



## #4 CARDIOPULMONARY EXERCISE TEST

A Cardiopulmonary Exercise Test (CPET) is an advanced, non-invasive clinical test that allows a doctor to see how a patient's lungs, heart and muscles react together during exercise. The test, which is done while walking on a treadmill, measures the amount of air being breathed in during exercise, how much oxygen is needed, and how fast and efficiently the heart beats during exercise.

"Measuring the gases in breath during exercise allows us to estimate very accurately the health and fitness of an individual's entire heart, lung and circulatory system," says DR PETER TING, from **The Harley Street Heart & Cancer Centre**. "The VO<sub>2</sub> (cardiorespiratory fitness) measurement gives us the oxygen consumption of the body, and is a very accurate measure of the intensity of the physical exercise being done; it's a very strong predictor of the longevity of a person, as well as the prognosticator of any underlying disease condition that he or she might have."

The CPET, which Dr Ting believes is the most precise gauge of cardiorespiratory fitness, is used for a variety of purposes, such as helping to determine the cause of unexplained exercise limitations or breathlessness. For instance, he says, breathlessness can result from being overweight, or from physical deconditioning through being sedentary, but it may also be a sign of serious underlying heart, lung or circulatory problems.

"Any deficiency in one of more of these systems may result in a sensation of shortness of breath on exertion. The CPET test helps us identify if there is a serious underlying medical problem, as well as pinpoint which system may be responsible," he explains.

Dr Ting also says the CPET can help assess a patient's maximum exercise capacity, and the degree to which he or she is limited by the disease. It can help in following disease progression over time, and in monitoring the effects of therapy in order to make decisions about treatment plans.

Another key way the CPET is used is measuring a patient's fitness to undergo surgery. "Gauging the performance of the person during the CPET is an extremely good way to evaluate their overall health and cardiorespiratory function. Hence a normal or better VO<sub>2</sub> performance is indicative of a very low risk

of heart or lung complications, both during and after surgery," says Dr Ting. "In certain countries, if the surgery isn't urgent, some patients are even sent for 'pre-habilitation' to improve their VO<sub>2</sub> before going for surgery."

In addition, Dr Ting says the test can be done to monitor the effects of training in highly conditioned athletes, and to guide decisions regarding training programmes.

As for any potential risks and complications, he says that the CPET is "generally safe and well tolerated". He explains: "Most complications are minor and include injuries sustained from falling from the treadmill machine. Some patients may develop chest discomfort or an abnormal heart rhythm as a result of their underlying condition, and may require urgent treatment as a result."

However, he says, patients are closely supervised by trained medical professionals throughout the testing process, which can be stopped at any time a patient feels unwell or experiences any chest pain or discomfort.

### WHAT TO EXPECT WHEN YOU GO FOR A CPET:

- You'll be asked about any symptoms you've had while exercising in the past. It's important to describe any chest discomfort, breathing problems, light-headedness, dizziness, fluttering in the chest, weakness, tiredness, or anything else you think may be relevant.
- An ECG (electrocardiogram) will monitor the rhythm and rate of your heart, using sticky patches called electrodes that are placed on your chest.
- An inflatable cuff on your upper arm will measure your blood pressure throughout the test, and a small peg on your finger will measure how much oxygen is in your blood.
- A soft facemask over your mouth and nose will help monitor your lungs.
- Once the treadmill begins, it will increase at a predetermined speed and incline. You'll need to keep walking until you're told to stop, or until you're unable to carry on.
- Your breathing, heart rate, blood pressure and oxygen level will continue to be monitored during the recovery period.

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