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Introduction to Autism Spectrum Disorders: Characteristics and Learning Styles
May 1, 2017

Tara Warwick, MS, OTR/L

www.todaystherapysolutions.com

Course Objectives

* Describe at least two core deficits and at least two learning styles of individuals with autism spectrum disorders.
* List the two main characteristics of autism spectrum disorders.
* Identify three benefits of exercise to individuals with ASD.
* Describe at least three ways to implement a physical therapy intervention to an individual with ASD.
What are Autism Spectrum Disorders?

The Hidden Disability

“If you’ve seen one child with autism, you’ve seen one child with autism”

Author Unknown
Current Statistics

• More common than pediatric cancer, diabetes and AIDS combined

• Autism increased 172% during the 1990’s

• Prevalence Rates in U.S.
  - 2007 1 in 150 children (CDC)
  - 2009 1 in 110 children (CDC)
  - 2012 1 in 88 children (CDC)
  - 2014 1 in 68 children (CDC)

1% of population identified with ASD

https://www.cdc.gov/ncbddd/autism/data.html

What causes of autism?

• Neurodevelopmental disorder
• No single cause.
• Both genetic and non-genetic factors play a role (two-hit theory)
• Studies also suggest the following:
  • Children born to older parents are at slightly higher risk.
  • A small percentage of children who are born prematurely or with low birth weight are at greater risk for having ASDs.
  • Some harmful drugs taken during pregnancy have been linked with a higher risk of ASDs; for example, the prescription drugs thalidomide and valproic acid.

http://www.cdc.gov/Features/CountingAutism/
Etiology

• Genetics in Autism
  * Twin studies
    o Higher risk in identical twins (60 to 90%)
    o Lower risk in fraternal twins (5 to 10%)
  * Recurrence rates in siblings (5 to 10%)
  * Broader Phenotype (5 to 25% of siblings, 15% of parents share some traits)
(MESA, 2017)

Some Theories on the Growth

• Increased awareness of autism
• More screening tools and services
• Changes in how autism has been defined and diagnosed
• Children with more mild symptoms are being diagnosed
• Environmental influences
An Autism Epidemic?

• More cases identified
  * Changes in diagnostic criteria
  * Better recognition (high/low functioning)
  * Increased awareness in parents and professionals

• Implications of label
  * Educational services
  * Misconceptions associated with prognosis

• Diagnostic substitution
  * Children identified with other disorders in past now are receiving ASD label
  (MESA, 2017)

Brain Basis of Autism

• Brain structure
  * Differences in brain size (i.e., enlarged)
  * Abnormal brain chemistry
  * Social circuitry
  * Abnormalities in connections among neural systems

• Brain function
  * Face perception
  * Perceptual processing
  * Theory of mind (i.e., mirror neurons)
What autism is not?

- Not a mental illness
- Not result of bad parenting
- Not children who are choosing to be unruly

Is there a cure for Autism?

- No cure for autism
- Best treatment method is education directly to individuals with autism and those working with individuals with autism
- Although no cure, individuals with autism can grow to live successful lives
Dual Diagnosis

- ASD can occur in association with:
  - Obsessive Compulsive Disorder
  - Learning Disabilities
  - Fragile X syndrome
  - Sensory impairments
  - Mental impairments
  - Attention Deficit Hyperactivity Disorder
  - Down’s Syndrome

- Students with ASD often experience severe anxiety and depression

- It is not uncommon for students to be misdiagnosed at one time or another

Project MESA, 2017

[www.autismspeaks.org](http://www.autismspeaks.org)
Identification of Autism

• No biological markers

• Diagnosis based on behavior and history (DSM-V)
  * Parent interview
  * Play/conversation based assessment
  * Input from others familiar with child

• Assessment tools should tap social and communication delays
  * ADOS (Autism Diagnostic Observation Schedule)

