



# The Structure of the Heart and its Physiology in Regular Athletes

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**ABSTRACT**

This article describes in detail the structure, physiology of the heart, regular exercise.

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It is a pair of heart and blood vessels. Professor Carre explains to me: Le heart is a muscle, it is filled with blood, and when it reaches a certain pressure, the valves open, contract, pump blood to the aorta, and from there the blood is distributed to all the organs. v The heart is therefore pumped.

**What is a pulse?**

This is the number of contractions, so the blood flowing out of the heart per minute, in other words, the number of beats - so its unit is the beating per minute (beating per minute). Heart rate fluctuates throughout the day for a variety of reasons, such as exercise, stress, or caffeinated beverages. Resting heart rate is the heart rate recorded at a state of complete rest of the body, which varies depending on people, gender, habits, and lifestyle. Cardiac output is

the number of liters of blood released per minute by the heart. On average, a resting heart produces 5 liters per minute.

**What Happens If You Exercise Regularly?**

- Improved compression makes your heart work less to effectively distribute blood throughout the body.
  - You protect your arteries because physical activity opens blood vessels and improves blood circulation.
  - Blood circulation improves and you have low blood pressure.
  - You lower bad cholesterol and lower blood sugar (blood sugar).
- Eventually you will reduce your risk of cardiovascular disease (heart attack) or brain (AVC).

There is no doubt that exercise is good for your cardiovascular health and other parts of your

body. Just as your quadriceps or your biceps respond to exercise, keeping your heart muscle under controlled stress allows it to adapt and strengthen, becoming stronger and more efficient.

But when you exercise hard for many years, your heart undergoes more important changes to adapt to the load, and as a result, experts sometimes call it the “athlete’s heart”.

The long-term consequences are not fully understood. Some studies show that the correlation between training and heart disease risk is a U-shaped curve rather than a decrease in decline. In other words, as you become more sedentary and moderately active, your heart problems will decrease. But if you work your heart out for a few hours a day, the risk may increase again.

“There’s a moderate point where we can maximize our health from a cardiovascular perspective,” said Jared Bunch, MD, medical director of heart rhythm services at the Intercollegiate Heart Institute and American Cardiology. College Sports Council Member Committee.

However, the data is not clear, said Jeffrey Lander, MD, an associate professor of sports cardiology at Morristown Medical Center in New Jersey. Long-term research is needed to understand how athletes develop heart problems. Highly harmful changes may not lead to the same results as less active ones.

As they continue to study the issue, cardiologists agree that just exercising does not trigger immunity to heart problems. If you have any symptoms - chest pain, shortness of breath or a sudden and unexplained loss of ability to exercise - see a doctor.

It can also mimic the symptoms of serious heart problems, even if the athlete’s heart does not require treatment. So it’s good for athletes and their healthcare professionals to know the basics.

### **What is an athlete’s heart?**

Over the years, endurance training - think jogging and cycling - has set high standards for strengthening your hard-working muscles. To fall, your body works to increase what is called heart production, or the amount of blood

released per liter per minute, says Justin Trivax, medical director of the Cardiovascular Clinic at Beaumont Hospital in Michigan.

The main update required is an enlarged left ventricle, which carries a heavy load of oxygen-rich blood through the aorta to the rest of the body. The muscle walls of this chamber thicken and the space inside expands. At the same time, other chambers of the heart work harder to grow.

An increase in cardiac output means your heart shouldn’t work too much when you’re not at the gym, says Dr. Trivax. Therefore, athletes often have a resting heart rate, which can be a concern for other people.

Strength training also changes the heart. “Unlike endurance exercises, where we put a lot of strain on the heart, with strength exercises it puts a lot of pressure,” says Dr. Lander.

Lifters, especially those that use the Valsalva maneuver to lower and adjust their breathing, cause a temporary but significant increase in blood pressure. Over time, when they repeat this, the walls of the heart may thicken, but the left ventricle usually does not enlarge as much as in endurance athletes, says Dr. Lander.

### **What are the consequences for an athlete’s heart?**

These changes in the heart are part of pushing you to the finish line or a new deadlift max. But they may not be completely benign. In endurance athletes, fragments of scar-like tissue called fibrosis can form as the heart’s chambers stretch, which can alter how electrical signals travel through your heart, Dr. Bunch says.

