Vol 2, 2009 CEC ARTICLE: WATER, THE ELIXOR OF LIFE

By Beckie Jacobsmeyer

Every living thing needs water. It is essential to life, but what is water? A drop of water is composed of millions of molecules. Each molecule contains one oxygen atom and two hydrogen atoms, which bind together to form water. Water is very unique because to can change forms depending on the temperature from a liquid to a gas to a solid.

Water is the most important substance in the human body. Approximately 70% of your body weight is water. Your blood is almost all water and a large part of your skin, bones, muscles, and brain are made up of water. Every system in your body needs and utilizes water to work efficiently. For example, if you do not have enough water in your blood stream your blood will thicken causing your blood pressure to increase as your heart works harder to circulate your blood. Dehydration causes your muscles to fatigue quickly and can even cause muscle cramps. An inadequate amount of water causes your body to constantly be borrowing water from its' different body systems (cardiovascular, digestive, musculature, etc.) making all of them function at less then capacity.

You are very dehydrated if the amount of water in your body drops by as little as **one percent**. A lost of five percent of the water in your body causes your skin to shrink, an inability to move your muscles properly and difficulty in thinking clearly. If the amount of water in your body fell by more then ten percent you would probably die. Humans can only survive a few days without water.

Humans need to take in at least two quarts or liters of water a day. Half that amount should come from water and other liquids we drink. Milk, for example, is 87% water. Another third comes from our food. A raw potato is 90% water and a tomato is 95%. The remaining water is created by our own body. As the cells of your body use food to produce energy there by-product is water.

On a beautiful 65-degree day with low humidity the average person expends about 64 ounces of water by urinating, breathing and sweating. You will need much more if you live in hot, humid or cold climates. Hiking in the mountain's higher altitudes will also increase the amount of water you will need. Exercising in indoor pools where the water temperature is 84 degrees or higher and the air temperature is in the 80's is another place where more water is needed. Another time you need more water is when you are sick with a cold or flu, especially if you are running a fever.

Many people do not drink until they feel thirsty. This is a bad habit to get into because when you are thirsty you are already dehydrated. Mild dehydration can cause health conditions such as lethargy and constipation because the body will siphon the water from the colon. Other dehydration symptoms are loss of appetite, minor headaches, dizziness and general lack of mental clarity. A pregnant woman who is dehydrated can go into premature labor. According to the Mayo Clinic there is even evidence that drinking adequate amounts of water can prevent health conditions such as kidney stones and colon cancer.

As mentioned above you need approximately 64 ounces of water for the body to maintain all it's systems efficiently. If you would like to know exactly how much water your body needs to maintain itself you can figure this by dividing your body weight by two. This will give you the number of ounces of water you need a day. Space your water

consumption evenly throughout the day. A good way to know that you are getting the water you need is by using a water bottle or keeping a pitcher of water in the refrigerator. If drinking this amount of water is new for you start out slowly increasing your intake by eight ounces each day. This will help your body adjust and help you spend less time in the bathroom.

Exercisers should drink an extra eight ounces of water for every hour of exercise they do. The American Dietetic Association recommends at least two cups of water two hours before exercising, followed by another two cups of water 15 to 20 minutes before endurance exercise activities (anything for more then 60 minutes). During exercise drink every 15 to 20 minutes. Water is recommended instead of sports drinks during exercise unless you are going to be exercising for longer then one hour or in extreme conditions.

Plain old water is the best choice. You can add some flavor to your water by adding a slice of lemon or lime. Sports drinks and flavored water often have hidden calories and ingredients we don't need such as sodium. The typical American diet contains too much sodium. Other beverages to avoid are caffeinated, such as, coffee, tea and soda, and alcoholic drinks because they are diuretics and increase fluid loss. In fact, you should drink a glass of water for each cup of these beverages you drink. Decaffeinated beverages are better then caffeinated but some of these are decaffeinated by using sodium, which raises their sodium content.

Are you trying to lose weight or maintain your current weight? Drinking water is the single most important catalyst in losing weight and keeping it off! Water has no calories and helps the stomach to feel full. Drink a glass of water 20 minutes before eating and you won't eat as much because the stomach already perceives that it is full. Water also helps the body metabolize stored fat. Studies have shown that a decrease in water intake will cause an increase in fat deposits, while an increase in water intake can actually reduce fat deposits.

