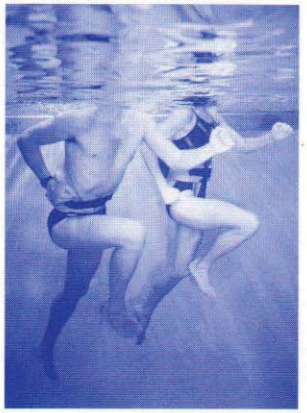
Water Running

THE ORIGINAL® AQUAJOGGER WATER WORKOUT GEAR

with David Brennan



Secrets To Successful Water Running For All Sports

- *Conditioning*
- *Active Recovery*
- *Injury Prevention*
- *Rehabilitation*

Handbook

www.aquajogger.com

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About David Brennan, M.S.

The methods and programs featured in this handbook have been developed by water running specialist, David Brennan. The techniques have evolved from Brennan's research on water running conducted with Dr. Robert Wilder and from Brennan's training of athletes who range from novice to world class. A special focus on water running emerged from his participation in distance running which included competition at the national and international levels and continues to compete at the age group level. Brennan's assistant professorship at the Baylor College of Medicine, Department of Physical Medicine and Rehabilitation, and his direction of the Water Exercise Therapy program for Medifit of America and the Human Performance Center in Houston, Texas, involves him in aquatic conditioning and rehabilitation on a daily basis. He is also President of the Houston International Running Center and founder of the Aquarunning Deep Water Exercise and Rehabilitation Program.

Overview

Whatever your sport, fatigue and injuries are barriers to your success. Being at your best for those moments of competition is what training is all about, but surviving your training schedule without injury can be your greatest challenge.

Running is one of the best forms of cardio-vascular exercise. It is also one of the primary contributors to lower body injuries. The unique environment of water running can help you reduce the risk of injury and increase fitness levels in ways that cannot be accomplished with land exercise alone.

In a world of impact, start thinking amphibious. Explore how you can combine land and water exercise to stay in top form longer and with fewer injuries.

What's so special about water? Although various forms of water exercise have been used for centuries, space age research now documents more reasons than ever to take training and recovery programs into the water.

• ***No impact running.*** Your body weighs about 10% of its land weight when up to your neck in water. If you weigh 200 lbs. when standing on land, you weigh only 20 lbs. in water. With the addition of a buoyancy belt like the AquaJogger®, you can run with your head comfortably out of water, breathe normally, and accomplish most of the same workouts you perform on land.

In the water your musculo-skeletal system is no longer bearing weight, so it can be recovering from all the pounding of your land based programs while you focus your conditioning on the cardio-pulmonary system. No pounding...no impact.

• ***Aerobic and Anaerobic Conditioning.*** A decade of research by a variety of sources has shown that the training effect of water running can be equal or greater than the same level of effort on land. Improve your cardio-pulmonary conditioning while giving your weight-bearing joints and muscles a day off.

• ***Resistance.*** Water creates resistance to movement in all directions through a full range of motion. Increase or decrease the intensity by changing the speed of your movements. Being submerged in water is like having an adjustable weight machine surrounding your body.

• ***Massage.*** Water massages your muscles with every movement of your arms and legs. This action increases circulation, promotes relaxation, and helps remove stress and tension.

• ***Up to your neck.*** Being up to your neck in water produces physiological changes in your body that help **remove metabolic waste**, **improve cardiac function**, **lower blood pressure**, and **assist** the body in **tissue healing**. Start thinking about how you can use these changes to accelerate your recovery from competition, training sessions, and injuries.

• ***Conditioning program.*** Much of what you know about land-based conditioning and fitness programs applies to water exercise. Learn how to how to transfer your regimen of land-based exercises and conditioning programs into this friendly environment.

It's revolutionary, it works, it's fun, and it just may be the most beneficial conditioning and recovery modality available. This handbook will help you get your program launched, so you can start writing your own success story.

Before You Start

1. Safety: **Before embarking on any exercise program, you should be examined by a physician, particularly if you have any known heart or blood pressure problems, any metabolic disorders, or have been previously inactive. The instructions and advice presented here are not intended as a substitute for medical counseling. Not all exercises are suitable for all people. Start at an easy or beginning level and then work up to more advanced levels as you gain conditioning and experience. Never run or exercise in the water alone.**

2. Equipment. Wear a flotation device (AquaJogger® recommended). It is nearly impossible to maintain the correct movement patterns without one. If you are working out in a confined area, you may want to use a tether such as the AquaJogger® Hitch. Other options that will add more intensity and variety to your workouts include AquaRunners® for your feet, hand-held DeltaBells®, and/or webbed Fitness Gloves for increased upper body resistance.

