Vision Rehab 101:

Beyond OT School Basics

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Learning Objectives

01 **Differentiate** common visual impairments in ocular disease and neurological conditions, including effects on activities of daily living, mobility, cognition, and community participation.

02 **Identify** evaluation findings and clinical indicators that support appropriate referral, interprofessional collaboration, and scope of practice considerations in vision-related rehabilitation.

03 **Analyze** the impact of visual neglect, inattention, and visual field deficits on functional mobility, self-care, and community participation.

04 **Synthesize** evaluation findings and client-centered goals to develop occupation-based intervention plans for individuals with visual dysfunction for adult clients.

Introduction

Vision Loss and Blindness in the United States

32.17 million

People with presenting visual acuity loss

9.46% prevalence

25.02 million

Uncorrected refractive error

7.36% prevalence

7.15 million

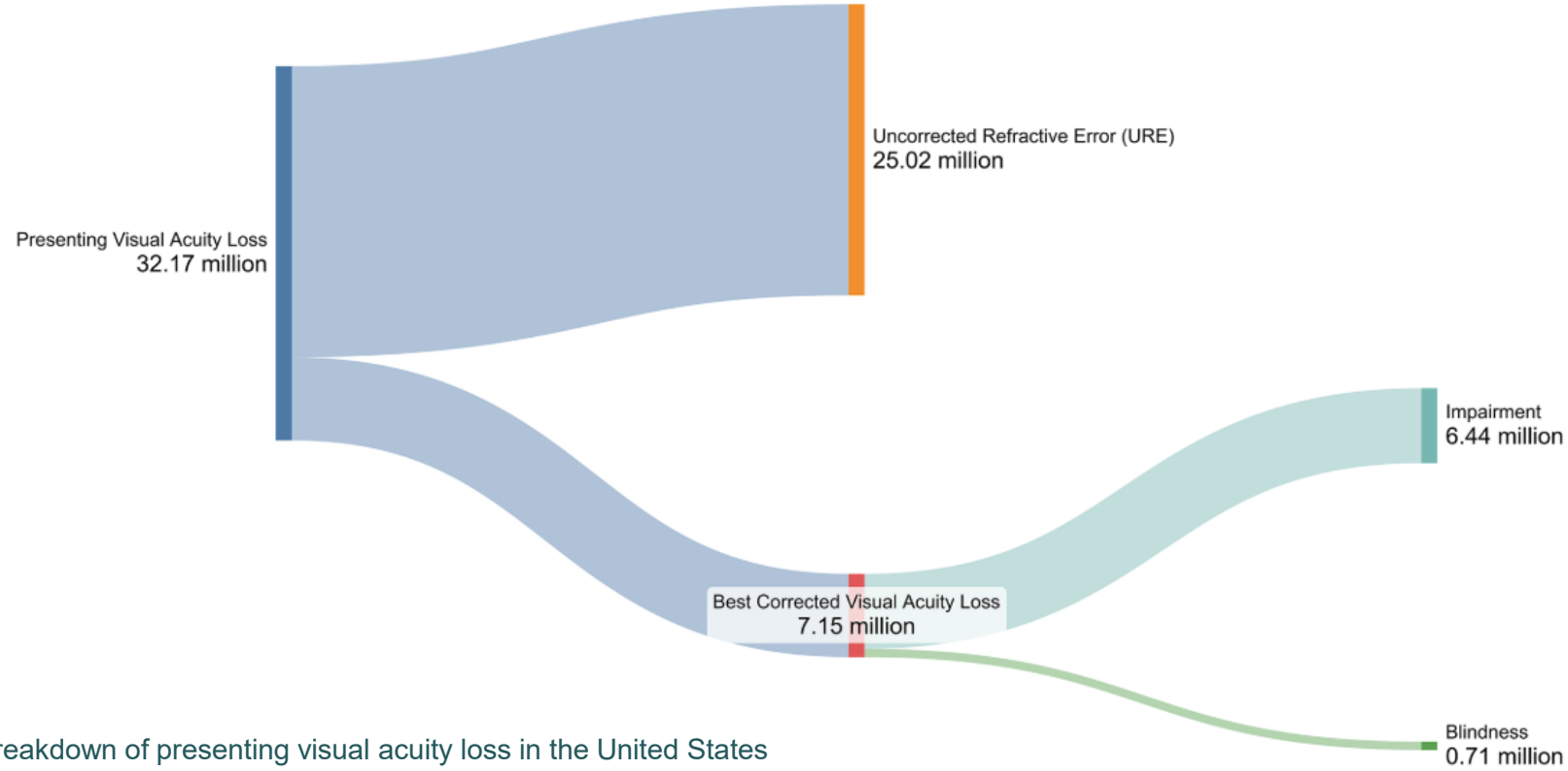
Best corrected visual acuity loss

2.10% prevalence

700,000 People with visual acuity of 20/200 or lower

Source: CDC, Vision and Eye Health Surveillance System (VEHSS)

Visual Representation



Breakdown of presenting visual acuity loss in the United States

Source: CDC, Vision and Eye Health Surveillance System (VEHSS)

