

# Prehabilitation for Total Joint Replacement

By Rick McAvoy, PT, DPT

More than a million people each year are undergoing total joint replacements -- most typically hips or knees. With the aging, but still active baby boomer population, the number of joint replacement surgeries is expected to grow dramatically, to some 4 million, in less than 20 years. More than half of the recipients will be younger than 65 years old.

Returning clients to full function in the shortest amount of time is not only desirable to the clients but also insurance companies. Pre-surgical or prehabilitation (prehab) programs have been gaining increased popularity and show promising results in getting clients moving quicker after surgery. Prehab can be defined as an individualized physical conditioning program to improve strength, endurance, and range of motion prior to surgery.

A multicenter study performed at New England Baptist Hospital, Beth Israel Deaconess Medical Center and Harvard Medical School found that knee and hip-replacement surgery patients who had participated in prehab for just six weeks prior to surgeries reduced the need for inpatient rehabilitation by 73 percent. This study involved water and land-based strength training, plus aerobic and flexibility exercises.

Let's look at the specific benefits of the water.

## Recue Pain & Swelling

Clients awaiting joint replacement surgery are usually in a significant amount of pain. They may experience pain not only at the specific joint but also in corresponding joints that have compensated for improper biomechanics. Using the water's unloading properties to reduce pain, as well as the hydrostatic pressure to help with swelling reduction, are tremendous benefits.

## Restore Range of Motion (ROM)

I always tell my clients, "Motion is lotion." This means that the more you

move correctly, the better you will feel. Gaining as much ROM prior to joint replacement is very important. I also share, "The doctor will be replacing your joint, not your ligaments, tendons or muscles. The more muscle balance we can get the better you will do post operatively." I give the example of a worn out tire on a car. Over time the cars suspension adapts to that worn tire and pulls out of alignment. The replaced joint represents the new tire; now we have to realign the suspension so everything rides correctly.

In the water, flotation equipment on the lower extremities allow the client to gain much more ROM. Buoyancy unloads the joint and assists the motion, but more importantly the client has control over the movement. When I try to manually stretch a client, he/she is guarded, no matter how much I remind them to relax. Moving freely in the water, the client is more likely to push the ROM than if I stretch him/her manually.

One of my favorite aquatic exercises for both hip or knee prehab is the *Heel to Buttocks* exercise. Using a flotation cuff on the lower extremity, the client keeps his/her thigh in a vertical position while bringing the heel towards the buttocks. This elicits an effective stretch on both anterior hip musculature and the quadriceps.



Heel to Buttocks

If a client can tolerate positional changes, and does not have any spinal considerations, then the *Prone Single Knee to Chest* or *Double Knee to Chest* are effective exercises to facilitate increased knee

flexion. The client begins in a prone position (with good gluteal recruitment) and flotation cuffs on the lower extremities. He/she then brings one knee toward the chest; to gain even more ROM, perform a double knee to chest exercise. The flotation cuffs will translate the lower leg superiorly to get a nice stretch.



Prone Single



Double Knee to Chest

To open up the hip joint and help gain increased ROM prior to a total hip replacement I like to use the *Standing Clock* exercise. The client stands on one leg and visualizes being at the center of a clock. He/she moves the involved lower extremity to various positions on the clock. For example, with the left leg, try to touch 12 o'clock, 9 o'clock, 6 o'clock and even attempt 3 o'clock.



Standing Clock



Standing Clock



Standing Clock

### Gain Muscular Control of the Lower Extremity

Pain causes muscle inhibition and hence muscle weakening. Neuromuscular control needs to be restored prior to surgery in order to facilitate muscle recovery post-operatively. The stron-

ger the muscles are, the faster they will recover afterwards. Prehab strengthening exercises to help balance all muscle groups are much easier and comfortably performed in the water. Do not focus only on strengthening the lower extremities. Clients may be using assistive devices immediately post op and will need significant strength and endurance in the upper body and core as well.

A good exercise for upper and lower body strength, as well as balance and coordination, is Power Swings. Using resistive equipment, the client balances on one leg and performs opposite arm and leg swings.



Power Swings



Power Swings

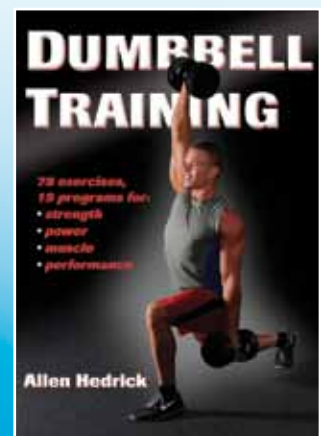
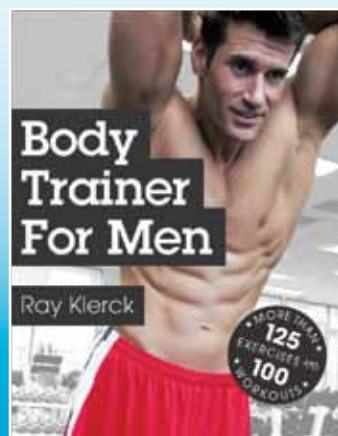
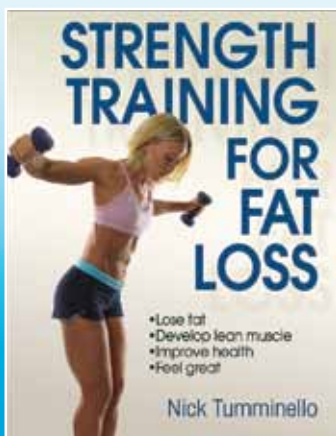
### Improve Proprioceptive Awareness & Normal Movement Patterns

Any functional movement depends on the coordination and fine-tuning of the neuromuscular system. Joint degeneration affects the soft tissues that contain proprioceptors, which will cause significant reduction in the awareness of joint movement.

