

## **Swimming programs**

<b>Introduction</b>	<b>1</b>
<b>Getting started and building up</b>	<b>2</b>
<b>The look of a training session</b>	<b>2</b>
<b>Proposed swimming programs</b>	<b>3</b>
18 workouts to build up to 500 yards	3
10 Beginner workouts	4
General explanation for short intervals	8
Aquatic aerobic exercises	8
<b>References</b>	<b>12</b>

## **Introduction**

Swimming is one of the most performed physical activities worldwide. It is an activity that can be done by a broad range of people and often facilitates the exercise. For example, obese people do not have to carry their full weight due to the buoyancy of the water, which allows them to move without pain or discomfort. The same applies for people who suffer from joint problems. The diminished impact resulting from the upward forces expressed by the water on your body can increase your joy of exercise. Water can also be used as an aid to increase movement amplitude and causes a resistance against your movements allowing us to use water-based exercise as a form of strength training.

You already understand that a swimming pool offers much more possibilities than swimming alone. Below there are some proposed training programs, which offer varied types of exercise training you can do in a swimming pool. Before we start with the more practical side of aquatic exercise, first the general benefits of training in the water will be discussed.

People who swim regularly have lower mortality rates and a higher exercise capacity compared to sedentary persons. When you submerge yourself in water, the water exerts a compressive force upon your body. This leads to a higher flow of blood to your heart, increasing your stroke volume and consequently your cardiac output. Because of the increase in your stroke volume, your heart can beat slower and still pump the same amount of blood around in your body. This is why your heart rate will be lower while doing exercise in water. So, your heart rate is lower and your muscles still get enough blood and oxygen to function, which means that swimming is an exercise that should feel quite easy on your muscular system. However, don't be fooled! Swimming will cost you a lot of energy because of the large active muscle mass. Swimming a given distance is 4 times more energy-costly compared to running the same distance. Because of this great energy expenditure, swimming can be applied as an effective means to lose weight and body fat. Important in this case is to know that swimming generally is accompanied by a greater food intake after training in comparison with running or cycling. If you effectively want to lose weight by swimming alone, be aware of this trap!

Swimming has also positive effects on your blood pressure, glycemic control and lipid profile. People who swim more often had lower levels of total and bad cholesterol. They also showed adaptations in their muscles which indicated better endurance capacity.

Just like in any other sport, frequency, duration and intensity play a major role in swimming to induce aforementioned benefits. Intensity is the most important training parameter in this case. The intensity of swimming is regulated by an interaction of different factors. First, there is your individual skill level. Unskilled swimmers generally have a greater energy expenditure during training because they do not move economically. Second, water temperature has an influence on your energy expenditure. When swimming in colder water, your body will have to work harder to keep you warm, resulting in higher energy consumption. Third, gender determines also your swimming efficiency. Women tend to have a higher body fat percentage compared to men and thus float easier on water, making their swimming more efficient. Lastly, the kind of stroke you use is another influential factor. When executed correctly, the front-crawl is the most efficient one. It is followed by the back-stroke, butterfly and breaststroke.

There is only one patient group that should pay caution when it comes to swimming or other water exercises where you are immersed until your neck. This group are the patients with heart failure who have a maximal exercise capacity of  $<15$  ml/min/kg oxygen consumption and/or an anaerobic threshold at  $<8$  ml/min/kg oxygen consumption.

### **Getting started and building up**

When getting started with swimming, it is not unexpected that you will need to get acquainted with the movements again. The first sessions of your training will therefore be spent on rediscovering the basics. Just spend some time in the pool and work on the different strokes you know and used in the past. You will notice that after a couple of times you will automatically swim greater distances because of the movements becoming more efficient. Once the technique is back in your system, you can start with a progressive training program. Below are some of those training programs presented, but if you think this is still too much for you, don't hesitate to first gradually build up your distance on your own. The general rule when it comes to building up is to first build up the duration and frequency of the training sessions. Once you reached a duration and frequency you are happy with and that fits your schedule, you can start increasing intensity.

General advice concerning the amount of physical activity that you need to do 150'/week of moderate intensity or 75'/week of vigorous intensity or a combination of both. If you enjoy swimming, you can try to reach these amounts with swimming alone, but it is also allowed to use a combination of different exercise types to achieve this goal (walking, cycling, PATHway exerclasses).

