Best Ways to Handle Sports Concussions

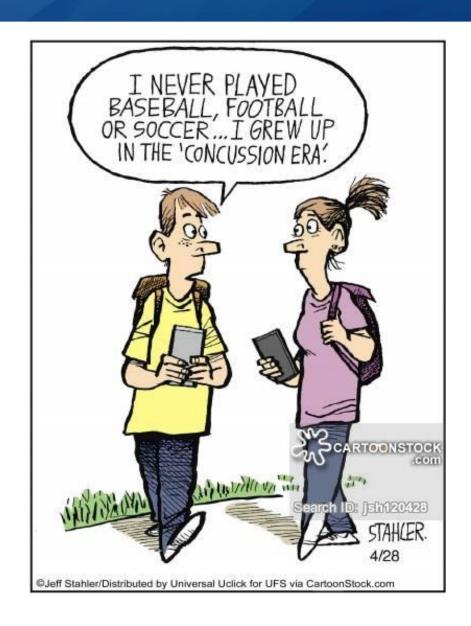
Sherrie Ballantine-Talmadge, DO CU Sports Medicine and Performance Center 720-743-5399





Concussion: What Happened?









Consensus Statement on Concussion in Sport: International Conference on Concussion



- 1st Vienna 2001
- 2nd Prague 2004
- 3rd Zurich 2008
- 4th Zurich 2012
- 5th Berlin 2016
- 6th Amsterdam 2022







11 R's of Sport Related Concussion (SRC) Boulder Community Health



- RECOGNIZE
- REDUCE
- REMOVE
- REFER
- RE-EVALUATE
- REST

- REHAB
- RECOVER
- RETURN TO LEARN
- RETURN TO SPORT
- RECONSIDER
- RETIRE
- REFINE

Patricios JS, Schneider KJ, Dvorak J, et al Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sportâ€"Amsterdam, October 2022 British Journal of Sports *Medicine* 2023;**57:**695-711.



6th Symposium 2022 - Sport Related Concussion: Recognize



SMPC

Defined as:

- "Traumatic brain injury caused by direct blow to head, neck or body resulting in an impulsive force being transmitted to the brain that occurs in sports and exercise-related activity."
- Causes a neurotransmitter and metabolic cascade, with possible axonal injury, blood flow change and inflammation affecting the brain.
- Signs and symptoms can present immediately or evolve, over minutes to hours;
 commonly resolving in days but can be prolonged.
- No abnormal findings on standard imaging (CT scan, MRI, x-ray, etc.).
- May or may not involve loss of consciousness (LOC).
- Clinical signs and symptoms cannot be explained by drug, alcohol, or medication use, other injuries (such as cervical injuries, peripheral vestibular dysfunction, etc.) or other comorbidities (e.g., psychological factors or coexisting medical conditions).

6th International Conference on Concussion in Sport



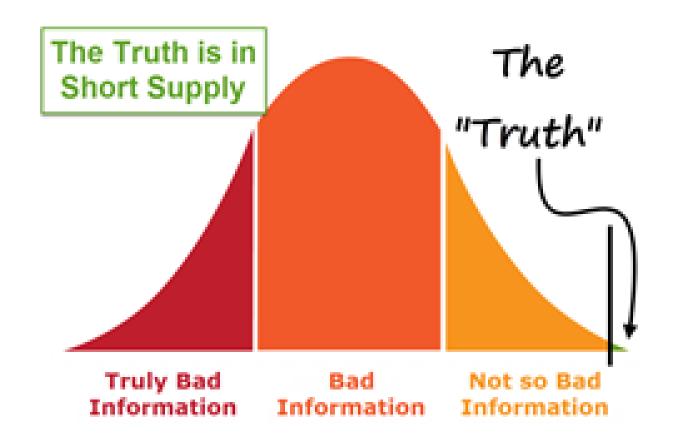
- Held in Amsterdam, October 2022.
- With all these changes, still need to remember assessment, treatment, management and advice still specific to each patient.



