



Concussion Management Protocol

A guide for managing concussions in your club or training centre and at home.

This protocol is for: CAS and its Members, registrants and participants and applies to:

- Coaches
- Parents
- Athletes
- Officials
- Trainers
- Administrators
- Licenced Healthcare Professionals

Introduction to Concussion Management

Canada Artistic Swimming has developed the Canada Artistic Swimming Concussion Management Protocol as a companion to its Concussion Policy to help inform and guide the management of artistic swimmers who may have a suspected concussion as a result of participation in Canada Artistic Swimming activities.

Artistic Swimming is classified by the Canadian Olympic and ParaOlympic Sport Institute (COPSI) Network and Own the Podium (OTP) as a high-risk Olympic Summer sport. As such, CAS must provide up-to-date concussion policy and protocols on an annual basis. CAS and its stakeholders (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 medical team or consulting physician in the high performance training and competition environment.

Purpose of this Protocol

This protocol covers the recognition, medical diagnosis, and management of artistic swimming athletes who may sustain a suspected concussion during a sport activity. It aims to ensure that athletes with a suspected concussion receive timely and appropriate care and proper management to allow them to return back to their sport safely. This protocol may not address every possible clinical scenario that can occur during sport-related activities but includes critical elements based on the latest evidence and current expert consensus.

Who should use this Protocol?

This protocol is intended for use by athletes and all individuals who interact with athletes in organized artistic swimming activities, including parents, coaches, officials, trainers, administrators and licensed healthcare professionals.

This protocol includes important information regarding concussion management in your club, at home, and for provincial and national teams. The following information/sections are included:

1. Pre-season concussion education
 2. Code of Conduct
 3. Head Injury Recognition:
 - (a) Early recognition of signs and symptoms of a concussion
 - (i) Concussion Recognition Tool – CRT5
 - (b) How can my athlete suffer a concussion in artistic swimming?
 4. Onsite Medical Assessment
 5. Medical Assessment
 6. Concussion Management
 - (a) Return to school/learn protocol
 - (b) Artistic Swimming Return-to-Sport protocol
 7. Multi-disciplinary concussion care
 8. Return to Sport
- Appendix A: Pre-Season Concussion Education form
- Appendix B: Guidelines for Prevention of Concussions
- Artistic swimming injury prevention culture
 - Artistic swimming concussion prevention strategy
 - Highlight and Connected figure/ hybrid recommendations
 - Highlight Safety



Appendix C:	CRT5
Appendix D:	CAS Removal-from-Sport Protocol
Appendix E:	Medical Assessment Letter
Appendix F:	Artistic Swimming Return-to-Sport Protocol
Appendix G:	Medical Clearance Letter
Appendix H:	Full Time training Group Sport Concussion Guidelines & Return-to-Sport Protocol
Appendix I:	Return to High-Risk Sport following a Sport-Related Concussion Athlete Informed Consent Acknowledgement Letter

For a summary of the Canada Artistic Swimming Concussion Management Protocol please refer to the Canada Artistic Swimming Sport Concussion Pathway diagram at the end of this document (page 13).

Recognition

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- ❖ Concussion Protocol Harmonization Project (Parachute)
- ❖ Canadian Concussion Collaborative

Government Policies and Regulations Resources

Government of Ontario:

- Ministry of Education (English): <http://www.edu.gov.on.ca/extra/eng/ppm/158.pdf>
- Ministry of Education (French): <http://www.edu.gov.on.ca/extra/fre/ppm/158f.pdf>
- Rowan’s Law: http://www.ontla.on.ca/bills/bills-files/41_Parliament/Session1/b149ra.pdf

Associated Documents

Canadian Guideline on Concussions in Sport:

- <http://www.parachutecanada.org/concussion>

Educational Resources:

- Complete Concussion Management: <https://completeconcussions.com/>
- Coaching Association of Canada – Making Headway: <http://www.coach.ca/-p153487>
- Institut nationale d’excellence en santé et en services sociaux: <http://fecst.inesss.qc.ca/en/documentation/publications.html>
- Alberta Concussion Alliance: <http://www.sportmedab.ca/content.php?id=1745>
- Canadian Concussion Collaborative: <http://casem-acmse.org/education/ccc/>
- BC Injury Research and Prevention Unit: <http://www.cattonline.com/>



Stages of Concussion Management

In order to achieve the policy objective, the protocol outlines direction for prevention, identification, management, access to care, communication, surveillance of concussions and policy/protocol review.

Prevention: Ensuring Safe Play - Concussion Prevention Strategies

The incidence of concussions can be mitigated by the proper implementation of prevention strategies by ensuring athletes, coaches, officials and parents are properly educated about concussions, Canada Artistic Swimming field of play guideline policies and procedures are followed at all times and that training and competition venues are properly prepared.

1. Pre-Season Concussion Education

Despite recent increased attention focusing on concussion there is a continued need to improve concussion education and awareness. Optimizing the prevention and management of concussion depends highly on annual education of all sport stakeholders (athletes, parents, coaches, officials, trainers, licensed healthcare professionals) on current evidence-informed approaches that can prevent concussion and more serious forms of head injury and help identify and manage an athlete with a suspected concussion.

All parents, athletes and coaches are required to review and submit a signed copy of the [Pre-season Concussion Education Sheet](#), Appendix A, to their coach/ club prior to the first practice of the season.

In addition to reviewing information on concussion, it is also important that all sport stakeholders have a clear understanding of the Canada Artistic Swimming Concussion Management Protocol.

Canada Artistic Swimming encourages all members clubs to offer pre-season in-person orientation sessions for athletes, parents, coaches and other sport stakeholders.

2. Code of Conduct

All coaches will be required to acknowledge and agree to abide by the Canada Artistic Swimming Conduct Policy annually.

3. Head Injury Recognition

Although the formal diagnosis of concussion should be made following a medical assessment, all sport stakeholders including athletes, parents, coaches, officials, 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. This is particularly important because many sport and recreation venues will not have access to on-site licensed healthcare professionals.

For further information, please consult Appendix B: [Guidelines for Concussion Prevention and Recognition](#).

(a) Early recognition of signs and symptoms of a concussion



- ▶ Who: Athletes, parents, coaches, officials, trainers, and licensed healthcare professionals
- ▶ How: Concussion Recognition Tool 5, Appendix C

A concussion should be suspected:

- in any athlete who sustains a significant impact to the head, face, neck, or body and demonstrates ANY of the visual signs of a suspected concussion or reports ANY symptoms of a suspected concussion as detailed in the Concussion Recognition Tool 5.
- if an athlete reports ANY concussion symptoms to one of their peers, parents, or coaches or if anyone witnesses an athlete exhibiting any of the visual signs of concussion.

In some cases, an athlete may demonstrate signs or symptoms of a more severe head or spine injury including convulsions, worsening headaches, vomiting or neck pain. If an athlete demonstrates any of the 'Red Flags' indicated by the Concussion Recognition Tool 5, a more severe head or spine injury should be suspected, and Emergency Medical Assessment should be pursued.

(b) How can my athlete suffer a concussion while artistic swimming?

Artistic swimming examples:

- ▶ collision with teammate swimming laps,
- ▶ eggbeater kick or other kick to the head,
- ▶ elbow to the head,
- ▶ fall from a lift/highlight,
- ▶ hitting head on bottom of pool in shallow end (ex: ending of a figure)
- ▶ a hard fall onto the bum (in the gym, slipping on the wet deck).

Canada Artistic Swimming Head Injury Prevention Action Plan Checklist

1. Each athlete, parent, coach has signed the Pre-Season Concussion Education form and submitted to their coach/ club Administrator.
2. Each coach has completed the CAC Making Head Way in Sport
3. Clubs have the Concussion Recognition Tool 5 – CRT5 available on deck
4. Coaches are educated on how to complete the Concussion Recognition Tool 5 – CRT5.
5. Each competition host has copies of the Concussion Recognition Tool 5 – CRT5 in case an athlete is injured with a suspected concussion. See Appendix C.
6. Each coach ensures a facility incident report form is completed and completes the CAS Injury Tracker.
7. All cases of concussion are noted in the CAS Injury Tracker. The individual who completed the CRT5 should enter data in CAS Injury Tracker.



4. Onsite Medical Assessment

Depending on the suspected severity of the injury, an initial assessment may be completed by emergency medical professionals or by an on-site licensed healthcare professional where available. In cases where an athlete loses consciousness or it is suspected an athlete might have a more severe head or spine injury, Emergency Medical Assessment by emergency medical professionals should take place (see 3a below). If a more severe injury is not suspected, the athlete should undergo Sideline Medical Assessment or Medical Assessment, depending on if there is a licensed healthcare professional present (see 3b below).

4a. Emergency Medical Assessment

If an athlete is suspected of sustaining a more severe head or spine injury during a practice or competition, an ambulance should be called immediately to transfer the patient to the nearest emergency department for further Medical Assessment.

Coaches, parents, trainers and officials should not make any effort to move the athlete and the athlete should not be left alone until the ambulance arrives. After the emergency medical services staff has completed the Emergency Medical Assessment, the athlete should be transferred to the nearest hospital for Medical Assessment. In the case of youth (under 18 years of age), the athlete's parents should be contacted immediately to inform them of the athlete's injury. For athletes over 18 years of age, their emergency contact person should be contacted if one has been provided

4b. Sideline Medical Assessment

If an athlete is suspected of sustaining a concussion and there is no concern for a more serious head or spine injury, the athlete should be immediately removed from the field of play.

