Duke University School of Medicine
Doctor of Physical Therapy

PHYSICAL ACTIVITY LEVELS OF CHILDREN WITH DOWN SYNDROME: A SYSTEMATIC REVIEW

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Background

- Down syndrome (DS), the most common congenital chromosomal disorder in the US, affects 1 in 790 children[1]
- Health conditions associated with DS include hypotonia, delayed gross motor development, heart defects, ligamentous laxity, abnormal compensatory movement patterns, and obesity[2,3]
- Physical activity (PA) is important for health and well-being, but children with DS may have decreased ability to engage in PA
- Government guidelines recommend individuals age 6-17 years should engage in at least 60 min of moderate-vigorous PA (MVPA) each day[4]

Purpose

Examine PA levels in individuals age ≤21 years with DS, as measured by activity monitors

Methods

Systematic Review:
- Articles in PubMed, Embase, and CINAHL, conducted according to PRISMA guidelines

Inclusion Criteria:
- English full text articles published through July 2017
- Participants ≤21 years of age diagnosed with DS
- Activity monitors used for data capture
- PA reported in terms of frequency, duration, or intensity

Exclusion Criteria:
- Editorials, letters, comments, and case reports

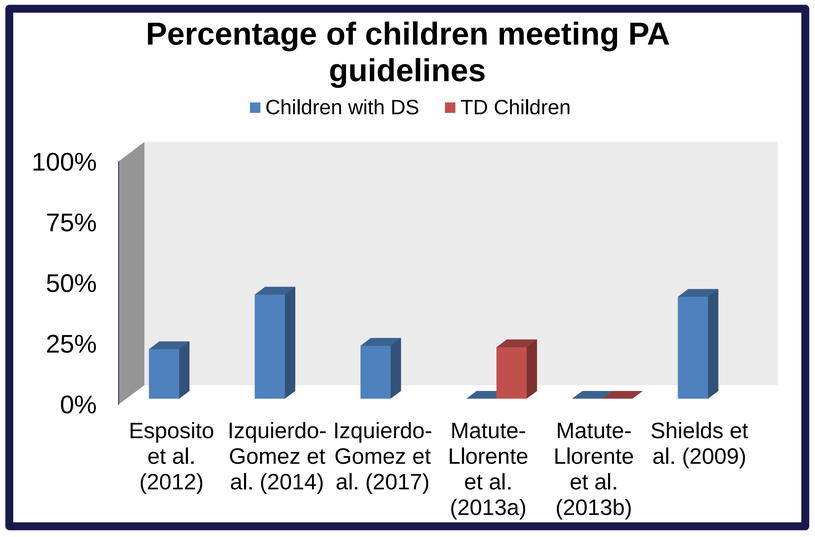
Methodological Quality Assessment:
- Modification of the Downs and Black tool

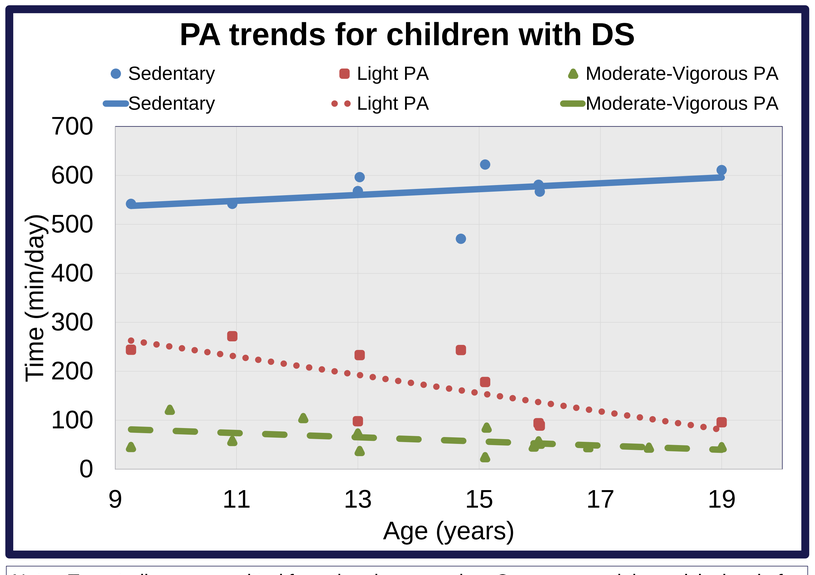
PEDIATRIC PHYSICAL THERAPY

This systematic review has been accepted for publication pending revisions by *Pediatric Physical Therapy.*

Results

- 8 studies included: 5 cross-sectional, 1 pilot, and 2 longitudinal
- Quality: Good in 2 studies, Fair in 5, and Poor in 1
- 4 studies used typically developing (TD) children as a control group
- Participants ranged from ages 3 months to 20 years with more males than females
- Type of activity tracker and cut points used to determine intensity level varied greatly across studies





Note: Two studies were omitted from the above graphs. One measured the activity level of infants, for which there are no guidelines (Shields et al. 2009). The other used cut-points much lower than the other studies, making the data outliers (Whitt-Glover et al. 2006).

Results

- Compared to TD peers, children with DS engaged in more light PA but less MVPA and sedentary activity
- Infants with DS engaged in low intensity activities for longer periods during the day and have different motor activity patterns than TD infants

Conclusions

- Children with DS are NOT reaching recommended guidelines of 60 minutes of MVPA each day
- PA (light, moderate-vigorous) tends to decrease with age while sedentary time increases

Clinical Relevance

- Clinicians can play a critical role in encouraging more exercise and movement in children with DS
- Fostering PA as a habit may reduce the risk of movement disorders and secondary illnesses from inactivity as children get older

Acknowledgements / References

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1.de Graaf G, Buckley F, Skotko BG. Estimation of the number of people with Down syndrome in the United States. *Genet Med*. 2017;19(4): 439-447.
2. Pitetti K, Baynard T, Agiovlasitis S. Children and adolescents with Down syndrome, physical fitness and physical activity. *J Sport Health Sci.* 2013;2(1): 47-57.
3. Mik G, Gholve PA, Scher DM, Widmann RF, Green DW. Down syndrome: orthopedic issues. *Curr Opin Pediatr*. 2008;20(1): 30-6.
4. US Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans*. Washington, DC: US Department of Health and Human Services; 2008.
Additional references are available upon request