VESTIBULAR
DISORDERS ASSOCIATION

Concussion and Dizziness How are they Related?

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What is a concussion?

When in doubt...sit out !!

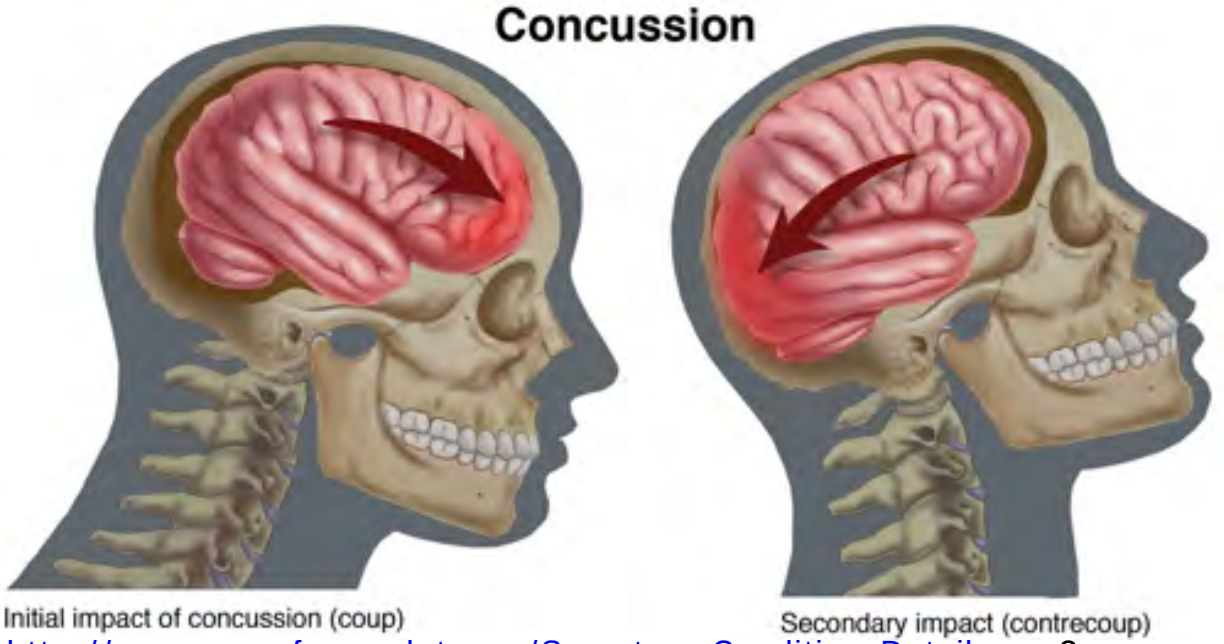
http://users.rowan.edu/~perkin47/Concussions.Expert.html

How are **concussion** and **dizziness** related?

https://concussionu.wordpress.com/why-concussions/

What is a **concussion**?

- Concussion is a **brain injury**
- Also called “mild Traumatic Brain Injury” (mTBI)
- Can occur after **direct or indirect** head trauma



http://www.moveforwardpt.com/SymptomsConditionsDetail.aspx?cid=4f2ebb00-f1c0-4691-b2ab-742df8dffb99#.VabWfZS8C80

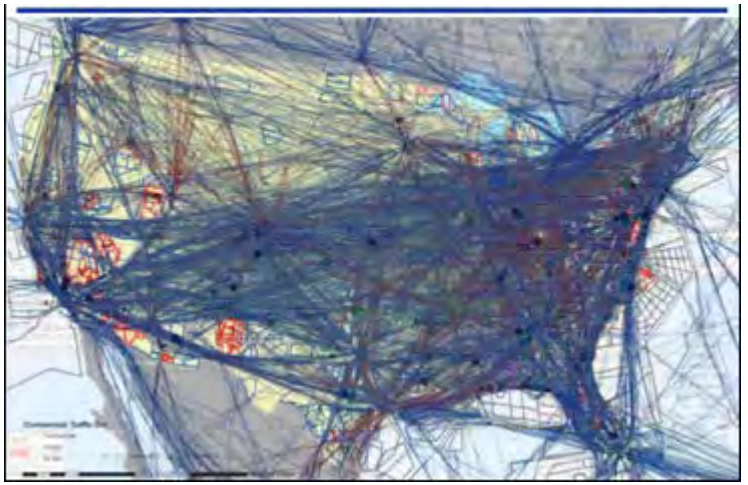
Concussion facts

- You may or may not lose consciousness
- You may have a ‘normal’ brain scan image
  - MRI Scan (Magnetic Resonance Imaging)
  - CT Scan (Computed Tomography)

http://radiopaedia.org/cases/normal-midline-brain-mri

Concussion facts

- After concussion there are several possible changes in the brain, including:
  - Changes in **brain chemistry**
  - Changes in **brain connections** (neural network)



http://usapartisan.com/2012/05/06/
http://www.geeky-gadgets.com/researchers-create-ai-for-dna-neural-network-31-07-2011/

Who gets a concussion?