Proprioceptive exercises need to be started prior to surgery to stimulate the neuromuscular mechanisms and make them more responsive after surgery. The water provides a proprioceptive-enriched environment to help restore neuromuscular function, including balance and proprioception.

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Degeneration of lower extremity joint will commonly result in a compensated gait pattern. This pattern is often continued, even after surgery, because of abnormal motor patterns. Use the water to correct gait patterns prior to surgery, which will assist with alignment, weight shift and proprioceptive input, and therefore facilitate a normal post-op gait pattern.

## Client Education

Surgeons often do not tell the client what they will experience post operatively. Thus, another benefit of prehab is the opportunity to educate the client on the post-op process. Clients often compare themselves to other people who have had a similar surgery, which can lead to frustration. Empower your client with knowledge, and with the understanding that everyone progresses at a different rate.

In my experience, utilizing the water for total joint replacement prehabilitation is one of the best ways to get clients moving faster! ●

## Author



Dr. Rick McAvoy, PT, DPT, CSCS, has specialized in Aquatic Physical Therapy for over 25 years. He is the owner of McAvoy Aquatic & Sports Therapy in Southern Maine and a co-owner in AquaStrength, an international aquatic equipment and programming company. A published author and researcher in the field of Aquatic Therapy and Conditioning, he teaches at both the University of New Hampshire and Franklin Pierce University, where he serves as an adjunct faculty member. He is a Master Instructor in the Burdenko Method, a specialized form of dynamic aquatic and land-based techniques. For more information, you can contact Rick at [www.MastH2o.com](http://www.MastH2o.com)



## AKWA International



**LATIN AMERICA.** In 2012 Vanina Delfino became AEA's International Training Specialist in Argentina and aquatic programming in Latin America has been quickly developing ever since. The number of people attending pools for aquatic fitness classes is rapidly increasing. Vanina's goal is to provide Spanish speakers with necessary tools to become AEA certified. She has designed an education program with in-person workshops and

online components to share the AEA philosophy with adaptations to the Latin American culture.

In December 2012, she offered the first AEA Aquatic Fitness Instructor Certification in Argentina. With the help of Adriana Melotto, she has developed a schedule to continue offering the certification twice a year. Seeing the success in Argentina, they are being invited to share aquatic education and the AEA Certification in other countries, including Uruguay and Chile, certifying 25 instructors there!

Says Vanina, "It was amazing to realize how sometimes a language barrier could stop some activities. Once we just translated the AEA materials into Spanish, and added some of the Latin America 'flavor', the interest quickly grew and many fitness instructors now have the opportunity to become AEA certified!"

During 2014, Adriana and Vanina decided to jump a step further by organizing the first international conference inspired by AEA: CIFA2014. They invited Mundo Hidro to share their knowledge with South American instructors. Tinoca & Pedro Santos (Pedrito) from Portugal and Roxana Brasil and Cristina Bredariol from Brazil rocked the Argentina water! Over one hundred people attended the conference, making it a great success for aquatics.

2014 saw 30 new Argentinian AEA Certified Instructors, as well as the renewal of instructors originally certified by Gina Bastidas (AEA Training Specialist from Mexico). Vanina shares, "We are proud of belonging AEA and during 2015 we are organizing AEA certifications through Latin America (Colombia, Peru, Costa Rica, Venezuela, Bolivia, Honduras, etc.) We are excited to continue expanding the AEA Family!"



**UNITED KINGDOM.** Hydro-Actif (founder, AEA International Training Specialist Steph Toogood) held their annual seminar in North London on December 14, 2014. The event was a sell-out with 30 enthusiastic instructors enjoying networking, education and wonderful diverse practical sessions. The main attraction was a visit from AEA International Training Specialists, Katrien Lema-hieu (Netherlands) and Kim Geeroms (Bel-

gium), who flew in for the weekend. The attendees were excited to see so many new ideas and fully participated in two workshops and a masterclass from the dynamic duo, known as Kataqua!

Seminar attendees were able to experience Kat's new Ai Chi in 3, designed for movement in cooler water. This received a standing ovation and it was many of the instructors first experience of Ai Chi. Another treat was the attendance of the new Aqua-Band distributors for the UK. Haylley, of Team Hydro-Actif, choreographed a short workout using the Aqua-Band and the Aqua-Loop. After lunch there was an interesting forum where the benefits of AEA certification were discussed and several of the AEA certified instructors spoke enthusiastically about the annual IAFC. This was a busy, happy and wet, wet day - the instructors left looking forward to returning for more. ●