

# RETURN-TO-SPORT STRATEGY

This water polo specific Return-to-Sport Strategy was developed as part of Water Polo Canada's (WPC) Concussion Protocol by the Institut National du sport du Québec (INS Québec) in collaboration with WPC. It ensures that correct activities are completed at the appropriate stages of an athlete's return-to-sport journey and is an important tool for stakeholders. This tool is a recommendation and should not replace medical advice.

## Return-to-Sport Summary:

### 1 Follow the WPC Return-to-School/Work Strategy and Return-to-Sport Strategies

These strategies are designed to begin at the same time, happen concurrently and the first step of both is the same. Therefore, please review both strategies to understand the correct stage sequencing for a safe, stepwise return to school, work and sports after a concussion.

### 2 Progressing through the Strategies

The player should spend a minimum of 24 hours at each step before progressing on to the next. It is common for a player's symptoms to worsen slightly with activity. This is acceptable as they progress through steps 1 to 3 of Return-to-Sport, so long as symptom exacerbation is:

- **mild:** symptoms worsen by only one to two points on a zero-to-10 scale, and
- **brief:** symptoms settle back down to pre-activity levels within an hour.

If the player's symptoms worsen more than this, they should stop the activity and try resuming the next day at the same step.



### **3 Return to Full Contact Sport Activities**

Players who have been determined to have not sustained a concussion and provide a Medical Assessment Letter indicating they can return to school, work and sport activities without restriction.

Players who have been diagnosed with a concussion can be considered for medical clearance to return to sport activities with risk of contact or fall once they have successfully completed:

- all steps of the Return-to-School/Work Strategy (if applicable), and
- steps 1 to 3 of the Water Polo-Specific Return-to-Sport Strategy.

The final decision to medically clear a player to return to full game activity should be based on the clinical judgment of the medical doctor or nurse practitioner taking into account the player'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).

To progress to step 4 of the Water Polo-Specific Return-to-Sport Strategy, each player 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 player to return to sports. In geographic regions of Canada with limited access to medical doctors (i.e. rural, remote 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.

Players who have been provided with a Medical Clearance Letter may progress through steps 4, 5 and 6 of the Water Polo-Specific Return-to-Sport Strategy. If the player experiences any new concussion-like symptoms while returning to play, they should be instructed to stop playing immediately, notify their parents/caregivers (if they are a minor), coaches, trainer, teachers, or employer and return to step 3 to establish the full resolution of symptoms. Medical clearance is required again before progressing to step 4.

In the event that the player sustains a new suspected concussion, the WPC Concussion Protocol should be followed as outlined here.

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



## WATER POLO SPECIFIC RETURN-TO-SPORT STRATEGY (FIELD PLAYER)

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
<b>1</b>	Activities of daily living and relative rest (first 24-28 hours)	Typical activities at home (e.g. preparing meals, social interactions, light walking). Minimize screen time.	Gradual reintroduction of work/school activities

After a maximum of 24 to 48 hours after injury, progress to step 2.

<b>2</b>	2A: Light effort aerobic exercise	<ul style="list-style-type: none"><li>• Start with light aerobic exercise*, such as stationary cycling and walking at a slow to medium pace</li><li>• May begin light resistance training that does not result in more than mild and brief worsening of symptoms</li><li>• Exercise up to approximately 55% of maximum heart rate</li><li>• Take breaks and modify activities as needed</li></ul>	Increase heart rate
	2B: Moderate effort aerobic exercise	<ul style="list-style-type: none"><li>• Gradually increase tolerance and intensity of aerobic activities, such as stationary cycling and walking at a brisk pace</li></ul>	

*\*Note: Members of WPC's National Teams must consult the team physician prior to the commencement of Step 2A.*

