Water's Healing Properties

Contributing authors: Rob Duncan, CALA (Canadian Aquafitness Leadership Alliance Inc., Can-Fit-Pro, and Charlene Kopansky, Hons BSc (Human Kinetics), BEd, CALA founder and president

Adam was a champion speed skater who, at age 15, experienced inflammation of the patellar ligament, and the patella was found to be tracking incorrectly against the condylar surface of the femur. The problem was identified as medial knee strain, likely developed through stress on the medial collateral ligaments as a result of intense training. With a goal of going to the Olympics in a couple of years, Adam required speedy rehabilitation. His physiotherapist recommended a course of water training therapy in conjunction with curtailing weight-bearing training activities in order to allow the inflammation to subside. Since water allows for the simulation of dynamic functional movement patterns, skating and cross-country skiing movements were incorporated into Adam's water exercises.

Water therapy, one of the oldest rehabilitation modalities, dates back to as early as 800 BC in England. Still today, however, not many understand water's healing properties and just how it can facilitate repair. How aquatic therapy might fit into a client's treatment strategy is contingent on the practitioner's knowledge of how that individual might benefit.

High-performance athletes can ill afford significant periods of inactivity while recovering from injury. Water works well to maintain function and cardio fitness, without the torsion and compressive forces experienced during movement on land. The muscles and joints above and below the injury can be trained effectively in water, which is a low- or no-pain environment.

WATER'S HEALING PROPERTIES

The hydrostatic pressure decreases swelling, enhancing venous return and heart stroke volume. Improved venous return speeds the elimination of metabolic waste, helping tissues to heal and also to lower blood pressure. Moreover, immersion promotes cardiovascular conditioning; cardiac output increases as much as 32 per cent during immersion. Pulmonary demand is increased since breathing during immersion is 60 percent more difficult.

Turbulence stimulates sensory receptors, which helps to decrease the pain-spasm cycle, especially if used in Phase I of rehab. The "gate theory" of pain control is related to a lowered perception of pain resulting from the massaging action of water.

Viscosity of water is 800 to 1,000 times that of air so there is substantial resistance to movement in water. Multi-planar movement possibilities make water ideal for re-training, restoration of function and muscle balance. Buoyancy increases joint space and decreases joint compression forces, helping to reduce pain. This permits earlier intervention and increased physical exertion. Early reintroduction of the gait sequence in water promotes strength, offers beneficial neurological input, and helps maintain cardiovascular fitness.

Thermal conductivity dissipates excess body heat, eliciting increased blood flow to working muscles. Warm water also decreases muscle guarding and pain, and is, simply, psychologically soothing.

THE FOUR PHASES OF REHABILITATION

Benefits of water occur in all four phases of musculoskeletal rehabilitation. In Phase I, water distracts attention away from pain, facilitating freer movement and posture correction. Water also helps to clear inflammatory metabolites and reduce edema.

In Phase II, the controlled-motion phase, water provides variable resistance and thus gives training opportunities for strength, endurance, flexibility, balance and range of motion.

In Phase III, clients can take full advantage of water properties as they return to normal function. More vigorous movement will improve core strength, cardiovascular and muscular endurance and balance.

In Phase IV, aquatic exercise can replicate everyday/ sport-specific movements to facilitate neuromuscular adaptations that continue to improve function. As the client moves from neck-deep water (where the weight of the body is reduced to 10 per cent of total body weight) to chest-deep immersion, axial loading of the body increases. The move from wet to dry therapy can be accomplished gradually in Phase III and Phase IV. At hip-deep water, the load is 50 per cent of body weight.

The components of a rehabilitation program involve the customary elements of warm-up, muscle strength, cardiovascular and cool-down. Examples of lower body exercises that can beneficially be done in water follow:

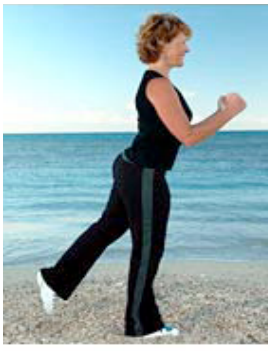
LOWER BODY PROGRAM
Exercise 1: Alternate Sartorius Leg Lift/ Lower

Leg Lift Phase: This exercise involves a combination of hip flexion with hip external rotation, and some knee flexion during the leg lift phase. In chest-to shoulder-depth water, during the hip flexion phase, this exercise involves concentric activation of the sartorius, rectus femoris and iliopsoas muscles. Add a complementary arm movement, such as shoulder joint diagonal adduction with purposeful spinal rotation to engage and therefore condition the spinal rotators, internal and external oblique abdominals, along with the anterior deltoid, pectorals and serratus anterior.