The kidneys flush waste from the blood stream such as excess sodium and minerals. If the kidneys don't get enough water to function properly some of their workload is given to the liver. The liver's primary function is to metabolize stored fat into useable energy for the body. If the liver has to do some of the kidney's work it can't operate at full capacity. As a result, it metabolizes less fat, which means more fat remains stored in the body.

Have you ever gained five pounds over night? The culprit is water retention. Remember to gain one pound of fat you must eat an excess of 3500 calories above what your body needs to maintain itself. The average middle-aged woman needs between 1800 and 2200 calories a day. It would be very difficult to eat an excess of 17,500 calories in one day!

Temporary fluid retention often happens during a woman's menstrual cycle or after a night of drinking alcohol or even going out to a restaurant that serves high sodium foods. Constant water retention is caused by a continuous diet of excess sodium (salt) and by some medications. The more salt you eat, the more water your body retains to dilute it. Fluid retention occurs as swollen feet, legs and hands. Diuretics offer a temporary solution as they force out stored water along with essential nutrients the body needs. Unfortunately, the body perceives this as a threat and will replace the lost water at the

first opportunity. The best way to overcome the problem of water retention is to give the body what it needs, plenty of water. When the body has plenty of water coming in on a regular basis it does not feel the need to hold on to or retain it.

Water is essential to for every system in your body to run efficiently. If your brain is over 70% water how can it process thoughts at maximum capacity if it is dehydrated? Part of your kidneys and bladder's job is to flush waste from the body and maintain the proper mineral levels in the body. How can they do that if they don't have the water they need to do the job? Want to look your best, get rid of those fine lines, pimples, and dry skin? Drink your water! Water plumps the skin and leaves it clear, healthy and resilient.

Most senior citizens are dehydrated because they lose the sensation of thirst as they age. I wonder how many symptoms we think are part of old age could simply be the body trying to exist on an inadequate amount of water. High blood pressure, bladder infections, constipation, slower thought process and reaction time, short term memory loss to name just a few. It would be interesting to see some studies done on this.

Remember water is essential for a healthy, active, happy body. Give your body what it needs! Raise that water bottle and take a toast to a healthier you!

Resources: The New Book of Knowledge Encyclopedia
The following articles: Water How Eight Glasses a Day Keeps Fat Away
And Drink More Water IDEA Personal Trainer 2000

NO EQUIPMENT UPPER BODY STRENGTH TRAINING

By Beckie Jacobsmeyer

I try to include upper body strength training in almost all of my classes whether its fifteen minutes at the end of the aerobics, sandwiched in between arthritis exercises or an actual strength training class. Not always an easy thing to do when you can't seem to get the participants to use their arms! I strength train with and without equipment. In fact, the water can be the only piece of equipment you need. This article will focus on strength training using only the water's amazing resistance! I will give my reasoning for no equipment later in this article. But first why should we strength train?

It is very important to strength train the upper body to maintain the strength in the muscles your participants currently have. There are several reasons for doing this:

1. It maintains a high muscle to fat ratio, which keeps their metabolism from dropping as they age. This helps your participants maintain their optimum weight.
2. Independent lifestyles can be maintained because they have the muscle strength to
   do everyday activities like housework and carrying groceries.
3. Strength training helps to prevent osteoporosis by building bone.

4. Strength training keeps the joints healthy by working them through their full range of motion. As the joints are moved they are lubricated by synovial fluid which helps keep the cartilage in the joints healthy.

What are the upper body muscles and what do they do? It is important to understand anatomy so that you know what exercise will work what muscle. An easy rule to remember is that you are always working the muscle above the joint that is moving. For example, if you are moving the elbow joint then the biceps and triceps are doing the work. However, your environment will also affect this. If you are on land you are dealing with gravity. If you bend your elbow you are working the biceps. When you straighten your arm gravity is assisting you so you are not working your triceps as you lower your arm. Now if you are in the water you have the water resistance to work against in both directions, as you bend your arm and as you straighten it. So in water you work both the biceps and triceps. It is important to inform your class what muscle they are working and where they should be feeling it. This will encourage them to exert maximum effort. Also if they are not feeling the contraction where you are indicating they can let you know so that you can check and make sure they are doing the exercise correctly. The following is a chart listing the major upper body muscles and their movement.

