

BOBSLEIGH CANADA SKELETON



SPORT-RELATED CONCUSSION 2017 – 2018 PROTOCOL

A Guideline supported by the Canadian Sport Institute (CSI) Calgary



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Preamble

This document provides a sport-related concussion protocol for Bobsleigh Canada Skeleton (BCS). It includes Own the Podium and Canadian Sport Institute Calgary supported clinical research protocols in the spirit of advancing the science and clinical care for athletes sustaining a sport-related concussion.

Disclaimer

Although the present document contains specific information that was considered current as of May 2017, the contributing author acknowledges that concussion protocols will evolve and the most current emerging research may add to or replace these guidelines. Therefore, this document is not intended to replace seeking help from a trained medical professional with concussion expertise in the process of adapting and implementing the protocol. The concussion policies and protocols will be reviewed annually and updated with any new medical and scientific advances.

1. Concussion Definition

Sport-related concussion (SRC) is a *“traumatic brain injury induced by biomechanical forces. Several common features that may be utilised in clinically defining the nature of a concussive head injury include:*

- *SRC 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.*
- *SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.*
- *SRC may result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.*
- *SRC results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.*

The 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 (eg, psychological factors or coexisting medical conditions)”.¹

2. Sport Concussion Protocol and Education

Athletes, coaches, medical staff, integrated support team (IST) members, management and executive staff must review the concussion protocol prior to the first day of competitive season training camp (or upon joining a team if thereafter). For coaches, formal concussion education qualification requirements such as the Concussion Awareness Program of The Coaching Association of Canada² must be met.

3. Baseline Clinical Assessment (healthy, uninjured)

Prior to the first day of competitive season training camp, all athletes must undergo:

- Biographical information assessment, including a detailed past medical history such as previous concussion and neck injuries, description of recovery from previous concussions, neurological

conditions, psychological / psychiatric conditions, other potential co-morbidities, medications, supplements, alcohol use, recreational drug use, etc.

- Sport Concussion Assessment Tool (SCAT5)³, including gait and balance assessment (e.g., Balance Error Scoring System (BESS) / modified BESS)
- Vestibular/Oculomotor Assessment (e.g., Visual Acuity, King-Devick, Vestibular/Ocular Motor Screening (VOMS)) (may also include formal oculomotor assessment by an optometrist / neuro-ophthalmologist and/or formal vestibular assessment by a qualified health care provider / otology/neurotology Ear, Nose and Throat (ENT) specialist in some cases pending concussion history)
- Web-based neurocognitive/neuropsychological assessment in a distraction-free environment (may also include formal neuropsychologist assessment in some cases pending concussion history)
- KINARM robotic assessment of sensorimotor and cognitive function, postural stability and oculomotor control
- May include Heart-Rate-Variability (HRV) response (pre- and post-progressive exercise load) in some cases.

Baseline assessments should be completed under the supervision / guidance of the team physician on an annual basis at the time of COPSI Network Comprehensive Athlete Medical Intake⁴ by a qualified health care professional (e.g., certified athletic therapist, physiotherapist) that is trained and experienced with the above sport concussion clinical assessments. Web-based neurocognitive / neuropsychological testing may be completed every other year if the athlete has not sustained a concussion in the prior season and if they have valid neurocognitive / neuropsychological assessment from three consecutive seasons. All other athletes shall undergo annual neurocognitive testing.

Athletes should refrain from consuming any caffeinated beverages or engaging in strenuous exercise within four hours of baseline testing. It is also important that the athlete is tested in a well-fed and hydrated state, and should not be tested if there has been insufficient sleep or if the athlete has been under the influence of any drugs or alcohol in the 24-48 hour period prior to baseline assessment. Given the use of multiple assessment tools and the possible associated influence / interference with task interpretation, it is recommended that SCAT5 and/or other neurocognitive / sensorimotor / exercise test batteries be spaced accordingly or administered on different days (where possible).

4. Concussion Identification and Removal from Play for Medical Evaluation

A BCS team certified athletic therapist, physiotherapist, chiropractor or physician (hereafter referred to as “medical team”) should be onsite during practice/training and competition. This individual must be trained and experienced in assessment and management of acute sport-related concussion. If a concussion is suspected (traumatic mechanism with evidence of post-traumatic signs/symptoms/behaviors) ([Appendix A: Concussion Recognition Tool 5](#))⁵, the athlete **must** be removed from training / competition and evaluated immediately.

