Please estimate the number of persons

- Who sustain a TBI each year
  - A. In USA
  - B. In Wisconsin
- The number of persons in your practice who have a TBI

Traumatic Brain Injury & Primary Care Clinicians: A Critical Connection

WREN Conference

Wisconsin Research and Education Network Conference

September 17, 2010

Tom Tatlock, M.D.

Overview

- TBI statistics
- Personal story
- TBI common residual symptoms
- Unique role of primary care clinicians
- Follow-up: some ideas and suggestions
- Questions & discussion

A Traumatic Brain Injury is

- caused by an external force
    - a blow or jolt to the head
    - penetrating head injury
    - a “blast” injury
- that disrupts the normal function of the brain.

The “Silent Epidemic”

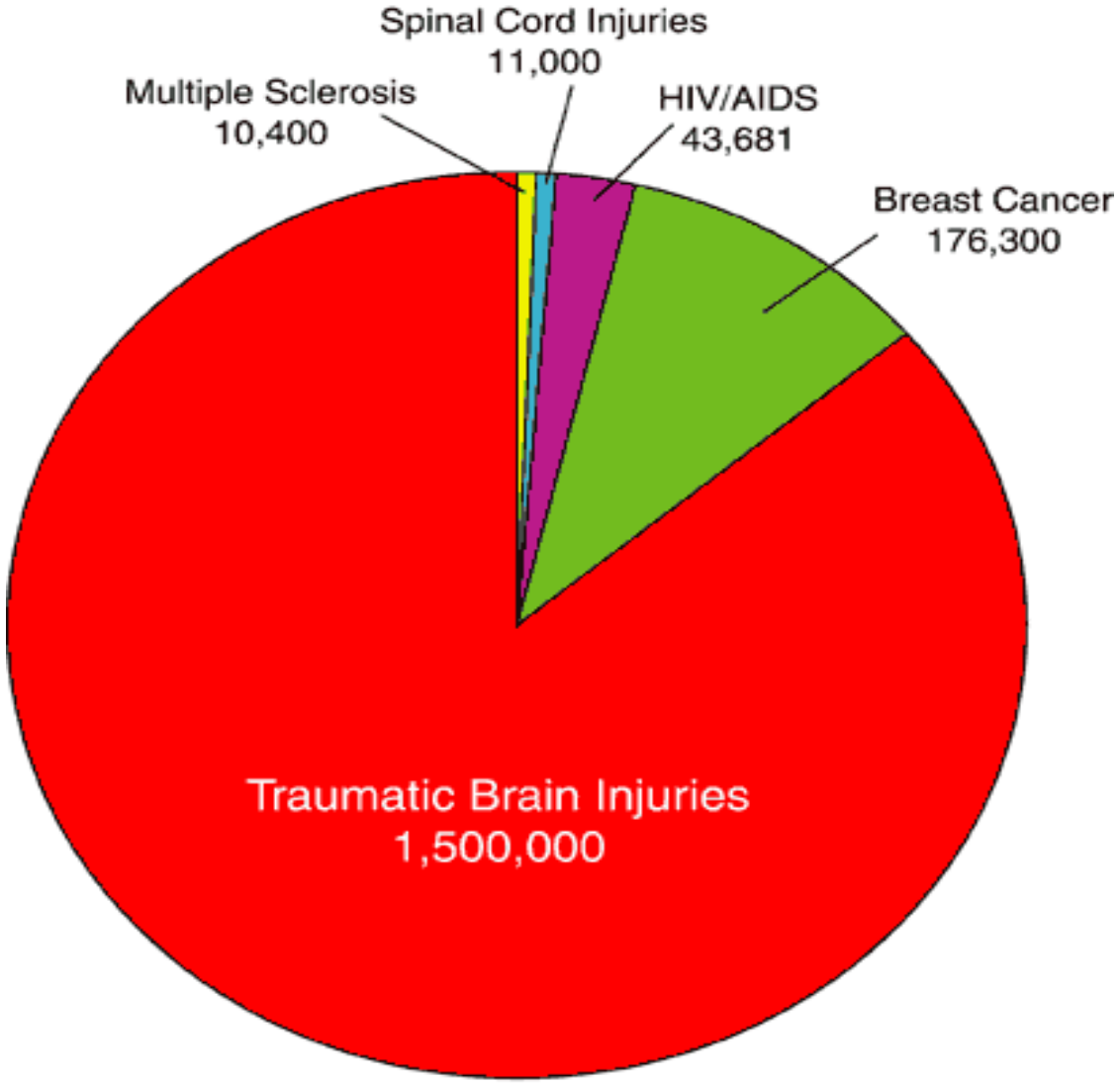
Each year 1.7 million sustain a TBI :

- Severe: 10% 170,000
- Moderate: 10% 170,000
- Mild: 80% 1,360,000

~ 75% to 85% of Mild TBI spontaneously improve, usually within 3 weeks

~ 15% to 25% of Mild TBI patients may have life-long symptoms or limitations.