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>Exercise up to approximately 70% of maximum heart rate</li> <li>Take breaks and modify activities as needed</li> </ul> <p><b>Examples</b></p> <p><u>Warm up:</u></p> <ul style="list-style-type: none"> <li>Stationary bike or inclined treadmill for 5 min @ 50% HR max</li> </ul> <p><u>Exercises:</u></p> <ul style="list-style-type: none"> <li>Stationary bike for 20 min @ 70% HR max in interval sets</li> <li>Floor stretching routine: <ul style="list-style-type: none"> <li>Gluteals</li> <li>Latissimus</li> <li>Quadriceps</li> <li>Hamstrings</li> <li>Adductors</li> <li>Butterfly stretch, Happy baby pose, Pigeon stretch</li> </ul> </li> <li>Foam roller on key areas: hips, back and shoulders</li> <li>Mobility work for hip flexion, rotations, extension</li> </ul>	

If the player can tolerate moderate aerobic exercise, progress to step 3

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
-------	----------	-------------	-------------------

**3**

Individual sport-specific activities, without risk of inadvertent head impact

- Add sport-specific activities (e.g., running, changing direction, individual drills)
- Perform activities individually and under supervision from a teacher, parent/caregiver or coach
- Progress to where the player is free of concussion-related symptoms, even when exercising

Increase the intensity of aerobic activities and introduce low-risk sport-specific movements.

#### **Examples:**

##### Warm up:

- Dryland with the team
- 200m freestyle without flip turns at each end of the pool
- 3 minutes of eggbeater
- 5 min of passing while facing a partner

##### Cardiovascular:

- Interval swim sets 3 x 5 x 25m progressive intensity up to 70% alt 25m 50% (375 m total) 20 sec rest between sets

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<u>Technical work:</u> <ul style="list-style-type: none"> <li>• 5 min of passing with 2 partners</li> <li>• 3 x 50m eggbeater with alternate side sliding</li> <li>• Make 10 shots at the net without opponents or goalie</li> </ul> <u>Cool down:</u> <ul style="list-style-type: none"> <li>• 100m freestyle @ 50% intensity</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <b>NO HEAD IMPACT ACTIVITIES</b>	

#### MEDICAL CLEARANCE

If the player has completed return to school (if applicable) and has been medically cleared, progress to step 4.

<b>4</b>	Non-contact training drills and activities	<ul style="list-style-type: none"> <li>• Progress to exercises with no body contact at high intensity, including more challenging drills and activities (e.g., passing drills, multi-athlete training and practices)</li> </ul>	Resume usual intensity of exercise, co-ordination and activity-related cognitive skills
----------	--	---	---

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<p><b>Examples:</b></p> <p><u>Warm up:</u></p> <ul style="list-style-type: none"> <li>• Dryland with the team (include 3 min of skipping rope)</li> <li>• 4 x 50m freestyle with diving start</li> <li>• 50m eggbeater</li> <li>• 50m breaststroke</li> <li>• 25m water polo backstroke + 25m eggbeater and vertical jumps</li> <li>• 5 x 10 sec breath hold with head underwater (alt 10 sec rest)</li> </ul> <p><u>Cardiovascular:</u></p> <ul style="list-style-type: none"> <li>• 5 x 25m catch-up: 60%-70%-80%-90%-100% (30 sec active rest throwing ball between reps)</li> <li>• 5 x 25m sprint head up (30 sec active rest throwing ball between reps)</li> <li>• 2 x 25m breaststroke</li> <li>• 5 x ½ pool sprints, spin and receive long pass + simulate post shot (return water polo backstroke easy)</li> </ul> <p><u>Technical work:</u></p> <ul style="list-style-type: none"> <li>• 3 min passing with 3 other players</li> </ul>	

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• 5 x 10 sec mirror drills with an opponent (alt 20 sec passive rest/set)</li> <li>• 10 x 5m sprint with the ball, fake and shoot on net with goalie and 1 defender</li> <li>• 10 x 2vs1 + goalie, receive pass and shoot on net</li> </ul> <p><u>Cool down:</u></p> <ul style="list-style-type: none"> <li>• 200m easy</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <p><u>Strength training:</u></p> <ul style="list-style-type: none"> <li>• Keep resistance below 80% 1RM and avoid jumping</li> <li>• Olympic lifting or exercises where head is below the level of the hips (i.e. back extensions on a bench)</li> <li>• Progressively increase external resistance for multi-joint exercises</li> </ul> <p><b>MAY START PROGRESSIVE RESISTANCE TRAINING</b></p>	

If the player can tolerate usual intensity of activities with no return of symptoms, progress to step 5.



STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
<b>5</b>	Return to all non-competitive activities, full-contact practice and physical education activities	<ul style="list-style-type: none"> <li>Progress to higher-risk activities including typical training activities, full-contact sport practices and physical education class activities.</li> <li>Do not participate in competitive gameplay</li> </ul> <p><b>Examples:</b></p> <p><u>Warm up:</u></p> <ul style="list-style-type: none"> <li>Dryland with the team</li> <li>100m freestyle with flip turns at the ends of the pool</li> <li>5 x (10m eggbeater + 6 turbo* + freestyle to finish pool)</li> <li>Alternate 5 x (10m eggbeater + 4 consecutive jumps + freestyle to finish pool)</li> <li>5 min passing with 1 partner</li> <li>*<i>Turbo: Fast/short/choppy strokes</i></li> </ul> <p><u>Cardiovascular:</u></p> <ul style="list-style-type: none"> <li>5 x 25m catch-up: 60%-70%-80%-90%-100% (30 sec rest)</li> <li>5 x 25m all-out sprint with head up</li> <li>2 x 25m breaststroke</li> <li>5 x ½ pool sprints, receive pass and finish ½ pool easy with the ball (Rest 1 min)</li> </ul>	Return to activities that have a risk of falling or body contact, restore confidence and assess functional skills by coaching staff

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• 5 x ½ pool sprint, spin and receive long pass + simulate post shot (return water polo backstroke easy)</li> <li>• Active rest, passing with horizontal movement around block technique.</li> </ul> <p><u>Technical work:</u></p> <ul style="list-style-type: none"> <li>• 3 vs. 3 simulations in small surface</li> <li>• Progress to 6vs6 full size playing area</li> </ul> <p><u>Cool down:</u></p> <ul style="list-style-type: none"> <li>• 200m easy freestyle</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <p><u>Strength training:</u></p> <ul style="list-style-type: none"> <li>• Return to normal resistance loads</li> <li>• Olympic lifting</li> <li>• Valsalva technique</li> </ul>	
		If the player can tolerate non-competitive, high-risk activities, progress to step 6.	
<b>6</b>	Return to sport	Unrestricted game play and physical activity	
<b>RETURN TO SPORT IS COMPLETE</b>			

Table adapted from: Patricios, Schneider et al., 2023; Reed, Zemek et al., 2023



## WATER POLO SPECIFIC RETURN-TO-SPORT STRATEGY (GOALIE)

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
<b>1</b>	Activities of daily living and relative rest (first 24-28 hours)	Typical activities at home (e.g. preparing meals, social interactions, light walking). Minimize screen time.	Gradual reintroduction of work/school activities

After a maximum of 24 to 48 hours after injury, progress to step 2.

<b>2</b>	2A: Light effort aerobic exercise	<ul style="list-style-type: none"><li>• Start with light aerobic exercise*, such as stationary cycling and walking at a slow to medium pace</li><li>• May begin light resistance training that does not result in more than mild and brief worsening of symptoms</li><li>• Exercise up to approximately 55% of maximum heart rate</li><li>• Take breaks and modify activities as needed</li></ul>	Increase heart rate
	2B: Moderate effort aerobic exercise	<ul style="list-style-type: none"><li>• Gradually increase tolerance and intensity of aerobic activities, such as stationary cycling and walking at a brisk pace</li></ul>	

*\*Note: Members of WPC's National Teams must consult the team physician prior to the commencement of Step 2A.*