Key Risk Groups

Presenting visual acuity loss in the United States

>3 million

Children with presenting visual acuity loss

>1.5 million

People living in care or custody

1.06 million in skilled nursing facilities
500,000 in correctional facilities

Groups with higher prevalence

13.68%

People living in poverty

12.79%

Age 15+ with less than a high school education

61.49%

Nursing facility residents

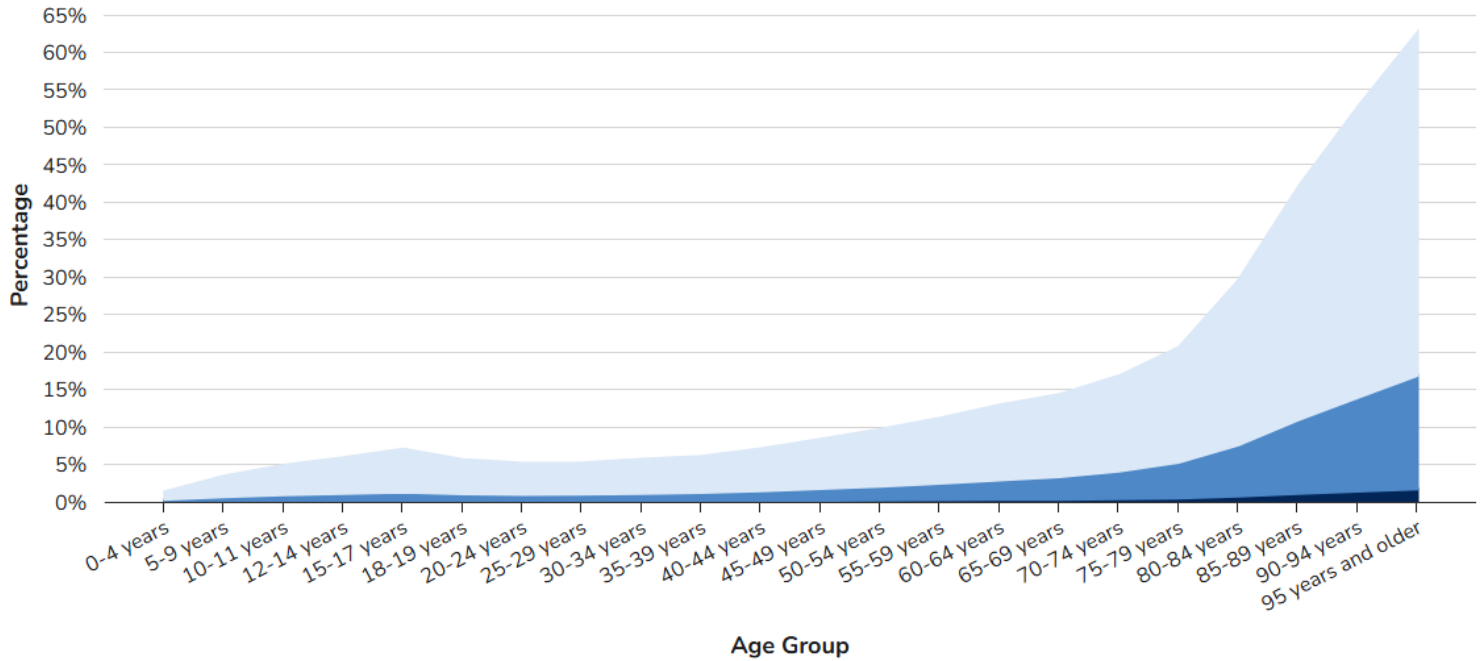
21.54%

Correctional facility residents

Source: CDC, Vision and Eye Health Surveillance System (VEHSS)

Across the Lifespan

Figure 2. Percentage of People of All Ages in the United States by Age Group and Category of Vision Loss, 2024



Source: CDC, VEHSS Modeled Estimates: Vision Loss and Blindness

Vision Impairment Increases with Age

Age over 85

20%

of people over 85 experience permanent vision loss

Vision loss also affects younger Americans

1 in 4

Americans with vision loss are under 40

1.6 million

under 40 live with vision loss

141,000

under 40 are blind

13% of all blind people in the US

Source: Flaxman et al., 2021, JAMA Ophthalmology

Eye Disease and Vision Loss

Age-Related Macular Degeneration

Diabetic Retinopathy

Glaucoma

Cataract

Other retinal, optic-nerve, and visual-pathway disorders

Sources: Rein et al., 2019; CDC Vision and Eye Health Surveillance System
AMD estimates / Diabetic retinopathy estimates / Glaucoma estimates / Vision problems and blindness

Occupational Therapy Practice Framework 4

The same clinical reasoning process as any other OT concern

Specialized knowledge, with an occupation-driven process

Occupational profile

Client's preferred occupations, goals, and concerns

Occupational performance

Occupations and performance skills

Synthesis

American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy, 74*(Suppl. 2), 7412410010. https://doi.org/10.5014/ajot.2020.74S2001

A Word About Theoretical Models

OT theory is essential to articulating our distinct value in vision rehabilitation

We have not always been explicit in identifying the theoretical models used in low vision practice in published literature

