

Appropriate Prescribing Practices for Optical Device Use in Students with Low Vision An AER Position Paper

Cynthia S. Bachofer, PhD, CLVT and Kelly E. Lusk, PhD

Position: The great majority of students who have a visual impairment (VI) and some functional use of vision should be seen by a clinical low vision specialist (MD or OD with a specialization in low vision) in a comprehensive clinical low vision evaluation (CLVE) to determine any appropriate prescriptions, such as optical (magnification) and electronic devices, as well as other recommendations.

Overview:

Optical devices such as handheld magnifiers and monocular telescopes are an affordable, convenient and flexible option for access to visual information (Coy & Andersen, 2010; Vasconcelos & Fernandes, 2015a). While digital devices (e.g., tablet, e-reader) are gaining widespread acceptance as a preferred reading tool, in the public as well as the low vision population, optical devices still hold a distinct and valuable purpose in the continuum of assistive technology. The appropriate device being placed in the hands of a user, whether school-age or older, continues to happen more by chance than by a planned process that includes educational, medical and perhaps rehabilitative expertise. Access to visual information is critical within as well as beyond the classroom. The Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP, 2018) as well as state laws delineate the scope and practice for the professional roles and responsibilities regarding how optical devices should be prescribed. Too often, a well-meaning VI professional steps outside of their scope and provides or is pressured to provide a device so that a student has access to instruction which may lead to possibly losing certification or accreditation. When this happens, the interdisciplinary structure is undermined and the critical step of collaborating in the exam process is never fulfilled. Three common reasons for this include:

1. Access to a doctor is not available or has multiple barriers.
2. The purpose and benefits of a CLVE are not well understood.
3. The perception that the handheld digital tool covers all needs is misleading.

Working in collaboration to establish best practice with students (Simons & Lapolice, 2000) is our primary goal as professionals in the field of visual impairments. A number of advantages exist for persons with low vision to acquire appropriately matched optical devices, even in our digital age, and build the proficiency to use these tools. In this overview we consider the range of devices and barriers and benefits to this promising practice. The key points provide further rationale and we conclude with recommendations.

Having quick access to visual information is a universal goal. We are in a fortunate era where a person with low vision has commercially available, high tech options such as a smartphone or tablet to see both near and distance information. These tools with built-in accessibility have become a part of the VI professional's toolset and are ubiquitous across settings and populations where the camera within the device operates as a viewing tool for quick spotting of

primarily stationary tasks. Although evidence-based studies comparing type of device use and task performance are few, researchers investigating tablet use have found that adults (Gill, Mao, Powell & Sheidal, 2013; Roth, 2012) and children (Gothwal et al., 2018) prefer the digital device as a reading tool because of its portability, social acceptance and design features such as augmented lighting and high contrast. Evaluation of critical print size, work distance and ergonomic factors is still essential for efficient, sustained reading with electronic devices. This is especially true for children with low vision if they are to develop efficient reading skills. However, in considering range of settings and tasks across the day, efficient and effective handheld tools with quality optics provide extended viewing, range of focusing needs indoors and out and speed of access.

Portable electronic video magnifiers (EVM) are another popular type of handheld device for near spotting tasks that also use a camera. These have been widely recommended in clinic and assistive technology (AT) settings and are often seen as an ideal tool for a wide range of users. Again research has not kept up with the rapid adoption of these devices. While portability is a plus, participants in one study reported problems with maintaining line orientation and design drawbacks of a stand-type magnifier (Matchinski & Winters, 2016). Screen size in a reading task was noted as the most critical component by all participants in this study as well. Desktop EVM models with larger screen options were preferred to portable EVM and resulted in higher reading rates. Electronic handheld devices have high tech appeal and like any tool warrant objective-based instruction and data collection on impact of functioning (e.g. continuous text reading).

Optical devices are a specialized tool specifically designed to magnify visual information. These devices do not raise questions regarding appropriate use as an electronic device may, e.g., distractions of other apps or problems associated with extended screen time. In the clinic setting, doctors prioritize prescription of optical devices (Wilkinson, 2010) while recognizing the usefulness and limitations of electronic options. An AT evaluation is an important step in this collaborative process. The low vision specialist, VI professional/AT specialist and family members can help to identify a full toolset that includes low and high tech.

