

TACSM Abstract

Are Men Cheaper Than Women? Insights from Walking Economy

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ABSTRACT

Introduction: The metabolic energy cost of human walking has been extensively studied. However, whether men and women require the same amount of energy (per kg of body mass) to walk at the same speed or cover the same distance remains unresolved. While most predictive algorithms incorporate only body mass and walking speed, we have recently found that mass-specific walking metabolic rates are inversely related to stature. **Objective:** We tested the specific hypothesis that walking economy does not differ between males and females when stature is controlled. We evaluated our hypothesis by comparing stature-matched adult males vs. females in each of three categories: short, medium and tall, at their respective most economical walking speeds. We predicted that minimum transport costs (COT_{min} , $ml\ O_2 \cdot kg^{-1} \cdot m^{-1}$) would not vary between gender groups of each stature. **Methods:** 30 subjects (15 male, 15 female) walked on a level treadmill at speeds ranging from $0.4\ m \cdot s^{-1}$ to $1.9\ m \cdot s^{-1}$. Indirect calorimetry was used to measure rates of oxygen uptake under steady-state conditions (Parvo Medics TrueOne 2400, Sandy, UT). **Analysis:** Minimum net transport cost, or net transport cost at the most economical walking speed, was determined for each subject by: 1) subtracting resting rates of oxygen uptake from the gross rates measured (VO_{2net} , $ml\ O_2 \cdot kg^{-1} \cdot min^{-1}$), and 2) dividing VO_{2net} by walking speed to identify the minimum COT. Unpaired *t*-tests were used to compare males and females within each stature group. **Results:** Transport costs were essentially identical for male and female groups of all three statures: short, medium and tall, and were inversely related to stature as expected. **Conclusion:** We conclude that men and women are equally cheap and gender does not influence walking energy expenditure. The mass-specific energy cost of transport does not differ in males and females of the same stature.

