CARDIAC AUTONOMIC FUNCTION: ASSOCIATIONS WITH CARDIORESPIRATORY FITNESS IN CHILDREN.

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The value of aerobic fitness in maintaining autonomic equilibrium has been noted in adults (Goldsmith et al., 2000); however, there is scant evidence available for children. The aim of this study was to establish the association between heart rate variability (HRV) indices and cardiopulmonary fitness in 275 children (139 boys and 136 girls) aged 10.6 years. Cardiopulmonary fitness was assessed from a maximal peak oxygen uptake (peak VO₂) test and from heart rate recovery (HRR), expressed as the number of beats recovered 1, 2 and 3 minutes post peak exercise. HRV indices were measured at rest under controlled breathing. Boys and girls were each divided into three tertile groups according to their aerobic fitness level (low fitness, <=40.3 ml/kg/min for girls and <=43.8 ml/kg/min for boys; moderate fitness, >40.3 to <=48.8 ml/kg/min for girls and >43.8 to <=53.5 ml/kg/min for boys; high fitness, >48.8 for girls and >53.5 ml/kg/min for boys) and HRV indices were compared using ANOVA. Partial correlations, adjusting for gender and body size, were used to investigate the relationships between resting HR, peak VO₂, HRR and HRV. In boys, logRRSTD and logPoincare plot SD2 were significantly higher in the HIGH fitness group than the other two groups (p < 0.05). LogRMSSD, logPoincare plot SD1, logLF and logHF were significantly higher in the HIGH fitness group compared to the LOW fitness group (p < 0.05). No significant differences in HRV indices were observed in the girls by aerobic fitness level. In boys, peak VO₂ was positively associated with log RMSSD, log Poincare plot SD1 and log HF (p's < 0.05), but not with HRR (p > 0.05). In girls, peak VO₂ was significantly associated with HRR (p < 0.05), but not with HRV indices (p's > 0.05). Partial correlations indicated resting HR was associated with all HRV indices (r² ranged from 5 to 62%). These results indicate that autonomic function is related to cardiopulmonary fitness in children; however, this relationship is gender specific.


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