

# Rethinking Brain Injury: Research, Accommodations and Access

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Handouts from PowerPoints

Slide 1

Rethinking Brain Injury: Research, Accommodations and Access

“Traumatic Brain Injury: A disease process, not an event.”

from M.B. DeWitt, Aug 2010, Journal of Neurotrauma

Slide 2

History of Neuroscience

Study of the brain

Research in brain trauma is directly proportional to the number of injuries seen during a large scale conflict

Thousands of years old

Trepanning

Modern neuroscience

Civil War – Mental institutions

WWI – “Shell Shock”

WWII- Vocational programs

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History of Head Injury

Korean War- MASH units

MVA's increase – Faster cars, more roads

Vietnam – Rehabilitation Act

Israeli Conflicts – Early intervention

Persian Gulf – Screening tool for mTBI

WOT (OEF/ OIF) – TBI is “signature wound”

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US Non-Military Statistics

NIH

Pie chart with % of TBI by injury event

50% Motor Vehicle Accident

21% Falls

12% Assaults

10% Recreational activities

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TBI

#1 cause of death in children and young adults

5.3 million Americans are disabled due to TBI

Almost 50% of individuals with TBI were intoxicated at time of injury (excluding soldiers)

Most TBI occur at night on the weekends

1 person every 21 seconds experiences a TBI

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Demographics

1.7 million individuals sustain a TBI yearly

Over 1.3 million are seen in the ER

30.5% of all injury-related deaths in US

Direct, indirect, loss of productivity costs are about \$60 billion annually

\$4 million dollars in health/ lost wages per individual with TBI

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Individual Characteristics

Greatest number of incidence of TBI by age

4 years and under

males with highest incident of ER visits

15-25 years of age

Over 65 years old

Risk Factors

Substance abuse

Psychiatric diagnosis

symptoms of impulsive behavior

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War on Terror (WOT)

Barotrauma is defined

60% of blast injuries result in TBI

Risk of injury / disability increases with every tour

Ratio of injuries to deaths (16:1)

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Definitions

Chart with Head injury at the top

Connected to traumatic brain injury with lines connected to open and closed

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Other Terms

Barotrauma

Coup Contra coup

DAI (Diffuse axonal injury)

LOC (loss of consciousness)

Glasgow Coma Scale

mTBI (mild traumatic brain injury)

Polytrauma

PCS (post-concussive syndrome)

Post-traumatic amnesia

Secondary impact syndrome

Shaken baby syndrome

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Barotrauma

IED (Improvised Explosive Device) <http://www.youtube.com/watch?v=gTuVem1SPiE&feature=related>

From hyper- and hypobaric environments

Pressure waves on body organs without direct contact

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Coup Contra Coup Injury

Back and forth or rotational movement of the brain within the skull

Doesn't necessarily come from a direct head injury

Whiplash

Barotrauma

Sports injury

Shaken baby syndrome

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Picture demonstrating coup contra coup injury

<http://www.dod.state.ga.us/armyguard/armyimages/brain.jpg>

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DAI

Diffuse axonal injury

Cell damage specially axon damage that is not readily visible by medical tests

Axons are neural cells that transmit messages within the brain

Damage can create any number of symptoms and contribute to post concussive syndrome, and secondary injury syndrome and death

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Glasgow Coma Scale

Medical scale used to evaluate degree of consciousness

Measures visual response, verbal ability, and motor skills

Will see number from 3 – 15

Neurological reports can refer to the initial GCS in the history

<http://www.brainandspinalcord.org/recovery-traumatic-brain-injury/glasgow-coma-scale.html%2520>

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LOC

Loss of Consciousness

Self reporting is not reliable

LOC below 30 minutes is mTBI; over 30 minutes is TBI

Part of the Glasgow Coma Scale

Not aware of surroundings, not easily awakened

Passing out

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mTBI

Mild Traumatic Brain Injury

Closed head injury

Blast related trauma

The injury not the resulting symptoms

No clinically observed signs or 30 minutes LOC

Maybe used interchangeably with concussion (grade 1 to 3)

Invisible disability

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Polytrauma

Common term among military medical personnel

More than one severe, life-threatening injury

Injuries may interfere with treatment of TBI

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PCS

Post concussive syndrome

Following a mTBI (concussion)