<table>
<thead>
<tr>
<th>ASD Specific Screening Tools</th>
<th>Age</th>
<th>Admin. Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asperger Syndrome Diagnostic Scale (ASDS) (Myles, Rook, &amp; Simpson, 2001)</td>
<td>5 - 16 years</td>
<td>10 - 15 min</td>
<td>The ASDS consists of 50 items that are rated for presence or absence of behaviors related to Asperger Syndrome. Results yield a standardized score.</td>
</tr>
<tr>
<td>Autism Behavior Checklist (ABC) (Krug, Arok, &amp; Almond, 2008)</td>
<td>3 - 14 years</td>
<td>10 - 15 min</td>
<td>The ABC is a subscale of the ASEBP-3, a questionnaire containing 57 items answered in a yes/no format. Results include cutoff score ranges based on different diagnoses.</td>
</tr>
<tr>
<td>Autism Spectrum Screening Questionnaire (ASSQ) (Ehers, Gilberg &amp; Wing, 1999)</td>
<td>7 - 16 years</td>
<td>5 - 10 min</td>
<td>The ASSQ consists of 27 items that are rated on a 3-point scale. The items are designed to screen for AS and other high-functioning disorders on the autism spectrum. Results are reported in cut-off scores, with higher scores being more indicative of an ASD.</td>
</tr>
</tbody>
</table>

www.autisminternetmodules.org
Early Red Flags

* Does not babble or coo by 12 months of age
* Does not gesture (point, wave, grasp, etc.) by 12 months of age
* Does not say single words by 16 months of age
* Does not say two-word phrases on his or her own (rather than just repeating what someone says to him or her) by 24 months of age
* Has any loss of any language or social skill at any age

National Institute of Child Health and Human Development (2005)

Two Systems Used to Identify Autism

• Clinical (Diagnosis)
  – Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5)
    • Given by a licensed professional (e.g., psychologist, physician)
• Educational (Categorical label)
  Based on the Individuals with Disabilities Education Act (IDEA)
  • Autism (all subtypes fit into autism category including Asperger Syndrome)
  • Students DO NOT have to have a clinical diagnosis to qualify for school services or a categorical label
• Collapsed previously distinct autism subtypes – including autistic disorder and Asperger syndrome – into one unifying diagnosis of ASD.

• Social impairment, communication deficits and repetitive/restricted behaviors were folded into two – social communication impairment and repetitive/restricted behaviors.

www.autismspeaks.org

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Change from the DSMIV to DSMV

• ASD now includes Autistic Disorder, Asperger’s, Childhood Disintegrative Disorder, and PDD-NOS.
• Everyone gets an ASD diagnosis, with clinical specifiers (level of language skill, severity ratings, etc.) to better describe individual kids.
• For the most part, no one should lose a spectrum diagnosis, with one exception—Rett’s is not going to be in the DSM at all.

www.autismspeaks.org
Study comparing DSMIV and DSMV

- Dr. Lord and her team reviewed the case records of 4,453 children previously diagnosed with ASD using the DSM-IV system. They also reviewed the records of 690 children with non-ASD conditions such as language disorder. Based on these records, they tried to gauge how well the proposed DSM-5 criteria identified children with ASD and excluded those with other disorders.

- According to their analysis, the proposed new criteria produced fewer “false positives” than the old definition of ASD. That is, fewer children who did not have ASD were incorrectly diagnosed as being affected. The DSM-5 criteria also identified 91 percent of those diagnosed under the DSM-IV system.

- The 9 percent of children who would have lost their diagnosis under the new criteria did so primarily because their social impairments were not severe enough to meet the DSM-5 criteria. The report did not include adults, and it remains unclear how the proposed changes will affect them.


<table>
<thead>
<tr>
<th>Severity Level for ASD</th>
<th>Social Communication</th>
<th>Restricted interests &amp; repetitive behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3</td>
<td>Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning; very limited initiation of social interactions and minimal response to social overtures from others.</td>
<td>Preoccupations, fixated rituals and/or repetitive behaviors markedly interfere with functioning in all spheres. Marked distress when rituals or routines are interrupted; very difficult to redirect from fixated interest or returns to it quickly.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions and reduced or abnormal response to social overtures from others.</td>
<td>RRBs and/or preoccupations or fixated interests appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress or frustration is apparent when RRB’s are interrupted; difficult to redirect from fixated interest.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Without supports in place, deficits in social communication cause noticeable impairments. Has difficulty initiating social interactions and demonstrates clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interactions.</td>
<td>Rituals and repetitive behaviors (RRB’s) cause significant interference with functioning in one or more contexts. Resists attempts by others to interrupt RRB’s or to be redirected from fixated interest.</td>
</tr>
</tbody>
</table>

