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» **Journal Abstract**

The rate pressure product is greater during supine cycle ergometry than during treadmill running

SR Simonson, FB Wyatt

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Supine cycle ergometry (SCE) is used to assess cardiopulmonary fitness and reserves and to predict potential cardiopulmonary complications of cardiac patients and those undergoing abdominal and non-cardiac thoracic surgery. It is also used to simulate exercise during spaceflight. The question arises as to how SCE compares to upright treadmill running (TMR). The purposes were: 1) to compare oxygen uptake, heart rate, blood pressure, and work of the heart (rate-pressure product, RPP) obtained during maximal bouts of SCE and TMR exercise; 2) to compare these parameters at similar oxygen uptakes during SCE and TMR; and 3) to establish a formula for predicting TMR performance based on SCE. Nine males, ages 21-35 years (\bar{x} = 27.44 yr) completed the Bruce TMR and a ramped SCE protocol to determine device specific peak oxygen uptake. Respiratory gasses and volumes, heart rate, blood pressure, and rating of perceived exertion were measured. Oxygen uptake, RPP, mean arterial pressure, parameter means and standard errors were calculated and a paired t-test ($P \leq 0.05$) performed. Absolute and relative peak oxygen uptake and peak heart rates were greater for TMR. SCE produced higher values for systolic, diastolic, and mean arterial pressures, and RPP. Although TMR produces greater systemic stress, SCE causes the greatest exertion by the heart. RPP should be used for evaluation and prescription of exercise rather than HR or BP alone. Increased wall motion abnormalities and ischemic events noted during supine exercise may be due to the heart working harder as well as to better imaging capabilities.

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