

# DIVE INTO SWIMMING REHAB

How to keep swimmers healthy—in and out of the water

MANY RECREATIONAL, fitness and elite athletes swim for fun, health and competition all year round. Whether it's a lake, ocean, pond or pool, water provides a unique environment in which to exercise. The buoyancy it provides protects joints and offers resistance. But working out in liquid surroundings doesn't guarantee an injury- or strain-free experience.

While the cardiovascular and musculoskeletal benefits of swimming abound, steps should be taken to ensure a safe approach to exercise in water. Physiotherapists, in partnership with swim instructors and coaches, can offer effective prevention and management strategies to those who want to take the plunge.

## How do swimming injuries present?

Swimmers who use the breaststroke may complain of medial knee pain or hip flexor and adductor soreness from the kick style required. Swimmers doing the breaststroke and butterfly may seek assessment for lower back issues. A freestyle swimmer may experience pain in the quadriceps that's especially present during a kick or push-off.

The most common swimming complaint usually involves the shoulder, due to fact that shoulders and upper extremities are used for locomotion, while at the same time requiring above-average flexibility. The hard work of pulling the body through water overdevelops the internal and adductor muscles of the shoulders, often causing them to tighten, shorten and protract the shoulder joint. This altered alignment reduces the subacromial space, increasing the risk of repetitive microtrauma to the rotator cuff

tendons. A forward-tilting scapula and imbalance between the stronger muscles described above and the relatively weaker muscles at the back of the shoulder may be noted. The resulting protracted shoulders and kyphotic upper thoracic spine is a common postural fault in swimmers, which is why physiotherapists must always consider and investigate the possibility of referred pain from the neck into the shoulder and arm. Incorrect repetitive movements, combined with poor posture, may lead to joint irritation, swelling and musculotendinous impingement, resulting in pain with overhead movements and even pain that disturbs sleep.

## Observing stroke mechanics

Ideally, physiotherapists should see swimmers in the water—either in-person or via video. Being able to watch how the hands are entering the water during strokes, scapular movement patterns and body rotations will allow for treatment of muscle imbalances and postural faults.

Chiara Singh, a physiotherapist at Surrey Memorial Hospital in Surrey, B.C., trains swimmers for fundraising events for the B.C. branch of the Leukemia & Lymphoma Society of Canada. Singh says video analysis is a valuable tool for physiotherapists to observe a swimmer in the water, analyze the swimmer's stroke mechanics and identify any problems. "If you don't have the expertise to understand and adjust the offending aspect of the swimmer's stroke mechanics, partner with someone who does, such as a coach or instructor," she recommends.

Additional tools are available online. There are many websites that teach proper stroke technique, including Singh's choice, [swimsmooth.com](http://swimsmooth.com) where 'Mr. Smooth' demonstrates his perfectly animated strokes. Being able to see how a stroke should be performed provides visual examples to share with patients and offers reference points for physiotherapists who may not be swimmers themselves. >>

## Rehabilitation phases

The acute, recovery and functional phases require unique actions:

**Acute phase:** Rest and activity modification. Avoid overhead activities, especially in the impingement zone.

**Recovery phase:** Goals are to achieve normal active and passive range of motion, strength, muscular balance and scapular control through high-volume lightweight or low-resistance band repetition to develop endurance and avoid further joint damage.

**Functional phase:** Aim is to resume sport-specific activities—swimmers in this phase should not return to full training until they can consistently maintain proper stroke mechanics despite a fatiguing workout.

## Body mechanics basics

Several muscles play a vital role in maintaining proper scapular-glenohumeral mechanics. Physiotherapists will often note that swimmers will have a positive Hawkins test, which is confirmed when the rotator cuff is compressed beneath the acromion. The compression can be affected by serratus anterior dysfunction. A weak serratus anterior will not only cause winging of the scapula, but also increased activation in the rhomboids.

Impingement can also be due to fatigue in any of these muscles as well as the subscapularis and pectoral muscles. The upper extremity is internally rotated and flexed when it is in recovery above water, which can contribute to the impingement, but can also occur during the late pull-through phase under water or at the hand-entry phase. Muscle fatigue occurs not only because of the endurance level required by the sport, but also due to the naturally unstable glenohumeral joint. The synchronization of muscle pairs around the shoulder becomes very important to the mechanical production. The pectoralis major and the latissimus dorsi are one pairing while the subscapularis and serratus anterior are another.

## 4 tips for tackling H2O injuries

1. **Assess the injured joint, taking into account the patient's individual body type and unique presentation.**
2. **Treat according to the findings, including addressing altered muscle imbalance (stretching overdeveloped anterior shoulder muscles and strengthening the underdeveloped posterior muscles), abnormal scapular movement patterns or rhythms, postural faults and core strengthening.**
3. **Educate patients on training alterations and the use of pain modalities, such as ice and sleeping postures, that facilitate a rest position for the shoulder.**
4. **Tailor your treatment to the athlete's rehabilitation phase.**

## Treatment

During an initial assessment, it's important for physiotherapists to ask swimmers about the frequency and intensity of their training.

