

# Basic Water Exercise Program

## for Cardiovascular Conditioning and Gait Training

### by Karen Pape, MD

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## **Water Exercise for Cardiovascular Conditioning and Gait Training**

This program is about water exercise. People talk about aquatic therapy and exercise as if they were the same thing. They are not. Exercise in the water has specific benefits that are applicable to all members of the family. Water exercise can increase overall fitness and strength and may secondarily improve a specific problem of movement. This form of exercise is recommended for people with mobility problems.

Water decreases the body weight up to 90%. There is an increased range of motion as the water supports the joints. Water provides a resistive environment with little risk of injury so that people with a balance or coordination problem are able to learn to relax while moving. The resistance of water offers many times the resistance of air. The interesting thing about water is that the faster you move and the more mass you move through the water, the more resistance it provides. This means that the bigger you are and the faster you move, the better workout you get.

**Gait Training for People with Neurologic Problems** - The water is a natural medium in which to practice a new motor skill. Once a child or adult is comfortable in the water, the fear of falling disappears. Water exercise, in a floatation device, eliminates the effects of gravity and allows free movement. The most important thing about water exercise is that it challenges the whole brain. Water walking or jogging is not a habitual or a learned movement.

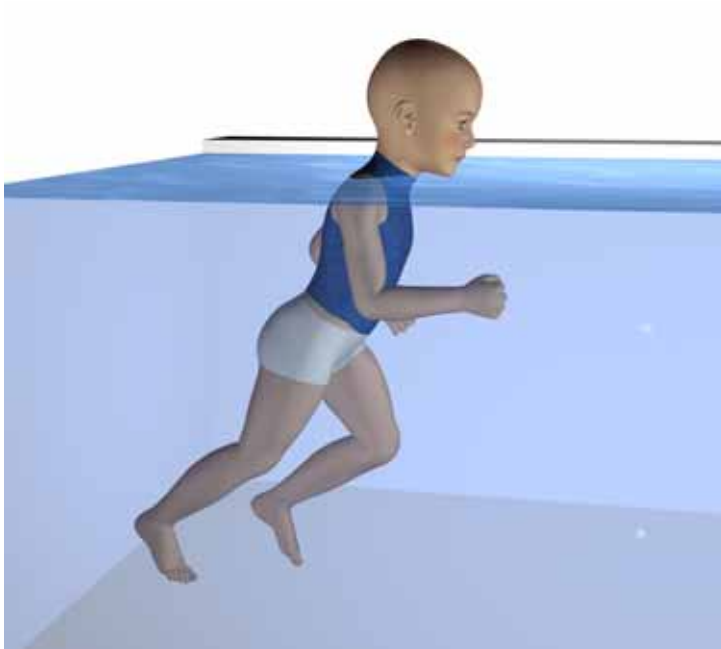
**Cardiovascular Fitness** - Water exercise provides an effective cardiovascular workout. Anyone with a mobility disorder is likely to be unfit. Children with an early onset problem are usually well below age standards of both physical and cardiovascular conditioning. The basic water exercise program is a good starting point. Heart rate monitoring is advised at the start. Target values for training heart rates in deep and shallow water training are available. Remember running in deep water removes approximately 90% of the effect of gravity. The floatation device eliminates all gravity by creating neutral buoyancy in the water. When you move slowly through the water, the resistance is approximately 4 times that of air. The faster you go, the more work is involved. When you run as fast as you can, the fluid resistance increases 20 to 30 fold.

**Flexibility and Strengthening** - Using buoyancy equipment can increase your passive range of motion from 5 to 20 % without pain. Working with the Sports Therapy Barbell is the first stage of the strengthening and flexibility program. It concentrates on improving core and upper limb muscle strength and stability. Water walking and/or jogging will improve trunk and leg endurance strength after 6 to 8 weeks of the program.

**Weight Loss** - The average adult male, running on land for 1 hour will burn 500 to 600 calories. The average female with the same exertion will burn 300 to 400 calories. The difference is women generally have about 40% less muscle mass than men do. The good news is that both men and women can use up to 1000 calories per hour while running in the water. The half-hour of cardiovascular work in the water program can be a benefit to the whole family. In water, being heavier means you will lose faster.

## Warm Up and Cardiovascular Conditioning

The first goal of a water exercise program is to increase flexibility and cardiovascular fitness. Each water session will start with an aerobic warm-up portion. Use an appropriate floatation device for water walking or jogging in the deep end of the pool. It may take a few sessions to feel comfortable in the water. Start with an easy walking motion and gradually move forward to an easy running motion. The ideal position is upright, leaning slightly forward, using the same motion of arms and legs as with running. Hands may be fisted or cupped. Do not try to pull the water towards you, just move arms forward and back. If you are using deep water walking/jogging as an aid to gait training use Position A. Start with 5 to 10 minutes of water jogging in the Wet Vest. Work this up to 30 minutes of continuous movement over the first month. Once you are at 30 minutes of aerobic conditioning, increase the work by increasing the speed and challenge of the activity. Younger children will get the same workout by running races about the pool, retrieving objects, or doing timed races from one side to the other. This exercise gives overall benefits for cardiovascular fitness, balance, strength and ultimately endurance.