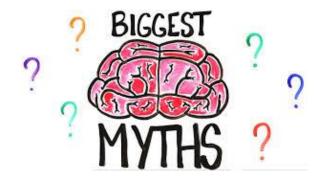


Concussion



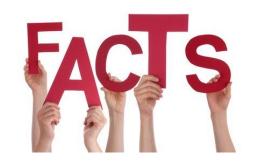




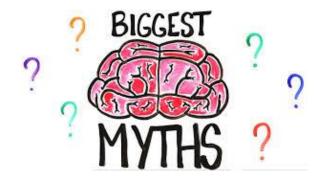




- You need a CT scan or an MRI to diagnose concussion!
- If you lose consciousness you are in big trouble!
- Helmets and soccer bands prevent concussion

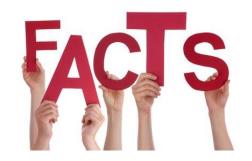


- You do NOT have to hit your head
 - Can come from whiplash-type injuries
- CT scan, x-ray and MRI are NORMAL
 - Functional disturbance
- The majority of concussions occur WITHOUT loss of consciousness
- Helmets are important and protect against skull fracture/brain bleeds



- Once your headache is gone you can play again.
- There is nothing to do for a concussion.

 Concussion causes CTE (chronic traumatic encephalopathy).



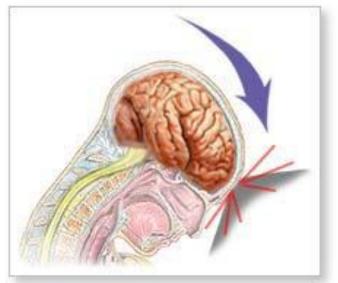
- Other symptoms can really be limiting with return to play, like dizziness.
- **ACTIVE** approach to concussion:
 - Restores hope in coaches and athletes.
- There is no study that directly links concussion to CTE (chronic traumatic encephalopathy).

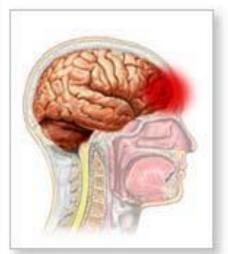
Concussion



- Most common head injury in sports
- Caused by shearing forces with direct blow to the head, face, neck or elsewhere in the body and forces transmitted to head to create injury
- Changes way brain works
- Presents different for each athlete
 - Wide range of severity
- Can occur during practice or competition and in ANY sport

A concussion is a violent jarring or shaking that results in a disturbance of brain function







Concussive Symptoms



If any one or more of these components is present, a concussion should be suspected:

- · Somatic -
 - headache, nausea, vision changes
- Cognitive
 - feeling like in a fog, everything slowed down
- Emotional symptoms
 - lability, more tearful, anxious
- Physical signs
 - LOC, amnesia, vomiting
- Behavioral changes
 - "not themselves"

- Cognitive impairment
 - slowed reaction times, impaired ability to perform simple functions
- Sleep disturbance
 - drowsiness, difficulty falling asleep