CDC, 2010



Comparison of Annual Incidence

Data compiled and arranged by the Brain Injury Association of America
based on data from the Centers for Disease Control and Prevention,
American Cancer Society and National Multiple Sclerosis Society

TBI in Wisconsin, 2007

- ~ 5,857 persons sustained a TBI
  - that is ~ 16 persons each day
- > 4,600 TBI related hospital discharges
- > 1,100 WI residents died from TBI
- How many go undiagnosed?

WI Bureau of Health Information

Brain Injury Consequences

A brain injury can affect
who we are and
the way we think, act and feel.

It can change everything
about us in a matter of
seconds.

Personal TBI Time Line 1999-2009

- May 19, 1999 “The Fall”
- June 14, 1999 Return to work
- January 20, 2000 “Retired”

… “Wandering in the Wilderness”…

- July 12, 2000 Start treatment
- 2005 - 2007 Back to school

My Journey

- May 19, 1999, fall from ladder with overnight hospitalization
- Subdural, subarachnoid hemorrhages “resolved” by early June…but pain did not
- “You’ll be back to your normal self in a month.”
- The “lost month” at home
- Return to work June 14, 1999

Wandering in the Wilderness

- July 1999, Neurologist, “Will improve over the next six months, no further treatment recommended”
- January 20, 2000, last day of my career
- February 5, 2000, fall with broken leg
- April 2000, Physiatrist, “I have no specific interventions other than the passage of time”
- May 2000, Psychologist, “His ideas and my anger”

Finally Finding Help

- BIA-WI State Conference, May 17-18, 2000
- Mayo Clinic, July 12, 2000 - 1st visit
- Relief in finding competent, caring providers with knowledge and experience
- Magical hopes of returning to “old” self
- Desperate desire for them to know who I had been vs. who I was post-TBI

The Beginning Stages of Treatment

- Assessment and evaluation
- Problem identification
- Education

Early Struggles in Treatment

- Depression and anxiety, different opinions
- Impossible assignments
  - Stop when you hurt
  - Stop when you feel tired
  - Stop thinking, put your mind at rest

Major Problems for Me

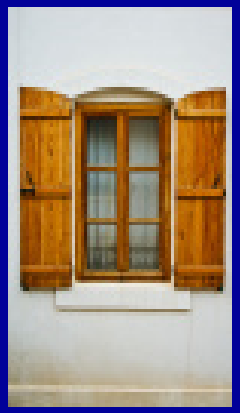
- Ignorance
- Pain
- Automatic behaviors
- Fatigue
- Sensitivity to external stimuli
- “Brain Brown-out”
- “Emotional Isometrics”
- Loss of sense of self

Pain

0% 25% 50% 75% 100%

Least Most

Fatigue



0%....20%....40%....60%....80%....100%

(window of awareness)

Least severe » Most severe

Components of Fatigue

- Physical
- Emotional

  (Emotional Isometrics)
- Psychological
- Intellectual

  (Brain Brownout)

Things That Help

- Having a loving and supportive wife, Andrea
- Having the support of my family physician
- Learning and following “the treatment program”
- Getting back on track, multiple times
- Learning to live within my limits, with less apologizing and feeling guilty and/or ashamed
- Having a sense of humor

Overall Strategies for Success

- Education about my injury for me and my family
- Building the alliance
- Team of experts working together
- Coaching and encouraging

Specific Coping Strategies

- Increase self awareness
- Create structure and organization
- Move from “failures” to “problems” to “solutions”
- Find new definitions of success and self

An Essential Tool

Activities That Helped

- Cooking
- Volunteering
- Lying in a hammock
- Exercising
- Going back to school
- Getting together with friends

Allure of Alcohol

- Relieves pain from physical symptoms
- Helps to fill the time when I can’t really function
- Blocks out emptiness and meaninglessness

