

Simplified Measurement of Occupational Energy Expenditure

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Abstract : Aim: To develop a simple methodology to allow collected heart rate (HR) data from inexpensive wearable devices to be expressed in a suitable format (METs) to quantitate occupational (and recreational) activity. Introduction: Assessment of occupational activity is commonly done by utilizing questionnaires in combination with prescribed MET levels of a vast range of previously measured activities. However for any individual the intensity of performing a specific activity can vary significantly. Ideally objective measurement of individual activity is preferred. Though there are a wide range of HR recording devices there is a distinct lack methodology to allow processing of collected data to quantitate energy expenditure (EE). The HR index equation expresses METs in relation to relative HR i.e. the ratio of activity HR to resting HR. The use of this equation provides a simple utility for objective measurement of EE. Methods: During a typical occupational work period of approximately 8 hours HR data was recorded using a Polar RS 400 wrist monitor. Recorded data was downloaded to a Windows PC and non HR data was stripped from the ASCII file using 'Notepad'. The HR data was exported to a spread sheet program and sorted by HR range into a histogram format. Three HRs were determined, namely a resting HR (the HR delimiting the lowest 30 minutes of recorded data), a mean HR and a peak HR (the HR delimiting the highest 30 minutes of recorded data). HR indices were calculated (mean index equals mean HR/rest HR and peak index equals peak HR/rest HR) with mean and peak indices being converted to METs using the HR index equation. Conclusion: Inexpensive HR recording devices can be utilized to make reasonable estimates of occupational (or recreational) EE suitable for large scale demographic screening by utilizing the HR index equation. The intrinsic value of the HR index equation is that it is independent of factors that influence absolute HR, namely fitness, smoking and beta-blockade.

Keywords : energy expenditure, heart rate histograms, heart rate index, occupational activity

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