In the event of a crash or impulsive force to the head:

- The athlete must report to the BCS medical team for assessment (or event physician if no member of the BCS medical team is present).
- The BCS medical team should also seek out the athlete.
- Coaches should report any suspicion of a concussion to the BCS medical team or event physician (if no member of the BCS medical team is present).
- In the event that the suspected concussion is assessed by the BCS team athletic therapist, physiotherapist or chiropractor, the BCS team physician should also be notified to assist with management.
- In the event that no members of the BCS medical team are available, the athlete must be assessed by a physician as soon as possible. Athletes with a suspected concussion should be escorted by a teammate, coach or responsible adult to a physician. Subsequent follow-up should then be arranged with the BCS team physician.
- In the case where athletes are competing out-of-country, follow-up with the team physician may be conducted by telephone, internet, etc., where available. The BCS team physician should also be contacted **PRIOR** to making travel arrangements to return home.
- **Athletes CANNOT be cleared to return to training/competition by paramedical track staff or BCS team coaches.**
- The diagnosis and acute management should follow the principles laid out in the Summary and Agreement Statement of the Fifth International Symposium on Concussion in Sport - Berlin 2016 ¹.

The athlete should not be left alone following the injury and serial monitoring for deterioration by the medical team is essential over the initial few hours following injury. Problems could arise over the first 24-48 hours. If the athlete experiences any of the following signs or symptoms (worsening headache, drowsiness or inability to be awakened, inability to recognize people or places, repeated vomiting, unusual behavior (confusion or irritable), seizures (arms and legs jerk uncontrollably), weakness or numbness in arms or legs, unsteadiness on their feet, slurred speech), they should go to the nearest hospital emergency department immediately.

5. Acute Sport Concussion Assessment & Management

a) Sideline Assessment

Standard emergency management principles should be adhered, with particular attention given to excluding a cervical spine injury, determining the disposition of athlete, and identifying any “Red Flags” listed in the Concussion Recognition Tool 5.⁵ Once the first aid issues are addressed, all suspected cases of concussion should be removed from the playing field and assessed by the medical team in a distraction-free environment where possible (i.e., medical room with only members of the medical team present). Formal concussion assessment should be completed using the SCAT5 and other clinical measures at the medical staff’s discretion. In all cases, the team or event physician shall be solely responsible for determining whether or not the athlete is diagnosed with a concussion. If there is no physician on site, the athlete should not return to training or competition until a physician has evaluated him/her. Because of the evolving nature of concussion in the acute phase, athletes diagnosed with a concussion after the acute evaluation shall not return to practice or competition on the same day of injury, regardless of the resolution of concussion symptoms. If, after the acute assessment the team or event physician determines that the athlete does not have a concussion, the athlete may return to practice or competition at the physician’s discretion.

b) Clinical Assessment & Management (0 – 14 days post-concussion)

Clinic Assessment

- Comprehensive clinical history and detailed neurological examination as soon as possible following the injury by the team physician (if possible) or a physician experienced with sport concussion
 - includes thorough assessment of mental status, cognitive functioning, coordination, gross sensorimotor, sleep/wake disturbance, oculomotor function, cervical assessment, vestibular function, gait and balance
- Repeat baseline assessments
 - may include formal optometrist / ophthalmologist / vestibular physiotherapist assessment in some cases
 - web-based neurocognitive/neuropsychological testing should only be administered when the athlete is free of concussion-related symptoms at rest and with exertion.

