

Physical Activity and Children on the Autism Spectrum

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(in press: *Autism Parenting Magazine*)

We know that physical activity is important for everyone, but did you know that physical activity can be particularly important for children on the autism spectrum? Research is finding that physical activity can provide important benefits to children on the autism spectrum. For example, physical activity in the form of aerobic exercise (e.g., jogging, brisk walk, riding a bike) lead to Improvements in attention span, social behavior, and learning (Bass, 1985; Oriel, George, Peckus, & Semon, A. (2011).

We also are learning that many children on the autism spectrum have motor deficits (Fournier, Hass, Naik, Lodha, & Cauraugh, 2010; Ming, Brimacombe, & Wagner, 2007). Research is finding that children on the autism spectrum are more apt to have issues with clumsiness, motor coordination, postural stability, and general gross motor functioning when compared to children not on the spectrum (Ghaziuddin & Butler 1998; Jones & Prior 1985; Kohen-Raz, Volkmar, & Cohen 1992; Minshew, Sung, Jones, & Furman, 2004). The high incidence of motor coordination deficits seen in children on the autism spectrum has lead Fournier and her colleagues (2010) to suggest that any developmental program should consider including interventions focused on improving motor coordination, gait and balance, arm functions, and movement planning.

The purpose of this paper is to present some simple physical activities you can do at home to help your child improve select motor skills and behaviors.

Overall Coordination and Motor Planning

Motor coordination is the ability to use more than one body part for a particular action. For example, a child who is playing catching with his mom has to coordinate the use of his left and right arms and hands as well as positioning his body in such a way to track and catch the tossed ball. Related to coordination is the concept of motor planning, which is defined as the ability to assess a motor activity, plan and organize how to carry out that motor activity, and finally implement motor skills to achieve that motor activity. Some children on the autism spectrum have difficulty with skills that requires coordinating different parts of their body and planning to complete a task. Here are some simple activities to practice coordination and motor planning:

- Playing patty cake with a sibling or parent helps a child learn to coordinate left and right sides of the body.
- Have your child toss a balloon up in the air and catching it with two hands.
- Have your child tap a balloon back and forth from left hand to right hand.
- Toss a ball to your child (can be a piece of newspaper rolled into a ball) and encourage child to catch ball with two hands.
- Have your child do a modified jumping jack. First have the child jump from a position of feet together to feet apart. Then jump from feet apart to feet together. Then separately, have your child go from arms down to the side of the body to above head. Then go back

down from arms overhead to arms to side. If your child is doing well with the separate arm and leg movements, try and combine the movement. From standing with arms next to side and feet together, have child jump to feet apart while at the same time raise arms above head. Then jump and go back to starting position.

- Have child lie on back with knees bent and feet up and parallel to floor. Hold your hand out in front of the child's feet and ask child to tap your hand with left foot. Then bring foot back and try and tap hand with right foot. Bring foot back, and then try and bring both feet together at same to tap hand with both feet.
- If you have a playground ball or small therapy ball, have your child lie on back with ball in hands over head. Then have child bring hands with ball forward towards feet, while at same time bring feet towards ball (making body into a V). Then have your child try and use feet to take ball from hands. Bring feet back down to floor while hold ball and bring hands back to overhead and to floor. Then reverse trying to bring feet with ball towards hands and hands towards ball. Then transfer ball from feet to hand.

Body Awareness

Physical activity can help children on the autism spectrum become more aware of their body and where their body is in space. Some children on the autism spectrum are clumsy, bump into things, and generally have a difficult time monitoring their body. Body awareness is also related to motor planning and understanding how to move the body to meet a particular task. Targeted physical activity can help children on the autism spectrum improve their body awareness and related motor planning. Here are some simple activities to practice body awareness and related motor planning:

- A simple at-home obstacle course could include stepping over shoes spaced on the floor
- Walking in between the couch and the coffee table, or walking in the kitchen between the island and the walls
- Going into a walk-in closet and trying not to touch the walls or clothes, or walking around various pieces of furniture in the living room
- Going under obstacles such as a parent holding a yard stick or pool noodle and asking the child to go under or crawling under kitchen table.
- Walk quietly trying not to make any noise with your feet and being very light on feet. Then try and make your feet be noisy by stomping feet and being very heavy with feet.