Severity of TBI

Within the 1.7 million persons with TBI annually

- Severe: 10% 170,000
- Moderate: 10% 170,000
- Mild: 80% 1,360,000

“Miserable Minority” 204,000 to 340,000

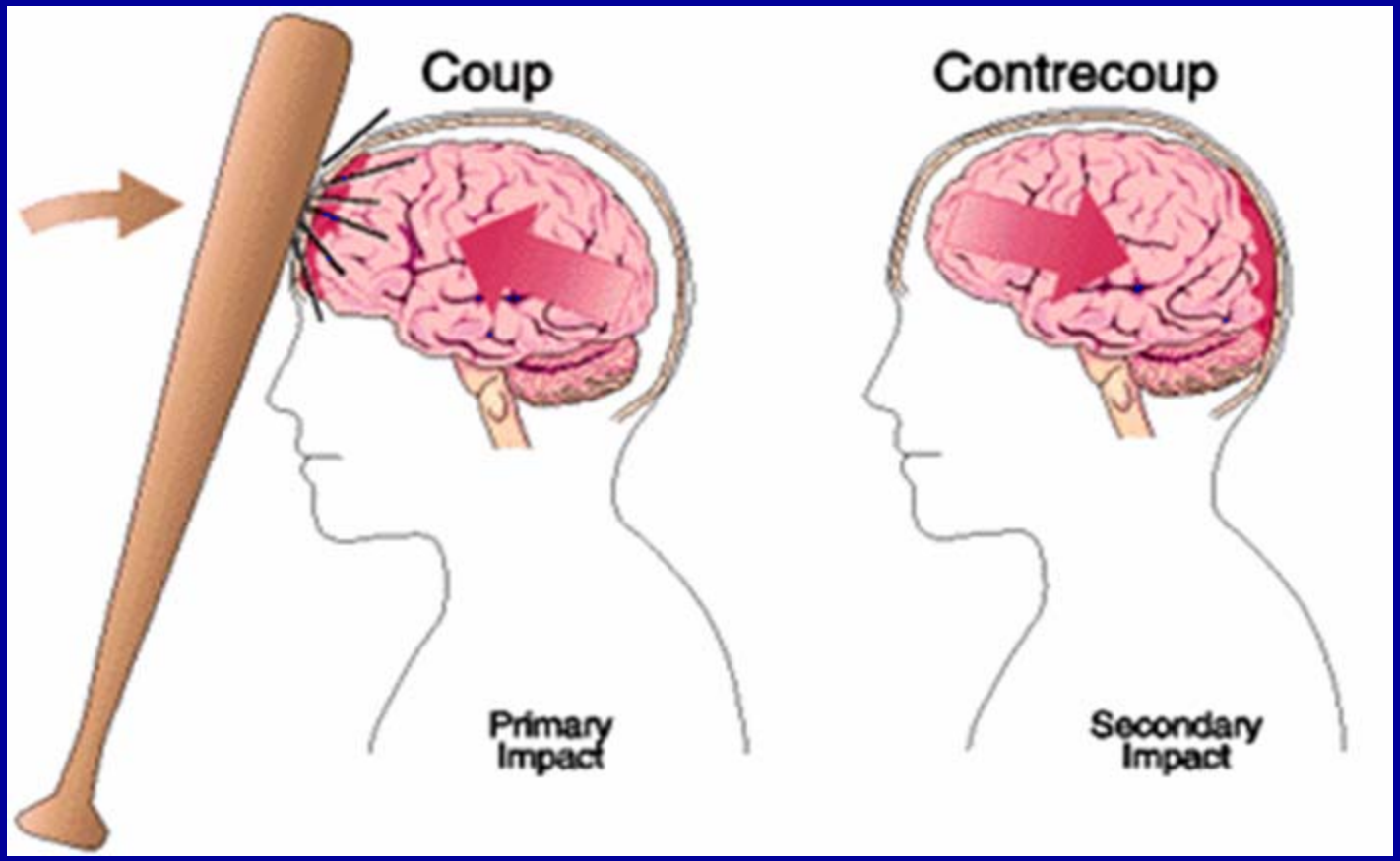
(that ~ 15% to 25% of the “Mild” 80% who have significant persistent symptoms)

