

## Physical activity levels in children with developmental disabilities during school

Erica Fenili\*, Tara Osborne, Kristin Ewertz, Heather Farney

*Department of Physical Therapy, College of Health Professions*

**Abstract.** Current guidelines recommend that school-age children accumulate at least 60 minutes of moderate to vigorous physical activity (MVPA) on most days of the week. However, little is known about the activity level of school-age children with developmental disabilities (DD): To evaluate physical activity behavior patterns of children with DD during 3 school settings: adapted physical activity (APE, 55 min), classroom (CR, 55 min), and recess (RC, 25 min). Participants were 14 youth (6 boys, 8 girls,  $8.7 \pm 2.2$  yrs) with DD. Heart rate (HR) was measured by telemetry (S410™ Heart Rate Monitor, POLAR®) during APE, CR, and RC on three different days, respectively. HRs were downloaded to a computer via SonicLink™. Resting HR (RHR) was measured on three days between 8 to 8:45 a.m. while the child was read to and rested on a beanbag. RHR was calculated as the mean of the 5 lowest HRs on the day that recorded the lowest RHRs (Logan et al., 2000). Time spent in MVPA was determined by the mean time spent (min) above 1.25 RHR ( $\geq 1.25 \times \text{RHR}$ ) in the three school settings (APE, CR, and RC). For these three settings, average time spent at MVPA was  $84.2 \pm 23.2$  min. Given that this only represents the morning session classes, these students were meeting and exceeding their recommended 60 minutes of MVPA during the school day.

### 1. Introduction

For school-age youth, daily physical activity (PA) is essential for the promotion of health, growth and development as well as reducing risk factors for adult onset of cardiovascular and metabolic diseases. Current PA guidelines recommend that school-age children accumulate at least 60 minutes of moderate to vigorous PA (MVPA) on most days of the week [1]. There is scarce information on the PA characteristics of youth with developmental disabilities (DD). Therefore, the extent to which youth with DD meet recommended PA guidelines has not been established.

Heart rate monitoring is commonly used to measure PA intensity in children and adolescents because of its objectivity, reliability, and validity [2]. The purpose of this study was to evaluate PA behavior patterns of children with DD in a school setting in terms of objectively measured intensity and duration. The school setting was chosen in that all children, disabled and non-disabled, attend school and it is the primary institution for promoting PA. PA was measured via heart rate monitoring during three school settings: adapted physical activity class (55 min); instructional or classroom activity (55minutes); and recess (25 minutes).

### 2. Experiment, Results, Discussion, and Significance

Physical activity (PA) behavior patterns of children with DD was evaluated during 3 school settings: adapted physical activity (APE, 55 min), classroom (CR, 55 min), and recess (RC, 25 min). Participants were 14 youth (6 boys, 8 girls,  $8.7 \pm 2.2$  yrs) with DD (See Table 1). Heart rate (HR) was measured by telemetry (S410™ Heart Rate Monitor, POLAR®) during APE, CR, and RC on three different days, respectively. HRs were downloaded to a computer via SonicLink™. Resting HR (RHR) was measured on three days between 8 to 8:45 a.m. while the child was read to and rested on a beanbag. RHR was calculated as the mean of the 5 lowest HRs on the day that recorded the lowest RHRs.

Using resting heart rates (RHR), activity intensity for each setting was calculated by the time spent between 1.25 RHR ( $\text{RHR} \times 1.25$ ) to 1.49 RHR ( $1.25 \times \text{RHR}$  to  $1.49 \times \text{RHR}$ ) for moderate physical activity (MPA) and above

1.50 RHR (1.50RxHR) for vigorous physical activity (VPA). For each child per setting, the mean time (min) for MPA and VPA was calculated from the three days. The time spend (min) in moderate-to-vigorous physical activity (MVPA) for each setting was calculated from mean MPA plus mean VPA (MVPA = MPA + VPA). The average time spent in MVPA for the morning classes (MVPA•min<sup>-1</sup>•day<sup>-1</sup>) was determined from sum of the mean MVPA per setting (APE + IC + R) (see Table 2).

The results of this study suggest that when measuring PA of youth with DD via HR monitoring, the participants in this study were meeting the recommended guidelines. It should be mentioned, however, that the APE teacher has been national recognized for here creativity in developing curriculum for children with DD. Additionally, most school districts have dropped their APE and have gone to inclusion PE (i.e., regularly developing children with children with DD).

### 3. Conclusions

Given that the daily school schedule includes an additional recess after lunch, the children with DD in this School District were meeting and exceeding their recommended 60 minutes of MVPA during school days.

### 4. Acknowledgements

We would like to thank each and every participant in our study. We would also like to thank Cindy Combs and all of the other special education teachers and para educators in Newton school district USD 373 and Dr. Ken Pitetti.

[1] Department of Health and Human Services & Department of Agriculture. *Dietary guidelines for Americans*. Retrived July 10, 2006 from <http://www.healthierus.gov/dietaryguidelines/>

[2] Eston, R.G., A.V. Rowlands, and D. K. Ingledew. Validity of heart rates, pedometry, and acclerometry for predicting the energy cost of children's activities. *J.Appl. Physiol.* 84:362-371, 1998.

Child	Gender	Age	Height (m)	Weight (kg)	BMI kg•m <sup>2</sup>	Condition
1	male	7.1	1.26	41.7	26.2	MR
2	male	6.5	1.12	21.8	17.4	DS
3	female	11.7	1.38	30.6	16.1	MR
4	male	9.1	1.31	29.0	16.7	MR
5	female	8.7	1.14	22.2	17.0	DS
6	male	10.2	1.27	29.7	18.4	MR
7	female	11.1	1.31	38.7	22.5	MR, FA
8	female	11.0	1.47	46.4	21.5	MR, A
9	female	11.8	1.32	27.7	14.2	MR
10	male	7.1	1.19	23.6	16.6	MR, FA
11	female	7.5	1.23	21.1	13.9	MR
12	female	6.5	1.14	24.5	18.8	DS
13	male	6.5	1.17	22.7	16.6	MR
14	female	8.5	1.30	23.0	13.5	MR, Spastic CP, GMFCS Level III

MR = mild mental retardation, no known cause; DS = Down syndrome; FA = mild mental retardation due to fetal alcohol syndrome; MR,A – mild mental retardation and autism; MR, CP = mild mental retardation with ambulatory spastic diplegic cerebral palsy.

Table 2: Total MVPA (min) for Each Setting (n=14)

Physical Education MVPA (min)	Classroom	Recess	Total
43.2+10.7	20.9+12.5	20.4+4.33	84.2+23.2