For many people with low vision, an optical device continues to be the ideal tool for accomplishing routine tasks (Coy & Andersen, 2010) whether functional or recreational in nature. These tasks are numerous throughout the day and may include reading print on a food package, following a game on the ball field, identifying a store sign or admiring an animal on the walking trail. Instances of optical device use beyond the school day in all areas of the expanded core curriculum are as valid as board work and book work within the classroom and may hold greater appeal for student curiosity, active pace and motivation. Having access to a comprehensive CLVE where devices are prescribed in collaboration with personnel who provide instruction (e.g., CLVT, TVI) is the first step to managing these essential and enjoyable tasks. Being handed a tool that is poorly matched to the user delays the process and increases the chances for a frustrating experience. Moreover, a poor match in the beginning may have long lasting negative impact and the user never recognizes the convenience and benefit of optical

devices. The key points note the purpose, value and potential outcomes of a comprehensive exam with collaboration between medical and educational expertise.

Key Points:

1. The great majority of students who have low vision can benefit from a clinical low vision evaluation (CLVE) with a low vision specialist (ophthalmologist or optometrist specially trained in low vision), (Simons & Lapolice, 2000; Wilkinson, 2010). Their medical expertise in collaboration with education professional(s) ensures the most appropriate recommendations.
 - a. The CLVE has a range of goals depending on the individual student's access needs, functional ability and overall goals. Based on examination, the recommendations provided by the low vision specialist may include:
 - i. Visual efficiency strategies (e.g., guidance in use of eccentric viewing, precise measurement of usable visual field)
 - ii. Prescription of specialty lenses (e.g., therapeutic or light occluding contact lenses, field expanding prism lenses, microscope lenses for hands-free reading)
 - iii. Prescription of handheld and low vision specific electronic optical devices (e.g. EVM) that are most appropriate to the individual's visual needs is done through a low vision specialist. See #3 for a further discussion of this point.

The low vision evaluation helps to define the category of the vision loss (e.g. contrast, visual field) as well as the static or progressive nature of the disease. It is the collaborative nature of the evaluation and joint expertise of the medical and educational professional(s) with family support that makes the findings valuable and presents next steps in instruction and use in school, home and community.
 - b. The comprehensive clinical low vision evaluation has a number of components that consider maximum visual functioning (Lusk & Schwartz, 2016). Measurement of acuity (near and distance) and field of view (central and peripheral) are familiar components. Identifying the appropriate refractive correction for children with low vision and keeping this prescription updated as the child gets older are specialized tasks. Essential factors in overall functioning that require precise measurement include the following: depth perception, color discrimination, contrast sensitivity, accommodation, nyctalopia, critical print size and appropriate work distance for near viewing. The low vision specialist has completed training and developed the expertise to evaluate these factors within this low incidence pediatric population. These examples are not part of the training for a TVI, COMS, or CLVT and are beyond their role and responsibilities.
 - c. The low vision specialist is also trained to diagnose progression of a condition or identify a secondary visual condition that the patient is unaware of.
2. Collaboration among all members of the interdisciplinary low vision services team is key to maximum use of vision and continued reliance on optical devices for gaining access (Lusk & Schwartz, 2016; Vasconcelos & Fernandes, 2016b).

