



Occupational
Health Clinics
for Ontario
Workers Inc.

Centres de
santé des
travailleurs (ses)
de l'Ontario Inc.

Concussions in the Workplace

International RSI Day

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Occupational Health
Clinics for Ontario
Workers Inc.

Outline

- What is a concussion?
- What are the signs and symptoms?
- What are the long term effects of concussions?
- What are workplace factors that can lead to concussions?
- What can be done to protect against concussions?
- Concussion recovery and returning to work
- Are concussion symptoms underreported? Why?



What is a concussion?

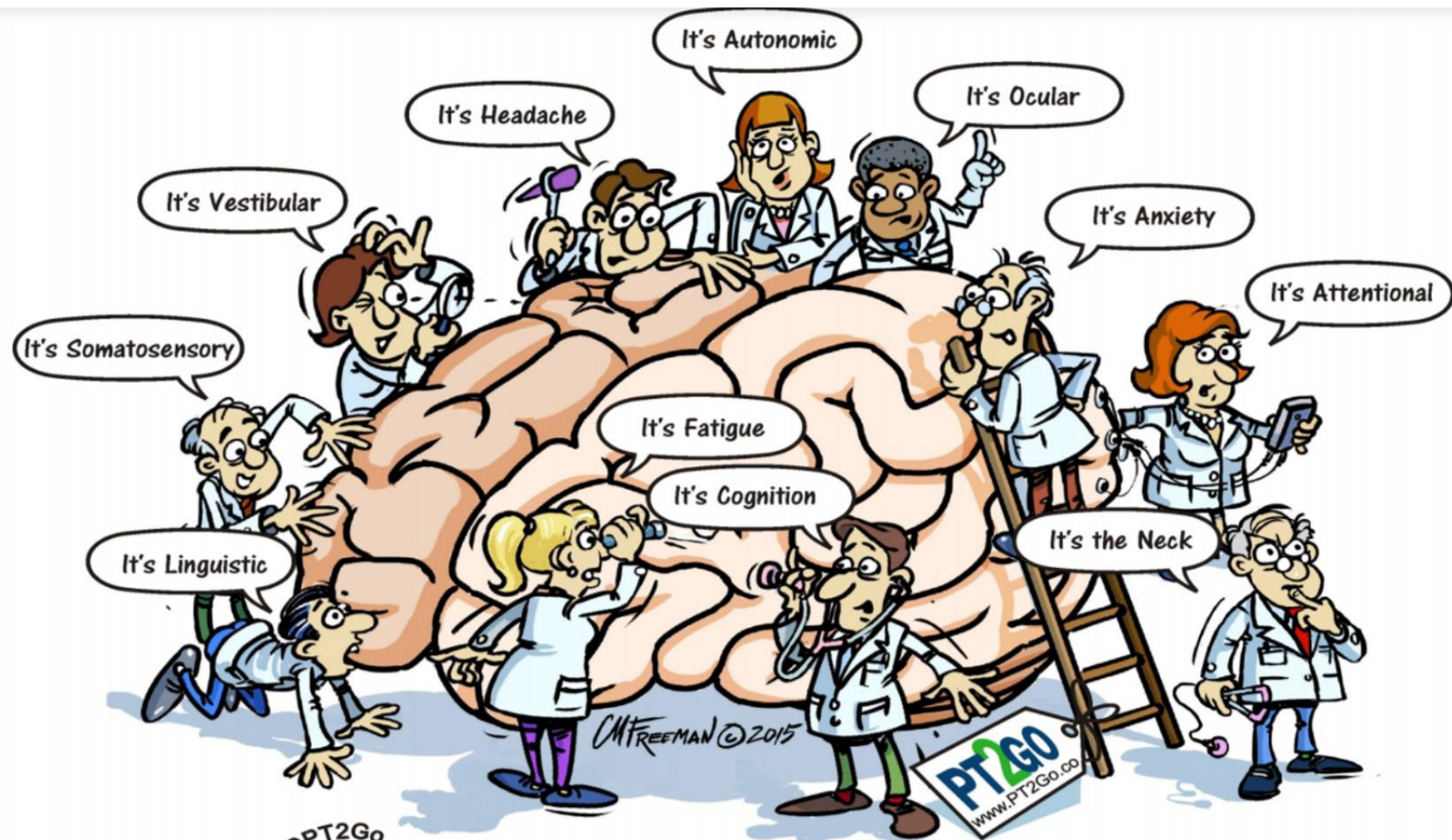
- The 5th consensus statement on concussion in sport (2017) held in Berlin, describes a concussion as “a traumatic brain injury induced by biomechanical forces”
- A concussion is the result of physical trauma to the brain, causing altered cognitive function. This trauma leads to a complex pathophysiological process that can result in a variety of symptoms that may vary substantially in severity across individuals.



