



## WATER POLO CANADA CONCUSSION PROTOCOL

**Institut National du sport du Québec in collaboration with WATER POLO CANADA (WPC)** has developed the **WPC Concussion Protocol** to help guide the management of athletes who may have a suspected concussion as a result of participation in **WPC** activities.

### **Purpose**

This protocol covers the recognition, medical diagnosis, and management of **PLAYERS** 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 all individuals who interact with athletes inside and outside the context of school and non-school based organized sports activity, including athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals.

For a summary of the **WPC Concussion Protocol** please refer to the **WPC Sport Concussion Pathway** figure at the end of this document.

## **1. Pre-Season 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, teachers, 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.

Concussion education should include information on:

- the definition of concussion,
- possible mechanisms of injury,
- common signs and symptoms,
- steps that can be taken to prevent concussions and other injuries from occurring in sport.
- what to do when an athlete has suffered a suspected concussion or more serious head injury,



- what measures should be taken to ensure proper medical assessment,
  - *Return-to-School* and *Return-to-Sport Strategies*, and
  - Return to sport medical clearance requirements
- ▶ **Who:** Athletes, parents, coaches, officials, teachers, and trainers, licensed healthcare professionals
- ▶ **How:** Pre-season Concussion Education Sheet

All parents and athletes are required to review and submit a signed copy of the *Pre-season Concussion Education Sheet* to their coach 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 **WPC Concussion Protocol**. For example, this can be accomplished through pre-season in-person orientation sessions for athletes, parents, coaches and other sport stakeholders.

## 2. Head Injury Recognition

Although the formal diagnosis of concussion should be made following a medical assessment, all sport stakeholders including athletes, parents, teachers, coaches, teachers, 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.

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 a player 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.

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.

- ▶ **Who:** Athletes, parents, coaches, officials, teachers, trainers, and licensed healthcare professionals
- ▶ **How:** [Concussion Recognition Tool 5](#)



### **3. 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).

#### **3a. Emergency Medical Assessment**

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

Coaches, parents, teachers, trainers and officials should not make any effort to remove equipment or move the athlete until an ambulance has arrived 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

- ▶ **Who:** Emergency medical professionals

#### **3b. 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 player 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 and 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-affiliated 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. Players 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.

- ▶ **Who:** Athletic therapists, physiotherapists, medical doctor
- ▶ **How:** [Sport Concussion Assessment Tool 5 \(SCAT5\)](#), [Child Sport Concussion Assessment Tool 5 \(Child SCAT5\)](#)

#### **4. 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, must rule out 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 doctors<sup>1</sup> 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.

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<sup>1</sup> 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.



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 practitioner, nurse
- ▶ **How:** *Medical Assessment Letter*

## 5. 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* 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, teachers, or employers. 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.

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 Sport-Specific Return-to-Sport Strategy* 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 *Sport-Specific Return-to-Sport Strategy*. Once the athlete has completed their *Return-to-School and Sport-Specific Return-to-Sport Strategy* 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*.

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 Strategy*, reintroduction of



daily, school, and work activities using the *Return-to-School Strategy* must precede return to sport participation.

*Return-to-School Strategy*

The following is an outline of the *Return-to-School Strategy* 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

***WATER POLO-Specific Return-to-Sport Strategy***

The following is an outline of the Return-to-Sport Strategy 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 ***WATER POLO-Specific Return-to-Sport Strategy***. 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 ***WATER POLO-Specific Return-to-Sport Strategy***. 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	GOAL OF EACH STEP
1	Symptom-limiting activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities



2	Light aerobic activity	<p><u>Warm up:</u> Stationary bike or inclined treadmill for 5 min @ 50% HR max</p> <p><u>Exercises:</u> Stationary bike for 20 min @ 70% HR max in interval sets Floor stretching routine: gluteals, latissimus, quadriceps, hamstrings, adductors, butterfly stretch, happy baby pose, pigeon stretch... Foam roller on key areas: hips, back and shoulders Mobility work for hip flexion, rotations, extension</p> <p>No resistance training.</p>	Increase heart rate
3	Sport-specific exercise	<p><u>Warm up:</u> Dryland with the team 200m freestyle without turns at the end of the pool 3 minutes eggbeater 5 min passes while facing partner</p> <p><u>Cardiovascular:</u> Interval swim sets 3 x 5 x 25m progressive intensity up to 70% alt 25m 50% (750m total) 20 sec rest between sets</p> <p><u>Technical work:</u> 5 min passes with 2 partners 3 x 50m eggbeater with blocking motions 3 x 50m eggbeater with alternate side sliding 10 x shooting at the net without opponents and no goalie</p> <p><u>Cool down:</u> 100m free @ 50% intensity, foam roller and stretching</p> <p>No head impact activities.</p>	Add movement
4	Non-contact training drills	<p><u>Warm up:</u> Dryland with the team (include skipping rope x 3 min) 4 x diving into the pool with 50m freestyle 50m eggbeater 50m breaststroke 25m water polo backstroke + 25m eggbeater and vertical jumps 5 times 10 sec breath hold with head underwater (alt 10 sec rest)</p>	Exercise, coordination and increased thinking