Management

- If a concussion is formally diagnosed, both physical and cognitive rest is advised for the initial **24 – 48 hours** post-concussion
 - eases discomfort / symptoms during the acute recovery period
 - promotes recovery by minimizing brain energy demands
 - physical and cognitive rest includes:
 - no physical activity including resistance training, sport-specific training, cross training, cardiovascular conditioning, weight lifting, exertion associated with activities of daily living, etc.
 - no excessive mental tasks including driving, studying, reading, social media streaming, etc.)
 - quiet environment
 - minimize exposure to visual and auditory stimulation (computer use, television, texting, video games, night clubs, etc.)
 - removal from potential stressful situations (media attention, interviews, team meetings, etc.)
 - other aspects of acute concussion management that are important to consider include:
 - avoiding alcohol or recreational drug use
 - maintain regularly scheduled fluid intake (hydration), meals and snacking (well-balanced)
 - avoiding sleeping pills, anti-inflammatory medication, aspirin, narcotics and other analgesics within the first 24 - 48 hours of concussion, and only used thereafter based on physician recommendations.
- After 24 – 48 hours of rest, athletes can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds (i.e., physical or cognitive activity should not bring on new or worsen existing symptoms)

- Brief napping (<25 minutes) is appropriate if needed, but avoid excessive daytime sleep
- Initiate rehabilitation, if warranted, based on the physician’s clinical assessment (i.e., cervical, vestibular, oculomotor)
- After the acute symptoms subside and the athlete is able to complete their usual daily activities without concussion-related symptoms, it is recommended that the athlete progresses through a graduated exertional protocol in accordance with the principles outlined in the Berlin 2016 Concussion in Sport Consensus Statement ¹ ([Appendix B: Graduated Return-to-Sport Strategy](#))
 - However, each athlete’s concussion shall be managed on an **individualized basis** based on the team physician’s clinical judgment
- When the athlete is determined by the medical team to be free of concussion-related symptoms at rest and with exertion, he/she should repeat the web-based neurocognitive/neuropsychological test to be reviewed by the team physician and team’s consultant neuropsychologist (if possible) for post-injury evaluation. In some cases, a formal Paper and Pencil neuropsychological test battery may be required as per determined by the team’s consulting neuropsychologist. The consulting neuropsychologist shall convey the results of the evaluation to the team physician
- Although neuropsychological test data are very useful in assessing the neurocognitive sequelae of concussion, they should not be used in isolation to make the diagnosis of concussion or as the sole determinant for return to play.

c) Return to Sliding (Unrestricted Training and/or Competition)

If the athlete’s post-concussion clinical assessments are within baseline normative levels in all testing domains (as per judged by the team physician), the risks associated with return to high-risk sport will be discussed with the athlete by the team physician (or medical team designate), with prevention / risk reduction strategies. The athlete will then sign an informed consent letter acknowledging that they were explained the risks and willingly accept that risk upon return to high-risk sport training and competition ([Appendix C: Athlete Informed Consent Letter](#)).

Athletes may return to unrestricted training and competition only after the following circumstances have occurred:

- (1) there is complete resolution of concussion-related symptoms at rest,
- (2) there is no recurrence of concussion-related symptoms at exertion levels required for unrestricted practice and competition,
- (3) the athlete’s post-concussion clinical and neuropsychological testing have returned to individual baseline levels as judged by the team physician and the team’s consulting neuropsychologist (wherever possible).

There is no mandatory period of time that an athlete must be withheld from play following a concussion, as the return to play decision is based on the individual circumstances of that athlete and team physician’s professional judgment.

The team physician remains solely responsible for making return to play decisions based on these parameters, including in circumstances where the athlete is referred to a consulting physician with experience in sport-related concussion for assessment and management. Prior to making the return to play decision, the team physician shall ensure that all aspects of the above protocol have been satisfied.

d) Persistent Symptoms (>14 days post-concussion)