Scenario 1: If a licensed healthcare professional is present

The athlete should be taken to a quiet area to undergo Sideline Medical Assessment using the Sport Concussion Assessment Tool 5 (SCAT5) or the Child SCAT5. The SCAT5 and Child SCAT5 are clinical tools that should only be used by a licensed healthcare professional that has experience using these tools. It is important to note that the results of SCAT5 and Child SCAT5 testing can be normal in the setting of acute concussion. As such, these tools can be used by licensed healthcare professionals to document initial neurological status but should not be used to make sideline return-to-sport decisions in youth athletes. Any youth athlete who is suspected of having sustained a concussion must not return to the game or practice and must be referred for Medical Assessment.

If a youth athlete is removed from play following a significant impact and has undergone assessment by a licensed healthcare professional, but there are NO visual signs of a concussion and the athlete reports NO concussion symptoms then the athlete can be returned to play but should be monitored for delayed symptoms.

In the case of national team athletes (age 18 years and older), an 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 the Sideline Medical Assessment. In these cases, the athlete may be returned to the practice or game without a Medical Clearance Letter but this should be clearly communicated to the coaching staff. Athletes that have been cleared to return to games or practices should be monitored for delayed symptoms. If the athlete develops any delayed symptoms the athlete should be removed from play and undergo medical assessment by a medical doctor or nurse practitioner.



Scenario 2: If there is no licensed healthcare professional present

The athlete should be referred immediately for medical assessment by a medical doctor or nurse practitioner, and the athlete must not return to play until receiving medical clearance.

- ▶ The majority of clubs will encounter scenario 2.
- ▶ As such, Canada Artistic Swimming requests all clubs to print and use CAS Removal-from-Sport Protocol – see Appendix D

5. Medical Assessment

In order to provide comprehensive evaluation of athletes with a suspected concussion, the medical assessment must rule out more serious forms of traumatic brain and spine injuries, and medical and neurological conditions that can present with concussion-like symptoms, and must make the diagnosis of concussion based on findings of the clinical history and physical examination and the evidence-based use of adjunctive tests as indicated (i.e. CT scan). In addition to nurse practitioners, medical doctors¹ that are qualified to evaluate patients with a suspected concussion include: pediatricians; family medicine, sports medicine, emergency department, internal medicine, and rehabilitation (physiatrists) physicians; neurologists; and neurosurgeons.

In geographic regions of Canada with limited access to medical doctors (i.e. rural or northern communities), a licensed healthcare professional (i.e. nurse) with pre-arranged access to a medical doctor or nurse practitioner can facilitate this role. The medical assessment is responsible for determining whether the athlete has been diagnosed with a concussion or not. Athletes with a diagnosed concussion should be provided with a Medical Assessment Letter indicating a concussion has been diagnosed. Athletes that are determined to have not sustained a concussion must be provided with a Medical Assessment Letter indicating a concussion has not been diagnosed and the athlete can return to school, work and sports activities without restriction.

- ▶ Who: Medical doctor, nurse practitioner¹
- ▶ How: Medical Assessment Letter – Appendix E

6. Concussion Management

When an athlete has been diagnosed with a concussion, it is important that the athlete's parent/legal guardian is informed. All athletes diagnosed with a concussion must be provided with a standardized Medical Assessment Letter, Appendix E, that notifies the athlete and their parents/legal guardians/spouse that they have been diagnosed with a concussion and may not return to any activities with a risk of concussion until medically cleared to do so by a medical doctor or nurse practitioner. Because the Medical Assessment Letter contains personal health information, it is the responsibility of the athlete or their parent/legal guardian to provide this documentation to the athlete's coaches. It is also important for the athlete to provide this information to sport organization officials that are responsible for injury reporting and concussion surveillance where applicable.

¹ Medical doctors and nurse practitioners are the only healthcare professionals in Canada with licensed training and expertise to meet these needs; therefore all athletes with a suspected concussion should undergo evaluation by one of these professionals.



Athletes diagnosed with a concussion should be provided with education about the signs and symptoms of concussion, strategies about how to manage their symptoms, the risks of returning to sport without medical clearance and recommendations regarding a gradual return to school and sport activities. Athletes diagnosed with a concussion are to be managed according to their Return-to-School and Return-to-Sport Protocol under the supervision of a medical doctor or nurse practitioner. When available, athletes should be encouraged to work with the team athletic therapist or physiotherapist to optimize progression through their Return-to-Sport Protocol. Once the athlete has completed their Return-to-School and Return-to-Sport Protocol and are deemed to be clinically recovered from their concussion, the medical doctor or nurse practitioner can consider the athlete for a return to full sports activities and issue a Medical Clearance Letter, Appendix G.

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.

After 24 - 48 hours 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)

- 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.)
- each athlete's concussion will be managed on an **individualized basis** based on the athlete's progression through the Return-to-School and Return-to-Sport strategies.



The stepwise progressions for Return-to-School and Return-to-Sport Strategies are outlined below. As indicated in stage 1 of the Return-to-Sport Protocol, reintroduction of daily, school, and work activities using the Return-to-School Protocol must precede return to sport participation.

Return-to-School Protocol

The following is an outline of the Return-to-School Protocol that should be used to help student-athletes, parents, and teachers to collaborate in allowing the athlete to make a gradual return to school activities. 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.

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

Artistic Swimming Return-to-Sport Protocol – Appendix F

NOTE:

- ▶ If you are a competitive athlete in a club, please use the RTS Club Athlete Protocol – Appendix F
- ▶ If you are a competitive athlete in a full-time training program (more than 5 days / week and 4 hrs/ day), please use the RTS Full-Time Training Group – Appendix H

The following is an outline of the Artistic Swimming Return-to-Sport Protocol for club-level athletes that should be used to help athletes, coaches, trainers, and medical professionals to partner in allowing the athlete to make a gradual return to sport activities.

- ▶ An initial period of 24-48 hours of rest is recommended before starting the Artistic Swimming - Specific Return-to-Sport Protocol
- ▶ If the athlete experiences new symptoms or worsening symptoms at any stage, they should go back to the previous stage.



- ▶ **It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the Artistic Swimming-Specific Return-to-Sport Protocol.**
- ▶ It is also important that all athletes provide their coach with a Medical Clearance Letter prior to returning to full contact sport activities.

Stage	Aim	Activity	Additional information	DURATION
1	Symptom-limiting activity GOAL: Gradual re-introduction of work/school activities	Daily activities that do not provoke symptoms Can commence light passive stretching if no symptoms increase	Limit exposure to bright lights and loud noise (should not attending practices)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes
To progress to stage 2, a Medical Assessment Letter is required.				
2	Light aerobic activity GOAL: Increase heart rate	At a slow to medium pace for 15-25 minutes at sub-symptom threshold intensity: <ul style="list-style-type: none"> - light swim kicking (no breath holding or flip turns or head rotations): <ul style="list-style-type: none"> o start with kicking with kickboard (cease if any neck pain occurs with kicking), o no swimming strokes (as involved head rotations) - walking - stationary cycling - Passive stretching - May start active stretching & extension drills - No inversions (head underwater) - No resistance training 	Limit bright light and loud noises. Try kicking drills at a time when no routines are being practiced (no music being played)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes <input type="checkbox"/> 25 minutes
3	Sport-specific exercise GOAL: Add movement	Moderate intensity swimming for 30-60 minutes at sub-symptom threshold intensity: <ul style="list-style-type: none"> - Swimming; <ul style="list-style-type: none"> o limited breath holding o no flip turns - Artistic swimming skills (no breath holding) <ul style="list-style-type: none"> o No head impact activities (swim out of pattern) o No inversions (head underwater) o Horizontal drills: sculls, back layouts, front layouts, ballet legs o Eggbeater & eggbeater boots o Land drills - No resistance training 	Limit time at the pool to 60 minutes. Dampen sound with ear plugs if needed.	<input type="checkbox"/> 30 minutes <input type="checkbox"/> 45 minutes <input type="checkbox"/> 60 minutes



4	<p>Non-contact training drills</p> <p>GOAL: Exercise, coordination and increased thinking</p>	<p>Harder training drills. Gradual increase from moderate to high intensity swimming and artistic swimming:</p> <ul style="list-style-type: none"> - figure practice; parts ONLY - out of pattern routine swims: lap by lap ONLY - Re-introduce spins. - No highlight training. - Resume progressive resistance training - Ensure non-contact practice without risk of collision 	<p>Progress time at pool to full practice training.</p>	<input type="checkbox"/> 75 minutes <input type="checkbox"/> 90 minutes <input type="checkbox"/> 105 minutes
<p>Medical Clearance Letter required to progress to Stage 5</p> <p>Youth and Adult student-athletes return to full-time school activities</p>				
5	<p>Full contact practice</p> <p>GOAL: Restore confidence and assess functional skills by coaching staff</p>	<p>Following medical clearance, participation in full practice without activity restriction</p> <ul style="list-style-type: none"> - Swimming: no restrictions - Artistic Swimming: <ul style="list-style-type: none"> o Resume figure wholes o Resume in pattern training: start with small parts in gradual increase to full routines. o Resume highlight training 	<p>Athlete is reintegrated to full time training with no limitations</p>	<p>With Medical Clearance:</p> <input type="checkbox"/> Full time training
6	<p>Return to sport</p>	<p>Normal artistic swimming training session and competitions.</p>		

- ▶ Who: Medical doctor, nurse practitioner and team athletic therapist or physiotherapist (where available)
- ▶ How: Return-to-Learn Protocol, [CAS Return-to Sport Protocol – Appendix F](#), [Medical Assessment Letter – Appendix E](#), [Full time Training Group Sport Concussion Guidelines - Appendix H](#), [Return to High-Risk Sport following a Sport-Related Concussion – Athlete Informed Consent Acknowledgement Letter – Appendix I](#)

7. Multidisciplinary Concussion Care

Most athletes who sustain a concussion while participating in sport will make a complete recovery and be able to return to full school and sport activities within 1-4 weeks of injury. However, approximately 15-30% of individuals will experience symptoms that persist beyond this time frame. If available, individuals who experience persistent post-concussion symptoms (>4 weeks for youth athletes, >2 weeks for adult athletes) may benefit from referral to a medically supervised multidisciplinary concussion clinic that has access to professionals with licensed training in traumatic brain injury and may include experts in sport medicine, neuropsychology, physiotherapy, occupational therapy, neurology, neurosurgery, and rehabilitation medicine.

