WHEN GLASSES AREN'T ENOUGH; INTEGRATING NEURO-OPTOMETRIC VISION THERAPY INTO STROKE RECOVERY

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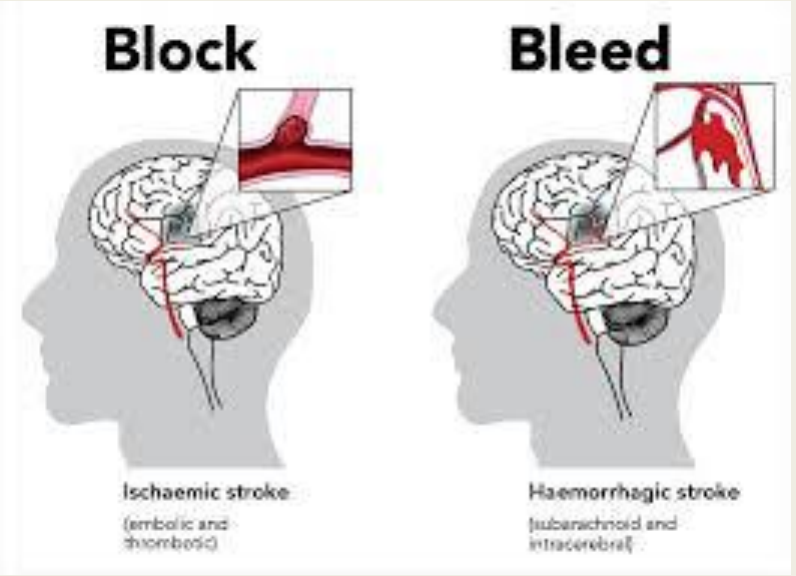
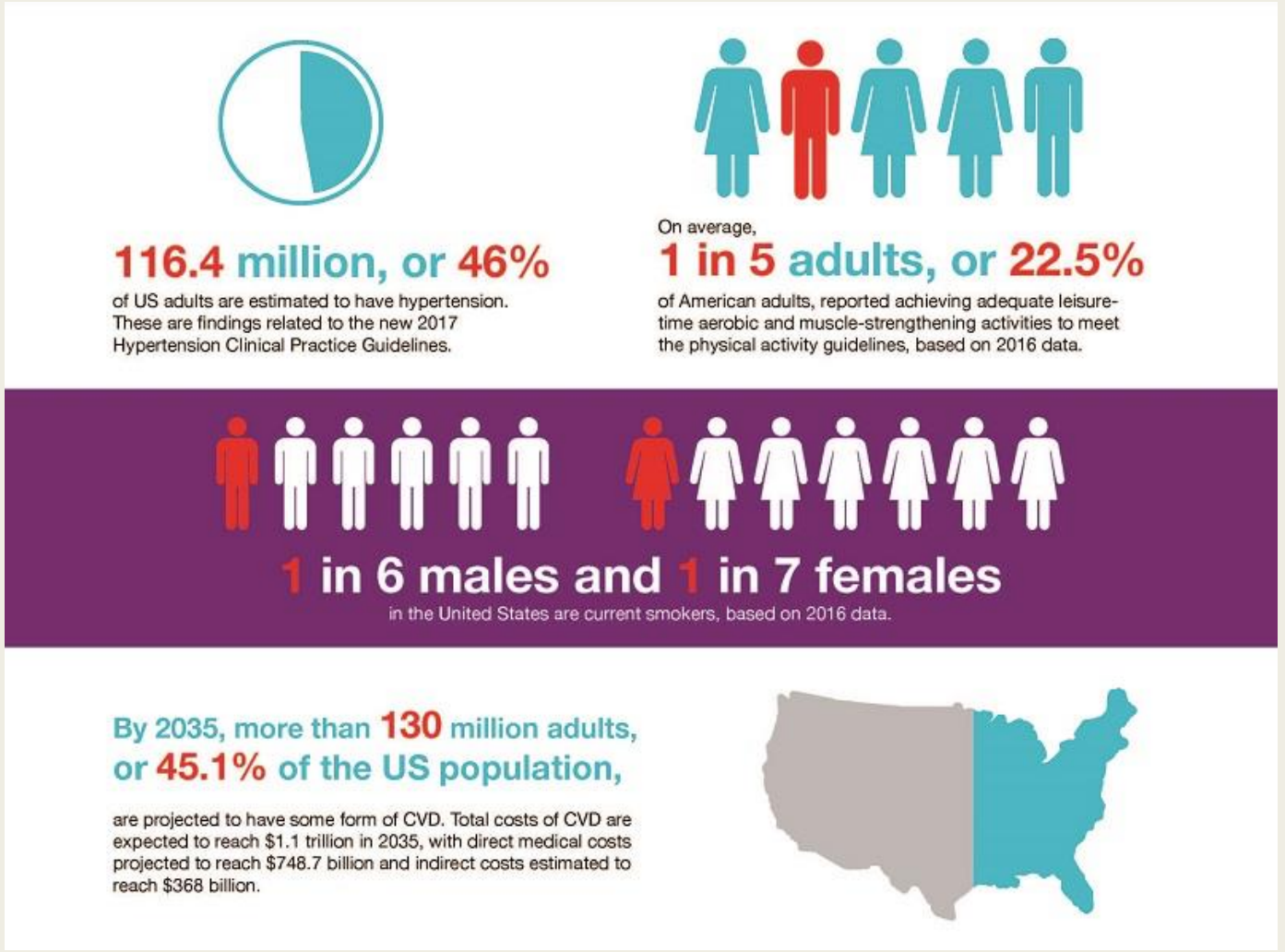
Stroke

