Exploring Lack of Sensitivity in Cognitive Assessments for Mild TBI

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Tina’s Story

- 2015: Sustained injury
- 2016: Battery of post-concussion and cognitive tests performed
  - “You’re fine.”
  - “Speech and language therapy is not warranted given the patient’s cognitive profile is generally within normal limits…”
- 2017: Referred to neurologist
- 2018: Speech therapy
You’re Fine

- Executive functioning deficit

- Formerly easy tasks extremely difficult to perform
  - Information processing
  - Memory
  - Concentration

- Interpersonal interactions impacted
  - Disinhibition

- Energy level
  - Adynamia

Rabinowitz & Levin, 2014
Combined to Impact Identity

- Communications have 3 primary objectives
  - Identity
  - Relationship
  - Content

- Repeatedly informed providers that I was not “fine”
  - Listen to client
  - Compare baseline rather than focusing solely on current state
    - Consider educational attainment

- Avoid condescension
- Use intentional statements
Intentional Statements

- When working with a client, recognize that an “easy” task may be extremely difficult for the client.
- Use neutral language.
- Statements that imply level of difficulty may negatively impact sense of identity:
  - “This is simple.”
    - *Then why can’t I do it.*
  - “This is a game for children.”
    - *I’m not a child.*
Who is in the audience?

- Have you ever had difficulty referring for services or qualifying an individual with mTBI for services?
- Have you ever worked with an individual with mTBI who was several months to several years post-injury who had not received prior treatment?
Falling through the cracks

- Concussion is a complex pathophysiological process
  - Symptoms may be experienced immediately or may slowly evolve (days, weeks later)
  - It is difficult to assess the extent of injury at the time of concussion due to metabolic changes

- Standard imaging studies may not show remarkable changes in the brain

Crawford & Sirmon-Taylor, 2014
Limitations of acute-care intervention

- Not everyone who sustains a mTBI goes to the ER
  - May be sent home due to lack of evidence on imaging studies
- Only a small percentage of individuals with concussion are admitted for short-term stays
- Brief evaluation and subsequent discharge when speech and language appear intact
  - Evaluations are short and do not challenge communication and cognitive skills
- May not report difficulties during stay in acute care is not comparable to the demands individuals may have at home, school, or work

Crawford & Sirmon-Taylor, 2014
Limitations of Inpatient Rehabilitation and Outpatient Rehabilitation

- Not many individuals with mTBI are admitted for inpatient rehab
- May not be referred for outpatient rehabilitation promptly after injury

Limitations of Primary Care and Urgent Care Clinics

- Limited awareness, sensitivity of assessment measures, turnover in providers
- Referral to emergency room- cycle begins again!

Crawford & Sirmon-Taylor, 2014
The “Miserable Minority”- Persisting Concussion Syndrome (PCS)

- Somatic complaints
  - Headache, dizziness, fatigue…

- Cognitive complaints
  - Deficits in attention, memory, information processing speed…

- Behavioral changes
  - Irritability, apathy,…

- Psychological complaints
  - Anxiety, depression, sleep disorders…

Azouvi et al., 2017
Long-term cognitive and emotional consequences of mTBI

- Struggles in work and school
  - Job loss or dropping out
- Decreased participation in productive activity
- Restructure of family roles
- Depression, anxiety
- Loss of identity

Konrad et al., 2011
Healthcare Providers that may Specialize in Brain Injury

- Neuropsychologist
- SLP/OT/PT
  - Specialty services
- Psychologist
- Sports Medicine Doctor
- Physical Medicine and Rehabilitation Doctor
- Driving Rehabilitation Specialist
- Neurobehavioral Optometry
Following Up

- Are you ensuring your clinic has the most up to date literature for brain injury resources and services in your community?
- Are you ensuring that local healthcare offices have the most up to date resources from your facility?
- Verbal discussion was completed and paper resources were provided to your client with a brain injury, and they now know who to call for services.
<table>
<thead>
<tr>
<th>Location</th>
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<th>Address</th>
<th>Notes</th>
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<td><strong>Lansing North</strong></td>
<td>Sparrow Outpatient Rehab</td>
<td>1200 E Michigan Ave</td>
<td>South of Grand River</td>
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<tr>
<td></td>
<td>St Lawrence</td>
<td>1210 W Saginaw St</td>
<td>Pennsylvania &amp; Michigan</td>
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<td>Saginaw &amp; Martin Luther King</td>
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<td>McLaren Regional Med</td>
<td>3333 S Pennsylvania, Ste 100</td>
<td>Btw Dunckel &amp; Collins</td>
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<td>3937 Patient Care Dr., Ste 105</td>
<td>Genesis Medical Center</td>
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<tr>
<td></td>
<td>Physiotherapy Associates</td>
<td>5400 S Pennsylvania Ste 2</td>
<td>N of Cavanaugh .5 miles</td>
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<td>C Weaver</td>
<td>1720 Abbey Rd</td>
<td>Coolidge &amp; Abbey</td>
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<td>Compas</td>
<td>250 East Saginaw</td>
<td>Abbott &amp; E Saginaw</td>
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<td>Kuirsta A. Carlson, PT</td>
<td>2775 E Lansing Dr</td>
<td>Haslett &amp; Merritt</td>
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<td>MSU Rehabilitation</td>
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<td>Hagadorn &amp; Hannah</td>
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<td>Lake Lansing &amp; Harrison</td>
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<td>Sparrow Health Pavilion MAC</td>
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<td>St Joe Hwy &amp; Snow</td>
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<td>Empower</td>
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<td>Hayes Green Beach Mem Hosp.</td>
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Ensure that provider lists are organized and updated regularly
- “Our speech pathologist left”
- “We’re not accepting new patients.”
- “We don’t provide that service any more”
- “We only work with children”

