement in a visual task.** The difficulty of functional tasks often changes according to the circumstances in which they occur. Carrying out a visual task in a stationary environment is generally easier than carrying out the same task in a moving environment (Nilsson, 1990; Warren & Lampert, 1994). For instance, a patient may be able to locate, recognize, and avoid obstacles such as furniture in a clinic; however, the same patient may experience collisions while walking in a crowded grocery store. Function within a stationary environment may be enhanced by the use of an organized scanning technique. Although systematic scanning may be useful in a moving environment, the patient must be able to track moving objects and anticipate their paths to function effectively.
Pattern and clutter present in a visual task: The number of objects and the amount of visual clutter (visual images that are present but do not provide relevant information) may affect the ability of a patient to locate and recognize information. Examples of everyday tasks in which visual clutter and pattern may be a factor include locating a specific brand or flavor of soup on a store shelf, locating a fork or knife on a striped or floral tablecloth, or determining a price on a tag that contains inventory numbers and product information. Training may be necessary to help the patient recognize relevant visual information when clutter is present. Additionally, compensations and modifications may be taught and used where they are practical. For example, a solid-color placemat may be used on top of the floral tablecloth for the patient's eating space if the floral tablecloth cannot be eliminated (Warren & Lampert, 1994).

Length of time involved in a visual task: The amount of time a patient has to complete a task may affect his or her function. A patient may require extra time to process or make sense of the incomplete or distorted visual information he or she is receiving (Corn, 1983). Additionally, tasks requiring extended visual attention (such as reading a chapter in a novel) may be problematic because the patient may experience a fading effect or wash out after several minutes of sustained close work (this experience is common with patients who have glaucoma). The therapist must keep these possibilities in mind when assessing a patient's performance on any task.

Expectations of others: A person with low vision is often in a unique social position in which he or she is not able to see as a person with normal sight yet has usable vision (Quillman, 1993; Welsh, 1980). This person may be suspected of malingering by family members as well as friends and acquaintances if he or she acknowledges both visual impairment and the presence of vision ("Why can he see some things but not all things?" "How can he be able to see a crumb of bread on the table but not recognize me when I come to pick her up in my car?" "Why does he need a white cane if he can see the traffic lights and cars?"). The patient may be suspected of being in denial if he or she attempts to function as a fully sighted person without obvious adaptation (D. C. Fletcher, personal communication, January 1995). Everyone may experience increased stress if roles are changed or disrupted or if economic changes (cessation or change of work) occur due to the visual impairment (Moore, 1984; Ringer, 1993; Youngblood & Hines, 1992). Additionally, family members' perceptions of what a person who is blind or visually impaired should be like and should do may influence the way the patient functions and the activities in which he or she chooses to engage (Welsh, 1980).

Suggested Protocol for Evaluation

An example of a protocol that may be helpful in ensuring that relevant information is collected during evaluation is provided below. This should be considered a starting point only. As the therapist becomes more experienced in observing influencing factors, he or she may find that information organized in a different way may be more useful in a particular setting. Additionally, although the process has been separated into distinct steps below for clarity, in practice elements of each step are likely to flow into each other.

Step 1: Background Information

Step 1 includes gathering background information such as the patient's condition, approximate onset date (if the patient experienced vision loss several years ago, what has caused him or her to seek assistance now?), medical history, visual acuity, current lens correction if any, contrast sensitivity scores, field losses (location and size of central scotoma and peripheral field losses), optical devices used if any, and new optical devices prescribed. This information may be obtained from medical records, ophthalmologist and optometrist reports, and patient interview.

Step 2: Screening

Step 2 involves investigation of functional difficulties experienced by the patient and the patient's desired outcome of low vision rehabilitation. Through interview, the therapist can begin to evaluate the functional impact of the vision loss on day-to-day activities. All areas of daily living should be addressed. It may be necessary to ask directed questions about specific areas and indicate that problems are not unusual in these areas, because some patients may be reluctant to volunteer this information (e.g., questions may be structured with phrases such as "Many people with your eye condition find locating food on a plate difficult; is this a problem for you?").