Anxiety

Anxiety is a common characteristic associated with those on the autism spectrum (CDC). Levels of anxiety differ between individuals on the autism spectrum, but being able to control your anxiety, or finding appropriate ways to deal with it, is a valuable skill to learn. According to Dr. Ratey, exercise has been shown to be "as effective as certain medications for treating anxiety (Ratey, 2008)." At times when anxiety levels are high or in situations where a person may typically experience anxiety, taking a quick break for some physical activity may prove to be helpful. Particularly stress-inducing activities include transitions, bed time, before or after mealtimes, and getting ready to get into a car and going out. Here are some simple physical activities that can help with anxiety:

- Taking a walk around the block
- Jumping on a mini-trampoline or on the bed
- Riding a trike/bike up and down the street for a few minutes
- Watch an activity or calming video from Go Noodle or other online sites (see recent article in Autism Parenting Magazine that show some of these websites - <https://www.autismparentingmagazine.com/coronavirus-autism-home-activities/>)
- Running in place for 30 seconds, walk in place for 15 seconds, then run in place for 30 seconds.
- Do regular knee, or wall push-ups until exhaustion. Take a break for 1 minute and then repeat.
- Lie on back with legs raised and pretend to ride a bike with legs. Do this for 1 minute and then rest for 30 seconds. Then repeat.

Calming/focus

Individuals on the autism spectrum may have an inability to focus, or they may focus too intensely on one particular (and sometimes insignificant) detail. One strategy that has been found to be helpful in getting people to focus is to establish strict routines. For most individuals on the autism spectrum, routines are already part of their daily life. Making physical activity part of the daily routine may help the individual on the autism spectrum to focus. In addition to focus, physical activity stimulates the brain and calms the person allowing them to focus better. But the benefits of being physically active are not restricted to what immediately follows physical activity. The benefits carry on throughout the days, weeks and months ahead. Incorporating a physical activity routine is very beneficial. All children should get 60 minutes per day of moderate to vigorous physical activity. You can start by doing just a little each day and gradually build up. These 60 minutes can also be broken up into smaller chunks (say 10 minutes at a time, 6 times throughout the day). Choose activities that your child enjoys. Involve the entire family, include the family pet if you have one. The activity that you choose is not what is important. What is important is that you are being physically active. Here are some physical activities that specifically help a child with focus and with calming:

- Do a body check where child tenses a body part and then relaxes a body part. For example, while sitting or lying down with eyes, have child tense hand (squeeze hand into a ball). Then slowly relax and open hand. Repeat with each body part.
- Watch a calming video from Go Noodle or other online sites (see recent article in Autism Parenting Magazine that show some of these websites - <https://www.autismparentingmagazine.com/coronavirus-autism-home-activities/>)
- Take the family dog for a walk around the neighborhood
- Do a few relaxing Yoga poses while focusing on taking deep breaths
- Go on a family hike
- The benefits of strenuous exercise have long-lasting effects. Before doing something that the child does not want to do, or that requires significant mental effort, engage in short bursts of significant physical activity such as running up a steep hill, pedaling as fast as possible on a bicycle until fatigued, or doing as many push-ups (modified if necessary) in one minute as possible

Executive Function

Executive function skills are the mental processes that enable us to plan, focus attention, remember instruction, and juggle multiple task successfully (Center on the Developing Child, n.d.). Children on the autism spectrum have been noted to have difficulty when compared to their peers not on the spectrum (Demetriou et al., 2017). Physical activity has been shown to have a positive influence on autistic children's executive function ability (Pan et al., 2016). Though, it appears that regular, long-term engagement is needed to attain most benefits to the executive function—it can't just be once in a while. So, to have the greatest likelihood of positive impacts, here are some things you could do as a family:

- Start a physical activity journal to document the activity the family does, trying to engage in at least 30 minutes of activity each time. It doesn't have to be everyday but should be consistent each week.
- Sign-up for a 30-day activity challenge as a family. Assign a start day on the calendar and plan to do some physical activity each day. It might be best to plan activity for first thing in the morning before planning to do other more cognitive activities.
- Take physical activity breaks. Build in time throughout the day to engage in different types of physical activity. As a family, you could try walking or swimming or yoga.