- According to the American Stroke Association the definition is:
  - *A disease affecting arteries leading to and within the brain which causes cells to die because of hypoxia, or loss of oxygen.*
    - Ischemic: is caused by a clot that obstructs the flow of blood to the brain,
    - Hemorrhagic: is when a blood vessel ruptures, prevents efficient blood flow to the brain.
    - Transient ischemic attack (TIA) or “mini stroke”: caused by a temporary clot



Statistics

- United States has it documented that strokes are:
  - *#5 cause of death*
  - *The leading cause of disability among its citizens.*
- 80% of strokes are 100% preventable
- CDC reports strokes:
  - *Kill about 140,000 Americans each year – that's 1 out of every 20 deaths*
  - *87% of all strokes are considered ischemic, or clot induced*
- Yearly more than 795,000 people in the United states have a stroke, with 610,000 of these as first time, or new strokes



Commonly Known Stroke Symptoms

- Speech
  - *Trouble speaking, or slurring of words*
  - *Misunderstanding speech*
  - *Confusion*
- Headaches, vomiting, dizziness, or altered consciousness.
- Fall risk
  - *Loss of Balance*
  - *Stumbling or trouble walking*
- Dropping of one side of the face

Ocular Related Symptoms

- Field loss
  - *Most likely seen as a hemianopia, is the loss of one half of the visual field*
- Facial palsy
  - *The lower portion of the face is affected, while the forehead is spared.*
- Dry eye
  - *This lag in the lower eyelid exposes the cornea causing dryness.*
  - *When the eye is dry it can cause blurred and double vision.*
- Blurred vision
  - *Caused by dryness, or difficulty focusing*
- Double vision
- Phorias or Tropias
  - *Misalignment which can be vertical, horizontal, or a combination. Due to miscommunication with the cranial nerve responsible for eye posture*
- Decrease in tracking
  - *Deficiencies in saccades (fast) or pursuits (slow) or the eyes may wobble, known as nystagmus.*[4]

Vision Related Symptoms

- Vision processing is the link between our eyes and our brain. With a disruption in this link, our patients may be able to see clearly but their interruption is jumbled.