Depending on the injury, Singh suggests adding scapular and core trunk stabilization to an athlete's training program. Swimmers can focus on their posture and hand placement in the water and perform postural exercises during dry land training.

Physiotherapists must specify which anatomical structures should be stretched and help swimmers avoid over stretching. While partner

stretches are common among competitive swimmers, Singh says they should be avoided as they may take the joint beyond its physiological range of motion and cause or aggravate joint laxity. Swimmers with a history of dislocation or subluxation should be especially careful and only stretch the areas that need to be stretched. The pectoral muscles should be stretched under caution to avoid over stretching the anterior capsule, which could affect the glenohumeral stability. A dynamic warm-up is enough to increase blood flow to the muscles and prepare them for the workout.

Elite swimmer and physiotherapist Jessica Deglau represented Canada twice at the Olympic Games (Atlanta in 1996 and Sydney in 2000) and has also coached many young swimmers. She says there are several suggestions physiotherapists can make to injured swimmers to modify their training: for example, breaststrokers can substitute the fly kick to protect an injured knee and freestylers can avoid paddles and arms-only training and substitute more kicking. Increased dry land training, including core exercises prescribed by the physiotherapist, facilitates connection with the team while pool training volume is reduced.

Deglau, who is on staff at Physimoves Physiotherapy Clinic in Surrey, B.C., says physiotherapists should know the swimmer's history, including their preferred stroke, competitive level, how often they swim, distance per week, phase of training and any recent change in technique, volume or intensity, in order to evaluate the modification options available to the training regimen. "They should be sure to assess the athlete's unique body type, posture, range of motion, muscle strength, flexibility and possible muscle imbalance," says Deglau, who notes that it's also important to conduct relevant special tests and assess for altered biomechanics, in particular scapular rhythm.



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# TAKE THE PLUNGE

Make the most of your water workout with these safe swimming tips

*Tom Crowell, a Charlottetown physiotherapist who is also a certified swim coach and Swim Canada official, offers tips on how to swim safely this summer.*

Swimming is a low-impact sport that is often considered injury-free, however there are risks and common injuries that can befall any swimmer—recreational or competitive. The most common swimming injuries include:

## SHOULDER INJURIES

Swimmers perform a number of overhead arm movements, subjecting the shoulders to tremendous stress. The resulting trauma can develop into a number of syndromes, known as rotator cuff tendonitis, biceps tendonitis and subacromial tendonitis. All can be caused by poor technique, excessive workload or the use of swim paddles and pull buoys.

There are several ways to avoid shoulder injury:

**Be mindful of body rotation.** Never swim with a flat body as this limits the rotation of the shoulder along the axis of the spine. Develop a symmetrical way to rotate your whole body for an efficient breathing pattern and this will significantly reduce the risk of shoulder injuries. Strong core muscles assist in developing this rotation.

**Enter the water with a flat hand.** A hand directed outwards when entering the water leads to unhealthy internal shoulder rotation. This is one of the most common causes of acute pain in the shoulder as it overuses the internal rotator muscles of the shoulder. It is best to enter the water with a flat hand, fingertips first.

**Maintain good posture.** Hunched or rounded shoulders can lead to shoulder injuries. Often swimmers overdevelop the large internal rotator muscles of the anterior chest, which become shortened and tight and underdevelop the scapular muscles, which become weak and stretched. Strengthening the muscles at the back of the shoulder and stretching those at the front will help prevent injury.

**Incorporate bilateral breathing into your swim workout.** Breathing only on one side will develop the muscles on that side more than the other. This can eventually lead to shoulder problems. Breathing on both sides can prevent this from happening.

## INNER KNEE PAIN (breaststroke knee)

When the legs extend, then are brought back together during the propulsive phase of the kick, the knee is put under stress and the ligament is strained.

To avoid breaststroke knee, it is advisable to:

- alternate the strokes during your practice
- properly warm up before a swim session
- avoid excessive breaststroke to start your swim
- do strengthening exercises for the hamstrings and quadriceps

## NECK PAIN

The neck is mobile and care must be taken to use proper positioning in swimming.

During freestyle, keep the head in line with the spine and the eyes looking straight down at the bottom of the pool. Avoid looking too far forward or lifting the head forward to breathe. Also avoid over-rotating the head during the inhale phase of the stroke. Rotate the body so that the head doesn't need to rotate so much to clear the water.

During backstroke, swim distances must be increased gradually so that the anterior neck muscles have time to adapt.

## LOW BACK PAIN

Low back injuries are often due to excessive repetitive arching when performing freestyle, breaststroke or butterfly. Strong core muscles, particularly abdominal muscles, will help to maintain the body in a neutral degree of flexion/extension. Ensure a gradual, relaxed warm-up and vary your strokes at the first sign of discomfort.

## MUSCLE CRAMPS

Cramps usually occur in muscles that cross two joints—the calf muscle, for example. Cramps may occur as a result of poor conditioning, muscle fatigue, dehydration or performing a new stroke. If a cramp occurs while swimming, it may be possible to continue swimming, however some cramps require leaving the pool and stretching on deck or land. To proactively avoid cramps, take the time to warm up before beginning the intensive part of your swimming and keep hydrated while you swim.