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A Novel Tool for Quantifying and Promoting Physical Activity in Youths With Typical Development and Youths Who Are Ambulatory and Have Motor Disability

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Abstract

Background

Several device-based instruments have been validated in the pediatric population, but none of these are clinically applicable and provide real-time feedback on actual physical activity in terms of postures and movements. A new device (Activ8) is promising for that purpose.

Objective

The objective was to investigate the criterion validity of the Activ8 for measuring static (sitting, standing) and dynamic (walking, bicycling, running) activities, and for separating postures and movements within basic and complex activities in children and adolescents (youths) with typical development (TD) and peers with motor disability (not typical development [NTD]).

Design

This was a criterion validation study.

Methods

Ten participants with TD (mean age [standard deviation] = 14 [2.5] years) and 10 participants with NTD (mean age = 12.9 [2.1] years) performed a standardized series of basic and daily life (complex) activities. The Activ8 measured postures and movements, while camera recording served as a reference. The outcome measures were the mean time differences between the Activ8 output and video data for the merged categories “static” and “dynamic” and for the separate postures and movements.

Results

For the merged categories static and dynamic, the criterion validity was found to be excellent both in participants with TD and participants with NTD within basic activities, and was found to be good to excellent in participants with TD and moderate to good in participants with NTD within complex activities. The detection of separate postures and movements was found to be poor to excellent in both groups within complex activities.

Limitations

The sample of youths with NTD was small and limited to youths who could be considered to be at least ambulatory within a household.

Conclusions

Activ8 is a valid tool when the merged categories static and dynamic are used to interpret physical activity in daily life in both youths with TD and youths with NTD and mild motor impairment. To optimize the quantification of separate postures and movements, adjustment of the existing algorithm is required.

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