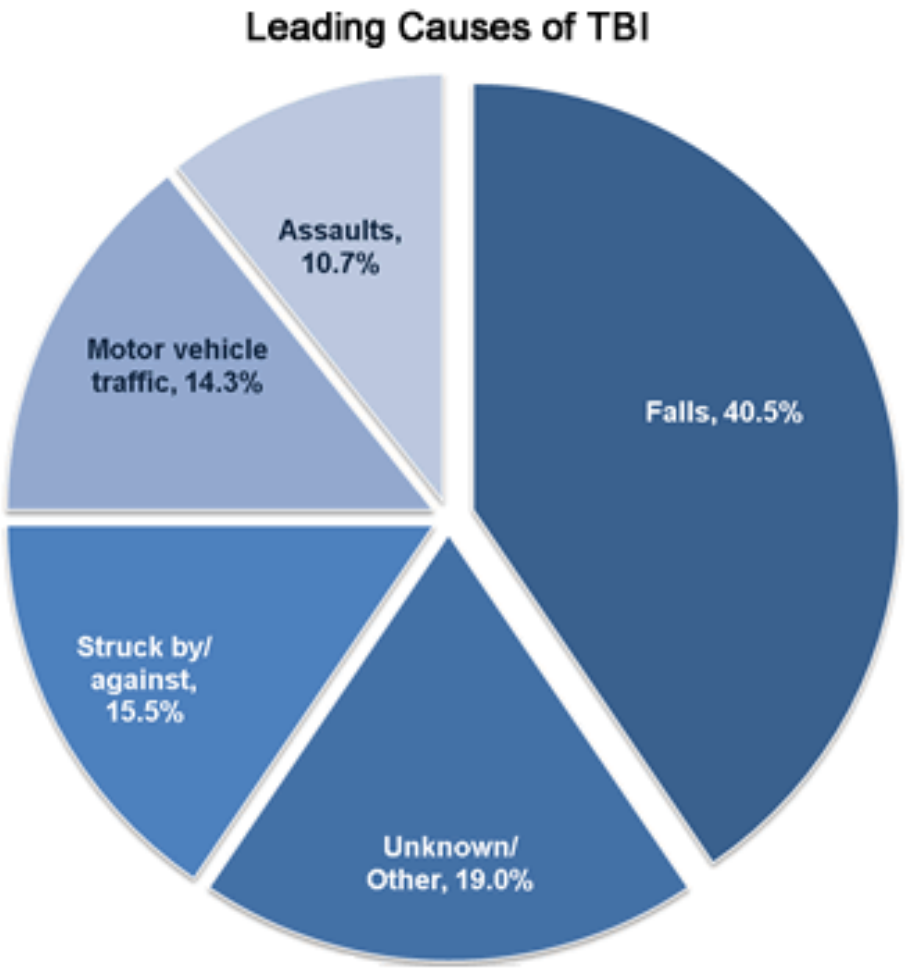
- There are an estimated 1.6 to 3.8 million sports-related concussion each year in the US (Langlois, 2006)
- 250,000 military service members between 2000 2014 received a concussion (DVBIC/DCoE, 2014)
- Professional athletes
- Youth/young athletes

http://www.todaysparent.com/kids/kids-health/concussions-hockey-problem/

Who gets a concussion?

Most common causes:

1. Falls
2. Sporting activities
3. Motor Vehicle Accidents
4. Assaults
5. Struck by object



http://www.cdc.gov/traumaticbraininjury/get_the_facts.html

What symptoms can occur?

A wide variety of symptoms can occur

Thinking/ Remembering	Physical	Emotional/ Mood	Sleep
Difficulty thinking clearly	Headache Fuzzy or blurry vision	Irritability	Sleeping more than usual
Feeling slowed down	Nausea or vomiting (early on) Dizziness	Sadness	Sleep less than usual
Difficulty concentrating	Sensitivity to noise or light Balance problems	More emotional	Trouble falling asleep
Difficulty remembering new information	Feeling tired, having no energy	Nervousness or anxiety	

http://www.cdc.gov/concussion/signs_symptoms.html

Baseline Testing

- Baseline tests are used to assess an athlete's balance and brain function (including learning and memory skills, ability to pay attention or concentrate, and how quickly he or she thinks and solve problems).
- Results from baseline tests (or pre-injury tests) can be used and compared to a similar exam conducted by a health care professional if an athlete has a suspected concussion.

Source: http://www.cdc.gov/headsup/basics/baseline_testing.html

What should I do after a concussion?

- "Concussion" is a clinical judgment, ideally made by a medical professional
  - Signs and symptoms may be subtle
  - Observe the person for at least 48 hours
  - Children are recommended to see a pediatrician
- You should:
  - **Stop sport / activity**
  - Seek professional medical evaluation
  - Do not return to sport/physical activity the same day

What should I do after a concussion?

WHEN IN DOUBT, SIT IT OUT!

- Post-injury exam compares to baseline test
  - For athletes and children
  - SCAT3 (Sport Concussion Assessment Tool)
  - SCAT3 Child
  - ImPACT

What should I do after a concussion?

- Concussion information and guidelines can be found from a number of reputable sources:
  - Zurich Consensus Guidelines
  - American Academy of Neurology
  - Centres for Disease Control – HEADS UP campaign
  - Ontario Neurotrauma Foundation
  - Parachute/Think First campaign
  - Concussion Awareness Tool (CATT) online

http://www.oneillinstituteblog.org/concussions-college-sports-time-ncaa-step-plate

Will I recover from a concussion?

- Concussion symptoms can last from minutes to months, or even longer in some cases
- With proper diagnosis and management, most people recover fully (Kusthluba, 1998)
- Recovery time may be longer for children and teens (Field, 2003)
- Multiple concussions complicates recovery

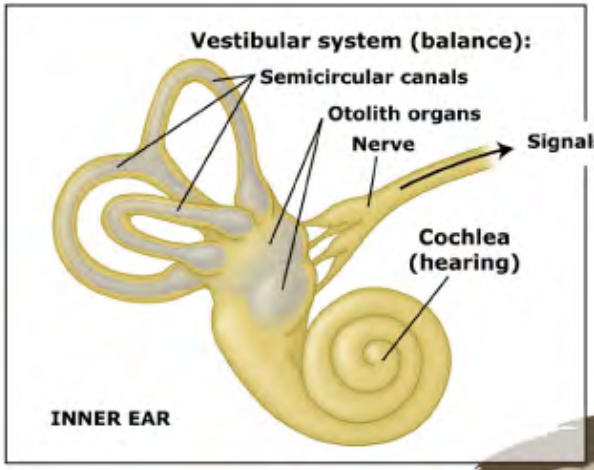
http://www.oneillinstituteblog.org/concussions-college-sports-time-ncaa-step-plate