- Visual neglect
- Decrease depth perception
- Loss of recognition of objects and people

Let us compare…

Eyesight

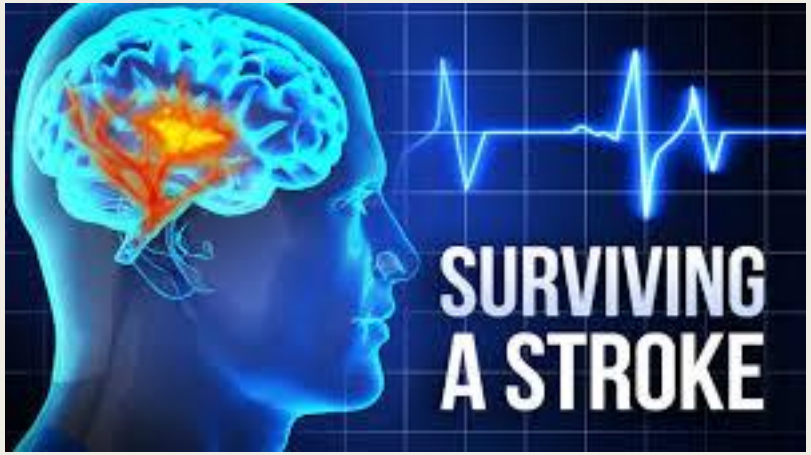
- The sharpness of vision
- It is the measured ability to identify letters, number, or figures on a standardized eye chart from a standardized viewing distance
- This is defined as “ability to see”, “rang of sight”, or “the sense of seeing”

Vision

- A broader term to describe how our brain perceives and interrupts what our eyes are seeing.
- Sharpness of sight
- PLUS
  - *Contrast sensitivity*
  - *Tracking moving objects*
  - *Color vision*
  - *Depth perception*
  - *Focusing ability*

Current Stroke Treatment

- Healthy lifestyle
  - *Diet, exercise, 6-8 hours of sleep nightly, decrease in stress/anxiety, avoiding or limiting alcohol and tobacco, etc.*
- Medications
  - *Antiplatelets, anticoagulants, antihypertensives, etc.*
- Therapy
  - *Physical therapy: gross motor*
  - *Speech therapy: slurred words, confusion, etc.*
  - *Occupational therapy: fine motor*



But what about Neuro-Optometric Vision Therapy?

- Currently not recommended in most treatment protocols
  - *Likely due to lack of knowledge, exposure, or confidence for referral*
- The visual processing and ocular motor teaming ability is said to “slowly improve with time”
  - *But why couldn’t we use Vision therapy to help speed along the process and cut down on the “waiting” period*
- Integrates:
  - *Optical therapy: mirrors, prisms, and lenses to position images into the line of sight*
  - *Eye movement: to retrain scanning, tracking, and strengthening the eye muscles to improve control.*

Therapy Activities

- Accommodation:
  - *Monocular/ Binocular flippers*
- Ocular Motility
  - *Hart Chart drills*
  - *McDonald Chart drills*
  - *Brock String and X string*
  - *Hand Eye Coordination*
  - *Pegboard rotations*
  - *Wayne Saccadic Fixator*
  - *Sanet Vision Integrator (SVI)*
    - Rotator
    - Saccades
    - Hand Eye
    - Verbal integration
- Binocular Localization/3D training
  - *Vectograms*
  - *Free space vergence activities*
    - Aperture Rule
    - Free Space Fusion
    - Barrel Card
  - *Computer Orthoptics VTS*
- Visual Thinking
  - *Cognitive Processing Therapy (CPT)*
    - Visual scanning
    - Tachistoscope
    - Visual Memory
    - Perceptual Speed
  - *Card games, puzzles, crosswords*

PATIENT CASES SEEN AT APPELBAUM EYE CARE

Case #1: Background

- 60-year-old African American male with complaints of double vision and listed as a fall risk due to decease in balance and gait.
- Referred from Neurologist and Neurophthalmology at John Hopkins
- Suffered 2 strokes in August 2019 secondary to history of:
  - *Diabetes, hypertension, hyperlipidemia, and congestive heart failure.*
- An acute right thalamic ischemic stroke with a subacute right midbrain stroke.
  - *Diagnosed by an MRI performed at John Hopkins*
- ”I’m just not myself anymore”
- “Sorry I have to keep asking you questions, I just keep forgetting”

Case #1: Exam findings

** Not our patient but very similar presentation*

- Reduced visual acuity with glasses: 20/25 OU, 20/40 OD, 20/40 OS
- Reduced Near Point of Convergence: 10 inches break/14 inches recovery
- 15-20 diopters of constant alternating exotropia with 10-12 diopters of right hypertropia at both distance and near.
- Facial drooping and occasional dry eye related symptoms
- Decreased balance due to truncal ataxia. This is what caused him to lean to the left when walking, occasional losing his balance. This also resulted in heaving breathing, decrease in endurance, and a shuffle like gait.