		<p><u>Cardiovascular:</u>          5 x catch up 25m head up: 60-70-80-90-100% (30 sec active rest throwing ball between reps)          5 x 25m sprints head up (30 sec active rest throwing ball between reps)          2 x 25m breaststroke          5 x ½ pool sprints, spin and receive long pass + simulate post shot (return water polo backstroke easy)</p> <p><u>Technical work:</u>          3 min passing with 3 other players          5 x 10 sec mirror drills with an opponent (alt 20 sec passive rest/set)          10 x 5m sprint with the ball, fake and throw on net with goalie and 1 defender          10 x 2vs1 + goalie, receive pass and throw on net          3 x 10 blocking shots moderate intensity</p> <p><u>Cool down:</u>          200m easy + foam roller and stretching</p> <p><u>Strength training:</u>          Keep resistance below 80% 1RM and avoid jumping, Olympic lifting or exercises where head is below the level of the hips (i.e. back extensions on a bench)          Progressively increase external resistance for multi-joint exercises</p> <p>May start progressive resistance training.</p>	
5	Full contact practice	<p>Following medical clearance.</p> <p><u>Warm up:</u>          Dryland with the team          100m free with turns at the ends of the pool          5 x (10m eggbeater + 6 turbo + free to finish pool)          Alternate 5 x (10m eggbeater + 4 consecutive jumps + free to finish pool)          5 min passing with 1 partner</p> <p><u>Cardiovascular:</u>          Catch up 25m head up: 60-70-80-90-100% (30 sec rest)          5 x all-out sprints with head up          2 x 25m breaststroke          5 x ½ pool sprints, receive pass and finish ½ pool easy with the ball</p>	Restore confidence and assess functional skills by coaching staff





		<p>Rest 1 min</p> <p>5 x ½ pool sprint, spin and receive long pass + simulate post shot (return water polo backstroke easy)</p> <p>Active rest, passing with leaning as when avoiding a block</p> <p><u>Technical work:</u></p> <p>2 x 5 reps 1vs1 battle to steal ball 5m away</p> <p>Passive rest 2 min</p> <p>2 x 5 reps defensive block</p> <p>Passive rest 2 min</p> <p>3vs3 simulations in small surface</p> <p>Progress to 6vs6 full size playing area</p> <p><u>Cool down:</u></p> <p>200m easy free, foam rolling and stretching</p> <p><u>Strength training:</u></p> <p>Return to normal resistance loads, olympic lifting and valsalva technique</p>	
6	Return to sport	Normal game play.	

***WATER POLO-Goalie-Specific Return-to-Sport Strategy***

STAGE	AIM	ACTIVITY	GOAL OF EACH STEP
1	Symptom-limiting activity	Daily activities that do not provoke symptoms.	Gradual reintroduction of work/school activities
2	Light aerobic activity	<p><u>Warm up:</u></p> <p>Stationary bike or inclined treadmill for 5 min @ 50% HR max</p> <p><u>Exercises:</u></p> <p>Stationary bike for 20 min @ 70% HR max in interval sets</p> <p>Tennis ball throws against neutral color wall:</p> <p>5 right hand throws with right hand catch</p> <p>5 left hand throws with left hand catch</p> <p>10 throws with alternate throwing and catching hands</p> <p>Floor stretching routine: gluteals, latissimus, quadriceps, hamstrings, adductors, butterfly stretch, happy baby pose, pigeon stretch...</p>	Increase heart rate