SIGNS OF A CONCUSSION



Loss of Consciousness

00

Confusion



Disorientation



Memory Loss



Incoherent Speech



Dazed or **Vacant Stare**

SYMPTOMS OF A CONCUSSION



Headache or Dizziness



Difficulty Concentrating



Sensitivity to Light



Ringing in the Ears



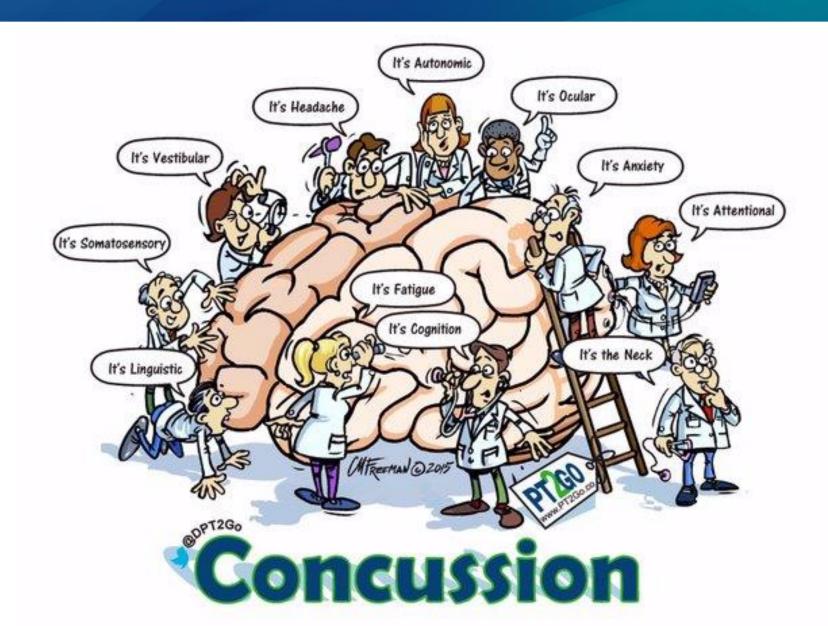
Fatigue



Vomiting

It's Not Really So Hard, Right?







Sport Related Concussion: Reduce Boulder Community Health



- Policy disallowing body checking in child or adolescent ice hockey reduced rate of concussion in games by 58%.
- Policies that disallow body checking in youth ice hockey applied across all levels of children's ice hockey and most levels of adolescent.
- Mouthguards associated with 28% reduced concussion rate in ice hockey across all age groups.

- American football reduction of practice related concussion & reduced head impact rates reduced by 64% in all age groups by changing policy & rules limiting number & duration of contact practices & strategies to restrict collision time in practices.
- Participation in on-field neuromuscular training 3x/wk associated with lower rate of concussion in rugby across all age groups.









What to Do if You Suspect Concussion: Remove



- Symptoms can be:
 - Rapid in onset; delayed; or appear, resolve, and then return later
- Ask specific questions about circumstances around event
- Don't leave athlete alone make sure they have supervision in the following hours so they can be watched
- If suspect concussion, athlete should NOT be allowed to return to play on the day of injury
 - Get athlete in for medical evaluation as soon as possible







Concussion: What to Do When You Suspect Head Injury



When in doubt, sit them out!





Sport Related Concussion





- Removal of player
 - Immediate removal: actual or suspect LOC, seizure, tonic posturing, ataxia, poor balance, confusion, behavioral changes & amnesia
- No return unless evaluated by HCP experienced in concussion management
- Maddocks questions





CRT6™



Concussion Recognition Tool

To Help Identify Concussion in Children, Adolescents and Adults.

Mind to the Consussion Recognition You'll

As preciously is as best hours. The Computer Recognition fluid (CDRS) is to be used by reconstitutional individuals for the destination and remarker represents of supported preciously. It suits disappear to degree remarkers

Resegnise and Remove

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- Month made as baseline same.
- Balance, Wird, or convolution.
- Loss of Vision or double vision.
- 1. Loss of consciousness.
- Increased confusion or detailorating coneclous state (becoming less reasonairs, sharing)
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- Repeated Ventiling
- Recent or increasing bookening.
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Receipped by The Communication In Space George (Cirilli)

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What To Do If You Suspect Concussion



- Evaluation by medical professional as soon as possible
 - Can be ER or urgent care
 - Primary care provider
- DO NOT stay at home and not go to school until symptom-free
 - Find out school policy
 - Return to learn education



• KEY POINTS:

- ER/urgent care is not for definitive management!
- Concussion = outpatient diagnosis and management
- Do not go to the urgent care/ER for sports return to play clearance!
- Remember, we are very fortunate in the district to have a district-wide policy that covers all students.



SCAT-6 (Sideline Concussion Assessment Tool)





- Use within 72 hours
- Use up to 5-7 days from injury
- Utility diminishes after 72 hours
- Child SCAT-6 8-12 yrs old
- Paper and electronic forms
- Add timed dual gait tasks
- Cognitive changes



Sports Concussion Assessment Tool (SCAT 6)



SCAT6™



Sport Concussion Assessment Tool For Adolescents (13 years +) & Adults

What is the SCARS?

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Child SCAT6™



Sport Concussion Assessment Tool For Children Ages 8 to 12 Years

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When To Worry?



- Prolonged loss of consciousness, especially over 5 minutes
- Other distracting injuries
- Repetitive vomiting
- Worse headache of life
- Unresponsive
- Rapid decline of consciousness
- Difficult to arouse







When to Worry?



