C. The person reporting whole body stiffness is particularly tight in the frontal plane at the hip and lacks sagittal plane motion at the ankle.

Does meeting all of their needs in a group setting seem feasible? I can address all of their needs with one simple tool. Integration of the *Movement Matrix* helps ensure that I give student A, B and C what each needs the most. I don't even need to know these specific needs of each participant for this approach to be effective because I am "covering it all."

Group Exercise Gets Personal

Better results for your clients are possible. Integrating a 3D training approach is the first step to helping your clients move and feel better.

Let's apply this to a **Single Leg Balance Reach**. *(Check out Single Leg Balance Reach and other 3D exercises on You Tube: ExerciseElements)*

Single Leg Balance Reach for Mobility

Part 1. For Mobility. Move at a slow to moderate pace using buoyancy to facilitate movement. Reach the leg in all six directions (front to back, right to left, and turn right and left).

Part 2. For Stability. Next try moving at a quicker rate while decreasing the range. Don't forget to make it 3D.

Note: Student B knows to hold the pool edge for better balance during this exercise. Teach your students options so that they can be successful at every exercise in the routine.

All of my workout formats combine the feel-good, body friendly exercises my students enjoy with 3D thinking to deliver better results. Continue to explore new ways to use buoyancy to facilitate movement and resistance to strengthen the body to give personalized results to your group exercise programs. Consider the water, the music and the moves and every *body* will approve 3D training. Join the movement! ●

Author

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Aquatic Training and Conditioning for Sports Performance

By Rick McAvoy, PT, DPT

Traditional uses for aquatics in sports performance programs tend to primarily focus on two key areas. One area is improving flexibility or reducing muscle soreness via active recovery techniques during in-season training. The other is using the water's supportive and gentle properties when the athlete cannot tolerate the full gravitational influences of land-based training, such as during rehabilitation.

However, I find the water to be a powerful medium that can be used in any phase of an athlete's training, from rehabilitation to the highest levels of sports performance.

I have been incorporating water into my athletes' training programs for a number of years and have found it very beneficial in all phases of sports performance training. It is encouraging to see the literature, specifically the strength and conditioning journals, over the past few years beginning to validate the benefits of aquatic training for strength, flexibility and power, among other effects.

Let's look at the many aspects of a sports training program that can be enhanced by integrating an aquatic component.

Flexibility: The greater the range of motion in the joints of an athlete, the greater the ability to move dynamically. An athlete with limited flexibility is unlikely to ever achieve outstanding athletic performance. Muscle imbalances will reduce the ability of the muscle to achieve maximum power, and will increase the risk of injury. For proper muscle performance, flexibility must be established in all three planes of motion.

Because water is a surrounding medium and provides three-dimensional resistance, when an athlete moves in the water, he/she is subjected to the forces of buoyancy, viscosity and drag. These factors tend to slow movements down and allow the trainer to focus on both movements and muscle imbalances simultaneously, and be able to quickly key in on the areas to target.

In the water the athlete is able to perform exercises that focus both on flexibility and stability at the same time, which assists with injury reduction. In a previous article I spoke about Lower Cross Syndrome and how using drag equipment not only lengthens the tight muscles but can also strengthen the underactive muscle groups. This is significantly more challenging when attempted on land.

Using the water before and after land-based training sessions has been shown to be very effective in improving dynamic flexibility as well as active recovery in the athletic population.

Supine Upper Body Flexibility

Strength/Stability: The water allows you to effectively target multiple muscle groups simultaneously, and focus on both agonist/antagonist and side-to-side comparisons. Recent aquatic strength studies show that by monitoring cadence and performing repetitions to near maximum effort the muscle activation will be great enough to achieve strength goals.

It is not possible for the body to produce forces that exceed the core's ability to stabilize the body. By using the water, the athlete can quickly and effectively target the core in all movement planes. Immersed in the water, it is almost impossible not to engage the core musculature when performing exercises in a vertical position, in part due to the increased kinesthetic feedback. By challenging proximal stability with distal mobility we can target stability and ROM simultaneously, which reduces joint dysfunction and resultant injury.

