

Resort Medicine Ski Clinics Concussion Care
(last Updated October 2023)

Sport-related Concussion Management— (for patients)

- Brief description: A concussion is a brain injury resulting from direct impact to head, neck or body affecting nerve function in the brain and which causes up to four categories of symptoms:
 - o Physical (headache, nausea, altered balance, light and noise sensitivity)
 - o Mental (fatigue, confusion, “fogginess”)
 - o Emotional (irritability, emotional “ups-and-downs”)
 - o Sleep (excess sleepiness, or inability to fall or stay asleep)
- Research confirms that a concussion injury does not need hospital admission or brain imaging (such as CT scan)
- Warning signs of a more severe brain injury—go to the Emergency Room if any of these are present:
 - o Severe headache (“worst of my life”)
 - o Dysfunction of the nervous system (for example: arm weakness, loss of vision, seizure)
 - o Repeated vomiting
- Care during the Initial 48 hours (following these recommendations will speed recovery):
 - o Minimize screen time (including mobile phone, computers, movies, and gaming)
 - o Maximize rest and sleep
 - o Participate in light cognitive (e.g., leisure reading) and light physical (e.g. walks) as tolerated (as long as your symptoms do not get worse)
 - o Avoid alcohol intake (which interferes with sleep and brain recovery)
 - o Begin range-of-motion exercises for the neck (for example, search “gravity assisted neck stretches” on a web browser).
 - o Be aware that travel may worsen symptoms due to general stressors of travel and altitude changes.
- After 48 hours (follow a “graded” or gradual return):
 - o Gradually return to full screen use as symptoms allow. Consider blue light filter glasses.
 - o Gradually re-introduce mental activity (school and work) as symptoms allow.
 - o Ease in to physical exercise/fitness as symptoms allow. Research shows exercise actually speeds recovery (by helping with stress and increasing one’s ability to sleep). **However, don’t return to contact/collision/high speed sports (including skiing and snowboarding) until you have a follow-up visit and “medical clearance” from a doctor.**
- Care at home:
 - o **Concussion is treatable.** Don’t think that that you must “wait it out.” Treatments include physical therapy for neck pain, home rehabilitation for vision and balance (which can be helpful even if you don’t have vision and balance

disruption as your primary symptoms), and, in some cases, medication specifically for concussion recovery (melatonin for sleep, prescription medication for headache). In rare cases formal vision therapy, vestibular physical therapy, and cognitive therapy are needed. We advise that you schedule an appointment with a physician who has experience in concussion management as soon as you are home (and if you live in Utah, we can provide referrals/recommendations)

Sport-related Concussion Management—Physician's Guide

- Red Flags
 - Per Consensus statement:
 - Neck tenderness
 - Seizure
 - Double vision
 - Loss of consciousness
 - Weakness or tingling in more than one arm or in the legs
 - Deteriorating consciousness
 - Vomiting
 - Severe/increasing headache
 - Agitation
 - GCS<15
 - Skull deformity
 - **Per Canadian CT Head rule/NEXUS II/New Orleans criteria, head CT advised (send to ER) if:**
 - GCS<15
 - Suspected open or depressed skull fracture
 - Any sign of basilar skull fracture
 - Two or more episodes of vomiting
 - New neurologic deficit
 - Bleeding diathesis/anticoagulant use
 - Seizure
 - Age 60 or older
 - Retrograde amnesia of 30 minutes or more
 - *Potentially high-impact head injury*
 - Intoxication or other alteration affecting patient's ability to have adequate medical evaluation
- Definition:
 - "Conceptual" definition: "Blow to head causing neurotransmitter and metabolic cascade in the brain. Symptoms and signs may be present immediately or evolve over minutes or hours." (Patricios)
 - **"Operational" definition** (Silverberg): Head impact causing at least **one sign**
 - loss of consciousness
 - alteration of mental status (cognitive slowing, agitation, disorientation)
 - amnesia
 - *and* at least **two symptoms** (the two can be from a single category):
 - physical (HA, N/V, dizzy, balance problems, vision disruption, light/sound sensitivity)
 - Cognitive: feeling slowed down, "mental fog," difficulty concentrating, memory disruption
 - Emotional symptoms: uncharacteristic emotional lability/irritability
 - *And* at least **one clinical (physical exam) finding**:
 - Cognitive impairment (e.g. doing "serial 7's")

- Balance impairment (e.g. single leg balance for 10 seconds with eyes closed)
 - Oculomotor impairment or symptom provocation with VOMS exam
- Helpful points/specific exercises to review with patients
 - Definition of concussion
 - Concussions are treatable. We don't have to "wait for them to get better."
 - Gravity-assisted stretches
 - Pencil push-ups (basic vision home therapy)
 - Single-leg balance (basic vestibular home therapy)
- Other salient points:
 - Competitive skiers tend to under-report concussion and minimize symptoms in an effort to avoid time off from sport due to injury
 - Snowboarding has a minimally higher rate of injury than skiing. Child and adolescent injuries are more common than adult injuries. In resort snow sports, there is a slight male>female preponderance.

References:

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