Converging Views: Impact, Assessment & Management of Acquired Brain Injuries

Sherry Rock OT Reg. (Ont)
Tammy Labreche OD, BSc
>400,000 Canadians living with disability as a result of stroke

• ~ 800,000 individuals experience a stroke each year
• Leading cause of disability
Possible Visual Consequences of ABI
• 26% of those with ABI reported trouble with their vision most of the time...

The OBIA Impact Report 2012
https://www.ontario.ca/img/ontario@2x-print.png
Following a cerebrovascular accidents...

• Typical visual symptoms may include:
  – Blur (sometimes intermittent)
  – Double vision
  – Difficulty tracking
  – Trouble focusing
  – Glare sensitivity and photophobia
  – Loss of peripheral vision
• May also report:
  – Eye strain/fatigue
  – Difficulties with balance and posture

Loss of Visual Function

• Decreased acuity
  – NB importance of good refraction!

• Decreased contrast sensitivity

Oculomotor control and accommodation

• Accommodative dysfunction
• Vergence issues/misalignment
• Version abnormalities
Visual Field Defects

• Homonymous VF defects

http://www.perkinselearning.org/videos/webcast/visual-fields
Visual Sequelae of Stroke

- Alignment/movement impairment – 68%
- Visual field impairment – 49%
- Low Vision – 26.5%
- Perceptual impairment – 20.5%

Visual Versus Perceptual?

http://ih2.redbubble.net/image.14161792.3742/flat,550x550,075,f.jpg
Attentional/Perceptual Changes

- Neglect
- Extinction
- Visual Midline Shift Syndrome
Neglect

• aka Unilateral Spatial Inattention
• Unawareness of one side of visual space
  – Personal
  – Peripersonal
  – Extrapersonal

Extinction

• Different from neglect??
• Selective impairment in awareness/response to a stimulus when presented simultaneously on both sides

Visual Midline Shift Syndrome (VMSS)

• aka Abnormal Egocentric Localization (AEL)
• Deviated perception of visual midline
  – Poor eye/hand coordination
  – Postural changes
  – Diminished ability to navigate environment

Functional Limitations of Visual Inattention/Visual Field Deficits

- Activities of Daily Living
- Instrumental Activities of Daily Living
  - Home
  - Community
- Leisure Interests

- Sand et al., 2015; Wolter et al., 2006; Warren, 2008;
- Warren, 2009)
Assessment Tools

http://www.toolscartoon.com/multimedia/images/GROUP.GIF
Refraction

• May need to consider trial frame refraction
Contrast Sensitivity
Oculomotor control/accommodation

• Proper prescription
• Vergences
• Accommodation
Visual Fields

http://www.customeyesvisioncare.com/user-files/visual_field.jpg

https://s-media-cache-ak0.pinimg.com/236x/1b/83/8c/1b838cc30369848251c5ccd76562452f.jpg
Neglect

Line Bisection


Copying Tasks

https://www.google.ca/search?site=&tbm=isch&source=hp&biw=1253&bih=875&q=visual+perception&oq=visual+perception&gs_l=img.3..0l10.5614.9027.0.10510.17.8.0.9.9.77.523.8.8.0...1ac.1.64.img..0.17.556.oA9hkNDFy48#tbm=isch&q=line+bisection+test&imgrc=zAFVd7J7Qx9pEM%3A
Extinction

https://www.clicktocurecancer.info/optic-nerve/images/2129_16_31-eye-schematic-confrontation-test.jpg
VMSS
Occupational Therapy Assessment

• Detailed Subjective Assessment (client & caregiver)

• Brief visual screen/
  Encourage client to get formalized eye assessment
Assessment Continued

• Generalized observation of client’s posture/movements

• Collaborate with other team members

• Functional Assessment
What to Watch For...

- Bumping into items
- Missing items
- Head position
- Posture when sitting (rotated/PPT/weight dispersion)
- Posture when standing (weight dispersion/rotation/pushing with hands)
- Hesitancy when walking
- Keeping close to the wall
- Hesitancy to come forward during a transfer or when scooting on bed
- Anxiousness when walking/standing/transferring

(Nijboer, T. et al., 2014; Berryman et al., 2010; Warren, 2008; Warren, 1998)
Bell’s Test

Created by Gauthier, Dehaut, and Joanette in 1989; http://www.strokengine.ca
Example of an Unorganized Search Pattern
Treatment: “Look” at the Whole Picture

(Berryman et al. 2010; Bierman et al., 2016; Hazzard, 2011)
The Task

• Make it motivating
• Make it functional if possible
• Consider the client’s impairments/skill level
• Ensure "the just right challenge"
• (Warren, 1998; Warren, 2008)
The Task

Incorporation of kinesthetic/motor input
(Berryman et al., 2010; Luukkainen-Markkula et al., 2009; Profitis, et al., 2013; Spaccavento et al., 2016; Warren, 2008)
The Environment

– Contrast
– Lighting
– Uncluttered environment
– Consistency
– Amount of distractions
– Size of environment
– Stationary/dynamic

(Warren, 1998; Warren, 2008)
Facilitation

• Anchors/visual cues
• Ask question versus tell client
• Encourage reflection/problem solving from the client
  • (Vossel et al., 2013)

Facilitation Con’t

**Lighthouse adaptation (Niemeier, 1998; Pereira Ferreira, 2011)**

http://d3seu6qyu1a8jw.cloudfront.net/sites/default/files/images/iStock_000013186131Medium.jpg

https://i.ytimg.com/vi/2e8v5DZYNaA/maxresdefault.jpg
• Proper Spectacle Prescription!
• Filters
• Vision Therapy
• Yoked prisms
• Magnification?
• Field Enhancement
  – Orientation and Mobility Training
Field Enhancement

