

**AT and 3D Printing
personalized tech outside the phoropter**

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The Impaired Eye/Brain Connection

- The “Birthday disease” – our aging patients
- Learning Related Vision Problems (LRVP)
- Hemianopsia
- Cerebral/Cortical Visual Impairment (CVI)
- Traumatic Brain Injury (TBI)

What Our Patients Struggle With

- 1. Visual Acuity
- 2. Oculomotor Control (tracking, localization, fixation)
- 3. Binocular Stability (convergence insufficiency, strabismus; diplopia)
- 4. Depth Perception / Depth Judgment
- 5. Visual Field – pathological
- 6. Central-Peripheral awareness – functional visual field

What Our Patients Struggle With

- 7. Contrast Sensitivity – more than meets the eye
- 8. Visual Motor Coordination-integration of eyes
eye movements
hand/foot/head/body movement
- 9. Visual Reaction Time – response to visual stimulus
involvement of visual skills
- 10. Visual – Vestibular Interaction

Demos

- 1. - what is it like to “see” with eye disease
- - what is it like to “see” or “not see” with a visual processing disorder
- 2. Experience the effects of vision impairment that may accompany sight loss
 - - near/far focus shifting
 - - receded near point of convergence (NPC)
 - - poor binocular coordination
 - - reading with prism

Demos

- 3. What happens when my hands/feet won't do what my eyes see
- 4. What is it like to function with poor oculomotor control, or binocular vision instability along with sight loss
- 5. Importance of movement

Options

- What are some of the options available in vision rehabilitation to maximize visual processing in individuals diagnosed with these conditions.
- Speed of detecting and identifying simple discrete stimuli along with Visual search speed are affected in these conditions. In USI, speed is lateralized compared to a more general spatial, attention or scanning deficit.

Other Professional Intervention

Occupational Therapists and other rehabilitation professionals treating patients with these conditions often utilize the following options to maximize visual processing performance

Non-optical interventions

1. Positioning of the person
2. Positioning of the material they are viewing
 - a. Proper body, head and eye position
 - b. Effects of prescription lenses
 - c. Elevated work surfaces
 - d. Proper size of work area

Contrast

Making the important text stand out

Contrast

- a. Darker/bolder lines
- b. Type of lined paper
- c. Choice of pencil/pen

Making the important text stand out

- a. Use of color
- b. Beyond the typoscope - ideas for isolating text
- c. Importance of character and line spacing
- d. Combining enhancements

Lighting

- a. General lighting vs. task lighting
- b. Understanding color temperature
- c. Awareness of reaction to newer sources of light

High Tech – Magnification not just for acuity

What's Already On Our Smartphones

High Tech – Magnification

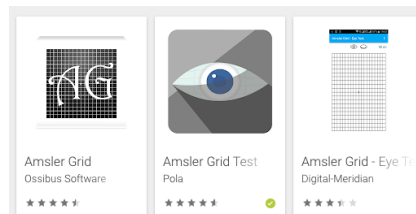
1. Specialized Eyeglasses
2. HH vs. Stand magnifiers
3. Electronic devices – desktop and portable options

Self-Testing of Vision in Age-Related Macular Degeneration

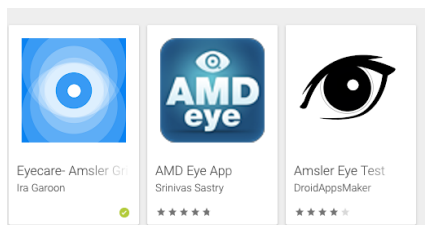
Amsler Grid apps for iPhone and Android

Konan Amsler
eyecare – Amsler Grid Eye Test
Macula Tester

Google Play (Android) Apps



Google Play (Android) Apps



High Tech – Audio alone and as adjunct

1. JAWS
2. knfb Reader
3. Seeing AI and Envision

MultiSensory Devices/Services

The devices available include:

1. OrCam
2. NuEyes
3. eSight / Jordy
4. Iris Vision

When is the device useful?
What are some limitations?

MultiSensory Devices/Services

5. Oculenz
6. Sunu band
7. Aira

- When is the device useful?
- What are some limitations?
Weighing cost (device+training) vs. benefit

Tools from the Optometrist

1. Therapeutic lenses
2. Visual field enhancement
3. Yoked prisms
4. Selective occlusion
5. Chromatic filters

Introduction to New or Updated Techniques

1. visual field expansion – new ways of using prism
2. virtual reality – for VT testing and training
Vivid Vision
Optics Trainer
3. assistive technology – off the shelf and in our homes
Amazon
Google

Introduction to New or Updated Techniques

3. assistive technology – off the shelf and in our homes

- Amazon
- Google
- Smart Home

3D Printing and Optometry

- Equipment for Evaluation
- Assistive Devices
- Frames
- Personalized Medicine

Case Studies and Uses

Several case studies and use of assistive and 3D technology will be presented

Podcasts

Disability Matters

focuses primarily on employment issues facing people with disabilities

Assistive Technology Update

a fast-paced weekly update for AT professionals and enthusiasts

Inclusive Education Project Podcast

weekly podcast about education reform and disability rights