

P-177

Influence of exercises combinations and anthropometric risk factors for the development of hypertension in elderly

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The purpose of this study was to evaluate the relationship between functional fitness, risk factors to the development of hypertension and the physical exercise combinations practiced among older adults. The sample consisted of 396 participants (77 men and 319 women, aged 50-83 years old). The study was previously approved by the Institutional Review Board of São Paulo State University (Brazil). All subjects underwent a physical examination to assess body mass index (BMI), waist-hip ratio (WHP) and blood pressure (BP). BP was measured after 5 min of rest between 7-8 am over three separate days, according to VI Brazilian Hypertension Guidelines using an aneroid sphygmomanometer placed over the brachial artery. The average of the two last recordings was used as baseline BP on data analysis. Training status was evaluated by "Functional Fitness Battery Test" proposed by "American Alliance for Health, Physical Education, Recreation and Dance" (AAHPERD) in order to assess functional fitness, which comprises the following tests: coordination, flexibility, muscular strength, agility/dynamic balance and endurance. General functional fitness index (GFFI) was calculated using the sum of the percentile score of each test as previously described. All participants were separated according to the modality of physical exercises practiced (SEDENTARY = no exercise / SINGLE - single modality of exercise / MULT - multicomponent (two or more) modalities of exercise). Descriptive statistics and Pearson's correlation coefficient were performed to detect correlation between variables. Both genders were included in the groups, even though the number of men was lower than women; however no differences were found on variables when the gender was analyzed separately. Our results show that subjects who practice at least one modality of physical exercise have lower rates of risk factors compared with sedentary individuals and when there is a combination of exercises (multicomponent modality), this benefit increased. These results suggest the importance of the multicomponent practice of physical exercise in the control of the development of hypertension and for the maintenance of high levels of functional fitness in older adults. Values are mean (SE). A $p < 0.05$ versus SEDENTARY. B $p < 0.05$ versus SINGLE.

Keywords: Exercises combinations; hypertension; elderly

Table 1. Subjects' characteristics

Anthropometric variables	SEDENTARY (n=55)	SINGLE (n=169)	MULT (n=172)
Age (years)	62.52 (8.42)	64.09 (8.29)	64.52 (8.19)
Body Mass Index (kg/m ²)	30.86 (5.48)	28.24 (4.71)A	27.06 (4.17)A, B
Waist circumference (cm)	97.49 (16.08)	92.46 (12.88)A	89.96 (11.43)A
Hip circumference (cm)	109.29 (12.11)	103.24 (9.72)A	100.88 (11.15)A
Waist-hip Ratio	0.89 (0.11)	0.89 (0.09)	0.89 (0.12)
Functional fitness			
Coordination (secs)	13.33 (4.39)	13.04 (4.04)	12.58 (3.25)
Flexibility (cm)	51.47 (11.80)	56.66 (12.17)A	57.86 (12.11)A
Strength (repetitions)	18.67 (4.59)	21.55 (6.47)A	24.05 (7.01)AB
Agility (secs)	26.04 (6.02)	24.14 (6.07)	23.39 (5.57)A
Aerobic endurance (secs)	546.20 (69.59)	531.63 (78.57)A	497.93 (86.58)AB
GFFI	194.23 (89.94)	246.38 (106.40)A	277.74 (109.29)AB
Hemodynamic variables			
Systolic blood pressure (mmHg)	126.33 (14.66)	122.37 (12.25)	121.56 (12.89)
Diastolic blood pressure (mmHg)	82.38 (10.47)	78.14 (8.45)A	76.11 (8.98)AB

P-178

Comparison of the acute effect of the aerobic and resistance exercise on blood pressure of the older individuals with treated hypertension

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Introduction: Several researches show that continuous aerobic exercise (CAE) induces more hypotensive effect than interval aerobic exercise (IAE), which seems to be more efficient in increasing the peak of VO₂max. The prescription of resistance exercise (RE) has been encouraged in the routine of the elderly in order to improve functional capacity and control degenerative effects caused by aging, such as sarcopenia. However, there are few studies on the response of the acute blood pressure (BP) in such exercise methods.

Objective: This study examined the 24-hours BP response after a single CAE, IAE, ER session and control session (C).

Methods: Twenty-two subjects of both genders, hypertensive individuals under drug therapy, were underwent a stress test, which detected no changes suggestive of ischemia. They had the order of intervention or control randomized, with the interval of 7 days between them. Aerobic exercises were conducted with duration of 40 minutes, using 5- minute warm up and 5-minute cool-down. In the CAE, the intensity was corresponding to 70% of maximum heart rate (MHR) obtained in the stress test. In IAE, intensities were 60% and 80% of MHR in each 2 minutes. In the ER, subjects were submitted to the 1 repetition maximum (1RM) test, to obtain the corresponding loads, and after 7 days the exercise was scheduled. Two sets of ten repetitions were used in nine exercises for the major muscle groups, with a warming series of 50% of 1 RM, and after 1 minute, another series of 70% of 1RM. Blood pressure was measured for 24 hours after each intervention by Ambulatory Blood Pressure Monitoring (ABPM) (Spacelabs).

Statistical Analysis: one-way ANOVA.

Results: The mean age was 68.5 / 5.6 years and BMI of 27.4 / 4.7 kg/m². There was no difference between the BP post exercise and C in the systolic 24-hour ABPM: C = 128/14 mmHg, IAE = 126/15 mmHg, CAE = 126/17 mmHg, ER = 127/14 (p = 0.98, ANOVA one -way), in systolic awake ABPM: C = 131/15 mmHg, IAE = 127/14 mmHg, CAE = 127/15 mmHg, ER = 129/13 mmHg (p = 0.79, one-way ANOVA), in systolic or diastolic sleep ABPM.

Conclusion: A single session of continuous aerobic exercise, interval aerobic exercise or resistance exercise did not change the BP compared to the control in older individuals with treated hypertension.

Keywords: Blood pressure; aerobic exercise; resistance exercise

P-179

Long-term effects of renal denervation on blood pressure burden in ambulatory blood pressure measurements in patients with resistant arterial hypertension

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Background: Catheter based ablation of nerves around renal arteries (renal denervation, RDN) by the use of radiofrequency energy can reduce blood pressure (BP) in patients with resistant arterial hypertension (RAH). Ambulatory blood pressure measurements (ABPM) provide a full BP profile by a high number of readings, resulting in a high reproducibility of BP levels. We systematically investigated the effect of RDN on the BP burden in ABPM in a consecutive series of patients 12 months after RDN.

Methods: Patients suffering from RAH were treated by RDN after exclusion of secondary causes of hypertension. RAH was defined by a mean systolic office BP >160mmHg. ABPM for 24-hours was performed 3, 6 and