

AN INDIVIDUAL-SPECIFIC HEART RATE
MONITORING METHOD OF
DETERMINING DAILY PHYSICAL
ACTIVITY PATTERN IN MINUTES

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Introduction: Physical activity questionnaires (PAQs) are used in clinical and research work. However, concern over their reliability and validity has resulted in the need for objective quantification of physical activity (PA). Objective measures previously used assess energy expenditure (EE) only (eg. Caltrac accelerometry¹). Heart rate monitoring (HRM) in conjunction with individual calibration enables quantification of time spent in different intensities of PA and is therefore a more valuable method of validating PAQs.

Method: 24 subjects were individually calibrated according to their HR at 3 levels of PA: a light walk (normal respiratory rate (RR), stair-climb (slightly out of breath) and jog (greater increase in RR). Mid-points between these HRs were used to create cut-off points for light, moderate and vigorous intensity PA. HR data was collected for a full waking day:

Results: The table shows two contrasting examples of the percentage of the day spent by subjects in each intensity category of PA.

| | Rest | Light | Moderate | Vigorous | total time | Total PA EE |
|----|--------|--------|----------|----------|-------------|-------------|
| 1/ | 82.5 % | 12.6 % | 4.3 % | 0.6 % | 15:08 hours | 423 kcals |
| 2/ | 24.5 % | 70.0 % | 4.9 % | 0.5 % | 12:51 hours | 2660 kcals |

Conclusion: This method enables demonstration of the proportions and amounts of time spent by individuals in different intensities of PA. It is objective and clinically accessible, for example in work with Cystic Fibrosis patients and weight management programs. This method provides the most comprehensive method of assessing the reliability and validity of PA questionnaires.

1. Epstein, L., Paluch, R., Coleman, K., Vito, D. & Anderson, K. (1996) Determinants of physical activity in obese children assessed by accelerometer and self-report. *Medicine and Science in Sports and Exercise* **28**, 1157-1164.