Recommendations regarding the use of educational media are often based on minimal data, availability of free large print materials, and a reluctance to teach braille. Low vision driving is a controversial and poorly understood topic for most ophthalmologists, complicated by issues associated with teen driving. To optimize literacy skills in children, this course will; define literacy, present data regarding literacy instruction (braille, print, and optical devices), offer strategies for making appropriate recommendations, and discuss impediments to and advocacy for pediatric low vision services. Viewed by many as a means to become more independent and increase options for employment, low vision driving issues (qualifications, safety data, and controversies) will be presented.

I. Defining and fostering literacy
   A. Literacy is reading, writing, listening/multimedia, copying, keyboarding, all subjects, home and community…
   B. Literacy Considerations:
      Stamina (Two types)
      - Immediate duration (reading for a specific period of time)
      - Extended duration (throughout the day/week)
      Reading and writing speed, including copying
      - Indicator of career success
      - Need at least 150 wpm reading speed by end of high school
      Comprehension (text-based and auditory)
      - Need at least 80% comprehension
      Prognosis of the visual impairment
      - May require additional literacy medium or media if eye condition is progressive
      Hand strength and dexterity
      - May impact writing and keyboarding, both in print and braille, as well as manipulation of optical or electronic devices
      Increased level and intensity of literacy materials as child progresses through formal education
      Progression of the acquisition of literacy skills
      - If a child is not progressing in their acquisition of literacy skills, another approach (including alternate literacy media) may be needed

C. Braille instruction vs Print
   Dual-media demographics: Most students are either dual-media from pre-literacy or are print students who add braille later
   Dual-media considerations:
   - Student's Acuity/Ability to use Functional Vision
   - Possibility of a Progressive Eye Condition
   - Student's Age, Academic Ability Level
   - Student/Parent Interest in Braille/Dual Media
   Decision should be made based on each individual child’s needs
   - Teach now or wait?
   - How to teach: multi-modal, blindfolded, etc.

D. Large print vs devices (simple and electronic magnification)
   Positives of magnification:
   - Immediate access vs. delay due to enlarging/copying
   - Lower cost; large print approximately $0.50/page
   - Exact same material as peers
   Positives of large print:
   - Some students may feel more comfortable using large print on standardized tests
   - Allows for some amount of relaxation; no need to maintain vertex/material distance.
   Optical Device Highlights
   Near:
Pediatric patients have definite preferences for different mounting systems of near magnification.
Spectacle-mounted near devices allow for hands-free longer-term reading possibilities.
Added prism can allow for more relaxed long-term reading.
Decreases hand/arm strain/fatigue.

Distance:
Spectacle-mounted distance devices allow for hands-free maneuverability.
Taking notes.
Decreases arm strain/fatigue.

E. High-tech Options:
Enlarging software, scanners and real-time video, and portable electronic magnification (i.e., computer, iPad, CCTV) - effective way of accessing visual material, has the same lure for visually impaired children/teens as for sighted children.

High-tech Highlights:
Portable
Voice over
Real-time storage and manipulation of media.

II. Driving for teens with low vision:
A. Definition of low vision driving:
Where:
36/51 states permit (prohibited in 2 Conn/OK) some require special testing/training.
Most states impose requirements that incur little or no cost to the state.

Rules and regulations:
Acuity: poorly correlated with accidents
20/40 best corrected acuity (unrestricted)
20/50 – 20/70 daytime or restricted use
20/80 – 20/160 biopic (achieving 20/40)
Limit to certain roads or geographic area.

Visual field: much more highly correlated with accidents and mortality than visual acuity
(not tested in all states)
140 degrees uninterrupted field (unrestricted)
120 degrees horizontally and 80 degrees vertically.

Other visual concerns: color perception, glare, contrast, binocularity but NOT regulated.
Criteria for license renewal: annual vision re-examination (in some states).

Distance Magnification:
Spectacle mounted telescope (Bioptic).
Miniature telescope, monocular telescope at the top of carrier lens
10 – 15° field of view
5% Biopic – 95% Carrier
Change fixation: from carrier to bioptic in “2 snaps” (1.5 sec).

Types of telescopes:
Galilean – minus ocular / plus objective (cheap)
   Smaller, upright image, increased field with decreased vertex distance, more light.
Keplerian – 2 plus lenses with an internal prism to invert image
   Larger (inverted image requires mirror), bigger field, less light.

1st low vision bioptic driver licensed in California 1971.

