



EDITORIAL COMMENT

Heartfelt exercise: Physical exercise gets the cardiovascular system into shape

Sistema cardiovascular em forma com exercício físico

Frederico C. Pereira ^{a,b}

^a Institute of Pharmacology and Experimental Therapeutics/IBILI, Faculty of Medicine, University of Coimbra, Coimbra, Portugal

^b CNC.IBILI-University of Coimbra, Coimbra, Portugal

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The combination of a sedentary lifestyle and a Western-type (high-calorie) diet is the most important factor contributing to excess body weight, metabolic impairment, and increased risk of developing cardiovascular disease (CVD).¹ An estimated 17.9 million people died from CVD worldwide in 2016, representing 31% of all deaths.² Of these, 85% are due to myocardial infarction and stroke. Moreover, epidemiological and clinical studies have shown an association between maternal malnutrition (under- and overnutrition, including Western-type diets) and the development of cardiovascular and metabolic dysfunction.³

The Western-style diet is characterized by highly processed and refined foods and high intakes of sugar, salt, and fat and protein from red meat.⁴

Exercise and diet were important components of ancient medical theory. For example, Hippocrates (c. 460-370 BC) noted that "eating alone will not keep a man well; he must also take exercise."⁵ Epidemiological studies in large cohorts support the notion that physical fitness is associated with reduced cardiovascular mortality and hospitalization due to CVD. During the last 20 years even the idea that

patients should remain inactive after a myocardial infarction has dramatically changed, and nowadays patients are mobilized and included in exercise training programs very shortly after the event.⁶ Exercise-based cardiac rehabilitation is accordingly given a class IA recommendation for patients with coronary artery disease and heart failure. Aerobic (continuous and/or interval training), resistance or respiratory muscle training are usually prescribed, depending on patient assessment and needs.⁷

Combined resistance-endurance training has been shown to be more effective than aerobic endurance training in improving CV fitness.⁸ Moreover, resistance training alone has also been shown to improve cardiovascular health by reducing resting blood pressure, improving lipoprotein-lipid profiles and/or dyslipidemia, decreasing triglycerides, increasing high-density lipoprotein cholesterol, and improving cardiovascular response to exercise.⁹

The paper by Santana-Filho et al. published in this issue of the *Journal*¹⁰ is thus timely and addresses a hot topic regarding the impact of physical exercise, specifically resistance training, on cardiovascular and metabolic parameters.

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E-mail address: fredcp@ci.uc.pt

Conflicts of interest

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References

1. Jensen MD, Ryan DH, Apovian CM, et al., American College of Cardiology/American Heart Association Task Force on Practice Guidelines; Obesity Society. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Obesity Society. *Circulation*. 2014;129:S102–38.
2. World Health Organization. Cardiovascular diseases (CVDs). Available at [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)) [accessed 09.04.19].
3. Costa-Silva JH, Simões-Alves AC, Fernandes MP. Developmental origins of cardiometabolic diseases: role of the maternal diet. *Front Physiol*. 2016;7:504.
4. Odermatt A. The Western-style diet: a major risk factor for impaired kidney function and chronic kidney disease. *Am J Physiol Ren Physiol*. 2011;301:919–31.
5. Tipton CM. The history of “Exercise Is Medicine” in ancient civilizations. *Adv Physiol Educ*. 2014;38:109–17.
6. Adams V, Linke A. Impact of exercise training on cardiovascular disease and risk. *Biochim Biophys Acta Mol Basis Dis*. 2019;1865:728–34.
7. Witvrouwen I, Van Craenenbroeck EM, Abreu A, et al. Exercise training in women with cardiovascular disease: differential response and barriers – review and perspective. *Eur J Prev Cardiol*. 2019, <http://dx.doi.org/10.1177/2047487319838221> [accessed 09.04.19].
8. Gielen S, Laughlin MH, O’Conner C, et al. Exercise training in patients with heart disease: review of beneficial effects and clinical recommendations. *Prog Cardiovasc Dis*. 2015;57:347–55.
9. Shaw BS, Shaw I, Brown GA. Resistance exercise is medicine: strength training in health promotion and rehabilitation. *Int J Ther Rehabil*. 2015;22:385–9.
10. Santana-Filho V, Costa JH, Nascimento E. Treinamento de resistência melhora o controle automático cardiovascular e perfil bioquímico de ratos expostos a dieta ocidental. *Rev Port Cardiol*. 2019;38:337–45.