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Case Studies for the Master Clinician: Vision Assessment in Home Care

Gina Green, MOT, OTR/L

Fawn Carson, MS, OTR/L, ATP

Gina Green, MOT, OTR/L

Fawn Carson, MS, OTR/L, ATP

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Learning Objectives

Participants will be able to:

- Describe the connection between vision and ADL and IADL completion.
- List three areas of vision impairment.
- Identify three common diagnoses associated with vision impairment.
- Recall three common vision screens.
- Explain three steps involved in completing a vision screen.
- Summarize how to complete one standardized vision screen.
- Discuss how vision impairment is related to falls as evidenced in the literature.

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Agenda

Part 1:

- Case Introduction

Part 2:

- Vision Overview

Part 3:

- Case Study Evaluation and Intervention

Part 4:

- Clinician Interview

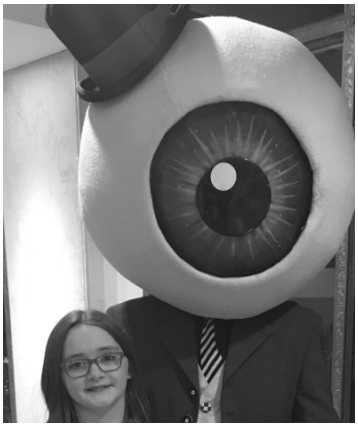
Part 5:

- Evidence-Based Practice

Vision Assessment in Home Care- Case Introduction

Presenter: Gina M. Green, MOT, OTR/L

My interest in Vision



Case Study Mr. S.

- I was recently referred to see Mr. S. for "home safety assessment and falls."
  - 89 y.o. male with minimal support
  - HS graduate with 1-2 years of community college
  - Diagnosis of CHF, COPD, and borderline diabetes
  - History of 3 falls in the past 6 months
  - Last seen by an optometrist 10 years ago

Home Environment

- Lived alone in a split level with 2 entryways
- Back stairs appeared unstable and were covered in snow.
- Entrance to the front of the house had one step and a very small landing.
- Upon entering, there were 7 steps up into the main living area and 7 steps down to the basement level with a wobbly handrail.
- Small crumpled up throw rug on the landing that he appeared not to notice.
- Laundry facilities in basement

Home Environment

- Main living area had throw rugs which were not secure, pathways are otherwise clear.
- Bedroom was not tidy with clothing items and 4 unidentifiable pills on the floor.
- Sleeps in full size bed and reports no difficulty with bed transfers.
- Bathroom has adequate space with a tub/shower unit, no grab bars or any additional assistive devices.

IADLs

- Mr. S. is responsible for driving, shopping, prepping light meals, and caring for himself and his home.
  - Reports difficulty caring for himself and relies more and more on fast food.
  - When I asked specifically about bathing Mr. S. stated "I do fine." As I pressed further, Mr. S. revealed he is sponge bathing because he is afraid to step into the bathtub.

Leisure

- Mr. S. spends most of his waking hours sitting in a recliner listening to jazz.

Initial Observations

- Deficits in hygiene- lenses of his glasses were filthy and clothing appeared disheveled
- Reported 3 falls in the past 2 months and stated falls were related to “tripping.” “I don’t know why.”
- Reports intermittent low back pain.
- For specific goals, Mr. S. responds that he would like to stay in his home but did not know if he could.

Vision Assessment in Home Care- Vision Overview

Importance of Vision

- We use vision for all aspects of our life.
- Vision is directly related to functional performance.
- ADLs and IADLs – reading, dressing, feeding, bathing, coordination, balance, work, leisure, etc.

Signs of Impairment

- Patient reports difficulties reading or no longer reads
- Frequent headaches
- Bumping into things
- Falling
- Missing objects
- Clumsiness
- Social Isolation
- Medication Non-compliance

Statistics

Estimated Number of Cases by Vision Problem Age ≥ 40 from NIH based on 2010 U.S. census

