

Heart disease – coronary heart disease (CHD)

What is CHD?

Coronary heart disease (CHD), also known as coronary artery disease (CAD), 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, and accounts for 17% of all deaths in Australia (1). CAD is almost always due to atheroma (fatty deposit in the blood vessel); with estimates that over 20% of CAD worldwide being due to lack of physical activity or exercise (2). Cardiovascular disease is diagnosed on the basis of medical history, physical examination and medical tests (such as coronary angiogram, pharmacologic imaging or exercise testing with electrocardiography and/or cardiac ultrasound).

How does physical activity or exercise effect CHD?

In clinically stable people with CHD who are responding to treatment, the benefits of physical activity far outweigh the risks. 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 of CHD (4), as well as decrease the risk of death from CHD (3). Additional benefits from exercise in those with CHD include: improved physical function and psychological wellbeing, and favourable changes in body weight and composition.

What types of exercise are recommended?

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 include:

- duration of 20–30 minutes (preferably 45–60 min) of moderate-intensity exercise, such as vigorous walking (6); exercise may be done in shorter sessions of 10 minutes and accumulated throughout the day (6); and
- frequency of three days each week (preferably 6–7 days each week) (5).

Exercise intensity can be set in any of the following ways:

- as a proportion of maximal heart rate (50–80%) or at 40–60% of heart rate reserve(5);
- using the rating of perceived exertion (10–14 on a 6–20-point Borg's scale); and

- at a heart rate corresponding to 10 beats per minute below the heart rate at which ischaemia occurs in patients who experience exertional angina (chest pain during physical activity (7)).

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

After a cardiac event (e.g. heart attack), people should perform 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. People need to be taught the correct technique for, and the importance of, regular breathing when performing resistance exercise. Isometric (static) training should be avoided, because it can increase the pressure on the heart muscle (myocardium).

Resistance training should:

- be done at a maximum intensity of 30–50% of one-repetition maximum (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 (8); and
- be done 2–3 days per week and include one set of 8–10 exercises targeting all major muscle groups.

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.

Reference and related information

Exercise & Sports Science Australia www.essa.org.au

Heart Foundation www.heartfoundation.org.au

1. Australian Institute of Health and Welfare. Cardiovascular Health. (2008). Available from: www.aihw.gov.au/cvd/index.cfm [accessed 2 March 2011]
2. World Health Organization. (2002). *The world health report :reducing risks, promoting healthy life*. Geneva: WHO.
3. Taylor RS, Brown A, Ebrahim S, Jolliffe J, Noorani H, Rees K, et al. Exercise-based rehabilitation for patients with coronary heart disease: systematic review and meta-analysis of randomized controlled trials. *Am J Med* 2004; 16: 682–92.
4. Wise FM. Coronary heart disease. The benefits of exercise. *Aust Fam Physician* 2010; 39(3): 129–33.
5. Corra U, Piepoli MF, Carre F, Heuschmann P, Hoffmann U, Verschuren M, et al. Secondary prevention through cardiac rehabilitation: physical activity counselling and exercise training: key components of the position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation. *Eur Heart J* 2010; 31(16): 1967–74.
6. Briffa TG, Maiorana A, Sheerin NJ, Stubbs AG, Oldenburg BF, Sammel NL, et al. Physical activity for people with cardiovascular disease: recommendations of the National Heart Foundation of Australia. *Med J Australia* 2006; 184(2): 71–5.
7. Fletcher GF, Balady GJ, Amsterdam EA, Chaitman B, Eckel R, Fleg J, et al. Exercise standards for testing and training: a statement for healthcare professionals from the American Heart Association. *Circulation* 2001; 104(14): 1694–740.
8. Thompson PD. Exercise prescription and proscripton for patients with coronary artery disease. *Circulation* 2005; 112(15): 2354–63.