- These are difficult cases that should be managed in a multidisciplinary collaborative setting, by healthcare providers with experience in sport-related concussion, and overseen by a physician experienced with sport-related concussion
- Typically reflects failure of normal clinical recovery
- Typically does not reflect a single pathophysiological entity, but describes a constellation of non-specific post-traumatic symptoms that may be linked to coexisting and/or confounding factors, which do not necessarily reflect ongoing physiological injury to the brain
- Requires detailed multi-disciplinary clinical assessment under direction of the team or consulting physician to identify specific primary and secondary pathologies that may be contributing to persisting concussion-like symptoms, which may include:
 - formal cervical assessment by a qualified health care professional (athletic therapist, physiotherapist, chiropractor, osteopath)
 - formal vestibular assessment by a vestibular therapist or otology/neurotology Ear, Nose and Throat (ENT) physician experienced in sport concussion
 - formal oculomotor assessment by an optometrist / neuro-ophthalmologist specialist experienced in sport concussion
 - formal physiology assessment of autonomic instability / dysfunction by an exercise physiologist experienced in sport concussion
 - formal mental health assessment by a registered psychologist, neuropsychologist or psychiatrist experienced in sport concussion
 - formal assessment by a physiatrist, neurologist or neurosurgeon experienced in sport concussion
- Treatment should be individualized and targeted to specific medical, physical and psychosocial factors identified on multi-disciplinary assessments
- In cases where the athlete suffers persistent symptoms, including persistent symptom recurrence with exertion, or specific sequelae (e.g., convulsive convulsions, prolonged loss of consciousness or cognitive impairment following the injury), a more conservative management approach may be warranted based on the team physician's clinical judgment. This group may also include athletes who suffer multiple concussions over time or where repeat concussions occur with progressively less impact force.

References:

1. McCrory P, Meeuwisse W, Dvorak J, *et al.* Consensus statement on concussion in sport – the 5th international conference on concussion in sport held in Berlin, October 2016. *Br J Sports Med* 2017; <http://dx.doi.org/10.1136/bjsports-2017-097699>.
2. Coaching Association of Canada. Concussion Awareness. <http://www.coach.ca/concussion-awareness-s16361> (accessed May 2017).
3. Echemendia RJ, Meeuwisse W, McCrory P, *et al.* The Sport Concussion Assessment Tool 5th Edition (SCAT5). *Br J Sports Med*; Published Online First: 26 April 2017. doi: 10.1136/bjsports-2017-097506.
4. McCluskey P, Liang E, Benson B, *et al.* Canadian Olympic and Paralympic Sport Institute Network Athlete Intake Process. National Sport Science and Medicine Advisory Council, Own the Podium. 2016.
5. Echemendia RJ, Meeuwisse W, McCrory P, *et al.* The Concussion Recognition Tool 5th Edition (CRT5). *Br J Sports Med*; Published Online First: 26 April 2017. doi: 10.1136/bjsports-2017-097508.
6. NHL / NHLPA 2016-2017 Concussion Evaluation and Management Protocol. October 5, 2016.
7. Canadian Concussion Collaborative. <http://casem-acmse.org/education/ccs/> (accessed May 2017).

Appendix A

Concussion Recognition Tool 5

BJSM Online First, published on April 26, 2017 as 10.1136/bjsports-2017-097508CRT5

To download a clean version of the SCAT tools please visit the journal online (<http://dx.doi.org/10.1136/bjsports-2017-097508CRT5>)

CONCUSSION RECOGNITION TOOL 5®
To help identify concussion in children, adolescents and adults

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RECOGNISE & REMOVE

Head requests can be associated with serious and potentially fatal brain injuries. The Concussion Recognition Tool 5 (CRT5) is to be used for the identification of suspected concussion. It is not designed to diagnose concussion.

STEP 1: RED FLAGS – CALL AN AMBULANCE

If there is concern after an injury including whether ANY of the following signs, any obvious or subtle, are observed, then the athlete should be removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

- Neck pain or tenderness
- Severe or increasing headache
- Deteriorating conscious state
- Double vision
- Weakness or tingling/burning in arms or legs
- Seizure or convulsion
- Vomiting
- Loss of consciousness
- Increasingly restless, agitated or combative

Remember:

- In all cases, the basic principles of first aid (protect, prevent, support) should be followed.
- Do not attempt to move the player or remove any equipment unless trained to do so.
- Assessment for a spinal cord injury is critical.

