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ORIGINAL RESEARCH

Cardiovascular responses during resistance exercise after an aerobic session

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KEYWORDS
Physical therapy;
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Abstract
Objective: To analyze the influence of previous aerobic exercise on cardiovascular responses during resistance exercise.
Methods: This is a crossover observational study. The sample included 19 normotensive men aged between 19 and 39 years. Subjects performed two experimental sessions in random order: resistance exercise (R: three sets of knee extension exercises with 40% of one repetition maximum) and aerobic exercise + resistance exercise (A + R: 30 min of aerobic exercise followed by R protocol). In both sessions, blood pressure (BP) and heart rate were monitored beat-by-beat by finger photoplethysmography.
Results: After aerobic exercise in the A + R session, there was a maintenance of systolic BP −2 (95% CI: −6; 2) mmHg ($P = 0.35$), diastolic 1 (95% CI: −2; 5) mmHg ($P = 0.40$) and mean BP 0 (95% CI: −4; 4) mmHg ($P = 0.91$) and an increase in heart rate 11 (95% CI: 7; 16) bpm ($P < 0.001$). Diastolic and mean BP increased and peak heart rate was higher during resistance exercise in the A + R session compared to the R session. Differences between sessions: diastolic BP 7 (95% CI: 2; 12) mmHg ($P = 0.03$); mean BP 8 (95% CI: 2; 13) mmHg ($P = 0.05$); and peak heart rate 18 (95% CI: 13; 23) bpm ($P < 0.001$). The increases in systolic BP during resistance exercise were similar between sessions 16 (95% CI: 6; 26) mmHg ($P = 0.43$).
Conclusion: Aerobic exercise before resistance exercise increased diastolic and mean BP and heart rate. However, due to the sample size of 19 individuals, the results must be interpreted with caution.

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Introduction

Resistance exercises increase strength, muscle mass and power, functional capacity, and quality of life,[1–3] therefore they have been consistently recommended for individuals with and without the presence of cardiovascular diseases.[4–6] However, during resistance exercise, there are abrupt increases in heart rate,[7–11] cardiac output,[10] and blood pressure (BP),[7–10,12–14] which have been a concern.[5,6] Thus, strategies to attenuate the cardiovascular responses during resistance exercise have been sought.

A single bout of maximal dynamic exercise has been shown to attenuate the BP response to mental stress.[15,16] These responses were attributed to an increase in vasodilation, decreases in sympathetic outflow from the central nervous system, and post-exercise hypotension observed after aerobic exercise.[17] Therefore, it is plausible that cardiovascular responses during resistance exercise could also be attenuated after aerobic exercise.

The aim of this study was to analyze the influence of previous aerobic exercise on cardiovascular responses during resistance exercise. We hypothesized that previous aerobic

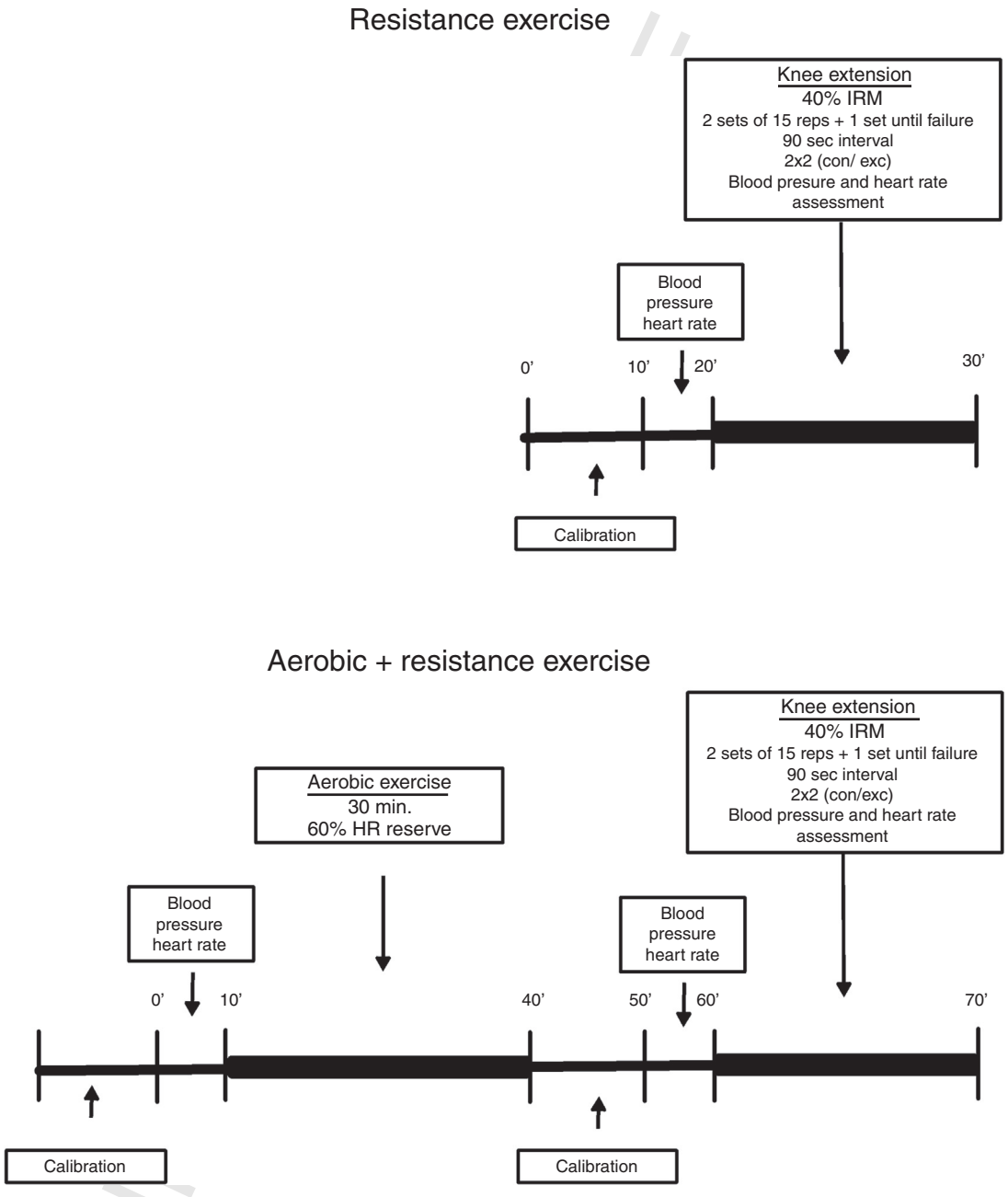

Figure 1 Design of the study sessions: resistance exercise and aerobic + resistance exercise. 1RM, one maximal repetition; con, concentric contraction; ecc, eccentric contraction; HR, heart rate; reps, repetitions; sec, seconds.

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