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Women have greater shortness of breath than men when exercising

November 7 2013

The reason women find it harder to breathe than men during exercise is due to greater electrical activation of their breathing muscles, shows a new study published today [8 November] in the journal *Experimental Physiology*.

It is well established that women experience greater shortness of breath during physical activity, from stair climbing to long-distance running, than men of a similar age. This is true in healthy young and older adults, as well as in patients with chronic heart and lung disease. This study is the first to explain why this happens.

Dr Dennis Jensen, who led the study at McGill University, Canada, says: "Our study uniquely showed that sex differences in activity-related breathlessness could be explained by the awareness of greater electrical activation of the respiratory muscles – specifically the diaphragm – needed to achieve any given ventilation during exercise in healthy young women compared to men.

"Our findings indicated that greater electrical activation of the respiratory muscles during exercise in women is needed to compensate for their biologically smaller lungs, airways and breathing muscles."

This information could be used by researchers and healthcare providers to help identify new treatments to relieve the symptoms of breathlessness and improve exercise capacity for groups such as the elderly and patients with chronic heart and lung disease.

Dr Jensen explains how the research was carried out: "50 healthy, non-smoking men and women aged 20-40 years completed a maximum exercise test on a stationary bicycle. During exercise, we monitored the participants cardiovascular, metabolic and ventilatory responses to exercise using computerized equipment.

"At regular intervals during exercise, participants rated the intensity of their breathlessness using a 10-point scale. Using a multipair electrode catheter placed in the participants' oesophagus, we also recorded the electromyogram of the diaphragm (an index of the drive to breathe that presumably originates in the central nervous system) throughout exercise. These measurements were then analysed and compared between men and women."

Future research is needed to extend the findings to other groups of men and women, such as those that are overweight or obese.

More information: Schaeffer M, Mendonca C, Levangie M, Anderson R, Taivassalo T and Jensen D (2013). Physiological mechanisms of sex differences in exertional dyspnea: Role of neural respiratory motor drive. *Experimental Physiology*.

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