Self-regulation

Related to executive function, many children on the autism spectrum show atypical self-regulatory behaviors. Self-regulation is defined as the organization or modulation of affective, mental, and behavioral responses (Jahromi, 2017). These often are displayed outwardly as self-stimulatory behaviors such as rocking, tightening fists or jaw, jumping, spinning, and hand-flapping; though they are highly variable from person to person. The common practice for many years was to attempt to reduce or eliminate these behaviors from occurring as they were not neurotypical—in fact, physical activity has been shown to reduce the occurrence of such behaviors (Ferreira et al., 2019). In recent years, autistic adults have advocated for therapists, teachers, and parents to allow self-stimming behaviors as it allows for the individual to self-regulate (see <http://www.thinkingautismguide.com/2011/04/about-stimming.html>). By attempting to reduce or eliminate these behaviors, individuals on the autism spectrum may experience increased levels of anxiety due to attempting to hide them, which can lead to burnouts. As for the evidence of physical activity's role and a decrease of self-stimulation, it is likely due to a fatiguing effect of the activity or the physical activity is filling the role of the self-stimulatory behavior. If, however, these behaviors are impacting your child's engagement with other aspects of their daily life, physical activity could be beneficial by serving as the self-regulatory behavior. For instance, if your child likes to jump to regulate, you could try doing it on a mini-trampoline. Sit ups, lying down and rolling on the carpet, and using a rowing machine are good alternatives to rocking. If water is calming and helpful, you might have them try swimming classes. Be aware though, that you may see self-regulatory behavior during physical activity and that's ok. Learn your child's behaviors to know when their behaviors are expressing positive or negative emotions and act accordingly.

Strategies to Support Physical Activity for Children on the Autism Spectrum

We have presented several physical activities to help children on the spectrum improve their motor skills and behaviors. However, it may be necessary to provide specially-designed instruction to meet the unique needs of the learner. Below you will find a brief overview of visual supports and how they can be used to aid participation in physical activity for children on the autism spectrum.

Visual Supports

Visual supports are illustrations that assist the learner to engage in a targeted skill or behavior, independent of a prompt. Visuals supports have shown to be effective in teaching an array of skills (i.e., social-communication, play, behavior, academic, motor, and adaptive skills). Visual supports may include pictures, photos, written words, visual activity schedules, task cards, visual timers, choice boards, countdown schedules, maps, scripts, and others (Wong et al., 2014). Here are some examples of how visual supports can help children on the autism spectrum.

Overall Coordination and Motor Planning

Visual Task Card: Take a picture of your child or a sibling or peer performing each of the following tasks (i.e., Patty Cake, balloon toss with two hand catch, balloon tap left and right hand, and parent-child ball toss). Laminate and Velcro the pictures to a 4 x 11" piece of cardstock in the order they are to be completed. Have your child clip a clothes pin above or below the picture (i.e. task) that he/she is performing. This will provide your child with a visual illustration of the tasks completed, the tasks being performed, and the tasks to be completed (see Figure 1).

Body Awareness

Visual Map: Create a visual map of the at-home obstacle course. Include stepping over shoes, walking between furniture, going into a walk-in closet, and going under obstacles (i.e., yard stick, pool noodle, or kitchen table). A visual map will provide your child with an overview of the at-home obstacle course and provide a defined start and finish to the activity (see Figure 2).

Anxiety

Visual Timer: A visual timer can be a fun and exciting way to help motivate your child to stay engaged in an activity. Visual timers can vary from the traditional sand timer to battery-operated clocks in which the face of the clock transitions from red to white. Visual timer APPs, with an array of features, can also be downloaded to various devices (i.e., computer, tablets, phones) to support your child in learning the concept of time (see Figure 3).

Calming/focus

Visual Task Card with Text: To help your child to relax his/her body, provide a simple, age-appropriate image of the human body. Include text to identify the specific body parts to be “tensed” and “relaxed” throughout the activity. You may also want to include photos to visually illustrate the terms “tense” and “relaxed”. A visual task card with text will provide your child with an overview of the relaxation activity and provide a defined start and finish to the process.

Executive Function

Visual Schedule: Collect photos, images, or clipart to create a visual schedule of your child’s daily activities. Include mealtimes, chores, academic work, social events, and physical activity breaks. Laminate and Velcro the pictures to an 8.5 x 11” piece of cardstock in the order they are to be completed (i.e., first activity at the top and to the left side of the chart). As the activities are completed, have your child place the picture to the right of the chart to indicate that the activity has been completed. A visual schedule will provide your child with some structure in the design and implementation of various types of physical activity breaks (i.e., family walks, swimming, or yoga) (see Figure 4).