Referral to a multidisciplinary clinic for assessment should be made on an individualized basis at the discretion of an athlete’s medical doctor or nurse practitioner. If access to a multidisciplinary concussion clinic is not available, a referral to a medical doctor with clinical training and experience in concussion (e.g. a sport medicine physician, neurologist, or rehabilitation medicine physician) should be considered for the purposes of developing an individualized treatment plan. Depending on the clinical presentation of the individual, this treatment plan



may involve a variety of health care professionals with areas of expertise that address the specific needs of the athlete based on the assessment findings.

- ▶ Who: Multidisciplinary medical team, medical doctor with clinical training and experience in concussion (e.g. a sports medicine physician, neurologist, or rehabilitation medicine physician), licensed healthcare professionals

8. Return to Sport

Athletes who have been determined to have not sustained a concussion and those that have been diagnosed with a concussion and have successfully completed their Return-to-School and Artistic Swimming Return-to-Sport Protocol can be considered for return to full sports activities. The final decision to medically clear an athlete to return to full artistic swimming activity should be based on the clinical judgment of the medical doctor or nurse practitioner taking into account the athlete's past medical history, clinical history, physical examination findings and the results of other tests and clinical consultations where indicated (i.e. neuropsychological testing, diagnostic imaging).

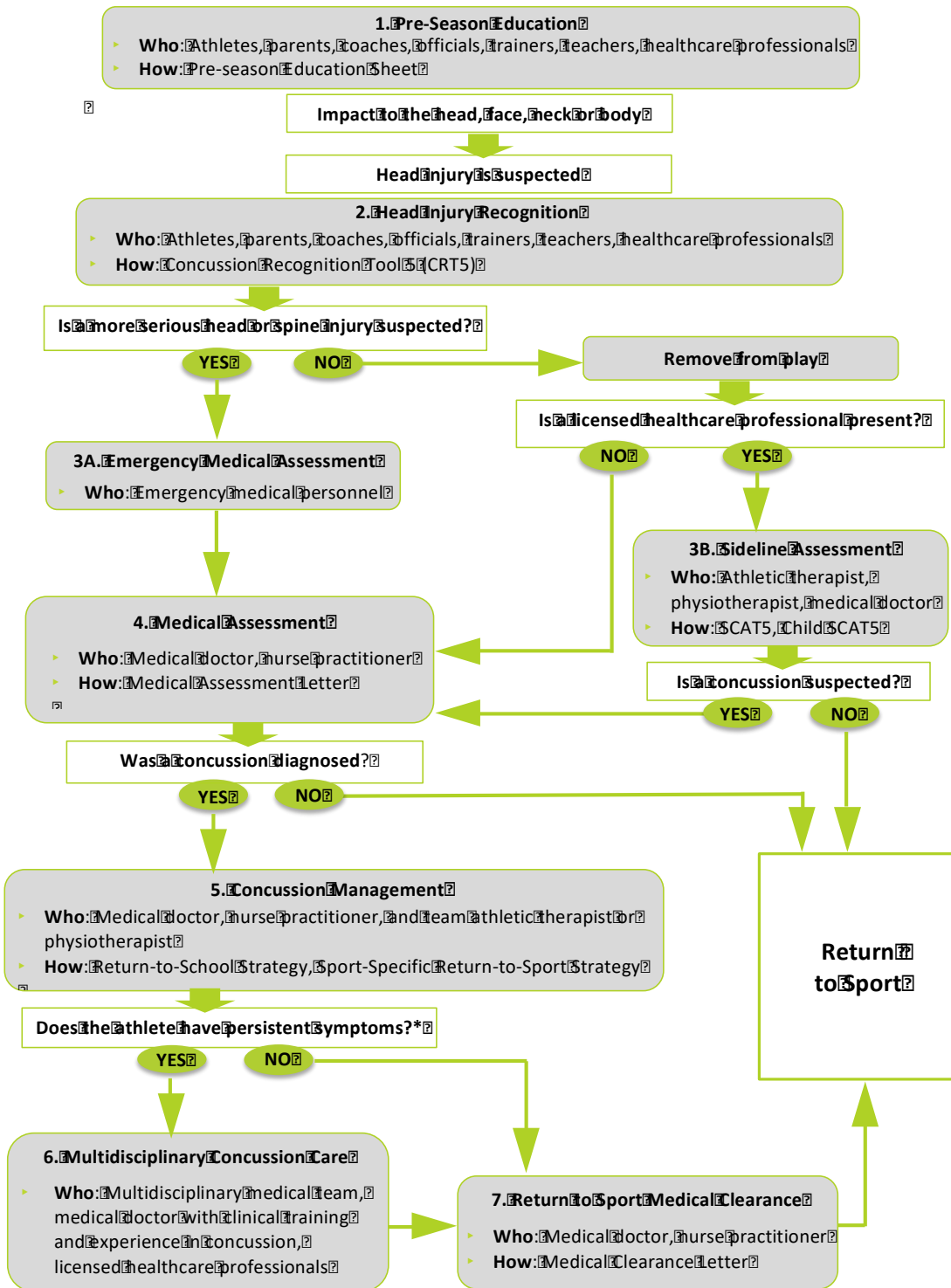
Prior to returning to regular artistic swimming practice with no restrictions, each athlete that has been diagnosed with a concussion must provide their coach with a standardized Medical Clearance Letter that specifies that a medical doctor or nurse practitioner has personally evaluated the patient and has cleared the athlete to return to sports. In geographic regions of Canada with limited access to medical doctors (i.e. rural or northern communities), a licensed healthcare professional (such as a nurse) with pre-arranged access to a medical doctor or nurse practitioner can provide this documentation. A copy of the Medical Clearance Letter should also be submitted to provincial and/or national sports organization officials that have injury reporting and surveillance programs.

Athletes who have been provided with a Medical Clearance Letter may return to full sport activities as tolerated. If the athlete experiences any new concussion-like symptoms while returning to sport, they should be instructed to stop playing immediately, notify their parents, coaches, or trainer, and undergo follow-up Medical Assessment. In the event that the athlete sustains a new suspected concussion, the Canada Artistic Swimming Concussion Management Protocol should be followed as outlined here.

- ▶ Who: Medical doctor, nurse practitioner
- ▶ Document: Medical Clearance Letter – Appendix G



Canada Artistic Swimming Concussion Pathway



*Persistent Symptoms: Lasting 2-4 weeks in children & youth or 2-3 weeks in adults



Appendix A

Pre-Season Concussion Education

Form to be signed by parents and athletes; and coaches and submitted to coach/ club administrator



PRE-SEASON CONCUSSION EDUCATION

WHAT IS A CONCUSSION?

A concussion is a brain injury that can't be seen on x-rays, CT or MRI scans. It affects the way an athlete thinks and can cause a variety of symptoms.

WHAT CAUSES A CONCUSSION?

Any blow to the head, face or neck, or somewhere else on the body that causes a sudden jarring of the head may cause a concussion. Examples include getting body-checked in hockey or hitting one's head on the floor in gym class or on the side of the pool deck.

WHEN SHOULD I SUSPECT A CONCUSSION?

A concussion should be suspected in any athlete who sustains a significant impact to the head, face, neck, or body and reports ANY symptoms or demonstrates ANY visual signs of a concussion. A concussion should also be suspected if an athlete reports ANY concussion symptoms to one of their peers, parents, teachers, or coaches or if anyone witnesses an athlete exhibiting ANY of the visual signs of concussion. Some athletes will develop symptoms immediately while others will develop delayed symptoms (beginning 24-48 hours after the injury).

HOW CAN MY ATHLETE SUFFER A CONCUSSION IN ARTISTIC SWIMMING?

Artistic swimming examples:

- ▶ collision with teammate swimming laps,
- ▶ eggbeater kick to the head,
- ▶ elbow to the head,
- ▶ fall from a lift/highlight,
- ▶ hitting head on bottom of pool in shallow end (ex: ending of a figure)
- ▶ a hard fall onto the bum (in the gym, slipping on the wet deck).

WHAT ARE THE SYMPTOMS OF A CONCUSSION?