Severities: Level 3 - Requiring very substantial support; Level 2 - Requiring substantial support; Level 1 - Requiring support.
Current Tools

- Autism Diagnostic Observation Scale (ADOS), 2nd Edition
- Autism Diagnostic Interview – Revised (ADI-R)
- IQ Testing
- Adaptive Skills

Characteristics of Autism
Signs & Symptoms

1. Difficulties in social communication and interaction

2. Restricted, repetitive patterns of behavior

[http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=a6482e75-65c6-4c1f-be36-5f4a847b2042](http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=a6482e75-65c6-4c1f-be36-5f4a847b2042)

Social communication and interaction

- Avoids eye contact
- Playing alone
- Difficulty with relationships
- Difficulty interpreting non-verbal language
- Difficulty understanding perspective of another
- Delayed speech and language
- Not pointing
- Repetitive speech on preferred topic
Social Skills, cont’d.

• May not respond to name
• Difficulty with:
  • Sharing enjoyment with another person
  • Initiating interactions
  • Maintaining conversation with another person
  • Relationships
  • Theory of mind (seeing world from another person’s perspective
  • Executive Functioning

Sally-Anne Scenario


(Baron-Cohen, 1995)
Autism Speaks Video

Communication

http://autismspeaks.player.abacast.com/asdvideoglossary-0.1/player/autismspeaks

Conversation – Video 1
Make Believe Play – Video 1

Autism Speaks Video

Social Skills

http://autismspeaks.player.abacast.com/asdvideoglossary-0.1/player/autismspeaks

Non-verbal Behaviors - Video 4 and Video 6
Social Reciprocity – Video 3
Restricted, repetitive patterns of behavior

- Self stimulation (rocking, flapping, spinning)
- Difficulty with changes in routines
- Obsessive interests
- Aggression, self-injurious behavior
- Lack of safety awareness
- Sensory sensitivities
- Repeated routines/rituals
- Repeated verbal phrases
- Increase with: stress, excitement, change in schedule, boredom

Special Interest Areas

* Pre-occupation with parts of object versus whole object

* Special interest in one item/activity
  * All conversation revolves around special interest
  * Difficulty to direct them away from this special interest
  * They learn everything they can about special interest
Autism Speaks video
Restricted patterns of interest

http://autismspeaks.player.abacast.com/asdvideoglossary-0.1/player/autismspeaks

Video 4

Other developmental areas

* Daily living
* Cognitive
* Motor
Daily Living Skills

• May have difficulty with the following activities:
  • Toilet training
  • Sleeping through the night
  • Maintaining personal hygiene
  • Wearing certain clothing items
  • Brushing teeth
  • Eating variety of foods

Cognitive Skills

• Range from significant delays to above average
• Can have splintered skills
• May not learn in typical progression
• Difficulty knowing expectation level
• Difficulty setting appropriate goals
Motor skills

* Difficulties with:
  * Motor coordination,
  * Postural control
  * Learning of skills through imitation
  * Planning and completing new motor tasks
* Early motor delays may contribute to difficulty acquiring social skills

http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=a6482e75-65c6-4c1f-be36-5f4a847b2042

Motor skills, cont’d.

* Lack of coordination
* Delays in gross motor movements
* Poor balance
* Poor core strength
* Poor coordination and eye-hand coordination
Strengths of Individuals with Autism

- Visual learners
- Can learn and remember routines
- Special interests can drive learning and behavior
- Objective, honest, and straightforward
- Rule driven

Role of Physical Therapist

* Improve participation in daily routines
* Acquire new motor skills
* Develop better coordination and posture
* Play skills/leisure skills
* Motor imitation
* Fitness, health, and stamina

http://www.moveforwardpt.com/symptomsconditionsdetail.aspx?cid=a6482e75-65c6-4c1f-be36-5f4a847b2042
Components of physical therapy assessment

- Postural strength and control
- Functional mobility
- Body and safety awareness
- Coordination
- Play skills
- Interests and motivators
- Transitions
- Gross motor movements (jumping, hopping, pedaling bike, skipping)
- Daily routines

What does the research say?
Evidence-Based Practice and Autism

The National Professional Development Center on Autism Spectrum Disorder

The National Professional Development Center on ASD (identified 24 EBPs)

http://autismpdc.fpg.unc.edu/project-background

EVIDENCE-BASED PRACTICES

*Indicates practices with newly developed content (2015-2016). Select the practice to access these modules and downloadable resources.

