Return to Learn: How Schools Can Support Students with Traumatic Brain Injury

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COSA

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What is a concussion?

- Mild traumatic brain injury
- Disruption in normal brain function due to blow or jolt to the head
- CT or MRI almost always normal
- Invisible injury

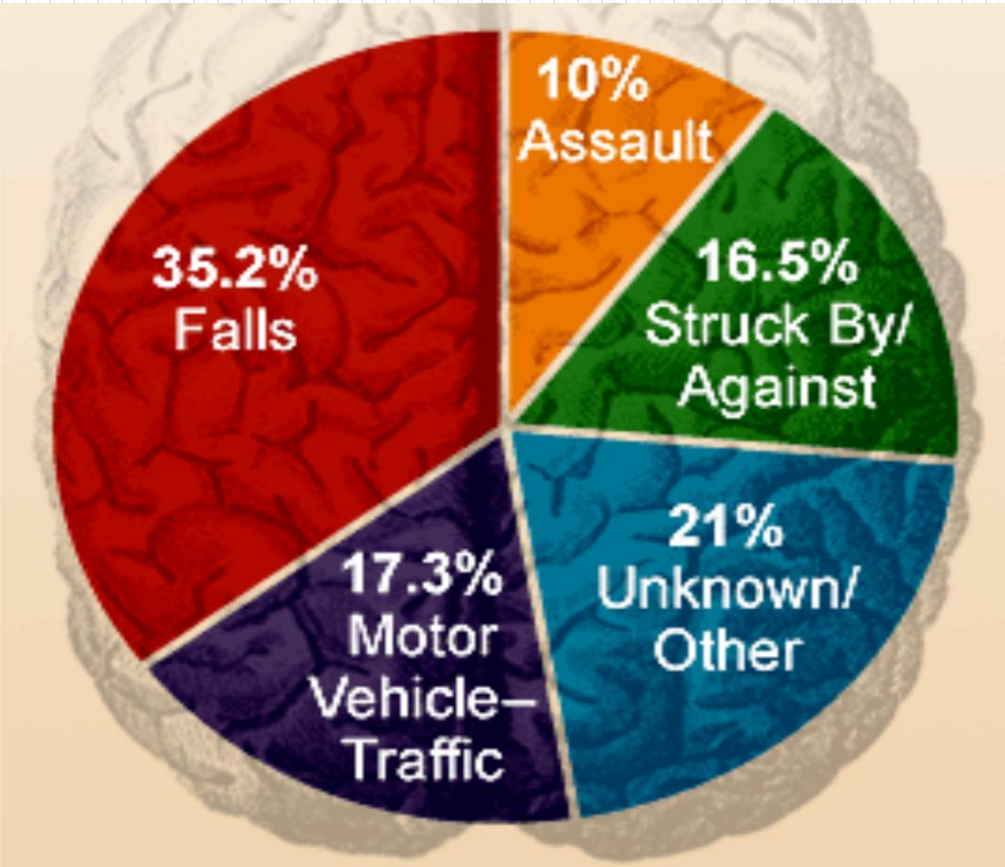
An estimated 1.7 million TBIs occur in the US annually.

CDC.gov

Epidemiology of Concussion

- Falls, MVA, assaults are most common causes
- 20% sports-related – adolescents % higher
- 10% sports concussions involve loss of consciousness
- Risk of TBI is 4-6 times greater after one and 8 times greater after two

cdc


10%
Assault
16.5%
Struck By/
Against
21%
Unknown/
Other
17.3%
Motor
Vehicle–
Traffic
35.2%
Falls

Mechanism of Injury

- Complex physiological process
- Sudden chemical changes
- Traumatic axonal injury
- Causes a neuro-metabolic cascade – brain goes into an energy crisis usually lasts up to 7-10 days
- Symptoms may get worse before they get better

