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A Bump or a Bleed …
and Where It Can Lead:

Updates:
Prevention, Identification
and Management

Our Short Time Together

- **Know the facts** – brain injury / neuro-insult including mTBI
- Identify **typical symptoms** *(immediate, early and latent)*
- **Prevention** messaging to patients
- **Management: What can YOU do?**
  - Awareness (knowing the signs)
  - Prevention
  - Screening
  - Post-injury management (**!!! Rest for 72 hours !!!**)  
- **Resources** – Share information to strengthen the patients and educate their families and caregivers *(Support is THE best predictor of positive outcomes for survivors!)*
Traumatic Brain Injury Facts

For over a decade we've known that BRAIN INJURY is the leading cause of disability and death among children older adults – in the US and internationally.


Someone in America sustains a traumatic brain injury (TBI) serious enough to seek medical attention at a hospital* every 12 seconds.

That is 300 people during this 60-minute time slot with you...

...and 2 more people... will DIE.

* NOTE: Hospitals within CDC data and reporting do not include federal programs.

Traumatic brain injury has been classified as a public health epidemic in America for a decade.

How are people injured?

- **Falls** are the leading cause (28%)
  - especially prevalent among infants/young children and the elderly.
- **Motor vehicle-traffic crashes** account for 20% of all traumatic brain injuries.
- **Struck by/against events** are the third major cause (19%)
- **Assaults** account for 11% of injuries (and DV is underreported in elderly populations).
- **Other important causes:**
  - **Violence**, particularly from firearms
  - **Blasts**, the leading cause of head injuries for active duty military personnel in war zones.
Who is at risk in the general population?

- Males are 1.5 times more likely to sustain a TBI.
- Males are 3 times more likely to die as a result of TBI.
- However, in the elderly population, women are more likely to be injured.
- The three age groups at highest risk for TBI are
  - 0-4
  - 15-19
  - 65 years and older.

What are the risks among older adults?

- Adults aged 75 and older have the highest rates of TBI-related hospitalization.
- Older adults have the highest death rate from TBI.
- Falls are the leading cause of TBI for older adults (51%), and motor vehicle traffic crashes are second (9%).
- Older age is known to negatively influence outcome after TBI.
**Educating Families and Caregivers**

**Vocabulary for Brain Injury Types**

- **Congenital Brain Injury**
- **Acquired Brain Injury**
- **Traumatic Brain Injury**
  - Closed Head Injury
  - Open Head Injury
- **Non-traumatic Brain Injury**

[Savage, 1991]

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**Medical Causes of Brain Injury**

**Primary injury (impact / insult)**
- Skull fracture
- Bleeds (contusion, hematoma, aneurism)
- Axonal shearing
- Hypoxia, anoxia

**Secondary injury (reaction)**
- Secondary tissue damage
- Necrosis
- Increased intracranial pressure (ICP)
- Swelling / inflammatory response
- Intracranial infections
- Disease processes

[NEURON diagram]
## AAN Grading of Concussion Severity

(Implications for ALL ages)

<table>
<thead>
<tr>
<th>Grading mTBI</th>
<th>Loss of Consciousness</th>
<th>Symptoms of Confusion</th>
<th>Length of time until Return to Play (sports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No LOC</td>
<td>&lt; 15 minutes</td>
<td>+15 minutes + ARS 15-341</td>
</tr>
<tr>
<td>II</td>
<td>No LOC</td>
<td>&gt; 15 minutes</td>
<td>1 week</td>
</tr>
<tr>
<td>IIIa</td>
<td>LOC for seconds</td>
<td></td>
<td>1 month</td>
</tr>
<tr>
<td>IIIb</td>
<td>LOC for minutes</td>
<td></td>
<td>6 months</td>
</tr>
</tbody>
</table>

2018 NEW Guidance:
The GOAL is to return to activity - without symptoms increasing!!!

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### Concussion: Early Onset – Late Arrival

- **EARLY SYMPTOMS**
  - Headache
  - Confusion
  - Dizziness
  - Nausea with or w/out vomiting
  - Disorientation to time/place
  - Slow to respond or to follow instructions
  - Being uncoordinated

- **LATE SYMPTOMS**
  - Persistent headache
  - Poor attention and concentration
  - Memory dysfunction
  - Vision disturbance
  - Ringing in the ears
  - Anxiety and depressed mood
  - Irritability
  - Intolerance to loud noise

Clustering of symptoms is referred to as PCS...
... but can they be interpreted as other disorders?
Concussion (mTBI): Long-term

- **Second Impact Syndrome (SIS)**
  - 2nd concussion while still symptomatic
  - Can occur within hours, days or weeks
  - May lead to lifelong impairments
  - Can lead to early death...

