

Aerobic Training

Aerobic training strengthens the heart and lungs and improves muscle function. One goal of aerobic training is to enhance sports performance and to improve training response. The following is information from the American Academy of Pediatrics about aerobic training exercises.

What are aerobic training exercises?

Aerobic training exercises are any activities that raise heart rate and make breathing somewhat harder. The activity you are doing must be constant and continuous. Examples of aerobic activities are

- Walking or hiking
- Jogging or running
- Biking
- Swimming
- Rowing
- In-line skating
- Cross-country skiing
- Exercising on a stair-climber or elliptical machine

Other activities, when done in a constant and continuous way, can be aerobic, such as tennis, racquetball, squash, and the martial arts. Weight training, however, is not aerobic because it is done in short bursts of a few minutes at a time.

How does aerobic training improve endurance?

Aerobic training increases the rate at which inhaled oxygen is passed on from the lungs and heart to the bloodstream to be used by the muscles. Aerobically fit athletes can exercise longer and harder before feeling tired. During exercise they have a slower heart rate, slower breathing rate, less muscle fatigue, and more energy. After exercise, recovery happens more quickly. Aerobic fitness can be measured in a laboratory setting while exercising on a treadmill or bicycle. This is called *maximal oxygen uptake* or $VO_2 \text{ max}$.

How often and how long should athletes train?

To achieve a training response, athletes should exercise 3 to 5 times per week for at least 20 to 60 minutes. Fitness level can be improved with as little as 10 minutes of exercise if done 2 to 3 times per day. If the goal is also to lose body fat, athletes should exercise for at least 30 to 60 minutes. Athletes who are not fit will need to start with lesser amounts of exercise. They can slowly add more time as their endurance improves. Increasing the level of exercise about 10% per week is a good goal to prevent overuse injury.

Cross-training may help reduce the risk of overuse injuries. This is done by alternating different kinds of activities. To avoid putting too much stress on the body and help prevent injuries, it is wise to alternate high-impact activities, like running, with low-impact exercises, like walking, cycling, and swimming.

How hard should athletes train?

Training at low to moderate intensity levels is enough to improve endurance. In general, this level of intensity is more enjoyable and less likely to lead to injuries than high-intensity training.

However, aerobic training programs should be designed to match each athlete's fitness level. There are 3 ways to measure aerobic training intensity.

1. **The "talk test."** During a workout, athletes should be able to say a few words comfortably, catch their breath, and resume talking. If it is difficult to say a few words, then athletes should probably slow down. If athletes can talk easily without getting out of breath, then they are probably not training hard enough.
2. **Heart rate.** Aerobic training occurs when heart rate during exercise is between 60% to 90% of maximal heart rate. Athletes can figure out their maximal heart rate by subtracting their age from 220.

How to Calculate Target Heart Rate (HR)

Maximal HR = 220 - your age

60% maximal HR = 0.6 X (220 - your age)

90% maximal HR = 0.9 X (220 - your age)

Example for a 15-year-old

Maximal HR: 220 - 15 = 205

60% maximal HR: 0.6 x 205 = 123

90% maximal HR: 0.9 x 205 = 184.5

Target HR range for aerobic training is 123 to 184 beats per minute.

3. **Level of difficulty.** Athletes can determine how hard the exercise feels on a scale of 1 to 10 using the Borg Scale of perceived exertion. The ideal range for aerobic training is between 2 and 7.

Borg Scale of Perceived Exertion— How to Tell How Hard You Are Exercising

0	Nothing at all
0.5	Very, very weak
1	Very weak
2	Weak
3	Moderate
4	Somewhat strong
5	Strong
6	
7	Very strong
8	
9	Very, very strong
10	Maximal

Other factors affecting aerobic training response

- **Baseline fitness level.** The more unfit athletes are, the greater the training response. However, as athletes become more fit, it will take higher levels of training to improve further.
- **Genetics.** Genetics play a large role in an athlete's natural fitness level as well as how much he will improve as a result of training.

- **Growth.** As children grow, they are able to respond more to aerobic training. However, before puberty, the aerobic training response is much less than during and after puberty. This is why aerobic training is of limited value for improving endurance in young children. Activities should focus more on other goals, such as skill development and fun.

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®



The American Academy of Pediatrics (AAP) is an organization of 67,000 primary care pediatricians, pediatric medical subspecialists, and pediatric surgical specialists dedicated to the health, safety, and well-being of infants, children, adolescents, and young adults.

The information contained in this publication should not be used as a substitute for the medical care and advice of your health care professional. There may be variations in treatment that your health care professional may recommend based on individual facts and circumstances.

© 2020 American Academy of Pediatrics. All rights reserved.