Biceps	Flexion of the elbow
Triceps	Extension of the elbow
Deltoid (anterior)	Flexion of the shoulder (raises arm to the front)
(posterior)	Extension of the shoulder (raises arm to the back)
(medial)	Abduction of the shoulder (raises arm to the side)
Trapezius (upper)	Elevation of the shoulder blades
(mid)	Adduction of the shoulder blades
(lower)	Depression of the shoulder blades
Latimus Dorsi	Adduction of the shoulders (pulls arms down and in)
Pectoralis Major	Front adduction of the shoulders
Rotator Cuff	Internal and external rotation of the shoulders

Now that you understand what the upper body muscles are and why you should strength train them why would you want to train without equipment? How can you provide adequate overload? What about variety? Wouldn't the routine become boring?

First why train without equipment? Here are a few reasons:

1. Water only gives you the force that you apply against it. This prevents injury for new participants who have weak muscles.
2. Proper form can be learned before adding more overload with equipment.
3. It provides a balanced muscle workout automatically working the opposing muscle groups. When you add buoyant equipment you only work the muscle pulling down against the buoyancy of the water, which sets up muscle imbalance.

4. The participant controls the intensity of the move by increasing / decreasing the speed while keeping the full range of movement or by increasing / decreasing the surface area.
5. Participants can protect their joints if they have arthritis in the hands, elbows or shoulders by not having to grip anything or maintain control of the equipment.
6. You can work all of the muscle fibers by turning your hands in different directions to create a stronger muscle.
7. You train the participant to become aware of their body because their own muscles are creating the power and the intensity.
8. This gives you options when you may not have access to equipment. For instance, working at a subdivision pool for the summer.

To effectively strength train you need to create muscle overload. Overload is working the muscle to the point of fatigue within a predetermined number of repetitions. The American College of Sports Medicine's guidelines are that participants younger then 50 should overload a muscle in 8 to 12 repetitions. Participants over 50 should overload a muscle in 12 to 15 repetitions. Seniors usually work with lighter weights to protect their joints so they need more repetitions.

How do we create overload without equipment? First we use the following water intensifying methods:

1. Increase the force or power being exerted.
2. Increase the speed of the movement while keeping the full range of motion.

Notice speed and force always work together. You apply more force by increasing the speed.

3. Increase the surface area from a slice, to a cup, to a webbed hand.
4. Traveling creates currents to work against.
5. Exercising at level two (shoulders in) and level three (suspended) increase both the range of motion and surface area.
   Exercising in place so that the momentum comes from the core and muscle being worked.
6. Turning the palm different directions can create directional force.

As mentioned above speed and force work together. It is important to always do each move through it's full range of movement. Don't sacrifice range of movement for speed. Also remember to keep the wrist firm and straight. As the participant's muscle becomes stronger they will be able to apply more force, which in turn increases the speed. At some point the maximum force and speed will be achieved. To continue to provide overload another method must be applied such as increasing the surface area.

Enlarging the hand surface increases the surface area. Utilizing the side of the hand or slicing through the water is the easiest hand position because it provides the smallest surface area to push through the water. The next hand position is the cupped hand, which keeps the fingers together forming a cup with the palm. This increases the

intensity because the surface area is larger. The hardest intensity hand position is the webbed. In this position the palm and fingers are spread apart. The fingers are curled in slightly so the hand resembles a bear claw.

Traveling can increase the intensity by creating a current to push against. For example when doing the breaststroke arms traveling forward the arms assists the legs in moving forward. But when you travel backwards the arms become impeding because they are still trying to pull you forward. We call this opposing forces.

Opposing forces can also be accomplished by turning the palm different directions. For example by doing the cross country ski with the palm facing down while traveling backwards and palm up while traveling forward.

Using different water positions can also increase the intensity by increasing the surface area being moved through the water. The triceps extension done at level two increases the range of movement because the hand starts at the shoulder instead of the waist. When the triceps extension is done at level three with traveling the triceps are pushing the whole body forward.

While traveling is an excellent way to increase the intensity you can also intensify while standing in place. Any time you use the legs the power is generated by the whole body. If the legs are taken out of the exercise by standing still your core has to stabilize while the muscle being worked generates all of the power. For example, when doing scissor arms behind your back, palms down, back of the hand up in a jumping jack stance the core stabilizes while the lats create the power to pull down and the medial deltoids create the power to press up.