3. Pool depth. The depth of water you need for deep water running is determined by your height. The water level should be at least up to your chin so that your feet are off the bottom of the pool once you put on your buoyancy device. This usually requires a pool depth that is at minimum about 6"- 8" less than your height.

4. Flotation and buoyancy. It is important that you have sufficient flotation support for the body so that you can comfortably keep your head above water without compromising your running form. Your body's natural flotation level will determine the amount of additional buoyancy you need.

A good test to determine the additional flotation required is to get in the water without a buoyancy device and tread water. If you can stay up easily when treading without a buoyancy device, the AquaJogger® Classic will work for you.

Fat floats while muscle and bone tend to sink. A dense muscle mass or bone structure and a low fat ratio make flotation difficult. If you find you have difficulty treading water, the AquaJogger® Pro, with 30% more flotation than the Classic, is a better choice. If you are a sinker and have great difficulty staying afloat, you need the AquaJogger® Pro Plus with 50% more flotation than the Classic.

The AquaJogger® Pro and Pro+ are recommended for most athletes and those who have high buoyancy needs because of physical limitations or fear of water. Additional buoyancy is also added by using AquaRunners® or adding a Versa Float™ (a foam pad that can be inserted in front or in the back of an AquaJogger® to provide additional flotation). DeltaBells® also provide extra buoyancy as well as resistance for upper body moves.

5. Water temperature. Most athletes train in water that ranges from 82-86 degrees Fahrenheit. Water temperature should not exceed 90 degrees Fahrenheit for a training session. If the water becomes colder than 80 degrees Fahrenheit, you may become uncomfortable due to problems maintaining body temperature and performance.

The Three Rs

Brennan begins each instructional session with what he call the three Rs of successful water running.

1. Relaxation. It's very important to relax your muscles before movement takes place. A relaxed muscle moves quicker and with more fluidity than one that is tense. Whether you are on land or in water, controlled flowing movements is your goal. Take advantage of the water medium to relax your muscles before and during movements. The feeling of weightlessness allows you to move freely and quickly. Since your legs aren't bearing any weight, it's easy to relax through the entire running stride. This stress free movement should help you develop a more relaxed and fluid stride on land.

2. Range of Motion. Movement through the correct range of motion and in a linear direction is as critical when you're running in the water as it is on land. Your range of motion with your legs can be greater in the water because there is no impact with the ground.

3. Rhythm. Once you've mastered relaxation and range of motion, focus on your rhythm which is the result of coordinating the upper and lower extremities as you move through the water. Start slow and get the feel of this rhythm. Once you have it mastered, build up speed. The rhythm should feel much like it does on land. The weightless atmosphere, however, allows movement in slow motion through the complete range of motion and also allows you to focus on one leg at a time. Speed of movement is directly related to effort in the water. The faster you go...the harder you will be working.

Running Form

Whether you are a world class athlete or an individual just getting started on a health and fitness program, there are some basic techniques that need to be considered in order for you to maximize the benefits of your deep water running program. The desired running form in water is almost identical to running form on land. ***Note:*** *Your center of gravity on land is at your hips. In water, your center of buoyancy is at your lungs. To get used to this change, you need to retrain your body to use your abdominal muscles to maintain the correct vertical posture.*

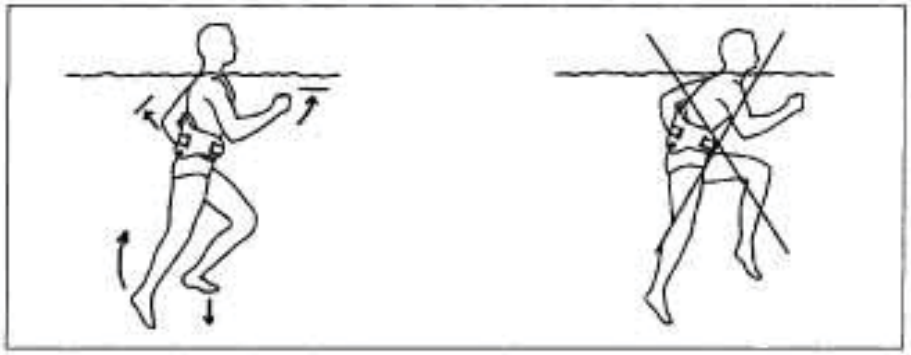

Figure 1
(Runner with Good Form)

Figure 2
(Runner with Bad Form)

Body Angle. Running with the upper body leaning too far forward is the most common error committed by beginners. This posture rolls you up into a little ball and restricts movement (figure 2). Straighten up your posture with the chest out and visualize a plum line that runs from above your head down through the trunk of your body in a perfect vertical line. It may help to imagine there is a helium balloon pulling your head out of the water until you are nice and vertical. Adjust your **body angle so it is about 3 degrees forward of vertical** (figure 1).