Position A



Position B

If the pool you have available is shallow, Position B may be used. This is half way between running and swimming. You will move faster in this position, but there is less water resistance and thus less exercise benefit.

## Standing Exercises

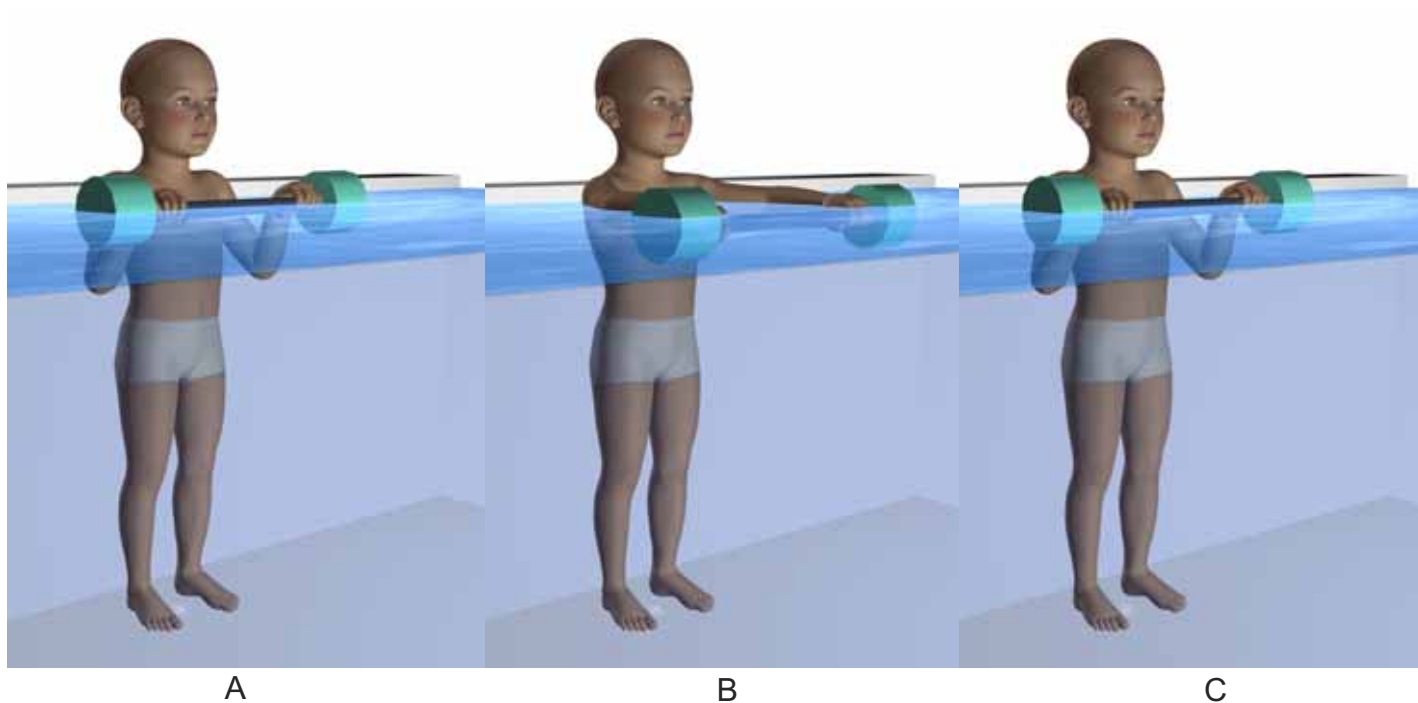
Shallow water exercises are done after completing the warm-up and cardiovascular component of your routine. These exercises are done in chest deep water. They are designed to stretch, tone and strengthen the core and upper limb muscles

### Upper Limbs and Trunk - 1A - Barbell In and Out

A. Stand as straight as you can at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool. Hold the Sports Therapy Barbell on the surface of the water with both hands, elbows flexed, hands holding the top of the bar.