		<p>Foam roller on key areas: hips, back and shoulders</p> <p>Mobility work for hip flexion, rotations, extension</p> <p>No resistance training.</p>	
3	Sport-specific exercise	<p><u>Warm up:</u>            Dryland with the team            200m freestyle without turns at the end of the pool            3 minutes eggbeater            5 min passes while facing partner</p> <p><u>Cardiovascular:</u>            Interval swim sets 3 x 5 x 25m progressive intensity up to 70% alt 25m 50% (750m total)            20 sec rest between sets</p> <p><u>Technical work:</u>  <i>In the pool</i>            Circuit training: 3x (5sec eggbeater hands up, 6x lateral lunging alt sides, 10sec crazy hands, 10sec flutter kick against the wall)            5 min passing with 1 partner at increasing distance            10-10sec of reaction drills with side to side or vertical jumping            10x blocking lobed throws in free space (no net)  <i>Out of the water, tennis ball throws against a wall:</i>            5 right hand throws with right hand catch            5 left hand throws with left hand catch            10 throws with alternate throwing and catching hands  <i>Athlete can also be challenged on land with passing and reaction drills with partner</i></p> <p><u>Cool down:</u>            100m free @ 50% intensity, foam roller and stretching</p> <p>No head impact activities.</p>	Add movement
4	Non-contact training drills	<p><u>Warm up:</u>            Dryland with the team (include skipping rope x 3 min)            4 x diving into the pool with 50m freestyle            50m eggbeater            50m breaststroke</p>	Exercise, coordination and increased thinking



		<p>25m water polo backstroke + 25m eggbeater and vertical jumps          5 times 10 sec breath hold with head underwater (alt 10 sec rest)  <u>Cardiovascular:</u>          Lunge and jump to the same side 4 x 6          Lunge and jump to opposite side 4 x 6          Jump and lunge to the same side 4 x 6          Jump and lunge to the opposite side 4 x 6          Goalie position T-test 3 x 5 x 5 with 30 sec rest between reps and 3 min between sets  <u>Technical work:</u>          5 minutes passing with 1 partner at increasing distances          10 x blocking lobed shots vs single attacker          10 x top corner blocking (2 on 1 play or single attacker vs goalie)          10 x blocking direct shots from various play positions, left to right then right to left (2 on 1 play or single attacker vs goalie)          Reaction drills following ball movement 5 x 10 reps left/right/up  <i>This is also an opportune period to practice decision making with match video situations and others, volume dependant on visual and cognitive findings at Step 1</i>  <u>Cool down:</u>          200m easy + foam roller and stretching  <u>Strength training:</u>          Keep resistance below 80% 1RM and avoid jumping, Olympic lifting or exercises where head is below the level of the hips (i.e. back extensions on a bench)          Progressively increase external resistance for multi-joint exercises</p> <p>May start progressive resistance training.</p>	
5	Full contact practice	<p>Following medical clearance.</p> <p><u>Warm up:</u>  <i>Continue to monitor heart rate throughout this period. Ensure return to adequate heart rate between longer sets or after very intense drills.</i>          Dryland with the team          100m freestyle with regular turns at each end of the pool</p>	Restore confidence and assess functional skills by coaching staff

		<p>3 x ½ distance eggbeater sideways and switch to the end of the lap</p> <p>3 x ½ distance eggbeater and slide every 5 seconds, finish freestyle</p> <p>3 x ½ distance eggbeater and jump every 5 seconds, finish freestyle</p> <p>5 min passing with partner face to face</p> <p><u>Cardiovascular:</u></p> <p>Lunge and jump to the same side 4 x 6</p> <p>Lunge and jump to opposite side 4 x 6</p> <p>Jump and lunge to the same side 4 x 6</p> <p>Jump and lunge to the opposite side 4 x 6</p> <p>Circuit training: 3x (5sec eggbeater hands up, 6x lateral lunging alt sides, 10sec crazy hands, 10sec flutter kick against the wall)</p> <p><u>Technical work:</u></p> <p>5 minutes passing with 1 partner at increasing distances</p> <p>Practice game situations with ½ field or play (i.e. positions 1-2-3-6 only)</p> <p>2 x 10 blocking lobed shots random sides</p> <p>2 x 10 blocking straight top corner shots random sides</p> <p>2 x 10 blocking skipped shots random sides</p> <p>15 x blocking 2 on 1 situation, full net to cover</p> <p><u>Cool down:</u></p> <p>200m easy free, foam rolling and stretching</p> <p><u>Strength training:</u></p> <p>Return to normal resistance loads, olympic lifting and valsava technique</p>	
<b>6</b>	Return to sport	Normal game play.	