When they look like THIS...





Coaches and Parents: Sideline Assessment



- Best practice = having a certified athletic trainer present for sporting activities
- "When In Doubt Sit Them Out"
- Ask sports specific questions
- Learn what signs and symptoms to watch out for
- Error on the side of caution







Treatment



• "Brain rest"

- What do we do with this now?
- Rest still has a role but it's not the WHOLE story
- May need a period of both physical AND cognitive rest
- In the first week as a student, get them back to school
- In school, remember RETURN TO LEARN comes before RETURN TO PLAY





SRC: Treatment



"Return to Learn"

- If athlete/student tells you they are exhausted at the end of the day and feels terrible, find out what academic adjustments they are taking in school.
- You can't "push through" a concussion without paying the price with interval worsening of symptoms.
- Needs formal clearance from physician for return to activity/play.
- DON'T TRY TO MANAGE THIS ON YOUR OWN. GET HELP!
- All symptoms need to be resolved and then student/athlete starts a graded return to activity/play.



SRC: Treatment



"Rest and exercise"

- Encouraged to recommend early (24-48 hrs) return to Physical activity (walking, stationary biking), avoid risk of fall/contact
- Reduced screen time in first 48 hours, uncertain beyond that **
- Increase exercise based on symptoms exacerbation
- 2-10 days after SRC can recommend subsymptom threshold exercise treatment, based on HR threshold that does not increase more than MILD symptom exacerbation
- STOP exercise if symptom provocation more than mild & brief; ok to resume once symptom returned to previous level
- MILD Exacerbation = brief symptoms (under 1 hr) and doesn't delay recovery
- Sleep disturbance in the 10 days AFTER SRC associated with increased risk of persisting symptoms and needs more evaluation



Return to Learn vs Return to Play







RETURN TO LEARN!



Partnering Together



 CU Sports Medicine & Performance Center = medical responsibility to patients



IN PARTNERSHIP WITH BOULDER COMMUNITY HEALTH

 Boulder Valley School District = academic responsibility to students





BVSD Brain Injury Resource Team





- Sherrie Ballantine-Talmadge, D.O.
 - Shannon Aberton, ATC
 - Kelli Preston, BSN, RN
 - Sadie Marthaller, BSN, RN
 - Karen Brady, MS, CCC-SLP







IN PARTNERSHIP WITH BOULDER COMMUNITY HEALTH



BVSD High School Sports Medicine



Boulder

- Eric McCarty, MD
- Shannon Aberton, ATC

Fairview

- Derek Stokes, MD
- Mario Rivera, ATC

Nederland

- Sherrie Ballantine-Talmadge, DO
- Katie Harris, ATC

Centaurus

- Matt Ziegler, M.D.
- Edien Fernandini, ATC

Monarch

- Brad Changstrom, MD
- Alex Esposito, ATC

Broomfield

- Sherrie Ballantine-Talmadge, DO
- Shelby Shadix, ATC



Translating Medicine into Education Boulder Community Health



Concussion Symptoms	Academic Adjustments Grouping
Headache, nausea, vision changes	Somatic
Feeling like in a fog, everything slowed down	Cognitive
Emotional liability, more tearful, anxious	Emotional symptoms
Vomiting	Physical signs
"Not themselves"	Behavioral changes
Slowed reaction times, impaired ability to perform simple functions, amnesia	Cognitive impairment
Drowsiness, difficulty falling asleep, fatigue	Sleep disturbance



Academic Terminology



- Academic adjustments use this word instead of modifications.
- **Differentiation** tailoring instruction to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction.
- 504 plan civil rights law prohibiting discrimination based on disability in any program receiving federal financial assistance; this legislation defines a person with a disability as anyone who has a mental or physical impairment that substantially limits one or more major life activity.
- IEP (Individualized Education Plan) can be referred to as plan or program; map that lays out the program of special education instruction, supports, and services kids need to make progress and thrive in school.
- **A 504 plan isn't part of special education. It serves a different purpose than an IEP**





BVSD Teacher Feedback Form - Concussion

Student Name:	Date:				
Date of Concuss on:	Concussion Learn Leader:				
Teachers: To ensure appropriate brain rest and opportunity for recovery, we are asking for feedback on any adjustments or symptoms continuous in your					