Ambiguity in the definition of concussions and post concussion symptoms

- Variety of terms used
 - “concussion”, such as mild head injury, mild traumatic brain injury, and cerebral concussion
- Slang expressions
 - These are frequently used within lay literature and the media including “being dinged” or “having one’s bell rung.” seeing stars.





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Concussion



Defining features of concussions:

- May be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head.
 - Misunderstood.
- Typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
- In some cases, signs and symptoms are delayed and will evolve over a number of minutes to hours.



Defining features of concussions:

- *Brain function* is thought to be affected, if only temporarily, by concussion. A concussion does not have to be severe to affect brain function – mild head trauma has been shown to produce neural damage.
- Does not have to cause loss of consciousness to be a concussion.



Defining features of concussions:

- May result in neuropathological changes, but the acute clinical signs and symptoms reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.



Common features of concussions:

Large list of potential consequences, including:

- cognition (memory, judgment, communication)
- movement ability (strength, co-ordination, balance)
- sensory (vision, hearing, tactile)
- social relationships



Common Signs and Symptoms of a Concussion

- Headache
- Dizziness
- Feels dazed
- Feels “dinged” or stunned
- Sees stars, flashing lights
- Ringing in the ears
- Sleepiness
- Loss of vision
- Sees double or blurry
- Stomach ache/pain
- Nausea
- Poor co-ordination or balance
- Blank stare/glassy-eyed
- Vomiting
- Slurred speech
- Slow to answer questions or follow directions
- Easily distracted
- Poor concentration
- Strange or inappropriate emotions (i.e., laughing, crying, getting mad easily)
- Not participating well



Common features of concussions:

- Because the duration, symptoms, diagnostic testing and treatment in each case are so varied, concussions can be very complex and costly to treat.
- It is, however, hard to predict the end result from the initial impact or event.



Concussion Recovery

- Typically recovery will be within days to months
- The majority of individuals (estimates range from 73-88%) who experience mTBI are able to return to their principal occupation within a year of the injury
- Depending on the severity of the trauma, concussions can have a very prolonged recovery.
- This is due to microscopic physiological changes that occur post-concussion that can have delayed secondary injury implications.



Concussion Recovery

- Concussion recovery is a process that can show persistent symptoms for over 12 months
- Early physiological symptoms such as headaches can turn into psychopathological issues such as anxiety and hypersensitivity, depression.



Post-Concussion Symptoms

- Though a consensus has not been reached on the cause of long-term PCS, it is likely that biological, physiological, psychological, and social elements all play a role in symptom persistence.
- Suffering from PCS-related symptoms for an extended time may delay an individual's return to work, adversely affect one's quality of life, developmental trajectory, and result in additional social and economic costs.



Post-Concussion Syndrome

- Most mild traumatic brain injuries (mild concussion) resolve within hours or days. However, up to 80% of people who experience moderate to severe concussion symptoms may develop post-concussion syndrome.
- The syndrome can involve a cluster of symptoms such as memory loss, headaches, vertigo, cognitive delay, anosmia, phonophobia, photophobia, anxiety, depression and fatigue.
- Post-concussion syndrome following unconsciousness (considered severe concussion) usually lasts more than 3 months.



Factors that may contribute to persistent post-concussion symptoms

- Medication-induced fatigue
- Headache of migrainous or cervical origin
- Benign paroxysmal positional vertigo
- Deteriorated sleep hygiene
- Alcohol use
- Depression



PCS can be particularly challenging for employers and insurers.