- a. Pre-clinic visit preparation: Once an appointment is scheduled, it is important to prepare for the visit by noting the visual access needs of the student in school, home and community settings. Keeping a list of questions, instances where the student is struggling and particular interests or hobbies is needed. The student's family, TVI, COMS and other teachers/therapists provide information via assessments, questionnaires, interviews and observations in a variety of settings.
 - b. The clinic visit: The low vision specialist (MD/OD) and other clinic professionals evaluate the student on the various components of the clinical low vision evaluation while soliciting further information from the student, family, and student's teachers/therapists. During the appointment the student and family have the chance to ask questions specific to the etiology and visual functioning which is a key part of the evaluation. The low vision specialist prescribes any optical devices or other needed prescriptions, and the interdisciplinary team members make educational and other recommendations.
 - c. Post-clinic instruction and follow-up: The collaboration continues between the school-based VI teacher/team and clinic personnel or the doctor. The low vision specialist provides a report that summarizes the exam and emphasizes access to instruction, which the TVI then discusses with members of the student's educational team. This discussion encompasses potentially negative psychosocial factors regarding use of a novel tool in front of peers. As the student gains proficiency in using a range of devices, team members are updated and reinforce the student's increased access. As this reinforcement occurs, further refinements to the recommendations may need to take place to ensure continued, effective use. Providing data taken during instruction to the low vision specialist and education team members on student progress or lack of progress is essential in the collaborative process.
 - d. Reevaluation: Generally, a CLVE reevaluation is completed every 3 years to address changes in growth and development, new interests and academic demands. An abbreviated timeframe may be requested due to a change in vision, maturity of the student, a school transition or another vision-related issue.
3. While other vision professionals are integral to the interdisciplinary team and the low vision continuum of services, the low vision specialist is the most qualified to prescribe optical devices (American Academy of Ophthalmology, 2017; American Academy of Optometry, 2014).
 - a. Each optical device has specific measurements (Dister & Greer, 2004; Region 4, 2013; Zimmerman, Zebehavy & Moon, 2010) such as power, field of view and light gathering properties. These factors mean that devices, like eyeglasses, should be prescribed to match the individual's specific visual needs.
 - b. Range of devices: The low vision specialist maintains an updated array of devices that are available on the market through routine contact with manufacturers. Other vision professionals may have limited access to company representatives or vendors and constrained budgets for keeping an array of

quality devices in stock. Many devices are available on the market but may be inferior products which lead to frustration in use.

- c. Response to device use: Student frustration with device training may be the result of a device provided that did not match the student's visual needs.

Recommendations for practice:

1. The great majority of students who have a visual impairment and some functional use of vision should have a clinical low vision evaluation conducted by a low vision specialist (MD or OD).
2. Provide rationale to both medical and education professionals about the purpose, value and possible outcomes gained through the CLVE process.
3. Consider the full continuum of available devices and integrate both non-electronic and electronic devices across the student's day.
4. Include all team members throughout the CLVE process to ensure a thorough assessment of needs in all arenas of life (school, home and community):
 - a. Pre-clinic interviews and background information gathering
 - b. Interdisciplinary format during clinic visit with time for questions/discussion
 - c. Instruction and follow-up as a joint effort between the medical and educational team members to confirm/refine appropriateness and functionality of prescriptions/recommendations
5. If not already available, establish a process and protocol for obtaining a CLVE.

Resources:

Many states have faced the challenge of identifying eyecare providers with this specialization and establishing a process that provides a comprehensive exam and instruction in device use for the range of eligible students. Geographical distance, funding and understanding of benefits of the exam are a few of the barriers.

1. TSBVI Directory of Low Vision Service Providers -
<http://www.tsbvi.edu/lowvisionservices>
2. Collaboration among state leadership, agencies that support rehabilitation and stakeholders in the visual impairment community is necessary to resolve the history of no access to low vision service providers. Examples of statewide models to consider include:
 - a. Identified network of doctors across the state: Kanlovkids in Kansas and Smokey Powell Center in Georgia
 - b. Mobile clinics-Iowa low vision clinic through the Iowa Braille School and West Virginia mobile clinic through West Virginia University
 - c. Agency sites such as Lighthouse for the Blind in St. Louis, MO and Cincinnati Children's Vision Rehabilitation Program at Cincinnati Children's Hospital Medical Center/Clovernook Center for the Blind and Visually Impaired in Cincinnati, OH

3. Connection with American Optometric Association, American Academy of Optometry and American Academy of Ophthalmology (American Academy of Ophthalmology, 2017; American Academy of Optometry, 2014; Vasconcelos & Fernandes, 2015a, 2015b, 2016a, 2016b)

References:

ACVREP. (2018). Certified Low Vision Therapist (CLVT) Handbook, Section 2 - Scope of Practice for Low Vision Therapists. Retrieved from <https://www.acvrep.org/certifications/clvt-scope>