Source: Weisser-Pike et al., 2024

Neuroanatomy of Vision and the Visual Pathway

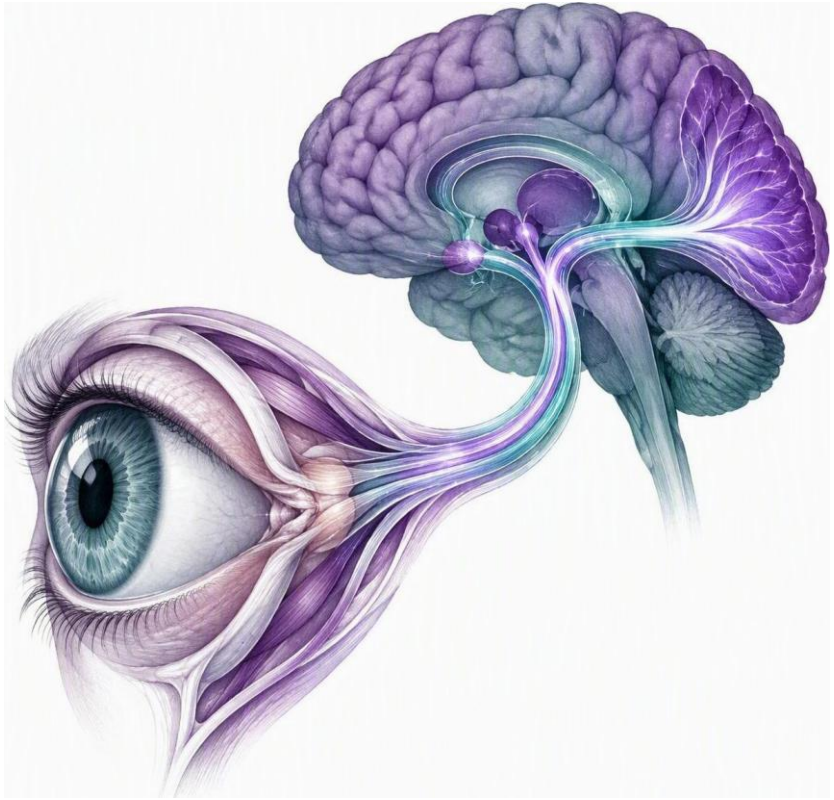
Anatomy of the eye

Visual process

Optical stage, receptor stage, neural processing

Oculomotor control

Visual pathway



Eye Anatomy

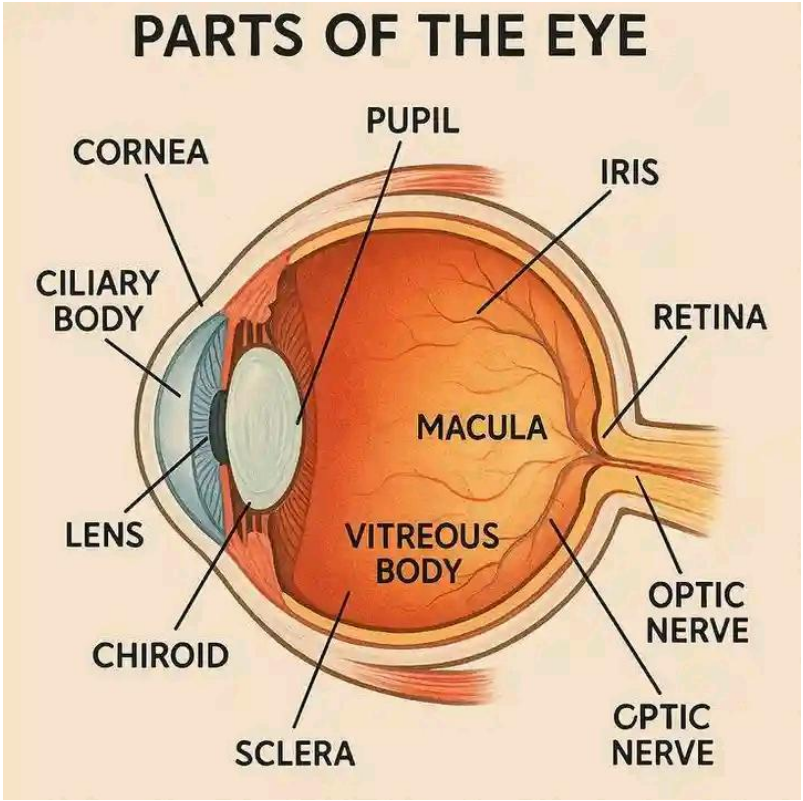


Image: Aliyu Mohammed Aliyu, “Anatomy of Eye of Human Being,” Wikimedia Commons, CC0 1.0.

Macula and Fovea

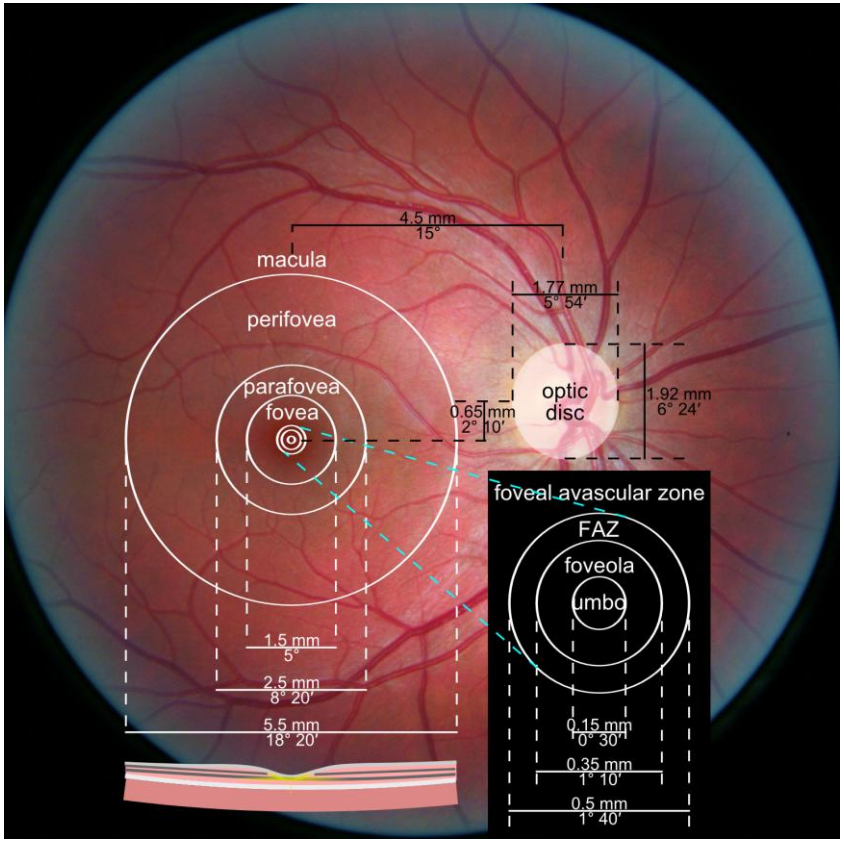


Image: “Macula,” diagram by Zyxwv99; retinal photograph by Danny Hope, via Wikimedia Commons, CC BY 2.0.

Visual Processes

01	**Optical stage**	Delivers an image to the retina via refraction
02	**Receptor stage**	Converts the image into neural impulses
03	**Neural processing**	Retina, visual cortex, cortical centers, perception, visually guided behaviors, actions, and interactions

Source: Colenbrander, Fletcher, & Schoessow (2018)