MVA

No clinically observed signs or 30 minutes LOC

Symptoms can be difficult to distinguish from PTSD

DSM-IV TR diagnosis (symptoms lasting 3 months)

Majority of the head injury in US

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PCS Symptoms

Physical

Headache, sleep disturbances, dizziness, nausea, fatigue, photo /phonophobia

Cognitive

Impaired attention, difficulty concentrating, memory problems

Affective

- Anxiety, depression, emotional lability

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Post Traumatic Amnesia

Memory loss due to injury

Periods of confusion

Research showing a directly link with prognosis

Anterograde

After the injury

Retrograde

Before the injury

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Secondary Impact Syndrome

Experiencing another mTBI before the brain has recovered fully

Seen in athletes especially high school

Those with psychiatric diagnosis engage in high risk activity tend to have repetitive head injuries

Can cause severe brain swelling and cell death

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Neuropsychological Testing

Evaluates:

Perceptual/Sensory

Motor Functions

Intelligence Cognitive Abilities

Academic Achievement

Personality/ Behavior

Educational / Classroom

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Selection of Assessments

Neuropsychological Testing

Halston Reittan Battery

Luria Nebraska Battery

WISC/ WAIS

Woodcock Johnson and Dean-Woodcock

Wechsler Memory Scale

MMPI

Bender Visual Motor Gestalt

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Reading Reports

Looking for

Significant differences from the norm

Slow processing

Short term memory issues

Visual /auditory processing problems

Impulsivity

Executive functioning

Abstract thinking

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Brain picture colored and labeled with parts

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Brain Functioning

Brain stem – midbrain, pons, medulla; most life threatening injury

Cerebellum- physical abilities

Limbic system- thalamus, hypothalamus, amygdala, hippocampus

<http://www.neuroskills.com/brain.shtml>

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Cerebrum or Cortex

Frontal lobe – reasoning, problem solving, judgment, impulse control; also motor control and memory

Parietal – skin sensation, movement, orientation in space, speech

Temporal – auditory discrimination, language recognition, emotion, memory, speech

Occipital- visual processing

Broca's area- speech, language recognition and facial nerves

Corpus callosum – translates information between two hemispheres of the brain

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PET

Images of the brain Positron emissions tomography

Googleimage.living with alzheimers\_yourbrain

Slide 30

Impact on Learning

## Attention and Concentration

Restlessness

Easily distracted

Difficulty initiating tasks / finishing tasks

Problem following conversations/ verbal directions

## Slide 31

### Impact on Learning

#### Communication

Word finding

Initiating conversation

Rambling thoughts, flight of ideas

Disorganized

Flat affect

Inability to read social cues

## Slide 32

### Impact on Learning

#### Planning / Organizing

Missing information in class

Remembering appointments

Steps to complete projects papers

#### Processing Information

Slower fluency, processing, reaction time

Needs information repeated often

Problem solving

Easily fatigued

## Slide 33

### Impact on Learning

#### Memory

Retention

Recall

Amnesia which creates fear

Tends to "fill in the gap" when short term memory fails

Unreliable historian

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Impact on Learning

Reasoning / Problem solving

Recognition of problems

Flexibility of thought

Analyzing information

OCD tendency

Impulsivity

self awareness

self control

social cues

inappropriate behavior

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Impact on Learning

Physical

Epilepsy

Balance, mobility, strength

Endurance

Fine motor movement

Pain / spasticity

Vision

Hearing

Speech

## Emotions

### Slide 36

#### Impact on Learning

#### Psychological

Co-existing conditions

Pre-morbid conditions

ADHD

OCD

PTSD

Depression

Anxiety

Sleep disorders

Personality disorders

Suicide ideation

Violence/ Aggression

### Slide 37

#### Accommodations for Learning

#### Case Study

History of ADHD and head trauma from football, undiagnosed PCS

Slow processing

Difficulty following verbal directions

Reading difficulty

Easily distracted

Organization / planning problems

### Slide 38

#### Accommodations for Learning

#### Case Study

History of high blood pressure, Sickle Cell, stroke post 12 years.