School of hard knocks

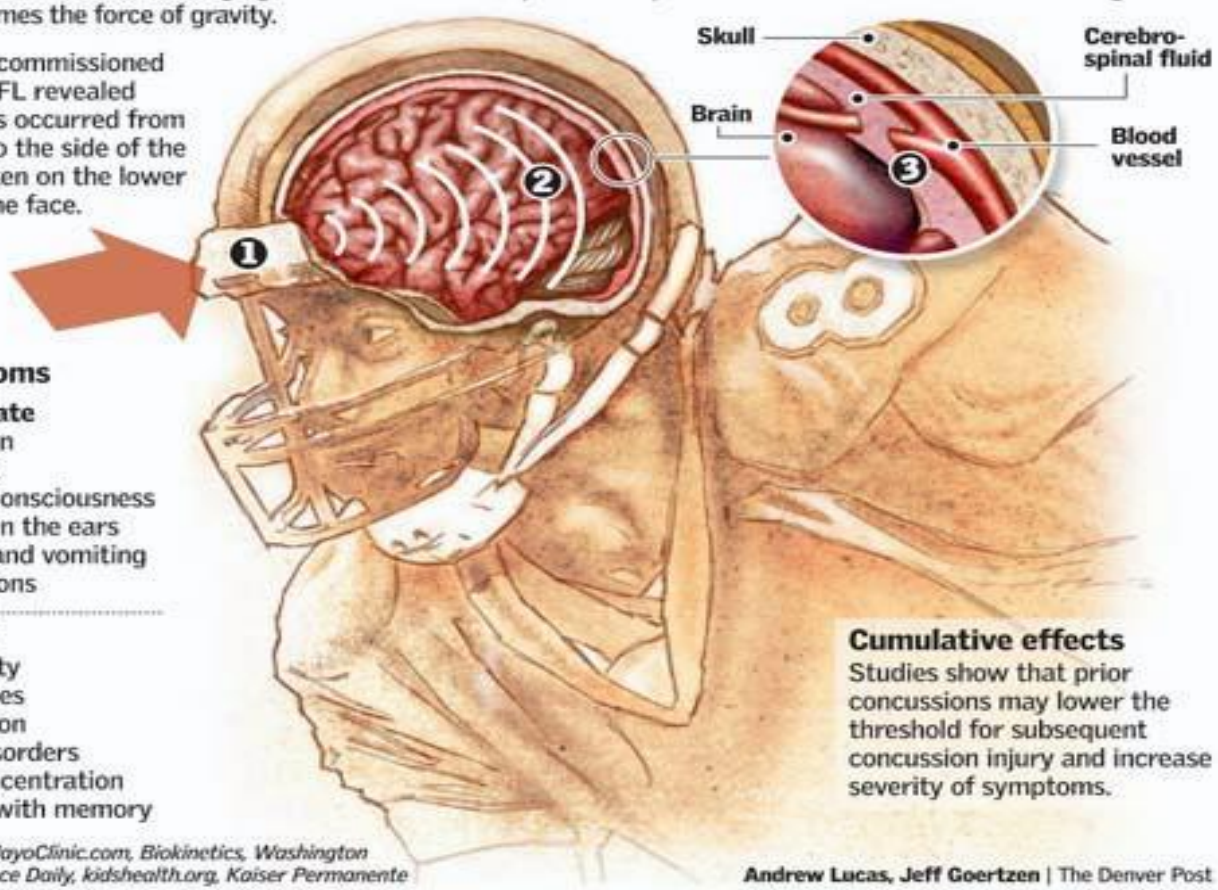
A concussion occurs when a violent blow to the head causes the brain to slam against the skull beyond the ability of the cerebrospinal fluid to cushion the impact. Between 1996 and 2001, NFL teams reported nearly 900 concussions.

1 When a football player takes a hit to the head, speeds range from 17 to 25 miles per hour with a force averaging 98 times the force of gravity.

2 The shock wave passes through the brain and bounces back off the skull. The concussion usually occurs at the opposite side from the point of impact.

3 The impact can cause bruising of the brain, tearing of blood vessels and nerve damage.

A study commissioned by the NFL revealed most hits occurred from a blow to the side of the head, often on the lower half of the face.



