Prediction of Heart Rate Response Associated with Aerobic Capacity - A Retrospective Analysis in Young Healthy Fit Adults

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Rationale:

Maximal heart rate (MHR) and aerobic capacity decline with age among men and women. Most literature concludes that MHR is not associated with maximal oxygen consumption (VO_2max), and only the aging process affects on MHR. However, several studies reported that MHR tends to be lower in young highly conditioned endurance athletes compared to age-matched non-athletes. The aims of the present study were to assess the association between heart rate response and aerobic capacity, and to compare measured and predicted MHR in healthy young fit adults.

Methods:

Two hundred forty five maximal exercise tests on treadmill were retrospectively analyzed using SPSS software v.18. Mean subject age was 23.5±3.2 and 22.3±2.4 years (range 18-32) for 138 men and 107 women respectively (table 1). Pearson correlations were performed between estimated VO_2max and measured MHR, resting heart rate (RHR) and heart rate reserve (HRR). One way analysis of variance for repeated measures using LSD post-hoc procedure was performed to assess differences between measured and predicted MHR.

Results:

MHR was not associated with aerobic capacity in our study population, although significant correlation was observed between both HRR and RHR with VO_2max (r=0.18 p=0.033, r=-0.19 p=0.029 for men, and r=0.33 p0.001, r= -0.35 p0.001 for women) respectively (table 2). Significant difference (6.2±7.8 beat/min p0.001) between measured and predicted MHR using 220-age equation was observed in men and women. Alternative prediction equations yielded fewer differences between measured and predicted MHR (table 3).

Conclusion:

Higher HRR and lower RHR were associated with higher aerobic capacity. MHR was not related to aerobic capacity in young healthy fit adults. In our study population alternative prediction equations were more accurate for predicting MHR. We suggest considering HRR and RHR as indicators for aerobic capacity and using alternative MHR prediction equations in this population.