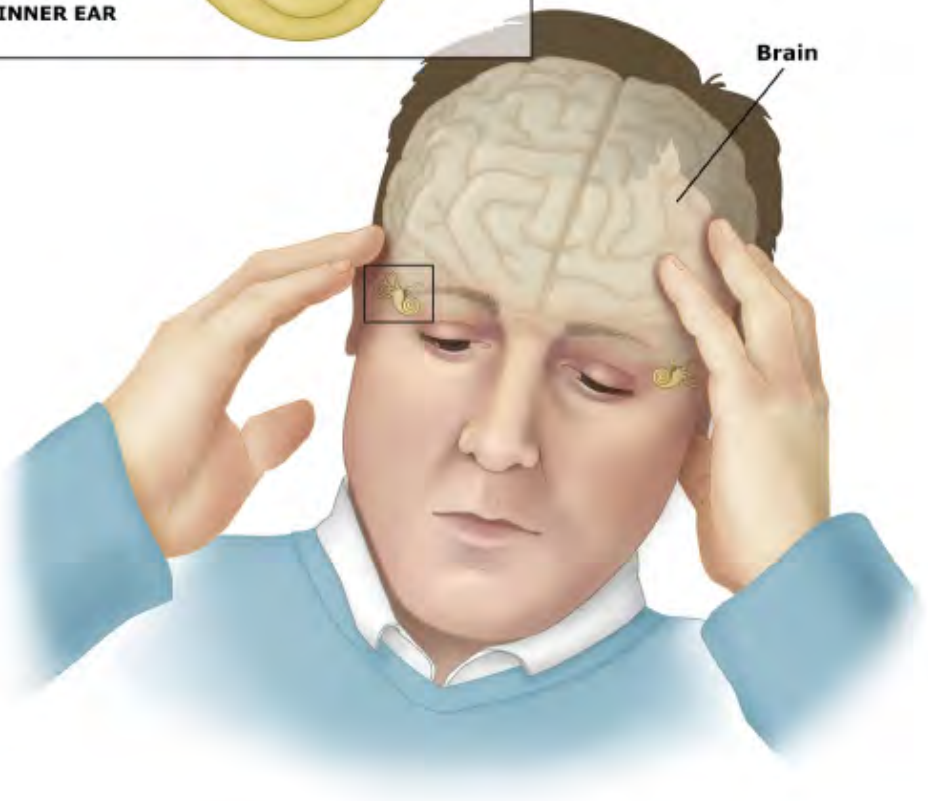
Will I recover from a concussion?

- Follow the well established Return to Play/Learn/Work guidelines
  - CanChild Return to Activity for children and youth
- Free education modules are available for
  - Athletes/Parents/Coaches
  - Teachers/Educators/Administrators
  - Medical Professionals

www.cattonline.com

Can trauma cause damage to my inner ear/vestibular system?



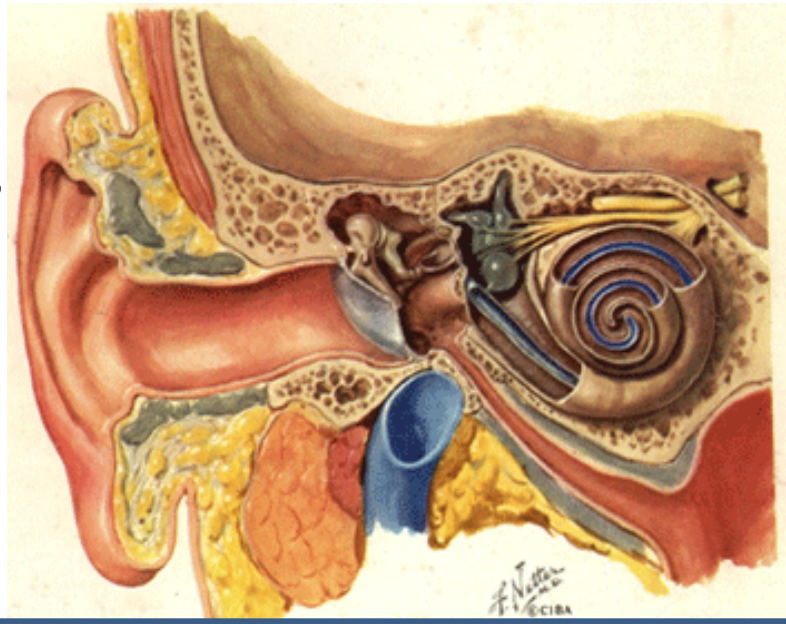


The brain and vestibular (balance) system can both be damaged with head trauma.

http://www.emedmd.com/content/vertigo-and-imbalance

Trauma to the inner ear

- A direct or indirect blow to the head can:
  - Damage the inner ear in several ways
    - Damage nerve, crystals, membrane, fluids
  - Affect how the vestibular system and brain work together as a team.
    - *e.g.* working out what is moving (you or the TV)



