Further Proof That Almost Any Type of Regular Exercise Improves Cardiorespiratory Fitness

Duncan GE, Anton SD, Sydeman SJ, Prescribing exercise at varied levels of intensity and frequency: a randomized trial. Arch Intern Med 2005;165:2369–9.

Study Overview

Objective. To examine the effects of 4 exercise prescriptions of varied intensity and frequency on selected cardiovascular risk factors in free-living sedentary individuals.

Design. Randomized study.

Setting and participants. 492 participants (64% women) were randomized to 1 of 4 exercise-counseling prescriptions or to a physician advice comparison group.

Intervention. While the type and duration of exercise were constant in the 4 intervention groups (ie, 30 minutes of walking), intensity and frequency were adjusted through 4 exercise options: moderate intensity–low frequency, moderate intensity–high frequency (HiF), hard intensity (HardI)–low frequency, and HardI-HiF. The exercise intervention was given in 2 phases: the first phase included 11 group sessions over 6 months, and the second phase included 6 quarterly group sessions over the remaining 18 months. Participants randomized to the physician advice (comparison) group received one 90-minute session in which written materials regarding recommended levels of exercise for health were provided.

Main outcome measure. Changes in cardiorespiratory fitness (maximum oxygen consumption), high-density lipoprotein (HDL) cholesterol level, and total cholesterol–HDL cholesterol ratio at 6 and 24 months.

Main results. At 6 months, maximum oxygen consumption was significantly higher in the HardI-HiF, HardI–low frequency, and moderate intensity–HiF exercise groups ($P < 0.01$). Participants in the moderate intensity–low frequency and physician-assisted counseling groups had nonsignificant fitness increases of about 1% over baseline. Of the 4 exercise prescriptions, only the HardI-HiF group showed significant improvements in HDL cholesterol ($P < 0.03$), total cholesterol–HDL cholesterol ratio ($P < 0.04$), and maximum oxygen consumption ($P < 0.01$) as compared with the physician advice group. At 24 months, maximum oxygen consumption remained significantly higher than baseline in the HardI–HiF, HardI–low-frequency, and moderate intensity–HiF exercise groups compared with the physician advice group ($P < 0.01$ for all). However, there was no significant effect of any exercise intervention on HDL cholesterol level ($P = 0.57$) or total cholesterol–HDL cholesterol ratio ($P = 0.64$).

Conclusion. Significant improvements in cardiorespiratory fitness were seen with both HiF and HardI exercise interventions. Either HiF or HardI exercise or a combination of HardI plus HiF exercise may provide additional benefits, including greater fitness changes and improved lipid profiles.

Commentary

Physical activity builds and maintains bones, increases lean muscle, reduces fat, improves blood pressure and blood glucose control, and can improve functional independence and quality of life for older adults. Despite these benefits, many adults do not engage in any regular physical activity. Preliminary age-adjusted data for 2003 show that only 33% of adults aged 18 years and older regularly engaged in moderate physical activity (ie, ≥ 30 minutes of moderate activity at least 5 times/wk) [1].

Duncan et al demonstrated that high-intensity exercise (either low or high frequency) and moderate-intensity activity at HiF show significant and similar increases in fitness over baseline at 24 months. These changes in fitness were observed despite the fact that adherence was lower than the levels prescribed. During phase 1 of the exercise intervention, participants completed approximately 57% to 70% of the minimum amounts prescribed. Furthermore, exercise completed was inversely proportional to the prescribed intensity, with lower adherence in the HardI groups.

Applications for Clinical Practice

Public health recommendations for physical activity [2–4] vary slightly, but the consensus is that individuals should engage in 30 min/day of moderate-intensity physical activity for at least 5 days/wk or engage in more vigorous physical activity for 20 min/day at least 3 days/wk. This study's

findings provide further evidence that practitioners have the opportunity to counsel their patients on a health behavior that has critical importance for disease prevention.

–Review by Christianne L. Roumie, MD, MPH

References

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