GENDER DIFFERENCE IN CARDIOVASCULAR RESPONSES TO EXERCISE

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Abstract

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There are physical and physiological gender differences in humans. The most consistent gender difference in cardiovascular responses to endurance or “dynamic” exercise (e.g., running, jogging, cycling, walking, etc.) is the lower stroke volume of women and the smaller increase in stroke volume from rest to exercise. Gender-specific differences in cardiac size/mass and blood volume may be responsible for the smaller stroke volume at rest and during exercise, as well as the lower peak oxygen uptake (VO_{2peak}) in women than men of similar age. At the same absolute workload, both gender and physical fitness affect the heart rate response to exercise. Specifically, the increase in heart rate during exercise is the greatest in unfit women and smallest in fit men. However at the same relative workload (e.g., the percentage of VO_{2peak}), the heart rate response is similar between men and women, as well as between fit and unfit individuals. At peak exercise effort, heart rate, blood pressure and arteriovenous oxygen difference are not significantly different between genders. Normal aging is associated with a decline in VO_{2peak}, while the rate of decline appears to be similar between men and women. The age-related decreases in stroke volume, heart rate and arteriovenous oxygen difference across the body at peak exercise contribute importantly to the decline in VO_{2peak} in the elderly. Regardless of age, gender and physical fitness, there is a constant relationship between the increase in VO_{2} and the corresponding increase in cardiac output (stroke volume × heart rate) during exercise; in general, about 5-6 liters of cardiac output are required for every liter of oxygen uptake above rest. Taken together, gender does not affect cardiovascular responses to exercise and the age-related decline in exercise capacity in humans.

Keywords: sex, exercise capacity, physical fitness, aging
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2004, DAVID H.P. STREETEN American Autonomic Society Travel Award, The American Autonomic Society
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