### **The look of a training session**

- Warming up: consists of a stimulus for your cardiorespiratory system to get your blood pumping. Typically this is done by swimming calmly the first couple of minutes of your training.
- Technique: spend a short period of time in the beginning of your swimming session to pay attention to correct form.
- The main part: consists of one of the training programs mentioned below or when you understand the principles of endurance and interval training and feel creative, you can make your own training session.
- Cool down: Likewise as the warm-up, spend the last few minutes of your session slowing down. When finished, perform a couple of static stretches as you can find in the PATHway system.

## **Proposed swimming programs**

*- 18 workouts to build up to 500 yards according to <http://www.swimming.about.com/>*

### **Workout #1 (100)**

4 x 25 with no more than 20 breaths rest

### **Workout #2 (100)**

4 x 25 with no more than 15 breaths rest

### **Workout #3 (150)**

6 x 25 with no more than 20 breaths rest

### **Workout #4 (150)**

6 x 25 with no more than 15 breaths rest

### **Workout #5 (200)**

8 x 25 with no more than 15 breaths rest

### **Workout #6 (200)**

1 x 50 with no more than 20 breaths rest

6 x 25 with no more than 15 breaths rest

### **Workout #7 (250)**

1 x 50 with no more than 20 breaths rest

8 x 25 with no more than 15 breaths rest

### **Workout #8 (250)**

1 x 50 with no more than 15 breaths rest

8 x 25 with no more than 15 breaths rest

### **Workout #9 (300)**

2 x 50 with no more than 20 breaths rest

8 x 25 with no more than 15 breaths rest

### **Workout #10 (300)**

2 x 50 with no more than 15 breaths rest

8 x 25 with no more than 15 breaths rest

### **Workout #11 (350)**

2 x 50 with no more than 10 breaths rest

10 x 25 with no more than 15 breaths rest

### **Workout #12 (350)**

1 x 75 with no more than 20 breaths rest

1 x 25 with no more than 15 breaths rest

2 x 50 with no more than 15 breaths rest

6 x 25 with no more than 15 breaths rest

### **Workout #13 (400)**

1 x 75 with no more than 20 breaths rest

1 x 25 with no more than 15 breaths rest

3 x 50 with no more than 15 breaths rest

6 x 25 with no more than 15 breaths rest

### **Workout #14 (400)**

1 x 75 with no more than 20 breaths rest

1 x 25 with no more than 15 breaths rest

3 x 50 with no more than 15 breaths rest

6 x 25 with no more than 10 breaths rest

### **Workout #15 (450)**

2 x 75 with no more than 20 breaths rest

2 x 25 with no more than 15 breaths rest  
3 x 50 with no more than 15 breaths rest  
4 x 25 with no more than 10 breaths rest

**Workout #16 (450)**

2 x 75 with no more than 15 breaths rest  
2 x 25 with no more than 15 breaths rest  
4 x 50 with no more than 15 breaths rest  
2 x 25 with no more than 5 breaths rest

**Workout #17 (500)**

2 x 75 with no more than 15 breaths rest  
2 x 25 with no more than 15 breaths rest  
4 x 50 with no more than 10 breaths rest  
4 x 25 with no more than 5 breaths rest

**Workout #18 (500)**

1 x 100 with no more than 20 breaths rest  
2 x 75 with no more than 15 breaths rest  
2 x 25 with no more than 15 breaths rest  
4 x 50 with no more than 10 breaths rest

- 10 Beginner workouts according to <http://www.100swimmingworkouts.com/>

<p><b>WORKOUT 1</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Build endurance, improve crawl stroke</p> <p><b>Total Distance:</b> 600 yards</p>	<ul style="list-style-type: none"><li>• 2 x 50 yards crawl warm-up (rest between laps if needed)</li><li>• 4 x 25 yards crawl counting strokes per length (try to keep an even number of strokes)</li><li>• 4 x 50 crawl. Resting = 30s between each lap (try to hit the same time on each lap)</li><li>• 4 x 25 yards crawl counting strokes per length (try to keep an even number of strokes)</li><li>• 2 x 50 crawl cool-down (swim slowly and relax)</li></ul>
<p><b>WORKOUT 2</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Build endurance, improve breathing</p> <p><b>Total Distance:</b> 600 yards</p>	<ul style="list-style-type: none"><li>• 100 yards crawl warm-up (rest between laps if needed)</li><li>• 4 x 50 yards crawl. Resting = 30s between each lap (try to keep the timing the same for each lap)</li><li>• 4 x 25 yards crawl changing breathing pattern (breathe every 4th stroke on the first two, then every 2nd stroke on the last 2)</li><li>• 2 x 50 yards your choice of strokes. Resting = 30s between each lap</li></ul>

