



ORIGINAL ARTICLE

Influence of load intensity on blood pressure after a resistance training session

Victor Gonçalves Correa Neto^{a,b,c,f}, Tiago Figueiredo^{a,c,d},
Alexandre Damasceno Simões^{a,b}, Michel Gonçalves Bezerra^{a,b},
Samuel Thul Pereira Barguti^{a,b}, Claudio Melibeu Bentes^{a,e,*},
Luiz Gustavo Dias dos Santos^{a,c,d}, Roberto Simão^{a,c}, Humberto Miranda^{a,b,c}

^a Federal University of Rio de Janeiro, School of Physical Education and Sports, Rio de Janeiro, Brazil

^b Lato Sensu Post Graduation in Strength Training, Federal University of Rio de Janeiro, Brazil

^c Stricto Sensu Post Graduation in Physical Education, Federal University of Rio de Janeiro, Brazil

^d Estácio de Sá University, Physical Education Graduation Program, Macaé, RJ, Brazil

^e Oswaldo Cruz Foundation, Fernandes Figueira Institute, Graduate Program in Applied Clinical Research On Women's Health, RJ, Brazil

^f Gama e Souza College, Physical Education Graduation Program, Rio de Janeiro, RJ, Brazil

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Abstract This study aimed to compare the blood pressure responses in normotensive-trained men following resistance training (RT) experimental sessions with loads of 60% and 80% of a one-repetition maximum. Ten participants underwent three experimental condition: (P60) – session adjusted with 60%, (P80) – session adjusted with 80% of 1 repetition maximum (1RM) and, (CONT) – only blood pressure assessments in rest condition for 60 min (intervals of 10 min). The resistance training design was adjusted with 3-sets, 3-min rest interval length between sets and exercises. Blood pressure was measured before, and at 10, 20, 30, 40, 50, and 60 min after the training session. The results showed that both protocols induce post-exercise hypotension ($p < 0.05$) compared to the rest values. The P80 showed greater magnitude and duration of post exercise hypotension when compared with P60 protocol ($p < 0.05$). In conclusion, resistance training is effective to provide a post exercise hypotension independent of the load intensities. This study is important to show the importance of control of the load intensity during development of resistance training programs and, the RT with 60% of 1RM can be as effective as protocols with 80% of 1RM to prevent the high blood pressure.

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* Corresponding author.

E-mail addresses: claudiomelibeu@gmail.com, claudio.bentes@iff.fiocruz.br (C.M. Bentes).

PALABRAS CLAVE

Entrenamiento de fuerza;
Respuesta cardiovascular;
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Estrés cardiovascular;
Ejercicio de resistencia

La influencia de la intensidad de la carga sobre la presión arterial después de una sesión de entrenamiento de fuerza

Resumen Este estudio tuvo como objetivo comparar la respuesta de la presión arterial en los hombres normotensos entrenados realizando sesiones experimentales con cargas del 60 y el 80% de una repetición máxima. Diez participantes se sometieron a 3 condiciones experimentales: P60 (sesión realizada con el 60%); P80 (sesión realizada con el 80% de una repetición máxima [1RM]), y CONT (solo las evaluaciones de la presión arterial en el estado de reposo durante 60 min [intervalos de 10 min]). El protocolo experimental se llevó a cabo con 3 series, con intervalo de 3 min entre las series y los ejercicios. La presión arterial se midió antes y a los 10, 20, 30, 40, 50 y 60 min después de la sesión de entrenamiento. Los resultados mostraron que ambos protocolos indujeron hipotensión postejercicio ($p < 0,05$) en comparación con los valores en reposo. El P80 mostró una mayor magnitud y duración de la hipotensión postejercicio en comparación con el protocolo P60 ($p < 0,05$). En conclusión, el entrenamiento de fuerza es eficaz para proporcionar hipotensión postejercicio independientemente de la intensidad de la carga. Por lo tanto, en esta investigación es importante mostrar la relevancia del control de la intensidad de la carga durante el desarrollo de los programas de entrenamiento de fuerza. El entrenamiento de fuerza con el 60% de 1RM puede ser tan eficaz como los protocolos con 80% de 1RM para prevenir la presión arterial alta en los hombres.

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Introduction

High blood pressure (HBP) is considered an important public health problem and the prevalence in worldwide is dramatic.¹ To prevent the HBP has been suggested changes in lifestyle and control of risk factors.² Furthermore, the physical exercise must be included as a non-pharmacological strategy to prevent and control this chronic disease.^{3,4}

Several evidences have shown positive associations between physical exercises (aerobic, neuromuscular and neuromotor fitness) and post-exercise hypotensive responses (PEH).⁵⁻⁷ The PEH is an important physiological response and there is a significant relationship with a prevention of cardiovascular events like strokes and coronary arterial diseases. Therefore, resistance training (RT) may represent an important strategy for public health and quality of life for everyone.⁸⁻¹⁰

Previous studies have examined PEH following RT sessions performed in different formats, such as a circuit training,¹¹ different numbers of sets,¹² different rest interval length,^{13,14} different exercise order^{15,16} and load intensity.^{6,7,17}

However, few studies have compared the effect of different load intensity on blood pressure responses and, there are controversies in literature about this variable.¹⁸

Figueiredo et al.¹⁷ analyzed the effect of three different load intensities (60%, 70% and 80% of 1 repetition maximum (1RM) with 8–10 repetitions per set) on PEH in prehypertensive trained men, and showed significant differences in the duration of the PEH when the 70% of 1RM loads were applied in a RT session, independent of the total volume. These results suggesting that moderate to high intensities could induce a better PEH response in trained men. In addition, Simão et al.¹¹ analyzed the effect of two different load intensities (6RM vs. 12RM with 50% of a 6RM) in

normotensive-trained men, and showed no significant differences in duration of PEH between experimental sessions, independent of the total volume.

These results have shown that low or high intensities could induce PEH responses. On the other hand, Duncan et al.⁷ compared different RT intensities on PEH and showed significant results only in group with high intensity (80% of 1RM). Moreover, Bentes et al.¹⁶ did not showed differences between to intensities (60% and 80% of RM) on PEH. Yet, there is no consensus in the literature regarding the effects of RT load intensity on PEH.^{12,18}

Must still be developed researches with objectives to analyze the PEH and, it has a significant value for conditioning and research of RT and to help coaches and other professionals to prescribe with security the RT programs for anyone. Therefore, the purpose of this study was to compare BP responses in normotensive-trained men following RT experimental sessions with loads of 60% and 80% of a 1RM. It was hypothesized that high intensity can promote longer PEH than low intensities.

Methods

Participants

Ten trained men with at least five years of recreational experience in RT volunteered for the study. Participants were recruited according to the criteria established by the Seventh Joint National Committee.¹⁹ Prior to subject participation and data collection, all participants answered the Physical Activity Readiness Questionnaire and signed an informed consent form according to the Declaration of Helsinki. The exclusion criteria for the study were: (a) use of medication affecting their cardiovascular responses and

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