Arm Action. Swing the arm from the **shoulder** in a **relaxed, pendulum-like action** with the elbow about three inches out from your side. Start with the **forearm at a right angle to the upper arm** and the **thumb about 2 inches below the water line**. With the **elbow close to your side**, move the thumb down as you **swing the elbow back until the thumb reaches the hip**. Return to the starting position with the thumb 2 inches below the water line to complete the cycle. Arm action moves back and forth between these two thumb points with the efficiency of the pendulum on a grandfather clock. It's very important that the arms aren't crossed in front of the body. This is wasted motion.

Leg Action. The stride begins by bringing the upper leg up to **70-80 degrees hip flexion** with the **knee at a right angle** - about 90 degrees. The **foot is directly below the knee** with the **foot flat** so it can push the water down. Brennan likens this motion to **stomping on grapes** that are directly underneath you. When your leg has reached full extension, let it swing back a little behind your body. Then **lift your heel quickly toward your buttocks** as you bend your knee and **rotate your knee forward and up** in position to push straight down in the next cycle. Make sure that your lower leg does not extend in front of the body and reach forward, an action which is similar to over-striding on land.

Focus on the **up and down cycling of your legs** and keep an erect posture. This allows a quick and efficient cycling action that can be varied to meet pacing needs. Adjust your cycling time to the level of exertion that your training requires. **Remember! Don't try to move quickly through the water by leaning your body forward and reaching out in front with your lower leg. This will restrict cycling tempo, diminish running efficiency, and reduce the training effect from your efforts.**

As you practice your running form in the pool, start very slowly. Use full ranges of motion and avoid crossing over in front of your body with your arms and legs. Once you have mastered the running form, you can increase speed. With a little practice, running in the water will help your running form on land.

Checking Buoyancy

Before you get into the pool, check your AquaJogger® to ensure that it's properly positioned, fits snugly, and has all of the slack out of the belt. Get into the pool and hold onto the side while you move your legs directly underneath you. Push away from the side of the pool and check the level of the water. You have the right amount of buoyancy when your head is comfortably out of the water as you gently tread water.

Using a Tether

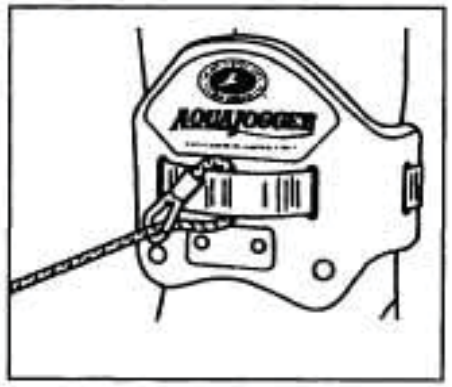

Figure 3
(AquaJogger® with hitch attached)

A tether line such as the AquaJogger® Hitch can assist you in maintaining correct body position in the pool and/or minimizing your traveling forward in a confined area. You can attach one end through the AquaJogger® belt as shown in (figure 3) and the other to a pool

ladder, a lane line, a heavy object or some other stationary object at pool side. Brennan likes to use two AquaJogger® Hitches threaded through the large port-holes in the back of the AquaJogger® to increase lateral stability.

Warm Up/ Cool Down

Before and after each workout session, warm up and cool down for 4-5 minutes with some very light activity followed by some gentle stretching. Keep all movements smooth and stay relaxed. Take your pulse periodically during the workout and try to use the RPE scale to monitor your intensity (figure 4).

Deep and Shallow Water Defined

"Deep water" is water sufficiently deep that your feet do not touch the bottom of the pool when suspended in an erect position by a buoyancy belt (AquaJogger®). "Shallow water" refers to a water depth that ranges from your waist up to your shoulders, giving you the option of touching the bottom of the pool at any time. An AquaJogger® can be used effectively to perform a variety of "buoyancy assisted" or suspended exercises in shallow water.