- Hard to prove → for the average insurance company, as you can have post-concussion syndrome but all tests show that everything's normal — the CT scan, the MRI — yet you're still unable to attend work.
- It's difficult for sick leave insurance companies to adjudicate. Your brain has shifted in a closed cavity, and those tiny shear forces cause the brain receptors not to fire in the same way they were before the head injury.
- Impacts memory, mood and function, but that is difficult to prove without any pre-tests, which themselves can be inaccurate or gamed.
- Hard for employers to understand how concussed worker is actually feeling.
 - No visible signs.
- Challenge of identifying ones own symptoms on a day to day basis
- Symptoms can return when returning to work



Other future concerns with brain injury

Repetitive brain trauma is also associated with:

- Alzheimer's-like dementia
- Parkinsonism
- Motor neuron disease including Amyotrophic Lateral Sclerosis (ALS).



Second Impact Syndrome

- **Second impact syndrome** is caused when a second concussion like event happens to someone who has *already undergone a previous concussion and still having symptoms*.
- Working after sustaining a concussion can be very risky if the concussion has not fully healed, as the brain is now more susceptible to a second injury.
- This second impact can lead to even worse symptoms, further brain damage and even death.
- Caution after a reported concussion is extremely important for this reason.



What is Chronic Traumatic Encephalopathy?

- Neurodegenerative condition known as chronic traumatic encephalopathy (CTE).
- CTE is thought to result from repetitive blows to the head, which accumulate over time with repetitive impacts or concussion like events
- Can show up many years later, and can cause many complications for day to day life.



What is CTE?

- Individuals with CTE show an increase in tau proteins throughout the brain, although some have suggested that the significance of these markers is unclear at this time
- These tau proteins wrap around blood vessels within the brain, disrupting normal functioning and causing nerve cells to die
- Several other biomarkers are currently being studied for their significance



Concussions causing future health problems through CTE

- While CTE was originally associated with boxing, it has recently been found in other cases of repetitive head injury including former football and hockey players, and professional wrestlers.
- In a study by Guskiewicz et al. (2005), retired NFL players had
 - earlier onsets of Alzheimer’s disease
 - players with three or more concussions were five times as likely to report mild cognitive impairment
 - threefold prevalence of memory problems as compared to players who retired without any previous history of concussions.
 - neuroimaging abnormalities and differences in brain metabolism disproportionate to their age.



Why include concussions in RSI day?

- May not be the same as an muscular RSI, but if you repetitively impact your brain, the result can be an injury just the same.
- Long term effects can be worse than RSI's, and you are less likely to recover fully from a brain injury.
- Concussions compared to other injuries often involve a loss of time at work.
 - In 2016, 78% percent of SFM's concussion claims involved lost time from work, compared with 15% for non-concussion claims



Concussions in Ontario workers

- In Ontario, 7.3 per cent of all traumatic brain injuries are work related.
- According to data from the Workplace Safety and Insurance Board, there were 1,644 claims requiring time off work in Ontario in 2012, up from 790 in 1996.
- Large incoming wave of concussion problems has already started, and we are short on frontline help.
- There is an increase in awareness of concussions due to sports concussions and the media.



Concussions in Ontario workers

- Upon examining workers' compensation board reports, it was also found that there is an increased trend in number of concussion cases that are being reported.
 - in 2013 in Ontario, 80% of traumatic brain injuries filed to the Workplace Safety and Insurance Board were for concussions versus 50% prior to 2010.
 - Statistics reveal that the number of time loss claims for work-related concussions increased by 371% in Ontario from 2004 to 2013.



Concussions in Ontario workers

- 65% of Ontario's occupational concussions in 1998 were experienced by males
- However, females in similar sports report more concussions than males.



