Novel CPET Reference Values in Healthy Adults: Associations with Physical Activity

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Cardiopulmonary exercise testing (CPET) is an important measurement in clinical practice and its primary outcome, maximal oxygen uptake (V[Combining Dot Above]O2peak), is inversely associated with morbidity and mortality. The purpose of this study is to provide CPET reference values for maximal and submaximal parameters across the adult age spectrum of a healthy European cohort, to compare V[Combining Dot Above]O2peak values with other reference datasets and to analyze the associations between physical activity (PA) levels and CPET parameters.; In this cross-sectional study, we prospectively recruited 502 participants (47% female) from 20 to 90 years old. The subjects performed a CPET on a cycle ergometer using a ramp protocol. PA was objectively and continuously measured over 14 days using a triaxial accelerometer. Quantile curves were calculated for CPET parameters. To investigate the associations between CPET parameters and PA levels, linear regression analysis was performed.; V[Combining Dot Above]O2peak values observed in the group of 20-29 years were 46.6ś7.9 and 39.3ś6.5 (mL/kg/min) for males and females, respectively. On average, each age category (10-year increments) showed a 10% lower V[Combining Dot Above]O2peak relative to the next younger age category. V[Combining Dot Above]O2peak values of previous studies were, on average 7.5 (mL/kg/min) (20%) lower for males and 6.5 (mL/kg/min) (21%) lower for females. There was strong evidence supporting a positive association between V[Combining Dot Above]O2peak (mL/kg/min) and the level of habitual PA performed at vigorous PA (estimate 0.26; $p < 0.001$].; Maximal and submaximal CPET reference values over a large age range are novel and differences to other studies are clinically highly relevant. Objectively measured vigorous-intensity PA showed a strong positive association with higher V[Combining Dot Above]O2peak and other performance-related CPET parameters, supporting the implementation of higher intensity aerobic exercise in health promotion.
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