Symptoms

Immediate
Confusion
Amnesia
Loss of consciousness
Ringing in the ears
Nausea and vomiting
Convulsions

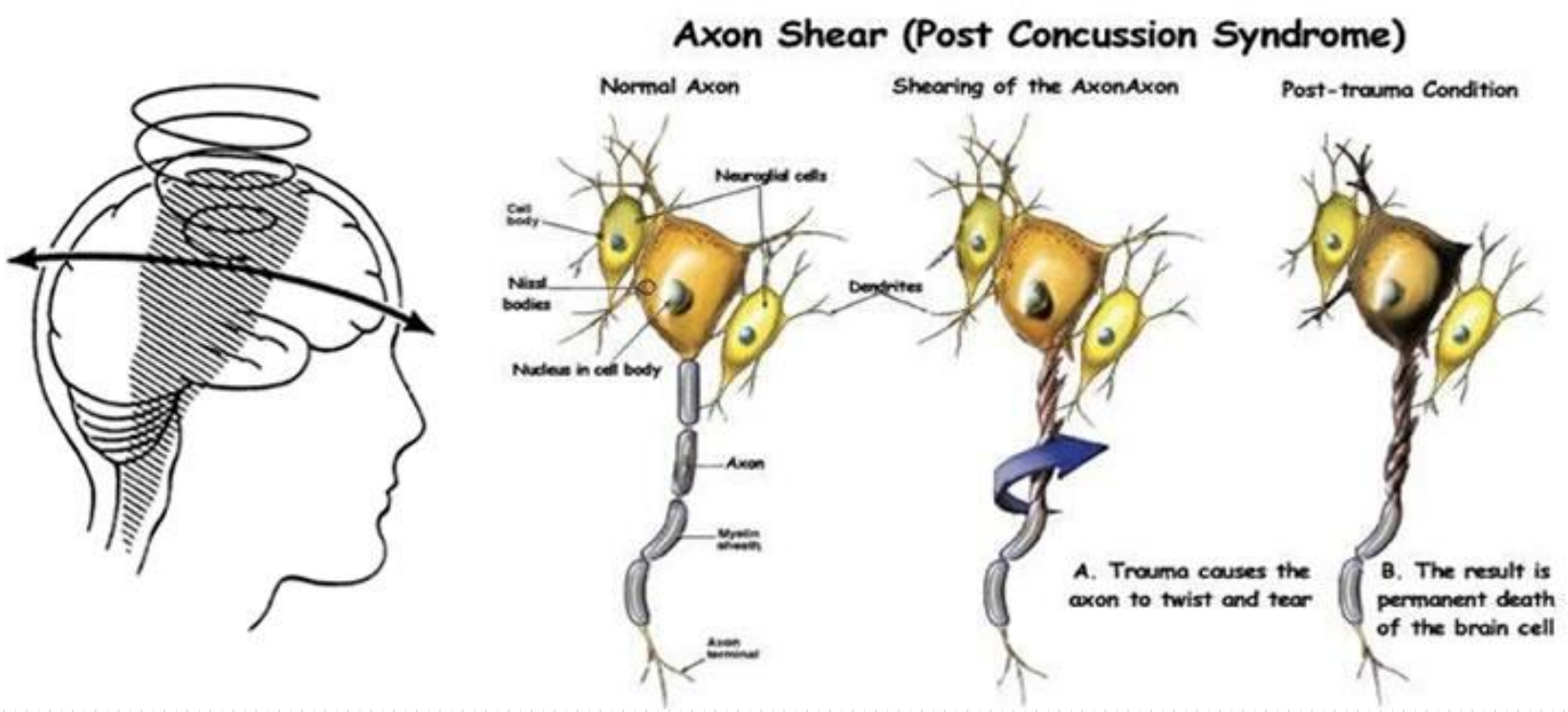
Delayed
Irritability
Headaches
Depression
Sleep disorders
Poor concentration
Trouble with memory

Cumulative effects
Studies show that prior concussions may lower the threshold for subsequent concussion injury and increase severity of symptoms.