Self-regulation

Visual Choice Board: For children on the autism spectrum that may experience anxiety and have difficulty in communicating or regulating their behaviors, create a visual choice board. Collect photos, images, or clipart of physical activities they enjoy (i.e., mini-trampoline, sit-ups, rolling activities, or a rowing machine). By providing your child a visual choice board of preferred physical activities, your child could develop a better understanding of their behaviors and act accordingly (see Figure 5).

Additional Suggestions:

As you introduce physical activity to your child, it is suggested to use clear and concise language. For example, during the Balloon Tap Left and Right Hand Activity you may want to use prompts such as “left hand” – “right hand”. It is also suggested to use plenty of positive reinforcement during the early stages of learning to keep your child focused and engaged in the activity. Positive reinforcement can vary from verbal praise, high-fives, tangible items (e.g., tokens, stickers, play money), or access to preferred items (e.g., computer, puzzle, toy,) or activities (e.g., jumping on a mini-trampoline, riding a bicycle, going for a walk).

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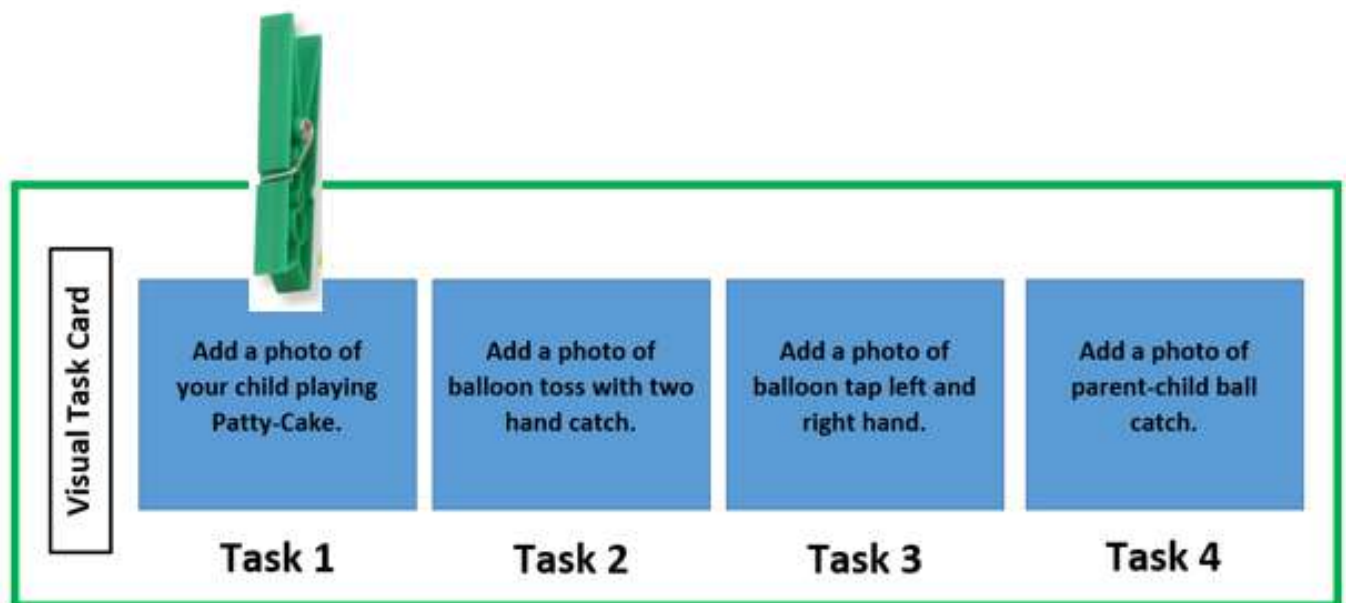