The one way that you cannot add intensity to an exercise is by changing the lever. When you change the lever you change the muscle being worked. For instance, if you are doing a bicep curl by bending the elbow and pulling the palm up to the surface of the water you can not increase the intensity by keeping the arm straight and pulling it to the surface. This would change the muscle being worked from the biceps to the anterior deltoid.

Our job as a fitness instructor is to provide progression in our program. Below is an example of how to provide gradual progression using the above intensity methods over a period of several weeks.

Week 1. Biceps Curls / Triceps Extensions jogging in place cupped hands
Week 2. Biceps Curls / Triceps Extensions jogging in place webbed hands
Week 3. Biceps Curls jogging backwards palms up / slice down / Triceps Extensions palms down / slice up jogging forwards (assisting arms)
Week 4. Biceps Curls jogging forwards palms up / slice down / Triceps Extensions jogging backwards palms down / slice up (opposing forces or impeding arms)
Week 5. Biceps Curls / Triceps Extensions with Russian Kick level 2 in place
Week 6. Biceps Curls travel backwards / Triceps Extensions travel forward with Front Russian Kicks level 2
Week 7. Biceps Curls / Triceps Extensions with Russian Kick level 3 in place
Week 8. Biceps Curls travel backwards / Triceps Extensions travel forward with Front Russian Kicks level 3

There are so many ways to add variety to a strength-training program without equipment. In the above example the intensifying methods were used to create the variety as well as provide the progression. The example uses different working positions; level one, two, and three, different surface areas: cupped, webbed, palms up / slice down and palms down / slice up, as well as traveling. Other ways to add variety and intensity are changing the planes and working unilaterally. Below is an example of adding gradual progression using these methods.

Week 1. Biceps Curls / Triceps Extensions with elbows out to sides shoulder level jogging with the legs in place
Week 2. Biceps Curls / Triceps Extensions with elbows out to sides shoulder level jog forward / backwards
Week 3. Biceps Curls / Triceps Extensions with elbows out to sides shoulder level jog sideways right / left
Week 4. Biceps Curls / Triceps Extensions with elbows out to sides shoulder level standing in place
Week 5. Biceps Curls / Triceps Extensions with elbows out to sides shoulder level right arm only for one set, then left arm only standing in place

While working with equipment is fun and adds progression to your workout you don't need it. In fact, the participant gains a better body awareness when they use their own body to generate the power and intensity of the movement. Just a little creativity and own your body is all you need to create a challenging strength training workout!

Resources: Aquatics and Fitness Professionals Association's CORE Manual Aquatics and Fitness Professionals Association's Progressive Resistance Training

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Water, The Elixor of Life Article Quiz

1. T or F Water is essential for all life.

2. T or F Only two systems in the human body need water.

3. The human body's weight is approximately
    A. 50% water
    B. 30% water
    C. 70% water

4. The human body becomes very dehydrated when the body loses what percent of water?
    A. 5%
    B. 1%
    C. 10%

5. The average human needs approximately how much water on a mild 65-degree day?
    A. 64 ounces
    B. 24 ounces
    C. 100 ounces

6. Name 3 sources that the body gets water from.

7. When exercising for more then 60 minutes how often should a person drink water?
    A. every half hour
    B. every 15 to 20 minutes
    C. when they feel thirsty

8. T or F Our blood is almost totally water.

9. T or F Coffee, tea and soda are good sources of water.

10. T or F Water is not a major component in losing weight.

NO EQUIPMENT: UPPER BODY STRENGTH TRAINING

1. T or F You need equipment to strength train effectively.

2. List three intensifying methods you can use without equipment.

3. List two upper body muscles and their joint movement.

4. T or F You cannot increase intensity without adding leg movement.

5. List three reasons why you might want to strength train without equipment.

6. The muscle in a 60-year-old person should be worked to the point of fatigue after completely _____ repetitions of the exercise?
    A. 8 to 10
    B. 12 to 15
    C. 10 to 12

7. Working a muscle to the point of fatigue is called _____.
    A. strength training
    B. interval training
    C. overload

8. T or F You can work different muscle fibers within the muscle by turning your hands different directions.

9. T or F It is important for your class participant to be aware of their posture and joint range of movement before adding equipment.

10. T or F Strength training without equipment is a valid option for class participants with arthritis or other joint issues.