Efficacy of Wearable Physical Activity Trackers, Function and Participation Measures in Children with Cerebral Palsy; Review of the Evidence

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Background Cerebral Palsy is the primary cause of early physical disability in children and affects approximately 110,000 people, with a prevalence of 2–2.5 per 1000 live births in the United Kingdom. Young people with Cerebral Palsy have reduced physical fitness with an estimated, maximum aerobic capacity of 15–28% less than healthy peers. This may lead to health consequences, such as hypertension and obesity.

The UK physical activity guidelines for healthy children (5–18 years), advise 60-minutes of daily moderate-intensity physical activity (MIPA). However, these guidelines do not include children with long-term conditions such as Cerebral Palsy. Additionally, appropriate outcome measures are required to record the effects of interventions on physical activity, functional-mobility, and participation in children with disabilities.

Objectives To review the evidence for the use of the physical activity, functional-mobility, and participation measures for young people with Cerebral Palsy.

Methods The current research was screened using the key search terms Cerebral Palsy, exercise, and physical activity, to critique the literature for physical activity, functional-mobility, and participation measures for young people with Cerebral Palsy. These included wearable physical activity trackers (WPAT), the Physical Activity Questionnaire for Older Children (PAQ-C), the Timed-up-and-Go (TUG) and the Child and Adolescent Scale of Participation (CASP).

Results Physical activity can be measured subjectively or objectively. WPAT can be used to track objective PA in children and adolescents with chronic diseases to record health-outcomes. Furthermore, a benchmark of 12,000–16,000 steps-a-day, has been suggested to meet the recommended daily PA (60-minutes). However, the articles indicate limitations in the variability of devices, placement, duration, activity, and environment.

The PAQ-C papers demonstrated some evidence for acceptable psychometric properties and provided normative scores for recording PA levels. However, the impact of different seasons, school holidays, and recruiting healthy children samples, needs to be considered to record subjective PA levels, in children with disabilities.

The TUG has been used to measure balance, postural control, mobility, and function in children with CP. The literature suggests high reliability and minimal detectable change and minimal clinical important difference values of the TUG in children. However, the small sizes used this research must be acknowledged.

The research reviewed for the CASP were predominantly used in TBI and arm-injuries and suggested some preliminary evidence for the psychometric properties in children with neuropsychological conditions.

Conclusions The literature review indicates preliminary evidence for the use of WPAT, PAQ-C, TUG, and CASP to record the effects of interventions in children with disabilities, such as Cerebral Palsy. However, future research should focus on the feasibility, and applicability, of public health guidelines for physical activity, intended for children with CP, to improve and maintain health and well-being.