Sources: MayoClinic.com, Biokinetics, Washington Post, Science Daily, kidshealth.org, Kaiser Permanente

Andrew Lucas, Jeff Goertzen | The Denver Post

Traumatic Axonal Injury: brain is shaken and rotated inside the skull, stretching and tearing axons. White matter underneath stretched and torn

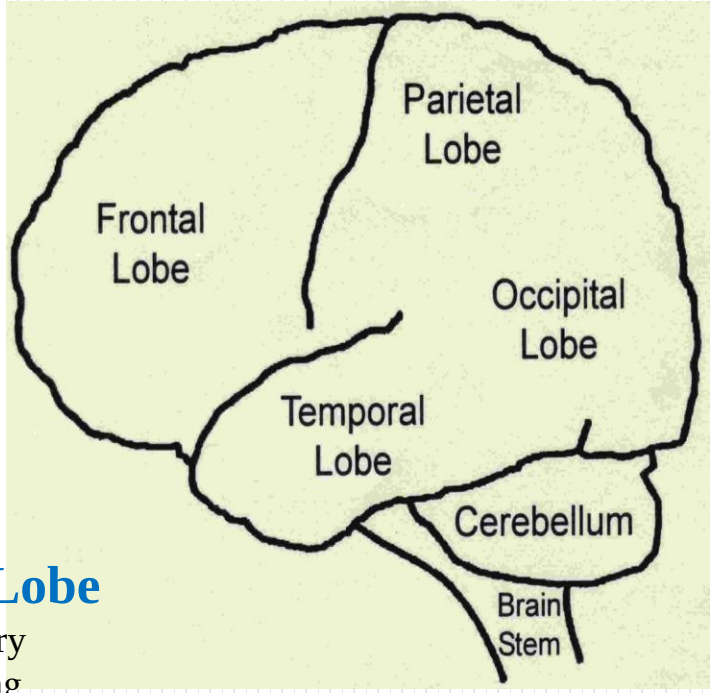


Frontal Lobe

- Initiation
- Problem solving
- Judgment
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Organization
- Attention/concentration
- Mental flexibility
- Speaking

Parietal Lobe

- Sense of touch
- Differentiation: size, shape, color
- Spatial perception
- Visual perception



Occipital Lobe

- Vision

Cerebellum

- Balance
- Coordination
- Skilled motor activity

Temporal Lobe

- Memory
- Hearing
- Understanding language (receptive)
- Organization and sequencing

Brain Stem

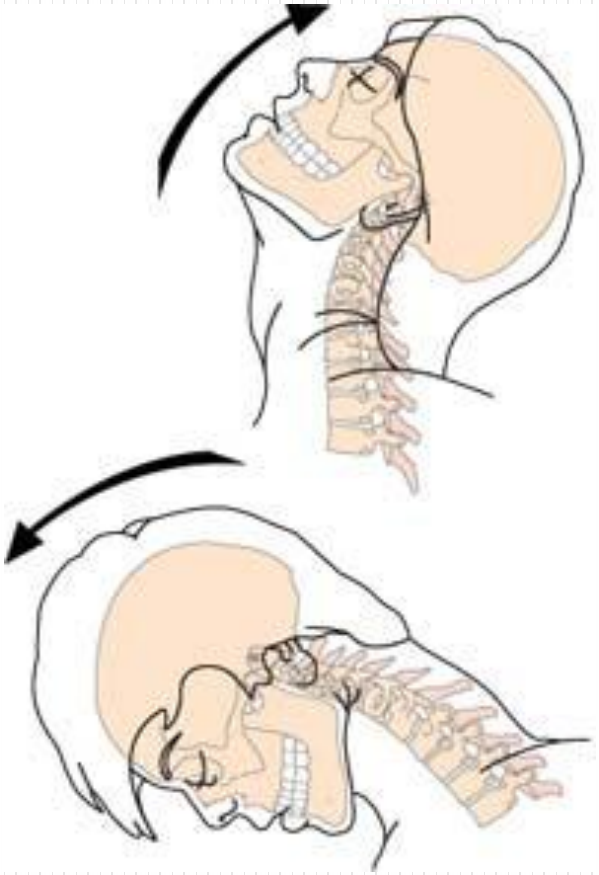
- Breathing
- Heart rate
- Arousal/consciousness
- Sleep/wake functions
- Attention/concentration

Types of Brain Injuries

- Closed Head Injuries: Occurs when brain tissue impacts the inside of the skull. Can cause bleeding, bruising, tissue damage, neurochemical changes & increased intra-cranial pressure or fluid buildup.
- Penetrating injuries: Open fractures of the skull, gunshot wounds, entry of any foreign object into the brain, resulting in damage to the brain structure neurons.
- Anoxic injuries: Occur when the lack or reduction of oxygen causes brain cells to die. Anoxic injuries can produce widespread effects throughout the brain.
- Toxic injuries: Caused by exposure to toxic chemical agents, which can cross the blood-brain barrier & damage or kill brain cells.