- Antecedent-based Intervention (ABI)*
- Cognitive Behavioral Intervention (CBI)**
- Differential Reinforcement of Alternative, Incompatible, or Other Behavior (DRA/I/O)
- Discrete Trial Teaching (DTT)*
- Exercise (ECE)*
- Extinction (EXT)
- Functional Behavior Assessment (FBA)*
- Functional Communication Training (FCT)
- Modeling (MD)**
- Naturalistic Intervention (NI)
- Parent-implemented Intervention (PII)
- Peer-mediated Instruction and Intervention (PMII)*
- Picture Exchange Communication System (PECS)*
- Pivotal Response Training (PRT)
- Promoting (PP)*
- Reinforcement (R+)*
- Response Interruption/Redirection (RIR)
- Scripting (SC)**
- Self-management (SM)*
- Social Narratives (SN)*
- Social Skills Training (SST)*
- Previously Social Skills Groups
- Structured Play Group (SPG)**
- Task Analysis (TA)*
- Technology-aided Instruction and Intervention (TII)*
- Computer Aided Instruction and Speech Generating Devices
- Time Delay (TD)*
- Video Modeling (VM)
- Visual Support (VS)*

** Indicates new EBP identified in 2014 review. Practice briefs are not available for these practices, but are currently being developed as part of APED.
Exercise

* Individuals with autism has less physical activity
* Improve the physical fitness of learners with ASD.
* Increase desired behaviors (time on task, correct responding)
* Decrease inappropriate behavior (aggression, self-injury)

(Griffin & AFIRM Team, 2015)
Prior to implementation:

Prior to the program:
1. Identified the target behavior
   - Collected baseline data through direct observation
2. Established a goal or outcome that clearly stated when the behavior will occur, what the target skills will be and when it mastered.

www.afirm.fpg.unc.edu
Goals?

- Increase physical fitness
- Increase appropriate behaviors
  - Academic engagement
  - Focus on task
  - Task completion
- Decrease inappropriate behaviors
  - Aggression
  - Self-injury
  - Time off task

Behavior monitoring

<table>
<thead>
<tr>
<th>Date: Time: Setting:</th>
<th>Behavior (define in measurable terms)</th>
<th>Antecedent (what happened just before)</th>
<th>Consequence/Response (what happened afterwards)</th>
<th>Exercise Participation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Yes ☐ No ☐ Approx. time:</td>
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<td>Yes ☐ No ☐ Approx. time:</td>
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<td>Yes ☐ No ☐ Approx. time:</td>
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</tr>
</tbody>
</table>
1.1 Identify potential exercise activities

* Consider location
  * Outside, inside or both
  * Gym, nearby location?
* List of exercises that are appropriate and attainable
* Sample exercise inventory

Sample exercise inventory

<table>
<thead>
<tr>
<th>Exercise Activity</th>
<th>Options Description/</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running</td>
<td>Run a specified distance for a specified time, or a specific number of laps; run a relay-style race with a partner; shuttle-run sprints while collecting and depositing an item (e.g., from one end to the other)</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Jogging</td>
<td>Same as running but less strenuous</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Wall push-ups</td>
<td>Standing “push-up” – pressing on wall and pushing off</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Riding a scooter</td>
<td>Riding a specified distance for a specified time, or a specific number of laps</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>
### Exercise Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description/Options</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumping Rope</td>
<td>Jump turning own rope or jumping a rope others are turning; basic jumping or jumping with tricks/stilts/etc.; jump ropes can also be used to create structure for other movement activities, such as laying rope on the ground and jumping back and forth over the rope.</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Riding a bike</td>
<td>Riding a specified distance, for a specified time, or a specific number of laps</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Jumping Jacks</td>
<td>Jumping a specific number of times or for a specific duration of time</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Trampoline</td>
<td>Jumping a specific number of times or for a specific duration of time; simple jumping or jumping with tricks/kick/etcs.</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Pushups</td>
<td>A specific number of times or for a specific duration of time; full pushups or pushups on knees</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Sit-ups</td>
<td>A specific number of times or for a specific duration of time</td>
<td>☐</td>
<td>☐</td>
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</tr>
</tbody>
</table>