B. Driving safety
i. Driver preparation: Bioptic training: spotting device like using a side view mirror. Must be skillful and efficient. Training is essential.

ii. Controversies: bioptic use, ring scotoma, vibration, glare/photophobia

iii. WV Driver prep: 30 hr classroom, 30 hr passenger-in-car, 30 hr driving

C. Teen drivers (with typical vision)
   i. Problems: distraction, drinking, speeding, aggression, age, experience, underestimating risk
   ii. Higher crash rate than older more experienced drivers:
      • Highest early in licensure
      • Especially under complex driving circumstances (night, adolescent passengers)
      • Make more judgment-related driving errors (due to faulty risk and hazard perception)
      • Measures of risky driving all higher in adolescents than experienced drivers
         o Elevated g-force events (late braking, rapid starts, sharp turns, yaw)
         o Speeding
         o Close following (poor speed management with late or inadequate braking)
         o Distraction
         o Impairment
      • Some with persistent “risky driving style” despite increasing skill/judgement

D. Driving for teens with low vision:
   i. Driving is the primary mode of personal transportation in the US
   ii. Facilitates: employment, social engagement, personal independence, access to health care (older adults decreases depression/long term care placement)

III. Referral and intervention for the child with low vision
A. Developmentally appropriate evaluation and prescribing of devices
   Age
   Educational requirements (Developmental)
   Attentional issues (e.g. ADHD)
   Motor problems (e.g CP)
   Diagnosis (e.g. albinism)

Preschool (Devices)
   Toilet Paper Roll
   Telescope (2.8X)
   Dome magnifier
   Slant Board/pencils/paper
   Sunfilters

Pre-Reading Skills (Built on visual function)
   Matching: shapes, patterns, letters and, finally, words
   Rhyming: enhances early reading and spelling
   Letter skills: recognizing letter shapes, learning the most common sounds each letter makes
   Direction: Print goes from left to right, top to bottom
   Motor skills: writing letters and words
   Concepts of print: orientation of a book, turning pages in sequence, exploring pictures, understanding that words can tell a story
   Language skills: language fluency correlates with reading acquisition

B. Templates for sharing information
   Referral for services and additional
   Functional Vision Assessment (FVA):
      Asks “how is vision used in daily activities”
      Provides meaningful translation of clinical findings into how the child uses vision
      This evaluation is administered in an educational setting as opposed to a clinical setting
Learning Media Assessment (LMA): Selects the appropriate learning and literacy media for the student. 
- auditory
- braille
- regular print
- large print
- devices
- technology

LMA includes a checklist of functional literacy tasks and looks at working distances and size preferences. It also looks at academic achievement, handwriting, technology, and literacy tools. Reading speed and efficiency are assessed as well.

Orientation and Mobility Assessment (O&M): Knowing where you are, where you want to go and how to get there. It is the ability to move safely, efficiently through all environments.

1. O&M can and should be taught from preschool – adulthood
2. Assessment takes place at home, school and community
3. Can include device instruction, long cane instruction, light and rapid public transit instruction and application for guide dogs
4. Can include evening lessons for those with night blindness and for functioning in adverse weather condition and terrain challenges
5. Reassessment

Who teaches O&M? - Only qualified Orientation and Mobility Instructors should be teaching these skills or a qualified VIT may teach some under the supervision of an O&M Instructor

Who benefits from O&M? - Students who are blind or visually impaired may need some level of O&M instruction. (reduced visual acuity, depth perception, dark adaptation, and/or visual field, photophobia)

C. Sample Report from a Physician to an Educator

Information needed:
- Distance vision with best correction
- Near vision with or without spectacle (at 40cm and at preferred viewing distance)
- Diagnosis
- Stable/Progressive
- Field Restriction
- Relevant symptoms: photophobia, nyctalopia, glare
- If available: color, contrast sensitivity

Dear Educator,

Child’s name is age with diagnosis. Best corrected distance visual acuity is 20/xx OD, 20/xx OS, and 20/xx OU. At near, visual acuity is 20/xx (xxM) OU at standard distance of 40 cm. At preferred near distance of xx cm, visual acuity is 20/xx (xx M). Color vision is xx and visual field is xx. Depth perception is xx. Contrast sensitivity threshold is xx.

The condition is stable/progressive. Child’s name should be allowed to sit close to instruction and to hold materials as close as needed. I would like to request a functional vision assessment/orientation and mobility assessment/learning media assessment for this child. Medically, child’s name meets the criteria for having a vision impairment which may adversely affect education.

Additional descriptions or requests might include:
- Photophobia: Visual acuity and comfort will decrease as a function of glare and high intensity light. Although there are no physical limitations, sunglasses, hat and sunscreen are recommended for the playground.
Glasses: Glasses should be worn at all times/may be removed for reading/may be removed for play.

Nyctalopia: Will need time to adjust to indoor lighting when coming inside from the playground or entering a darkened room.

IV. Impediments to and Advocacy for Pediatric Low Vision Services

A. Brief historical overview
   Beliefs about Impaired Vision in Education
   Key Dates to Understand the Issues

B. Advocacy Initiatives
   Individuals with Disabilities Education Act (IDEA)
   Patient Preferred Patterns of the American Academy of Ophthalmology
   Position Papers
   Association for Education and Rehabilitation of the Blind and Visually Impaired
   Division on Visual Impairments/Council for Exceptional Children

C. Potential Impediments
   Schools’ Interpretations of IDEA
   Learning Media Assessments
   Funding Issues
   Professional Disciplines
   Parents’ Knowledge
References:


www.BiopticDriving.org