Ambulatory but mobility slow with paraesthesia on left side

Short term memory problems

Executive functioning issues

Visual spatial concerns

Flat affect

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Accommodations for Learning

Case Study

Veteran of WOT with two tours of duty, official diagnosis is amputation below the knee (BTK) of right leg due to IED

Decreased concentration

Depressed affect

Slow speech

Difficulty reading

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TBI Retention Issues

Ready to return to educational setting

Course load

Support services

Faculty/support services not familiar with sequela of TBI

Lacks advocacy skills

Lack of role models

Career choice usually pre injury

Need to repeat courses due to slow processing

Memory loss may interfere with life skills

Impulsive behavior

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Athletes

Temporary disabling condition

PCS

Short term accommodations to support educational goals

Pre and Post injury testing

ImPACT

Support services

Institutional

State

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National Support

Brain Injury Association of America <http://www.biausa.org/>

National Resource Center for TBI <http://www.neuro.pmr.vcu.edu/>

National Institute of Health <http://www.nlm.nih.gov/medlineplus/traumaticbraininjury.html>

Center for Disease Control and Prevention <http://www.cdc.gov/traumaticbraininjury/>

Mayo Clinic <http://www.mayoclinic.com/health/traumatic-brain-injury/DS00552>

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State Support

Brainline.org

Brain injury association of Pennsylvania sponsors Brain Steps –school reentry program for K-12

State Affiliates

### **BIA of Washington**

401 Broadway, 4th Floor Seattle, WA 98122

**Info Line:** 877-824-1766 **Toll-Free:** 877-982-4292 **Phone:** 206-897-5755

**E-mail:** [info@braininjurywa.org](mailto:info@braininjurywa.org) **Website:** <http://www.braininjurywa.org>

### **BIA of Pennsylvania, Inc.**

950 Walnut Bottom Road, Suite 15-229 Carlisle, PA 17015

**Info Line:** 800-444-6443 **Toll-Free:** 866-635-7097 **Phone:** 717-692-5569

**E-mail:** admin@biapa.org **Website:** <http://www.biapa.org>

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Current Research

No real advancement in 30 years due to

Decreased funding from federal agencies

No real interest from industry

Continued disappointing results

Medics on front lines had little/no experience handling major trauma injuries/TBI

No rehabilitation programs for vets with TBI

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Currently

OD Initiative to Help Iraq/Afghanistan War Efforts

NFL interest in testimony from former athletes

505 studies currently

Focus of Current Research

Prevention

Minimizing secondary injury damage

Regeneration

<http://www.traumaticbraininjury.com/content/videolibrary/state/penn.html>

<http://www.washingtonpost.com/wp-srv/special/metro/traumatic-brain-injury/#/intro/>

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History of TBI and Prognosis

Linked to

Reduced life expectancy

Chronic sleep disorders

Neurodegenerative disorders

Neuroendocrine disorders

Neurobehavioral disorders

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A blow to the brain. Discusses head injury in the NFL. This is a 60 minutes program.

<http://www.youtube.com/watch?v=OQMLI66r0NM>

<http://www.youtube.com/watch?v=fY7J7bccNoU&feature=related>

Disclaimer: There may be some alteration or addition to the presentation between the time the handouts are posted and the presentation. Thank you for your patience.

### Other Resources

#### Websites

<http://www.biausa.org/>

Brain Injury Association of America

<http://cms.montgomerycollege.edu/edu/tertiary1.aspx?urlid=53>

Combat 2 College

[http://www.pdhealth.mil/downloads/TBI\\_PTSD\\_Final04232007.pdf](http://www.pdhealth.mil/downloads/TBI_PTSD_Final04232007.pdf)

Department of Defense TBI and PTSD Quick Facts

[http://www.washington.edu/doit/Brochures/Programs/equal\\_access\\_spaces.html](http://www.washington.edu/doit/Brochures/Programs/equal_access_spaces.html)

Equal Access: Universal Design of Physical Spaces

<http://www.halfofus.com/veterans/>

Half of Us: Veterans (self-help site)

[www.heath.gwu.edu](http://www.heath.gwu.edu)

Health Resource Center at George Washington University, National Clearinghouse on Postsecondary Education for Individuals with Disabilities