- Cataract
  24,409,978

- Glaucoma
  2,719,379

Images from NIH: National Eye Institute

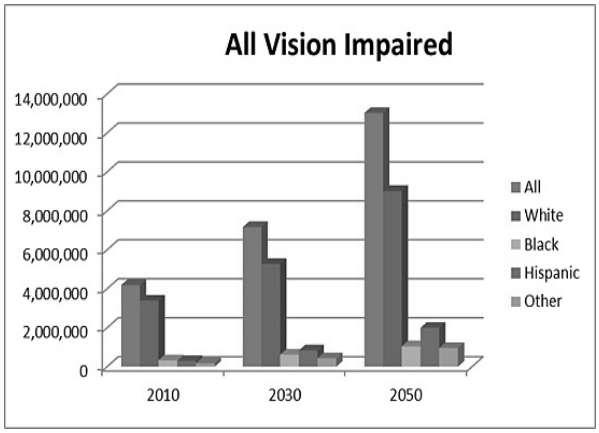
Statistics

- AMD
  2,069,403

- Diabetic Retinopathy
  7,685,237

Images from NIH: National Eye Institute

Vision Impairment Projections



NIH: National Eye Institute (NEI)

Legal Blindness/ Statutory Blindness

As defined by the Social Security Administration:

a. The Act defines blindness as central visual acuity of 20/200 or less in the better eye with best correction.

b. OR an eye that has a visual field limitation such that the widest diameter of the visual field in the better eye is 20 degrees or less.

c. If acuity is measured on newer test charts that can measure at 20/100 level and impairment is found, a person can be qualified as legally blind.

(2007 SSA update)

Low Vision

- Common Types of Low Vision
  - Loss of Central Vision
  - Loss of Peripheral (Side) Vision = Tunnel Vision
  - Blurred Vision
  - Generalized Haze
  - Extreme Light Sensitivity
  - Night Blindness

(https://www.aoa.org/patients-and-public/caring-for-your-vision/low-vision/common-types-of-low-vision)

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Important Eye Health Disorders for OT's

- Ptosis – drooping eye lid
- Optic nerve neuritis – optic nerve inflammation with loss of vision due to swelling and destruction of the myelin sheath
- Optic nerve atrophy – loss of fibers due to another disease

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Vision Specialists

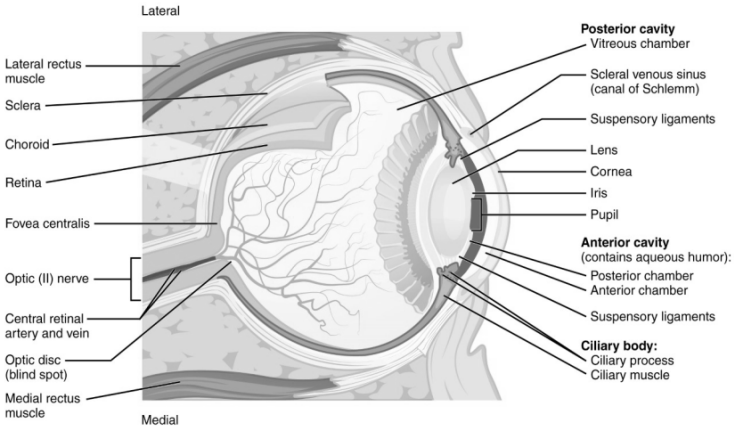
- Ophthalmologist
- Optometrist
- Optician

- Occupational Therapist
  - Specialty Certification SCLV or SCLV-A through AOTA

Academy for Certification of Vision Rehabilitation & Education Professionals

- ACVREP Statistics 2017
- ACVREP Certifications
  - Certified Low Vision Therapist (CLVT)
  - Certified Vision Rehabilitation Specialist (CVRT)
  - Certified Orientation and Mobility Specialist (COMS)
  - Certified Assistive Technology Instructional Specialist for People with Visual Impairments (CATIS)