Extrinsic Eye Muscles

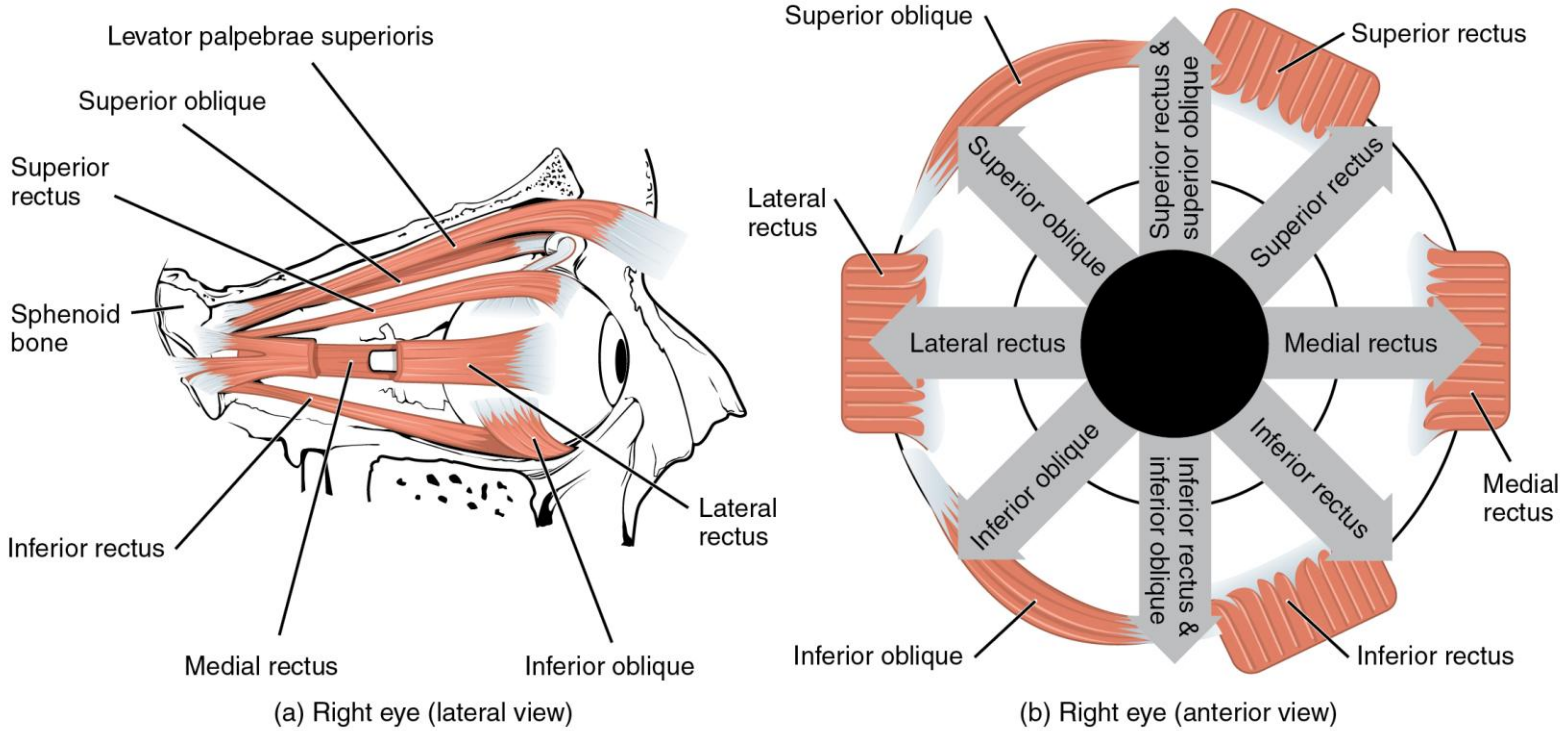


Image: CFCF, “The Extrinsic Eye Muscles—Right Eye, Anterior View,” Wikimedia Commons, CC BY-SA 4.0. Used/adapted under license.

Muscle Actions

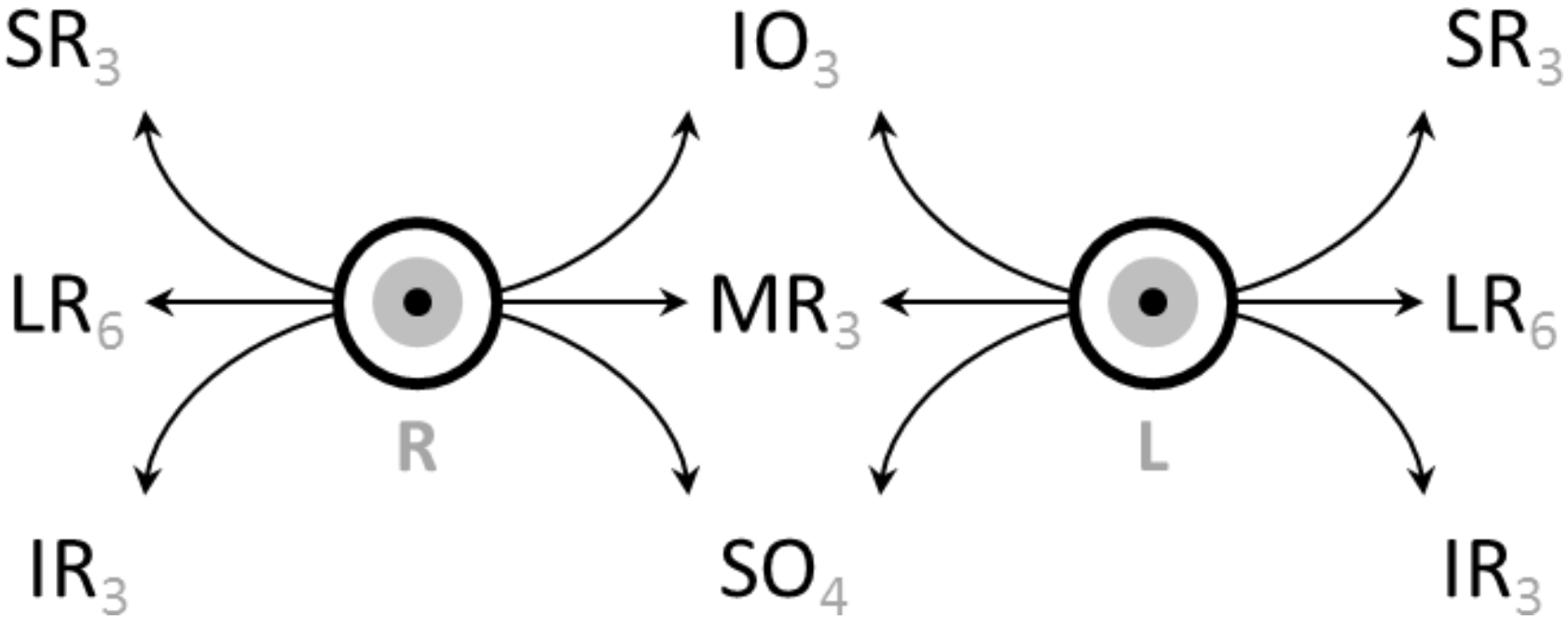


Image: Au.yousef, “Extraocular Muscle Actions and Innervation,” Wikimedia Commons, CC BY-SA 4.0.

