

Exercise and Autism Spectrum Disorder

Savannah Hollifield and Karlee Moore
EXSI 410



Introduction

Autism spectrum disorder (ASD) is often a condition that is widely acknowledged but not considered or connected when considering the importance of exercise. ASD is a group of conditions, typically behavioral conditions, that can have different etiologies and different severities, causing it to be a spectrum disorder (Jacobs, 2018). ASD is often determined by a lack in one's ability to communicate and interact socially, repetitive behaviors, repetitive interests or activities, sensitivity to sensory simulations such as sight, smell, sound, taste, and touch, and common bodily behaviors such as hand clapping, repetitive vocalizations, and obsessive fixations on one object or concept at one time (Jacobs, 2018).

There are several different types of conditions under the umbrella of autism spectrum disorder. Classical autism is when an individual is either extremely low functioning, or extremely high functioning. If an individual is low functioning, they could not do basic tasks at all, and if they are high functioning, they can do basic tasks but struggle to do so because of how high functioning their brain is (Jacobs, 2018). The next type is Asperger's syndrome which is the most well known type of ASD. This is when the person has deficiencies in social interaction but typically have above normal cognitive function (Jacobs, 2018). Childhood disintegrative disorder (CDD) is when an individual loses language, social, and motor skills that were previously learned (Jacobs, 2018). The last subtype of ASD is pervasive development disorder - not otherwise specified (PDD-NOS). This happens to be the most difficult form to diagnose because this is used when an individual is showing some signs of ASD, but does not have enough signs to be diagnosed with one of the previously mentioned forms such as Asperger's (PDD-NOS, 2018).

The most recent data on the prevalence of ASD is showing that 1 in 58 births will result in a child with autism (Autism Spectrum Disorder, 2018). With this increasing prevalence, it has quickly become the fastest growing disability (Jacobs, 2018). This disorder can be diagnosed as early as age 2, but can also take until later childhood to be noticed, due to the social nature of the condition (Autism Spectrum Disorder, 2018). The Center for Disease Control and Prevention (CDC) also show that it is four times more common in young boys than it is in girls, with it being common among all socioeconomic and racial statuses (Autism Spectrum Disorder, 2018). A potential reason for the increase in ASD is that until just a few years ago, Asperger's and PDD-NOS were not considered autism, causing the statistical prevalence to increase when the umbrella for autism grew. Another suggested reason is the growing awareness of autism (Jacobs, 2018).

The exact cause of ASD is unknown. However, some correlations are known in regards to co occurring conditions. It is very likely that an individual with ASD will also be diagnosed with a developmental, neurological, chromosomal, or genetic disorder as well, with that being the case in 83% of diagnoses (Autism Spectrum Disorder, 2018). Other factors such as older maternal gestational age and premature births are risk factors for ASD. Psychological and professional testing is done to diagnose an individual on the spectrum with the *Diagnostic and Statistical Manual of Mental Disorders: DSM-5* (Jacobs, 2018). Testing is not invasive, but rather observatory and interactive in nature.

Presently, there are no medications to cure ASD. It is rather difficult to formulate a medication for a disease without a specific etiology. Medication is rarely given, but in some cases medication will be used to manage symptoms such as high energy levels, depression, seizures, and inability to focus (Jacobs, 2018). The first group of medications prescribed are called selective serotonin reuptake inhibitors (SSRIs). Essentially, this drug increases serotonin in the brain which combats depression, but comes with some side effects such as weight gain, sleep problems, and appetite changes (Ferguson, 2001). The other type of medication given is antipsychotic drugs which can reduce aggression and self-harming behaviors (Jacobs, 2018).



Figure 1 Child with ASD Performs Exercises

https://www.youtube.com/watch?v=1_SDT-a8FNM

Exercise Testing

Children and adolescents with ASD may be more susceptible to trends of decreasing physical activity and be may more vulnerable for being overweight or obese due to a limited number of opportunities for physical activity outside of school (Srinivasan, Pescatello, & Bhat, 2014). Specifically, there are a shortage of programs that are tailored to the needs of an individual with ASD. It has become common practice to preoccupy this special population with movies, television, or other forms of media.

When starting an exercise training program with client with ASD, enjoyable and developmentally appropriate activities should be incorporated into the exercise training (Lang, Koegel, Ashbaugh, Regester, Ence, & Smith, 2010). It may be difficult for the client to perform exercises such as jumping, pulling, and pushing, so the client's initial ability should be evaluated prior to establishing an exercise program. However, the workouts should progress and incorporate more difficult activities over time.

It is important for verbal exchange to be made simple for the client with ASD to comprehend. The conversations should be emotionally neutral and free of jargon, sarcasm, and rhetoric (Lang et al., 2010). Doing so will minimize frustrations and distractions and decrease the likelihood of an outburst. Additionally, an ease of communication will increase the learning ability of the client. Similarly, sensory stimulation should be minimized. Therefore, the room clothing, and music should be kept as neutral as possible during exercise sessions (Jacobs, 2018).

According to Srinivasan and colleagues (2014), reliable tests to evaluate cardiovascular fitness are the six-minute walk test, submaximal cycle ergometer or treadmill test, 1-mile walk test, and the shuttle run test. Further, recommended tests to evaluate muscular fitness include sit-ups, push-ups, flexed arm hang-up, standing long jump, and the dynamometer for limb muscles (Srinivasan et al., 2014). The instructor may decide which test is best based on the client's current abilities or lack of abilities.