A person does not need to be knocked out (lose consciousness) to have had a concussion. Common symptoms include:

- Headaches or head pressure
- Dizziness
- Nausea and vomiting
- Blurred or fuzzy vision
- Sensitivity to light or sound
- Balance problems
- Feeling tired or having no energy
- Not thinking clearly
- Feeling slowed down
- Easily upset or angered
- Sadness
- Nervousness or anxiety
- Feeling more emotional
- Sleeping more or sleeping less Having a hard time falling asleep
- Difficulty working on a computer
- Difficulty reading
- Difficulty learning new information



WHAT ARE THE VISUAL SIGNS OF A CONCUSSION?

Visual signs of a concussion may include:

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

WHAT SHOULD I DO IF I SUSPECT A CONCUSSION?

If any athlete is suspected of sustaining a concussion during sports they should be immediately removed from play. Any athlete who is suspected of having sustained a concussion during sports must not be allowed to return to the same game or practice.

It is important that ALL athletes with a suspected concussion undergo medical assessment by a medical doctor or nurse practitioner, as soon as possible. The Medical Assessment Letter should be given to coach/ club. It is also important that ALL athletes with a suspected concussion receive written medical clearance from a medical doctor or nurse practitioner before returning to full contact sport activities (Stage 5 in Return-to-Sport Protocol).

WHEN CAN THE ATHLETE RETURN TO SCHOOL AND SPORTS?

It is important that all athletes diagnosed with a concussion follow a step-wise return to school and sports- related activities that includes the following Return-to-School and Artistic Swimming Return-to-Sport Strategies. It is important that youth and adult student-athletes return to full-time school activities before progressing to stage 5 and 6 of the Return-to-Sport Protocol.

Return-to-School Protocol

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

Stage	Aim	Activity	Additional information	DURATION
1	Symptom-limiting activity	Daily activities that do not provoke symptoms Can commence light passive stretching if no symptoms increase GOAL: Gradual re-introduction of work/school activities	Limit exposure to bright lights and loud noise (should not attending practices)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes
To progress to stage 2, a Medical Assessment Letter is required.				
2	Light aerobic activity GOAL: Increase heart rate	At a slow to medium pace for 15-25 minutes at sub-symptom threshold intensity: - light swim kicking (no breath holding or flip turns or head rotations): o start with kicking with kickboard (cease if any neck pain occurs with kicking), o no swimming strokes (as involved head rotations) - walking - stationary cycling - Passive stretching - May start active stretching & extension drills - No inversions (head underwater) - No resistance training	Limit bright light and loud noises. Try kicking drills at a time when no routines are being practiced (no music being played)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes <input type="checkbox"/> 25 minutes
3	Sport-specific exercise GOAL: Add movement	Moderate intensity swimming for 30-60 minutes at sub-symptom threshold intensity: - Swimming: o limited breath holding o no flip turns - Artistic swimming skills (no breath holding) o No head impact activities (swim out of pattern) o No inversions (head underwater) o Horizontal drills: sculls, back layouts, front layouts, ballet legs o Eggbeater & eggbeater boots o Landdrills - No resistance training	Limit time at the pool to 60 minutes. Dampen sound with ear plugs if needed.	<input type="checkbox"/> 30 minutes <input type="checkbox"/> 45 minutes <input type="checkbox"/> 60 minutes
4	Non-contact training drills GOAL: Exercise, coordination and increased thinking	Harder training drills. Gradual increase from moderate to high intensity swimming and artistic swimming: - figure practice; parts ONLY - out of pattern routine swims: lap by lap ONLY - Re-introduce spins. - No highlight training. - Resume progressive resistance training - Ensure non-contact practice without risk of collision	Progress time at pool to full practice training.	<input type="checkbox"/> 75 minutes <input type="checkbox"/> 90 minutes <input type="checkbox"/> 105 minutes <input type="checkbox"/> 120 minutes
Medical Clearance Letter required to progress to Stage 5				
Youth and Adult student-athletes return to full-time school activities				
5	Full contact practice GOAL: Restore confidence and assess functional skills by coaching staff	Following medical clearance, participation in full practice without activity restriction - Swimming: no restrictions - Artistic Swimming: o Resume figure wholes o Resume in pattern training: start with small parts in gradual increase to full routines. o Resume highlight training	Athlete is reintegrated to full time training with no limitations	With Medical Clearance: <input type="checkbox"/> Full time training
6	Return to sport	Normal artistic swimming training session and competitions.		

HOW LONG WILL IT TAKE FOR THE ATHLETE TO RECOVER?



Most athletes who sustain a concussion will make a complete recovery within 1-2 weeks while most youth athletes will recover within 1-4 weeks. Approximately 15-30% of patients will experience persistent symptoms (>2 weeks for adults; >4 weeks for youth) that may require additional medical assessment and management.

HOW CAN I HELP PREVENT CONCUSSIONS AND THEIR CONSEQUENCES?

Concussion prevention, recognition and management require athletes to follow the rules and regulations of their sport, respect their opponents, avoid head contact, and report suspected concussions.

TO LEARN MORE ABOUT CONCUSSIONS PLEASE VISIT:

Parachute Canada: www.parachutecanada.org/concussion

SIGNATURES: The following signatures certify that the athlete and his/her parent or legal guardian have reviewed the above information related to concussion.

Printed name of athlete

Signature of athlete

Date

Printed name of parent

Signature of parent

Date

For Coaches ONLY: one signed copy per season required.

Coaches need to sign only one copy. The following signature certifies that the coach has reviewed the above information related to concussion

Printed name of coach

Signature of coach

Date

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www.parachutecanada.org/guideline



Appendix B

Guidelines for Prevention of Concussions

- ▶ Artistic Swimming Injury Prevention Culture
- ▶ Canada Artistic Swimming concussion prevention strategy
- ▶ Highlight and Connected Figure/ Hybrid Recommendations
 - ▶ Highlight Safety



Guidelines for Prevention of Concussions

Artistic Swimming injury prevention culture

Canada Artistic Swimming's priority is the prevention of injuries and safety of all participants in artistic swimming. We take the subject of injuries very seriously and are committed to ensuring we have tools and policies in place that protect all our participants. Coaches are trained to build programming around injury prevention; to develop physical weaknesses, to implement recovery strategies, to helping athletes understand performance fuelling (nutrition), and performance planning.

Canada Artistic Swimming's Centre of Excellence athletes are supported by a staff physiotherapist and staff Sports Medicine Doctor, as well as an Exercise Physiologist, Biomechanists, Strength and Conditioning coaches, and a Sport Nutritionist as part of their Integrated Support Team (IST) assessing the well being and health of the athletes.

Canada Artistic Swimming's National Development Program uses IST members during their training camps and competitions.

Canada Artistic Swimming encourages all clubs attending the Qualifier/Canadian National Championships annually to develop and implement an IST that supports their competitive athletes on a yearly basis.

Canada Artistic Swimming concussion prevention strategy

Daily training:

- ☑ Ensure your athletes are well rested prior to each practice session.
- ☑ Ensure coaches have a copy of CAS Concussion Guidelines.
- ☑ Ensure coaches have copies of the Concussion Recognition Tool 5 – CRT5 at every practice.
- ☑ Ensure coaches have a written Emergency Action Plan and follow the procedures in a suspected concussion occurs (to be developed in conjunction with the training facility).
- ☑ Ensure your athletes are educated and understand how to swim properly in lap swimming.
- ☑ Ensure your athletes understand the importance of being aware of their surroundings and other athlete when training underwater, specifically in highlight training.
- ☑ Ensure your athletes don't dive into shallow water.
- ☑ Teach artistic swimming movements out of pattern in routines and on same count pattern, to ensure all underwater kicks are synchronized and purposeful.
- ☑ Ensure athletes are aware of their teammates' locations in land-drill.
- ☑ Ensure athletes are aware of their teammates' locations during their team routine swims and keep their knees/ legs and arms as close to their bodies as possible.

Highlight and Connected figure/ hybrid Recommendations

Recreational athletes are not encouraged to learn or train any lifts (platform, stacks and throws). Recreational athletes can learn and train floating patterns and connected/ joined hybrid figures and arms.



Competitive Athletes:

Considerations:

- Athletes must commit to 100% focus when training and competing lifts.
- Coaches must educate athletes on absolute focus required in training lifts in practice and competition, all eyes should always be on the flyer and to anticipate any wrong movement.
- Coaches are encouraged to consider placement of lifts; more difficult lifts should be done at the start of the routine, when athletes are less fatigued.
- Coaches are encouraged to use floating patterns, simple stacks, and unidirectional throws/ jumps for highlights at the end of the routine (more relevant for 12U routines).
- Coaches are encouraged to use alternative lifts if a lift continually fails or is unsafe for athletes.
- Coaches are requested to ensure all appropriate skills are acquired before commencing lift training and development of lifts, ie: if not all athletes all able to properly eggbeater, the team should not start lift training.

Highlight Safety

(We wish to thank Vanessa Keenan for the following contribution on Highlight Safety)

The most important thing to consider is choosing highlights that are appropriate for your own team's abilities. This includes physical abilities and cognitive abilities. For example, your team can throw someone up metres in the air, but that swimmer may lack the awareness of swimmers around them and if that is the case, then the throw should not be performed.

Remember that highlights do not need to be lifts or throws either. Highlights need to be something memorable. This could be a float, a unique pattern change, a partner figure, a cadence movement, etc.