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• Exercise up to approximately 70% of maximum heart rate</li> <li>• Take breaks and modify activities as needed</li> </ul> <p><b>Examples</b></p> <p><u>Warm up:</u></p> <ul style="list-style-type: none"> <li>• Stationary bike or inclined treadmill for 5 min @ 50% HR max</li> </ul> <p><u>Exercises:</u></p> <ul style="list-style-type: none"> <li>• Stationary bike for 20 min @ 70% HR max in interval sets</li> <li>• Tennis ball throws against neutral color wall: <ul style="list-style-type: none"> <li>◦ 5 right hand throws with right hand catch</li> <li>◦ 5 left hand throws with left hand catch</li> <li>◦ 10 throws with alternate throwing and catching hands</li> </ul> </li> <li>• Floor stretching routine: <ul style="list-style-type: none"> <li>◦ Gluteals</li> <li>◦ Latissimus</li> <li>◦ Quadriceps</li> <li>◦ Hamstrings</li> <li>◦ Adductors</li> <li>◦ Butterfly stretch, Happy baby pose, Pigeon stretch</li> </ul> </li> <li>• Foam roller on key areas: hips, back and shoulders</li> <li>• Mobility work for hip flexion, rotations, extension</li> </ul>	

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
-------	----------	-------------	-------------------

If the athlete can tolerate moderate aerobic exercise, progress to step 3

**3** Individual sport-specific activities, without risk of inadvertent head impact

- Add sport-specific activities (e.g., running, changing direction, individual drills)
- Perform activities individually and under supervision from a teacher, parent/caregiver or coach
- Progress to where the player is free of concussion-related symptoms, even when exercising

Increase the intensity of aerobic activities and introduce low-risk sport-specific movements.

#### **Examples:**

##### Warm up:

- Dryland with the team
- 200m freestyle without flip turns at each end of the pool
- 3 minutes of eggbeater
- 5 min of passing while facing a partner

##### Cardiovascular:

- Interval swim sets 3 x 5 x 25m progressive intensity up to 70% alt 25m 50% (375 m total) 20 sec rest between sets

##### Technical work:

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• In the pool               <ul style="list-style-type: none"> <li>◦ Circuit training: 3x (5 sec eggbeater hands up, 6x lateral lunges alt sides, 10 sec crazy hands, 10 sec flutter kick against wall)</li> <li>◦ 5 min passes with 1 partner at increasing distance</li> <li>◦ 10 x 10sec of reaction drills with side to side or vertical jumping</li> <li>◦ 10x blocking lobed o throws in free space (no net)</li> </ul> </li> <li>• Out of the water, tennis ball throws against a wall:               <ul style="list-style-type: none"> <li>◦ 5 right hand throws with right hand catch</li> <li>◦ 5 left hand throws with left hand catch</li> <li>◦ 10 throws with alternate throwing and catching hands</li> </ul> </li> </ul> <p><i>Goalie can also be challenged on land with passing and reaction drills with partner</i></p> <p><u>Cool down:</u></p> <ul style="list-style-type: none"> <li>• 100m freestyle @ 50% intensity</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <p><b>NO HEAD IMPACT ACTIVITIES</b></p>	

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
<b>MEDICAL CLEARANCE</b>			
If the player has completed return to school (if applicable) and has been medically cleared, progress to step 4.			

<b>4</b>	Non-contact training drills and activities	<p><b>Examples:</b></p> <p><u>Warm-up:</u></p> <ul style="list-style-type: none"> <li>• Dryland with the team (include skipping rope x 3 min)</li> <li>• 4 x 50m freestyle with diving start</li> <li>• 50m eggbeater</li> <li>• 50m breaststroke</li> <li>• 25m water polo backstroke + 25m eggbeater and vertical jumps</li> <li>• 5 x 10 sec breath hold with head underwater (alt 10 sec rest)</li> </ul> <p><u>Cardiovascular:</u></p> <ul style="list-style-type: none"> <li>• 4 x 6 Lunge and jump to the same side</li> <li>• 4 x 6 Lunge and jump to opposite side</li> <li>• 4 x 6 Jump and lunge to the same side</li> <li>• 4 x 6 Jump and lunge to the opposite side</li> <li>• Goalie position T-test* 3 x 5 x 5 with 30 sec rest between reps and 3 min between sets</li> </ul> <p><i>*T-Test: A test of sliding forwards then laterally in the shape of a T.</i></p>	Resume usual intensity of exercise, co-ordination and activity-related cognitive skills
----------	--	--	---

