

Is it safe for people with congenital heart disease (CHD) to exercise?

Many adults with CHD were told as children to not exercise. It used to be thought that exercise was dangerous for them. For this reason, many adults with CHD are not comfortable exercising. Some have anxiety when they think about exercising. We now know that exercise is good for most adults with CHD. However, it is important for patients to check with their adult congenital cardiologist before beginning an exercise program.

What is exercise?

Physical activity is any bodily movement produced by skeletal muscles using energy. This includes activities that move your muscles. Exercise is a specific type of physical activity. It is planned, structured, and repetitive. Its goal is to improve or maintain physical fitness.

What is physical fitness?

Physical fitness is a physiologic state of well-being that lets you meet the demands of daily living with additional reserve to do things like playing sports. Most adults with CHD have less “reserve” than people who weren’t born with a heart defect. This can be due to the underlying diagnosis, coexisting lung disease, physical deconditioning or other reasons. This makes optimizing fitness even more important. For adults with CHD, this reserve is important when our bodies are stressed or we become ill. Physically fit people recover more quickly after heart surgeries or infection.

Physical fitness can be aerobic or musculoskeletal. Cardiologists focus on aerobic physical fitness because it increases the availability of oxygen to tissues. This is strongly related to heart function. The more aerobic exercise you do, the better it is for your body. Musculoskeletal fitness is important for the elderly or frail. It helps people perform activities of daily living and prevent falls.

Why would you want to be physically fit?

Aerobic fitness is associated with living longer. In a study of thousands of apparently heart-healthy subjects, after 10 years, those with superior physical fitness (greater than average predicted for age, sex and body size) were much less likely to die. This is also true for people with CHD.

There are many reasons to be fit! Not only do fit, active people live longer, but they tend to be happier and feel

better. They have a lower risk of getting cancer and better rate of survival if they do get cancer. They also are less likely to develop other chronic diseases such as osteoporosis, gallstones, hypertension, diabetes and dementia. Regular exercise also reduces stress, and improves symptoms of depression and anxiety.



Do you need to exercise?

The answer is yes. It’s unlikely that normal day-to-day physical activity will keep you optimally fit. Almost every part of body participates in exercise. Exercise results in a series of changes in almost every organ in the body. The vast majority are beneficial. It is thought that a series of small- and medium-size effects allow the body to be more efficient and to work better.

What happens when you exercise?

When you exercise, your muscles contract and relax. While doing this, at the cellular level, two proteins (actin and myosin) interact. This requires energy. A little energy is stored in muscle and a little more energy can be made quickly in the muscle. The stored energy only allows less than a minute of heavy exercise. To continue exercising, you need aerobic metabolism. This requires oxygen.

What does this have to do with CHD?

As you exercise, your heart rate increases and so does the amount of blood your heart pumps. As the amount of oxygen you use increases, your cardiac output matches it. While your oxygen demand increases 10-15 times, your cardiac output only increases 3-5 times. The rest of the oxygen comes from extracting more oxygen from blood.

Can anything go wrong?

Almost anything that can go wrong can limit exercise performance. This includes things like heart disease, lung

disease, anemia and blood clots. Exercise testing can help determine what is causing the limitation.

It is important that the blood reach its destinations, primarily muscles. At rest, your muscles receive 15-20% of blood pumped through the body. When exercising, that increases to 80-85%. Your blood vessels play an important role in directing blood where it needs to go with exercise.

What is exercise testing and why is it needed?

Exercise testing provides an objective measurement of aerobic fitness. Exercise test performance is a good predictor of prognosis. Different types of exercise tests make it possible to know if exercise limitation is present. For example, it can help narrow down whether you have primary lung disease, pulmonary vascular disease, heart disease or rhythm issues. And it also tells your providers how you can safely exercise.

Your doctor can also assess your current symptoms with an exercise test. Exercise testing allows your doctor to look at the body at a time of physiological stress. It also lets him/her evaluate why you can't do more—what limits you. Is it your heart, your lungs, or something else?

Changes in the electrocardiograms (ECG) with exercise can be suggestive of coronary artery disease. Although this can be helpful in adults with CHD, there are CHD patients whose resting ECG can be difficult to interpret. For this reason, exercise testing in adults with CHD is often done with an exercise test that measures the VO_2 max (maximum oxygen use) and other elements of exercise physiology. Measurement of gases via the mouth (as in done with VO_2 measurements) gives the cardiologist great insight into what's happening in each of your cells.

Your doctor is measuring your peak VO_2 with this test. If your max VO_2 doesn't increase, it tells the cardiologist you may not have given a good effort.

Can I improve my fitness?

Even modest exercise can improve physical fitness in adult patients with CHD. In one study done at the Boston Adult Congenital Heart Program, fitness was shown to improve in patients who exercised more and dropped for those who exercised less.

How can I change my exercise habits?

There is a spectrum of exercise attitudes in ACHD patients: unmotivated, timidly active, or overachievers. Unmotivated patients become "couch potatoes." Timidly active people only exercise a little because they feel it is not safe.

Overachievers over exercise and feel worse. If you are one of the patients who feel worse with exercise, stop exercising immediately and talk with your doctor.

Exercise is good for everyone. However, you should check with your ACHD cardiologist to get an exercise prescription. He/she will most likely perform an exercise test to learn about your state of health and to figure out a safe exercise regimen for you. Don't ever push yourself beyond the point of "feeling safe."

Two types of exercise programs can be addressed in your exercise prescription: aerobic exercise and weight or resistance training. Exercises are usually prescribed based on a percentage of your heart rate or the rated perceived exertion (RPE) scale. RPE is a scale that lets you know how hard you're working. It ranges from 6 at rest to 20—or the point in exercise that you can't do more. Doctors recommend for the majority of your exercise to be within the 14-16 range. This is moderate exercise at 60-70% of your maximum heart rate. You should not work out past your limit.

How long do I exercise?

When beginning to exercise, start slowly and be patient. As a rule of thumb, do gentle exercises 2-3 days/week for 25 minutes a session and increase the intensity only every month. Even when you've reached your maximum ability, it is rarely recommended to perform intense exercise more than 2 days in a row.

What about resistance training or muscle work?

Muscle work should be limited to 2-3 days a week. You should start gently until you can complete at least 8-10 repetitions and between 1 and 3 sets of upper and lower body exercises. Do not lift weights that require straining or lift something so heavy you can't do 8-10 reps. You should also avoid lifting more than 2 days in a row because muscles need to heal.

What are some warning signs to make sure you are exercising safely?

While exercise is safe for most people and overall the risks are far outweighed by the benefits, there are risks. Call your doctor if you have any of these symptoms: chest pain, unusual shortness of breath or shortness of breath after stopping activity, lightheadedness, palpitations, nausea/vomiting, feeling wiped out the next day, leg swelling or shortness of breath the next day. You have to "listen to your body" and stop if something doesn't seem right. The goal of exercise is to make you feel better.

For their work on this article, ACHA thanks **Alexander "Sasha" Opotowsky, MD**, and **Keri Shafer, MD**, of the Boston Adult Congenital Heart (BACH) Service.