Canadian Olympic and Paralympic Sport Institute Network

SPORT-RELATED CONCUSSION GUIDELINES FOR CANADIAN NATIONAL AND NATIONAL DEVELOPMENT HIGH-PERFORMANCE ATHLETES

2018

A Guideline endorsed by the Canadian Sport Institute (CSI) Chief Medical Officers (CMOs), Canadian Olympic Committee (COC) Medical Director, and Own the Podium*

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Preamble

This document provides a guideline for National Sport Organizations (NSOs), National Development athletes / teams (i.e., NextGen), and in some provinces Provincial Sport Organizations (PSOs) regarding sport-related concussion in the Canadian Olympic and Paralympic Sport Institute (COPSI) Network. Due to the different settings and rules of individual sports, adoption of these concussion guidelines may need to be done in accordance to their specific regulatory environment[26]. The COPSI Network and Own the Podium (OTP) support each Canadian Sport Institutes / Centres research initiatives in the spirit of advancing the applied science and ultimately clinical care for athletes sustaining a sport-related concussion.

Recommendations / suggestions were provided based on the level of evidence using the Oxford Centre for Evidence-Based Medicine Levels of Evidence (2009)[27]. If the quality and quantity of such evidence are sufficient (level 1-3) to be confident that any portion of the assessment or management strategy should be conducted, we *recommend* that assessment or management strategy. If liability or medico-legal concerns advise an element of an assessment or management strategy, we *recommend* that element. Where evidence is of limited quantity and/or quality (level 4 or 5), and that limited evidence advises a particular component of an assessment as best practice, we *suggest* it.

Disclaimer

Although the present document contains specific information that was considered current as of August 2018, the contributing authors acknowledge that concussion guidelines / 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 guidelines. The COPSI Network concussion guidelines will be reviewed annually and updated with any new medical and scientific advances, and/or with any learned experiences through implementation.

1. Concussion Definition

Currently, health care professionals lack a "gold standard" assessment tool to reliably and objectively determine whether an athlete has sustained a sport-related concussion and/or definitively ascertain whether they have recovered. Concussion is a diffuse brain injury with the potential for coexisting, overlapping and confounding pathologies (e.g., cervical, vestibular, visual, previous concussion history, coexisting medical conditions such as anxiety, depression, migraine headaches, etc.). It is not always clear what to look for as it may present with many different signs and symptoms that differ from individual to individual (e.g., cognitive, emotional and physical symptoms, sleep disturbances, sensorimotor and visuospatial deficits, slowed reaction time, working memory and decision making, balance deficits, etc.). There is also the challenge of athletes wanting to return to sport quickly.

Sport-related concussion (SRC) is defined as a *"traumatic brain injury induced by biomechanical forces. Several common features that may be utilized 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* [15]*.*

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 (e.g., psychological factors or coexisting medical conditions)"[15].

2. Sport Concussion Policy, Protocol and Education

All *high-risk Olympic winter and summer National Sport Organizations must have an up-to-date sport concussion policy and protocol in place that is, at a minimum, compliant with Rowan's Law (Concussion Safety, 2018, S.O. 2018, c. 1 - Bill 193)[16], which specifically addresses: 1) concussion education/awareness, 2) code of conduct, 3) removal from sport, and 4) return to sport. All athletes, coaches, medical staff, integrated support team (IST) members, management, executive staff, officials and other stakeholders should conduct themselves in ways that minimize the risk of concussion, maximize its recognition, and prevent continuation or premature return to high-risk sport activities until they have fully recovered, as judged by the team or consulting physician. It is also recommended that all non-high-risk sports have a concussion policy in place to manage concussions that may occur during training or competition. All stakeholders 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 qualification education requirements such as the Concussion Awareness Program of The Coaching Association of Canada[17] must be met.

*** High-risk Olympic winter sports**: Alpine Skiing, Freestyle Skiing, Ski Jumping, Snowboard, Speed Skating – Short and Long Track, Figure Skating, Ice Hockey, Bobsleigh, Skeleton, Luge.

*** High-risk Olympic summer sports**: Boxing, Wrestling, Football (Soccer), Rugby, Basketball, Cycling (track, road, BMX, mountain), Equestrian, Field Hockey, Gymnastics, Trampoline, Handball, Judo, Synchronized Swimming, Taekwondo, Volleyball, Water Polo, Diving, Athletics – Pole Vault.