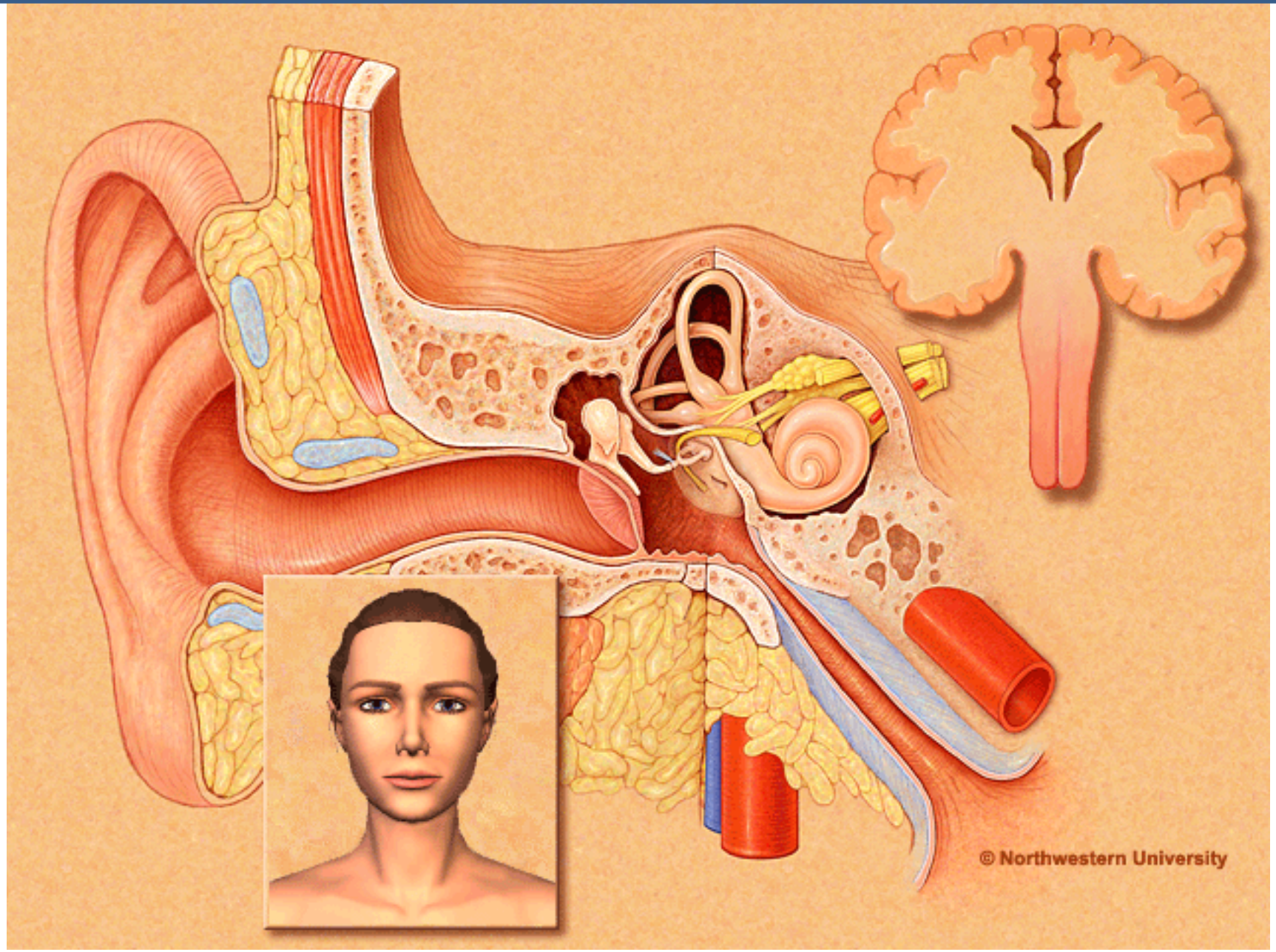
www.netter.com

Does it matter if my vestibular/balance system is affected?

Mercedes-Benz commercial

This video is a clever way to demonstrate the important connection between our inner ear and our vision.

https://www.youtube.com/watch?v=69os9jzKF14



www.northwesternuniversity.com

Your Vestibular System does important work behind the scenes!

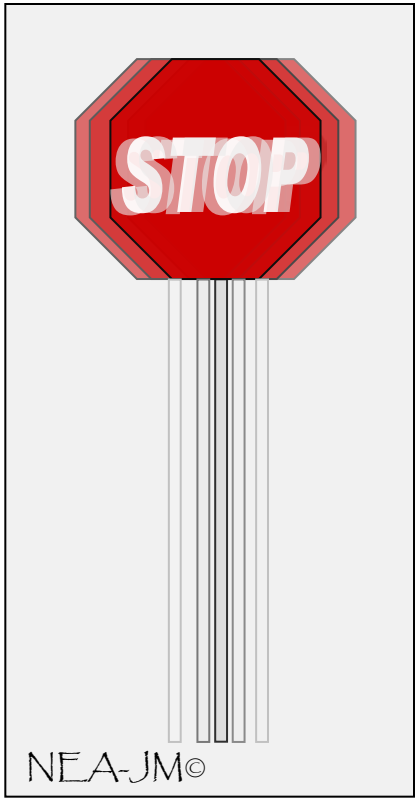
The vestibular system is difficult to appreciate until you lose its function

- Tells you when you are moving
  - *e.g.* plane taking off
- Keeps the world clear vision)
- Helps with your balance
- Helps in conflicting situations
  - *e.g.* When you are sitting on a train and one train moves while another stays still, it helps you decide if it's your train that is in motion.

http://www.ytravelblog.com/have-you-ever-done-this-when-taking-off-in-an-airplane/