B. Push the barbell straight out in front as far as you can.

C. Pull the barbell back into the start position. This is one repetition.



### Progression

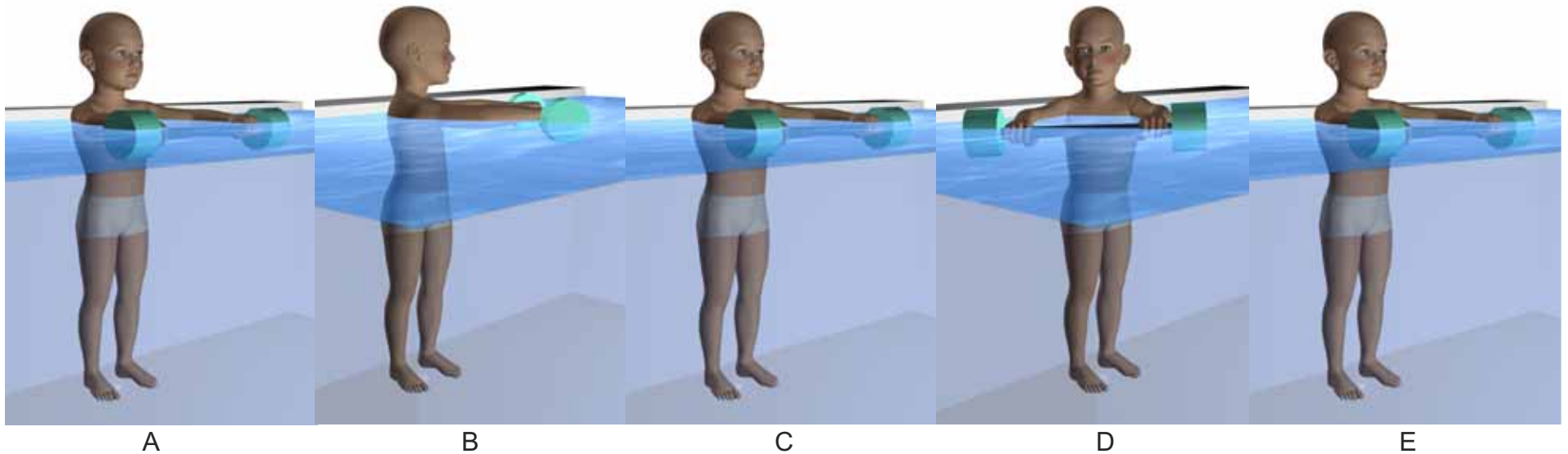
Start with 5 repetitions and gradually increase to 15 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 15 repetitions x 2 sets.

### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position. Keep elbows as close to the body as you can.

## Upper Limbs and Trunk - 1B - Barbell Twist Side to Side

- A. Stand straight at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool. Hold the Sports Therapy Barbell on the surface of the water with both hands, straight in front of you, hands holding the top of the barbell.
- B. Slowly twist to the left as far as you can go with the hips still touching the side of the pool.
- C. Return to start position.
- D. Twist to the right.
- E. Return to start position. This is one repetition.



### Progression

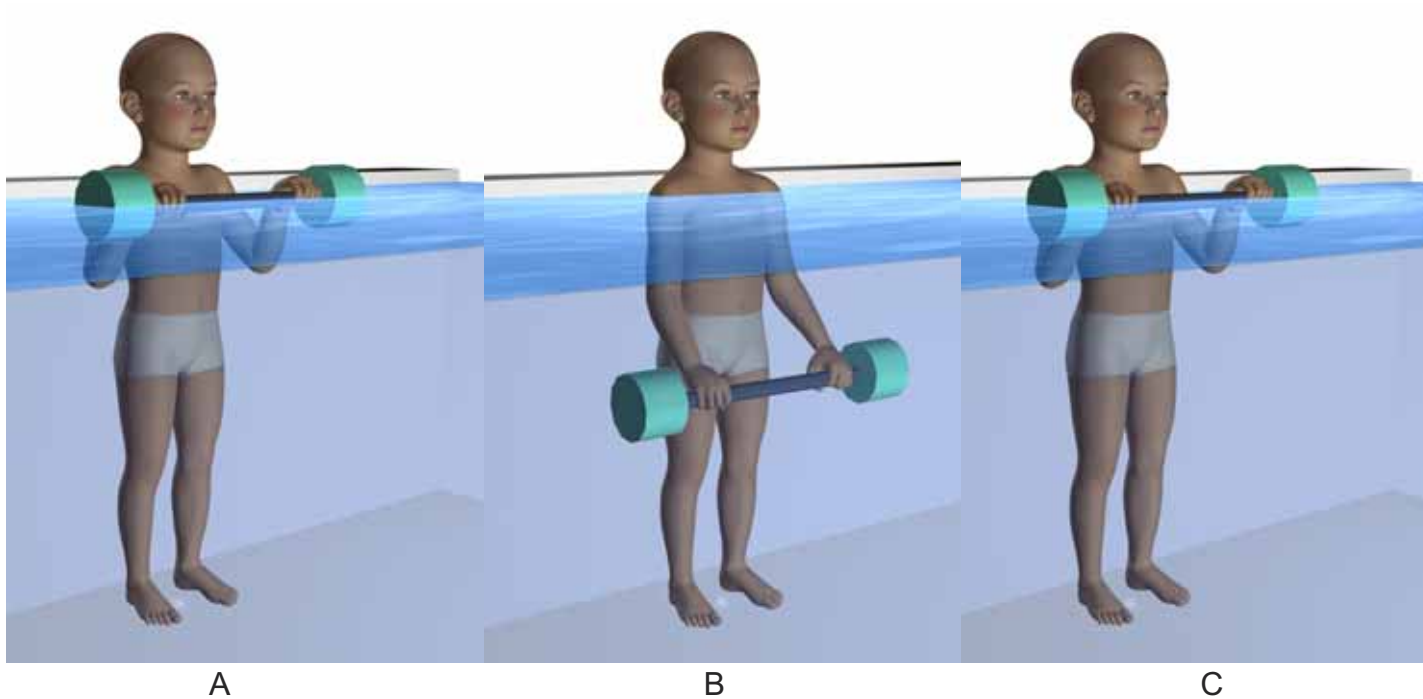
Start with 5 repetitions and gradually increase to 15 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 15 repetitions x 2 sets.

### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position.

## Upper Limbs and Trunk - 1C - Barbell Up and Down

- A. Stand straight at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool. Hold the Sports Therapy Barbell on the surface of the water with both hands holding the top of the bar.
- B. Push the barbell straight down in front as far as you can.
- C. Pull the barbell back into the start position. Control speed as the Barbell comes back to the surface. This is one repetition.



### Progression

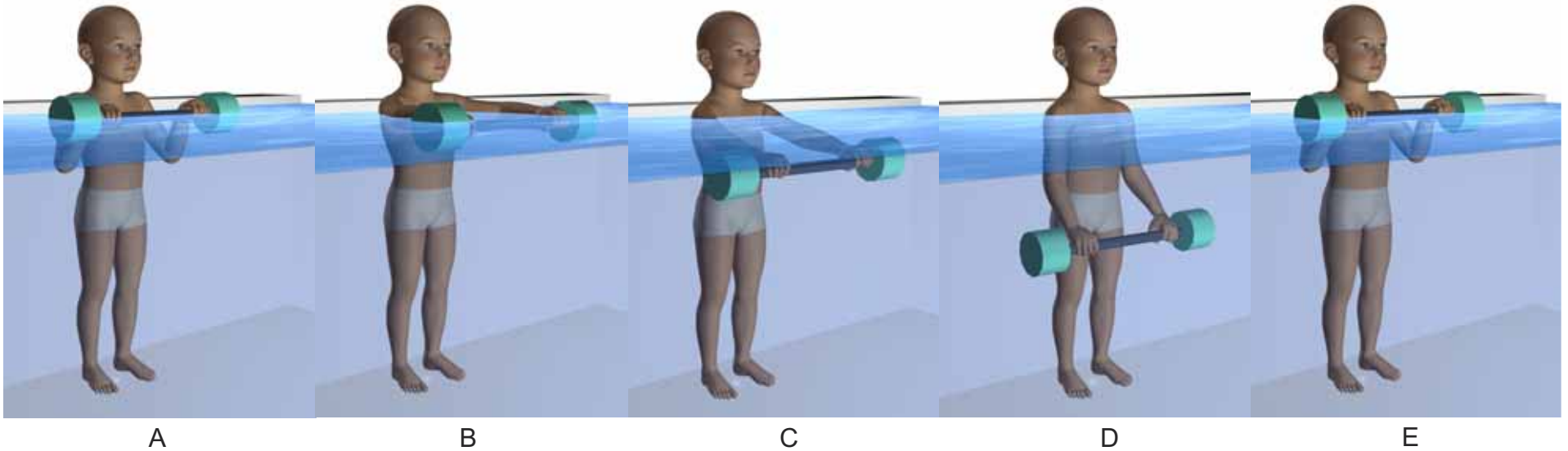
Start with 5 repetitions and gradually increase to 15 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 15 repetitions x 2 sets.

### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position. Keep elbows as close to the body as you can.

## Upper Limbs and Trunk - 1D - Barbell Circles

- A. Stand straight at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool. Hold the Sports Therapy Barbell on the surface of the water with both hands holding the top of the bar.
- B. Push the barbell out straight in front as far as you can.
- C./D. Pull the barbell down and in to your body.
- E. Raise the Barbell to the start position. This is one repetition.



### Progression

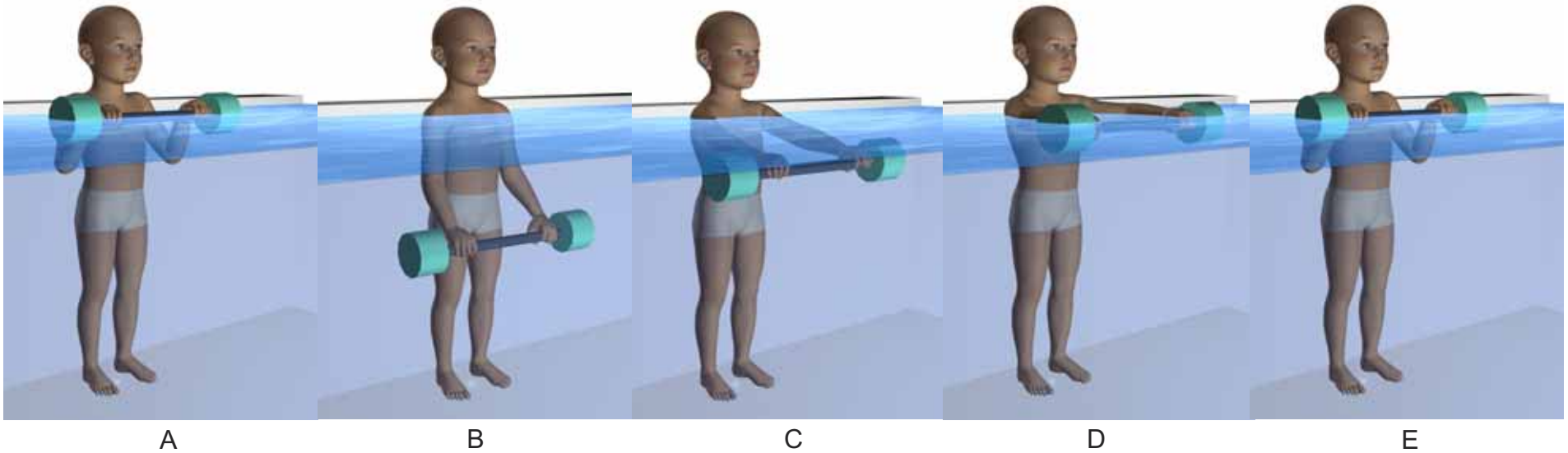
Start with 5 repetitions and gradually increase to 10 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 10 repetitions x 2 sets.

### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position. Keep elbows as close to the body as you can.

## Upper Limbs and Trunk - 1E - Barbell Circles / Reverse

- A. Stand straight at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool. Hold the Sports Therapy Barbell on the surface of the water with both hands holding the top of the bar.
- B. Push the barbell down in front as far as you can.
- C./D. Float out to surface with arms extended.
- E. Pull in the Barbell to the start position. This is one repetition.



### Progression

Start with 5 repetitions and gradually increase to 10 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 10 repetitions x 2 sets.

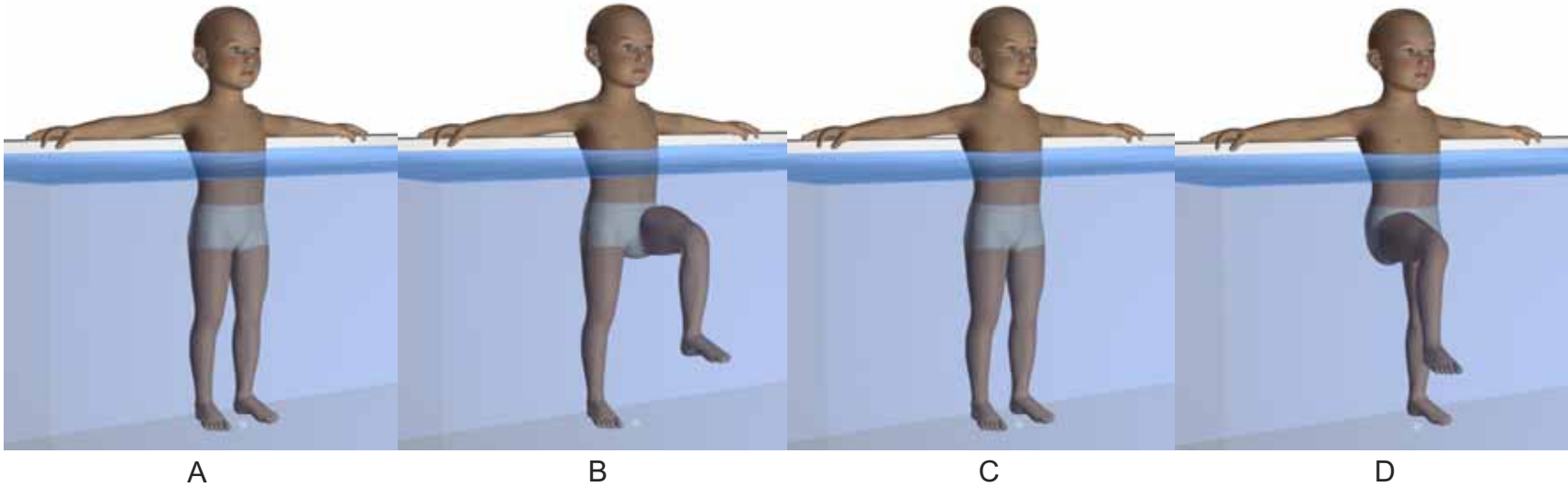
### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position. Keep elbows as close to the body as you can.



## Lower Limbs and Trunk - 2A - Bent Knee Leg Lifts

- A. Stand straight at the edge of the pool in chest deep water. Rest your back and hips against the side of the pool and hold on to the edge with arms extended to the side.
- B. Bring your left knee upwards towards your left shoulder. Feel a gentle stretch in your gluteal muscles.
- C. Press the leg down to the floor of the pool.
- D. Repeat with the right leg. This is one repetition.



### Progression

Start with 5 repetitions and gradually increase to 15 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 15 repetitions x 2 sets.