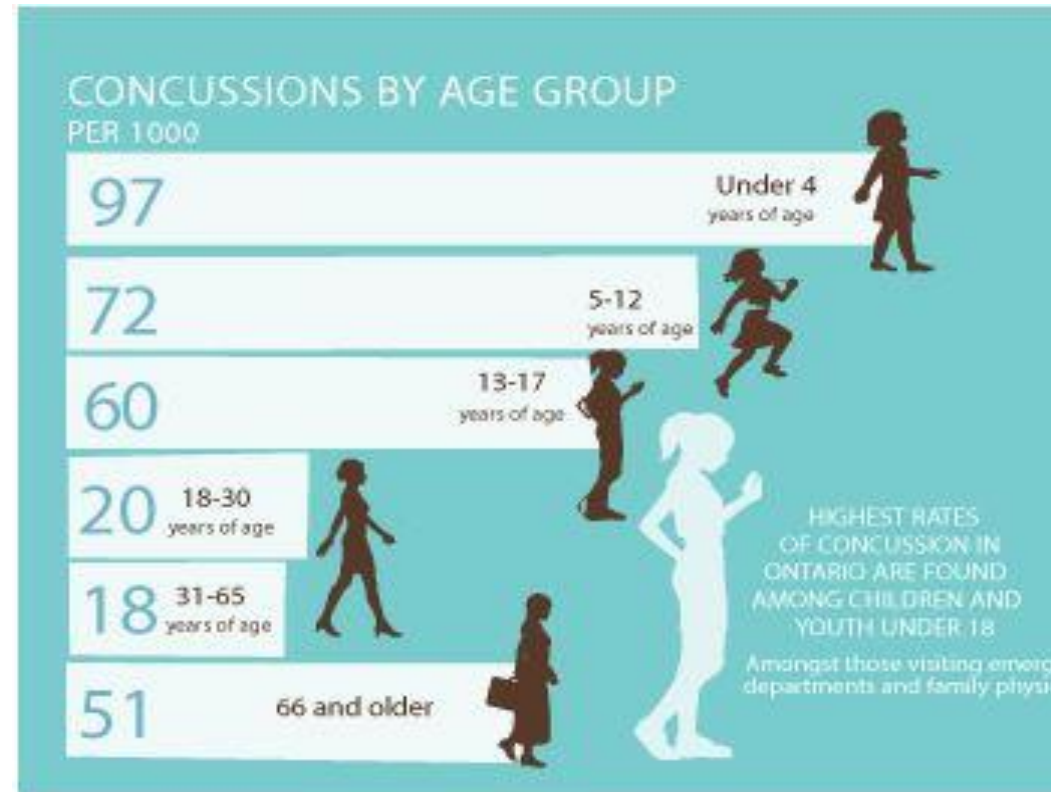
Traumatic Brain Injury in Canada

- According to the Public Health Agency of Canada, traumatic brain injuries will be the most prevalent neurological condition by 2031.
- And as the numbers increase, so do the claims.



What causes concussions?

- Depending on the population, the most likely events to cause a concussion are vehicle accidents, falls, sports and recreational activities, and assaults.



Who is at Risk?

In Canada, the highest rates of workplace concussions are in the industries of:

- Transportation
- Storage
- Government, and primary industries
 - Forestry
 - Fishing
 - Mining



What causes concussions in the workplace?

The most common cause of workplace brain injuries overall are:

- Slips, trips, falls
- Being struck by or against an object (falling boxes)
- Motor vehicle collisions
- In other cases students, customers, patients or co-workers might strike an employee.

However, the main causes of work-related concussion vary by industry and occupation.



Preventing Concussions in the Workplace

- Remove tripping hazards. Make sure walkways and work spaces are free of clutter, cords, puddles of water, or anything else that can cause a slip, trip or fall.
- Use proper signage to alert employees of wet surfaces.
- Keep shelves and storage areas and your work space clean and organized to avoid falling objects.
- In a warehouse or storage facility, place the heaviest objects on the floor or the lowest possible shelving.
- Wear the proper type of safety footwear to prevent falls if you work in slippery, icy or other types of rugged terrain.



Preventing Concussions in the Workplace

- Do not stand on chairs, desks or tables, but rather use an appropriate step stool, access platform, or ladder to avoid falls.
- Use caution when working from heights. Know how to use fall protection and fall restraint equipment.
- If a job requires wearing a hard hat, make sure it's appropriate to the job, properly fitted, and in good condition.
 - Helmets help, but concussions still happen.
- Report all unsafe conditions to the nearest supervisor.
- Use handrails when taking the stairs



Steps to take if a worker has concussion symptoms

- Alert a supervisor
- Report the incident immediately
- Seek medical help, do not try to diagnose yourself
- Consult a health-care professional to manage the concussion
- Do not drive or be left alone
- Give water, juice or any food they can eat



Seek a doctor immediately if..

- feeling more confused
- headache that is getting worse
- vomiting
- not waking up
- having any trouble walking
- having a seizure
- strange behaviour



Risk if an employee returns to work too early after the incident

- Even with good intentions, you may be unintentionally pushing the worker to activities that may be too demanding or stressful from a cognitive perspective
- The employee may be leaving very exhausted and they may be forgetting things, or doing things without their required mental capacity.