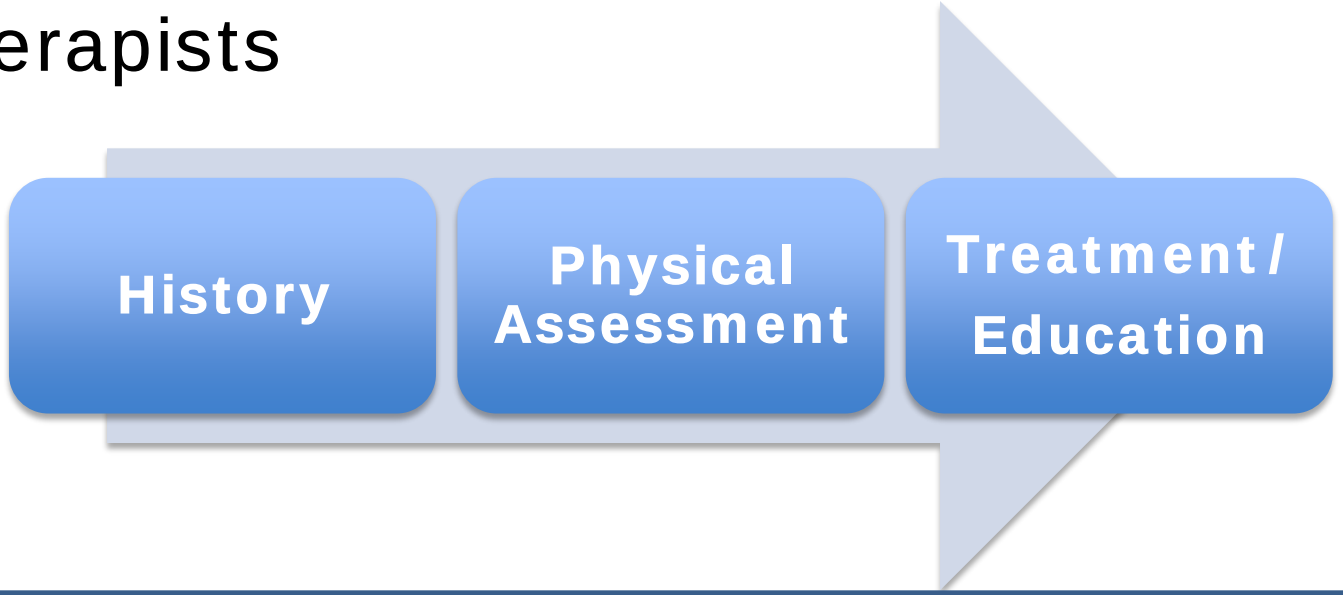
Trauma to the inner ear

- The vestibular system is a sensory system
- “Vestibular symptoms” include:
  - Dizziness
  - Vertigo (feeling of spinning)
  - Nausea
  - Imbalance or falls
  - Blurred vision
  - Hearing loss/noises in ear



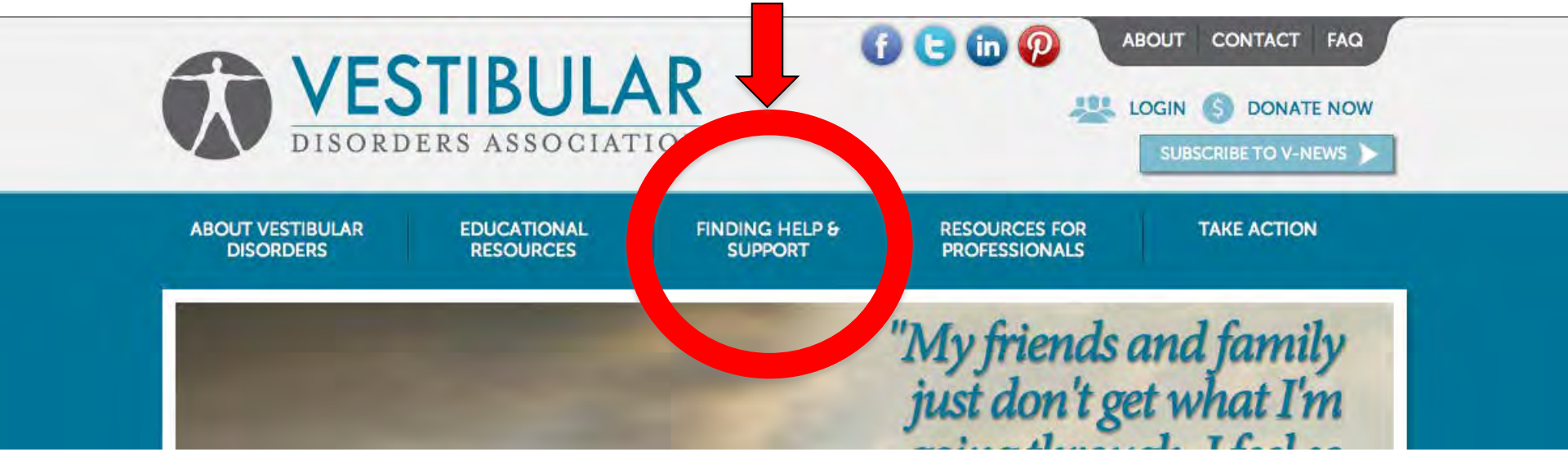
What should I do?

- Healthcare providers can be specially trained to diagnose and treat vestibular disorders
- For example, doctors such as ENT (ear, nose and throat) specialists or physical therapists



Finding a healthcare provider

- Ask for a referral from your family doctor or Concussion Clinic/Sports Medicine Clinic
- VEDA Provider Directory: http://vestibular.org/



Vestibular Treatment

- Depending on the cause of your dizziness, treatment may include:
  - Vestibular Rehabilitation Therapy (VRT)
  - Hands on treatment (to treat your neck or body movement)
  - Coping strategies
  - Education and fall prevention
  - Medication

www.keepcalm-o-matic.co.uk

Vestibular Rehabilitation Therapy

- VRT should be based on your goals and be customised to you
- Rehab may include:
  - Eye exercises
  - Balance/walking exercises
  - Exercises for motion sensitivity
  - Exercises specific to your sports or work
  - Assistance planning a “Graduated Return” to school, work, sports, other activities
  - Information on diet, exercise, sleep, trigger-prevention

http://drjuanitacollier.com/vt-resources-and-articles/articles/2014/concussions/

Will my vestibular symptoms improve?

