

Featuring Dr. Graham Wong, MD, MPH, FRCPC, FACC, Acute Cardiac Care, Cardiologist

Duration: 3 minutes, 18 seconds

A stress test is one of the most commonly used cardiovascular diagnostic tests. There are many reasons why people would reach for a stress test, and why a stress test is useful. At its heart, a stress test is an assessment of someone's physiological or aerobic reserve, and a fairly good assessment of a person's hemodynamic and circulatory response to exercise.

Using this test we can assess someone's fitness level, and whether or not there are any limiting sub-systems in the heart—whether it's the electrical system or the arterial system that might limit someone's ability to exercise.

On a treadmill examination, where you're able to accurately assess one's blood pressure, one's heart rate, and in this way we can understand your blood pressure and heart rate response to exercise, and we can very objectively assess how much aerobic work you're performing with a series of very graded algorithms.

The most common algorithm that's used on a treadmill is something called the BRUCE protocol. At its heart, a treadmill examination is an electrical test that looks at changes in an electrical signal—the electric cardiogram, and to determine if there are any changes that would reflect problems with the electrical sub-system, or more commonly, indirect signs that can suggest there's something wrong with the circulatory system.

Please note that the treadmill examination is limited to our ability to look at the electrical sub-system of the heart as well as the onset of any clinical symptoms that might be reproduced with exercise, such as chest pain or shortness of breath. Although a treadmill test is—at its very nature—an electrical test, the most commonly-used reason for a treadmill is to sort of infer the health of the circulatory system, to look for problems with plugged arteries or atherosclerosis.

But please note that the treadmill examination actually does not allow us to look at the arteries themselves, what we are trying to do is infer a problem with the arteries, if there are abnormalities in the treadmill test, by looking at changes in the ECG with exercise, that may come about as a result of impaired blood flow from a blocked artery.

Because of this limitation, treadmill examinations can be wrong, and there is up to a one-third chance of what we call a false positive, and so what people need to understand that not everyone should get a treadmill examination, and that the selection of patients for treadmill examination is very important, in order to make sure that the answers that we get and the accuracy of the treadmill is as good as we can make it.

Another less common, but very important indication for using the treadmill examination would be to understand the hemodynamic response of patients with valve problems, to understand whether or not the valve has degraded or deteriorated to the point where it impairs aerobic function and physiological function, and that would give some evidence potentially that a patient is at the point where a valve needs to be replaced.

So if you have any further questions about treadmill testing, I would invite you to speak to your family physician, or your specialist who performs treadmills.