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# Physical Activity Monitoring: Efficacy of Objective Methods to Maintain Adequate Levels of Physical Activity

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## Introduction

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that result in energy expenditure [1]. PA practice leads to numerous health and psychological benefits. For example, regular PA practice improves brain health, helps manage weight, reduces the risk of many metabolic and endocrine diseases, strengthens bones and muscles, and improves the ability to perform activities of daily living [2]. To achieve these benefits and to tailor PA prescription, direct observation of the individual's parameters should be used as the gold standard considering volume, duration, frequency and intensity [3]. Therefore, with any exercise program, a simple and reliable method of monitoring exercise intensity is crucial to improve health and physical performance [1]. Devices such as heart rate monitors, fitness trackers and accelerometers have become increasingly popular as measurement tools for PA [4]. These devices reduce the subjectivity inherent in survey methods and can be used with large groups of individuals [5]. In fact, objective measurement devices which measure movement duration, intensity, and frequency of activities, offer an important tool for understanding the true variation in PA and validating self-reported physical activity [6]. One of the most used tools for assessing objective PA is heart rate, which can be controlled through Fitness tracker and heart rate monitor [7]. Several studies showed the validity of Heart rate monitoring for PA level classification and its efficacy in monitoring PA levels in all populations [8]. Furthermore, heart rate is an easy and economical way to monitor the intensity of the training and through training zones calculation is possible to adapt exercise intensity according to the person's condition [9]. Another modality of PA measurement related to HR is the fitness tracker utilization, a wrist-worn device used to self-monitor the daily PA including a pedometer to record steps and measure the intensity of the activities done [8]. This tool has been particularly popular in all age groups due to its affordability and comfortability and it is used as both measurement and intervention tools [10]. Therefore, trackers could support the implementation of behavioral change techniques, tailoring of goals, and tracking of progress with minimal use of resources [11]. People are stimulated to become more active and the coach can monitor progress by modulating the fitness training [12]. Furthermore, Hodkinson showed that pedometer-based walking interventions are an effective way to use technology to increase PA [13]. Hooke et al reported that using pedometers with supportive daily feedback combined with the setting of step goals is an effective intervention for increasing activity in healthy youth [14]. In fact, risk factors for chronic disease, including a sedentary lifestyle, may be present even in young children, suggesting that early prevention programs may be key to reducing rates of chronic disease [15]. An accurate assessment of PA in children is necessary to identify current levels of physical activity and to assess the effectiveness of intervention programs designed to increase PA participation [16]. These can synchronously record various physiological data that help the trainer to monitor workouts, stimulating motivation and enjoyment [6]. In fact, as hypothesized and confirmed by Stodden, et al. [17], enjoyment has a key role in increasing PA participation and fitness trackers could help in diversifying the training, creating new stimuli and personalizing the training, using both objective and subjective

methods, to increase enjoyment. In conclusion, since PA has significant physiological and psychological health benefits and contributes to the prevention and management of many diseases, accurate PA monitoring is crucial to achieving positive effects of PA and promoting physical activity in the general population [18].

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