Yes!

- You will develop your own tool kit (bag of tricks) that will help you reach your goals
  - Your tool kit will include a combination of exercises, lifestyle changes, and coping strategies

Felix the Cat and his magic Bag of Tricks

www.genius.com

Concussion Recovery

- Consider how the concussion and vestibular symptoms impact return to sport, learning, and work

http://greycaps.com/readinghelps_yourchild

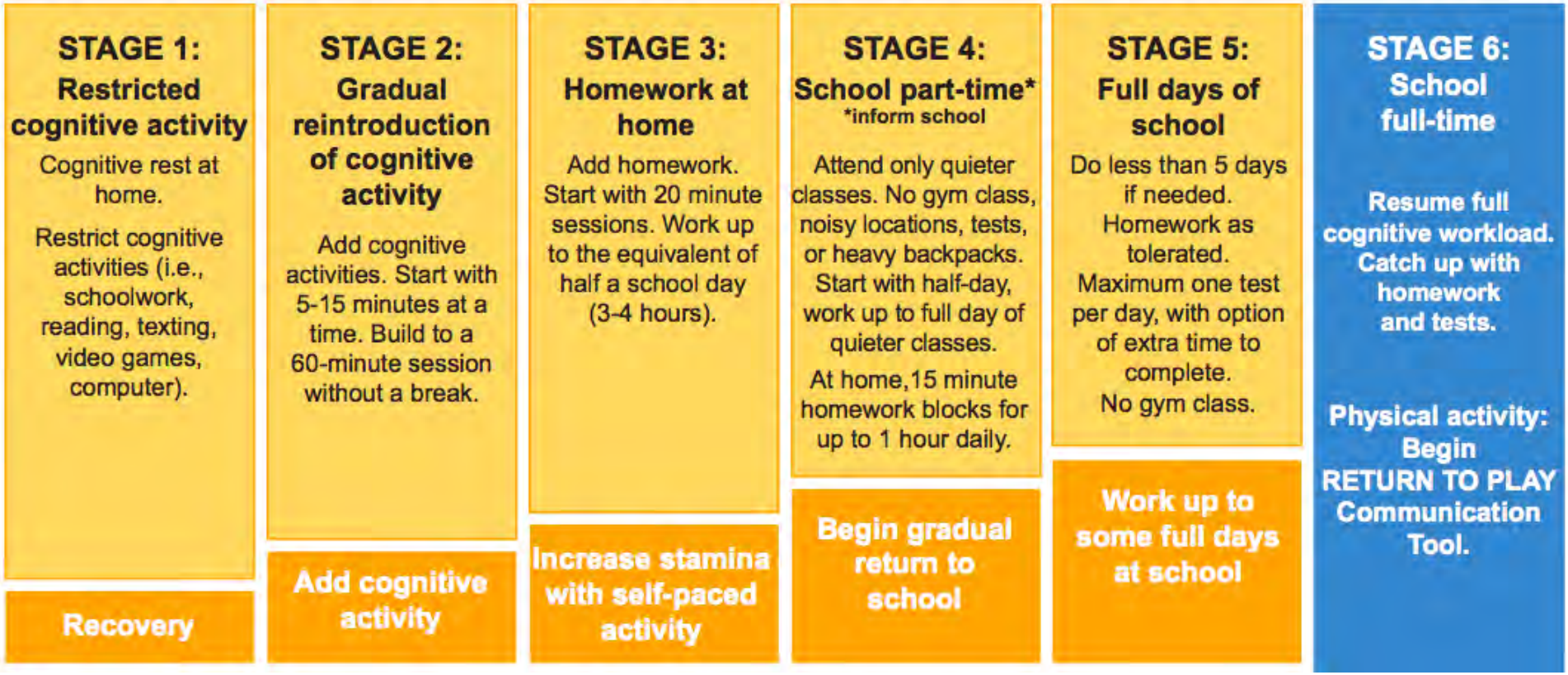
Children recovering from concussion

- Help children to:
  - Find words to describe what they are feeling
    - *For example,* describing ‘dizziness’ or blurry vision
  - Identify difficult tasks or triggers
    - *For example,* light or noise sensitivity
  - Understand why they have their symptoms
- Graduated return to school and sports is essential

Return to Learn & Play - Children

- A **team approach** is often best
  - The child, parents, medical professionals, teacher, and guidance counselor often work as a team for Return To Learn
- RT Learn should be completed before RT Play
- Children often have to learn new strategies
  - 'Brain Breaks'
  - Ways to improve concentration or memory
  - How to reduce blurred vision or dizziness