<http://www.military.com/education/>

Military.Com Education Center

<http://www.rand.org/multi/military/veterans/>

RAND Health and the RAND National Security Research Division

<http://www.studentveterans.org/>

Student Veterans Organization

<http://www.ptsd.va.gov/>

US Dept of Veteran Affairs, National Center for PTSD

<http://www.washington.edu/doit/Veterans/>

The Veterans Center at Do-It

<http://www.woundedwarriorproject.org/>  
Wounded Warriors Project

National Resource Center for TBI <http://www.neuro.pmr.vcu.edu/>  
National Institute of Health <http://www.nlm.nih.gov/medlineplus/traumaticbraininjury.html>  
Center for Disease Control and Prevention <http://www.cdc.gov/traumaticbraininjury/>  
Mayo Clinic <http://www.mayoclinic.com/health/traumatic-brain-injury/DS00552>  
National Dissemination Center for Children with Disabilities <http://nichcy.org/disability/specific/tbi>  
American Speech Language Association <http://www.asha.org/public/speech/disorders/tbi.htm>  
Defense and Veterans Brain Injury Center <http://www.dvbic.org/>  
US Dept. of Veterans Affairs [http://www.publichealth.va.gov/vethealthinitiative/traumatic\\_brain\\_injury.asp](http://www.publichealth.va.gov/vethealthinitiative/traumatic_brain_injury.asp)  
Traumatic Brain Injury.com  
<http://www.traumaticbraininjury.com/content/understandingtbi>

#### YouTube videos

[http://www.youtube.com/watch?v=j\\_OJQbaUI\\_U](http://www.youtube.com/watch?v=j_OJQbaUI_U)  
Scene from the Hurt Locker

<http://www.youtube.com/watch?v=gTuVem1SPiE&feature=related>

#### References

- Adams, EP. & Adams, A. (2008). Reality lessons in traumatic brain injury. *Teaching Exceptional Children Plus*, 4(3), Article 1. Retrieved from <http://escholarship.bc.edu/education/tecplus/vol4/iss3/art1>
- Bilmes, L. (2007, January 5). The Battle of Iraq's wounded. Retrieved January 8, 2007, from <http://www.latimes.com/news.printedition/asection/la-oe-bilmesjan05,1,4923609.story>
- Bilmes, L. (2007). The Battle of the Wounded. John F. Kennedy School of Government, Harvard University. Retrieved from [http://www.ksg.harvard.edu/ksgnews/Features/opeds/010507\\_bilmes.html](http://www.ksg.harvard.edu/ksgnews/Features/opeds/010507_bilmes.html)
- Boeing, M., Barton, B., Zinsmeister, P., Brouwers, L., Trudel, T., Elias, E., & Weider, K. (2010). Lifelong living after TBI. *Exceptional Parent*, 40(10), 22-27.
- Braininjury.org. (2010). Latest medical research. Retrieved from <http://braininjury.com/research.html>