Figure 1 Visual Task Card

Visual Map

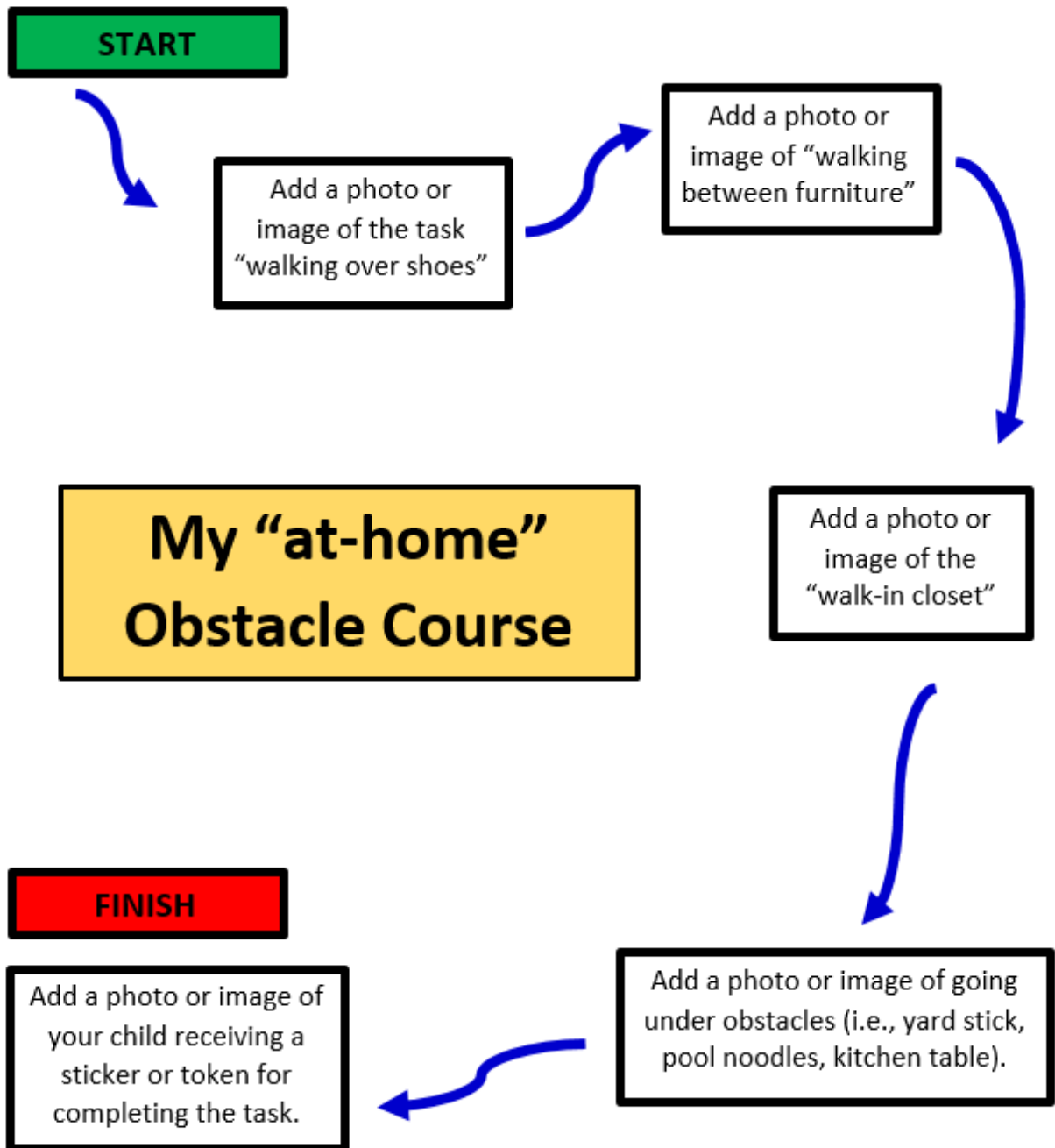


Figure 2 Visual Map



Figure 3 Visual Timer

My Visual Activity Schedule

To Do List:	Completed:
	<div>Wake Up Add a photo or image</div>
	<div>Eat Breakfast Add a photo or image</div>
<div>Get Dressed Add a photo or image</div>	
<div>Go for a Walk Add a photo or image</div>	
<div>Do Chores Add a photo or image</div>	
<div>Go to Soccer Practice Add a photo or image</div>	
<div>Eat Lunch Add a photo or image</div>	
<div>NOTE: Customize this schedule to meet the needs of your child.</div>	

Figure 4 Visual Activity Schedule

My Visual Choice Board

For the next 2 minutes, I would like to . . .

Jump on the mini-trampoline.

(Add image or photo)

Go for a walk.

(Add image or photo)

Workout on a rowing machine.

(Add image or photo)

Figure 5 Visual Choice Board