	<p>(try to hit the same time for each lap)</p> <ul style="list-style-type: none"> <li>• 100 yards crawl cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 3</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Build endurance, improve crawl and 1 other stroke</p> <p><b>Total Distance:</b> 800 yards</p>	<ul style="list-style-type: none"> <li>• 150 yards crawl warm-up (rest between laps if needed)</li> <li>• 4 x 50 yards alternating strokes. Resting = 30s between each lap (each lap is 25 yards crawl, then 25 yards either backstroke, breaststroke or butterfly)</li> <li>• 4 x 25 yards crawl counting strokes per length (try to keep an even number of strokes)</li> <li>• 4 x 50 yards your choice of strokes. Resting = 30s between each lap (try to hit the same time for each lap)</li> <li>• 150 crawl cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 4</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve breath control and consistency</p> <p><b>Total Distance:</b> 800 yards</p>	<ul style="list-style-type: none"> <li>• 150 yards crawl warm-up (rest between laps if needed)</li> <li>• 8 x 25 yards crawl sprints. Resting = 30s between lengths (effort should be at 60-70% of fastest swim)</li> <li>• 100 yards crawl counting strokes per length (try to use less strokes on each subsequent length)</li> <li>• 4 x 25 yards windsprints. Resting = 30s between lengths (swim each length without taking a breath)</li> <li>• 100 yards crawl counting strokes per length (try to use less strokes on each subsequent length)</li> <li>• 150 crawl cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 5</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve breath control and</p>	<ul style="list-style-type: none"> <li>• 2 x 100 yards crawl warm-up (rest = 30s between 100sets)</li> <li>• 4 x 25 yards windsprints. Resting + 30s between lengths (swim each length without taking a breath)</li> <li>• 4 x 50 yards crawl. Resting = 15s</li> </ul>

<p>consistency</p> <p><b>Total Distance:</b> 900 yards</p>	<p>between laps (count 3 kicks for each arm stroke)</p> <ul style="list-style-type: none"> <li>• 4 x 25 yards windsprints. Resting = 30s between lengths (swim each length without taking a breath)</li> <li>• 4 x 50 yards crawl. Resting = 15s between laps (count 3 kicks for each arm stroke)</li> <li>• 100 freestyle cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 6</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Develop multiple strokes</p> <p><b>Total Distance:</b> 900 yards</p>	<ul style="list-style-type: none"> <li>• 2 x 100 yards crawl warm-up (rest between 100s if needed)</li> <li>• 4 x 25 yards backstroke. Resting = 15s between lengths (work on swimming straight)</li> <li>• 4 x 25 yards breaststroke. Resting = 15s between lengths (work on technique)</li> <li>• 4 x 25 yards butterfly. Resting = 15s between lengths (choice of strokes if you can't do butterfly)</li> <li>• 2 x 100 IM. Resting = 30s between each 100 (25 butterfly, 25 backstroke, 25 breaststroke, 25 freestyle)</li> <li>• 200 crawl cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 7</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve endurance, develop technique for multiple strokes</p> <p><b>Total Distance:</b> 1000 yards</p>	<ul style="list-style-type: none"> <li>• 200 yards crawl warm-up (no rest during swim)</li> <li>• 4 x 50 crawl, alternating lengths of sprinting and easy swimming. Rest = 15s between (of each 50, sprint the first 25 yards then swim slowly on the second 25 yards)</li> <li>• 4 x 100 IM. Resting = 30s between each 100 (each IM is 25 butterfly, 25 backstroke, 25 breaststroke, 25 freestyle)</li> <li>• 200 crawl cool-down (swim slowly and relax)</li> </ul>