Pool Side Session

It is important that you master the correct running form before starting your conditioning program. It can be helpful to have someone stand at pool side and read the instructions in the Running Form section and provide feedback on how you are progressing. If this is not possible, memorize the running form section and coach yourself through the basics.

Start slow and easy and check out your form. Increase your speed slightly and check yourself out at this faster cadence. Gradually pick up the tempo, a little at a time, and check your form before you shift into a higher gear. Continue until you reach an all out effort without losing form. When you master this level, you are ready to start your training program.

Monitoring Training Intensity

Maintaining correct running form in the pool will help you maximize the training effects from deep water running. A structured program will yield better results than just jumping in the pool and hoping something will happen. Brennan prefers to use **three forms of monitoring training intensity** in the pool. You will need a wrist watch or a pool side clock that shows both minutes and seconds.

Heart Rate

The physiological changes that occur when you are submerged up to your neck in water will cause your heart rate to be from 10-15% lower than for a similar effort on land. You can find your heart rate very easily by touching the large artery in your neck near your Adam's apple. Count for ten seconds. Multiply by the number six to find your **heart rate per minute**. Some people prefer to take their pulse at their wrist. Brennan prefers to take the pulse immediately after each interval. Use either the 10 second count method or a heart rate monitor designed for underwater use such as the Polar® brand.

Cadence

Another form of monitoring your intensity is counting your cadence. Brennan has you count the number of times your right knee comes forward and up. He likes to take that count the last 30 seconds of each interval. Get your count and double it and that gives you your **cycles per minute**. It is difficult for you to use your wrist watch for this procedure. You may want to find a clock at pool side or someone closeby to call out the time start and stop times for the interval.

Rate of Perceived Exertion (RPE)

A subjective scale to measure effort is very useful. It works particularly well if you are used to training on land and have a feel for the cycling rate of your legs and the resulting breathing patterns for each level of exertion. Brennan uses a scale with 5 levels of intensity ranging from very light to very hard (figure 4).

How Hard are you Working in the Pool?

Brennan Rate of Perceived Exertion - **RPE**

Note: the cycles/min. are approximate numbers for a well conditioned athlete. Substitute the cadence numbers that are appropriate for your training level.

Rate of Perceived Exertion	1 Very Light	2 Light	3 Somewhat Hard	4 Hard	5 Very Hard
Cadence (cycles.min.)	60	60-70	70-80	80-90	90+
Dry-land Equivalent	Brisk Walk	Easy Jog	Brisk Jog	Race Pace	Track

Figure 4

Brennan suggests that unconditioned individuals should deduct about 10 cycles/min. or more for each level and that sprinters can often handle a slightly higher cycles/min. (for a shorter duration).

Levels of Intensity

LEVEL 1 - Very Light. Like a brisk walk through the park. This level is a good warm up and warm down.

LEVEL 2 - Light. An easy jog. A good pace for active recovery from a hard land training session or competition. This is also a good level at which to start if you are just beginning your cardiovascular program or working on your water running form.

LEVEL 3 - Somewhat hard. A brisk jog. This is the pace at which you would move if you're just out on a regular training run covering anywhere from three to five miles.

LEVEL 4 - Hard. This is like running a race pace or your pace during competition in your sport. You should be able to maintain this pace for anywhere between three to 10 minutes or even longer if you are a distance runner.

LEVEL 5 - Very Hard. This is an all out sprint and an important level for most sprinters or distance runners attempting to increase their running speed. This is similar to sprinting all out intervals on the track or the wind sprints commonly used in training for other sports. The intervals are short and range from 15 seconds to 2 minutes depending on your speed and your conditioning level.

Increase Your Running Speed

To increase speed and maintain quickness, you must train that way. Water provides an environment that allows speed training through a full range of motion without the impact and pounding associated with most sprint drills. When performed correctly, cycling speed in the water can be even faster than on land. Since there is no impact with the ground to slow down the cycle, sprinters often reach higher cycle per minute rates in the water than during land based sessions. The faster cycling trains neuromuscular response and allows fast twitch fibers to fire at a faster rate. Adaptation of these responses to a faster rate of activity is the primary component of increasing speed.
(Brennan is still wondering just how much his 1994 pre-season water running sessions with Leroy Burrell affected Burrell's running a world record of 9.85 in the 100 meters that summer!)