Case #1: How did vision therapy help?

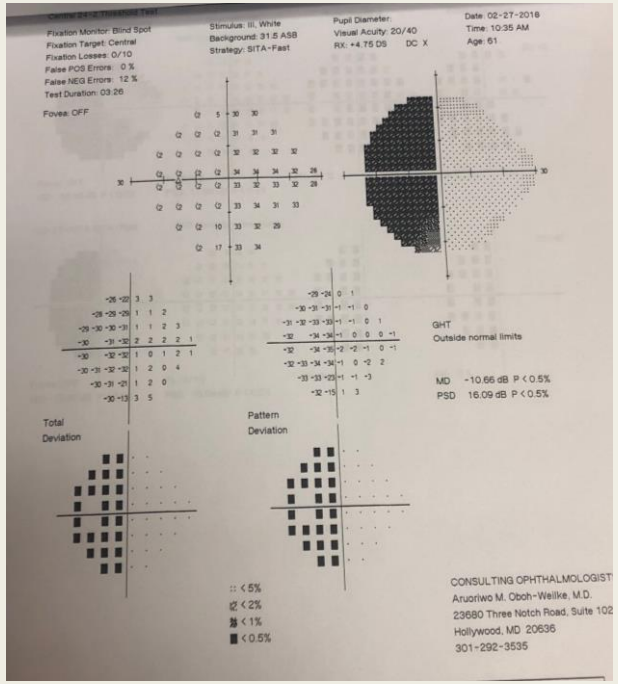
- Due to the large angle hypertropia, visual awareness of diplopia was explored with vectograms in order to retrain horizontal and vertical ranges vergence
- After about 8 sessions his vertical presentation went from about 10-15 diopters to 2-4 diopters of right hypertropia
- Increasing awareness of periphery to help strength balance, coordination, and awareness of surroundings using walking drills, Wayne Saccadic fixator, etc.
- This ultimately improved his balance and endurance
- Improvement in memory and recall but repetition and CPT programs
- Personality changes
  - *Started to get his sense of humor back*
  - *Smiling*
  - *More punctual*

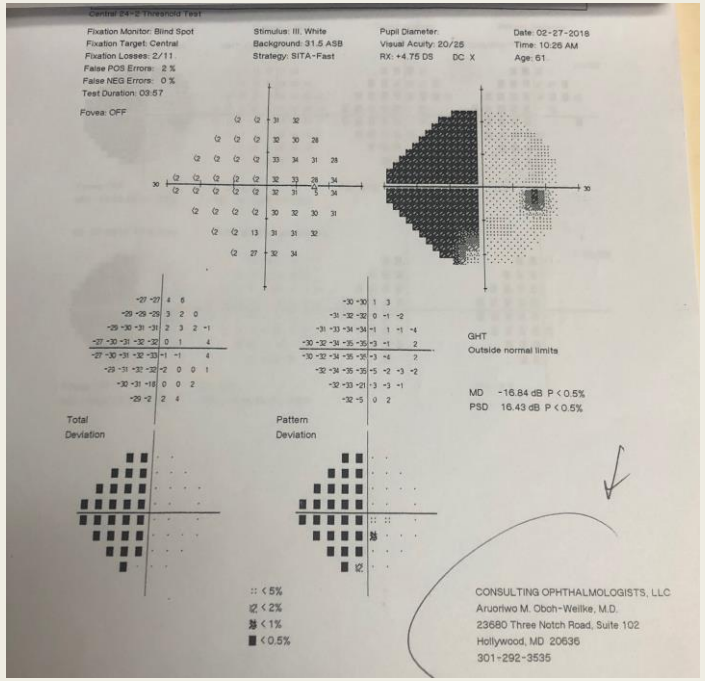
Case #2: Background

- 62-year-old Caucasian female with complains of loss of vision and left head turn.
- Suffered a stroke in August 2015
- Resulted in a left homonymous hemianopsia
  - *Respectful of vertical midline*
  - *Revoked Driver's License due to less than 140 degrees of visual field*
  - *Head turn towards the defect to compensate for loss*
- "I'm lost without my glasses, but they don't do much"
- "I feel like my independence has been taken away"