<p><b>WORKOUT 8</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve endurance, develop technique for multiple strokes</p> <p><b>Total Distance:</b>1000 yards</p>	<ul style="list-style-type: none"> <li>• 100 yards crawl warm-up (no rest during swim)</li> <li>• 4 x 50 alternating lengths of butterfly and crawl. Resting = 30s between each 50 (swim the first 25 butterfly and the second 25 crawl)</li> <li>• 4 x 50 alternating lengths of backstroke and crawl. Resting = 30s between each 50 (swim the first 25 backstroke and the second 25 crawl)</li> <li>• 4 x 50 alternating lengths of breaststroke and crawl. Resting = 30s between each 50 (swim the first 25 breaststroke and the second 25 crawl)</li> <li>• 4 x 50 crawl, alternating lengths of sprinting and easy swimming. Rest = 15s between (on each 50, sprint the first 25 yards then swim slowly on the second 25 yards)</li> <li>• 100 crawl cool-down (swim slowly and relax)</li> </ul>
<p><b>WORKOUT 9</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve endurance, breathing rhythm, gain technique on turns</p> <p><b>Total Distance:</b>1200 yards plus flip turn practice</p>	<ul style="list-style-type: none"> <li>• 300 yards crawl warm-up (no rest during swim)</li> <li>• 4 x 50 yards crawl alternating breathing each length. Resting = 15s between (breathe every 4th stroke on the first 25 yards, and breathe every 2nd stroke on the second 25yards)</li> <li>• 200 yards crawl no breath approaching wall (breathe in any pattern during swim but do not breathe within 4 strokes of approaching the wall)</li> <li>• 10 x flip turns (practice taking 2 strokes and doing a flip turn followed by 2 strokes)</li> <li>• 4 x 50 yards choice of strokes. Resting = 15s between (do any single stroke or mix the strokes)</li> <li>• 300 yards crawl cool-down (swim slowly and relax)</li> </ul>



<p><b>WORKOUT 10</b></p> <p><b>Category:</b> Beginner</p> <p><b>Workout Goal:</b> Improve endurance, breathing rhythm, gain technique on turns</p> <p><b>Total Distance:</b> 1200 yards plus flip turn practice</p>	<ul style="list-style-type: none"> <li>• 200 yards crawl warm-up (continuous swimming)</li> <li>• 200 yards crawl no breath approaching wall (breathe in any pattern during swim but do not breathe within 4 strokes of approaching the wall)</li> <li>• 4 x flip turns (practice taking 4 strokes and doing a flip turn followed by 4 strokes)</li> <li>• 4 x 100 yards crawl. Resting = 15s between (breathe every 4th stroke and do not breathe within 4 strokes of the wall, do flip turns on all turns)</li> <li>• 4 x flip turns (practice taking 4 strokes and doing a flip turn followed by 4 strokes)</li> <li>• 4 x 50 yards choice of strokes. Resting = 15s between (do any single stroke or mix the strokes)</li> <li>• 200 crawl cool-down (swim slowly and relax)</li> </ul>
---	---

- General explanation for short intervals according to <http://www.livestrong.com/>

Repeatedly swimming a short distance and taking a short rest is a good workout for beginners, according to the University of Akron. Start by swimming 50 yards, then rest for 15 to 30 seconds. Repeat this pattern for 15 minutes. Once you can comfortably complete this workout, increase the distance to 75 or 100 yards. If swimming 50 yards at one time is too difficult, swimming 25 yards and then resting may be helpful. Once you feel comfortable completing these workouts, try swimming for 20 to 30 minutes.

- Aquatic aerobic exercises according to <http://www.shape.com/> and <http://www.swimmingpool.com/>

Warm-up	<p>Start with walking a couple of lengths. Try to walk as if you are walking on land. This means that your heel strikes the ground first and you try to make an arm swing with both of your arms. You will feel resistance from the water. Do not only walk forward. Also walk backward and sideways to strengthen other muscles. This exercise is more difficult when you are chest-deep compared to waist-deep.</p> <p>After a couple minutes of walking, go to the side of the pool and do some dynamic stretching exercises as learnt in the PATHway exerclass. Turn your knees loose, turn your hips loose, swing your leg from front-to-back and from side-to-side. When you are chest-deep, you can do the same for your arms.</p>
---------	---

