

BCS Concussion Protocol

Sport-related concussion is a traumatic brain injury caused by a direct blow to the head, neck or body resulting in an impulsive force being transmitted to the brain that occurs in sports and exercise-related activities. This initiates a neurotransmitter and metabolic cascade, with possible axonal injury, blood flow change and inflammation affecting the brain. Symptoms and signs may present immediately, or evolve over minutes or hours, and commonly resolve within days, but may be prolonged. (Amsterdam Consensus 2023)

If an athlete is suspected of sustaining a concussion and there is no concern for a more serious head or spinal injury, they should be **immediately** removed from play and not to be left alone. If no red flags are identified, an initial assessment is to be completed by an emergency medical professional or by on-site medical professional if available. If the student is diagnosed with a concussion, the student will commence the BCS Concussion Protocol.

The student should complete 24-48 hours of relative rest. Daily routine tasks should be encouraged if they only mildly and briefly increase symptoms. (an increase of no more than 2 points on a 0-10 scales for less than an hour duration).

The goal of concussion recovery is to determine the appropriate level of cognitive and physical activities that will not worsen or provoke new symptoms. Normalizing a student's home and school life as soon as possible is key to maintaining their psychosocial well-being. (Concussion Kit Montreal Children's Hospital).

Return-to-School Strategy (Based on Amsterdam 2022 consensus statement on concussion in sport)

Stage	Aim	Activity	Goal of each step
1	Daily activities that do not result in more than a mild exacerbation* of symptoms related to the current concussion.	Typical activities during the day (eg, reading) while minimising screen time. Start with 5-15 min at a time and increase gradually.	Gradual return to typical activities
2	School Activities	Homework, reading or other cognitive activities outside of the classroom	Increase tolerance to cognitive work
3	Return to school part-time	Gradual introduction of schoolwork. May need to start with a partial school day or with increased breaks during the day.	Increase academic activities.
4	Return to school full-time	Gradually progress in school activities until a full day can be tolerated without more than mild* symptoms exacerbation.	Return to full academic activities and catch up on missed school work.

Following an initial period of relative rest (24-48 hours following an injury at Step 1), athletes can begin a gradual and incremental increase in their cognitive load. Progression through the strategy for students

should be slowed when there is more than a mild and brief symptom exacerbation*.

*Mild and brief exacerbation of symptoms is defined as an increase of no more than 2 points on a 0-10 point scale (with 0 representing no symptoms and 10 the worst symptoms imaginable) for less than an hour when compared with the baseline value reported prior to cognitive activity.

It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the Sport-Specific Return-to-Sport-Strategy.

Testing and evaluations should not take place during stage 1-4 due to cognitive demands. Prior to full return to learn, students will meet with an academic support teacher, at the Enrichment Center, to help with return to learn strategies. The academic support teacher will also coordinate with the students' respective teachers on how to best support the student in successfully completing their return to learn. BCS recognizes that each concussion may present differently, and the faculty/staff will work in correlation with recommendations from health care professionals to ensure a safe and optimal recovery.

Return-to-Sport Strategy (Based on Amsterdam 2022 consensus statement on concussion in sport)

Stage	Aim	Activity	Goal of each step
1	Symptom-limiting activity	Daily activities that do not exacerbate symptoms (eg. Walking).	Gradual re-introduction of work/school.
2	Aerobic activity	Stationary cycling or walking at slow to medium pace. May	Increase heart rate.

	2A – Light (up to approximately 55% maxHR) then 2B – Moderate (up to approximately 70% maxHR)	start light resistance training that does not result in more than mild and brief exacerbation* of concussion symptoms. Student must successfully pass the Buffalo Treadmill Test prior to moving onto Stage 3.	
3	Individual sport-specific exercise Note: If sport-specific training involved any risk of inadvertent head impact, medical clearance should occur prior to Step 3	Sport-specific training away from the team environment (eg. Running, change of direction and/or individual training drills away from the team environment). No activities at risk of head impact	Add movement, change of direction
Stage 4-6 should begin after the resolution of any symptoms, abnormalities in cognitive function and any other clinical findings related to the current concussion, including with and after physical exertion. Medical clearance must be provided prior to starting Stage 4. Medical clearance must be provided by a physiotherapist or a medical doctor.			
4	Non-contact training drills	Exercise to high intensity including more challenging training drills (eg. Passing drills, multiplayer training)	Resume usual intensity of exercise, coordination and increased thinking.

		can integrate into a team environment	
5	Full contact practice	Participate in normal training activities	Restore confidence and assess functional skills by coaching staff.
6	Return to sport	Normal game play.	

*Mild and brief exacerbation of symptoms (ie, an increase of no more than 2 points on a 0-10 point scale for less than an hour when compared with baseline value reported prior to physical activity). Athletes may begin Step 1 (ie. Symptom-limited activity) within 24 hours of injury, with progression through each subsequent step typically taking a minimum of 24 hours. If more than mild exacerbation of symptoms (ie. More than 2 points on a 0-10 scale) occurs during Step 1-3, the athlete should stop and attempt to exercise the next day. Athletes experiencing concussion-related symptoms during Steps 4-6 should return to Step 3 to establish full resolution of symptoms with exertion before engaging in at-risk activities. Written determination of readiness to RTS should be provided by a HCP before unrestricted RTS as directed by local laws and/or sports regulations.

HCP, healthcare professional; maxHR, precited maximum heart rate according to age (ie. $220 - \text{age}$)

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