STRENGTH TRAINING FOR SWIMMERS WHEN POOLS ARE CLOSED

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The recent pandemic outbreak of Coronavirus forced most sports facilities to close across the country, including swimming pools. Athletes should not wait until facilities open to start training, instead athletes should take advantage of this time and develop their individual training plan by spending more time working on their weaknesses: nutrition, psychology, recovery, and massage for example. It is also a perfect time for athletes to improve sport specific strength and swimming is one of the areas athletes can benefit when pools are closed.

Many coaches and swimmers believe it is impossible to train swimming without water and have decided to take a break from their training. Other swimmers are turning the challenge into an opportunity to improve by spending more time training on land. Is it possible to maintain swimming skills and even improve without a pool? Research shows that swimmers can benefit from training on land and develop even better swimming technique, if they are doing certain exercises.

What Muscles Are Important For Swimming?

Swimming is one of few activities that engage all muscle groups. Swimmers don’t have bulky muscles. Their muscles are rather long due to extending arms and body fully in the water. Swimming develops specific strength endurance more than power, especially over distances longer than 100 yards/meters. Swimming in practices develops a muscles ability to contract and relax in a certain rhythm.

Training of swimmers is different than runners in the same duration of exercise. For example, 100 meter swimming event is about the same duration as 400 meter running. Theoretically, physiology and training should be similar. However, practically it is completely different. Swimmers train much higher volumes and lower intensity than runners over the same distance. It is related to swimmers ability to recover faster, lower stress on the muscles, focus on distance per stroke, training methodology and traditions

Swimmers are not weightlifters or wrestlers either. Power sport athletes are focused on short and quick movement. Their muscles are shorter and big. Since muscle mass is heavier than water, it is difficult for weightlifters or wrestlers to swim fast (see Picture 1 below). Swimmers don’t need to be as strong as power sport athletes.
Light muscles and bones create less drag in the water. Swimmers with big and heavy muscles are swimming deeper in the water and have to overcome additional drag. Often skinnier swimmers are winning the races against strong and muscular swimmers. As our Land Water Strength research shows, skinnier swimmers can utilize their land strength in the water better than very strong swimmers.

Swimmers strength training has to take in consideration all of these differences.

The major muscles in freestyle swimming are located in the chest area (Pectoralis Major, Pectoralis Minor), back area (Latissimus Dorsi, Trapezius, Rhomboid Major), arms/shoulders (Triceps, Biceps, Deltoid), forearms (Extensor, Flexor, Brachioradialis, Abductor), and legs (Glutes – Gluteus Maximus, Thighs – Rectus Femoris and Vastus Lateralis, Hamstrings – Biceps Femoris and Semitendinosus, Calves – Tibialis Anterior and Gastrocnemius). See Picture 2 below.
There are groups of muscles that play important roles in stabilizing the body in swimming and connecting other muscles. These muscles include neck (Trapezius, Sternocleidomastoid, Splenius Capitis), hips/abdominal (Tendinous Inscriptions, Rectus Abdominis), and back areas (Erector Spinae, External Oblique, Latissimus Dorsi).

Strengthening Muscles For Swimmers

There are many exercises on land that can help swimmers to become stronger. All strength exercises for swimmers can be divided in four big groups:

1. General Strength Exercises for all muscle groups
2. Swim Specific Strength Exercises
3. Core and Body Exercises
4. Exercises on Unstable Platform

1. General Strength Exercises

Since swimming engages many muscles, these exercises can include all muscle groups. Normally, swimmers can do these exercises using their own body weight or any free weights used in the strength & conditioning gyms, such as dumbbells, Olympic weights, kettle bells, and resistance/strength training machines.

General Strength Exercises can improve swimmer's overall fitness and swim times. They also may prevent swimmers from specific injuries. That's why General Strength Exercises are recommended for early season and maintenance of general strength. However, these exercises have strong diminishing return to swimming times. Once swimmers become physically strong, these exercises may make swimmers even slower. There are many examples when swimmers develop very strong and big muscles, which don’t have anything to do with swimming fast. In fact, some swimmers begin swimming slower, because big muscles are heavier and require oxygen and energy sources (glycogen) during the swim. Oxygen and energy sources (glycogen) should better be used by swimming specific muscles.

Examples of General Strength Exercises with own body weight: push-ups, pull-ups, squats (including one leg), squat jumps, one leg jumps, lunges, leg(s) or body raises (on your back, side or stomach), crunches (standing or lying on the back), burpees, dips (using a chair), etc. See Picture 3 below.
Examples of General Strength Exercises with free weights: bench presses, chest flies, seated shoulder presses, lateral raises, reverse flies, front raises, dead lifts, single arm row, upright rows, bicep curls, triceps extensions, half squats, lunges with weights in hands, etc. See Picture 4 below.

All exercises with own body weight or free weights should be done at maximum amplitude, instead of keeping high tempo. Short amplitude and high tempo exercises may lead to muscular hypertrophy and shortening distance per stroke in swimming. As result, swimmers may swim slower even being physically stronger.