Teachers: To ensure appropriate brain rest and opportunity for recovery, we are asking for feedback on any adjustments or symptoms continuing in your classroom(s). Information should be returned to the Concussion Team Leader.

	is the student still receiving any academic adjustments in your class? If so, what?		Do you believe this student is performing at their pre-concussion . !earning level?		
	ves	Yes	No	Don't know	
Class:	Pěn	No	Date: Signature;		
Name:	Yes, adjustments include:	Yes	Yes	No	Den't know
Class:	No	No	Date: Signature:		
Vame:	Yes, adjustments include:	Yes	Yes	No	Don't know
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Name:	Yes, adjustments include:	Yes	Yes	No	Don't know
Nasa:	No	No	Date: Signature.		

This mase rails adjacted from the Deuter for Consussion, Sorte Mc. Their Record the Children BEAS assets

This form is to be completed initially 3 weeks post-concussion and will be used to assess the need for a formal 504 if symptoms are still present at that time,

Concussion/ Head Injuries - Boulder Valley School District (bvsd.org)



Academic Options



- Nurses office for break
- Sunglasses/hat in school
- Decreased bright screens
- Decrease busy areas (lunchroom and hallways)
- Short burst of activity in 20-30 minutes
- Use symptoms to help figure out best academic adjustments
- Use other forms of learning like auditory
- Remind students how important sleep is
 - Encourage normal sleep patterns, no napping

- Consider pass/fail
- Decrease overall workload
- Prorating work
- No more than one test per day
- Take test in quiet place
- No standardized testing
- Oral testing
- Exemption from pop quizzes or the tests
- Crucial assessment for overall grade
- IEP or 504 plan





Translating Medicine into Education & Boulder Community Health

Remaining Concussion Symptoms	Academic Adjustments and Treatment: 504
Headache, vision changes	PT or more focused vision therapy
Exacerbated pre-existing mood disorders	Medication changes/additions
Exacerbated pre-existing learning disabilities, i.e., dyslexia	Speech pathology/cognitive therapy
Concussion unleashed a formal NEW learning disability, psychiatric disease	Neuropsychology evaluation
Additional MSK issue that needs to be treated	Further sports med evaluation: X-rays, MRIs, injections
Exacerbated underlying sleep disorder	Cognitive impairment - Sleep medicine consult



Concussion: It's All About the Team Boulder Community Health



Academic

- Student
- Family
- Teacher
- Coach
- Principal/Vice-Principal
- Guidance Counselor
- School nurse/school para
- Athletic Trainer (in the school)
- School Psychologist
- School Speech Pathologist
- Athletic Secretary

Medical

- Student
- Family
- Athletic Trainer (in clinic and at school)
- Lead Health Care Provider
- Physical therapist
 - MSK, vestibular, oculomotor, cognitive
- Occupational therapist
 - Trauma therapy, vision therapy
- Optometry
 - Neuro-Optometry
- Speech pathology/ Cognitive therapy
- Massage therapy
- Psychologist
- Neuropsychologist



Game Changers: Concussion Modifiers



Symptoms Number

Duration (10 days)

Severity

 Signs Prolonged loss of consciousness, amnesia

Sequelae

Concussive convulsions

Temporal Frequency

Repeated concussions over time

Timing

Injuries close together in time

"Recency"

Recent concussion or traumatic brain injury

Threshold

 Repeated concussions occurring with progressively less impact force or slower recovery after each successive concussion

Age

Child and adolescent (<18 years old)

Co- and pre-morbidities

 Migraine, depression or other mental health disorders, attention deficit hyperactivity disorder, learning disabilities, sleep disorders