### Remember

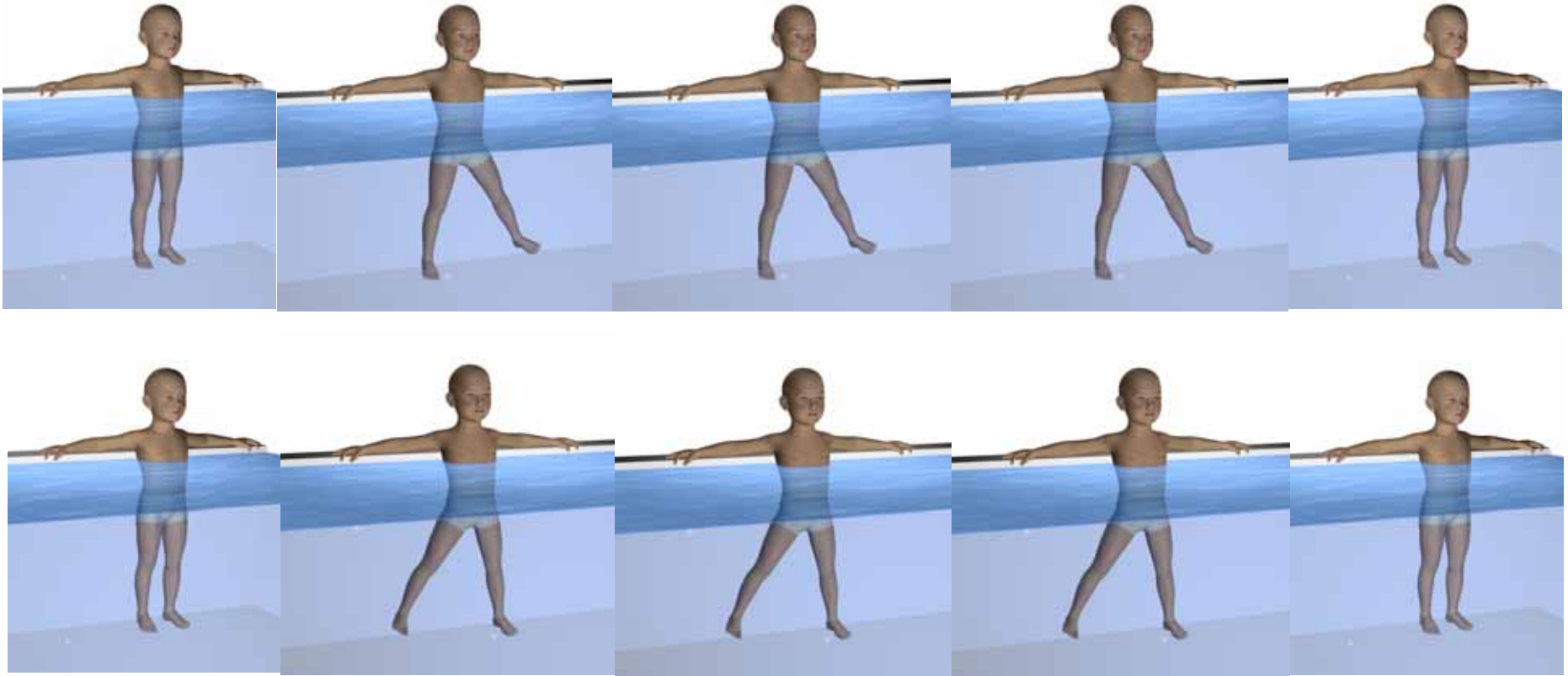
Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position.

## Lower Limbs and Trunk - 2B - Side Steps

Stand at the side of the pool in chest deep water. Rest your back and hips against the side of the pool and hold on to the edges with arms extended to the side.

Step 3 steps to the left and return.

Step 3 steps to the right and return. This is one repetition.



### Progression

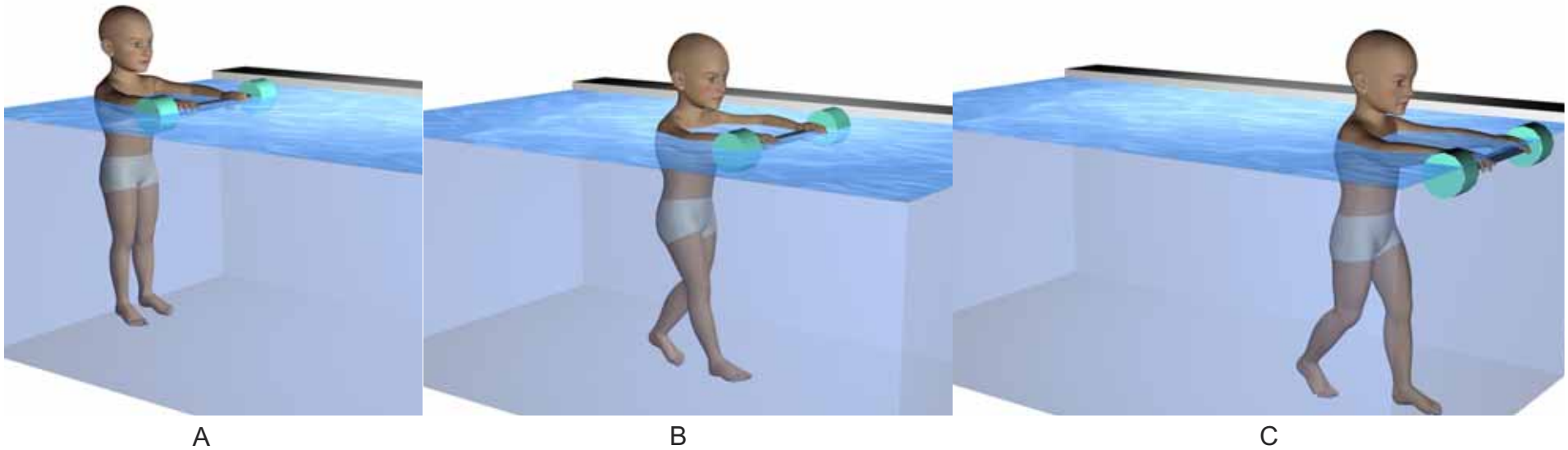
Start with 5 repetitions and gradually increase to 10 repetitions. Rest for 1 to 3 minutes after the first set and then do a second set, starting at 5 repetitions and working up to 10 repetitions x 2 sets.