Advertise
- Develop brochures of services for health care providers
- Television
- Social media
Follow Up with the Client

- Working through lists of providers requires complex thinking and planning
- Individuals with TBI may
  - Conflate information
  - Have difficulty remembering to seek service
  - May find the effort to find needed services exhausting
  - Become confused after multiple failed attempts to find services
The Evaluation Process- Critical Thinking (YOU are the Expert)

- Informal observations and formal measurements for
  - Verbal, visual, spatial, and prospective memory
  - Orientation
  - New learning
  - Selective attention
  - Alternating attention
  - Divided attention
  - Visual and auditory sustained attention
  - Verbal working memory
  - Skills necessary for functioning during daily tasks and responsibilities
  - Communication, pragmatics, and interpersonal skills
Standardized Assessments

- There are a myriad of standardized assessments available for various rehabilitation specialists

- Beware of “average” results
  - Recognize that far ends of the bell curve will not be well-represented during the standardization process

- Opt for assessments that are normed based on education-level
  - Woodcock-Johnson IV Test of Cognitive Abilities
  - Woodcock-Johnson IV Test of Oral Language
Difference in Education-Based Norms

Z-scores from Age-norms

Z-scores from education-norms

TABLE OF SCORES
Woodcock-Johnson IV Tests of Cognitive Abilities (Norms based on age)

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<thead>
<tr>
<th>CLUSTER/Test</th>
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<th>GE</th>
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Woodcock-Johnson IV Tests of Cognitive Abilities (Norms based on grade 17.9)

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Use of Task-Switching Tasks

- Individuals with concussion suffer deficits in ability to maintain and allocate attention within and between tasks.
- Task-switching paradigms require individuals to actively switch the manner in which stimuli and responses are mapped to each other.
  - 2014 study indicated that individuals with concussion had significantly larger switch costs than controls.
- Switch cost differences maintained throughout the 1-month testing period.

Mayr et al., 2014
Demo Resource for Task-Switching Paradigm

- https://www.psytoolkit.org/experiment-library/experiment_taskswitching.html
- Tutorial
- Test Phase
- Provides data of all results

Response times (RT in ms):

- RTs in single-task blocks: 659 ms
- RTs in mixed block, task-repeat trials: 860 ms
- RTs in mixed block, task-switch trials: 1350 ms
- Task switch cost in RTs: 490 ms

Press space bar to continue
Consideration of emotions in concussion recovery - UPFRONT Study

- A prognostic model of 6-month functional outcome for adults with mTBI

- Data Collection Points
  - ER Visit, 2 weeks, and 3-, 6-, and 12 months
  - Points at 2 weeks and 6 months were used for the study

Van der Naalt et al., 2017
Variables and predicted outcomes:

- **Emergency Department Model**
  - Complete recovery rates were higher for those 65+ years than those 40-64 years (58% vs 49%)
  - Effect of education: better recovery rates for those with higher education

- **Emergency-Department Plus Model**
  - Higher scores on depression scale, more post-traumatic complaints, and use of passive coping style were predictive of incomplete recovery
  - Higher scores on anxiety scale and use of avoidant coping style were predictive for better outcomes, perhaps due to protective value

Van der Naalt et al., 2017
Assessments of the Future?

- Computerized Cognitive Testing in the ED
  Lunter et al., 2018

- Robotic-Assisted Assessment
  Subbian et al., 2016
Hierarchy of Cognitive Functions

- Neurofatigue
- Adynamia/Disinhibition
- Attention/Concentration
- Information Processing
- Memory
- Executive Functions
- Compensation
  - Acceptance

Awareness
Strategies

- Executive Functions
- Memory
- Information Processing
- Attention
- Adynamia
- Disinhibition
- Neurofatigue
Final Activity

- Think for a moment, then share
  - The most important thing that I learned was…
  - What I wonder now is….
  - The one thing that I want to do, or do differently, in the next 30 days is…
    - Write it on the index card
    - Place the card in the envelope
    - Address it to yourself
  - We’ll mail it back to you in 30 Days
What’s routine for you, is not routine for those you serve every day.