*** High-risk Paralympic winter sports**: Para-Alpine, Para-Snowboard, Sledge Hockey.

*** High-risk Paralympic summer sports**: Para-Cycling, Para-Equestrian, Judo, Sitting Volleyball, Soccer 7-A-Side, Wheelchair Basketball, Wheelchair Rugby, Goalball, Wheelchair Athletics.

3. Pre-season Clinical Assessment (healthy, uninjured)

During the pre-season period and prior to the first day of competitive season training camp, we *suggest* all high-risk sport athletes 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)[18], including gait and balance assessment (e.g., Balance Error Scoring System (BESS) / modified BESS)
- Vestibular/Oculomotor Assessment (e.g., Visual Acuity, King-Devick[19,28], Vestibular/Ocular Motor Screening (VOMS)[20,29])
    a. 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[21] (e.g., Immediate Post Concussion Assessment and Cognitive Test (ImPACT), CogState Sport, etc.) in a distraction-free environment
    a. it is recognized that web-based neurocognitive testing has cost implications, and should not take precedence over programmes to provide clinical care. In addition, neurocognitive test batteries need to be interpreted as part of a comprehensive, multi-faceted clinical evaluation, preferably by a neuropsychologist, when available[26]
    b. may also include formal neuropsychological testing conducted by a neuropsychologist (gold standard) in some cases depending on complexity of case or pre-existing comorbidities (e.g., psychological/psychiatric, history of multiple concussions, decisions regarding athlete retirement for the season or career).

We *recommend* pre-season clinical assessments be completed under the supervision / guidance of the team physician on an annual basis at the time of COPSI Network Comprehensive Athlete Medical Intake[22] by a qualified health care professional (e.g., certified athletic therapist, physiotherapist, etc.) that is trained and experienced with the above sport concussion clinical assessments.

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.

4. Concussion Recognition and Removal from Sport Participation for Medical Evaluation

Recognition, diagnosis and timely clinical assessment of suspected concussions may help facilitate earlier recovery, reduce the risk of early complications and avoid further head and musculoskeletal injuries[26]. All sport stakeholders including athletes, parents, coaches, IST members, officials, volunteers, and licensed healthcare professionals are responsible for the recognition and reporting of athletes who may demonstrate visual signs of a head injury or who report concussion-related symptoms.

We *recommend* a COPSI Network team certified athletic therapist, physiotherapist, chiropractor or physician (hereafter referred to as "medical team") 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 (e.g., significant impact to the head, face, neck, or body and demonstrates any of the visual signs/behaviors of a suspected concussion or reports any symptoms of a suspected concussion; see Appendix A: Concussion Recognition Tool 5[23]), the athlete **must** be removed

from training / competition and evaluated immediately.

In the event of a fall, crash, head contact, or other impulsive force transmitted to the head:

- The athlete must report to the medical team for assessment (or event physician if no member of the medical team is present).
- The medical team should also seek out the athlete.
- Coaches should report any suspicion of a concussion to the medical team or event physician (if no member of the medical team is present).
- In the event that the suspected concussion is assessed by a COPSI Network team athletic therapist, physiotherapist or chiropractor, the team physician should also be notified (as soon as possible) to assist with management.
- In the event that no members of the 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 team or consulting 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 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 staff or team coaches.**
- We *recommend* the diagnosis and acute management follow the principles laid out in the Summary and Agreement Statement of the Fifth International Symposium on Concussion in Sport - Berlin 2016[15].

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 may arise over the first 24-48 hours. We *recommend* that 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 go to the nearest hospital emergency department immediately.

5. Acute Sport Concussion Assessment & Management

a) Sideline Assessment

Standard emergency management principles must 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 (Appendix A)[23]. If an athlete is suspected of sustaining a more severe head or spine injury during a game or practice, an ambulance must be called immediately to transfer the patient to the nearest emergency department for further medical assessment.

If there is no concern for a more serious head / spine injury and after the first aid issues have been addressed, all suspected cases of concussion must 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). We *recommend* formal concussion assessment be completed using the SCAT5 and other clinical measures at the medical staff's discretion.