Visual Pathway

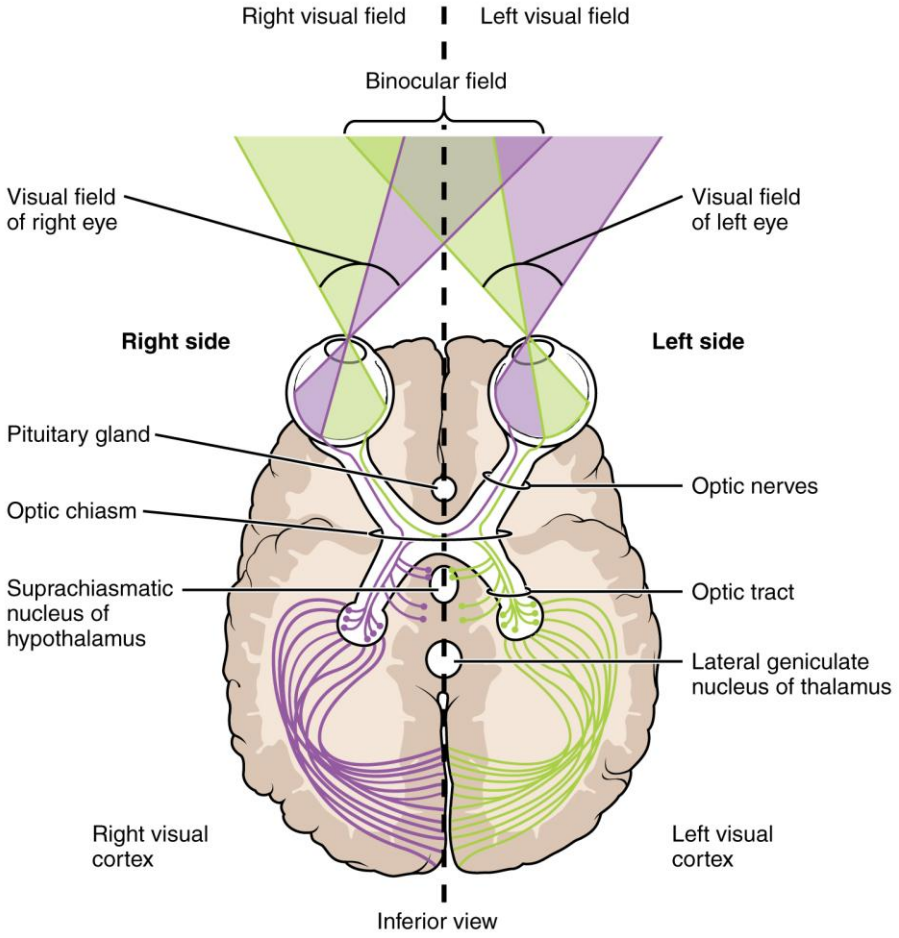


Image: OpenStax College, “Optical Fields,” via Wikimedia Commons, CC BY 3.0.

Visual Disorders and Conditions

Common Visual Issues (Summary)

Age-related macular degeneration (AMD)	Most common cause of low vision
Diabetic retinopathy	Rising, with earlier onset, but not inevitable. Deficits throughout the visual field.
Glaucoma	Often undetected. Peripheral vision loss precedes central vision loss.
Cataracts	Generalized deficits that can be treated surgically

Source: Colenbrander, Fletcher, & Schoessow (2018)

Simulations

Typical Vision	Glaucoma	Retinopathy	ARMD	Cataracts
				

Source: National Eye Institute, NIH, “See What I See: Virtual Reality Eye Disease Experience.”

Age-Related Macular Degeneration

Dry AMD

80–90%

of cases

Slow progression

May progress to wet AMD

Wet AMD

Progresses faster

Early and intermediate stages

Early AMD has no symptoms. The intermediate stage may also have no symptoms.

Late AMD (wet or dry)

Lines may look wavy. A blurry area in central vision may grow over time.

Colors appear less bright.

Seeing in low light becomes difficult.

Glaucoma

Open-angle is most common

Symptoms

Often minimal symptoms until it progresses

Vision loss

Loss of peripheral vision, progressing to loss of central vision

Can cause blindness

Cataracts

A cloudy area in the lens of the eye

1 in 2

people aged 80 or older have cataracts or have had them surgically removed

Common with aging

Very common as people age, but can also occur for other reasons.

Effects on vision

Untreated cataracts cause blurry, hazy vision and reduced color recognition.

Source: National Eye Institute, Cataracts

Retinitis Pigmentosa

A group of genetic diseases affecting the retina

Progressive vision loss

Retinal cells break down over time.

Symptoms usually begin in childhood, and people eventually lose most of their sight.

Symptoms

Loss of night vision is the most common early symptom

Peripheral vision loss and a gradually narrowing field of vision

Sensitivity to bright light

Loss of color vision

Source: National Eye Institute, Retinitis Pigmentosa

Vision Rehabilitation

Approaches

Addressing Low Vision and Blindness Due to Disease

- Evaluation
- Intervention
- Resources

Evaluation

Occupational Profile

Vision-related difficulties

ADLs, IADLs, work, school, leisure, etc.

- SRAFVP / SRAFVP-R
- COPM

Vision-specific issues with mobility

Psycho-social status

Evaluation (continued)

Cognition

Goals

Patient

Family

Use of technology

Phones

Tablets

Computers

Central visual field loss

Assessments

Scotoma interference

Reading

Contrast

Glare

Lighting

Peripheral visual field loss

Addressed in Neuro section

Depression scale

Mini mental, GDS

Cognition

Short blessed

Central visual field loss

Analyzing the scotoma interference for reading, writing and ADLs.