Problems faced returning to work

- A group of workers in the UK who had sustained mild to moderate TBIs reported that some of the important issues they faced were the invisibility of their injury, continuing symptoms affecting their ability to do their job, and lack of advice and guidance on returning to work. In addition, return to work support systems were considered to be poorly coordinated and managed.



Factors Associated with Poor Functional Outcomes

- Dizziness
- Number of symptoms reported at follow-up
- Posttraumatic stress
- Cognitive impairments on tests of memory and executive functioning
- Reduced social interaction
- Financial compensation-seeking
- Loss of consciousness
- Pre-existing mental health difficulties (anxiety, depression)
- Lower pre-morbid intelligence/cognitive ability
- Pre-injury work history



Limited Treatment Options

Treatment for concussions traditionally has meant **rest**.

- No computer screen
- No visual stimuli
- No multi-tasking
- No physical activity including sports.

It also means being off work, and the length of time an employee may need can range from weeks to months.

- Ongoing treatment options being researched, no best practice yet for those who do not experience spontaneous recovery.



Concussion Recovery tips

- Resting and getting an appropriate amount of sleep
- Not using alcohol or recreational drugs
- Not taking sleeping pills, sedatives, or any other medication not prescribed and/or approved by your doctor
- Not playing sports and avoiding other physically and mentally exhausting activities, such as intense exercise, sustained computer use, video games, until approved by a doctor.
- Check with doctor about when you can safely return to driving, biking, and operating heavy machinery
- Getting back to your normal activities slowly and gradually



Considerations during recovery

- Rehabilitation therapy may be key during recovery and may include speech therapy, occupational therapy, physical therapy, or a combination of the three, from one to four days per week.
- Realize that the workers thinking, speech and reaction times might be slowed, and they may be less able to concentrate. They probably won't be as productive as usual at first, and their job tasks may need to be altered.
- Incrementally over time, the employee should be able to return to normal work.



How to accommodate for a worker who has previously had a concussion.

- Important to respect any work restrictions.
- Reduce physical and cognitive exertion, reducing work during the initial stages of healing may help the employee's recovery
- Doctor may recommend the employee avoid driving, heavy lifting, working with machinery or work from heights for a period of time.
- Provide a calm, quiet work area where the lighting can be lowered if needed. Or a place to rest.
- Ensure plan for safety for commute to work.



Graduated Return to Work Process

- When an employee is ready to return to work, it should be a gradual process.
 - Try to accommodate the employee working with their physician as far as their restrictions are concerned
 - Physical job to sedentary desk work
 - Gradual increase in the amount of hours worked per day/week



Be positive!

- It's important to take the condition seriously, but it's also important to be positive and reassuring with the employee about their recovery.
- The injured employee may be in a **vulnerable state** — scared and upset by their symptoms and worried they might worsen in the future. The anxiety just makes their situation worse.
- Reduce the stigma surrounding concussions



PCS – When to return to work

Workers with symptoms that are present but do not change with an increase in activity can begin a transition return to work.

Workers with prolonged symptoms may require accommodations:

- Supervision
- Modified hours
- Working from home
- Reduction in sound
- Modified work load or reassignment



Are concussion symptoms underreported? Why?

- Although education is important, ambiguity in concussion definitions, and intentional underreporting contribute to the under-reporting of concussions



Why are concussion symptoms underreported?

- Although caused by physical trauma, concussions are an invisible injury that leaves little to no visible physical evidence.
- Assessment is not as simple as testing for swelling, pain, or strength, but rather, requires an evaluation of self-reported symptoms
- This self-evaluation can be difficult
 - What does “feeling like you are in a fog” mean to you?



Why are concussion symptoms underreported?

Still can be knowledge, even with the awareness of concussions today.

- In a survey among ED patients, 88.6% of the respondents who experienced concussion injuries reported that they didn't recognize that they had suffered a concussion



Why are concussion symptoms underreported?

- Knowledge about concussions
- Assumptions about how concussions will effect them
 - Expecting symptoms to be similar to previous concussions
- Social identity
- History with concussions
- Job Security/Fear of job loss
- Financial concerns



Why are concussion symptoms underreported?

- Assessment of the event that caused the concussion
 - Not in a good state to be assessing
 - Resort back to learned assessment techniques
- Uncertainty of diagnosis
- Uncertainty of the risk to continue with a concussion
- Symptoms are not drastic enough



Why are concussion symptoms underreported?

