



## EDITORIAL COMMENT

# Are we doing our best for our cardiac rehabilitation patients? Could we go further?



## Estamos a dar o melhor aos nossos doentes de reabilitação cardíaca? Podemos ir um pouco mais além?

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Available online 16 May 2019

There is no doubt that cardiac rehabilitation (CR) is a very effective therapeutic approach, associated with significant reductions in overall and cardiovascular mortality. It also improves patients' quality of life and their functional capacity.<sup>1,2</sup>

One of the main components of a CR program is aerobic exercise, prescription of which is guided ideally by the heart rate (HR) achieved in cardiopulmonary exercise testing (CPET), based on parameters including peak oxygen uptake ( $VO_2$ ) and  $VO_2$  reserve. However, because of the costs and limited availability of this test, conventional stress testing is more often used.

There are two common methods for obtaining the target (training) HR. One is based on HR reserve (HRR), for which the guidelines<sup>3,4</sup> specify a range of 40-80%. This method gives similar results to the gold standard CPET. The other method aims for 50-85% of peak HR.

In some situations it cannot be assumed that HR will have a linear relationship with  $VO_2$  and work rate increase, such as in pacemaker implantation, heart transplantation, chronotropic incompetence or beta-blocker therapy. In such cases an alternative is to use a rating of perceived exertion (RPE), as provided by the Borg scale. Target HR in this case will be determined by a score of 12-16 (on a scale from 6 to 20) on the Borg scale.<sup>3,4</sup>

Target HR has been set by high-intensity interval training (HIIT) in some studies at a level of 80-90% of HRR.<sup>5</sup>

The best method of determining target HR has not been clearly established, nor has the optimal progression of exercise intensity in the established range. A careful balance must be achieved between safety and performance.

Increases in the intensity of aerobic exercise can be guided by monitoring HR achieved during the sessions and the associated RPE.

This issue of the *Journal* features a study by Amorim et al.<sup>6</sup> of 238 randomly selected patients undergoing a CR program in the cardiac rehabilitation center of Centro Hospitalar de S. João, Porto, between 2008 and 2016, following an acute coronary syndrome. It aimed to describe the

DOI of original article:

<https://doi.org/10.1016/j.repc.2018.07.009>

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<https://doi.org/10.1016/j.repc.2019.04.005>

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progression of aerobic exercise intensity in these patients, and revealed a significant improvement in functional capacity following the program.

The authors studied the progression of aerobic exercise intensity by measuring patients' weekly peak exercise HR on the treadmill and exercise intensity in metabolic equivalents (METs), using the American College of Sports Medicine formulas based on the speed and grade of the treadmill.<sup>3</sup>

To quantify improvement in functional capacity due to the program, they indexed the peak HR achieved in the sessions and the RPE score to the intensity of exercise (in METs).

The results were as expected, with significant increases in functional capacity, and greater intensity of exercise with lower perception of effort.

The study revealed that the patients trained at the upper end of the recommended range by the peak HR method, but at the lower end of the recommended range by the HRR method (which is more reliable and is closer to measured  $\text{VO}_2$ ) guided by RPE and peak HR achieved in aerobic sessions during treadmill exercise. This supports the idea that there may be room to increase the intensity of training, such as by raising the RPE score to 14-16, in selected patients.

The authors conclude that the major changes resulting from exercise occurred during the first month of training, with less visible change in functional capacity thereafter, especially in older patients. This highlights the need for a different approach to these patients, to enable them to achieve better results.

In conclusion, there is room for further improvement in the benefits provided by a conventionally structured CR program, in particular by introducing more ambitious goals in

progression of exercise intensity in some patients and by diversifying the program schemes.

## Conflicts of interest

The author has no conflicts of interest to declare.

## References

1. Anderson L, Oldridge N, Thompson DR, et al. Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane systematic review and meta-analysis. *J Am Coll Cardiol.* 2016;67:1-12.
2. Pryce KJ, Gordon BA, Bird SR, et al. A review of guidelines for cardiac rehabilitation exercise programmes: is there an international consensus? *Eur J Prev Cardiol.* 2016;23:1715-33.
3. American College of Sports Medicine. ACSM's guidelines for exercise testing and prescription. 10th ed. Lippincott Williams & Wilkins; 2018.
4. Mezzani A, Hamm LF, Jones AM, et al. Aerobic exercise intensity assessment and prescription in cardiac rehabilitation: a joint position statement of the European Association for Cardiovascular Prevention and Rehabilitation, the American Association of Cardiovascular and Pulmonary Rehabilitation and the Canadian Association of Cardiac Rehabilitation. *J Cardiopulm Rehabil Prev.* 2012;32:327-50.
5. Weston KS, Wisloff U, Coombes JS, et al. High-intensity interval training in patients with lifestyle-induced cardiometabolic disease: a systematic review and meta-analysis. *Br J Sports Med.* 2014;48:1227-34.
6. Amorim H, Cadilha R, Rocha A, et al. Aerobic exercise intensity 108 progression in a cardiac rehabilitation program. *Rev Port Cardiol.* 2019;38:275-80.