Reading assessments

- CCVFT
- SK Read
- MN Read
- Pepper test
- Colenbrander mixed contrast

Lighting and Glare

Lighting and environmental adaptations

Application of principles

Lighting, contrast, and glare

Glare filter

Intervention

Goal of OT

Low expectations

3 main types of intervention

- Occupation based
- Purposeful activity
- Preparatory

Peripheral visual field loss

Profound vision loss/Blindness

Intervention

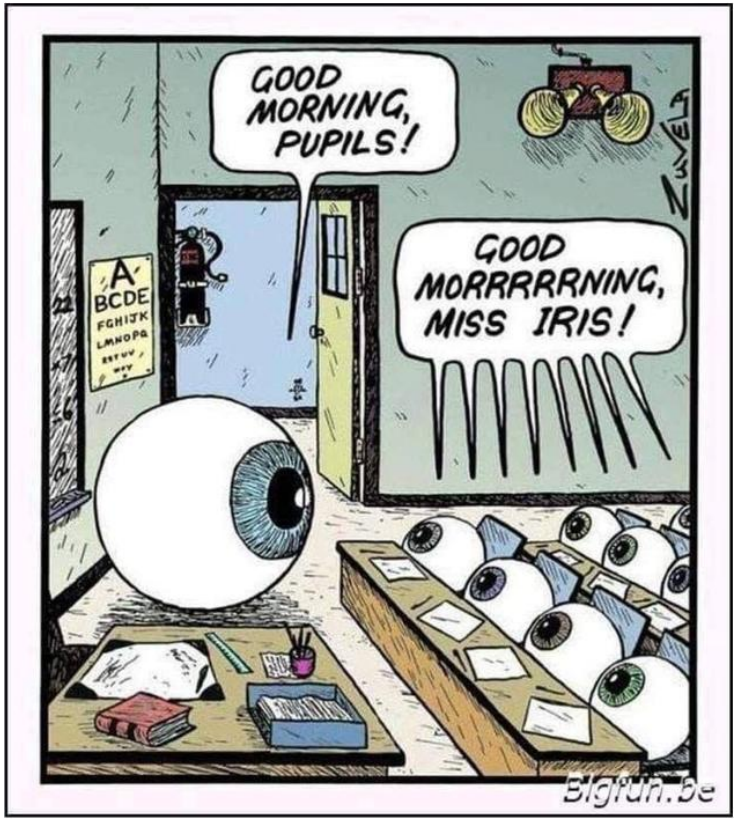
- ADLs
- Access to print
- Technology
- Mobility
- Caregiver training

Resources

- Non-profit organizations
- CTAP
- Audio books
- Hadley helps
- Script talk
- Podcasts
- YouTube channels

Conditions Related to Neurological Conditions

How Four Common Neurological Conditions Affect Vision



Neurological conditions and vision

Stroke, traumatic brain injury, concussion, acquired brain injury, and neurodegenerative disease each disrupt vision through different mechanisms and along different pathways.

This overview covers what each condition is and the visual impairments most associated with it.

Stroke/CVA

- Blood flow to part of the brain is interrupted by a blocked vessel (ischemic) or a bleed (hemorrhagic)
- Tissue is damaged
- Since so much of the brain is devoted to vision, visual symptoms are among the most common effects of stroke

Disorder	Typical presentation	Functional impact	OT priority focus
Homonymous hemianopsia	Loss of the same side of the visual field in both eyes	Runs into things, misses food/items, reading difficulty, mobility issues	Systematic visual scanning, environmental modification, compensatory strategies
Homonymous quadrantanopia	Loss of upper/lower quadrant	Missed items, difficulty on stairs, reading and mobility issues	Scanning and task/environmental modifications
Diplopia	Double vision, often with ocular motor dysfunction	Reading difficulty, balance issues, difficulty reaching for items accurately, ADL impairments	Coordinate with optometry/neuro-op; enlarge font to reduce visual demand initially
Ocular-motor dysfunction	Impaired saccades, pursuits, fixation, gaze control	Difficulty reaching accurately, visual search difficulty, reading difficulty	Functional visual tasks: locate targets on a table, wall or hallway; narrative scan; track moving objects (ball toss hand to hand, etc.)

Disorder	Typical presentation	Functional impact	OT priority focus
Reading-related visual dysfunction	Tracking, scanning, visual field loss or visual processing problems	Difficulty reading medication labels, instructions, etc.	Assess reading, work on visual skills and compensation strategies as appropriate: line tracking, visual anchors, reduced visual clutter

Functional signs of visual impairment

- **Missing food on one side of the plate**
- **Unable to locate items on a counter or utensils on a table**
- **Unable to read a label**
- **Difficulty negotiating a doorway or running into a wall**
- **Skipping lines, losing place, omissions, or not finding the beginning of a line while reading**

TBI/ABI

- TBI results from an external force such as an impact, blast or penetrating injury.
- ABI is a broad category that includes non-traumatic causes such as oxygen deprivation, infection or tumor.
- Much of the brain is devoted to vision, with pathways running through the brain, so vision is often impacted.

Focus Area	Visual Dysfunction	Description / Functional Impact
Focus	**Convergence & Accommodative Dysfunction**	Difficulty turning eyes inwards and adjusting focus for near tasks such as reading, computer use, looking at their computer and the white board in class, being able to track a ball in baseball or golf.
Motor	**Oculo-Motor Dysfunction**	Impaired saccades (quick eye movements between targets) &/or smooth pursuits which impacts reading, scanning, locating objects, and visually guided activities.
Field	**Visual Field Loss**	Partial or complete loss of portions of visual field, depending on location and extent of neurological injury. May impact environmental scanning, mobility, reading, and safety.

Focus Area	Visual Dysfunction	Description / Functional Impact
Sensitivity	**Photophobia**	Heightened sensitivity or discomfort in response to light, potentially interfering with reading, computer use, and classroom activities due to lighting, as well as participation in visually demanding environments.
Processing	**Visual Spatial Processing Deficits**	Difficulty judging distance, depth, position, orientation, and spatial relationships between objects. May affect navigation, reaching for items, dressing, transfers, and other occupations.

Concussion

- Mild traumatic brain injury
- A rapid acceleration, deceleration, or direct blow to the head causes temporary, functional disruption in brain activity rather than visible structural damage.
- Visual symptoms are among the most common and longest lasting complaints after concussion, even when imaging looks normal.

Focus area	Visual dysfunction	Description / functional impact
Focus	Convergence & accommodative insufficiency	Eyes struggle to team up for close work, often producing eye strain and headaches with tasks such as reading (books/computers) and paying attention to a task.
Motor	Saccadic dysfunction	Reduced accuracy or speed of quick eye movements impacts reading and scanning.
Sensitivity	Photophobia and visual motion	Discomfort with light and busy or moving visual environments impacts riding in a car/driving and being in crowds (mall, grocery shopping).