Anatomy of the Eye



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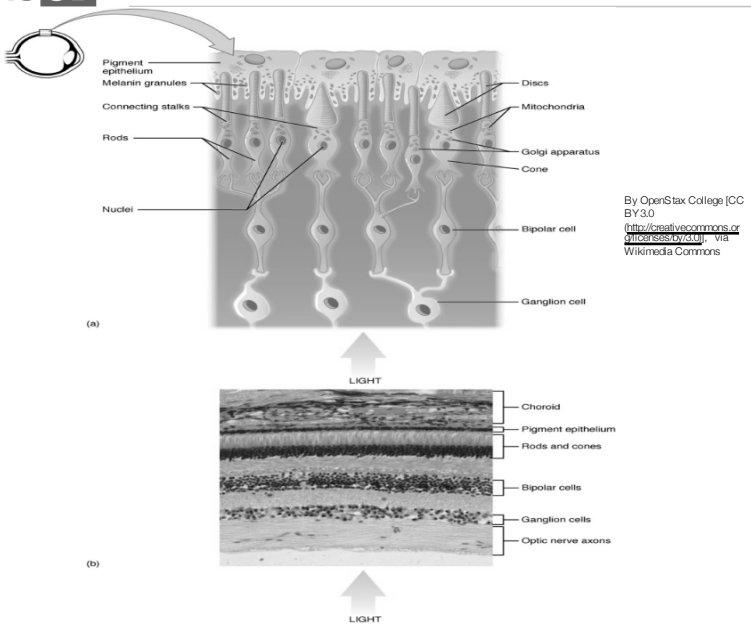
Anatomy of the Eye

- Optic nerve CNII– communicates from retina to brain
- Cornea
- Iris
- Pupil
- Lens
- Macula
- 6 small extraocular muscles – use to secure eye in the socket and control movement



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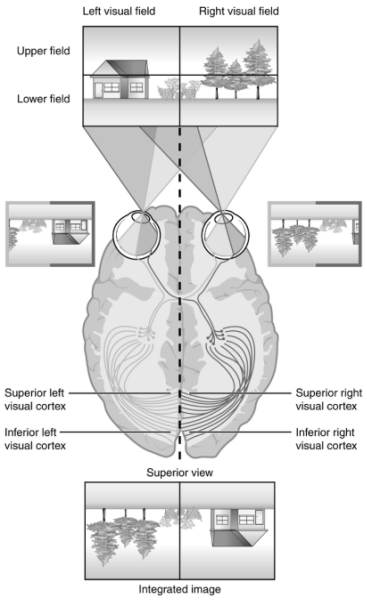
Visual Pathway



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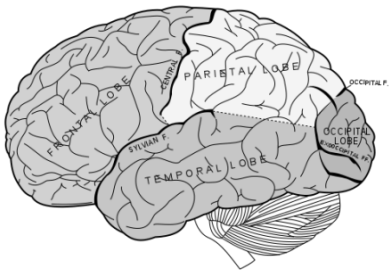
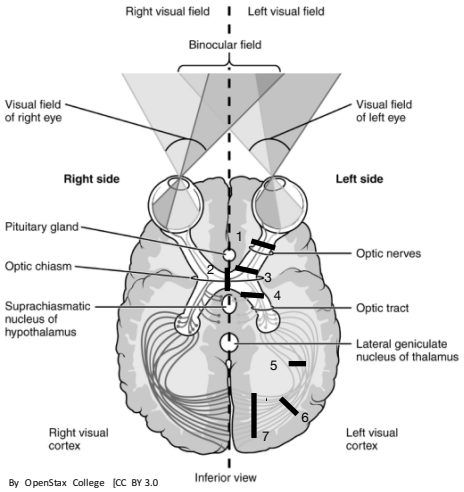
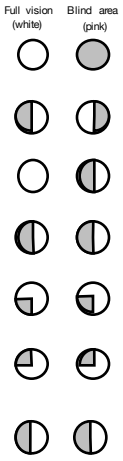
Role of the Brain

- Occipital lobe
  - Pursuits, visual attention and fields
- Posterior Parietal lobe
  - Spatial perception, personal space, body image, space localization







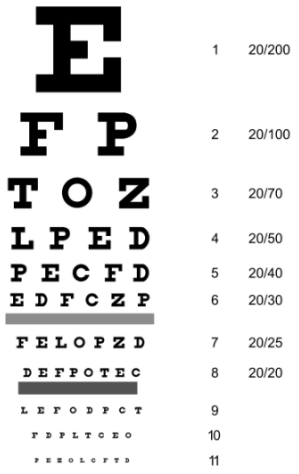
1. Lesion of R optic nerve: Total blindness of R eye
2. Midline chiasmal leasion: Bipolar hemianopia
3. Lesion in R perichiasmal area: R nasal hemianopia
4. Lesion or pressure on R optic tract: L homonymous hemianopia
5. Involvement of lower R optic radiations: L homonymous inferior quadrantanopia
6. Involvement of lower R optic radiations: L homonymous superior quadrantanopia
7. Lesion of right occipital lobe: L homonymous hemianopia

