

Sex and age differences in aerobic fitness in people with cystic fibrosis

C. Williams^{1,2}, O. Tomlinson^{1,2}, N. Withers², P. Oades², A. Barker¹

University of Exeter, Children's Health & Exercise Research Centre, Exeter, United Kingdom, Royal Devon and Exeter NHS Foundation Trust Hospital, Exeter, United Kingdom

Objective: A high exercise capacity ($\dot{V}O_2$) is known to be a predictor of mortality independent of lung function for people with CF (PwCF). Whilst $\dot{V}O_2$ has been shown to be significantly different between sexes in healthy children, it is unclear what the effects of age and sex are for $\dot{V}O_2$ in PwCF. This aim of the study was to characterise CPET results for PwCF.

Methods: Eighty-nine people with CF (53 male/36 female; age range 9-69 y; paediatric (< 18 y = 31, Adult ≥ 18 y = 58; $\Delta F508/\Delta F508 = 38$, $\Delta F508/Other = 46$, No $\Delta F508 = 10$) were included. CPET using a combined ramp-incremental and supramaximal verification cycle ergometer test determined maximal oxygen uptake ($\dot{V}O_2$). Absolute, relative to body mass and allometrically scaled $\dot{V}O_2$ were derived. One way ANOVA with Bonferroni post-hoc tests compared age and sex differences.

Results: Mean (SD) absolute $\dot{V}O_2$ male (n=19) and female (n=12) paediatrics were 2.19 (0.84) and 1.31 (0.34) L·min respectively and adult males (n=34) and females (n=24) were 2.12 (0.66) and 1.44 (0.36) L·min respectively. Mean (SD) relative $\dot{V}O_2$ for male and female (n=12) paediatrics were 38.9 (6.3) and 28.6 (5.4) mL·kg⁻¹·min respectively and adult males and females were 28.4 (9.1) and 22.7 (5.0) mL·kg⁻¹·min respectively. Mean (SD) allometrically scaled $\dot{V}O_2$ for male and female paediatrics were 79.6 (14.9) and 56.8 (10.3) mL·kg⁻¹·min and adult males and females were 61.6 (19.4) and 47.9 (10.4) mL·kg⁻¹·min respectively. A significant main effect for sex ($P < 0.01$) but no age ($P = 0.82$) or interaction ($P = 0.48$) effect was found for absolute $\dot{V}O_2$. Relative and allometrically scaled $\dot{V}O_2$, significant sex and age main effects ($P < 0.01$) but no interaction effects were found ($P = 0.16$ and $P = 0.20$).

Conclusion: Mean female $\dot{V}O_2$ scores were significantly lower than males irrespective of age and paediatric scores were significantly higher than adults. Of concern is the significantly reduced scores in adulthood for females.