Here are some guidelines:

- ☞ When teaching beginners highlights, start off with all the swimmers on land. Make sure they all know exactly what they are required to do. Have the swimmers show you how they will grab or hold and/or how they will move through the element.
- ☞ Depending on the equipment you have available and the type of highlight you are doing, you could have the swimmers do the set-up on land without the top person. This works really well for a classic throw where there is one person on top, a base (the person(s) being stood on or providing support) and a swimmer on each foot. The swimmers should be dry and the coach (es) help get the swimmers in position. Check out the holds and positions on land. Once the team can hold the position with accuracy then move to the next step.
- ☞ On land give the swimmers counts for the highlight. When do they grab on (they will train that in the water), when do they "squish", when do they "push" and when do they let go. Have them train the squish and push on land. Coaches are watching for the push from each foot to come at the same time and at the same level as well as the base swimmer standing evenly. Once there is good balance and consistency in the movements, show any extra swimmers where they go in the highlight. Ensure they know all the counts before moving on to the next step.
- ☞ In the water have the main part of the highlight do just the set-up. No one on top. Once that is solid,



practice the grab, squish, push and let go counts. Add the extra swimmers once the timing and stability is there.

- ☞ If everything underneath the water is stable and consistent add the top swimmer. The top swimmer is only allowed to stand up. These are the rules for the top swimmer:
 - ☞ If you do not feel ready for the highlight, roll off and away from the swimmers below you.
 - ☞ Always be listening for the coach. Sometimes even swimmers from other teams can cross your path accidentally or perhaps you moved more than usual and are close to the wall.
- ☞ Coaches should use the microphone so you can tell a highlight when to stop. Often a coach can see errors that may lead to a problem.
- ☞ The base swimmer needs to be aware of the top person. If she senses there is a chance a swimmer is coming down on her she should put her arms over her head to protect her head.
- ☞ Make sure the base swimmer has strong, uninjured shoulders. All the standing and jumping off the shoulders can lead to more harm.

If you have a throw of some kind, the swimmer on top needs to know precisely how to do her moves. I suggest working with a diving or acrobatic coach at least once a week. If the top person feels the highlight will not work they roll off or just jump away from the team. Sometimes the top person may not feel ready for a flip or twist, but they can still pull off a plain jump. That is safer than just trying to make a highlight work like it should.

In terms of choreography there are some things to consider as well.

- ☞ Make sure the swimmers have enough time to properly execute the highlight.
- ☞ Make sure swimmers have a direct path to the highlight. Swimmers crossing paths can lead to confusion underwater, swimmers being late to their positions and uneven push of the base of the highlight.
- ☞ Make sure your swimmers can count the music. In land drill all swimmers need to know the grab, squish, push and let go counts.
- ☞ Use the appropriate swimmers in the appropriate places. Sometimes your lightest swimmer is not the best to go on top. They could be scared, unaware of their own body, maybe they do not know how to jump.
- ☞ Consider keeping highlights simple for the beginning of the season and increasing the difficulty as the season and the swimmers' ability progresses.
- ☞ If a throw is not well-executed in training DO NOT put it in your routine in competition. Instead train it and show it off at water shows on its own until it is well-executed 80% of the time. (Might even be a good idea for younger swimmers to have a highlight event where they could show off a highlight to counts outside of the routine).

The key points are:

- ☑ Everyone needs to know their job. This includes the coach.
- ☑ Everyone needs to know the counts. This includes when is the coach going to start counting on the microphone. Try to count the numbers as well so everyone knows exactly where they are.
- ☑ Everyone needs to do the highlight correctly before someone goes off the top.
- ☑ Everyone needs to know what to do if something goes wrong.
- ☑ Ultimately the coach needs to keep their team safe.



Appendix C

Concussion Recognition Tool – 5 (CRT5)

DRAFT





CONCUSSION RECOGNITION TOOL 5 ©

To help identify concussion in children, adolescents and adults



Supported by



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
- Feeling like "in a fog"
- 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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Appendix D

Removal-from-Sport Protocol

DRAFT



CAS Removal-from-Sport Protocol

Prepared by Laura Steacy & Jennifer Langlois

What to do if you suspect a concussion?

1. Ensure there is no injury to the neck or spine. If suspicion of a spinal injury, adhere to standard emergency management principles.
2. Immediately remove athlete from the pool. Remove cap and goggles.
3. Go through a brief symptom checklist:
 - Headache (differentiate between headache and pain at the impact site)
 - Nausea
 - Dizziness
 - Confusion
 - Light and noise sensitivity
 - Balance problems
 - Feeling “not right”
 - Please see the attached Concussion Recognition Tool (Appendix C) for more information
4. If athlete has any of these symptoms, cease all activity immediately and inform lifeguard. Call parent or guardian to pick up the athlete and advise they should be taken to see a medical professional* immediately.
5. Remain with the athlete until discharged to a parent, guardian or other trusted adult or EMS. For swimmers over 18 years of age, contact their emergency contact person;
6. Complete facility incident report and **CAS Injury Tracker**.
7. If athlete does not have any symptoms, allow them to remain poolside but not actively engaged in activity. Continue to monitor the athlete for symptoms every 10-15 minutes. Symptoms can set in gradually over time.
8. If athlete has no symptoms at the end of the training session, inform the parent or guardian that an impact occurred and advise them to continue monitoring the athlete

* If an athlete has a suspected concussion, it is the parent or guardian’s responsibility to take the athlete to see a licensed healthcare professional immediately. This includes a family physician, pediatrician, emergency room physician, sports-medicine physician, neurologist or nurse practitioner. Documentation from any other source will not be acceptable.



Appendix E

Medical Assessment Letter

DRAFT



Medical Assessment Letter

Date: _____ Athlete's Name: _____

To whom it may concern,

Athletes who sustain a suspected concussion should be managed according to the Canadian Guideline on Concussion in Sport. Accordingly, I have personally completed a Medical Assessment on this patient.

Results of Medical Assessment

- This patient has not been diagnosed with a concussion and can resume full participation in school, work, and sport activities without restriction.
- This patient has not been diagnosed with a concussion but the assessment led to the following diagnosis and recommendations:

- This patient has been diagnosed with a concussion.

The goal of concussion management is to allow complete recovery of the patient's concussion by promoting a safe and gradual return to school and sport activities. The patient has been instructed to avoid all recreational and organized sports or activities that could potentially place them at risk of another concussion or head injury. Starting on _____ (date), I would ask that the patient be allowed to participate in school and low-risk physical activities as tolerated and only at a level that does not bring on or worsen their concussion symptoms. The above patient should not return to any full contact practices or games until the coach has been provided with a Medical Clearance Letter provided by a medical doctor or nurse practitioner in accordance with the Canadian Guideline on Concussion in Sport.

Other comments:

Thank-you very much in advance for your understanding.

Yours Sincerely,

Signature/print _____ M.D. / N.P. (circle appropriate designation)*

*In rural or northern regions, the Medical Assessment Letter may be completed by a nurse with pre-arranged access to a medical doctor or nurse practitioner. Forms completed by other licensed healthcare professionals should not otherwise be accepted.

We recommend that this document be provided to the athlete without charge.

Reference: Canadian Guideline on Concussion in Sport | Medical Clearance Letter, www.parachutecanada.org/guideline



Appendix F

Return-to-Sport Protocol

★ Club-level



Appendix F-1: Artistic Swimming Return-to-Sport Protocol for Clubs

Stage	Aim	Activity	Additional information	DURATION
1	Symptom-limiting activity	Daily activities that do not provoke symptoms Can commence light passive stretching if no symptoms increase GOAL: Gradual re-introduction of work/school activities	Limit exposure to bright lights and loud noise (should not attending practices)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes
To progress to stage 2, a Medical Assessment Letter is required.				
2	Light aerobic activity GOAL: Increase heart rate	At a slow to medium pace for 15-25 minutes at sub-symptom threshold intensity: - light swim kicking (no breath holding or flip turns or head rotations): o start with kicking with kickboard (cease if any neck pain occurs with kicking), o no swimming strokes (as involved head rotations) - walking - stationary cycling - Passive stretching - May start active stretching & extension drills - No inversions (head underwater) - No resistance training	Limit bright light and loud noises. Try kicking drills at a time when no routines are being practiced (no music being played)	<input type="checkbox"/> 15 minutes <input type="checkbox"/> 20 minutes <input type="checkbox"/> 25 minutes
3	Sport-specific exercise GOAL: Add movement	Moderate intensity swimming for 30-60 minutes at sub-symptom threshold intensity: - Swimming: o limited breath holding o no flip turns - Artistic swimming skills (no breath holding) o No head impact activities (swim out of pattern) o No inversions (head underwater) o Horizontal drills: sculls, back layouts, front layouts, ballet legs o Eggbeater & eggbeater boots o Landdrills - No resistance training	Limit time at the pool to 60 minutes. Dampen sound with ear plugs if needed.	<input type="checkbox"/> 30 minutes <input type="checkbox"/> 45 minutes <input type="checkbox"/> 60 minutes
4	Non-contact training drills GOAL: Exercise, coordination and increased thinking	Harder training drills. Gradual increase from moderate to high intensity swimming and artistic swimming: - figure practice; parts ONLY - out of pattern routine swims: lap by lap ONLY - Re-introduce spins. - No highlight training. - Resume progressive resistance training - Ensure non-contact practice without risk of collision	Progress time at pool to full practice training.	<input type="checkbox"/> 75 minutes <input type="checkbox"/> 90 minutes <input type="checkbox"/> 105 minutes <input type="checkbox"/> 120 minutes
Medical Clearance Letter required to progress to Stage 5				
Youth and Adult student-athletes return to full-time school activities				
5	Full contact practice GOAL: Restore confidence and assess functional skills by coaching staff	Following medical clearance, participation in full practice without activity restriction - Swimming: no restrictions - Artistic Swimming: o Resume figure wholes o Resume in pattern training: start with small parts in gradual increase to full routines. o Resume highlight training	Athlete is reintegrated to full time training with no limitations	With Medical Clearance: <input type="checkbox"/> Full time training
6	Return to sport	Normal artistic swimming training session and competitions.		