### 1.2 Conduct individualized exercise assessments

- Informal observations
- Review of current data
- Sample Informal Exercise Assessment Tool
- Other considerations:
  - Safety
  - Potential distractions
  - Appropriate clothing
  - Hydration
### Ability to Perform Skill

<table>
<thead>
<tr>
<th>Specific Activities</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
<th>No Interest</th>
<th>Some Interest</th>
<th>High Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Duration:</td>
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<tr>
<td>Jumping jacks</td>
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<td>Duration:</td>
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<tr>
<td>Jumping rope</td>
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<td>Duration:</td>
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<tr>
<td>Jumping on trampoline</td>
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<td>Duration:</td>
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</tbody>
</table>

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently

### Observed Interest in Performing Skill

<table>
<thead>
<tr>
<th>Basic Motor Skills</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
<th>No Interest</th>
<th>Some Interest</th>
<th>High Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitates basic motor movements/activities</td>
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<tr>
<td>Throws</td>
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<tr>
<td>Catches</td>
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<td>Runs</td>
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<td>Jumps</td>
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<td>Crawls</td>
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<td>Other:</td>
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</tbody>
</table>

Key: VP = with Verbal Prompt; VC = with Visual Cue; PP = with Physical Prompt; I = Independently
1.3 Develop an exercise plan

- Length
- Duration
- At least one routine per day for 10-20 minutes
- When will it be implementing
- Prior to activities/tasks in which the target behavior will likely occur

1.4 Plan for any needed supports

- Visual supports
- Picture cards
- Timer
- Written description
- Prompts
- Adult support
- Reinforcement
Exercise Buddy

breathe in through nose

blow out of mouth
1.5 Obtain and organize all needed materials and equipment

- Supports
- Written step by step
- Adult support

Step 2. Using Exercises
2.1 – Teach the learner the exercise routine

- Use visual cues
- Model each movement
- Prompt
  - Help to get it right
  - Gradually fade
  - Verbal, visual, physical

2.2 Reinforce learner

- What is reinforcement?
- 50% rule
- Use visual supports
- Gradually fade
Reinforcer board

2.3 Fade prompts and reinforcement

* Fade as quickly as possible

* More frequent and more support when first starting
  * Reinforcer board

* If behavior occurs during exercise, maybe you faded too quickly
Step 3. Monitoring ECE

3.1 Collect data

* Collect data on participation
* Collect data on the target behavior

<table>
<thead>
<tr>
<th>Date: Time: Setting</th>
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<tbody>
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<td>☐ Yes ☐ No</td>
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<td>Approx. time:</td>
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3.2 Determine next steps

• Is it working:
• Is the target skill well defined, measurable, and observable?
• Is the skill too difficult?
• Have we devote enough time?
• Fidelity?
• Supports appropriate?
• Changes to the routine?
Implementation checklist

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<th>Observation</th>
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<td>Observer’s Initials</td>
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Step 1: Planning
1.1 Identify potential exercise activities.
1.2 Conduct individualized exercise assessment.
1.3 Develop an exercise plan
1.4 Plan for any needed supports
1.5 Obtain and organize all needed materials and equipment

Step 2: Using
2.1 Teach the learner the exercise routine
   - Use visual cues as needed; reference the visual schedule for the routine when transitioning to each movement activity
   - Model each movement activity
   - Prompts as needed (visual, verbal, physical)
2.2 Reinforce learner engagement and completion of the exercise routine
2.3 Taste prompts and any tangible reinforcement as quickly as possible when criterion is met

Step 3: Monitoring
3.1 Collect data on engagement in exercise routine and target behaviors
3.2 Determine next steps based on learner progress

Evidence-Based Websites

www.researchautism.net
www.autisminternetmodules.org
www.asatonline.org
www.nationalautismcenter.org
Questions?

References

• See references sheet