Acuity 20/20

- Best corrected vision
- 20/40: can read normal print and street signs but slowly and with more difficulty
- 20/60: can barely read a newspaper
- 20/200: can barely read a newspaper byline or chapter heading at 16”
- 20/500: can barely read a newspaper headline at 16”

Visual Acuity Testing

Snellen Acuity Chart



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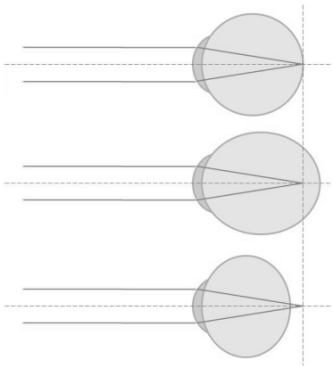
Refractive Disorders

- Refraction is the bending of light as it passes through one object to another.



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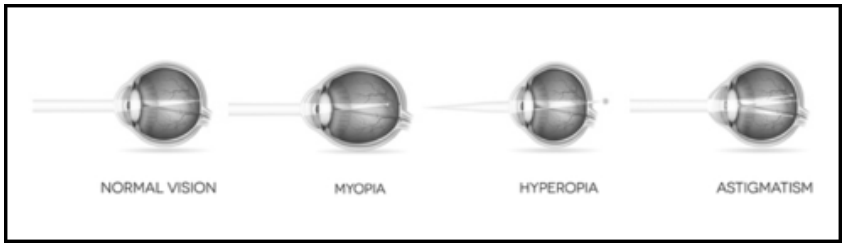
Acuity

- Refractive Disorders
- Nearsighted/Myopia – clear at near
- Farsighted/Hyperopia – clear at far
- Astigmatism – eye is not round, causes blurriness

By Ken Teegardin from Boulder, Boulder (Vision Of Eyechart With Glasses) [CC BY-SA 2.0 (https://creativecommons.org/licenses/by-sa/2.0)], via Wikimedia Commons

Vision Disorders



NIH: NEI

Contrast Sensitivity

- Measures your ability to distinguish between finer and finer increments of light versus dark (contrast).
- The difference in color and/or luminance in an object
- Increases fall risk
- Difficulty with driving (night, dusk, fog), reading, mobility (curbs), facial recognition (non-verbal cues), medication compliance and ADL's (putting on clothes, cutting food)

Pelli-Robson Contrast Sensitivity Test

Open Access-PubMed

Binocular Vision

By Downtowngal (Own work) [CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons

- Separate images from each eye combine into a single image
- Stereopsis - the perception of depth produced by the reception in the brain of visual stimuli from both eyes in combination
- Stereo fly or Randot test

Amblyopia

- Lazy eye
- Some common causes
  - Strabismus
  - Cataract
  - Ptosis

Ocular Alignment

- Diplopia (double vision)
- Coordination of both eyes
- Pictures in brain overlap
- Can cause headaches, poor spatial judgement and motion sickness
- Difficulty with reading, driving, walking and general task completion

By Jonathan Trobe, M.D. - University of Michigan Kellogg Eye Center (The Eyes Have It) [CC BY 3.0 (http://creativecommons.org/licenses/by/3.0)], via Wikimedia Commons

Visual Fields

- Loss of visual field
- Bumping into things, turning the head to see, slower reading, missing details, appears like neglect
- The patients compensate well
- Driving rules vary state to state, in Ohio the visual field is 70° in one eye and 45° in the other
- 8-25% of CVA patients have a field loss

Clinical Test for Visual Field Loss

- This is for field cuts NOT neglect
- Confrontation Test
  - Test all fields
  - One stimulus at a time
  - Any indication is confirmation
  - Test at 2:00, 4:00, 8:00, 10:00

Visual Fixation

- Ability to maintain focus on an object (often significant problems with TBI, CVA)
- Can assess with:
  - Focused reading test
  - How long can they read without coming off the text
  - Task completion with focus on objects, dressing, cooking, coloring, simple puzzles, saccades and tracking.