Appendix G

Medical Clearance Letter

DRAFT



Medical Clearance Letter

Date: _____

Athlete's Name: _____

To whom it may concern,

Athletes who are diagnosed with a concussion should be managed according to the Canadian Guideline on Concussion in Sport including the Return-to-School and Return-to-Sport Strategies (see page 2 of this letter). Accordingly, the above athlete has been medically cleared to participate in the following activities as tolerated effective the date stated above (please check all that apply):

- Symptom-limiting activity (cognitive and physical activities that don't provoke symptoms)
- Light aerobic activity (Walking or stationary cycling at slow to medium pace. No resistance training)
- Sport-specific exercise (Running or skating drills. No head impact activities)
- Non-contact practice (Harder training drills, e.g. passing drills. May start progressive resistance training. Including gym class activities without a risk of contact, e.g. tennis, running, swimming)
- Full-contact practice (Including gym class activities with risk of contact and head impact, e.g. soccer, dodgeball, basketball)
- Full game play

What if symptoms recur? Any athlete who has been cleared for physical activities, gym class or non-contact practice, and who has a recurrence of symptoms, should immediately remove himself or herself from the activity and inform the teacher or coach. If the symptoms subside, the athlete may continue to participate in these activities as tolerated.

Athletes who have been cleared for full contact practice or game play must be able to participate in full-time school (or normal cognitive activity) as well as high intensity resistance and endurance exercise (including non-contact practice) without symptom recurrence. Any athlete who has been cleared for full-contact practice or full game play and has a recurrence of symptoms, should immediately remove himself or herself from play, inform their teacher or coach, and undergo medical assessment by a medical doctor or nurse practitioner before returning to full-contact practice or games.

Any athlete who returns to practices or games and sustains a new suspected concussion should be managed according to the Canadian Guideline on Concussion in Sport.

Other comments:

Thank-you very much in advance for your understanding. Yours Sincerely,

Signature/print _____ M.D. / N.P. (circle appropriate designation)*

*In rural or northern regions, the Medical Clearance Letter may be completed by a nurse with pre-arranged access to a medical doctor or nurse practitioner. Forms completed by other licensed healthcare professionals should not otherwise be accepted.

We recommend that this document be provided to the athlete without charge.

Reference: Canadian Guideline on Concussion in Sport | Medical Clearance Letter, www.parachutecanada.org/guideline



Appendix H

Full Time training Group Sport Concussion Guidelines & Return-to-Sport Protocol

DRAFT



As a high-risk summer Olympic Sport, Canada Artistic Swimming must have an up-to-date sport concussion policy and protocol for all our full-time training group. A full-time training group is considered any training group that trains a minimum of 5 days a week and 4 hours per day as part of Canada Artistic Swimming National Team Programs and some Provincial Team Programs. Canada Artistic Swimming's Full-Time Training Group Sport Concussion Protocol covers the following information:

1. Education/ awareness
2. Code of Conduct
3. Pre-season Clinical Assessment
4. Removal from sport
5. Return-to-Sport

Education/ Awareness:

Coaches, athletes, medical staff must sign and submit to CAS the Pre-Season Concussion Education prior to commencing full-time training with the national team.

Code of Conduct:

Coaches must acknowledge and agree to abide by the CAS Conduct Policy annually

Pre-season Clinical Assessment (healthy, uninjured):

During the pre-season period and prior to the first day of national/ provincial team training camp, we *ask that* all artistic swimmers 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 assessment²¹ (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 available²⁶

- 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).

All senior athletes entering full time training at INS will undergo pre-season clinical assessments completed under the supervision / guidance of the team physician on an annual basis at the time of COPSI Network Comprehensive Athlete Medical Intake²² 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.

All athletes part of the 13-15 or Junior National program, will be required to complete a pre-season clinical assessments at one of the identified COPSI Networks across Canada. Canada Artistic Swimming will communicate directly with the selected athletes prior to each training camp for the appointments at the COPSI Network closest to them. If a COPSI Network clinic is not in the vicinity of the athlete’s home, the athletes will complete their pre-season clinical assessment upon arriving at camp (this may require the athlete to arrive in advance of the first day of camp to complete).

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.

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 injuries²⁶. 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.

CAS *recommends* 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 5²³](#)), 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:

1. The on-site COPSI network medical team, or assigned medical professional or coach if medical professional is not available, must follow the sideline assessment and CAS Removal-from-Sport Protocol.
2. The athlete must report to the medical team for assessment (or event physician if no member of the medical team is present).
3. The medical team should also seek out the athlete.



4. Coaches should report any suspicion of a concussion to the medical team or event physician (if no member of the medical team is present).
5. 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.
6. 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.
7. 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.
8. All athletes diagnosed with a sport-related concussion must be given the CAS Return-to-Sport Protocol and have the medical assessment signed by physician or nurse practitioner.
9. **Athletes CANNOT be cleared to return to training/competition by paramedical staff or team coaches.**
10. **Youth and Adult student-athletes return to full-time school activities and/ or cognitive activities before Stage 6 and 7.**

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.

Acute Sport Concussion Assessment & Management:

a) Sideline Assessment:

Scenario 1: If a licensed healthcare professional is present

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 pool (or other location) 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). A formal concussion assessment must be completed using the SCAT5 and other clinical measures at the medical staff’s discretion. If no medical team is onsite, the athlete must be assessed by a physician or nurse-practitioner.



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 onset²⁶. 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!

Athlete will be placed on Canada Artistic Swimming FTTG Return-to-Sport Protocol. The athlete will be given a copy of his/ her protocol that they must have with them at all times. The IST staff will ensure the athlete electronic file is keep current with the athletes most recent information.

Scenario 2: If there is no licensed healthcare professional present

The athlete should be referred immediately for medical assessment by a medical doctor or nurse practitioner, and the athlete must not return to play until receiving medical clearance.

- ▶ Most provincial team training and competition, and some training days for National teams may encounter scenario 2.
- ▶ As such, Canada Artistic Swimming requests all provincial and national teams programs to print and use CAS Removal-from-Sport Protocol – see Appendix D, and the Full-Time Training Group Return-to-Sport Protocol

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 *Stage 6*
 - may include formal optometrist / ophthalmologist / vestibular physiotherapist assessment in some cases *Stage 6*
 - web-based cognitive/neuropsychological testing should only be administered when the athlete is free of concussion-related symptoms *Stage 6*



- 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 days²⁶
- formal neuropsychological testing conducted by a neuropsychologist should be considered in complex cases where there are decisions regarding athlete retirement for the season or career²⁶.

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.

After 24 - 48 hours 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) *Stage 6*

- 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 Canada Artistic Swimming FTTG RTS – gradual exertional strategy - before progressing to stage 6 and 7 of the Return-to-Sport Protocol.
 - 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, it is recommended the athlete repeat the web-based cognitive/neuropsychological test for post-injury evaluation (if resources available).

- 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 ([Athlete Informed Consent Acknowledgement Letter, Appendix I](#)).

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.



For FULL-TIME TRAINING GROUP Return to Sport Protocol
Revised March 2019

A FULL-TIME TRAINING GROUP is any artistic swimming training in a daily training environment:

13-15/ Junior/ Senior National team training/ camp/ competition
Provincial team training/ camp/ competition

* If a concussion is suspected, remove the athlete immediately from the pool.
Refer to your licensed healthcare professional for complete concussion evaluation and treatment as required.*

Name of athlete: _____

Date of incident: _____

Date first medical consultation: _____

Date SCAT5 completed: _____

Diagnosis: _____

Completed by: _____

Parents communicated (if athlete under 18 years of age): _____



Stage 1

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A) at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, coach, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
The athlete should rest physically and cognitively for 24-72 hours.	Physical and cognitive activity (computer, watching TV, noise, etc.)

In most cases, after a few days of rest, the athlete can gradually increase their daily activity level as long as symptoms do not get worse. Once they are able to do their normal daily activities (driving, reading, cooking, hygiene, etc) without symptoms getting worse, the athlete can gradually increase physical activity/ training in steps, guided by a health care professional.

If the athletes signs or symptoms (see list below) worsen during daily activities, they do not return to sport training.