Leg Lower Phase: During the hip extension phase of this exercise, the gluteals and hamstrings work concentrically to extend the hip and return the leg to a vertical (standing) position. The posterior deltoid, trapezius and rhomboids can be activated to pull the arm back to the starting position (out to the side of the body, under the water).
Leg movement
1. Lift one leg up, with knee bent.
2. Turn that leg outward as you open up at the hip with knee facing away from you, at your side.
3. Bring your raised bent leg across to the front and slightly across the midline of your body.
4. Return your leg to start position, pushing your leg against the water's resistance.

Increase your workload with the following arm action:
Arm movement
1. Use the arm opposite to the moving leg to diagonally sweep across your body and simultaneously reach towards the shin of your working leg.
2. Keep your arm straight and, if you are fit and injury-free in the shoulder and torso region, keep your hand in a paddle or flat position to increase the resistance. To decrease the resistance, slice the hand through the water, or use a gentle fist-shaped hand. Or, shorten the length of the lever (the arm) by bending the elbow to a greater degree.
3. Return your arm to the start position at the side of the body, just below the water.

Exercise 2: Gluteus maximus posterior leg lift with unison upper cut arms
This exercise conditions the gluteals, the anterior deltoids and the abdominal muscles when performed effectively. It is most effective in shoulder-depth to deep water, with no bouncing or bobbing.
1. Keep hips still, pelvis level/neutral throughout this movement.
2. Concentrate on activating the gluteals and the hamstring muscles by powerfully activating these muscles while alternately extending the leg straight back.
3. Coordinate arms and legs, so that when the hip is extended (leg is pushed back), both arms are pushed forward (activating the anterior deltoid and pectorals). Activate the hip flexors as the foot returns to standing position, and the posterior deltoids as the arms return to the sides of the body, with the elbows pointing up and back. Keep hands in a lightly held fist position and your elbows bent at 90 degrees throughout the movement.
4. As the hip extends and the leg lifts to the back, the shoulders flex and the arms move to the front. Press the navel to the spine and exhale, consciously activating the

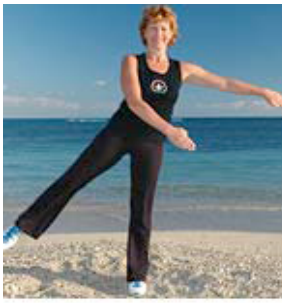


transverse abdominus and pelvic floor muscles. Maintain a hip-rib connection by isometrically activating the rectus abdominus and internal and external abdominus muscles. Continue to keep the pelvis level by engaging the multifidus and quadratus lumborum muscles.

Exercise 3: Pendulum leg lift / lower with low-swing pendulum arms
This exercise targets your outer and inner thighs, waistline and shoulders. Stand in chest- to shoulder-depth water the deeper you go, the harder it is to stabilize your body, and the harder your core muscles work. However, if you have trouble keeping your feet down, move to shallower water. When you reduce bouncing or bobbing and anchor the body, such that one foot is always in contact with the pool bottom, you increase your energy expenditure and burn more calories.

1. Lift one leg to the side. Keep your hips level and – to target the correct muscles – ensure your feet and knees point forward throughout the entire movement.
2. Only lift your leg about 30 degrees to the side of the body and apply force to the movement, rather than letting your leg float up.
3. While your leg lifts, swing both arms to the opposite side of your body, down and in front of the thighs, reaching away from your working leg.
4. Repeat this exercise several times on one leg.

Then repeat on the other leg. Remember to control your movements and use muscle force rather than the force of momentum to move your limbs. When done properly, this exercise works the muscles that stabilize your spine and keep it from rotating or twisting.



IN SUMMARY
Adam was able to use these and other exercises to his advantage, maintaining cardio conditioning and using muscles in a similar functional fashion as he would on ice. After three weeks of water training, the ligaments had healed sufficiently and Adam resumed his weight-bearing activities. His youth, combined with therapy in water, contributed to a speedy recovery.

For information on training and certification offered through the Canadian Aquafitness Leaders Alliance Inc. (CALA), phone 416-751-9823, e-mail cala_aqua@mac.com, or visit www.calainc.org.

Please include Charlene's head shot

Charlene Kopansky, Hons BSc (HK), BEd, PHESc, CALA, Can-Fit-Pro FIS, OFC, BCRPA
Charlene is the founder and president of the Canadian Aquafitness Leaders Alliance Inc. (CALA, 1993), a dynamic organization committed to enhancing the quality of aquafitness leadership worldwide. She is a popular presenter in fitness who shares the joy of movement through thoughtful integration of the mind, body and spirit. She has been internationally recognized as a world expert in aquafitness and aquatic post-rehabilitation with many awards including Top Specialty Presenter (Bodylife, Germany), Top Presenter (Attack Convention, Munich 2003), Bad Waltsee (Germany 2003), three-time Mal Peepre Award nominee, Leadership Award (OFC), Fitness Leader of the Year (Fitness Institute) and Who's Who of Canadian Woman in Fitness. She is the leader in all specialty types of water training.

Join Charlene at the Toronto Can-Fit-Pro Conference for more creative aqua fitness choreography and effective training tools. For more details on her sessions and to register visit www.canfitpro.com

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