Traumatic Brain Injury

- Approx. 1,000,000 children sustain TBI annually
- Overall incidence: 200–300 per 100,000 children
- Incidence varies with injury severity. 80 to 90 % of TBI classified as mild.
- Falls are the #1 cause of TBI (35%), followed by motor vehicle accidents (17%), struck by or against events, assaults
- Concussion is a TBI



Coup - Contrecoup injuries

Brain Injuries in Children

Children respond to brain injuries differently than adults.

- less likely to lose consciousness.
- have higher survival rates for serious injuries compared to adults.
- tend to have faster physical recovery of motor skills than adults.
- have a harder time learning new skills because the damage happens to a brain that is still growing and developing.
- Some of the skills a child will need as an adult have not yet developed, but may still be impacted by the brain injury. The full effects of the brain injury are unknown until higher thought processes develop.

How does TBI affect students?

- Effects vary
- May not be obvious at first, but more noticeable when cognitive demands increase (thinking and social activities increase)
- Effects may be
  - Physical
  - Cognitive
  - Emotional
  - Behavioral

Cognitive Red Flags

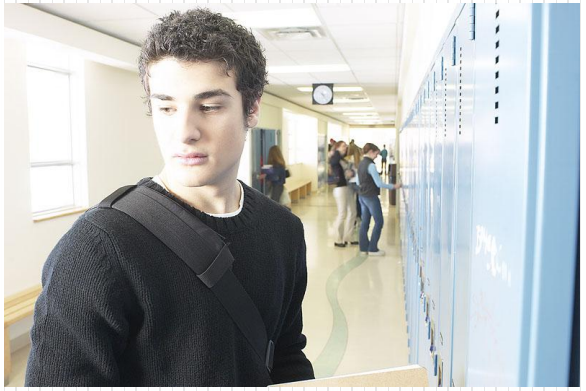
Look for increased difficulty

- Paying attention
- Staying on task
- Slowed response or processing information
- Shifting attention
- Organization challenges
- Reduced academic performance
- Increased confusion

Social Red Flags

Look for difficulty with increased:

- Impulsive behavior
- Trouble starting conversations or activities
- Changes in mood
- Withdrawal and depression
- Defiance
- Confusion
- Decreased motivation



Physical Red Flags

Look for increased difficulty with

- Headaches
- Blurred Vision
- Changes in:
  - Alertness
  - Taste
  - Smell

Fatigue Red Flags

Tends to last longer than other symptoms

May look like

- Irritability
- Confusion
- Memory problems
- Difficulty thinking quickly

Communication Red Flags

Differences in understanding

- Jokes
- Nuances in conversations
- Double meanings

Differences understanding

- Oral directions
- Written directions

Exertion Red Flags

Symptoms are worsened by…

- Mental effort
- Environmental stimulation
- Emotional stress
- Physical activity

From Students

- *I study for twice as long as I used to, but I'm doing much worse.*
- *I can't remember anything I read no matter how many times I re-read the same thing.*
- *I study hard and feel like I know the material. Then I go into the test and can't come up with the answers.*
- *Essay exams are murder. I need 20 minutes to think of what I want to say and then the time has run out.*
- *I get so tired I can barely get through the school day. At night, I'm just too tired to do my homework.*
- *I'm so distracted. I can pay attention for five minutes and then my mind wanders.*
- *I go to every class, but nothing sinks in.*

In the classroom Balance between

Medical need for rest & reduced exertion or stimulation

AND

Academic need to maintain progress & avoid falling too far behind

Return to Academic Guidelines

- Avoid re-injury until recovered
- Avoid over-exertion during recovery
- Early education and reassurance improves outcome
- Return to school gradually with accommodations as needed
- Return to play must follow a medically supervised process

Issues in the classroom

- Tires easily in class and over the course of the day
- Bothered by noise, light, and commotion (hallways, cafeteria)
- Trouble doing more than one thing at a time (listening to teacher and taking notes)
- Easily overloaded and shuts down