A trained and experienced certified athletic therapist, physiotherapist or medical doctor providing medical coverage for the sporting event may make the determination that a concussion has not occurred based on the results of a multi-faceted, SCAT5-based sideline medical assessment. Athletes removed from sport with a suspected concussion and subsequently cleared to return to training or competition must undergo serial re-evaluations for up to 48 hours because of the possibility of delayed symptom onset[26]. We *recommend* that if the athlete develops any delayed symptoms the athlete be removed from training or competition and undergo assessment by a medical doctor.

Because of the evolving nature of concussion in the acute phase, athletes suspected to have sustained a concussion after the acute sideline evaluation shall not return to practice or competition on the same day of injury, regardless of the resolution of concussion symptoms. If there is any doubt, sit them out!

b) Clinic Assessment & Management

Clinic Assessment

- Concussion is a clinical diagnosis with the aid of the following:
    - Comprehensive clinical history, including mechanism of injury and previous injury 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 *Level 5*
        - may include formal optometrist / ophthalmologist / vestibular physiotherapist assessment in some cases *Level 5*
        - web-based cognitive/neuropsychological testing should only be administered when the athlete is free of concussion-related symptoms *Level 5*
            - computerised neurocognitive test batteries should not be used as the sole criterion for return to sport decision-making
            - neurocognitive test batteries need to be interpreted as part of a comprehensive clinical evaluation, preferably by a neuropsychologist, when available
            - if a specialist neuropsychologist is not available, supervised computerised testing batteries and additional expert clinical opinion should be employed for concussed athletes who return to sport in fewer than 7 days[26]
            - formal neuropsychological testing conducted by a neuropsychologist should be considered in complex cases where there are decisions regarding athlete retirement for the season or career[26].

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 may include:

        - no resistance training / weight lifting,, sport-specific training, cross training, cardiovascular conditioning, intense exertion associated with activities of daily living, etc.
        - no excessive mental tasks including driving, studying, reading, social media streaming, etc.
        - quiet environments
        - 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 (e.g., imovane, restoril, xanax, halcion, etc.), anti-inflammatory medication (e.g., aspirin, ibuprofen, aleve, etc.), narcotics and other analgesics within the first 24-48 hours of concussion, and only use thereafter based on physician recommendations.

- **<u>After 24 - 48 hours</u>** of relative 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) *Level 5*
    - Brief napping (<25 minutes) is appropriate if needed, but avoid excessive daytime sleep
    - Initiate rehabilitation, if warranted, based on the physician's clinical assessment and recommendations (i.e., cervical, vestibular, oculomotor, etc.)
    - It is *recommended* that the athlete progresses through a graduated exertional strategy in accordance with the principles outlined in the Berlin 2016 Concussion in Sport Consensus Statement[15] (Appendix B: Graduated Return-to-Sport Strategy). It is important that youth and adult student-athletes return to full-time school activities (Appendix C: Graduated Return-to-School Strategy[25]) before progressing to stage 5 and 6 of the Return-to-Sport Strategy.
        - each athlete's concussion will be managed on an ***individualized basis*** based on the 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, we *suggest* he/she repeat the web-based cognitive/neuropsychological test for post-injury evaluation (if resources available and/or part of comprehensive concussion program).
    - Although neuropsychological test data are 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 high-risk training or sport.

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

Recent evidence has demonstrated that the window for physiological recovery typically outlasts

symptom recovery[1,2]. There is also evidence to suggest that the risk of musculoskeletal injury is significantly higher for athletes sustaining a sport-related concussion in the subsequent three, six and 12 months following their concussive injury[1,3-12]. One hypothesis to explain this finding is that athletes may be returning to unrestricted competition prematurely, before they have physiologically recovered from their concussive injury[1-3,13,14].

If the athlete's post-concussion clinical assessments are within baseline normative (healthy, uninjured) levels in all testing domains (as per judged by the consulting physician), the risks associated with return to high-risk sport will be discussed with the athlete, with prevention / risk reduction strategies. As an additional measure of the informed consent process, the athlete will then sign an informed consent letter acknowledging that they were explained the risks, their questions (if any) were answered, and that they willingly accept that risk upon return to high-risk sport training and competition (Appendix D: Athlete Informed Consent Acknowledgement Letter).