Applications To Practice

- Visual Assessments
- Videos

Vision Assessment in Home Care- Case Study Evaluation and Intervention

Evaluation

Strength/Balance:

- Tinetti Balance Assessment Tool – 20/28
- Functional Independence Measure (FIM) – 100/128
- MMT and ROM testing
  - MMT – grossly 4-/5
  - ROM – WFL throughout

Evaluation

Vision Screenings:

- Krug Vision Disability Screening Card (VDSC)
  - Reading rate - Pass
  - Contrast Sensitivity - Fail
  - Acuity – Pass at 20/100
  - Central Scotoma - Pass
- Confrontation Test
  - Visual field test – Fail - right inferior quadrant
- Stereo Fly Test
  - Stereopsis - Fail

Intervention

Home Environment:

- Removal of throw rugs/tack rugs down
- Stair glide (specific to VA patients) – to basement and living area
- Bathroom DME – shower chair, grab bar, tub mounted grab bar, bedside commode over toilet, hand held shower

Intervention

Vision:

- Based on the results of testing and observation, I recommended referral to an optometrist.
  - Mr. S. is at high risk for recurrent falls and has not been to see the eye doctor in 10 years.
  - His current glasses are old and in poor condition.
  - He failed contrast sensitivity testing and the Stereo Fly Test.

Intervention

- Home Exercise Program
  - Balance
  - Endurance
  - Strengthening
- Education
  - Falls risk prevention
  - Improved hygiene, including cleaning glasses

Intervention

Multidisciplinary Team Members:

- Nursing staff – pillbox filling and medication review
- Social Work – Guardian alert button, community resources, transportation, Home Health Aid
- Dietician – education on meal planning, carb counting

Mr. S. Outcomes

- Living independently
- Has a Home Health Aid 6 hours a week
- All DME is in place
- Was seen by Optometry for new glasses and further evaluation
- Meals on wheels in place
- Purchased new rugs with rubber backing
- Is attending programs at the senior center 2x/month

Clinician Interview

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Video 1: Confrontation Test

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CONTINUED

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Video 2:
Overview of the Krug Vision Disability Screening Card (VDSC)

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Video 3: VDSC Reading Box 1- High Contrast Text

60

61

62

Video 4: VDSC Reading Box 2- Low Contrast Text

(Contrast Sensitivity)

63

64

Video 5:
Amsler Grid

65

66

Video 6:
Legal Blindness Screen

CONTINUED

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CONTINUED

Vision Assessment in Home Care- Evidence-Based Practice

American Journal of Occupational Therapy

- Special Issue on Effectiveness of Occupational Therapy Interventions for Older Adults With Low Vision
- May 2013
- Volume 67 Issue 3

OT's Comfort Level

- Winner, S., Yuen, H. K., Vogtle, L. K., & Warren, M. (2014). Brief Report-Factors associated with comfort level of occupational therapy practitioners in providing low vision services. *American Journal of Occupational Therapy, 68,* 96-101.

Literature Addressing Vision and Falls

- Ivers, R., Optom, B., Cumming, R., Mitchell, P., Simpson, J., & Peduto, A. (2003). Visual risk factors for hip fracture in older people. *Journal of the American Geriatrics Society, 51*(3), 356-363. doi:10.1046/j.1532-5415.2003.51109.x
- Salonen, L., & Kivelä, S. (2012). Eye diseases and impaired vision as possible risk factors for recurrent falls in the aged: A systematic review. *Current Gerontology and Geriatrics Research, 2012*(26), 1-10. doi:10.1155/2012/271481
- Swenor, B., Simonsick, E., Ferrucci, L., Newman, A., Rubin, S., Wilson, V. & Study for the Health ABC (2015). Visual impairment and incident mobility limitations: The Health ABC Study. *Journal of the American Geriatric Society, 63(1),* 46-54.

Patients Perceptions

- Brundle, C., Waterman, H., Ballinger, C., Olleveant, N., Skelton, D., Stanford, P., Todd, C. (2015). The causes of falls: views of older people with visual impairment. *Health Expectations, 18,* 2021-2031.
- Cimarolli, V., Morse, A., Horowitz, A., & Reinhardt, J. (2012). Impact of vision impairment on intensity of occupational therapy utilization and outcomes in subacute rehabilitation. *American Journal of Occupational Therapy, 66,* 215-223.