Medication

Psychoactive drugs, anticoagulants

Behavior

Dangerous style of play

Sport High risk activity

 Contact and collision sport, high sporting level



Helpful Hints



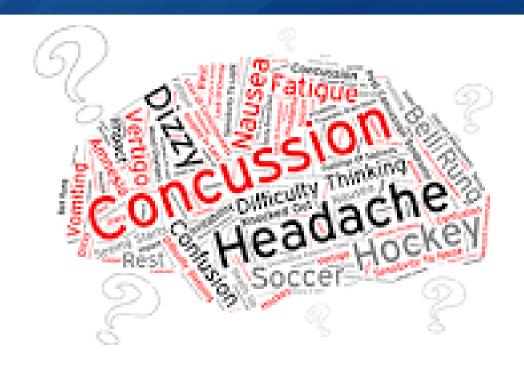
- Athletes may not recognize previous concussions
- Missed previous concussions
- Helpful to get previous concussion history
- Coaches/teammates may or may not be able to give accurate histories
- Previous head, neck, face injuries
- Typically, athletes under-report symptoms
- Fear of removal from game/sport





Return to Sport





CONCUSSION RETURN TO PLAY

YOU MAY NOT RETURN TO ACTIVITY WITHOUT PROPER MEDICAL CLEARANCE!

- Can start steps in the first 24 hours
- Each step still takes 24 hours
- After Step 4 must have HCP clearance and proper monitoring
- Manage on individual basis
- Unrestricted return to sport usually occurs in ~30 days



Return to Sport



• https://bjsm.bmj.com/content/bjsports/57/11/695.full.pdf

• <u>BVSD Return to School_Sport Form Rev 12.2023 FINAL .pdf</u> - <u>Google Drive</u>



Sport Related Concussion: Refer



 Persisting symptoms used for symptoms that persistent > 4 weeks*

Children, adolescents & adults

 May be because of pre-existing issues, concussion-related symptoms or both



Sport Related Concussion: Rehab



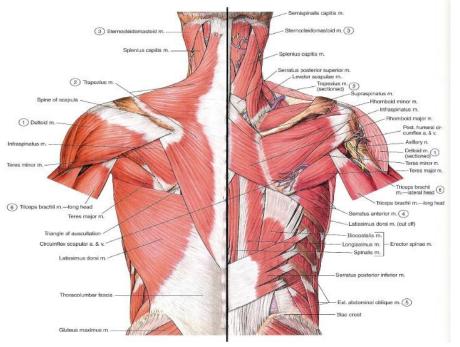
- Dizziness, neck pain &/or headache persist for more than 10 days, recommend rehab
- Symptoms beyond 4 weeks in children, adolescents, adults recommend rehab
- Watch for symptoms with Return to Learn as well



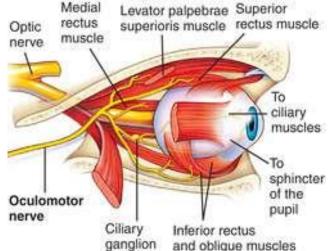
ACTIVE MANAGEMENT: Role of Physical Therapy in Concussion Management



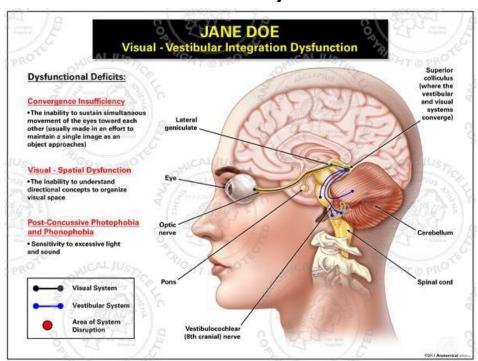
Muscular system



Oculomotor system



Vestibular system





Concussion Physical Therapy: Exertional Therapy



Exertion/return to play

Exertion testing:

- Cardio
- Functional
- Sport specialize

Exertion therapy:

- Follow graduated return to play guidelines
- Gradual increase in difficulty
- Takes into account sport/activity goals and vestibular/balance needs



SMP(

Boulder Community Health

















Post-Concussive Syndrome



- Characterized by continuation late concussive symptoms for extended period
- More relationships with pre-existing psych diagnoses
- May engage more testing
 - MRI, CT, Neuropsych testing
- Treatment
 - Physical therapy
 - Speech therapy
 - Medications
 - Psychotherapy
 - Massage therapy
 - Academic accommodations, i.e., 504



Post-Concussive Syndrome



- You do NOT leave the ER/urgent care with post-concussive syndrome
- You leave with a CONCUSSION!