- **Post-Concussive Syndrome**
  - Effect of repeated concussions
  - Cumulative neurological and cognitive deficits
  - More concussions, more risk...

...CTE...

Rest for 72 hours – No Pay – No Play

Educating Families and Caregivers
Moderate & Severe Effects can be Lifelong

Policy Implications: Proactive Management of TBI
- Risk factors and the TBI Model System Program should address...
- Identify symptoms in children, adults, and elderly individuals...
- Early intervention and treatment...
- Support for individuals and families...
- Training for healthcare providers...
- Increased awareness and education on the signs and symptoms of TBI...
- Communities and organizations should develop programs to educate individuals on TBI.
Add Early Issues...

- Early insults can create weakness that impacts future development (arrested development).
- Frontal lobe refinement is spurred on by secretion of hormones before and in puberty.
- Frontal lobe development is not complete until mid/late-20's (with a 2-3 year lag for males).
- Early trauma can result in delays to final myelination, effects may be revealed decades later.

... Impact Neuro-Development

As a result of injury/disease in childhood:

- Key stages of brain development may be altered, interrupted, or halted.
- The abilities that are just developing or have not yet emerged are the most sensitive and are therefore, more likely to be disrupted.
- There is greater risk/potential for co-morbidities in adulthood (chronic disease, mental illness, behavior disorders, and decreased longevity).
... Impact Longevity and QoL

As a result of injury/disease in childhood:

- **Survivors are more likely to experience**
  - Motor disorders
  - Endocrine dysfunction
  - Cardio-vascular complications...
  in later adult life (without genetic predisposition).

- **AND...complications from typical medications used by elderly for co-morbid conditions increases potential for undetected intracranial bleeds.**
  - Anticoagulants (1/5 over 65 yrs are prescribed)

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**When Injury or Disease Occurs...**
Families need to know that...

- **Sensory information** may not be able to get into the brain accurately...

- **Neuro-networks** through different parts of the brain may no longer communicate with one another...

- **Processing speed** (receptive and expressive) may be slowed...

- ...as a result, communication and behaviors may change!!!
So What Can YOU Do???

Become AWARE of Signs and Symptoms

- Listen for post-concussive complaints
- Watch for signs of neuro-impairment
- Add screening for TBI to your practice, policies and procedures
- Query/question the client about symptoms and onset
- Educate clients, families and caregivers

Add Screening for Brain Injuries

Integrate screening procedures into practice

- Use the World Health Organization's standardized screening tool – H.E.L.P.S. as part of patient intake
- If you have a positive screen...
**Integrate Interview Procedures**

Into your practice...

- conduct a more thorough interview/history using the *Ohio State University TBI – ID* Method (Corrigan, J. 2013)

**Promote PREVENTION MESSAGES**

- Wear passenger restraints EVERY TIME one rides in a motorized vehicle
- Never drive under the influence of drugs or alcohol *(or get into a vehicle with someone who is under the influence)*
- Make living areas safe for children and seniors
  - Remove trip hazards
  - Use non-slip mats (tubs/showers) & install grab bars
  - Improve lighting throughout the living area
  - Assess outdoors for safe play areas
- Promote regular physical activity to promote body strength, increased flexibility, and balance
Continue to Educate about signs

Both Clients and Their Families/Caregivers

- Look for changes (mood, behavior, communication) after suspected injury
- Offer local, state, and national resources about brain injury and its effects
- Encourage client’s participation in activities to increase strength and mobility and reduce fall risk.
- Closely monitor medications, focus on interactions and assess the client’s capacity for self-management

Brain Injury Alliance of AZ    www.biaaz.org
Children’s Safety Network      www.childrenssafetynetwork.org
CDC and Prevention             www.cdc.gov/traumaticbraininjury
Model Systems Knowledge        https://msktc.org/tbi
Translation Center
WETA.org / Washington DC PBS   www.brainline.org
AZ Governor’s Council on Spinal and Head Injuries
AZ Center for Disability Law   www.azdisabilitylaw.org
AZ Statewide TBI Training       www.azed.gov/TBI
DES – Vocational Rehab         https://des.az.gov/rsa-contact-information
Additional materials are available from the Council and the CDC.

Materials for patients and families are available at the Brain Injury Alliance of AZ (biaaz.org)

THANK YOU for your time!