

***Traumatic Brain Injury in Adolescence:
Treatment approaches and outcomes***

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Introduction

- Background
- Training
 - Doctorate of Psychology: Counseling
 - Colorado State University:
 - Pre-Doctoral Internship: Pediatrics
 - CHOC Children's Hospital
 - Post-Doctoral Fellowship: Pediatric Neuropsychology
 - Advanced Neurobehavioral Health of Southern California
 - Children's Hospital Colorado: Department of

Objectives

1. Identify outcomes for mild, moderate, and severe injuries sustained in adolescence.
2. Describe how moderate/severe TBI can impact typical development in adolescence.
3. Describe the impact of brain injury on emotional regulation and executive functioning adolescence.
4. Outline treatment approaches in moderate/severe TBI for teens, parents, providers.

Acknowledgements

- Jeanne Dise-Lewis: BrainSTARS
 - Children's Hospital Colorado
 - Developmental Model
 - Multidisciplinary approach
- Shari Wade: Coping with Head Injury
 - Cincinnati Children's Hospital Medical Center
 - Family problem solving

**RECOVERY COURSE:
MILD, MODERATE, SEVERE**

Historical Context

- TBI one of the most common causes of acquired disability in childhood
- Range from mild to severe
- Primary vs. Secondary deficits
- Role of Neuropsychologist
 - Understand difficulties
 - Inform/educate parents and educators
 - Liaison with school and rehab providers
 - Design academic/behavior interventions

Epidemiology

- 250: 100,000 experience TBI
- Half will not seek medical care
- 5-10% experience neuropsychological changes
- 5-10% fatal injuries
- 85% classified as mild, 44% no LOC

Epidemiology

- Age
 - Younger than three have highest rate of TBI
 - Infants = trauma associated with falls or child abuse
 - Severe, high mortality
 - Preschool age = due to falls, pedestrian accidents
 - School age and adolescents = sporting, cycling, pedestrian accidents
- Fatality rate decreases with age

Epidemiology

- Gender
 - Preschool: male: female 1.5:1
 - School age: boys 2 X as likely
 - Males sustain more severe trauma
 - Increase risk with age for boys, decreased for girls
- Psychosocial factors
 - Occur on weekends, holidays, and afternoons
 - More common in socially disadvantages, unemployed, or emotional disturbed
 - Premorbid learning, social, cognitive, and/or behavior problems

Outcomes

- Outcomes of injury depend on
 - Severity of injury
 - Child's age
 - Younger the child, more generalized decrease in capacities (IQ, behavioral control, and social development)
 - Older child more likely to have problems in limited areas of neurocognitive function

Neurocognitive Outcomes and Recovery After Pediatric TBI: Meta-Analytic Review of the Literature

