



# Changes, Challenges and Solutions: Cognitive Deficits after TBI

Sarah West, Ph.D.

Holley Stamper, LCSW, CBIS

## Learning Objectives

1. Be able to describe the characteristics of brain injury
2. Identify changes and challenges in cognitive functioning that can arise after TBI
3. Learn techniques and strategies to address cognitive deficits
4. Be knowledgeable regarding community based resources for brain injury

## Brief Introduction to Brain Injury

- Acquired Brain Injury (ABI): an injury to the brain, which is not hereditary, congenital, degenerative, or induced by birth trauma. An acquired brain injury is an injury to the brain that has occurred after birth.
- Traumatic Brain Injury (TBI): is an injury to the brain caused by an external force after birth
  - Such as from a car accident or fall



## Severity of Brain Injury

- Mild- concussion, brief loss of consciousness (<30 min.) or posttraumatic amnesia (<24hrs.)
- Moderate/Severe- loss of consciousness (>30 min) or posttraumatic amnesia (>24 hrs.)
- Glasgow Coma Scale (GCS)- a rating of severity
  - Mild- 13-15, Moderate 9-12, Severe 3-8

## Symptoms of a TBI

- Motor Impairment
- Challenges with daily tasks
- Personality Change
- Emotional Functioning
- Cognitive Impairment

## **Physical and Functional Changes**

- Hemiparesis
- Decreased balance/stability
- Fine motor impairment
- Vestibular disturbance
  
- Impacting activities of daily living
  
- Refer to physical and occupational therapy

## Personality/Mood Changes

- Individuals with frontal lobe injuries, in particular, can experience changes in personality and behavior
  - disinhibition, impulsivity, apathy, lability, decreased insight
- Depression and anxiety can be common
  - etiology can be from the brain injury v. reaction to the brain injury

## **Treatment for Personality/Mood**

- Neuropsychological intervention
  - Such as psychotherapy
- Behavioral Modification
  - Such as a behavioral treatment plan
- Psychopharmacological Intervention
  - Refer to specialist, such as neuropsychiatrist or  
physiatrist



## Cognitive Impairments

- Major domains of cognitive functioning that can be affected in TBI:
- Attention
- Processing Speed
- Language
- Memory
- Executive Functioning

## Attention

- Attention is considered to be the “building block” or “doorway” to performing higher level cognitive skills.
- Attention is a cognitive process of focusing on one or more external stimuli in the environment or focusing on one’s internal thoughts.
- Attention is the first stage of memory

## Attention

- Types of Attention
  - Selective Attention
  - Divided Attention
  - Alternating Attention
  - Sustained Attention

## Selective Attention

- The ability to focus on a particular stimulus,
  - while limiting environmental distractions
- Examples of Selective Attention at Work
  - Able to concentrate on a work task, despite working in a busy environment
  - Professional Athletes utilize selective attention, while playing in a noisy stadium of fans

## Selective Attention

- When impaired, selective attention can also be detrimental to success in the work environment
- Examples
  - Transportation drivers need to be aware of changes in their environment
  - Customer service representatives need to be able to multi-task

## Divided Attention

- The ability to focus on two or more tasks at the same time.
- Example of divided attention in the work environment:
  - Listening to a work presentation, while doing work on a laptop.
- Studies have shown that multitasking can diminish performance with either individual task

## Alternating Attention

- Ability to shift focus from one task to another
- Example of alternating attention:
  - A mechanic changing an alternator needs to check different parts of the car to make sure it's working properly

## Sustained Attention

- Ability to maintain attention to a specific task for an extended period of time
- Examples of Sustained Attention
  - Completing a work report
  - A teacher grading school papers



## Processing Speed

- In addition to attention, processing speed is most commonly negatively impacted in a brain injury
- Processing speed- speed of thinking, quickness in taking in information, thinking about it, generating a response

## Processing Speed

- Processing speed can result from “blocked lanes” on the brain’s “highways”
- Think of your internet browser when it takes a while to open

## Language

- Expressive Language- ability to express thoughts/verbal output
- Receptive Language - comprehension
- Aphasia: This is a condition associated with TBI involving impaired language with expressive and receptive can be affected.