Rotary Stabilization

Power: During strength training the focus is on moving maximum loads with little concern for speed. However, during power training, speed is the primary goal with less regard for load. During the power phase of training the athlete must take the strength gained and turn it into athletic movement.

Power training in the water is much safer and there is less of a need for heavy weights and equipment. Also, the aquatic environment enhances concentric forces while diminishing the eccentric force. The forces are then applied to the entire body in multiple directions.

Plyometric training is power training. Aquatic plyometric training can have similar effects to that of land-based plyometric training but with significantly less muscle soreness. The theory is that although eccentric contraction is reduced (due to buoyancy), greater than normal force is encountered during concentric contraction (thanks to the water's viscosity) when attempting to explode out of water.

Medicine Ball Power Training

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When working with athletes in the water, remember to become familiar with their sport-specific needs.

Endurance: This is the ability of the body to perform over time and is essential to success in all sports. Training for endurance in the water has been shown to have similar effects to that of land-based training.

One area where we should focus attention is on metabolic conditioning or energy system training. We need to train specifically for the energy systems used during the sporting event. Conditioning can be designed to train the muscle tissue and anaerobic or aerobic energy systems specifically for the timeframe of the sport. For example in my practice I often work with higher-level alpine skiers. The average alpine run is around 90 seconds, so it makes sense to perform aquatic endurance training for no longer than 2 minutes. However, with a soccer player, the formula obviously will be changed to incorporate a longer duration of training.

Kickboard Push Pull

Agility: Agility is defined as the ability to accelerate, decelerate and change direction. The athlete who can decelerate/accelerate fastest, and spend the least amount of time changing direction, will have the best "agility". This skill encompasses balance, speed, strength and coordination.

Agility training in the water can be very challenging due to the principles of drag and viscosity. This is especially true when performed with multiple speeds and very rapid direction changes. For example, when performing side stepping quickly in the shallow water, if the athlete changes direction quickly he/she must overcome the water current they just created.

Speed: Speed training focuses on the development of the fast-twitch muscle fibers. Performing speed training in both shallow and deep water has proved beneficial. I published a study comparing shallow water and land-based sprinting that demonstrated a higher lactate and RPE level when sprinting in water. This suggests that the metabolic demands of shallow water sprinting are different than land sprinting of the same distance.

Shallow Water Running

Movement Preparation: Athletes rely heavily on motor patterning for their specific sport. They are also influenced by gravity and momentum. When an athlete moves in the water, gravity and momentum are significantly reduced and he/she is subjected to the forces of buoyancy, viscosity and drag. These factors tend to turn most athletes (at least initially) into uncoordinated individuals.

In my experience, even the simplest movement, such as walking forward or backward with proper reciprocal arm swing, has been shown to frustrate even the most elite athlete. On a good note, the water provides increased proprioceptive feedback. Thus, the athlete is able to improve body awareness and motor patterning relatively quickly.

Proper exercise techniques, such as squatting, lunging and jumping, can be safely trained in the water, helping to instill proper motor patterning.

Sport specific movements in the water can be broken down and replicated to strengthen the motor patterns that are limited by muscle imbalances, and then solidified with land based training.

Injury Reduction: Another area where the water can help with sports performance enhancement is in injury prevention. Research on the most prevalent injuries for a particular sport, position, gender and age group can be used to specifically address areas that must be addressed. The trainer can then design an effective aquatic program to help balance and strengthen muscle groups, and perform movements to reduce the risk of non-contact related injuries.

In conclusion, when working with athletes in the water, remember to become familiar with their sport-specific needs including primary muscles involved, biomechanics, common injuries and metabolic demands. For the athlete to achieve the next level of performance, he/she requires a tailored training and conditioning program. ●

Author

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