Talin Babikian and Robert Asarnow
David Geffen School of Medicine at UCLA

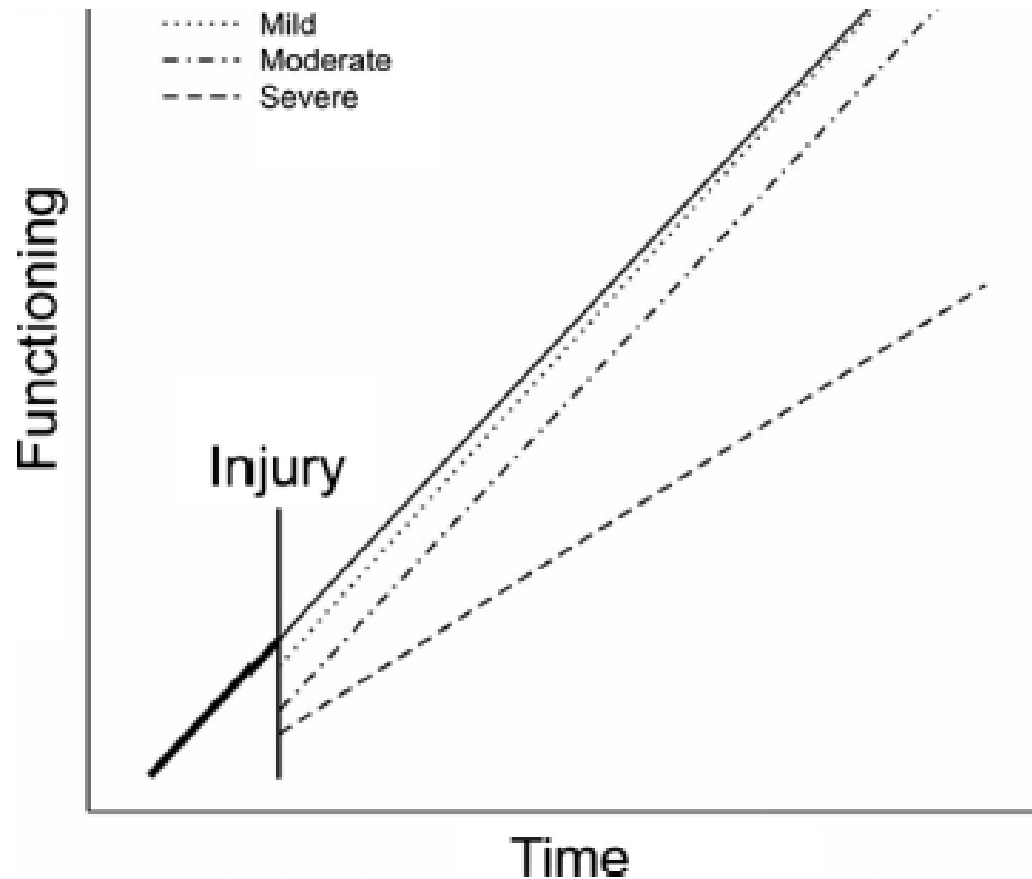


Figure 2. Summary diagram of trends in neurocognitive outcomes and recovery over time.

Mild TBI

- Most commonly cited stats from CDC (hospital-based)
 - Estimated 1.7 million people sustain TBI each year with majority of these being mild TBI
 - Do not include urgent cares, PCP, etc.
 - Many do not even seek medical care
 - Poor diagnostic consistency
 - Broad estimations -sports and recreation account for ~ **3.8 million** concussions each year (includes non-hospital)
 - Mild TBI is more prevalent in these groups:
 - Athletes
 - Children 4 and younger
 - Teens 15-19
 - Males

Post-Concussive Signs (i.e., observable)

Physical/Sleep	Cognitive (Mental Status)	Emotional
Balance problems/clumsy	Confusion	More emotional or moody
Vomiting	Disorientation	Irritable
Loses consciousness	Slurred speech	Sad or anxious
Sleepiness/lethargy	Poor focus	
Pronounced sleep changes	Immediate forgetting	
	Repeating self	
	Slowed response	

Moderate/Severe TBI

- Symptom Clusters
 - Physical Consequences
 - Fatigue, Sleep difficulties, Changes in appetite and weight, Motor impairments
 - Cognitive Consequences
 - Problems with attention, working memory and executive function skills, Speech and communication difficulties, Specific learning disabilities (reading, math)
 - Behavioral Consequences
 - Impulsivity, poor self-regulation, Secondary attention deficit hyperactivity disorder is common, Can range from apathy and withdrawal to emotional volatility and explosive anger, Depression, anxiety, internalizing symptoms, Post traumatic stress disorder

ADOLESCENT DEVELOPMENTAL MODELS

Models of Development

- Cognitive development:
 - Jean Piaget
- Emotional Development:
 - Erik Erikson
- Moral Development:
 - Lawrence Kohlberg
- Sexual Development:
 - Sigmund Freud

Developmental Achievements (12-16)

- ability to consider many aspects of a problem simultaneously
- development of abstract reasoning
- ability to plan, organize, and carry out complex projects
- ability to learn new information independently
- increasing autonomy
- identity development
- ability to assume limited responsibility for self and others
- maturing social skills, including friendships based on shared interests

Brain Injury at this stage usually causes:

- uneven cognitive skills and learning deficits
- difficulty learning new information, especially abstract information
- difficulty with inference, summarizing, planning, and organizing
- rigid, inflexible thinking
- reduced spontaneity
- judgment and reasoning difficulties
- dependence on others
- uncertainty about self and abilities
- difficulty managing frustrations
- reduced ability to assume responsibilities
- withdrawal from peers and limited social involvements

Interventions

- conduct a comprehensive evaluation of cognitive strengths and weaknesses to adequately understand the sources of learning difficulties; educate the student about his/her own profile
- create accommodations addressing both school and social success
- increase structure in the environment
- limit homework assignments
- reduce amount of content to be covered in coursework to support depth of understanding/ mastery
- increase communication between home and school regarding assignments, tests, and upcoming curriculum
- provide opportunities to talk with nonfamily members about the emotional impact of the injury
- be alert for signs of depression and proactively intervene to address these
- use videos, movies, field trips to create context and familiarity with new school topics
- identify clear roles and responsibilities in classroom and in group assignments

Developmental Achievements (16-19)

- complex reasoning and judgment
- capacity for spontaneous appropriate behavior in situations requiring judgment, weighing of consequences, and decision-making
- consolidation of academic accomplishments
- development of vocational plans and goals in line with personal interests and strengths
- ability to develop and accomplish goals independently
- solid sense of personal identity and relatively stable personality
- sophisticated social skills
- emancipation from home

Brain Injury at this stage usually causes:

