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Comparison of Maximal Treadmill Test Using Open-Circuit Spirometry and Maximal Effort Two-Mile Run Test Performance

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Maximal oxygen uptake (VO_2 max) testing is the leading measure for determining one's aerobic capacity. It directly relates to fitness level and optimal human performance. Cardiorespiratory fitness based field assessments have in the past focused on time of completion and distance covered rather than utilizing physiological measures. **PURPOSE:** To compare open-circuit spirometry measured VO_2 max during a maximal treadmill test and their normative scores to a maximal effort two-mile run test. **METHODS:** Gannon University Men's Soccer players ($N = 19$, 19.89 ± 1.91 years of age) volunteered to participate in this study. Testing appointments were separated by 48 hours of rest. Participants completed a maximal effort two-mile run test while wearing Polar Pro Team 2 heart rate monitors. Participants also underwent body composition testing via the Bod Pod, and then completed an open-circuit spirometry VO_2 max treadmill test utilizing the Bruce protocol. **RESULTS:** Participants in this study had an average fat-mass percentage of 12.39 ± 4.32 . A significant difference was found between normative standard performance scores of the maximal effort two-mile run test and open-circuit spirometry VO_2 max treadmill test ($t(36) = 2.117$, $p = 0.041$). Correlations between fat-mass percentages and normative test performances were significant. **CONCLUSIONS:** The maximal effort two-mile run test is not an accurate representation of an athlete's maximal cardiorespiratory fitness when compared to an open-circuit spirometry measured VO_2 max treadmill test. This research may be utilized in other physically demanding activities or professions such as military, law enforcement, and firefighters.