Dizziness	Headaches	Nausea/vomiting	Fatigue	Irritability
Sleepiness/feeling in a cloud	Trouble with memory	Trouble with balance	Sadness	Numbness
Concentration	More emotional than usual	Sensitivity to light and/or noise	Trouble sleeping	Anxiety/ Nervousness

***If any signs or symptoms worsen, continue with physical and cognitive for at least another 24 hours, or until signs and symptoms return to tolerable.**

ATHLETE COMPLETES STAGE 1 – DATE: _____

Medical Assessment Letter signed & received



Stage 2

Stage 2 start date: _____

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A), at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
<p>Return to light physical activity out of the pool in quiet environment (not on pool deck with music playing).</p>	<p>Headache or worsening of any sign or symptom (2 or higher on the post-concussion evaluation scale).</p> <ul style="list-style-type: none"> ➔ No intense aerobics, plyometrics, heavy lifting or spinning, etc. ➔ No trampoline ➔ No contacts ➔ No pool ➔ No apnea ➔ No head down



COMMENTS: Please note that the stages 2-8 are samples of progressions that can be used

Exercises	Date:					Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Walk (progressive: 5 to 20 min 50-60%FCmax or 65% VO2max)							
<input type="checkbox"/> Stationary bike (progressive: 5 to 20 min 50-60%FCmax or 65% VO2max)							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop, consult & go home <input type="checkbox"/> No = stage 3 with medical approval tomorrow							
<input type="checkbox"/> Return to rest at home!							

ATHLETE COMPLETES STAGE 2 – DATE: _____

*** and can move to stage 3 after 24 hrs has passed ***



Stage 3

Stage 3 start date: _____

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A), at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
<ul style="list-style-type: none"> • Progressive return to physical activity and cognitive activity • Keep athlete at pool no more than 2 hours • Light to moderate intensity out of the pool: <ul style="list-style-type: none"> ○ Mild aerobic + check % of perceived effort ○ Arm movements out of pool (land drill) sitting • Return in pool (LIGHT swimming and «eggbeater») 	<p>Headache or worsening or return of any sign or symptom (2 or higher on the post-concussion evaluation scale).</p> <ul style="list-style-type: none"> → No resistance training in weight room, spinning or sprints → No trampoline → No diving → No contacts (No swimming in patterns) → No apnea → No head down (underwater)



Exercises	Date:							Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Activation with team (no headstands) & Stationary Bike 10' (60-75%HRmax)									
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop, consult & go home <input type="checkbox"/> No = continue transition to pool 35'									
<input type="checkbox"/> Light swimming with no apnea (50-60%HRmax) 10-15'									
<input type="checkbox"/> «Egg beater» 15' \ 30 sec on/30 sec off 2x 5' Intervals (add arm mvts) 5' rest between sets									
<input type="checkbox"/> Cool Down 5' Swim very low intensity									
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop, consult & go home <input type="checkbox"/> No = continue									
<input type="checkbox"/> Light flexibility 20' (2 x30 seconds)									
<input type="checkbox"/> «Land drill» 15' sitting									
<input type="checkbox"/> Visualize video and/or correct teammates – 15' x 2									
<input type="checkbox"/> Break									
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop, consult & go home <input type="checkbox"/> No = stage 4 with medical approval tomorrow									
<input type="checkbox"/> Return to rest at home!									

If any signs or symptoms worsen or return, STOP TRAINING IMMEDIATELY, continue with complete rest for at least another 24 hours. Consult with your health care professional before proceeding to next stage.

ATHLETE COMPLETES STAGE 3 – DATE: _____

*** and can move to stage 4 after 24 hrs has passed ***



Stage 4

Stage 4 start date: _____

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A), at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
<ul style="list-style-type: none"> Progressive return to physical and cognitive activity at moderate to high intensity out of the pool+ Return to aerobics and plyometrics moderate + check % of perceived effort Return to weight training and cardio at high intensity + check % of perceived effort If all goes well, return to basic swimming elements at light to moderate intensity 	<p>Headache or return of any sign or symptom (2 or higher on the post-concussion evaluation scale).</p> <p>No trampoline</p> <p>No contacts = stay out of pattern</p>



Exercises	Date:						Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Progressive active on bike 5' and activation with team 20'								
Stabilisation Exercises (core) 20' eccentric, with control, increase resistance and intensity, 2x10reps/30 sec between each set – ENSURE ATHLETE IS NOT BREATH HOLDING								
<input type="checkbox"/> Push-ups <input type="checkbox"/> Abdominals <input type="checkbox"/> Deep squats								
<input type="checkbox"/> Heel raises unipodal <input type="checkbox"/> Alternating arms/legs on all fours/on Swiss ball								
Light Tubing 20' (arm/shoulders) 10 reps/60 secs rest between each set								
<input type="checkbox"/> Quadrants <input type="checkbox"/> Push-forward <input type="checkbox"/> Pull-back								
<input type="checkbox"/> Shoulder press <input type="checkbox"/> ER\IR @90 Abd								
Proprioception on ground 15', 2x30 seconds, 15 seconds between each progression:								
<input type="checkbox"/> 2 legs eyes open <input type="checkbox"/> Tandem walk <input type="checkbox"/> Squat jump 2 legs								
<input type="checkbox"/> Eyes closed <input type="checkbox"/> On cushion, theraband then unipodal <input type="checkbox"/> 1 leg and on a box								
<input type="checkbox"/> Transition								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Progressive activation with the team swimming 30' (no head down no apnea)								
<input type="checkbox"/> Synchro elements/ not in pattern, no head down, 40' (50-75%)								
<input type="checkbox"/> Rest 5'								
<input type="checkbox"/> Head underwater in apnea, w/o effort 2x10 head underwater: 10'' out of water 60'' rest between each series								
<input type="checkbox"/> Flexibility in water 10'								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Landrill 20' standing								
<input type="checkbox"/> Visualize video and/or correct teammates								
<input type="checkbox"/> Break								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Weight training (50-75%)								



<input type="checkbox"/> Video and/or correct teammates							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue							
<input type="checkbox"/> Visualize video and/or correct teammates							
<input type="checkbox"/> Meet with supervisor 15' discuss synchro elements and performance during the day, discuss objectives for the next day							
<input type="checkbox"/> Return to rest at home!							

If any signs or symptoms worsen or return, STOP TRAINING IMMEDIATELY, continue with complete rest for at least another 24 hours. Consult with your health care professional before proceeding to next stage.

Comments

For gym work: stay at 60-75% of Repetition Max. or less, avoiding jumps, heavy weight lifting and exercises in an inclined or declined position or with head below hips (ex : back extension on bench). If no signs or symptoms, may add more complex exercises per session and slowly begin re-integrating jumps and other plyometrics as well as skipping rope as activation.

«Land drill»: The athlete must be able to follow the timings/counts and be synchronized with other teammates.

ATHLETE COMPLETES STAGE 4 – DATE: _____

*** and can move to stage 5 after 24 hrs has passed ***



Stage 5

Stage 5 start date: _____

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A), at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
<ul style="list-style-type: none"> Progressive return to physical and cognitive activity at high intensity out of the pool Return to normal weight training, plyometrics and cardio + check % of perceived effort. If all goes well, return to apnea with head under water and basic swimming elements at moderate intensity (increase speed of execution progressively) 	<p>Headache or return of any sign or symptom (2 or higher on the post-concussion evaluation scale).</p> <p>No trampoline</p> <p>Avoid contact with teammates (STAY OUT OF PATTERN)</p>



Exercises and training as per usual	Date:						Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Progressive activation bike 5' and activation with team 20'								
<input type="checkbox"/> Transition								
<input type="checkbox"/> Head under water with harness or gym bars or 'figure trainer' 3 x 5 under :10'' rest,: 60'' rest between each series								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Progressive activation in the water 30', includes flex, apnea, head down								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> «Fish» position 3 x 5 under:10'' rest 60'' between series								
<input type="checkbox"/> Synchro elements out of pattern 50' (50-75%) progress with music								
<input type="checkbox"/> Test 400m swim (75%)								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Swimming 30' (70-90%) include 4x lengths in apnea								
<input type="checkbox"/> Barracuda» Head under, with physical effort 3x 5 : under 10'', 60'' rest between each series								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								
<input type="checkbox"/> Land drill 30', lengths /parts not all the way through								
<input type="checkbox"/> Break								
<input type="checkbox"/> Weight training (80-90%)								
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue								



<input type="checkbox"/> Meet with supervisor 15' discuss synchro elements and performance during the day, discuss objectives for the next day							
<input type="checkbox"/> Return to rest at home!							

If any signs or symptoms worsen or return, STOP TRAINING IMMEDIATELY, continue with complete rest for at least another 24 hours. Consult with your health care professional before proceeding to next stage.

Youth and Adult student-athletes returned to full-time school activities or cognitive activities

ATHLETE COMPLETES STAGE 5 – DATE: _____

*** and can move to stage 6 after 24 hrs has passed ***



Stage 6

Stage 6 start date: _____

FILL IN THE POST-CONCUSSION SYMPTOMS SCALE (see annex A), at the start of each day and consult with your health care professional to discuss the results and to decide whether to continue with rest, redo the same stage or proceed to the next stage.

Date:	Symptom Score Total (annex A)	Medical Consultation (name the professional)	Supervisor's Initials*

*supervisor (therapist, team manager, other specify _____)

Objectives of this stage:	Contra-indications/limitations:
<ul style="list-style-type: none"> Progressive return to physical and cognitive activity at maximal intensity out of the pool Return to Normal weight training and cardio + check % perceived effort Progressive return to basic elements on the trampoline If all goes well, return to basic swimming elements at moderate to high intensity Integrate technical synchro work with 2 to 3 teammates to regain points of reference in the water (STAY OUT OF PATTERN, duet and smaller groups ok) Trial of diving (contact with water) and acrobatics or jumps Trial of pool work with music, from parts to full routine 	<p>Headache or return of any sign or symptom (2 or higher on the post-concussion evaluation scale).</p> <p>Stay out of pattern</p>



Exercises and training as per usual	Date:					Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Regular Activation out of pool with team							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue							
<input type="checkbox"/> Activation in water with team 30'							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue							
<input type="checkbox"/> Elements 30'							
<input type="checkbox"/> Parts/lengths 75' out of pattern (with iPod to follow music)							
<input type="checkbox"/> 5 front dives and 5 back dives for entry to water							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue							
<input type="checkbox"/> Execute technical elements with 2-3 teammates							
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue							
<input type="checkbox"/> Normal training out of pattern and/or solo/duet +land drill/video with team + weight training with team							
<input type="checkbox"/> Meet with supervisor 15' discuss synchro elements and performance during the day, discuss objectives for the next day							
<input type="checkbox"/> Return to rest at home!							