American Academy of Ophthalmology. (PPP, 2017). Patient Preferred Patterns: Vision Rehabilitation PPP. Retrieved from <https://www.aao.org/preferred-practice-pattern/vision-rehabilitation-ppp-2017>

American Academy of Optometry. (2014). Position Paper on Clinical Low Vision Evaluation and treatment of students with visual impairments for parents, educators, and other professionals. Retrieved from https://www.aaopt.org/docs/section-documents/position-papers/low-vision-position-paper-8-12-mew-final.pdf?sfvrsn=539f06d0_4

Coy, J. & Andersen, E. (2010). Instruction in the Use of Optical Devices for Children and Youths. In A. L. Corn, & J. N. Erin, Eds., *Foundations of Low Vision: Clinical and Functional Perspectives* (2nd Ed.) (pp. 527-588). New York: AFB Press.

Dister, R., & Greer, R. (2004). Basic Optics and Low Vision Devices. In A. Lueck, Ed. *Functional vision: A practitioner's guide to evaluation and intervention* (pp. 61-86). New York: AFB Press.

Gill, K., Mao, A., Powell, A.M. and Sheidow, T. (2013). Digital reader vs. print media: the role of digital technology in reading accuracy in age-related macular degeneration. *Eye* (27), pp. 639-43.

Gerritsen, B. (2018). What are low vision optical devices? Retrieved from <http://www.visionaware.org/info/your-eye-condition/eye-health/overview-of-low-vision-devices/low-vision-optical-devices/1245>

Gothwal, V.K. et al. (2018). Randomized trial of tablet computers for education and learning in children and young people with low vision. *Optometry and Vision Science* (95), pp. 873-82.

Lusk, K. E., & Schwartz, T. L. (2016). Management of Vision Impairment in Children. In E. I. Traboulsi & V. M. Utz, Eds. *Practical Management of Pediatric Ocular Disorders and Strabismus*, New York: Springer.

Matchinski, T.L. and Winters, J. E. (2016). A comparison of subjects' reading and writing performance and preference while using various portable electronic magnifiers. *Journal of Visual Impairment and Blindness* (113), pp. 454-60.

Region 4 Educational Service Center. (2013). Functional optics for low vision devices. In *Program in Low Vision Therapy* (pp. 95-108). Houston: Region IV ESC.

Roth, D. (2012, November). *Digital Tablets Improve Speed and Ease of Reading* for People with Moderate Vision Loss. Paper presented at the meeting of the American Academy of Ophthalmology, Chicago, Ill.

Simons, B., & Lapolice, D. (2000). Working effectively with the low vision clinic. In F. M. D'Andrea and C. Farrenkopf, Eds. *Looking to learn: Promoting literacy for students with low vision* (pp. 84-116). New York: AFB Press.

TSBVI. (2018). Clinical low vision service providers. Retrieved from <http://www.tsbvi.edu/lowvisionservices>

Vasconcelos, G., & Fernandes, L. C. (2015a, November 24). Low-vision aids. Retrieved from <https://www.aao.org/pediatric-center-detail/low-vision-aids>

Vasconcelos, G., & Fernandes, L. C. (2015b, November 24). Low vision: Levels of care. Retrieved from <https://www.aao.org/pediatric-center-detail/low-vision-levels-of-care>

Vasconcelos, G., & Fernandes, L. C. (2016a, March 11). Low vision services and the IDEA. Retrieved from <https://www.aao.org/pediatric-center-detail/low-vision-services-idea>

Vasconcelos, G., & Fernandes, L. C. (2016b, March 11). Low vision: The multi-professional team. Retrieved from <https://www.aao.org/pediatric-center-detail/low-vision-multiprofessional-team>

Wilkinson, M. (2010). Clinical Low Vision Services. In A. L. Corn, & J. N. Erin, Eds., *Foundations of Low Vision: Clinical and Functional Perspectives* (2nd Ed.) (pp. 238-295). New York: AFB Press.

Zimmerman, G., Zebehazy, K., & Moon, M. (2010). Optics and low vision devices. In A. L. Corn, & J. N. Erin, Eds., *Foundations of Low Vision: Clinical and Functional Perspectives* (2nd Ed.) (pp. 192-237). New York: AFB Press.