Caution: You can overtrain in the water just like you can on land. The primary pressure in the aquatic environment is on the cardio-pulmonary system, so be especially watchful for signs of breakdown in this system. Give yourself a chance to recover between training sessions. The hard - easy system of training works best with an extra easy session thrown in whenever you are in doubt about your recovery from the previous session. If you are using the water for an easy day recovery from your land training, keep it easy and don't go much beyond level 2.

Traveling

In a pool in which you have to share space, stake out your own turf by moving forward in a series of straight lines and quarter turns that make a nice little square. First, move out away from the pool side in a straight line, maintaining good form. Remember, most of your effort should be spent turning the legs and arms over and not moving forward. When you get to the **first corner** of your square, take a quarter turn to the right and keep moving in a straight line. At the **second corner** of the square, take another quarter turn to the right and proceed forward while focusing on a point at the side of the pool directly in front of you. This will help you maintain a front to back action moving all the joints in a straight line. At the **third corner** of the square, take another right turn and proceed straight ahead until you reach the starting point. You have completed one lap of the track and staked out your training area. For variety, try traveling in different directions or using a rectangular shape. if you have room.

Loading

The magic of water allows you to progressively add more weight or load to the body. By varying the depth of the water, you're varying the load or the impact that you place on your body. As you progress downward to shallower and shallower water, you increase the load on the body. Using variable depths is very useful when recovering from an injury or when you've had a hard training session and you need to partially unload the body. Training at variable depths can often help prevent injuries and is an excellent cross-training procedure.

Resistive Equipment

Note: *Make sure you have the mechanics of running refined before you use these resistive devices. Do not use them when injured without guidance from your rehabilitation professional.*

Figure 5
(Runner with AquaRunners® and DeltaBells®)

On land, people use weights to add resistance. In the water, buoyancy and the surface area of an object are used to provide resistance that places stress on the body. A device is **buoyancy resistive** when its buoyancy makes it difficult to move the object down from the surface of the water. It is **surface resistive** when the surface area of the object makes it difficult to move through the water. The intensity of the resistance for both buoyancy and surface resistive devices is increased in direct relationship to the speed at which they are moved through the water.

Figure 6 ***(AquaRunners®)***

Figure 7 ***(DeltaBells®)***

AquaRunners® (figure 6) are both buoyancy and surface resistive and can be placed on the feet to increase the workload by making it more difficult to push the legs down and adding surface area resistance

on the return. The faster the pace, the more resistance. Always consider the stress on your joints when adding resistance (loading) to an extremity. Start at a slow, easy level and give your joints and muscles time to recover and adapt to the added resistance. AquaRunners® are not to be used for standing or running on the bottom of the pool in shallow water or on the deck. AquaRunners® are designed to be used with a buoyancy belt.

The **DeltaBells®** (figure 7) are hand-held buoyancy and surface resistive devices designed to condition the body's upper extremity. Their buoyancy provides resistance when pushed away from the surface of the water, their surface area provides resistance when pushed or pulled by the limbs through the water. Their triangular shape allows you to push or pull either the flat or pointed shape through the water. The flat surface provides more resistance than the point so you can vary the intensity with the turn of your wrist. The resistance effect is increased as the speed of the devices movement through the water is increased. Ordinary round water dumbbells are not as efficient for water running as the triangular shaped DeltaBells® which can be turned flat side toward the body allowing arms to swing close to the body in correct running form. ***Caution: When using a buoyancy resistive device it is important to keep it below the surface of the water so there will be no radical change in movement when the device leaves the water or is pulled back under the surface.***

Webbed Gloves

Other resistive devices that runners find useful in the water are webbed gloves like the AquaJogger® Fitness Gloves. You can vary the surface area and the resistance by spreading the fingers to catch more water as the hands are moved through the water. Webbed gloves allow movement of the hand through the correct range of running motion without compromising running form.

Shallow Water

Note: *In shallow water it is advisable that you wear something to protect your feet from abrasion. Nike® Aqua Turf shoes are recommended.*

If you're transitioning from a deep water program to land during rehabilitation, or if your pool is too shallow, shallow water running is a good alternative or supplement to deep water running. You are only carrying about 10% (loading) of your body's weight when standing in water up to your shoulder joint line. This is a good place to start when you are transitioning from deep to shallow water and gradually loading the body. After a week or

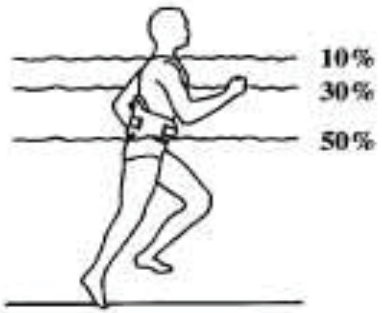

*Figure 8 (**Shallow Water Running**)*

two at the shoulder level, move to chest level, which is about 30% loading. As your program moves along (two to three weeks), progress to water that is hip level where the loading is about 50%. This procedure allows your body to slowly adapt to the impact of land-based running. To begin, leave the flotation belt on. This will reduce the percent of loading. As you progress, take the belt off to increase the loading and prepare for the impact of land running.