- rigid thinking
- slow mental processing
- difficulty understanding and responding to complex situations
- difficulty identifying the most important parts of problems
- poor decision-making and judgment
- poor organizational skills
- difficulty with appropriate, spontaneous behavior
- interference in developmental drive toward independence/separation
- insecure body image, self-image, and/or social image
- social awkwardness
- defensiveness regarding emotional/cognitive problems
- depression

Interventions

- recognize the rippling effects of the injury on personal, emotional, and social life
- identify roles and responsibilities within the competence of your student
- provide a forum for expression of feelings and exploration of coping skills
- clarify the nature of learning difficulties and develop appropriate accommodations
- reduce course load, tailoring coursework to student's strengths
- waive grade point average requirements for participation in school sports
- provide a counselor or other professional at school for your student to check in with on a daily basis
- involve student in problem-solving group
- be alert for difficulties reconciling new profile of strengths/weaknesses with previous self-identity

TREATMENT APPROACHES

Family Problem Solving

- Braga et al. (2005)
 - Seminal study
 - Family-delivered cognitive and physical rehabilitation more effective than standard clinician-delivered rehabilitation
- Shari Wade and colleagues have done an impressive amount of family-based intervention work
 - Wade and Ohio colleagues - Taylor, Yeates, Stancin
 - Dozens and dozens of peer reviewed publications since the 1990s
 - Since 2008, Mayo Clinic and Children's Hospital Colorado

Why is the family important?

- There is a reciprocal relationship between the family's and the injured individual's functioning.
- Individuals from well functioning families show greater recovery.
- Individuals with more severe injuries and greater changes in behavior have more stressed families and caregivers.
- Families can make a big difference in terms of the success or failure of behavioral treatments and school-based accommodations

Involving Parents and Families in the Child's Behavioral Treatment: Does it make a difference?

- Braga, DaPaz, & Ylvisaker (2005) demonstrated that rehabilitation intervention delivered by the family was more effective in improving outcomes long-term than rehabilitation intervention delivered by hospital-based clinicians.
- Parents can be particularly effective interventionists because they are with the child on a daily basis.

Underlying Tenets of Family Problem Solving Intervention

- Problem solving, self-regulation and communication skills are helpful for youth with TBI as well as their family members (parents and siblings).
- Sometimes, problems with other family members contribute to family burden and can be addressed through family problem solving.
- Better caregiver coping/problem solving will support the child's recovery.

Models of Family Involvement in Outpatient Rehabilitation following ABI

- Treatments targeting the family (example-family problem solving)
- Treatments in which the parent/family serves as therapist (i.e., Braga et al., 2005; parent-skills training)
- Treatments in which parents scaffold or support treatment (e.g., attention training)
- Families must be involved at some level because they need to consent, bring the child to treatment etc.

Problem Solving Therapy as An Intervention for ABI

- Facilitates parent/family coping in response to injury and other stresses in their lives.
- Provides the injured individual with an executive function heuristic for addressing post-injury challenges.
- Flexible to accommodate the different kinds of issues facing survivors and their families.



Summary of Child Outcomes: Older Teens in CAPS Report Greater Improvements

- High school-age children in CAPS were rated as having lower levels of:
 - Executive function behaviors
 - Externalizing problems
 - Aggressive behaviors
 - Attention problems
 - ADHD
 - Conduct Disorder
- Long term outcomes
 - Group differences in externalizing symptoms were not maintained over time.
 - Treatment group differences in overall functioning did not emerge until 12 months following treatment.
 - For older adolescents, CAPS participants had significantly lower internalizing symptoms, anxiety/depression, and executive dysfunction than IRC participants at the 12-month follow-up.



Health and Behavior Intervention

- **Interventions require consideration of a variety of theoretical approaches:**
 - **Developmental Psychology**
 - **Trauma**
 - **Grief**
 - **Pain**
 - **Cognitive-Behavioral Therapy**
 - **Interpersonal process therapy**
- **ABC's of Behavior Regulation**
 - **Antecedent**
 - **Behavior**
 - **Consequent**

Goals of Intervention

- Environmental interventions reinforcing targeted behaviors
- Antecedent behavior management (shaping the environment to avoid behavior problems)
- Anger management training
- Cognitive behavioral therapy for depression and anxiety
- Social skills training
- Peer mentors
- Training in emotion recognition
- Training in communication skills
- Intervention to address sleep hygiene, medications
- Aerobic exercise interventions to address weight issues and fatigue
- Direct attention training
- Training in problem-solving, planning, and organization (executive function skills)
- Metacognitive strategy training
- Remediation of specific skills/errorless learning

ABC Model of Behavior

- **A (Antecedents):** The events, actions, conditions, and/or environments that come before behavior.
- **B (Behavior):** Can be desirable and appropriate, or problematic.
- **C (Consequences):** Can also be positive or negative.
- Remember: **A**  **B**  **C**

Antecedents Set The Stage

- Physical environment
 - emphasize clear structure, support the activities and behaviors desired, and limit overly complex or distracting stimulation.
 - Multidisciplinary Approach:
 - What worked well?
 - What are some of the challenges you have faced?
- Visual cues
 - photographs, written words, printed or drawn symbols, gestures and signals, signs, schedules, routine flowcharts, and color coding.
 - Verbal directions and cues are fleeting and demand good attention, memory, and processing speed.
 - Multidisciplinary Approach (Speech):
 - What worked well?
 - What are some of the challenges you have faced?