Issues in the classroom

- Takes longer and more effort to accomplish the same work
- Concentration aggravates symptoms, especially headache
- Clumsy in hallways or stairwells (risk of re-injury, falls, dizzy, balance issues)
- Frequent visits to nurse’s office
- Late or incomplete homework

Issues in the classroom
Invisible injury

- Student looks normal and sometimes feels normal
- Standard medical and neuro-cognitive testing may not show significant impairment
- Expectation from self and others to “get over it” and “get back in the game”

Issues in the classroom
Secondary problems

- Depression anxiety
- Due to medical distress and uncertainty
- Inability to participate in sports or other usual activities
- Academic stress
- Social isolation

Common Academic Accommodations

- Allow rest breaks during school in quiet location
- Reduced course and work load if needed, drop unnecessary classes
- Focus on essential material
- Decrease homework
- Avoid overstimulation, cafeteria and noise hallways
- Allow student to wear sunglasses or baseball cap to help with light sensitivity

Common Academic Accommodations

- Reduce emphasis on spelling and grammatical errors unless it is the purpose of the assignment
- Permit referencing a dictionary or thesaurus for assignments
- Provide preferential seating
- Reduce quantity of work required, in favor of quality.
- Avoid placing student in high pressure situations
- Exempt student from reading aloud in front of classmates

Common Academic Accommodations

- Allow additional time to complete in-class assignments
- Allow student to wear sunglasses or baseball cap to help with light sensitivity
- Provide student with instructor's notes or help student obtain quality notes from other students
- Allow student to audio record lectures for later playback
- Provide both oral and written instructions; clarify instructions
- For lectures, provide student with an outline or study guide when available
- Allow use of AT devices

www.cbirt.org/tbi-education/instruction-strategies

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Latest News: **New school-wide educational resource on concussion management**

Our Projects | TBI Education: Students Age 0 - 21 | Instruction Strategies

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Instruction Strategies

8 Principles for Classroom Instruction
Effective Skills of Teachers of Students with TBI
The Big 5 Questions for Completing Assignments
Instructional Design for Students with TBI
Strategies for New Learning
Strategies for Somatic Complaints
Strategies for Cognitive Overload
Strategies for Attention and Concentration
Strategies for Organizational Skills
Strategies for Problem Solving and Reasoning
Strategies for Speed of Mental Processing
Strategies for Memory
Strategies for Cognitive Challenges
Strategies for Fatigue and Energy Level
Strategies for Supporting Sensory and Motor Systems

Tools

OCCHTA Worksheet

Related Reading

Teaching Planning to Young Children

More Information

Additional resources for supporting Oregon students with TBI:

Oregon TBI Educational Consulting Team

TBI Seminars & Events

Announcements

Find strategies to help students with TBI:

Visit TBI Education!

TBI Education offers evidence-based information and resources for working with students who have a traumatic brain injury.

Test Accommodations

- Allow additional time to complete tests.
- Provide for completion of tests in a quiet, individual environment with the goal of minimizing distractions.
- Administer long examinations in a series of shorter segments with breaks allowed between sections.
- Allow oral examinations and assist student in having responses scribed, as needed.
- Assess knowledge using multiple-choice instead of open-ended questions.

Test Accommodations

- Allow student to clarify and explain responses on exams (and assignments).
- Permit student to keep a sheet with mathematic formulas for reference, unless memorizing the formulas is required.
- Permit student's use of a calculator.
- Permit the student to utilize a dictionary and thesaurus in writing test responses.
- If two exams are scheduled on the same day, allow student to reschedule one for another day.

PE Accommodations

- Avoid re-injury
- Avoid physical and mental over-exertion
- Avoid over-stimulation (noise and light)
- Minimize exertion at first, then increase activity gradually as tolerated
- In complicated cases, some physical activity may promote recovery
- Don't substitute mental activity for physical activity

Processes Needed

- Home tutoring, 504 plan, IEP,
- Form a concussion team as a resource to students, families
- Develop and implement RTP and RTL policies at your school or district
- Oregon TBI Teams

Join the Conversation

Like our Facebook page and receive updates on news and research related to traumatic brain injury, upcoming CBIRT events, and new resources!!!

Always wear your helmet