Resources

Definitions of legal blindness:
https://www.ssa.gov/disability/professionals/bluebook/2.00-SpecialSensesandSpeech-Adult.htm

Vision specialist credentialing site:
https://www.acvrep.org/certifications/cvrt

Vision statistics:
https://nei.nih.gov/eyedata/adultvision_usa

Definitions for eye diseases:
https://www.mayoclinic.org/diseases

Resources

Finding low vision providers:
https://nei.nih.gov/lowvision/content/resources2

Visual processing:
https://www.visionweb.com/content/consumers/dev_consumerarticles.jsp?RID=28

Vision impairment and blindness fact sheet:
http://www.who.int/mediacentre/factsheets/fs282/en/

ICD 10 codes and definitions:
https://www.icd10monitor.com/looking-at-new-icd-10-cm-codes-for-blindness

WHO fact sheet:
http://www.who.int/blindness/Change%20the%20Definition%20of%20Blindness.pdf

Selected Vision Screening Tools

- Vision Disability Screening Card

https://www.precision-vision.com/product/krug-vision-disability-screening-card/

Selected Vision Screening Tools

- Stereo Fly Test

https://www.precision-vision.com/product/stereo-fly-test/

Additional resources:

Grue, E., Kirkevold, M., & Ranhoff, A. (2009). Prevalence of vision, hearing, and combined vision and hearing impairments in patients with hip fractures. *Journal of Clinical Nursing, 18,* 3037-3049.

Lakshmanan, Y., & George, R. J. (2013). Stereoacuity in mild, moderate and severe glaucoma. *Ophthalmic and Physiological Optics, 33*(2), 172-178. doi:10.1111/opo.12021

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Other Vision Screening Tools

- Pelli-Robson Contrast Sensitivity Test

http://psych.nyu.edu/pelli/pellirobson/index.html

- Visual Field Confrontation Test

Video demonstration

- Focused Reading Tests-

Can be informal looking at ability to read and maintain attention (normal reading rate for an adult is 200-300 words/min. at 6th grade reading level.)

Example of a standardized test:

Wechsler Test of Adult Reading™(WTAR™)

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Tinetti Balance Assessment Tool

- https://www.livingresources.org/images/stories/Requested_Documents/CHHA/Physical_Therapy_Forms/Tinetti_Balance_Assessment_Tool.pdf

Functional Independence Measure (FIM)

- https://www.strokengine.ca/en/assess/fim/

Occupational Profile

- https://www.aota.org/~/media/Corporate/Files/Practice/Manage/Documentation/AOTA-Occupational-Profile-Template.pdf

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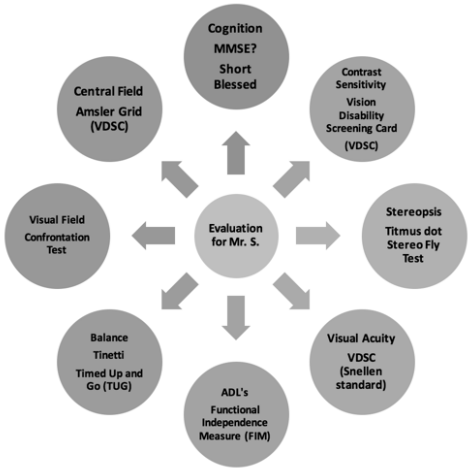
Concept Mapping- Evaluation



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Concept Mapping- Intervention

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If you want to expand your knowledge on vision…

In this course we have identified how to screen for vision impairments in a home health client. We also discussed the need for additional training and services. The following references provide an overview of some of these gaps and further identify the need for generalist OT practitioners to expand their skill set for patients with impaired vision.

- Berger, S. (2013). Effectiveness of occupational therapy interventions for older adults living with low vision. *American Journal of Occupational Therapy, 67,* 263-265.
- Barstow, A., Bennett, D., Vogtle, L. (2011). Perspectives on home safety: Do home safety assessments address the concerns of clients with vision loss? *American Journal of Occupational Therapy, 65*, 635-642.
- Brabyn, J. A., Haegerstrom-Portney, G., Schneck, M. E., & Lott, L. A. (2000). Visual impairments in elderly people under everyday viewing conditions. *Journal of Visual Impairment and Blindness, 94(12),* 741-756.
- Butler, M. (2016). The role of occupational therapy in visual impairment. *New Zealand Journal of Occupational Therapy, 63*(1), 31-33.