Step 3: Evaluation

Step 3 involves observation and evaluation of the patient's use of vision in functional activities. When it has been determined that a patient finds a particular area of daily living difficult, the therapist can gather more information about how the person uses his or her vision (e.g., is the patient aware of any blind spots; is he or she able to efficiently achieve and maintain an eye or material position that allows consistent clarity?), the specific task, how it is carried out, factors contributing to difficulty, factors that may contribute to success, and areas in which compensations beyond environmental manipulations (changing contrast, amount of lighting, pattern, size, placement,
and so forth) may be needed. Compensations beyond environmental manipulations may include training in use of visual efficiency skills and alternative viewing techniques (such as eccentric viewing), use of nonoptical adaptive equipment (such as a visor for glare control), or use of optical devices prescribed by a physician. Objective assessments such as the Pepper Visual Skills for Reading Test (Watson, Baldesare, & Whittaker, 1990) or MNread (Legge, Ross, & Luebker, 1989) are often helpful in determining how a person uses vision during reading and identifying skills that may require attention.

Step 4: Planning

On the basis of the information gathered, goals and objectives are developed with the patient as they would be for any patient population. A sample format is provided in the Appendix. In the accompanying explanation, short phrases and lists are included in places for clarification and as reminders.

Collaborative Efforts

Collaborative efforts with other disciplines and professionals are important to ensure identification of all of a patient’s needs and to promote the development of a comprehensive intervention program. In evaluation, collaboration helps provide information about all aspects of the patient's visual functioning. In treatment, it ensures that all functional needs are met (Greenblatt, 1991; Weisse, 1989).

Therapists must become familiar with the services available in their geographic areas and refer to these services when the needs presented or solutions required are beyond the therapist’s knowledge and skill base. For example, if a therapist is unfamiliar with optical devices or functional compensations for vision loss, it will be ineffective for that therapist to attempt to evaluate and train the patient in the use of such devices. Referral to other disciplines such as orientation and mobility specialists and rehabilitation teachers may be an appropriate method of ensuring intervention effectiveness and meeting patient needs.

Summary

Low vision rehabilitation as a distinct practice area within occupational therapy is not well developed. There is no science of low vision within our profession. Consideration of factors that influence a patient’s performance in functional tasks can promote the development of an effective model for intervention in this area as we work to provide a basis for it through research and study.

Appendix

Sample Format

Client Name: Date:

Diagnosis and Date of Onset:
Best Corrected Acuity: _____ OD (right eye) _____ OS (left eye)

Visual Field. Describe location and size of scotomata and available fields; indicate best eye position for functional vision.

Reported Areas of Difficulty: Briefly list areas client has identified as problems or goals (for example, reading bills or newspapers, meal preparation, or “client would like to be able to play golf”).

Visual Skills: Describe materials used and distances at which skills were carried out (for example, 2M single black letter on white background at 14 cm). Describe the lighting conditions under which tasks were carried out. Note the client’s awareness of and ability to locate best eye position or to position material in usable area efficiently, ability to maintain fixation long enough to recognize visual targets, ability to shift gaze from one visual target to another and among several targets (letters in a line of print, for example) accurately and while maintaining clarity, scanning patterns (does client view systematically to gain relevant information, or does the client search for a target randomly?), and pursuits (can the client maintain a clear image while tracking a moving target?).

Activities of Daily Living: Describe both client report and therapist observation of specific activities. Areas to be considered include meal preparation, self-care, financial management, functional mobility, functional communication, housekeeping, and leisure skills. Note lighting conditions, contrast in task, size, and placement of items and how these affect the client’s function. (For example, if client uses a 60-watt incandescent bulb in a desk lamp while writing checks, does performance improve with a 50-watt halogen bulb? If client has difficulty writing on a standard check with a pastel patterned background, does using bold-lined single-colored checks improve performance?) Observe how the client reacts to varying light conditions (when moving from a brightly lit hallway to a dimly lit room, does the client have an extended adjustment time?). Note if environmental modifications can be made to enhance visual function or if nonvisual methods may be more efficient for a particular task. (For example, will improved lighting allow client to see temperature controls on the stove? Will using Hi Marks (Kentucky Industry for the Blind, Louisville, KY 40206) for a tactile guide be more efficient in this case?)

Plan and Goals: On the basis of information gained, list goals and objectives as developed with the client, how these goals will be achieved, and the expected duration of services.

References


