


SHEPHERD.ORG

# BRAIN INJURY REHABILITATION: FAMILY EDUCATION

---


 Shepherd Center | 2020 Peachtree Road, NW, Atlanta, GA 30309-1465  
 404-352-2020

1


SHEPHERD.ORG


## OUTLINE

Part 1:  
– What is Brain Injury Rehabilitation at Shepherd?

Part 2:  
– What is a Brain Injury?  
– Neuroanatomy Basics

Part 3:  
– What Happens Next?  
– Family Support




 Shepherd Center

2

SHEPHERD.ORG

## Part I: Rehabilitation Program



 Shepherd Center

3

SHEPHERD.ORG

## Rehabilitation Program


- Main Goal:** Focus on patient and family-centered goals
  - Work with team to determine appropriate goals
  - Relearn skills
  - Learn new ways to do things, compensate
  - Increase mental & physical endurance/stamina
- Neuroplasticity**
  - Brain's ability to adapt/compensate
  - Connections among brain cells (neurons) reorganize in response to our changing needs
  - A goal of rehabilitation is to *attempt* to rebuild connections among neurons to make it possible for a function previously managed by a damaged area to be taken over by another undamaged area


 Shepherd Center

4

SHEPHERD.ORG

## Part II: Brain 101



 Shepherd Center

5

SHEPHERD.ORG

## Acquired Brain Injury (ABI)

- **Traumatic Brain Injury (TBI):**
  - Outside force impacts head hard enough to cause brain to move within the skull or the force directly hurts the brain
  - Examples: motor vehicle collisions, falls, gun-shot wounds, sports, physical violence, etc.
  - Closed Head Injury vs. Open Head Injury
- **Non-Traumatic Brain Injury (n-TBI):**
  - Does not involve external mechanical force
  - Examples: stroke, aneurysm, insufficient oxygen (anoxia/hypoxia) or blood supply (ischemia), infectious disease, AVM, etc.


 Shepherd Center

6

SHEPHERD.ORG

## Brain Anatomy

- ❑ Brain is soft & has the consistency of a Jello mold
- ❑ Attached to the skull by small veins and meninges
- ❑ Floats in Cerebral Spinal Fluid (CSF)
  - ❑ Provides a cushion, "shock absorber"
- ❑ Enclosed environment
  - ❑ Other than veins and arteries, there is only one exit—where brain stem exits the base of the skull to become the spinal cord

Shepherd Center 7

7

SHEPHERD.ORG

## Brain Anatomy

- ❑ Two relatively symmetrical hemispheres (halves)
- ❑ Contralateral Control
  - ❑ Left side of brain controls right side of body, etc.

Left Brain Functions

Right Brain Functions

Shepherd Center 8

8

SHEPHERD.ORG

## FRONTAL LOBES

- ❑ Facilitates executive functions and goal directed thoughts:
  - ❑ Attention/concentration
  - ❑ Planning, organization, sequencing
  - ❑ Judgment/decision-making
  - ❑ Personality, behavioral & emotional regulation
- ❑ Motor strip at back of frontal lobe controls body's ability to move itself
  - ❑ Weakness (hemiparesis)
  - ❑ Paralysis (hemiplegia)

Shepherd Center 9

9

SHEPHERD.ORG

## PARIETAL LOBES

- ❑ Sensory strip at front of parietal lobe, behind motor strip
  - ❑ Detects pain, touch, pressure
  - ❑ Senses where the body is in space, movements
- ❑ Visuospatial judgments
- ❑ Attention to entire environmental field
  - ❑ Inattention vs. neglect
    - ❑ "Left Sided Neglect"

Shepherd Center 10

10

SHEPHERD.ORG

## TEMPORAL LOBES

- ❑ Auditory processing cortex
- ❑ Expressive and receptive language (aphasia)
- ❑ Hippocampus facilitates memory storage
  - ❑ Short-term vs. Long-term memories

Shepherd Center 11

11

SHEPHERD.ORG

## OCCIPITAL LOBES

- ❑ Processes visual information
- ❑ Visual problems common after brain injury
- ❑ Input enters through eyes, but you "see" with your brain
- ❑ Many injuries affect vision
  - ❑ Double vision, blurred vision
  - ❑ Visual field cut
  - ❑ Cortical blindness

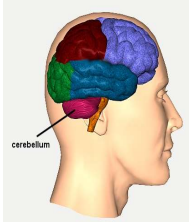
Shepherd Center 12

12

SHEPHERD.ORG

## CEREBELLUM

- ❑ Fine motor coordination and balance
  - ❑ Fluid motor movements
  - ❑ Eye-hand coordination, timing, adjustment
  - ❑ Posture, gait
  - ❑ Motoric memory (e.g., how to play an instrument, walk)
- ❑ Ataxia, balance problems when damaged
- ❑ Can affect executive functioning