## Language

- Refer to a speech and language pathologist if language impairments is a concern
- General Communication Techniques:
  - Communication Boards
  - Assistive Technology
  - Improve intelligibility
- Speech consultation services can address swallowing difficulties

## Memory

- Stages of Memory in Sequential Order:
  - Attention
  - Encoding
  - Storage
  - Retrieval

## Memory

- Short-Term Memory- more likely to be affected in TBI
  - Such as remembering what you ate yesterday
- Long-Term Memory- generally preserved in TBI
  - Such as remembering events in childhood, name
- TBI v. Dementia- in later stages of dementia long-term memory impairment is notable

## Executive Functioning

- Definition: Integration and management of multiple cognitive skills
  - These complex processes enables individuals to attain goals and perform everyday activities.

## **Executive Functioning**

- Executive-Functioning includes:
  - Attention
  - Memory
  - Novel Problem-Solving
  - Cognitive Flexibility
  - Self-Awareness
  - Organization and Planning
  - Initiation
  - Behavioral Control



## **Measuring Cognitive Functioning**

- Neuropsychological Testing: Utilizing a battery of standardized assessments to measure cognitive skills
- Generally assess attention, memory, visual-spatial skills, language, processing speed, working memory, and executive-functioning

## **Measuring Cognitive Functioning**

- Can also assess emotional functioning and daily-functioning
  - Texas Functional Living Scale
  - BDI
  - MPAI
  - Quality of Life

## Cognitive Interventions

**Compensatory strategies** are environmental modifications or behavioral **strategies** designed to bypass persistent impairment in attention, memory, executive-function, and/or other cognitive skills as a means to achieve desired rehabilitation goals

*Matthew M. Kurtz, 2011*

## Cognitive Interventions

- Attention Process Training
  - Computer based training program with therapist intervention
  - Determine where the deficits are
    - (i.e. types of attention)
  - Selected tasks reinforcing those skills
  - Get immediate feedback about performance
  - Add in strategies

# **Attention Deficits and Compensatory Strategies**

- Attention Strategies
- Limit Environmental Distractions
  - Slower paced environments
  - Private work space

## Attention Deficits and Compensatory Strategies

- Participate in a structured schedule
  - Avoid alternative work schedules
- Incorporate Breaks
  - Schedule breaks to reduce cognitive fatigue

# **Processing Speed Deficits and Compensatory Strategies**

- Time Pressure Management
  - Plan in Advance
  - Try to Prevent Time Pressure
  - Manage the Environment
  - Plan!
- Repeat information to individual

## **Memory Strategies**

- Chunking: Organizing information into meaningful groups
  - Chunking numbers of a phone number
- Mnemonics: Memory Aid Techniques
  - Acronyms, Rhymes, Image-Name Technique
- Verbal Rehearsal



## Memory Strategies

- Utilizing multiple modalities helps encoding information into long-term memory, such as linking words with images
- Mnemonics
  - MIMAL to remember middle states

## Memory Strategies

- Association of Information
  - Association new task with well-learned one
- Categorization
  - Group into category, grocery list
- Visualization
  - Created a picture in mind of what you need to remember

## External Memory Aids

- Utilize checklists
- Develop a personal note-taking system
  - Memory journal, Post-its, Voice recorder
- Use everyday technology as assistive devices for memory
  - Smartphones, iPads, Computers

## External Memory Aids

- Examples of Technology Memory Aids
  - Electronic notepads on smart/tablets

## **External Memory Aids**

- Electronic calendar on phones or computers
- Alarms/Alerts on devices

## Family/Caregiver Strategies

- Put up signs or sticky notes
- Hang calendar on refrigerator or prominent place
- Leaving items visible (i.e. for appointments)
- Verbal prompts/cues

## **The Importance of Place and Train in Brain Injury**

- Practice strategies in home and community
- Eliminates generalization of skills
- Provides opportunities to help build natural supports

## **Rehabilitation Services for TBI**

- Cognitive Rehabilitation Therapy
- Speech Therapy
- Occupational Therapy
- Physical Therapy
- Neuropsychological Services



## **Rehabilitation Services for TBI**

- Day Programming
- Residential Services
- Home and Community Cognitive Rehabilitation
- Therapy
- Vocational Rehabilitation



## **TBI Community Resources**

- Brain Injury Association of America
- Brain Alliance of NJ
- Division of Vocational Rehabilitation
- Medicaid Long-term Services



## TBI Community Resources

- Paratransit Services
- Rehabilitation Driving Assessments
- College Disability Services
- Brain Injury Support Groups



## Funding Sources

- TBI Fund
- Worker's Compensation
- Division of Vocational Rehabilitation
- Private Insurance



# Questions and Comments