Sample Workouts

Brennan provides three workouts as an example of the type of deep water running sessions he creates for uninjured athletes. They can be adapted for shallow water running. Be sure to include a **warm up** and a **cool down** period.

Continuous Low Intensity

- 20-40 minutes of deep water walking or running at a steady pace.
- RPE level at 1-2. (figure 4)
- You should be able to hold a conversation and breathing should be moderate.
- Try this workout 3-4 times per week.
- If you are just starting, stick with this one for the first 4-6 weeks and build a good endurance base.

Medium Intensity Interval Training

- Try bursts of activity for 3-5 minutes at somewhat hard (not all out) pace.
- Take a 30-60 second recovery period to catch your breath.
- Repeat the burst of activity 10-15 times depending on your fitness level.
- Total workout time 25-45 minutes.

High Intensity Interval Training

- Short hard burst of activity ranging from 30 seconds to 2 minutes duration.
- Recovery periods of 15-30 seconds.
- Repeat 15-20 times.
- Total workout time 25-35 minutes.
- Only try this one if you are in good shape.
- One of these high intensity workouts each week is enough!

Use these examples to create your own training sessions based on your own sport and conditioning needs.

Supplemental Exercise

There are many exercises that can be incorporated into your water running program. Sit kicks (figure 8), cross country ski (figure 9), and tires (figure 10) are three popular moves. Use them during warm up and warm down, to add variety and to provide cross training for muscles.

*Figure 9 (**Sit Kicks**)*

Sit Kicks

Sit as if in a straight back chair with your thighs stabilized. Alternating legs, **kick out from the knee**, then pull your heel back as if trying to kick your buttocks. Try to make the water boil in front of you.

Tips

- Focus on keeping your thighs still, as if they are resting on a chair seat.
- Scoop the water in toward your chest with your arms, or try other arm variations.
- Point toes to increase resistance.

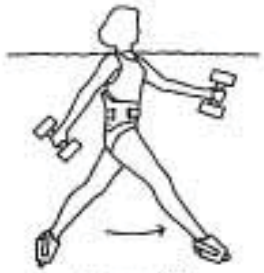

Figure 10
*(**Cross Country Ski**)*

Cross Country Ski

Body is vertically aligned and legs and arms are straight. Scissor legs forward and backward from the hip, leading with your toes. Coordinate the arms and legs as in cross country skiing.

Tips

- Lead with fingers and toes.
- Point toes to increase resistance.
- Keep arms fairly straight and move from the shoulder.
- Push and pull arms through the water with scooped hands.
- Keep buttocks and abdominals tight.
- To decrease resistance and intensity, bend knees slightly.

*Figure 11 (**Tires**)*

Tires

This move is similar to the football drill of running through two parallel lines of tires. The body is open and vertical. Have your legs turned out and feet flexed as you alternate pushing down with each leg.

Tips

- Try breast stroke arms, or scoop the water in toward your chest.

Additional Information

The following sources provide additional information and exercises that can be utilized to add another dimension to your aquatic program.

- Most AquaJogger® products include exercise guides and exercise information.
- On line: www.aquajogger.com
- Call 800-922-9544 for current information available.

Videos

• Take It To The Water. *Water Running for Sports Conditioning and Recovery*, with David Brennan. Step by step demonstrations and instructions on water running form and developing a water running program. It includes injury prevention tips from Dr. Stan James, internationally known sports orthopedic surgeon.

• The Complete AquaJogger® Water Workout Video features Juliana Larson, nationally recognized instructor who has developed award winning programs. Demonstrates a wide range of deep and shallow exercises that provide great variety to your aquatic program.

These products can be obtained from your AquaJogger® dealer. For the dealer nearest you: call 800 922 9544 or 541 484 2454 or fax 541 484 0501 or write Excel Sports Science Inc., P.O. Box 1453, Eugene, Oregon 97440.

Illustrations in Handbook: