Abstract

A variety of training approaches have been shown to improve running economy in well-trained athletes. However, there is a paucity of data exploring lower-body determinants that may affect running economy and account for differences that may exist between genders. Sixty-three male and female distance runners were assessed in the laboratory for a range of metabolic, biomechanical, and neuromuscular measures potentially related to running economy (ml·kg(-1)·min(-1)) at a range of running speeds. At all common test velocities, women were more economical than men (effect size [ES] = 0.40); however, when compared in terms of relative intensity, men had better running economy (ES = 2.41). Leg stiffness (r = -0.80) and moment arm length (r = 0.90) were large-extremely largely correlated with running economy and each other (r = -0.82). Correlations between running economy and kinetic measures (peak force, peak power, and time to peak force) for both genders were unclear. The relationship in stride rate (r = -0.27 to -0.31) was in the opposite direction to that of stride length (r = 0.32-0.49), and the relationship in contact time (r = -0.21 to -0.54) was opposite of that of flight time (r = 0.06-0.74). Although both leg stiffness and moment arm length are highly related to running economy, it seems that no single lower-body measure can completely explain differences in running economy between individuals or genders. Running economy is therefore likely determined from the sum of influences from multiple lower-body attributes.

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