In fact, many (but not all) studies show that middle-aged and older athletes, especially men, have a dangerous type of arrhythmia called atrial fibrillation. It occurs when the upper chambers of the heart vibrate and appear in sync. Atrial fibrillation can cause symptoms such as weakness, shortness of breath, and decreased ability to exercise, and contributes to the risk of conditions such as stroke and heart failure, says Dr. Trivax.

The development of these changes can take about 3-4 months, and it mainly occurs in

people who exercise more than an hour a day or more than 420 hours a year, says Dr. Bunch. For information, the latest exercise guidelines for Americans - published in JAMA in November - recommend a journal of healthy adults with an average intensity of 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) per week. active activities per week or from 75 minutes (1 hour and 15 minutes) to 150 minutes.

While exercising more than an average of five hours a week can provide additional health benefits, 17 experts from the Instruction Preparation Commission stopped making the same claim for extra workouts.

There is also evidence that long-term endurance athletes have high levels of coronary artery calcium, a hard compound in the blood vessels that can contribute to a heart attack. But what is still unclear is whether the increase in calcium poses the same risk as athletes who exercise less, Dr. Lander said.

A study published in JAMA Cardiology in February found that people who did a lot of sports, which was equivalent to running six miles at a speed of 10 minutes a day, had increased calcium levels, but this was correlated with their. not increased risk of death from heart disease In fact, although the researchers cut it in any form, the risk of death was lower for those who were well-trained than those who were not.

#### **What about the athlete's heart?**

Elites and professionals typically undergo heart tests, and Dr. Trivax advises recreational athletes to do the same: "Anyone who engages in regular exercise should engage in cardiovascular training, especially if they find themselves overweight. "If they're arguing," he said.

This type of screening can detect impending problems, which increases the risk of a sudden heart attack during physical activity. For example, in your document you may see early warning signs of aortic dissection - this often leads to the death of the aortic wall, which is caused by changes in pressure that occur during strength training.

One problem: The symptoms in an athlete's heart can look very similar to

cardiomyopathies, heart muscle diseases, which can be inherited or developed due to other conditions such as high blood pressure or diabetes. Often, cardiomyopathies help athletes die suddenly on the field or in a race, says Dr. Lander.

It can be very difficult to tell the difference, but more sophisticated procedures like cardiologist MRI give cardiologists more tools to tell the difference, says Dr. Lander. If it is still unclear, your doctor may stop you for a while to see how your heart responds; after a few months break, many of the athlete's heart symptoms subside, he says.

If you have cardiomyopathy or other illness, a sports cardiologist can work with you on the safest way to approach exercise, says Dr. Trivax. Otherwise, the athlete's heart is not in a condition such as heart disease or heart failure or high blood pressure. That way, it doesn't need to be treated on its own.

Dr. Trivax says what it takes is vigilance. Fortunately, athletes have adapted to their bodies and devices like heart rate monitors (and even the Apple Watch) provide additional information.

If you feel a heartbeat, jump, or no need to jump, or notice sudden and inexplicable changes in your heart rate - for example, if you feel rested or ascending to 70 degrees as usual by the age of 50, talk to your document. In the sprint, climb to 180 or a maximum of 130, says Dr. Trivax. And make sure your doctor knows if you have a family history of heart problems.

Other red flags include passing during exercise, chest pain, and a general feeling that your work has been turned off for no apparent reason. "It's very subtle - to achieve the highest goals you've achieved before, or to feel like you're being pushed harder than ever," says Dr. Lander. "Or even when you're talking about team sports, all of a sudden you feel like you can't keep up with your teammates and nothing else has changed."

If you develop atrial fibrillation or other heart problems, treatment can sometimes be difficult. Many heart medications are not ideal for athletes because they have side effects such as dehydration, electrolyte abnormalities, poor performance, and muscle pain.

Dr. Trivax says this is another reason to see a sports-oriented cardiologist. It can work to balance risks and benefits, depending on your athletic performance.

### **How can you escape an athlete's heart?**

Dr. Bunch says you can do a lot to protect your heart outside the doctor's office. Commonly used lifestyle recommendations - eating well, getting enough sleep and not smoking - also apply to athletes.

Also, be careful with energy drinks and supplements. High levels of caffeinated energy drinks can cause dangerous heart problems - some of which are more than 300 milligrams, while Dr. Bunch is no more than 500 milligrams in the lab to induce abnormal heart rhythms. These effects are enhanced by exercise.

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