Image courtesy of Eli Peli

http://archopht.jamanetwork.com/data/journals/ophth/6878/s_ecs70078f4.png
Facilitation: Collaboration is Key

- Ongoing client and caregiver education
- Managing expectations
Team Effort

• Collaborate with team members

• (Norup et al., 2016)
Grading The Task and Environment

• Provide the “just right challenge”
  – More compensation → Less compensation
  – Less cluttered → More cluttered scanning tasks
  – Small field → Larger field to scan
  – Stationary → Dynamic tasks
  – Less distractions → More distractions

  (Berryman et al., 2010; Warren, 1998; Warren, 2008)
Other Occupational Therapy Treatment Ideas

Scanning Boards

(Warren, 1998; Warren, 2008)
Scanning Wall

(Warren, 1998; Warren, 2008)
Light Show

(Warren, 1998; Warren, 2008)
Scanning Hallway
(Berryman et al., 2010; Warren, 1998; Warren, 2008)
Consider the Client`s Interests

- Flyers
- Money
- Magazines
- Menus
- Schedules
- Bookshelves
- Items from or in kitchen
- Items from or in bathroom
- Items from or in stores
- Card games
- Board games
- Puzzles
- Computer tasks
- Lego/constructional tasks
- Word Searches
- Books (cross out the “the’s”)  
  - (Berryman et al., 2010; Luukkainen-Markkula et al., 2009; Profitis, et al., 2013; Spaccavento et al., 2016; Pereira Ferreira, 2011; Warren, 2008)
Occupational Therapy Treatment

• Lots of homework
  – Scanning sheets
  – Functional tasks

  (Berryman et al., 2010; Proto et al., 2009; Vossel et al., 2013; Warren, 2008; Warren, 1998)
Scanning Sheets

Mark all R's.

R I N R U E R R V U W R X R U
E R T O R E B U Q R W R R R W
I Q R W V I R R R R S Z R N R Z
U Y R T D C N U T R R E S E D

Mark all O's.

O W O R I T O I C U O U B G O
W I N C U T P R O O H O E O S
O O E I O R I T H O O V B O O
W O R O O C V O R O T O O S Z

Mark all G's.

C R T C V I V C D C C S X C R
C C C S C R I T E N C X C S C
U C Y N C B H D C C E C G V C
C C E W Q O C D C J C H C G C

Cancellation Activities

P O J A U T O I B N O K J
P O T U O I T J A C Y J P I
U J V O I J I U G Y J L K M
L K S D J O I T U R E O S I
J S K V K N B U I Y R U K J
H Z I Y T Z Y F I U S G M F
N L K P O T K L M L Y P O Y
K M L K M K F D J G C H S C
K J S V J S A F U Y A B V D
K G H I U T E K J O I J N O
P J O I B I H U I G C Y U Q
Y V U G H I O V W J M O I N
J O R I O Y K P O P E I O W
U I W E H R U Q T R A B K J
N B M N L G K U P O M N M K O
I T S U G I N M N V K A Y
U Y F I U H P N K V N N V
M Z B V H U Z G F U Z G F Y
T Q G Y U E H T I H S Y J D
O J M L K N M L M N P B J N
D I O J G E O I U H F A U Y
Bringing It Together: Case Study

- 67 year old female
- CVA in July, 2016
- Inpatient rehab for approximately 3 months; transferred to outpatients
- Assessed in Outpatient Clinic in October, 2016 for OT and PT
- Goals:
  - 1) Achieve functional use of left upper extremity
  - 2) Increase independence in ADLs and IADLs;
  - 3) Increase independence in ambulation;
  - 4) Return to driving;
  - 5) Return to volunteer work
Functional Status

• Assistance for ADLs
• Dependent for most IADLs
• Reduced community involvement
Assessment Findings

• Cognitive and Perceptual Challenges:
  – Reduced attention
  – Missed items on the left/right when walking
  – Unorganized search pattern demonstrated on paper tasks
  – Found items on right before left on paper tasks
• Physical Challenges:
  – Left hemiparesis
  – Head tilted and turned to left
  – Left upper trunk rotated back
  – +++cuing to shift weight to left in sitting and standing
• Vision assessment findings:
  Best corrected visual acuity 6/6 OD, OS and OU
  Binocular vision within normal limits
  Contrast sensitivity mildly reduced
• Visual challenges:
  – ?resolving left hemianopsia
  – Unable to assess extinction
  – Right mid line shift???
Treatment

• Collaborated with and educated client, caregiver and multidisciplinary team
• Encouraged left to right scanning for all functional tasks
• Worked with left upper extremity in active support for all tasks
• Encouraged reflection
• Homework
• Prisms in therapy only
Outcomes

- Participating more in ADLs and IADLs
- Getting out with friends with supervision
- Walking with walker but still forgets about left hand
- With prisms: improved midline alignment
- Improved scanning pattern but continues to miss items
- Still requires cuing to scan left to right
Bell’s Test: Before Prism Adaptation Theory
Bell’s Test: After Prism Adaptation Theory
Take Home Message:

• Vision cannot be overlooked - it impacts everything
• No concrete recipe regarding assessment/treatment
• Team Approach
  • (Norup et al, 2016)
References


Hazzard, C. Advanced Handling and Problem Solving course notes. 2011.


Nijboer, T. et al. Prismaadaptation improves postural imbalance in neglect patients. Cognitve neuroscience and neuropsychology. 00(00): 2014: DOI:10.1097/WNR.0000000000000088


