Mild Traumatic Brain Injury (mTBI)  
Myths vs Reality

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Concussion: Myth vs Reality?

“Children are young, they do better than adults after an injury”

Traumatic Brain Injury (TBI)

“Traumatic brain injury is an important public health problem in the United States. Because the problems that result from TBI, such as those of thinking and memory, are often not visible, and because awareness about TBI among the general public is limited, it is frequently referred to as the silent epidemic.” (CDC)
Statistics
- Almost two million TBIs are treated annually
- ¾ of those TBIs are mTBIs/Concussions
- Nearly 300,000 hospitalizations

Statistics
- Close to 1.5 million emergency department visits
- The majority of mTBIs are a result of falls
- The two age groups most vulnerable are toddlers and teenagers

Who’s at risk? (And why?)
- Infants: NAT, falls & drops
- Toddlers: Learning to cruise, falls (high & low)
- Preschoolers: Bikes, falls (high & low)
- School age: Organized sports, bikes,
- Adolescents: Sports, driving, risky behaviors ("Hey, watch this...")
What is a TBI?

- Head injury causing disturbance in normal brain function
- Damage can range from mild (mTBI) to severe
- Most common type of mTBI is concussion

Types of TBI

Structural
- Subarachnoid
- Subdural
- Epidural
- Diffuse Axonal Injury

Non-structural
- Concussion

Concussion: Myth vs Reality?

“My CT scan was normal, so I don’t have a concussion”
What is a concussion?

• Not a ‘structural’ injury
• Cannot be visualized by CT or MRI
• Considered a metabolic crises (or energy crises)

What is a metabolic crisis?

• Potassium rushes out of the brain cells
• Calcium rushes into the brain cells
• Brain is now functioning at a rate of over 120% of normal
Sustaining a concussion

- It is a force/counter-force action:
  - Brain is ‘floating’ inside the hard skull structure
  - Sudden jolt or shake moves the brain from side to side
  - Does not have to result from a perceptible blow to the head
  - Often two opposing sides of the brain sustain injury

As a result...

- Brain ‘RPMs’ are at an exaggerated rate at rest
- Normal metabolic function is altered
- Activities of Daily Living (ADLs) are increasingly difficult
- Cognitive functioning (school/work) is affected

Feeding the Misconceptions

“The patient is completely unconscious and in a state of flaccid paralysis. In a severe case, the respiratory and cardiac functions may hardly continue. In a few minutes recovery begins; the visceral reflexes are the first to return, and vomiting is common at this stage. The other cerebral functions recover more gradually, and there may be complaint of headache, dizziness and giddiness, but at the end of 24 hours, in a typical case of concussion...recovery should be complete”

CP Symonds, 1928 - British Medical Journal

1928...and this is still the belief frequently encountered!
What to do?

- Acute—(minutes to about an hour): Sideline or incident neuro-cognitive evaluation
- Acute—(first 24 hours following initial injury): Emergency department or primary care appointment—CT scan/MRI when medically necessary

What to do?

- TBI clinic for treatment post acute and throughout the recovery period
- Collaborations between healthcare providers and school systems

How do we diagnose?

- Sideline or incident evaluation
- Sideline Concussion Assessment
- (SCAT)
  - Symptoms
  - Memory
  - Balance
How do we diagnose?

- Physical exam
- Self-reported signs and symptoms
- Diagnostic testing
- Speech evaluation
- Physical therapy/Occupational therapy evaluation

Concussion: Myth vs Reality?

“I didn’t get knocked out, so I don’t have a concussion”

Signs and Symptoms

- Sleep issues
- Physical complaints
- Thinking problems
- Emotional complaints
Sleep
Addressing is paramount: best to address first

• Treat medicinally
• Teach sleep hygiene

Physical Complaints
Common complaints—some medicinal ‘Band-Aids’ and patient education paramount

• Headache
• Dizziness/balance
• Light/Noise sensitivity
• Fatigue/malaise

Cognition/Thinking
School collaboration highly recommended—some medicinal aids if needed

• Memory problems
• Difficulty thinking clearly
• Feeling slowed down
• Difficulty concentrating
• Difficulty remembering new information
Concussion: Myth vs Reality?

“This is just teenage behavior, nothing to do with the head injury”.

Emotional Changes

Medicinal interventions can be used, sometimes in conjunction with referral to specialists
- Irritable
- Sadness
- Nervous
- Not him/herself

Diagnostic Testing

Neuro-cognitive testing:
- IMPACT Test
- ACE Test
- SCAT 3
- More intensive: (often for more serious TBI or if recovery is long-term or stalled)—full Neuropsychological testing
Concussion: Myth vs Reality?

“My concussion was over a week ago, so I should be fine”

How do we treat?

COGNITIVE REST AND...
MORE COGNITIVE REST

How do we treat?

Physician treatment plan: meds, PT/OT, school accommodations, omission from physical ed and contact sports...

While gradually re-integrating normal life activities
VA Legislation

- Now applies to non-interscholastic youth sports programs utilizing public school property.
- Now addresses “the effects of concussions on student-athletes’ academic performance.

Return to Learn

- Patient Specific
- Homebound vs. School: with Accommodations
- Some common misconceptions

Concussion: Myth vs Reality?

“That wasn’t a concussion, I just got my bell rung”
Return to Play

- No post-concussive signs or symptoms
- Completion of ‘recovery validating’ protocol
- Awareness of new vulnerability to future injury
- Last re-integration of normal pre-concussion activities

Return to Play

- Progressive return to physical activity
  - Step 1: light aerobic activity
  - Step 2: moderate aerobic activity
  - Step 3: Heavy non-contact activity
  - Step 4: Controlled practice
  - Step 5: Return to competition
  - Minimum 24 hour increments.
  - STOP with return of symptoms

Recovery from Concussion

- Healing takes time
- Healing is unique to the individual
- Recovery is not ‘black and white’
Concussion: Myth vs Reality?

“Wearing a ‘really good’ helmet protects my child from a concussion”

Prevention

- Helmets:
  - Biking and other wheeled sports
  - Football, Lacrosse, Baseball, etc.
- Addressing high risk behaviors:
  - Distracted Driving
  - Car Surfing, etc
- Head’s up Football

Head’s Up Football

- Player safety focus
  - Concussion awareness
  - Heat & hydration
  - Head’s up tackling
  - Equipment fitting
Case Study

- 9 year old boy practicing youth football
- “Oklahoma” Drill
- Two players collide head-on
- “Saw stars”, “out of it for awhile”
- Pulled from practice
- To the pediatrician the next day, SCAT 2 in the office.

Case Study

- Physical and cognitive rest
- Out of football for the season
- TBI clinic
- PT for balance work
- School accommodations
- No spring sport that year
- Back to Football the next season.
Epidemic

The numbers are staggering...
• They continue to grow with sports participation growing and attracting younger and younger children
• The misconceptions are perpetuating the issue

Advocacy

• **Awareness is key, and you all on are the front lines as parents and healthcare providers!**
• Stay informed of changes in legislation and local policies.
• Be part of the solution.

THANK YOU!!