Return to Learn/School
Communication Tool – CATT online



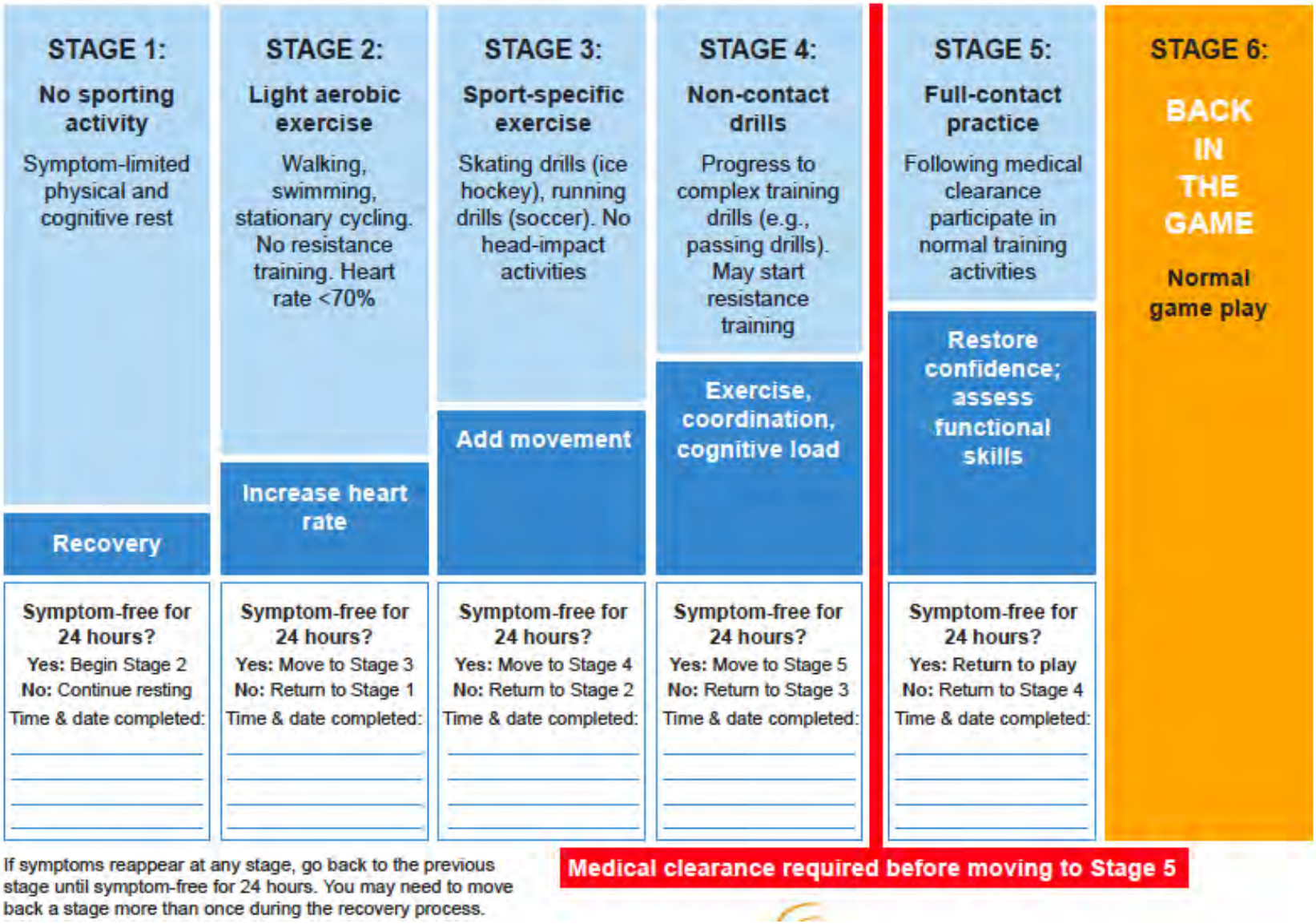
BC Injury Research and Prevention Unit

http://d1my5j483tjlis.cloudfront.net/resources/cattonline/return-to-learn.pdf

Return to Play

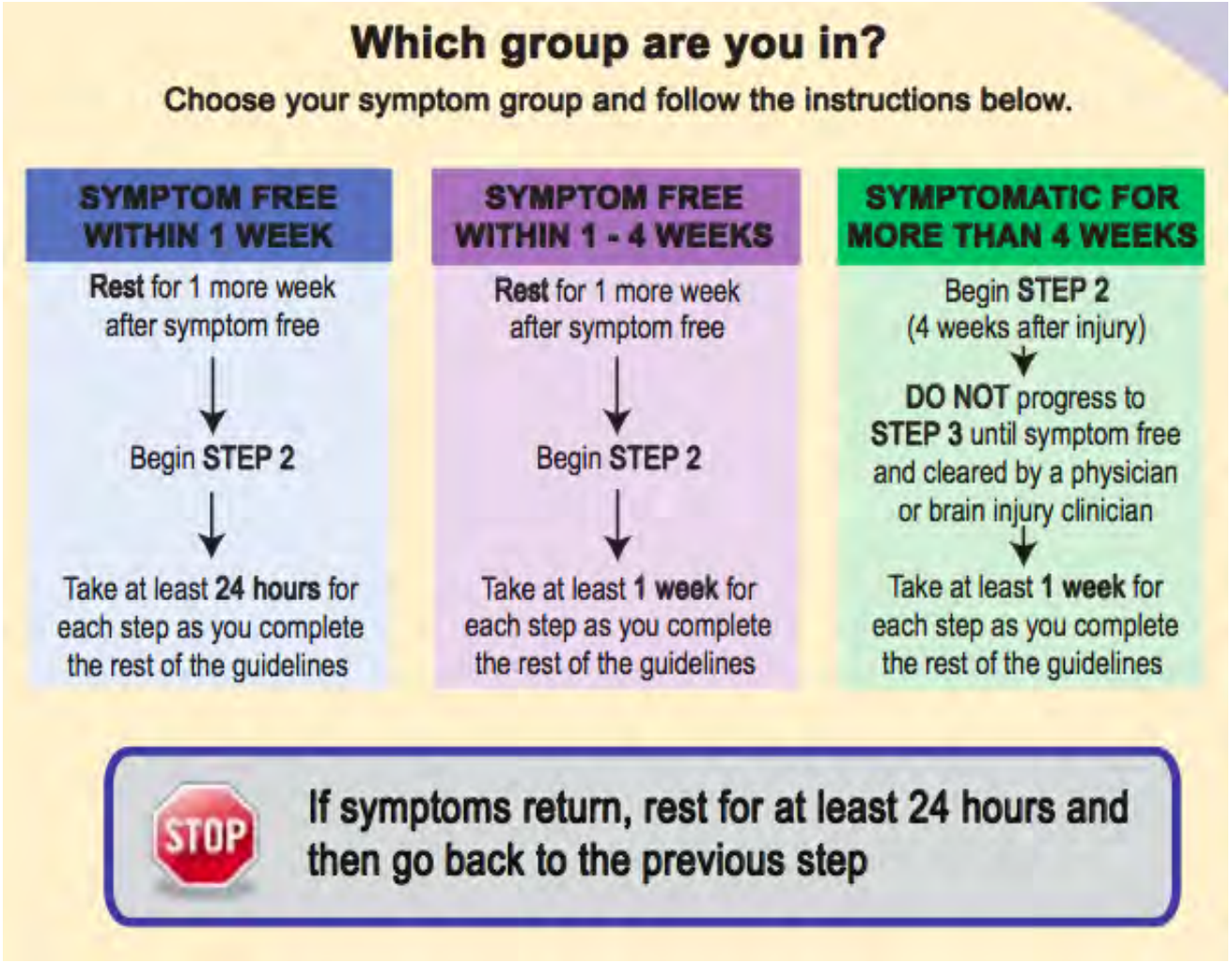
- Gradual return to physical activity/sports
- Especially important for contact sports
- Many excellent guidelines available
  - Sport-specific guidelines
  - CATT online, CDC HEADS-UP, McMaster CanChild, *etc.*
  - Montreal Children's Hospital Trauma Concussion Kit: http://www.thechildren.com/health-info/trauma/mch-trauma-concussion-kit - return to rugby, soccer, basketball, football, hockey