- ▶ **Who:** Medical doctor, nurse practitioner and team athletic therapist or physiotherapist (where available)
- ▶ **How:** *Return-to-Learn Strategy, Sport-Specific Return-to Sport Strategy, Medical Assessment Letter*

## 6. 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 that 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

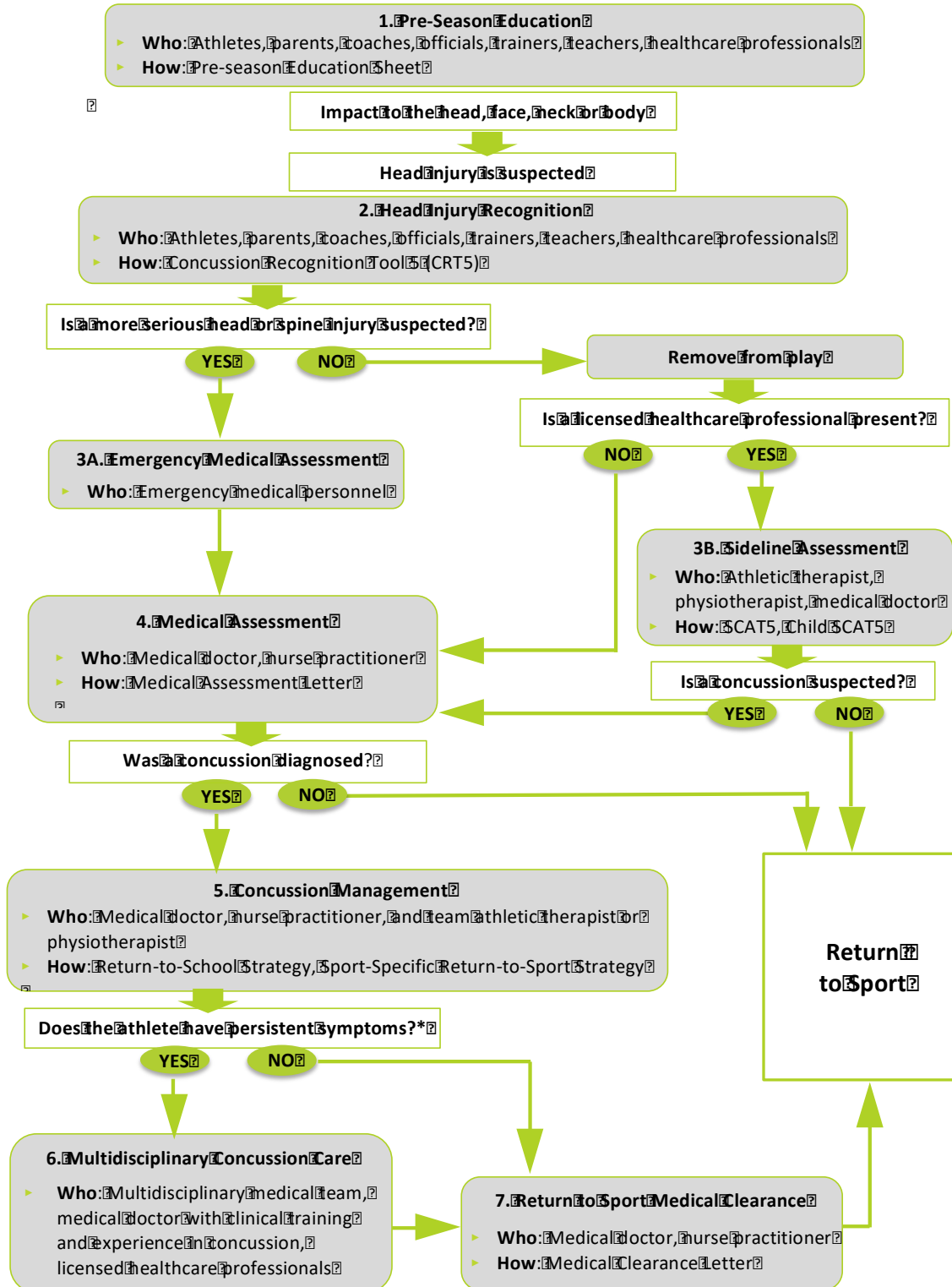
## 7. Return to Sport

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 WATER POLO-Specific Return-to-Sport Strategy* can be considered for return to full sports activities. The final decision to medically clear an athlete to return to full game 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 full contact practice and game play, 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 sports organization officials that have injury reporting and surveillance programs where applicable.

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 play, they should be instructed to stop playing immediately, notify their parents, coaches, trainer or teachers, and undergo follow-up *Medical Assessment*. In the event that the athlete sustains a new suspected concussion, the **WPC Concussion Protocol** should be followed as outlined here.

- ▶ **Who:** Medical doctor, nurse practitioner
- ▶ **Document:** *Medical Clearance Letter*

### WPC Concussion Pathway



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