Shepherd Center

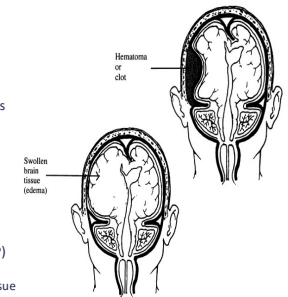
13

13

SHEPHERD.ORG

## Neuropathology of Brain Injury

- **Contusions**
  - ❑ Blood vessels in or around brain are damaged or broken
- **Hematoma**
  - ❑ Localized pooling of blood that occurs from hemorrhaging
- **Hemorrhage**
  - ❑ Bleeding from blood vessel leakage rupture
- **Edema**
  - ❑ Swelling in brain tissue
  - ❑ Increased intracranial pressure (ICP)
  - ❑ Enclosed space
    - ❑ Increased pressure on all brain tissue



Shepherd Center

14

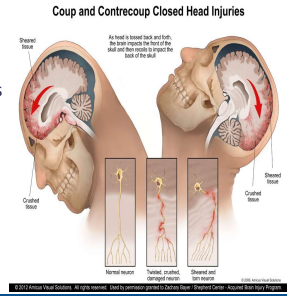
14

SHEPHERD.ORG

## Neuropathology of Traumatic Brain Injury

### Diffuse Axonal Injury

- ❑ "Shear injury"
  - ❑ Results from rotating, twisting and tearing of axons of neurons
  - ❑ Tears capillaries & blood vessels
- ❑ Often due to coup-contrecoup injury
  - ❑ Back-n-Forth contact with skull



Shepherd Center

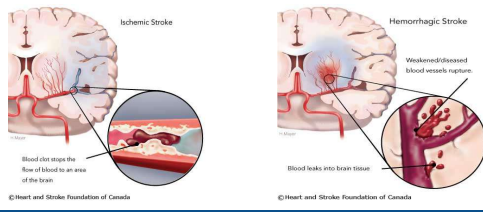
15

15

SHEPHERD.ORG

## Neuropathology of Stroke

- ❑ Loss of brain function due to interruption in blood supply to all or part of the brain
- ❑ Results in depletion of oxygen and glucose in affected area



Shepherd Center

16

16

SHEPHERD.ORG

## Anoxia/Hypoxia

- **Anoxic Brain Injury**
  - ❑ Brain does not receive any oxygen. Cells in the brain need oxygen to survive
    - ❑ No oxygen supplied to the brain
    - ❑ Blood isn't carrying enough oxygen
- **Common causes:**
  - ❑ Cardiovascular disease or trauma, asphyxia (e.g., drowning), chest trauma, electrocution, severe asthma attack, poisoning, substance overdose
- **Common difficulties after anoxic injury:**
  - Memory loss
  - Tremor (i.e., myoclonus)
  - Visual deficits (i.e., cortical blindness)

Shepherd Center

17

17

SHEPHERD.ORG

## Chemical Changes after Brain Injury

- ❑ Brain injury may cause neurochemical imbalance
  - ❑ Neurotransmitters:
    - ❑ Serotonin → mood
    - ❑ Dopamine → mood reward-motivated behavior/ motor control/ alertness
    - ❑ Norepinephrine → concentration
  - ❑ Medications may be given:
    - ❑ Neurostimulants (e.g., Amantadine, Ritalin, Provigil)
    - ❑ Mood stabilizers, antidepressants may be beneficial
- ❑ Damage to pituitary gland and hypothalamus can effect hormone disruptions, sleep/wake cycles can be affected

Shepherd Center

18

18

SHEPHERD.ORG

## MEMORY LOSS AFTER BRAIN INJURY

- ❑ Retrograde amnesia
  - ❑ Inability to remember things from past
- ❑ Anterograde amnesia
  - ❑ Inability to make new memories
- ❑ Post-Traumatic Amnesia (PTA)
  - ❑ Retrograde and anterograde memory difficulties following a traumatic brain injury

Confabulation is common

- ❑ Disorientation & confusion → incorrect memories

Shepherd Center 19

19

SHEPHERD.ORG

## Potential Behavior Issues after Brain Injury

- ❑ Decreased initiation
  - ❑ Difficulty getting started
    - ❑ The “gas” is not working properly: “Abulia”
- ❑ Disinhibition
  - ❑ Problem with “social filter”, opposite of initiation problems
    - ❑ Colorful language, socially inappropriate behaviors
  - ❑ Unaware of inappropriateness of behavior
    - ❑ Not intentional
    - ❑ Not “personal”

Shepherd Center 20

20

SHEPHERD.ORG

## Potential Behavior Issues after Brain Injury

- ❑ Impulsivity
  - ❑ behavior with little or no forethought, reflection, or consideration of the consequences.
- ❑ Perseveration
  - ❑ Repetitive topics, phrases, or behaviors
- ❑ Emotional lability (mood swings)
- ❑ How can you help?
  - ❑ Reduce over-stimulation
  - ❑ Discuss phone/device use with MD/Neuropsychologist
  - ❑ Try not to argue or reason
    - ❑ Redirect, change the topic, ignore as needed

Shepherd Center 21

21

SHEPHERD.ORG

## PART III:

## WHAT HAPPENS NEXT?

Shepherd Center 22

22

SHEPHERD.ORG

## Discharge from Rehab Track

- ❑ Family Training Day(s)
- ❑ Ongoing care/rehab
  - ❑ Shepherd Pathways
    - ❑ Day Program vs. Single Service
  - ❑ Other outpatient therapy clinics
  - ❑ Other skilled care facilities
  - ❑ Home health
- ❑ May have neuropsychological testing to assess cognitive and emotional functioning at discharge