 Remember MOST concussions will resolve without complication or treatment on their own



Second Impact Syndrome



- Rapid brain swelling & herniation after second head injury while still recovering
- Can be mild and athlete seems dazed
- Progress to collapse, rapidly dilating pupils, coma & respiratory failure in minutes!
- May be over-reported, but this is why the laws for concussion exist in each state
- NO SYMPTOMATIC ATHLETE CAN RETURN TO PLAY!





Baseline Testing



- Has evolved over time
- Not just computer testing
- Use new 2022 guidelines and incorporating neuromuscular rehab
- Can be helpful to use as comparison once potential concussion has occurred
- Defines risk factors, i.e. ADHD, Dyslexia
- Clarifies education
- Establishes PRE-/EXISTING physical exam abnormalities
 - Oculomotor findings
 - Scoliosis



Where Do We Go From Here?











Sport Related Concussion: Refine



Consider:

- Para athletes
- Peds
- The athlete's voice
- Ethical considerations, limitations & improvements
- Equity, diversity & inclusion
- Stakeholder voices
- Observer input
- Sustainability of consensus process
- Potential conflicts of interest and transparency
- Timing of consensus meeting and expert panel consensus meeting



What Have We Learned:

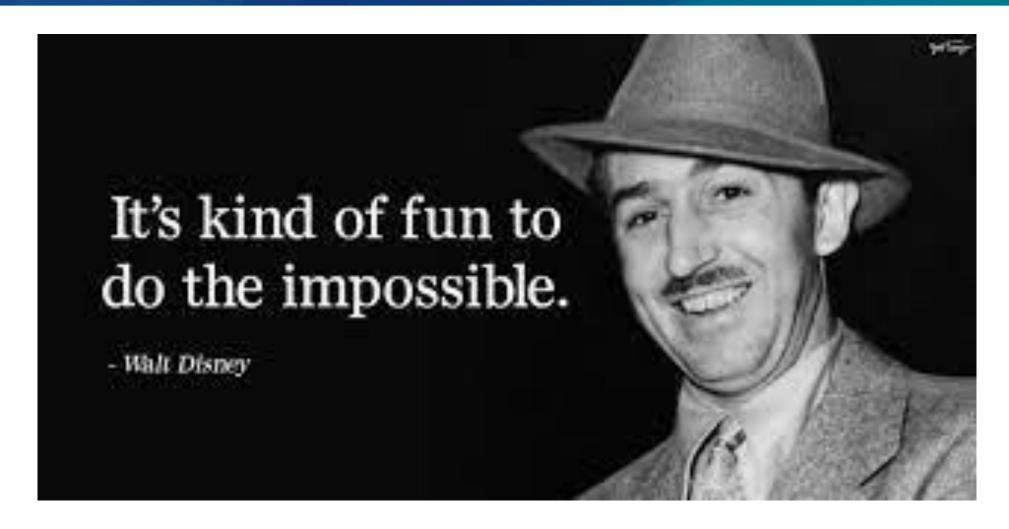


- Kids graduate and teachers change jobs
- Kids and teachers MUST talk
- Bridging between school nurses, the health room paras, and school athletic trainers is **ESSENTIAL**
- Coaches need education as well
- Speaking the same language is critical
- Concussion doesn't matter until it matters!
- Once you have seen one concussion, you have seen one concussion
- Concussion programs work











Special Appreciation



- We could never have been so successful without all these people and more!
 - Students and their families
 - BVSD Coaches, Administrators, Counselors
 - BIRT (Brain Injury Resource Team)
 - Stephanie Faren
 - Cristina Norman
 - Kelli Preston
 - Harry Waterman
 - Shannon Aberton
 - Ann McNamara

- All the BVSD ATCs in the schools and ATCs in the clinic
- CUSM&PC Concussion PT Team
- All the Boulder concussion collaborating health care providers
- Joan DePuy
- BCH Speech Pathology
- BCH Trauma Team
- CUSM&PC Front Desk team



What's Next?



 Stay tuned for our next lecture on the CU Sport Medicine & Performance Center Blog on "Concussion Rehab: What's to Learn?"



Questions? Concerns? Comments? Boulder Community Health







Best Ways to Handle Sports Concussions

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