### Remember

Stand as straight as you can with your back and hips against the side of the pool. Stop and readjust if you lose the start position.

## Gait Training - 2C - Walking with Barbell

- A. Start at side of pool in chest deep water, arms extended holding Sports Therapy Barbell in both hands on the surface of the water.
- B. Walk across the shallow end of the pool, keeping the Barbell on the surface of the water. At first, you may need the Barbell steadied by a helper.
- C. Walk backwards across the pool to the start position. This is one repetition.



### Progression

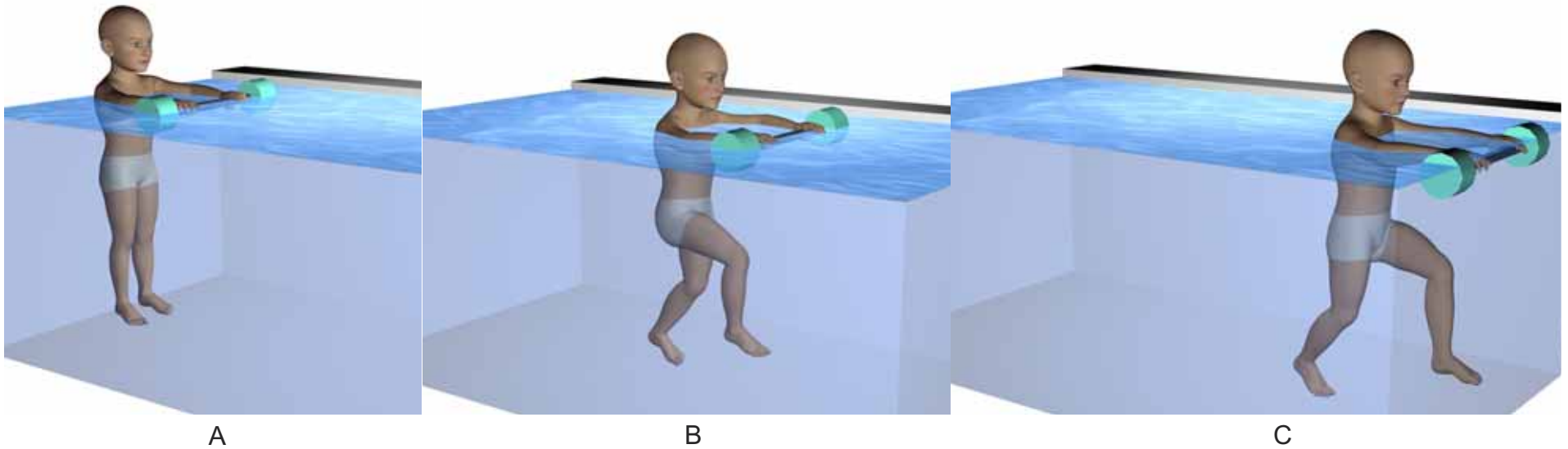
Start with 1 to 2 repetitions walking across the pool and back. Gradually increase to 10 repetitions.

### Remember

Stand as straight as you can and work to keep the Barbell straight, floating on top of the water.

## Gait Training - 2D - High Knees with Barbell

- A. Start at side of pool in chest deep water, arms extended holding Sports Therapy Barbell in both hands on the surface of the water.
- B. Walk with high knees, bringing your knee up with each step, across the shallow end of the pool, keeping the Barbell on the surface of the water. At first, you may need the Barbell steadied by a helper.
- C. Walk backwards across the pool to the start position. This is one repetition.



### Progression

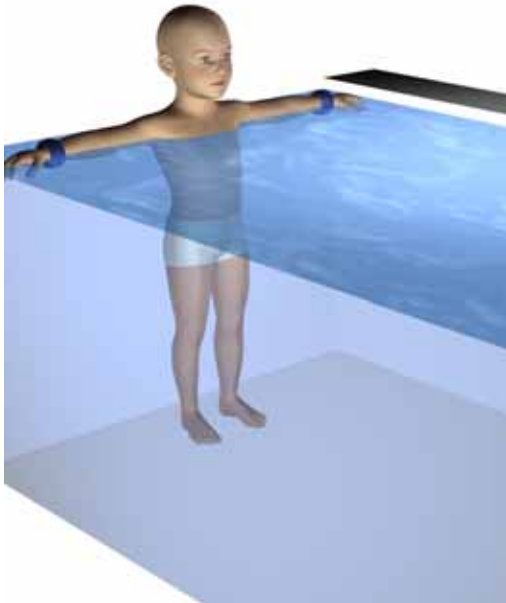
Start with 1 to 2 repetitions walking forwards and back with high knees after you have completed 10 repetitions of regular walking forwards and back across the pool. Gradually work up to 10 repetitions (1 set). At this point, stop doing straight walking and substitute only high knee walking. Add further repetitions until you can easily do 10 repetitions x 2 sets of high knee walking forwards and back.