CDC, 2010

Types of TBI

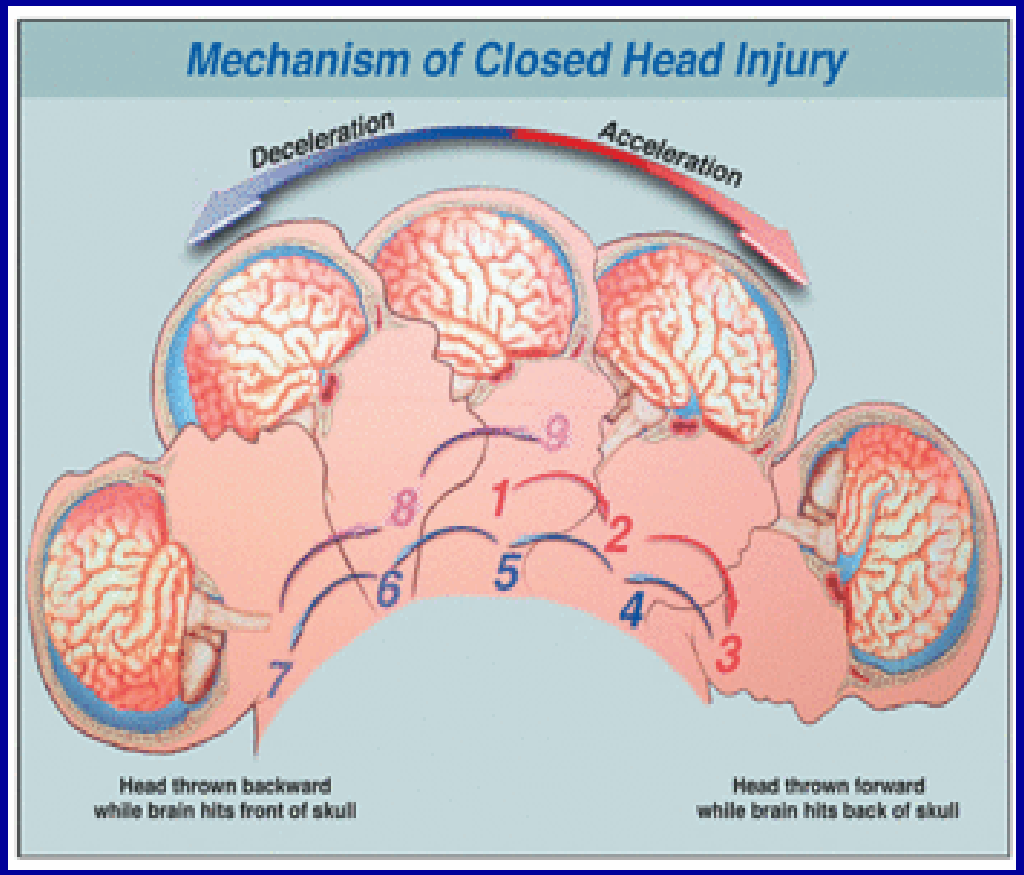
- Penetrating Head Injury
  - Gun Shot Wound
  - Stabbing
  - Blast (fragments)
- Closed Head Injury
  - Blast
  - Fall
  - MVA
  - Blunt trauma
  - Sports

Closed Head Injury

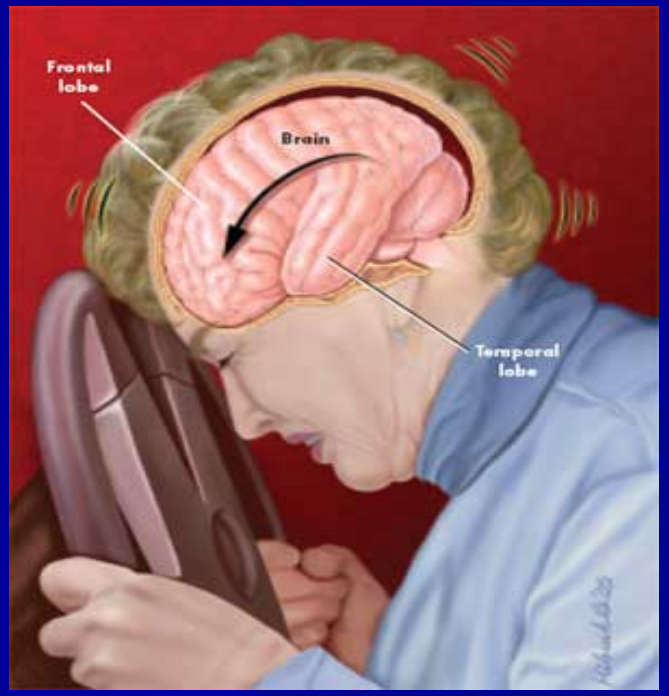


ALL-NET Pediatric Critical Care Textbook Source: LifeART EM Pro (1998) Lippincott Williams & Wilkins. www.med.ub.es/All-Net/english/neuropage/trauma/head-8htm

Acceleration/Deceleration



Whiplash

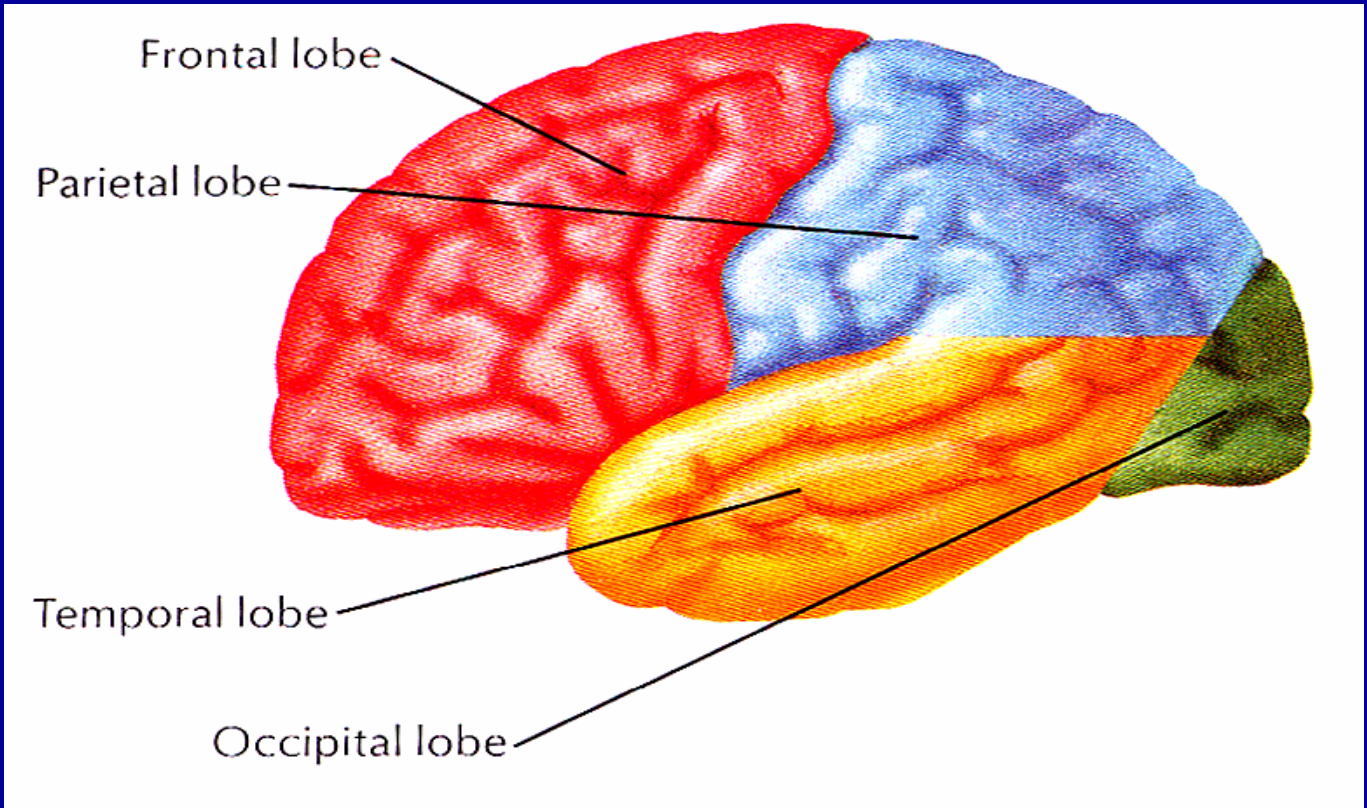


MVA

Mechanism of Damage

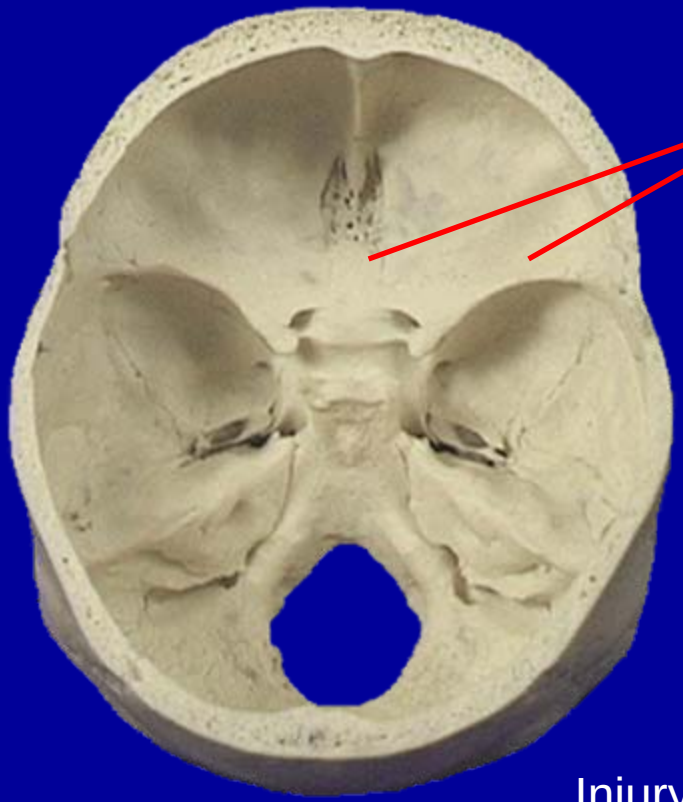
- Brain is like consistency of formed “Jell-O”
- Bruising of the brain is due to forward/backward movement against skull
- Twisting of nerve fibers is due to twisting of brain within skull
- Nerve fibers are broken or stretched = temporary or permanent brain damage
- Leads to cognitive and behavioral changes

Areas of the Brain



Lobes of the Brain: Frontal, Temporal, Parietal, Occipital

Interior Skull Surface

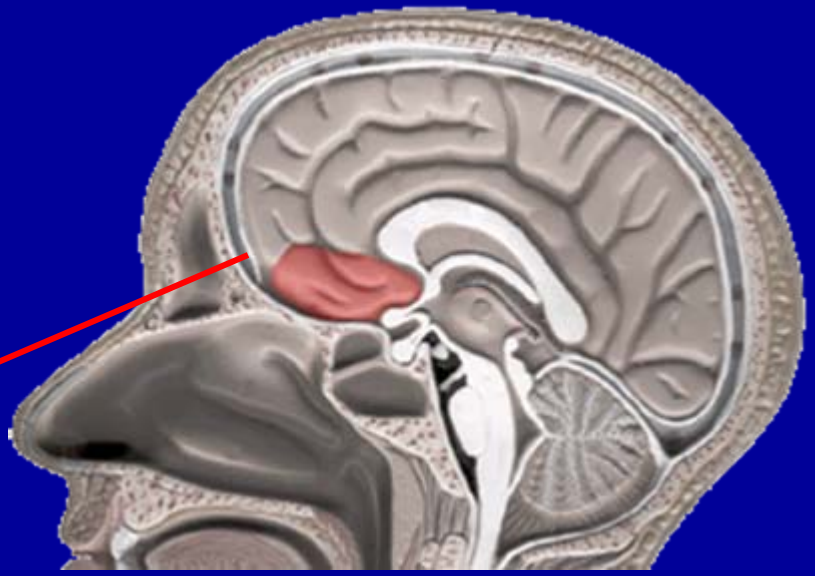


Bony ridges

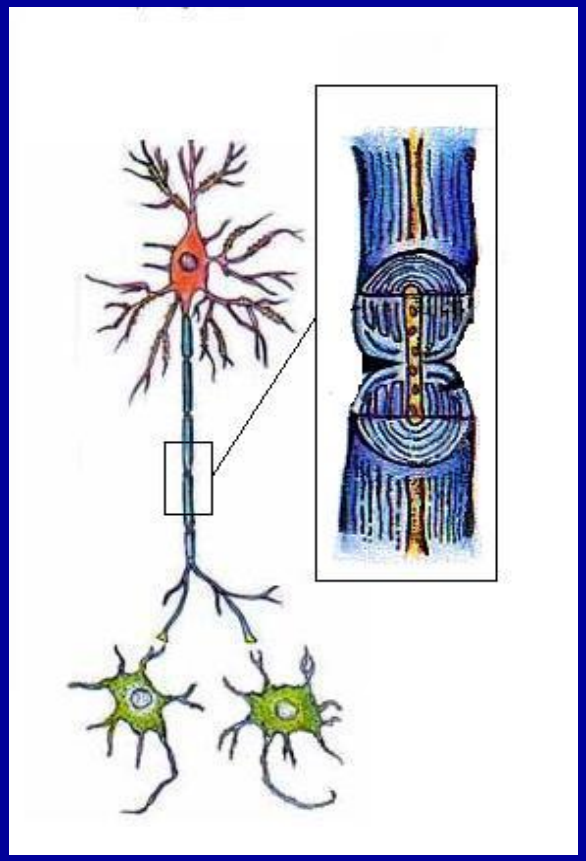
The base of the skull is rough, with many bony protuberances.

These ridges can result in injury to the temporal lobe of the brain during rapid acceleration.

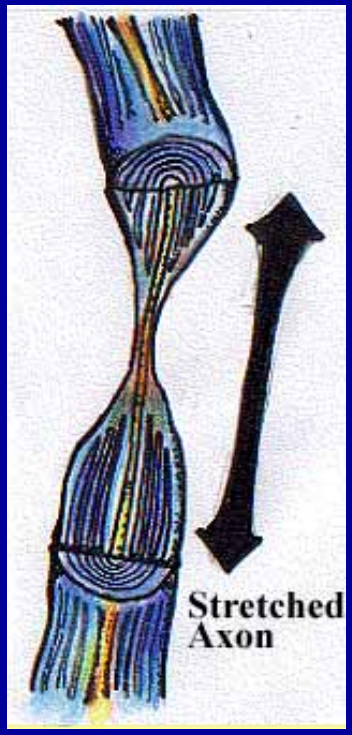
Injury from contact with skull



Diffuse Axonal Injury (DAI)



Healthy Axon



Stretched Axon

Twisted Axon

Sheared Axon

Axonal Injuries

- Nerve fibers within specific areas of the brain are severed … never to be regained
- Nerve fibers are stretched … resulting in inefficient and slowed functioning
- Onset of physical, cognitive and behavioral changes after the TBI reflect impaired functioning due to these broken or stretched nerve fibers
- These injuries are not visible on CT scan or MRI

In TBI, there is preferentially greater damage to the *frontal* and *temporal* lobes of the brain

Frontal Lobe Functions

- Planning/anticipation/initiation
- Problem solving/judgement
- Awareness
- Mental flexibility
- Ability to inhibit responses
- Personality/ emotions

Temporal Lobe Functions

- Memory and learning
- Organizing and sequencing
- Hearing
- Understanding language

Thinking Changes in "Executive Functioning"

- Difficulty planning and setting goals
- Difficulty problem solving
- Difficulty organizing
- Difficulty prioritizing
- Difficulty being flexible
- Difficulty being aware of thinking changes in self

Thinking Changes

Attention

- Reduced concentration
- Reduced visual attention
- Inability to divide attention between competing tasks

Processing speed

- Slow thinking
- Slow reading
- Slow verbal and written responses

Thinking Changes (2)

Communication

- Difficulty finding the right words, naming objects
- Disorganized in communication

Learning and Memory

- Information before TBI intact
- Reduced ability to remember new information
- Problems with learning new skills

Physical Problems

- Fatigue
- Headaches
- Increased sensitivity to noise/bright lights
- Overall slowing
- Clumsiness
- Decreased vision/hearing/smell
- Dizziness

Typical Descriptions…

- “Unmotivated”
- “Unfocused”
- “Poorly organized”
- “Unable to plan ahead”
- “Unable to follow a train of thought”
- “Forgetful”

- Koss 1997, Walker 1991, Warshaw 1993

TBI: Cost to Society

- $ 60 Billion per year
- High risk populations
  - Veterans
  - Homeless persons
  - Prison population
- 3.17 million persons on long-term disability from TBI

CDC

Higher Risk for TBI

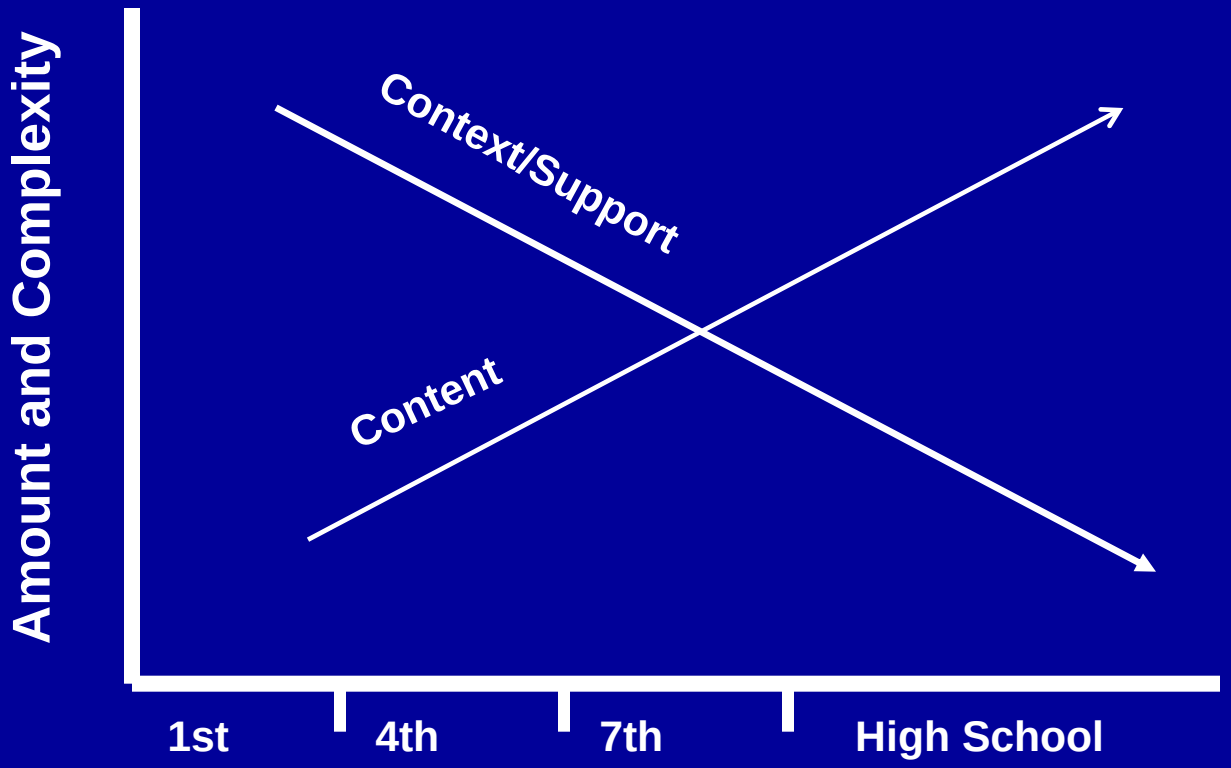
- Special Populations:
  - Veterans ~ 20%
  - Homeless ~ 50%
  - Prisoners ~ 27% to 85%
- Males: 1.5 to 2 times risk
- Age: 15-45; < 5years; > 75 years
- **TBI: leading cause of death ages 15-45**

CDC

TBI: Children Statistics

- CDC reports 300,000 sports-related “mild” TBI per year (a “concussion”) – with LOC
- 165,000 children will be hospitalized each year with a BI
- After hospital stay fewer than 2% are recommended for special education (though 19% have cognitive limitations) [from National Pediatric Registry]

TBI: Academic Stress Points



How to Recognize TBI

- High index of suspicion
- History
- Observation of behavior and cognitive functions
- More formal testing
- CT scan and MRI may be negative
- Neuropsychological testing

Missing … TBI

- **Mild to moderate TBI** often goes undiagnosed
- The effects of brain injury can be very subtle
- Lingering effects of TBI may not emerge in earnest until after 12 months
- Families and school personnel have limited knowledge about brain injury
- “Growing into your deficits”

Perspective on Brain Injury

The most important things to remember include:

- No two brain injuries are exactly the same
- The effects of a brain injury depend on such factors as cause, location and severity
- Adjustment is dependent on “before-after” changes in the person
- ***When the symptoms persist, TBI is not an event but a lifelong process.***

Conceptual Models

- TBI as a family illness
- Improvement can continue
- “Erosion by chronic condition”
- Difficulties at transition points
- Interdisciplinary team
- Need to create resources
- Referral and consultation issues

Unique Role of the Primary Care Providers

- Has an ongoing relationship
- Knows the person both pre-TBI and post-TBI
- Knows the family
- Knows the community
- Remains a constant when transitions occur

Primary Care Clinicians have Unique Opportunities to

- Partner with TBI treatment experts
- Educate others
- Create systems for identification
  - Sports injuries
  - Higher risk populations
- Create treatment systems at local level
- Develop long-term care protocols

Develop your TBI Network

- TBI model systems in your area
- Rehabilitation hospitals
- VA hospitals and clinics
- University medical centers
- Brain Injury Association of WI
- Training of local TBI providers

Long-Term Follow-Up Goals

- Best quality of life
- Life style changes
- Prevention of problems
- Continuity of care
- Life cycle challenges
- Early intervention for problems
- Emerging treatment options

TBI: A Chronic Condition

When the symptoms persist, TBI is not an event but a life long process.

Symptomatic TBI affects the

- Individual
- Family
- School / Work
- Community

Ideas for Discussion

- Frequency of follow-up
- TBI, adaptations in office visit
  - Time
  - Structure and focus
- Goals of active follow-up
- When/how to involve the family

Aaron Kampman on TBI

“Say you get hit in the leg," Kampman said. "You can analyze with your brain to say, 'OK, my knee is sore, my leg is sore.’

Well, if your head is sore, it's kind of hard to analyze your own thing you're trying to analyze, if that makes sense."

Kampman said he could tell watching film of himself against Tampa Bay that he was not playing the way he normally does.

Tom Silverstein of the Milwaukee Journal Sentinel

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Thank You

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