We *recommend* athletes 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 status has returned to individual baseline levels as judged by the team physician, and the team's consulting neuropsychologist (if resources available and/or part of comprehensive concussion program).

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. Athletes may require a 3rd party independent assessment in cases where the athlete suffers persistent symptoms, including persistent symptom recurrence with exertion, or athletes who suffer multiple concussions over time or where repeat concussions occur with progressively less impact force. Prior to making the return to high-risk sport decision, the team physician shall ensure that all aspects of the above protocol have been satisfied.

d) Persistent Symptoms

- Approximately 15-30% of patients will experience persistent symptoms (> 2 weeks for adults or > 4 weeks for athletes < 18 years)[15]
- 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 the direction of a physician experienced in concussion management to identify specific primary and secondary pathologies that may be contributing to persisting concussion-like symptoms, which may include:

  - formal cervical (i.e., neck) assessment by an experienced licensed health care professional
  - formal vestibular assessment by an experienced vestibular therapist or otology/neurotology Ear, Nose and Throat (ENT) physician experienced in sport concussion
  - formal oculomotor (i.e., visual/gaze control) assessment by an optometrist / neuro-ophthalmologist specialist experienced in sport concussion
  - formal physiology assessment of autonomic nervous system instability / dysfunction by an exercise physiologist experienced in sport concussion
  - formal mental health assessment by an experienced sport psychologist, registered psychologist, neuropsychologist or psychiatrist experienced in sport concussion
  - formal assessment by a physiatrist or neurologist experienced in sport concussion

- We *suggest* treatment 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., concussive convulsions, prolonged loss of consciousness or cognitive impairment following the injury), a more conservative management approach may be warranted based on the consulting 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.

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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

Supported by FIFA

RECOGNISE & REMOVE

Head impacts 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 are observed or complaints are reported then the player should be safely and immediately removed from play/game/activity. If no licensed healthcare professional is available, call an ambulance for urgent medical assessment:

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

Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Assessment for a spinal cord injury is critical.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove a helmet or any other equipment unless trained to do so safely.

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
- Blank or vacant look
- Balance, gait difficulties, motor incoordination, stumbling, slow laboured movements
- Facial injury after head trauma

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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.

The CRT5 may be freely copied in its current form for distribution to individuals, teams, groups and organisations. Any revision and any reproduction in a digital form requires approval by the Concussion in Sport Group. It should not be altered in any way, rebranded or sold for commercial gain.

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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Davis GA, *et al*. *Br J Sports Med* 2017;**0**:1. doi:10.1136/bjsports-2017-097508CRT5 1

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, e.g., 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 Return-to-Sport progression. There should be at least 24 hours for each step of the progression. If any symptoms worsen during exercise, the athlete should go back to the previous step after symptoms subside. Resistance training should be added only in the later stages (stage 3 or 4 at the earliest).[15]

Appendix C

Graduated Return-to-School Strategy

Stage	Aim	Activity	Goal of each step
1	Daily activities at home that do not give the student-athlete symptoms	Typical activities during the day as long as they do not increase symptoms (i.e. reading, texting, screen time). Start at 5-15 minutes at a time and gradually build up.	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	Return to full academic activities and catch up on missed school work

Note: Depending on the severity and type of the symptoms present student-athletes will progress through the following stages at different rates. If the student-athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage. Athletes should also be encouraged to ask their school if they have a school-specific Return-to-Learn Program in place to help student-athletes make a gradual return to school.[24]

Appendix D

Return to High-Risk Sport following a Sport-Related Concussion

Athlete Informed Consent Acknowledgement Letter

Date: _____

Athlete Name: _____

Address/City: _____

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 impairment. 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 clinical ability) before you return to higher risk training or sport competition.

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 in adults or >1 month if under 18 years).

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. You also acknowledge that you were given the opportunity to ask questions and that all of your questions (if any) were satisfactorily answered.

Sincerely,

Sport Concussion Consulting Physician

Medical Team Representative: _____

Medical Team Signature: _____

Athlete Name: _____

Athlete Signature: _____

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

Parent / Guardian Signature: _____