### Remember

Stand as straight as you can and work to keep the Barbell straight, floating on top of the water.

## Gait Training - 2E - Arms Out with Arm Floatation Device

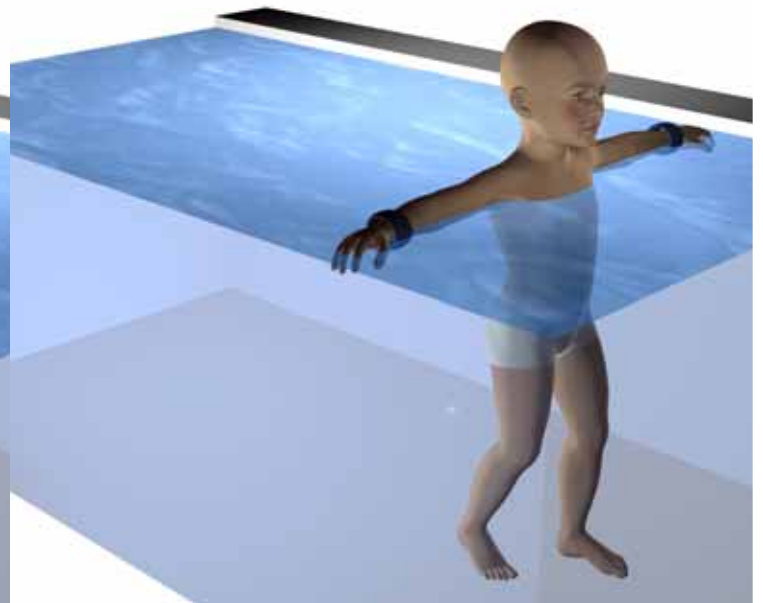
- A. Start at side of pool in chest deep water with arms extended to the side with floatation device on each arm.
- B. Walk forwards across the shallow end of the pool.
- C. Walk backwards across the pool to the start position. This is one repetition.



A



B



C

### Progression

Start this exercise when you can do 10 repetitions x2 of high knee walking. Start with 1 to 2 repetitions until you work up to 10 repetitions. Continue doing 10 repetitions x1 of high knee walking and 10 repetitions x1 of arms out walking with a floatation device. The next progression is to do these exercises in progressively more shallow water. The last progression is to do 1 set of high knees and 1 set regular walking without supports. Swing your arms as you walk when you reach this stage.

### Remember

Form is everything! Practice does not make perfect, perfect practice makes perfect. Fatigue will make you lose form and that is the signal to stop and rest.

## Equipment for the Water Program

The first item is a floatation device. Think about teaching an able-bodied child to dive into the water headfirst. You will conjure up an image of a child who tip toes towards the side of the pool, stiffens all joints, puts their arms up over their heads and then steps out into the water. Think of a child learning to swim. The pain, the terror, the swallowed water, until finally they get it. If a child who has disturbed neuromotor control attempts to learn how to swim without a floatation device, they have to learn through their abnormal tone. In other words, we put them in the water, they tighten up and then we expect them to learn a new skill.

It is much more effective to teach the child to learn to swim with a floatation device. It takes a variable amount of time to get a child completely comfortable in the water. When this happens, they relax totally in the water and their tone diminishes. When they reach this relaxed state in the water, we can start teaching them a new new skill. You have to use something simple that allows as much free movement as possible. The Wet Vest is recommended for all children and adults with a neuromotor difficulty. The Wet Vest provides increased proprioceptive input to the trunk which makes the exercise program simpler to perform. Children and adults without balance or strength issues, may be able to use a variety of other floatation devices. A neck floatation collar is available for those most severely involved. Children and adults with severe neuromotor disability need this extra support. About 3% of the population are “sinkers”. Extra floatation can be built into the Wet Vest by special order. A life jacket is not as effective as a floatation device as it floats the child backwards and face up. This is not a normal walk/jog position. Able bodied adults and children can use a buoyancy belt. They are less expensive and help everybody work out in the water in the same way. The Wet Vest is not a life jacket and individuals still need adult supervision.

Water floatation weights come in a variety of shapes and sizes for Exercise 2E. One type looks like a standard weight belt and has clips to attach them around the arms and/or legs. This type has slightly more floatation properties than the softer arm bands with a Velcro attachment. The softer weights are more comfortable than the clip on ones. For the child who is too small to use either of these floatation devices, plastic water wings that are used to teach children how to swim may be used.

Note: Never use any floatation device as a life preserver and do not work out in the water alone. Do not use arm and leg floatation weights at the same time as there is a risk of losing balance and control in the water.

RECOMMENDED EQUIPMENT - [www.hydrofit.com](http://www.hydrofit.com)

Wet Vest



Belt



Wet Vest Float-its with Velcro



Hydrofit Classic Cuffs with Clips



Water Wings



Neck Floatation



Sports Therapy Barbell



Heart Rate Monitor  
Heart Rate Charts (see Teaching Tools at [www.hydrofit.com](http://www.hydrofit.com))

