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Novel progressive moderate-intensity interval-to continuous training as a promising alternative for exercise prescription. Where two are fighting, a third one wins?

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Moderate-Intensity Continuous Exercise (MCT) and the High-Intensity Interval Training (HIIT) have been widely adopted in cardiac rehabilitation centers. Scarce data is available on the alternative approaches to exercise training. As the total volume of exercise training is a result of its frequency, intensity, and time, thus, up-titration of any training variable results in increase in exercise volume. We developed exercise training model with progression by gradual adjustment of the duration of hard segments. Interval-to-continuous training typically commences with hard blocks interspersed with recovery blocks of duration 4 min and 2 min, respectively. With gradual tolerance of exercise training, time or intensity of hard segments can be up-titrated accordingly (one variable at time), while maintaining planned training heart rate zone. After attaining 40-60 min of endurance training per session, the secondary goal is to extend duration of the hard segments (by 2-min) up to 15-20 min. We studied over 300 consecutive patients undergoing cardiac rehabilitation at Prince Sultan Cardiac Center, Riyadh twice-to-three times a week during a period of 8-12 weeks. Functional capacity has been assessed utilizing a maximal symptom-limited exercise treadmill test prior the beginning, and after program completion (after 8-12 weeks). Initial interval protocols after few weeks have been modified into long intervals or continuous protocols. From 300 consecutive patients, 218 attended at least 24 exercise session. Among them 212 patients improved their initial functional capacity by at least 10%, while remaining 6 patients attained similar capacity level as during initial exercise test. No single major cardiac event occurred during sessions. Average functional capacity improvement of 2.78 METs has been reported, with more than 50% of patients attaining level of 12 METs



Figure.1 Progression of the moderate-intensity interval training into interval-to-continuous protocol

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Recent Publications

1. Anderson L, Thompson DR, Oldridge N, Zwisler AD, Rees K, Martin N, Taylor RS. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database Syst Rev.* 2016 Jan 5;2016(1):CD001800.
2. Ambrosetti M, Abreu A, Corrà U, Davos CH, Hansen D *et al.* Exercise-Based Cardiac Rehabilitation for Coronary Heart Disease: Cochrane Systematic Review and Meta-Analysis. 2020 update. A position paper from the Secondary Prevention and Rehabilitation Section of the European Association of Preventive Cardiology. *Eur J Prev Cardiol.* 2020 Mar 30;2047487320913379.
3. Conraads VM, Pattyn N, De Maeyer C, Beckers PJ, Coeckelberghs E *et al.* Aerobic interval training and continuous training equally improve aerobic exercise capacity in patients with coronary artery disease: the saintex-cad study. *Int J Cardiol* 2015; 179:203–210.
4. Ellingsen Ø, Halle M, Conraads V, Støylen A, Dalen H *et al.* SMARTEX Heart Failure Study (Study of Myocardial Recovery After Exercise Training in Heart Failure) Group. High-intensity interval training in patients with heart failure with reduced ejection. *Circulation* 2017; 135:839–849.

Biography

Adam Staron, Ph.D. is a consultant cardiologist with over 20 years of experience in clinical cardiology. He is currently the Head of the Cardiac Rehabilitation Department in Gliwice, Poland. He served between 2018 and 2022 as a Director of Cardiac Rehabilitation at Prince Sultan Cardiac Center Riyadh, where he established the first exercise training program in the Kingdom of Saudi Arabia. In the past, he has been working for several years in the Upper Silesian Cardiac Center in Katowice, Poland. He served then as a Head of the Cardiac Rehabilitation Department in Murcki Hospital, Katowice, implementing yoga and tai-ji. He has been awarded a European Society of Cardiology training grant in the field of 3-dimensional echocardiography in 2008, and he was a co-founder of the International Summit on Imaging and Interventions in Cardiology (ISIIC) conference in 2011.

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