2. Swim Specific Strength Exercises

These exercises include swim specific muscles. They include muscles engaged in arm pulling movement, such as Pectoralis Major, Pectoralis Minor, Latissimus Dorsi, Trapezius, Rhomboid Major, Triceps, Biceps, Deltoids, and some others.

Swim Specific Strength Exercises are the most important to swimmers. These exercises have higher correlation with swimming times, than General Strength Exercises. Swimmers should strengthen these muscles regularly during the training season.

Swim Specific Strength Exercises include pulling and kicking exercises. Examples of pulling exercises on land: stretch cords or Thera-bands using both or single arm, pulling on swimming equipment (swim benches, Vertical Swim Trainers, etc.). Examples of kicking exercises on land: kicking with elevated legs above the ground laying down on the back or stomach, kicking with ankle weights, kicking against Thera-band. See Picture 5 below.

![Pulling cords on land.](image)

3. Core and Body Exercises
Large group of Core and Body Exercises are important in swimming for several reasons:

- Strengthening connection between body-arms-legs muscles
- Improving stability/rigidity of the body
- Using body muscles to generate more power in swimming and kicking

Stable and rigid body creates less frontal drag. There are two weak links in the body which can be unstable: neck and hips. To swim faster, we should look at fish and other fast animals in the water (dolphins, seals, etc.) Unlike humans, all these animals don’t have a neck and hips! Their body is strong and rigid. Nature designed them correctly to swim at high speed in the water. Keeping muscles strong around neck and hips is important for good swimming technique.

Many swimming clubs incorporated Core and Body Exercises in swimmers’ daily routine. Examples of exercises to strengthen body and neck muscles: sit-ups, plank (standard, leg raised, kneeling), hip bridges, superman (kneeling or prone), V-sit kicking, Russian twists, wheel rollout, scissor crunch, kneeling halos in streamline position, mountain climber in plank position, etc. Most of these exercises don’t require any equipment. If swimmers have some equipment, such as dumbbells, kettle bells, med balls, many Core and Body Exercises can be done with additional resistance in more challenging way. See Picture 6 below.

![Picture 6. Examples of Core and Body Exercises (www.darebee.com).](image)

4. Exercises on Unstable Platform

Unlike exercises on land, swimming in the water doesn’t have stable platform like ground. Swimmers can’t accelerate in the water by using ground or leaning on hard surface. Swimming requires using body muscles, especially the center of mass of the body, to generate power. Exercises on unstable platforms mimic swimming movements better than doing exercises on the ground.

These are the most popular unstable platforms used by swimmers: Swiss ball, Bosu ball, TRX suspension trainer, folded towel, Dyna Disc, balance board, etc. Exercises using an unstable platform train the body
to respond to balance changes with muscular contraction. These exercises are similar to a swimming environment, when athletes can’t generate power from pushing the ground. Body muscles are engaged during these exercises to control and stabilize movements.

One of the most advanced unstable platforms in swimming is the Vertical Swim Trainer, which was developed by us. Most of you probably are familiar with this equipment. The goal is to swim in vertical position on an unstable platform, which tips and rotates at the same time. It forces swimmers to keep body rigid and vertical. As result, swimmers can develop good body position, stroke and breathing technique. Some swim clubs around the country are using Vertical Swim Trainers. See Picture 7 below.

![Picture 7. Vertical Swim Trainer (www.globsport.org).](www.globsport.org)

If you don’t have access to this equipment, you can mimic something similar using a Bosu ball or other unstable platform.

Another good way to improve body position and strengthen muscles engaged in pulling movements is to pull stretch cords staying on one leg only. This type of exercise keeps the body more rigid and strengthens body muscles when using stretch cords.

What Swim Strength Training Exercises Are The Most Effective?

All described exercises may help to strengthen your muscles. To select the most effective exercises, you should decide how much general or specific strength you need. If you are generally strong, you should
do less general more swim specific exercises. The most effective exercises are when you are working on strength and balance at the same time.

Recommended Plan For A Physically Strong Athlete

- General Strength Exercises for all muscle groups – 10%
- Core and Body Exercises – 20%
- Pulling on land staying on a Bosu ball or one leg similar like on the Vertical Swim Trainer – 40%
- Kicking against Thera-band laying on the stomach – 30% (See Picture 8 below)

![Picture 8. Kicking against Thera-band on land.](image)

Recommended Plan For A Not As Physically Strong Athlete

- General Strength Exercises for all muscle groups – 20%
- Core and Body Exercises – 30%
- Pulling on land staying on a Bosu ball or one leg similar like on the Vertical Swim Trainer – 30%
- Kicking against Thera-band laying on the stomach – 20%

If you are currently not doing strength exercises, you should start strength training on land with about 30-40 min three times a week, total 90-120 min per week. Every week try to increase weekly volumes by
5-6%. Eventually, you will need to have 4 practices per week, which will be plenty to maintain or improve your swim specific strength.

Have a great training!