Return to Play



http://d1my5j483tjlis.cloudfront.net/resources/cattonline/return-to-play.pdf

Return to Play – CanChild (Children/Youth)



http://canchild.ca/en/ourresearch/resources/MTBI-Return_to_Activity_Brochure.pdf

Return to Work

- RTW needs to be customised to the individual
- Depends on the person's symptoms and their work
  - Consider:
    - Dizziness with head turns/body movements
    - Balance and risk of falling
    - Vision with computer tasks and reading
    - Tolerance to "busy" environments, lights, noise

Prevention

- Preventing a 2nd concussion is very important
  - Risk of 2nd concussion MUCH HIGHER
  - Impact of 2nd concussion is often much worse

Prevention

- Helmets/headgear
  - **Helmets DO NOT PREVENT CONCUSSION**
- Avoid “head-checks” and hitting from behind
- Avoid on (or off-field) fights
- Baseline testing or sideline tests
  - ImPACT: https://www.impacttest.com/
  - SCAT3: http://bjsm.bmj.com/content/47/5/259.full.pdf
  - SCAT3 Child (5-12 years old): http://bjsm.bmj.com/content/47/5/263.full.pdf

http://www.winnipegfreepress.com/sports/hockey/when-helmets-dont-help-87099227.html

Josh's Story

- Josh was injured while playing tennis during his freshman year of high school.
  - He couldn't concentrate on homework
  - He experienced constant dizziness and headaches
  - He missed so much school that he couldn't graduate with his class
  - He became isolated from his friends and suffered from depression
  - Josh continues to struggle because teachers and school officials didn't understand that he needed accommodations

How Could We Have Helped Josh?

- Vestibular therapy to address his underlying visual and vestibular impairments
- Safe physical exercise (type, duration, frequency, intensity), e.g. stationary bike
- A team approach and concrete strategies for Josh, his teachers and school administrators to address his cognitive and learning disabilities
- Appropriate “return-to-learn” and “return-to-play” guidelines
- Counselling to help Josh cope with the emotional challenges of social isolation and physical limitations

In Summary

- Concussion is a **brain injury**
- Trauma can cause **vestibular dysfunction**
- If you have prolonged symptoms after concussion, speak to your healthcare providers for **assessment and treatment**
  - Dizziness, vertigo (spinning), blurred vision, imbalance or falls

http://www.oneillinstituteblog.org/concussions-college-sports-time-ncaa-step-plate

Resources

- **Vestibular Disorders Association (VEDA)**, Concussion info: https://vestibular.org/sites/default/files/page_files/Concussion_0.pdf
- Centres for Disease Control (CDC**) HEADS UP** Concussion campaign: http://www.cdc.gov/headsup/index.html
- Concussion Awareness Training Tool (**CATT online** for athletes, coaches, teachers, parents): http://www.cattonline.com/
- Zurich Concussion Guidelines: http://bjsm.bmj.com/content/47/5/250.full
- American Academy of Neurology: www.aan.com/concussion
- American Academy of Neurology, Sports Concussion Resources: https://www.aan.com/concussion
- Ontario Neurotrauma Foundation Guidelines: http://onf.org/documents/guidelines-for-concussion-mtbi-persistent-symptoms-second-edition

Resources

- McMaster University **Can Child** programme (Return to Activity or School guidelines): https://www.canchild.ca/en/ourresearch/mild_traumatic_brain_injury_concussion_education.asp
- Parachute/**Think First** Guidelines: www.parachutecanada.org/thinkfirstcanada
- Brainstreams: http://www.brainstreams.ca/
- ImPACT Concussion Assessment: https://www.impacttest.com/
- Sport Concussion Assessment Tool version 3 (SCAT3): http://bjsm.bmj.com/content/47/5/259.full.pdf
- SCAT3 Child (for children 5-12 years old): http://bjsm.bmj.com/content/47/5/263.full.pdf
- Montreal Children's Hospital Trauma Concussion Kit: http://www.thechildren.com/health-info/trauma/mch-trauma-concussion-kit - return to rugby, soccer, basketball, football, hockey

Questions?

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