Shepherd Center 23

23

SHEPHERD.ORG

## Discharge from Rehab Track

- ❑ Recovery does not end at discharge
  - ❑ First 6 months: most rapid recovery
- ❑ Continued neuronal recovery for 1 – 2 years after injury
- ❑ Continued functional recovery continues


Shepherd Center 24

24

SHEPHERD.ORG

## NEURAL RECOVERY

- Everyone is DIFFERENT
  - Time & Biology
- Types of recovery
  - Recovery from secondary effects (brain swelling, medical complications, etc.)
  - Reorganization of brain functions
  - Nearby cells may take on additional work
- Limitations
  - We do not make new brain cells
  - Limited capacity for reorganization


 25

25

SHEPHERD.ORG

## Ongoing Difficulties & Limitations

- Physical
  - Movement, coordination, balance
  - Stamina and endurance
- Cognitive
  - Safety awareness, impulsivity
  - Memory, confusion
  - Executive skills
- Emotional and behavioral issues
  - Depression, anxiety, adjustment issues
  - Dysregulation, poor self-monitoring
  - Apathy—"can't do" not "won't do"
- Importance of supervision
  - Due to deficits in judgment, memory, safety awareness, problem solving, insight into limitations, distractibility, impulsivity and behavioral regulation


 26

26

SHEPHERD.ORG

## Family


- Adjustment to Injury (for family)
  - Feelings of loss, sadness, anger, guilt, and frustration are common
- You do not have to go through this alone - help is available
  - Family counselor
  - Chaplain services
  - Peer support coordinator
- Break the stress response cycle
  - Rest, eat well, get some exercise
  - Practice whatever gives you strength, peace, hope
- Manage your physical & emotional energy
  - Find people who will help you *and then let them*
  - This is your chance for a break before your loved one is discharged

 27

27

SHEPHERD.ORG

## PART IV: ADDITIONAL INFORMATION

 28

28

SHEPHERD.ORG

## (EXAMPLES OF) TIPS FOR VISITORS

Reduce stimulation


- Turn off TV/radio/phones/lights
- 1-2 visitors at a time
- Limit side conversations

Reduce fatigue

- Limit visits to short periods (15-30 min) at a time
- 1-2 visitors during therapy (therapist may also ask to meet alone)
- Give breaks in between visits (30 min)
- Limit conversation time

Communication Tips

- Speak at a slightly slower rate with lower volume
- One question at a time
- Have one person speak at a time/no cross-talk or side conversations
- Give time to think/respond
- Don't talk down to the person


 29

29

SHEPHERD.ORG

## CVO/AVASYS KEEP YOUR LOVED ONE SAFE

- Constant Visual Observer (CVO)
  - 1:1 tech who stays with your loved one to keep them safe
    - Fall risk
    - Wandering
    - Pulling at lines/tubes
    - Harm to themselves/others
- Avasys
  - 360°, tele-monitoring device
  - A tech monitors cameras live
    - Does not record feed
    - Verbal re-direction through speakers on device
    - Tech can call nurses/staff to intervene

 30

30

SHEPHERD.ORG

## Substance Use

- Brain is still in recovery mode
  - Increases risk of falls
  - Increases risk of seizures
  - Reduced medication efficacy
  - Reduced judgment
- Substance abuse is more common after brain injury, even if not present before

If you have concerns about your family member using alcohol/ substances after discharge, please talk to your neuropsychologist

Shepherd Center 31

31

SHEPHERD.ORG


## REHAB TREATMENT TEAM

### Medical Doctor

- Designs treatment plan
- Monitors medical status and places orders for consults
- Medication management

### Nursing

- Day by day duties and examination
- Medication distribution
- Bowel/Bladder
- PCTs work with nurses



Shepherd Center 32

32

SHEPHERD.ORG

## REHAB TREATMENT TEAM

### Case Manager

- Contact between team and family
- Management of insurance companies
- Discharge planning

### Respiratory Therapy

- Tracheostomy management
- Monitor respiratory function and need for oxygen

Shepherd Center 33

33

SHEPHERD.ORG

## REHAB TREATMENT TEAM

### Occupational Therapy (OT)

- Rehabilitation for arms, hands, fine motor skills, vision
- Activities of daily living

### Physical Therapy (PT)

- Rehabilitation for legs, torso, balance, sequencing movements
- Wheelchair fitting/training
- Transfers

Both OT and PT may work on casting limbs to address tone

Shepherd Center 34

34

SHEPHERD.ORG

## REHAB TREATMENT TEAM

### Speech & Language Therapy

- Swallowing
- Speech and Language
- Cognition

### Neuropsychology

- Formal, standardized assessment of thinking skills
- Capacity evaluations (ex: Power of Attorney vs. Guardianship)
- Mood functioning

### Nutrition

- Diet, weight
- Importance of/education for nutrition habits for discharge

Shepherd Center 35

35