- Pain killers may mask symptoms
- External pressures to continue to work
 - sometimes external pressures are generated internally
- The importance of upcoming deadlines and work goals
- Stigma about concussions in the workplace
- The normalization of concussion symptoms



Under recording of concussions?

- Using only one surveillance source can lead to significant underestimation of the extent and burden of work-related concussions
- Important to always report any incident
 - Delayed symptoms



Who should be helping with concussions?

- Doctors?
- Physiotherapists?
- Ergonomists?
- JHSC?
- Workers?
- Teachers/Coaches are expected to be knowledgeable with concussions in schools/sports



Validated tools to measure Post-Concussion Syndrome

- The Rivermead Postconcussion Symptoms Questionnaire (RPQ)
- The World Health Organization disability assessment schedule 2.0 (WHODAS 2.0)
- The British Columbia Postconcussion Symptom Inventory-Short Form (BC-PSI-Sf)
- The Postconcussion Syndrome Symptom Scale (PCSSS)
- The Postconcussion Syndrome Checklist (PCSC)
- Post-Concussion Symptom Scale (PCSS)
- Postconcussive Symptom Questionnaire (PCS Questionnaire)
- Neurobehavioral Symptom Inventory (NSI)
- Head Injury Scale (HIS)
- The New Swedish Post-Concussion Symptoms Questionnaire (Swedish PCSQ)
- The Sport Concussion Assessment Tool SCAT5
- ImPACT
- Concussion Recognition Tool 5 (CRT5)



The Rivermead Post-Concussion Symptoms Questionnaire*

After a head injury or accident some people experience symptoms which can cause worry or nuisance. We would like to know if you now suffer from any of the symptoms given below. As many of these symptoms occur normally, we would like you to compare yourself now with before the accident. For each one, please circle the number closest to your answer.

- 0 = Not experienced at all
- 1 = No more of a problem
- 2 = A mild problem
- 3 = A moderate problem
- 4 = A severe problem

Compared with before the accident, do you now (i.e., over the last 24 hours) suffer from:

Headaches.....	0	1	2	3	4
Feelings of Dizziness	0	1	2	3	4
Nausea and/or Vomiting	0	1	2	3	4
Noise Sensitivity, easily upset by loud noise	0	1	2	3	4
Sleep Disturbance.....	0	1	2	3	4
Fatigue, tiring more easily	0	1	2	3	4
Being Irritable, easily angered	0	1	2	3	4
Feeling Depressed or Tearful	0	1	2	3	4
Feeling Frustrated or Impatient	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
Poor Concentration	0	1	2	3	4
Taking Longer to Think	0	1	2	3	4
Blurred Vision	0	1	2	3	4
Light Sensitivity, Easily upset by bright light.....	0	1	2	3	4
Double Vision	0	1	2	3	4
Restlessness	0	1	2	3	4

Are you experiencing any other difficulties?

1. _____ 0 1 2 3 4
2. _____ 0 1 2 3 4

*King, N., Crawford, S., Wenden, F., Moss, N., and Wade, D. (1995) J. Neurology 242: 587-592



Helpful Links and Resources

- https://www.cdc.gov/headsup/basics/concussion_prevention.html
- https://www.ccohs.ca/products/courses/preventing_falls/
- <http://horizon.parachutecanada.org/en/?s=concussion>
- <http://www.wsib.on.ca/> (Program of care for mild traumatic brain injuries page)
- http://onf.org/system/attachments/60/original/Guidelines_for_Mild_Traumatic_Brain_Injury_and_Persistent_Symptoms.pdf
- <https://www.worksafebc.com/en/resources/health-safety/books-guides/concussions?lang=en>
- <https://www.worksafebc.com/en/resources/health-care-providers/guides/post-concussion-syndrome-validated-symptom-measurement-tools?lang=en&direct>
- <https://www.cos-mag.com/personal-process-safety/29869-reported-work-related-concussions-increasing-says-researcher/>
- <https://www.sfmic.com/work-related-concussions-prevention-tips/>
- Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016
- <http://concussionsontario.org/access-to-care/concussion-data/>
- <https://www.benefitscanada.com/news/concussions-a-growing-workplace-challenge-95165>



Thank You

**If you have any questions about this presentation,
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