

CORONARY HEART DISEASE AND EXERCISE

WHAT IS CORONARY HEART DISEASE?

Coronary heart disease (CHD), also known as coronary artery disease, is a disorder of the coronary arteries around the heart (which supply oxygen and nutrients to the heart muscle) in which the regional blood supply is insufficient to deliver the oxygen needed by the heart muscle. CHD is the leading cause of death in many developed countries, accounting for 12% of all deaths and almost 1 in 2 deaths from cardiovascular disease in Australia in 2015 [1]. CHD is almost always due to atheroma (fatty deposit in the blood vessel), with estimates that 6% of CHD worldwide is due to a lack of physical activity or exercise [2].

HOW DOES EXERCISE AFFECT CORONARY HEART DISEASE?

In clinically stable people with CHD who are responding to treatment, the benefits of physical activity far outweigh the risks. Indeed regular exercise appears similarly effective in secondary prevention as many drug interventions [3], without the side effects they may produce. Regular moderate-intensity exercise has many benefits for people with CHD: it prevents the blood vessels from narrowing further (anti-atherosclerotic), prevents blood clotting (anti-thrombotic), helps deliver blood to the heart (anti-ischaemic), and helps to maintain a normal heart rhythm (anti-arrhythmic). These changes reduce the load on the heart at rest and during exercise, which helps to lessen some of the symptoms as well as decrease the risk of death from CHD [4]. Additional benefits from exercise in those with CHD include: improved physical function and psychological wellbeing, and favourable changes in blood pressure, HDL cholesterol and insulin sensitivity [5].



WHAT TYPES OF EXERCISE ARE RECOMMENDED?

Both aerobic and resistance training are safe for people with stable CHD, as long as they are assessed properly and the training program is tailored to their needs. With a suitable exercise prescription, people can expect to manage or even reduce the disease load; improve exercise tolerance, physical function and quality of life; and reduce the risk of a secondary heart event. Cardiac rehabilitation programs and allied health professionals such as Accredited Exercise Physiologists or Physiotherapists are skilled in exercise assessment and prescription for patients with chronic conditions, and are ideally suited to prescribe and oversee exercise programs for these individuals.

Exercise prescription should take into account the individual's exercise capacity and risk profile, and aim to reach and maintain the individual's highest possible fitness level [6].

Aerobic or 'cardio' exercise improves the body's ability to use oxygen to produce energy for movement. Aerobic exercise improves cardiorespiratory endurance (the ability to exercise for a long time).

Exercise recommendations for CHD state 30-60 minutes per day, on 3-5 days per week, of moderate-intensity exercise (e.g. vigorous walking). The total may be completed in shorter sessions of 5-10 minutes and accumulated throughout the day [6].

Exercise intensity can be set in any of the following ways starting at the lower end of the range and increasing over time:

- as a proportion of maximal heart rate (50-80%) or at 40-60% of heart rate reserve [6]; and
- using the rating of perceived exertion (10-14 on a 6-20-point Borg's scale).

In patients who experience exertional angina (chest pain during physical activity), exercise should be prescribed at



a maximum heart rate corresponding to 10 beats per minute below the heart rate at which ischaemia occurs [7]. Interval training holds promise as an alternative to traditional continuous aerobic exercise, however, safety across the range of patients and optimal training protocols are yet to be determined [6, 8]. Isometric (static) training involving large muscle groups should be avoided, because it can increase the pressure on the heart muscle (myocardium). However, isometric handgrip exercise may be an acceptable exercise for those who are unable or unwilling to perform full body dynamic exercise as it can lead to reductions in blood pressure [9].

Strength is often compromised in patients with CHD so dynamic resistance (weight) training should be incorporated with aerobic exercise training to improve physical strength needed for activities of daily living. Resistance training should:

- Commence at a maximum intensity of 30-50% of one-repetition maximum (1RM: weight that can be lifted only once), and the intensity should not exceed the weight that can be lifted for 12-15 repetitions using correct technique [10]; and
- Be performed 2-3 days per week and include one set of 8-10 exercises targeting all major muscle groups. As the patient progresses, the number of sets of each exercise should increase (up to three) following which the intensity may be increased up to a maximum of 60-70% of 1RM.
- Include a recovery pause of at least 1 minute between each set [6].

People need to be taught the correct technique for, and the importance of, regular breathing when performing resistance exercise.

CONTRAINDICATIONS TO EXERCISE

- People who are clinically unstable should not exercise until their clinical condition has been stabilised.
- After a cardiac event (e.g. heart attack), people should complete at least two weeks of aerobic training before starting resistance training.
- After coronary artery bypass graft surgery, people should avoid exercises that cause tension or pressure on the breastbone for two to three months.



RESOURCES & FURTHER INFORMATION

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Exercise is Medicine Australia www.exerciseismedicine.org.au
 Exercise Right www.exerciseright.com.au
 Find an Accredited Exercise Physiologist www.essa.org.au
 Find a Physiotherapist www.choose.physio
 Find a Sport and Exercise Physician www.acsep.org.au/

If you have any concerns about the safety of your patient in commencing an exercise program, please consider a referral to a Cardiologist or a Sport and Exercise Physician.

Find a Cardiac
 Rehabilitation Program
[www.heartfoundation.org.au/
 cardiac-services-directory](http://www.heartfoundation.org.au/cardiac-services-directory)



REFERENCES

1. Australian Bureau of Statistics, Causes of Death 2016 (3303.0). 2017.
2. Lee, I.M., et al., Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*, 2012. 380(9838): p. 219-29.
3. Naci, H. and J.P. Ioannidis, Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *BMJ*, 2013. 347: p. f5577.
4. Anderson, L., et al., Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev*, 2016(1): p. CD001800.
5. Wienbergen, H. and R. Hambrecht, Physical exercise and its effects on coronary artery disease. *Curr Opin Pharmacol*, 2013. 13(2): p. 218-25.
6. Vanhees, L., et al., Importance of characteristics and modalities of physical activity and exercise in the management of cardiovascular health in individuals with cardiovascular disease (Part III). *Eur J Prev Cardiol*, 2012. 19(6): p. 1333-56.
7. Fletcher, G.F., et al., Exercise standards for testing and training: a statement for healthcare professionals from the American Heart Association. *Circulation*, 2001. 104(14): p. 1694-740.
8. Elliott, A.D., et al., Interval training versus continuous exercise in patients with coronary artery disease: a meta-analysis. *Heart Lung Circ*, 2015. 24(2): p. 149-57.
9. Whelton, P.K., et al., 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension*, 2017.
10. Thompson, P.D., Exercise prescription and proscription for patients with coronary artery disease. *Circulation*, 2005. 112(15): p. 2354-63.