If any signs or symptoms worsen or return, STOP TRAINING IMMEDIATELY, continue with complete rest for at least another 24 hours. Consult with your health care professional before proceeding to next stage.

Comments

Validate if athlete can adjust to teammates around her and execute at required speed and intensity as well as be synchronized with her teammates.

Aerials: add acrobatic elements to create contact with water



ALL CONCUSSION SYMPTOMS ARE 100% ABSENT

ATHLETE COMPLETES STAGE 6 – DATE: _____

*** and can move to stage 7 after 24 hrs has passed ***

Medical Clearance Letter signed & received



Stage 7

Date: _____

Objectives of this stage:	Contra-indications/limitations:
<ul style="list-style-type: none"> • Re-integrate Training and Competition as per usual 	Any return of Signs and / or Symptoms

Exercises and training as per usual	Comment from athlete and/or supervisor	Supervisor initials
<input type="checkbox"/> Re-integrate Gym and all normal out of pool activities		
<input type="checkbox"/> Re-integrate Pool and all normal in-pool activities in pattern		
Q: Verify all signs and symptoms any changes? <input type="checkbox"/> Yes = stop and consult <input type="checkbox"/> No = continue		
<input type="checkbox"/> Meet with supervisor 15' discuss synchro elements and performance during the day, discuss objectives for the next day		

Comments

Full solo and duet

Return to team routines progressively one a day, out of pattern until complete reintegration of all routines

Athlete Informed Consent Acknowledgement Letter signed & received



KEEP AN EYE ON THE ATHLETE FOR AT LEAST ANOTHER WEEK TO ENSURE THAT NO SIGNS OR SYMPTOMS RETURN DURING TRAINING. Should any return, remove immediately from training, rest for 24 hours and consult with team physician before re-integrating training.

File Closed by: _____

Date: _____

Comments:

Signature of treating health care professional: _____



ANNEX A

Name of athlete: _____
 Evaluator: _____

Date: _____

POST CONCUSSION SYMPTOMS EVALUATION SCORE

Fill in at the start of each day and consult with appropriate medical personnel BEFORE each stage.

Ask athlete to note the severity of their symptoms using a 0-6 severity scale.

Nothing = 0 Light: 1-2 Moderate = 3-4 Severe = 5-6

Symptoms	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Date										
Headaches										
“Pressure un head”										
Neck pain										
Nausea/ vomiting										
Dizziness										
Blurred Vision										
Trouble with balance										
Sensitivity to light										
Sensitivity to noise										
Feeling slowed down										
Feeling like “in a fog” / in a cloud										
“Don’t feel right”										
Difficulty concentrating										
Difficulty remembering / Trouble with memory										
Fatigue or low energy / sleep more then usual										
Confusion										
Drowsiness / sleepiness										
More emotional										
Irritability										
Sadness										
Nervousness or Anxious										
Trouble falling asleep / with sleep										
Other (specify) _____										



Do these signs/symptoms get worse with physical activity (change in positions, lifting bag, walking, etc.)?

Yes / No

Do these signs/symptoms get worse with cognitive activity (reading, TV, computer, studying, etc.)?

Yes / No

The athlete must be symptom free for 24 hours before attempting to proceed to the next stage of the protocol. Furthermore, they must obtain medical approval to pass from one stage to the next.

*If any signs or symptoms return or persist, STOP, continue with complete rest for at least another 24 hours.



Appendix I

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

Athlete Informed Consent Acknowledgement Letter



**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: _____



References: for Full-Time Training Concussion Guidelines, Appendix H

1. Kamins J, Bigler E, Covassin T, *et al.* What is the physiological time to recovery after concussion? A systematic review. *Br J Sports Med.* 2017;51(12):935-940.
2. McCrea MA, Nelson LD, Guskiewicz K. Diagnosis and Management of Acute Concussion. *Phys Med Rehabil Clin N Am.* 2017;28(2):271-286.
3. Herman DC, Jones D, Harrison A, Moser M, *et al.* Concussion May Increase the Risk of Subsequent Lower Extremity Musculoskeletal Injury in Collegiate Athletes. *Sports Med.* 2017 May;47(5):1003-1010.
4. Nyberg G, Mossberg KH, Lysholm J, *et al.* Subsequent traumatic injuries after a concussion in elite ice hockey: A study over 28 years. *Curr Res Concussion* 2015;2(3):109-112.
5. Lynall RC, Mauntel TC, Padua DA, *et al.* Acute Lower Extremity Injury Rates Increase after Concussion in College Athletes. *Med Sci Sports Exerc.* 2015;47(12):2487-92.
6. Pietrosimone B, Golightly YM, Mihalik JP, *et al.* Concussion Frequency Associates with Musculoskeletal Injury in Retired NFL Players. *Med Sci Sports Exerc.* 2015;47(11):2366-72.
7. Brooks MA, Peterson K, Biese K, *et al.* Concussion Increases Odds of Sustaining a Lower Extremity Musculoskeletal Injury After Return to Play Among Collegiate Athletes. *Am J Sports Med.* 2016;44(3):742-7.
8. Kardouni JR, Shing TL, McKinnon CJ, *et al.* Risk for Lower Extremity Injury Following Concussion: A Retrospective Cohort Study in Soldiers. *Med Sci Sports Exerc.* 2016; 48:629.
9. Gilbert FC, Burdette GT, Joyner AB, *et al.* Association Between Concussion and Lower Extremity Injuries in Collegiate Athletes. *Sports Health.* 2016;8(6):561-567.
10. Burman E, Lysholm J, Shahim P, *et al.* Concussed athletes are more prone to injury both before and after their index concussion: a data base analysis of 699 concussed contact sports athletes. *BMJ Open Sport Exerc Med.* 2016;2(1):e000092.
11. Nordström A, Nordström P, Ekstrand J. Sports-related concussion increases the risk of subsequent injury by about 50% in elite male football players. *Br J Sports Med.* 2014;48(19):1447- 50.
12. Cross M, Kemp S, Smith A, *et al.* Professional Rugby Union players have a 60% greater risk of time loss injury after concussion: a 2-season prospective study of clinical outcomes. *Br J Sports Med.* 2016;50(15):926-31.
13. Wilkerson GB, Grooms DR, Acocello SN. Neuromechanical Considerations for Postconcussion Musculoskeletal Injury Risk Management. *Curr Sports Med Rep.* 2017;16(6):419-427.
14. Dubose DF, Herman DC, Jones DL, *et al.* Lower Extremity Stiffness Changes after Concussion in Collegiate Football Players. *Med Sci Sports Exerc.* 2017;49(1):167-172.
15. 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>.
16. Rowan's Law – Ontario. 2018. <https://www.ontario.ca/laws/statute/S18001>.
17. Coaching Association of Canada. Concussion Awareness. <http://www.coach.ca/concussion-awareness-s16361> (accessed May 2017).
18. 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.
19. Galetta KM, Barrett J, Allen M, *et al.* The King-Devick test as a determinant of head trauma and concussion in boxers and MMA fighters. *Neurology* 2011; 76: 1456-62.
20. Yorke AM, Smith L, Babcock M, *et al.* Validity and Reliability of the Vestibular/Ocular Motor Screening and Associations With Common Concussion Screening Tools. *Sports Health.* 2017;9(2):174-180.
21. Arrieux JP, Cole WR, Ivins BJ, *et al.* Comparison of Four Computerized Neurocognitive Assessment Tools to a Traditional Neuropsychological Test Battery in Service Members with and without Mild Traumatic Brain Injury. *Archives of Clinical Neuropsychology* 2017: 1-18. DOI: 10.1093/arclin/acx036.



22. 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.
23. 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.
24. Canadian Concussion Collaborative. <http://casem-acmse.org/education/ccc/> (accessed May 2017).
25. Parachute. (2017). *Canadian Guideline on Concussion in Sport*. Toronto: Parachute.
26. Patricios JS, Ardern CL, Hislop MD, *et al.* Implementation of the 2017 Berlin Concussion in Sport Group Consensus Statement in contact and collision sports: a joint position statement from 11 national and international sports organisations. *Br J Sports Med* Published Online First: 02 March 2018. doi: 10.1136/bjsports-2018-099079.
27. Oxford Centre for Evidence-based Medicine—Levels of Evidence <http://www.cebm.net/index.aspx?o=1025>.
28. Galetta KM, Brandes LE, Maki K, *et al.* The King-Devick test and sports-related concussion: study of a rapid visual screening tool in a collegiate cohort. *J Neurol Sci* 2011;309:34–9.
29. Galetta KM, Morganroth J, Moehringer N, *et al.* Adding vision to concussion testing: a prospective study of sideline testing in youth and collegiate athletes. *J Neuroophthalmol* 2015;35:235–41.