Main part	<p>This part consists of dynamic and aerobic exercises. The exercises presented here can not only be followed, but can also be used as inspiration to develop your own exercises.</p> <ul style="list-style-type: none"> <li>- Jogging: jog a couple of lengths as you would do when on land. If available you can also use a floatation belt for deep water jogging. In that case you stay in place while jogging and can work in intervals of 1' with 15" rest in between.</li> <li>- Squats: Stand in the water with your feet apart. Bend trough your knees and keep your back straight as if you are going to sit on a chair. Then, push back up until you are back in a standing position. You can make this exercise more challenging by jumping up out of the water as high as you can. For this last exercise chest-deep water is recommended. You can do this for example 3x15 repetitions.</li> <li>- Stand in shoulder-deep water and raise your arms to the side, pushing against the resistance of the water. You can increase the intensity of the exercise by making it jumping jacks. Again, 3x15 repetitions is a way of doing this exercise.</li> <li>- Roman chair: When your swimming pool has kickboards at disposal take two of them and place your lower arms on them. Bring your weight on your both lower arms and raise both of your legs until you have a 90° angle in your hips. Hold for 2 seconds and put your feet back down. To make this exercise easier, you can use the side of the pool as support and/or lift your legs with bended knees instead of extended.</li> <li>- Kickboard presses: Place a kickboard under one foot (this is a challenge in itself). Then, push your foot to the ground and slowly lift your knee back up without losing control of the kickboard. Repeat 3x15 with every leg.</li> <li>- Kickboard dips: Place both your hands on a kickboard and push it underwater. Repeat 3x15 repetitions.</li> <li>- Bicycle: support your elbows on the side of pool. Lift your legs and make a cycle-like movement. 3x15 repetitions.</li> <li>- Hold on to the side of the pool with two hands and lay down on your belly in the water with your head out of the water. Start paddling with your feet as fast as you can. 3x20sec.</li> <li>- Stand in the water (deep water is more difficult). Lift one knee and bring the opposite elbow to that knee. Alternate between sides. 3x15 repetitions, were both sides should be used before counting 1.</li> <li>- knee tuck: Stand in at least chest-deep water. Jump upwards and tuck your knees to your chest. The water will slow down your movement so your core will need to be more engaged. 3x10 repetitions</li> <li>- Cross country skiing: Stand with your legs in a forward lunge position. Jump up and change the position of your legs so that the other leg stands in front. Use your arms too! 3x15 repetitions</li> <li>- Kickboard plank: place your hands on a kickboard and push the kickboard forward as far as you can without losing control. Your feet stay in place. 3x15sec hold.</li> <li>- Scissor kicks: face the side of the pool with your back and place your arms on the side as support. Lift your legs and spread them. Then cross them over each other and spread them again. 3x15 repetitions.</li> <li>- Under water sit-up: Put your legs on the side of the pool and your upper body in the water. Bring your head and trunk under water and come back up until your head is above the water again. 3x15 repetitions</li> <li>- Skaters: jump from side to side making a skate-like motion.</li> <li>- Push-offs: Push yourself off from the side of the pool with both legs and see how far you can go. 3x10 repetitions.</li> <li>- Push-ups: Place your hands on the side of the pool and push yourself up (don't help by jumping!). 3x10 repetitions.</li> </ul>
-----------	--

	As you may have noticed a lot of PATHway exerclass exercises are translatable into the pool. Do not hesitate and experiment with different exercises. Be creative and develop your own exercises or combinations of exercises. You can choose to do a whole-body workout or focus more on upper or lower body during a session.
Cool down	Walk and/or swim a couple of minutes at a relaxed pace. Do some static stretches as learnt in the PATHway exerclass.

## **References**

- 1: Lazar JM, Khanna N, Chesler R, Saliccioli L. Swimming and the heart. *Int J Cardiol.* 2013 Sep 20;168(1):19-26. doi: 10.1016/j.ijcard.2013.03.063. Epub 2013 Apr 18. Review. PubMed PMID: 23602872.
- 2: Tanaka H. Swimming exercise: impact of aquatic exercise on cardiovascular health. *Sports Med.* 2009;39(5):377-87. doi: 10.2165/00007256-200939050-00004. Review. PubMed PMID: 19402742.
- 3: Schmid JP, Noveanu M, Morger C, Gaillet R, Capoferri M, Anderegg M, Saner H. Influence of water immersion, water gymnastics and swimming on cardiac output in patients with heart failure. *Heart.* 2007 Jun;93(6):722-7. Epub 2006 Dec 12. PubMed PMID: 17164483; PubMed Central PMCID: PMC1955189.
- 4: Teffaha D, Mourot L, Vernochet P, Ounissi F, Regnard J, Monpère C, Dugué B. Relevance of water gymnastics in rehabilitation programs in patients with chronic heart failure or coronary artery disease with normal left ventricular function. *J Card Fail.* 2011 Aug;17(8):676-83. doi: 10.1016/j.cardfail.2011.04.008. Epub 2011 May 31. PubMed PMID: 21807330.