- Brown, D. (2011, June 3). Brain Damage. The Maimi Herald, International Edition.
- Burgstahler, S. (2009, March 20). Equal access: universal design of physical spaces-a checklist for designing spaces that are welcoming, accessible, and usable. Retrieved March 15, 2010, from [http://www.washington.edu/doit/Brochures/Programs/equal\\_access](http://www.washington.edu/doit/Brochures/Programs/equal_access)
- Burnett, S. E., & Segoria, J. (2009). Collaboration for Military Transition from Combat to College: It Takes a Community. *Journal of Post Secondary Education and Disability*, 22(1), 53-58.
- Church, T.E. (2009). *Veterans with Disabilities: Promoting Success in Higher Education*. Huntersville, NC: AHEAD
- D'Amato, RC. & Hartlage, LC. (Eds) (2008). *Essentials of Neuropsychological Assessment: Treatment Planning for Rehabilitation*. Springer Publishing: New York.
- Defense and Veterans Brain Injuries Center. (n.d.). Blast Injury FAQs. Retrieved from <http://www.dvbic.org/TBI---The Military/Blast-Injuries.aspx>
- EurekAlert. (2010). Researchers urge reclassification of traumatic brain injury as chronic disease. Retrieved from [http://www.eurekalert.org/pub\\_releases/2010-08](http://www.eurekalert.org/pub_releases/2010-08)
- Gary, KW., Arango-Lasprilla, JC., & Stevens, LF. (2009). Do racial/ethnic differences exist in post-injury outcomes after TBI? A comprehensive review of the literature. *Brain Injury*, 23(10), 775-789.
- Green, W., Ciuffreda, K., Thiagarani, P., Optom, BS., Szymanowicz, D., Ludlam, D., Kapoor, N. (2010). Accommodation in mild traumatic brain injury. *Journal of Rehabilitation Research & Development*, 47(3), 183-200.
- Heath Resource Center (2009). *Postsecondary students with disabilities*. Washington, DC: George Washington University, HEATH Resource Center. Retrieved March 15, 2010, from <http://www.heath.gwu.edu>
- Higher education and disability: education needs a coordinated approach to improve its assistance to schools in supporting students. (2009). United States Government Accountability Office (GAO), 10(33), 1-45.
- Kerr, J. (2009). Number of Disabled Vets Up With Iraq, Afghanistan Wars. Truthout. Retrieved March 16, 2010, from <http://www.truthout.org/article/number-disabled0vets-up-with-iraq-afghan-wars>
- Kocsis, J., & Tessler, A. (2009). Pathology of blast-related brain injury. *Journal of Rehabilitation Research & Development*, 46(6), 667-672, Retrieved March 15, 2010, from <http://www.rehab.research.va.gov/jour/09/46/6/kocsis.html>
- Longmore, P., & Umansky, L. (2001). *The New Disability History*. New York, NY. Fawcett

Columbine.

Lubit, R. (2010). Postconcussive Syndrome. Retrieved from <http://emedicine.medscape.com/article/292326>

Mandalis, A. & Galvin, J. (2009). Executive skills and their functional implications: Approaches to rehabilitation after childhood TBI. *Developmental Neurorehabilitation*, 12(5), 352-360.

Magrath, N. (2010). Supporting the student-athlete's return to the classroom after a sport-related concussion. *Journal of Athletic Training*, 45(5), 492-498.

Massel, BE. & DeWitt, DS.(2010). Traumatic brain injury: a disease process, not an event. *Journal of Neurotrauma*. 27(8), 1529-40.

Millard-Wermelinger, A., Yeates, K., Taylor, H., Rusin, J., Bangert., Dietrich, A., Nuss, K., & Wright, M. (2009). Mild traumatic brain injury and executive functions in school-aged children. *Developmental Neurorehabilitation*, 12(5), 330-341.

National Association of State Head Injury Administrators (NASHIA). (2007). Traumatic brain injury. Retrieved from <http://www.nashia.org/issues/tbi.html>

National Council on Disability (2009, March 4). Invisible Wounds: Serving Service Members and Veterans with PTSD and TBI. Retrieved March 18, 2010, from <http://www.ncd.gov/newsroom/publications/2009/veterans.doc>

Rogers, M. (2008, March 3). Vet fights to recover from brain injury. *Santa Cruz Sentinel*, pp. A-3.

Sherwin, E. & Frey, W. (2003). Going the distance: Pursuing post-secondary education after traumatic brain injury. *Brain Injury Source*, 6(3). Retrieved from Brain Injury Association of Minnesota.

Tanielan, T., & Jaycox, L. H. (Eds.). (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences and services to assist recovery*. Santa Monica, CA: The RAND Corporation.

University of Washington. (2007). DO-IT, Self-examination: How accessible is your campus? [Brochure]. Seattle, Washington: Author. Retrieved March 16, 2010, from [http://www.washington.edu/doit/Brochures/Academics/equal\\_access\\_udi.html](http://www.washington.edu/doit/Brochures/Academics/equal_access_udi.html)

University of Washington, DO-IT. (2008b) What is mental illness? Retrieved March 17, 2010, from <http://www.washington.edu/doit/articles?187>

Zoroya, G. (2007, September 23). Brain injuries from war worse than thought. *USA Today*. Retrieved from [http://www.usatoday.com/news/world/iraq/2007-09-23-traumatic-brain-injuries\\_N.htm](http://www.usatoday.com/news/world/iraq/2007-09-23-traumatic-brain-injuries_N.htm)