Focus area	Visual dysfunction	Description / functional impact
Clarity	Blurred or intermittent diplopia	Especially during or after visually demanding tasks. Impacts reading and screen use, with eye strain.
Balance	Visually induced dizziness	Triggered by visual input, reflecting disrupted visual vestibular integration.

Neurodegenerative Diseases

- Examples include Parkinson's, Alzheimer's, Multiple Sclerosis, and ALS
- These conditions involve progressive loss of neurons over time.
- Visual impairment varies with the disease and affected visual pathways or brain regions. Symptoms usually worsen gradually rather than appearing suddenly.

Focus area	Visual dysfunction	Description / functional impact
Clarity	Reduced contrast sensitivity	Difficulty distinguishing objects from similarly shaded backgrounds, plus reduced color discrimination. Impacts matching, ability to see writing, and items on a plate.
Motor	Oculomotor abnormalities	Slow saccades, impaired pursuits, or nystagmus vary by disease or stage. Impacts tracking on a communication device, looking between a mirror and the item in use, grooming, scanning the environment when walking or in kitchens and grocery stores, viewing TV, watching sports, and tele-types / closed-caption items.

Focus area	Visual dysfunction	Description / functional impact
Optic neuritis	Inflammation of the optic nerve causing pain and visual loss, most common in multiple sclerosis	Inability to read medication information. Difficulty seeing their face in the mirror, shaving, applying makeup, judging step/curb depth, reading a phone screen or text clearly, and reading labels.
Visuospatial & object recognition deficits	Difficulty recognizing faces or objects and judging depth, seen in posterior cortical atrophy in Alzheimer's	Difficulty identifying clothing, distinguishing front/back and arm/leg openings, and recognizing medication bottles. Safety concerns with walking, judging vehicle distance, recognizing signs, driving, tripping, and incorrect use of objects.

Neurologic Rehabilitation Approaches

Evaluation

OT evaluates key domains across all diagnoses

Occupations	Activities of daily living, instrumental activities of daily living, sleep, education, work, play, leisure, and social participation
Client factors	Body functions, body structures, values, beliefs, and spiritual needs
Performance skills	Motor and process skills, social interaction
Performance patterns	Habits, roles, routines
Context	Cultural, personal, physical, social, temporal, virtual

Evaluation

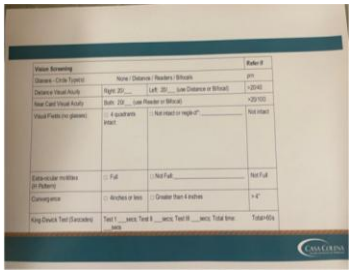
Functional evaluation is important across all diagnoses

Vision and mobility

- Acuity
- Visual fields
- Reading skills, including saccades and tracking
- Pursuits
- Convergence
- Accommodation
- Mobility: use of vision to navigate, find hazards and move through doorways

Assessment tools

- King-Devick
- Motor Free Visual Perception Test
- Bells Test
- Concussion: Rivermead Post-Concussion Symptoms Questionnaire (self-report)



Occupation-focused intervention

Connect the visual impairment to a specific occupational problem, then practice the compensatory or restorative strategy during meaningful functional activity.

Hemianopsia Use an anchor, turn eyes/head and scan systematically to locate a target.

Dressing, grooming, reading, meal preparation, walking

Poor visual scanning Practice organized vertical or horizontal scanning with increasing complexity.

Scan grocery or kitchen shelves, locate grooming items, navigate crowded rooms

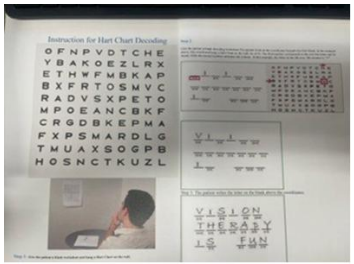
Oculomotor dysfunction Practice controlled saccades, fixation and shifting gaze, then incorporate into function when appropriate.

Reading, locating objects, reaching, mobility

Convergence insufficiency Teach an appropriate HEP, including Brock string.

Reading activities, writing, phone use, crafts

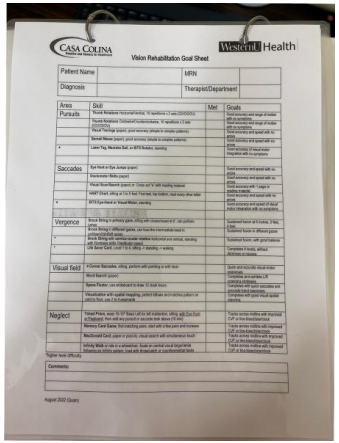




Intervention Goals

Collaboration

Neuro Op Vision Goal Sheet



Casa Colina | Western U Health

Vision Rehabilitation Goal Sheet

Patient Name		MRN	
Diagnosis		Therapist/Department	

Area	Skill	Met	Goals
Pursuits	Visuals Rotations: Horizontal/Vertical, 10 repetitions x 1 sets (CCW/CW)		Good accuracy and range of motion with no symptoms
	Visuals Rotations: Clockwise/Counterclockwise, 10 repetitions x 1 sets		Good accuracy and range of motion with no symptoms
	Visual Tracings (paper), good accuracy (shows to complete patterns)		Good accuracy and speed with no symptoms
	Reverse Maze (paper), good accuracy (shows to complete patterns)		Good accuracy and speed with no symptoms
	Laser Tag, Wanderer Ball, or BITS Rockets: standing		Good accuracy of visual motor integration with no symptoms
Saccades	Eye Hand or Eye Jumps (paper)		Good accuracy and speed with no symptoms
	Reactimeter Skills (paper)		Good accuracy and speed with no symptoms
	Visual Scan Boards (paper): A: "Cross out "A" with reading material		Good accuracy with 1 page or reading material
	HART Chart: sitting at 13 ft Read "Red Hat, top button, loud scary silver letter		Good accuracy and speed with no symptoms
	BITS Eye Hand or Visual Motor: standing		Good accuracy and speed of visual motor integration with no symptoms
Vergence	Brock String in primary gaze, sitting with crossbeam at 4": can problem		Sustained fusion at 2 inches, 3 feet, 6 feet
	Brock String in different gazes, can have the memorable beads to enhance/shift tasks		Sustained focus in different gazes
	Brock String with central vs peripheral visual fixation and vestibular, standing		Sustained fusion, with good balance
	Vision Rehab Activities: Wanderer Ball, Laser Tag, Reactimeter, Silly Bone Card, I Spy, Rockets, Bubble Wrap, Wanderer Ball		Completes 5 tasks, without dizziness or nausea
Visual field	4 Corner Saccades, sitting, perform with pointing or with item		Quick and accurate visual motor integration
	Word Search (paper)		Completes and scans L/R scanning strategies
	Space Fleshy: use whiteboard to draw 12 clock hours		Completes with accurate and possible head movements
	Visualization with spatial mapping, patient follows and matches pattern on card to floor, use 2-5 movements		Completes with good visual spatial planning
Neglect	Yahoo! Pillow, wear 10-20* Base Left for left inattention, sitting, with Dots Ball at Midpoint, then add any pounds or seconds limit allowed (15 max)		Tracks across midline with improved CAT at the Base/midpoint
	Memory Card Game, first matching pairs, start with a few pairs and increase		Tracks across midline with improved CAT at the Base/midpoint
	Macintosh Card, paper or pound, visual search with simultaneous touch		Tracks across midline with improved CAT at the Base/midpoint
	Infinity Walk: in lab or wheelchair, foods on central visual target time, followed an infinity pattern, load with dorsal pack or cognitive/visual tasks		Tracks across midline with improved CAT at the Base/midpoint