If there are no Red Flags, identification of possible concussion should proceed to the following steps:

STEP 2: OBSERVABLE SIGNS

Visual clues that suggest possible concussion include:

- Lying motionless on the playing surface
- Slow to get up after a direct or indirect hit to the head
- Disorientation or confusion, or an inability to respond appropriately to questions
- Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements
- Blank or vacant look
- Facial injury after head trauma

STEP 3: SYMPTOMS

- Headache
- "Pressure in head"
- Balance problems
- Nausea or vomiting
- Drowsiness
- Dizziness
- Blurred vision
- Sensitivity to light
- Sensitivity to noise
- Fatigue or low energy
- "Don't feel right"
- More emotional
- More irritable
- Sadness
- Nervous or anxious
- Neck Pain
- Difficulty concentrating
- Difficulty remembering
- Feeling slowed down
- Feeling like "In a fog"

STEP 4: MEMORY ASSESSMENT
(IN ATHLETES OLDER THAN 12 YEARS)

Failure to answer any of these questions (modified appropriately for each sport) correctly may suggest a concussion:

- "What venue are we at today?"
- "Which half is it now?"
- "Who scored last in this game?"
- "What team did you play last week/game?"
- "Did your team win the last game?"

Athletes with suspected concussion should:

- Not be left alone initially (at least for the first 1-2 hours).
- Not drink alcohol.
- Not use recreational/ prescription drugs.
- Not be sent home by themselves. They need to be with a responsible adult.
- Not drive a motor vehicle until cleared to do so by a healthcare professional.

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ANY ATHLETE WITH A SUSPECTED CONCUSSION SHOULD BE IMMEDIATELY REMOVED FROM PRACTICE OR PLAY AND SHOULD NOT RETURN TO ACTIVITY UNTIL ASSESSED MEDICALLY, EVEN IF THE SYMPTOMS RESOLVE

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Appendix B

Graduated Return-to-Sport Strategy

Stage	Aim	Activity	Goal of each step
1	Symptom-limited activity	Daily activities that do not provoke symptoms	Gradual reintroduction of work / school activities
2	Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate
3	Sport-specific exercise	Running or skating drills. No head impact activities	Add movement
4	Non-contact training drills	Harder training drills, eg, passing drills. May start progressive resistance training	Exercise, coordination and increased thinking
5	Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6	Return to sport	Normal game play	

NOTE: An initial period of 24–48 hours of both relative physical rest and cognitive rest is recommended before beginning the RTS progression. There should be at least 24 hours (or longer) for each step of the progression. If any symptoms worsen during exercise, the athlete should go back to the previous step. Resistance training should be added only in the later stages (stage 3 or 4 at the earliest). If symptoms are persistent (eg, more than 10–14 days in adults or more than 1 month in children), the athlete should be referred to a healthcare professional who is an expert in the management of concussion.¹

Appendix C

Athlete Informed Consent Letter

Date:

Athlete Name:

Address:

Dear Athlete,

We are pleased that you are making good progress in recovery from your concussion and that you have remained symptom free in all post-concussion testing so far. Your post-injury testing looks good in comparison to your baseline tests. It is now safe for you to return to the sport-specific component of your monitored return to play protocol.

A member of our sport concussion medical team has discussed the risks associated with returning to high-risk sport. You have indicated that despite the risks, it is your desire to return to unrestricted sport participation.

The long-term risk and effects of multiple concussions is something that is difficult to predict. We don't know how many concussions a person can experience before there may be some permanent brain damage. We do know that some individuals never fully recover after one or two concussions, and that others can have multiple concussions each with apparent full recovery. We do know that with each successive concussion, there may be an increased risk that the next concussion may take longer to recover from, or might not result in a full recovery.

In addition to the above, we know that the risk of persistent symptoms, permanent impairment, or in rare circumstances, death, is increased if an individual experiences another concussion before their current concussion has recovered. This is why we go to such great lengths to ensure that your concussion has recovered (to our best ability) before you return to your sport.

In your individual situation, you have the following features which may place you at higher risk of recurrent injury, prolonged concussion-like symptoms, or incomplete recovery (e.g., decline in cognitive function (thinking / calculating / reasoning)) if you experience another concussion. These features are:

1. You have now had at least ____ documented concussions.
2. ____ of your concussions have had a prolonged recovery (>14 days).

By signing this letter, you indicate that you understand that you are returning to a high-risk sport with significant risk and that because of your past concussive history you have personal increased risk, and that you willingly accept that risk.

Sincerely,

Team Physician, *electronically signed*

Medical Team Representative: _____

Medical Team Signature: _____

Athlete Name: _____

Athlete Signature: _____

Parent / Guardian Name (if under 18 years): _____

Parent / Guardian Signature: _____