Does Physical Activity Have an Impact on Behavior, Social Interaction and/or Functioning at School in Children with ASD?

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### Background

- If low cost and easy to implement physical activity programs are useful in decreasing interfering behaviors and increasing social and academic engagement, service providers and families can consider implementing them in the programs of students with ASD.
- Additionally, given the health risks created by limited physical activity, improved health may result if a child with ASD is more active; a significant secondary gain.

### Clinical Question

In children with ASD, what are the effects of exercise (physical activity) on behavior, social interaction, functioning at school and/or emotional well-being?

### Literature Review

#### Databases searched:
- CINAHL, PubMed, ERIC, and PsychINFO

#### Study selection:
- Studies completed after 1990
- Children/young 18 years or younger
- Diagnosis of Autism Spectrum Disorders

#### Search results:
- 167 articles
- 18 met criteria; later narrowed to 10 articles.

#### Review process:
- Each article was reviewed systematically to determine the quality of the study design, as well as statistical and clinical significance of each intervention.

### Results

<table>
<thead>
<tr>
<th>Authors</th>
<th>Participants</th>
<th>Intervention</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson Hanley, et al. (2011)</td>
<td>Pilot 1: 12 youth ASD diagnosis 10-18 years, Pilot 2: 22 youth ASD diagnosis 8-21 years</td>
<td>Both pilots: statistically significant decreases in repetitive behaviors &amp; increases in executive reasoning (digit span backward)</td>
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<tr>
<td>Bass, et al. (2009)</td>
<td>34 children ASD diagnosis 5-10 years</td>
<td>Therapeutic riding 60 minute session Weekly for 12 weeks</td>
<td>Some improvements in sensory seeking behavior, inattentiveness, sensory sensitivity, sedentary behavior No change in fine motor perception, social cognition or social awareness</td>
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<td>Levinson, et al. (1993)</td>
<td>3 children ASD diagnosis 11 years</td>
<td>Jogging 15 minutes or walking 15 minutes</td>
<td>Jogging (vigorous condition) immediately decreased stereotypical behavior; effect not maintained over time</td>
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<tr>
<td>Morrison, et al. (2011)</td>
<td>4 youth ASD diagnosis 15-21 years</td>
<td>3 interventions: Exercise (30 minutes) Leisure Social interaction</td>
<td>Decrease in self-injurious behavior (SIB) &amp; stereotypic behaviors: 2 subject post exercise 1 subject post all interventions 1 subject no decrease for any condition</td>
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<td>Nicholson et al. (2011)</td>
<td>4 children 3rd grade High-functioning ASD diagnosis</td>
<td>Jogging for 12 minutes</td>
<td>Increase in active academic engagement for 3 subjects Follow up phase: 3 subjects had no change</td>
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<tr>
<td>Oriel (2011)</td>
<td>9 children 3-6 years ASD diagnosis</td>
<td>15 minutes of running, jogging or other physical movement as whole group</td>
<td>7 of 9 subjects increase in correct responding No difference in on-task time or stereotypical behaviors</td>
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<tr>
<td>Pan et al. (2010)</td>
<td>15 children spastic CP 6-19 years</td>
<td>Swimming instruction with social and game activities 10 weeks- 2x week, 90 minute/session at indoor pool</td>
<td>Significant improvement aquatic skills, Social cognition or social awareness</td>
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<td>Prupas, et al. (2001)</td>
<td>4 children 5-9 years Various DD diagnosis</td>
<td>Two conditions: 1-10 minute walk/jog or 3-10 minute walk/jog</td>
<td>Both conditions showed significant reductions in stereotypical behaviors; more reduction in multiple exercise treatment condition</td>
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<td>Rosenthal et al. (1987)</td>
<td>5 youth 14-15 years ASD diagnosis</td>
<td>20 minutes jogging</td>
<td>Improved academic work and increase in work completion Significant decrease in self-stimulatory behaviors</td>
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<tr>
<td>Todd, et al. (2010)</td>
<td>3 youth 15-17 years ASD &amp; moderate-profound ID</td>
<td>Cycling circuit laps</td>
<td>2 of 3 subjects increased exercise intensity, distance and ability to predict achievement</td>
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</table>

### Limitations/Future Directions

#### Limitations:
- Small samples
- Lack of control groups
- Study design issues
- Inconsistent investigation of long-term impact of interventions

#### Continued research:
Continued research is warranted with larger sample sizes and control groups.