Case #2: Exam Findings

- Reduced visual acuity with glasses: 20/25 OU, 20/30 OD, 20/40 OS
- Reduced Near Point of Convergence: 12 inches break/18 inches recovery
- 1-2 diopters of exophoria and 1-2 diopters of left hyperphoria at distance
- 10-15 diopters of exophoria and 2-4 diopters of left hyperphoria at near
- Reduction in stereopsis, hand eye coordination, visual memory, and balance and coordination



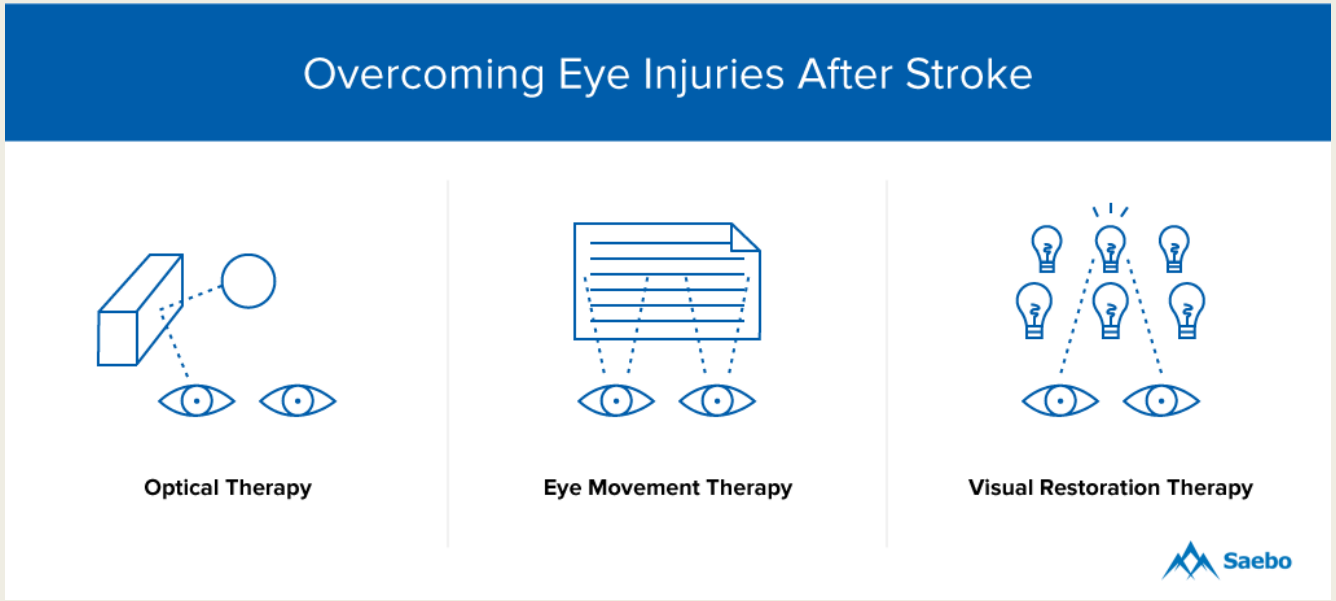


Our patient's HVF 24-2 (performed at Dr. Oboh-Weilke's practice). This shows the extent of her Left Homonymous Hemianopsia

Case #2: How did vision therapy help?

- Increased convergence and divergence and depth perception
- Strengthened visual memory, recall, and recognition with programs from CPT
- Decreased tendency of turning to compensate for the field loss
- Increasing awareness of periphery to help strength balance, coordination, and awareness of surroundings using primarily Wayne Saccadic Fixator
- More independent
  - *Started to cook for herself again*
  - *Grocery shopping on her own*
  - *Help care for her parents/father (stroke survivor)*

Conclusion



- Post-stroke difficulties in visual function are an under-recognized problem
- About one quarter of stroke survivors are of working age!
- Neuro-Optometric Vision Therapy helps to improve:
  - *perceptual speed, memory, and recognition*
  - *Adaptation to their environment*
  - *Sense of self*
  - *Quality of life*
- With patience and perseverance we can help to improve our patients' lives.

Resources

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