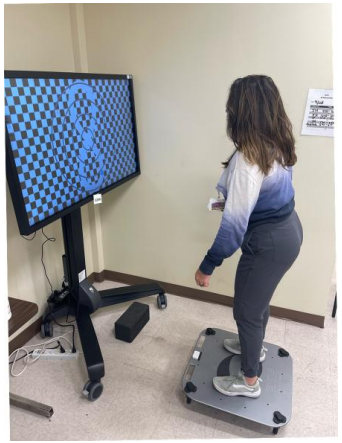
Higher level difficulties

Comments:

August 2022 (Quarc)

Visual motor task

Patients with concussion



Return to driving

Increased visual motion tolerance, dynamic and dual tasking



Intervention

Visual search activities

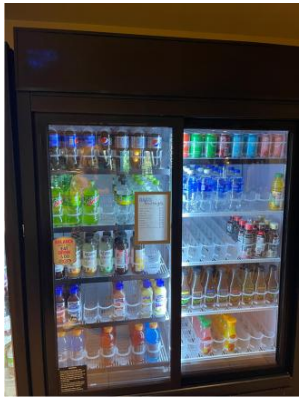
Structured visual scanning: narrative walks, BITs or Dynavision

Dual task

Motor and cognitive

Occupation completion

BADLs and IADLs: making lunch for children, grocery shopping, reading homework, completing classroom work, and playing a sport





Functional Vision Activities for Visual Impairments

OT interventions

- Structured visual scanning from left to right and right to left
- Anchoring strategies using a brightly colored visual marker
- Cancellation and visual search activities
- Functional item-location tasks
- Reading and environmental scanning
- Gradually increase visual complexity and distractors
- Practice scanning during mobility and ADLs
- Use real-world environments rather than relying exclusively on paper-pencil tasks

Occupational applications

Finding items in a refrigerator or cabinet
Locating grooming items
Reading menus/signs
Navigating hallways
Finding clothing in a closet
Community mobility





Oculomotor Dysfunction

Fixation activities

Controlled horizontal/vertical saccades

Pursuit activities

Near-to-far visual shifts

Visual target localization

Functional reading activities

Copying from a board/document

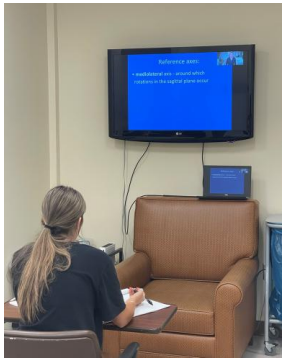
Computer-based visual tasks

Graded visual-motor activities



Convergence and binocular vision problems

Assess tolerance for near visual tasks
Graded near-point activities
Reading with controlled duration
Gradual increase in visual complexity
Frequent visual rest breaks
Modify print size, spacing, contrast, and working distance
Coordinate care with optometry/ophthalmology/neuro-optometry when binocular dysfunction is suspected



Visual field loss

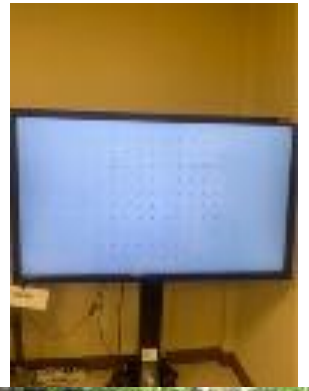
- Compensatory scanning training
- Systematic head and eye movement strategies
- Visual anchors
- Environmental organization
- Contrast enhancement
- Strategic placement of frequently used objects
- Mobility and environmental scanning
- Reading strategies

Hemianopsia

STOP → SCAN
LOCATE → VERIFY

Practice this during:

- Walking
- Dressing
- Meal preparation
- Reading
- Bathroom routines
- Community mobility





Functional integration for scanning skills

Daily activities

Incorporate scanning into:

Grooming
Dressing
Meal preparation
Transfers
Wheelchair mobility
Functional mobility
Community navigation





Reading difficulties

Use functional reading tasks:

Medication labels

Schedules

Emails

Menus

Recipes

Directions

Bills

Smartphone text

Compensatory strategies

Larger print
Increased spacing
Reduced visual clutter
Line guides
Highlighting
Anchoring
Shorter reading intervals
Increased lighting
Reduced glare
Electronic text modification

Collaboration

- **Team players**
  - Healthcare
  - Non-profit
- **Roles and responsibilities**
- **Scope of practice**

Discussion of Options for Specialization and Credentials

- SCLV
- OTCAVR
- CLVT

Case Examples and Discussion

Questions



References

NORA	Neuro Optometric Rehabilitation Association https://noravisionrehab.org
UAB Low Vision Certificate	https://www.uab.edu
AOTA	AOTA.org
Vision Education Courses	PESI, Medbridge, OccupationalTherapy.com
Duke Vision Rehabilitation OT Fellowship	dukeeyecenter.duke.edu

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Resources

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