Antecedents Set The Stage

- Schedules, mini-schedules, and routines
 - A **routine** is doing things the same way every day.
 - Routines conserve energy and reduce fatigue, because they allow a person to go on automatic pilot for some activities.
 - **Schedules** are visual representations of routines.
 - Post the schedule in a place where your child can see it easily and refer to it often.
 - At first, your child will need to practice using the schedule: she will benefit from looking at it with you and checking off listed events and activities as she goes through them.
 - You can create mini-schedules to help your child prepare for and conduct a series of substeps in a more complicated routine or activity.
- Multidisciplinary Approach (Nursing):
 - What worked well?
 - What are some of the challenges you have faced?

Antecedents Set The Stage

- Physical prompts
 - Range from lightly touching your student's shoulder to placing your hand over hers as she performs an action.
 - Provide in a **gentle and matter-of-fact manner**
 - Once the physical prompts have helped steer your child toward successful performance, **give him recognition** for the accomplishment.
 - When your child is working on learning a new skill, it is important that you determine and use **the least but still sufficient** physical prompts necessary to bring about the desired behaviors.
 - Multidisciplinary Approach (OT/PT):
 - What worked well?
 - What are some of the challenges you have faced?

Antecedents Set The Stage

- Modeling of skills and positive behavior
 - Your child will learn best from structured observation of others' behaviors, including:
 - Watching the behavior
 - Imitating and practicing the behavior
 - Receiving recognition
 - Repeating the sequence
- Provide more support, structure, and guidance at these junctures by giving **short and to-the-point verbal descriptions, visual cues, physical guidance, and reassurance.**

Antecedents Set The Stage

- Language Development
 - What you say to your child should be **simple, relevant to the activity at hand, and positive.**
 - Choose words that guide your child toward using a skill or complying with a direction.
- Instructions and directions
 - When you give a child an instruction or direction, be **clear, concise, simple, and specific.**
- How do we all work together to build language skills?

Antecedents Set The Stage

- Child's physical and emotional state
 - Physical: Fatigue, pain, hungry/thirsty, not feeling well
 - External: Stress, significant life transitions
 - Internal: Anxiety, frustration, anger, sadness
- How do we all work together to support emotional coping and behavior?

Consequences

- Potential pitfalls
 - The positive or negative nature of a consequence depends on whether the person who experiences the consequence considers it positive or negative.
 - Negative attention
 - Unintended outcomes

Consequences

- Getting the most out of positive consequences
 - The power of rewards
 - Link the consequence with the behavior
 - Vary the consequences
 - Rewards...mix and match!

Executive Functioning

- **Metacognitive strategies**
 - “Ready, Do, Done”
 - **Systemic thinking**
 - **Goal Management Training**
 - **Self-monitoring/Self-regulation**
- **Group based Intervention in working memory, self-monitoring, self-regulation**
 - **Life skills, social communication**
- **Practice in *everyday functional activities***

Memory

- Memory
 - Remediation vs. compensation
 - Severe Impairment
 - External aides (notebook, schedule, memory log)
 - Errorless learning
 - External compensation with application to functional activities
 - Mild-Moderate Impairment
 - Organizational technique (semantic clustering, story telling)
 - Associations (first, letter, visual imagery)

Emotion Regulation

- Why difficulty staying in control?
 - Part of brain that controls emotions may have been injured
 - Things may be harder now than they used to be
 - May feel less connected to friends and have a harder time shaking things off
- Anger: STARRS
 - STop
 - Accept
 - Relax
 - Reframe
 - Solve

Brain

Injury

Group



Purpose

- Connect with other families with similar shared experiences
- Discover resources available for brain injury recovery



Hope

- Meet someone new
- Hear an inspirational story
- Share your experience to help another
- Connect with a new resource
- Find answers to questions about follow up

Conclusion

- Brain Injury in adolescences can result in a number of cognitive, behavioral, and emotional challenges specific to the adolescent developing brain
- Involving family in intervention is known to improve outcomes
- Interventions should include medical team, school, therapists, family, and child for best outcomes