Exercise Prescription

The benefits provided by regular physical activity are primarily the same for both those with and without ASD, including increases in cardiovascular health, lean body mass, balance and coordination, and strength, and decreases in adiposity and risk factors for cardiovascular disease. For those with ASD, cognitive function following physical activity have displayed significant improvements (Jacobs, 2018). This is due to the effect exercise has on reducing anxiety.

According to the Srinivasan and colleagues (2014), the exercise prescription found in *Table 1* is recommended.

Table 1 *Exercise Prescription for Individuals with ASD*

EXERCISE COMPONENT		PRESCRIPTION	PROGRESSION
Aerobic Exercise Program			
Frequency		3 days / week	5 days / week
Intensity		Moderate physical activity	Vigorous physical activity
Time		20-30 min / day	45-60 min / day
Type		Cycling, swimming, jogging, walk / run interval training, and games encouraging exercise (ex. Wii Sports, cyber cycling)	
Resistance Exercise Program			
Frequency		1 day / week	2 days / week
Intensity		10-15 reps / min	After 6 months, 8-10 reps / min
Time		1 set of 6-15 reps	2-3 sets of 8-12 reps with 2-3 min break, gradually reduce breaks between sets
Type		Children under 10 years old: calisthenics and activities such as jumping, climbing, throwing Over 10 years old: strengthening program for upper and lower extremities and trunk using free weights, elastic bands, and body weight resistance; constant weight machines used with caution and supervision	
Flexibility Training			
Frequency		1-2 times / week	
Time		1 hour	
Type		Muscle stretching for major arm and leg muscles, yoga, aquatic exercises, and tai-chi	

Special Considerations

Exercise is an extremely important part of everyday life for all people, even those with ASD. Due to the nature of the condition, some special considerations are needed when combining exercise and ASD. The main considerations are progressive tolerance, interest, and neutral environments (Jacobs, 2018).

The first special consideration is progressive tolerance, which is different for each individual. For the majority of people with ASD, they also have a tendency to have gait and postural concerns, which requires making sure exercises are suitable for that person's ability (Jacobs, 2018). Behavior modifications such as reworking a gait or posture may be needed as well. Also, just like a normal exercise program, there should be a progression of difficulty, specifically tailored to each client's needs.

The next concern which may be one of the most important, is interest. A typical symptom of ASD is fixation one on object, and the lack of interest in anything else. If a client with ASD does not find the exercises interesting and engaging, they will refuse to do then. The exercise specialist will need to ensure that the programs are creative and individually tailored to each client's likes (Jacobs, 2018).

The last concern which often causes the most frustration for exercise professional's and the clients is maintaining a neutral environment. This includes the room, clothing, and music in the room. Often times individuals with ASD do not handle loud sensory information such as bright clothing, loud music, fire, or even just a change of rooms from what they expected (Jacobs, 2018). Other aspect of neutral environment is the tone of voice used with clients. Individuals with autism spectrum disorder lack the inability to understand sarcasm, jokes and rhetoric, requiring the exercise professional to take extreme caution in their language when training a person with ASD. This is because with ASD, individuals only take things literally and cannot realize that what other people think is different from what they think or say (Stuart-Hamilton, 2013). If these few special considerations are observed when training a client with ASD, the sessions can be beneficial to the client and enjoyable to the trainer.

Conclusion

Physical activities is especially important for the ASD population. An instructor should be well-prepared take on a client with ASD. The exercise environment and verbal communication should be kept neutral to avoid any possible outbursts during sessions. Exercise testing conducted prior to establishing the exercise prescription should determine the client's capabilities in addition to cardiovascular and muscular fitness. Progressions in training programs will depend on an individual's abilities. Enjoyable activity choices should be incorporated to engage the client and help the client maintain physical fitness. Anticipated outcomes include an improve cognitive function, increases in cardiovascular health and balance, and decreases in adiposity and risk factors for cardiovascular diseases.

References

Ferguson, J.M (2001). SSRI Antidepressant Medications: Adverse Effects and Tolerability. *Primary Care Companion Journal of Clinical Psychiatry*. 3(1), 22-27.

Jacobs, P. L. (2018). NSCA's Essentials of Training Special Populations. Champaign, IL: Human Kinetics.

Lang, R., Koegel, L. K., Ashbaugh, K., Regester, A., Ence, W., & Smith, W. (2010). Physical exercise and individuals with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, 4(4), 565-576. doi:10.1016/j.rasd.2010.01.006

PDD-NOS, (2018). *Autism Speaks*. Retrieved from <https://www.autismspeaks.org/ppd-nos>

Srinivasan, S. M., Pescatello, L. S., & Bhat, A. N. (2014). Current perspectives on physical activity and exercise recommendations for children and adolescents with autism spectrum disorders. *Physical therapy*, 94(6), 875–889. doi:10.2522/ptj.20130157

Stuart-Hamilton, I. (2013). People With Autism Spectrum Disorder Take Things Literally. *Psychology Today*. Retrieved from <https://www.psychologytoday.com/us/blog/the-gift-aging/201304/people-autism-spectrum-disorder-take-things-literally>