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<p><u>Technical work:</u></p> <ul style="list-style-type: none"> <li>• 5 min passing with 1 partner at increasing distances</li> <li>• 10 x blocking lobed shots vs. single attacker</li> <li>• 10 x top corner blocking (2 on 1 play or single attacker vs goalie)</li> <li>• 10 x blocking direct shots from various field player positions, left to right then right to left (2 on 1 play or single attacker vs goalie)</li> <li>• Reaction drills following ball movement 5 x 10 reps left/right/up</li> </ul> <p><i>This is also an opportune period to practice decision making with match video situations and other volume dependant on visual and cognitive findings at Step 1</i></p> <p><u>Cool down:</u></p> <ul style="list-style-type: none"> <li>• 200m easy</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <p><u>Strength training:</u></p> <ul style="list-style-type: none"> <li>• Keep resistance below 80% 1RM and avoid jumping</li> <li>• Olympic lifting or exercises where head is below the level of the hips (i.e. back extensions on a bench)</li> <li>• Progressively increase external resistance for multi-joint exercises</li> </ul>	



STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
<b>MAY START PROGRESSIVE RESISTANCE TRAINING</b>			

If the player can tolerate usual intensity of activities with no return of symptoms, progress to step 5.

**5**

Return to all non-competitive activities, full-contact practice and physical education activities

- Progress to higher-risk activities including typical training activities, full-contact sport practices and physical education class activities.
- Do not participate in competitive gameplay

Return to activities that have a risk of falling or body contact, restore confidence and assess functional skills by coaching staff

#### **Examples:**

##### Warm up:

*Continue to monitor heart rate throughout this period. Ensure return to adequate heart rate between longer sets or after very intense drills.*

- Dryland with the team
- 100m freestyle with flip turns at the ends of the pool
- 3 x ½ distance vertical eggbeater sideways and switch to the end of the lap
- 3 x ½ distance vertical eggbeater and slide horizontally every 5 seconds, finish freestyle

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• 3 x ½ distance vertical eggbeater and jump vertically with two hands every 5 seconds, finish freestyle</li> <li>• 5 min passing with partner face-to-face</li> </ul> <p><u>Cardiovascular:</u></p> <ul style="list-style-type: none"> <li>• 4 x 6 Lunge and jump to the same side</li> <li>• 4 x 6 Lunge and jump to opposite side</li> <li>• 4 x 6 Jump and lunge to the same side</li> <li>• 4 x 6 Jump and lunge to the opposite side</li> <li>• Circuit training: 3x (5sec eggbeater hands up, 6x lateral lunging alt sides, 10 sec crazy arms*, 10sec flutter kick against the wall)</li> </ul> <p><i>*Crazy Arms: This exercise works on arm speed while static. Goalie raises both arms above their head and back down to the water as fast as they can. Arms should be raised from the side and not in front.</i></p> <p><u>Technical work:</u></p> <ul style="list-style-type: none"> <li>• 5 mins passing with 1 partner at increasing distances</li> <li>• Practice game situations with ½ field or play (i.e. positions 1-2-3-6 only)</li> </ul>	

STAGE	ACTIVITY	DESCRIPTION	GOAL OF EACH STEP
		<ul style="list-style-type: none"> <li>• 2 x 10 blocking lobed shots random sides</li> <li>• 2 x 10 blocking straight top corner shots random sides</li> <li>• 2 x 10 blocking skipped shots random sides</li> <li>• 15 x blocking 2 on 1 situation, full net to cover</li> </ul> <p><u>Cool down:</u></p> <ul style="list-style-type: none"> <li>• 200m easy freestyle</li> <li>• Foam rolling</li> <li>• Stretching</li> </ul> <p><u>Strength training:</u></p> <ul style="list-style-type: none"> <li>• Return to normal resistance loads</li> <li>• Olympic lifting</li> <li>• Valsalva technique</li> </ul>	
If the player can tolerate non-competitive, high-risk activities, progress to step 6.			
<b>6</b>	Return to sport	Unrestricted game play and physical activity	
<b>RETURN TO SPORT IS COMPLETE</b>			

Table adapted from: Patricios, Schneider et al., 2023; Reed, Zemek et al., 2023