Sensory Integration and Autism: The Body-Centered Senses

Alexandra M. Himes, MOT, OTR/L
Occupational Therapist
HimesA@kennedykrieger.org

Center for Autism and Related Disorders
at Kennedy Krieger Institute

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Objectives

1. Define the body-centered senses
2. List common dysfunctions related to each body-centered sense
3. Understand best assessment/evaluation practices for the body-centered senses
4. Learn evidence-based interventions and strategies to develop functional outcomes in children with Autism Spectrum Disorder who have challenges with body-centered senses

Slido Poll 1

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Who is attending the webinar today? Share whether you are an OT, COTA, SLP, educator, parent, family member, or something else!

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What is a word or phrase that comes to mind when you think of sensory-integration and autism?

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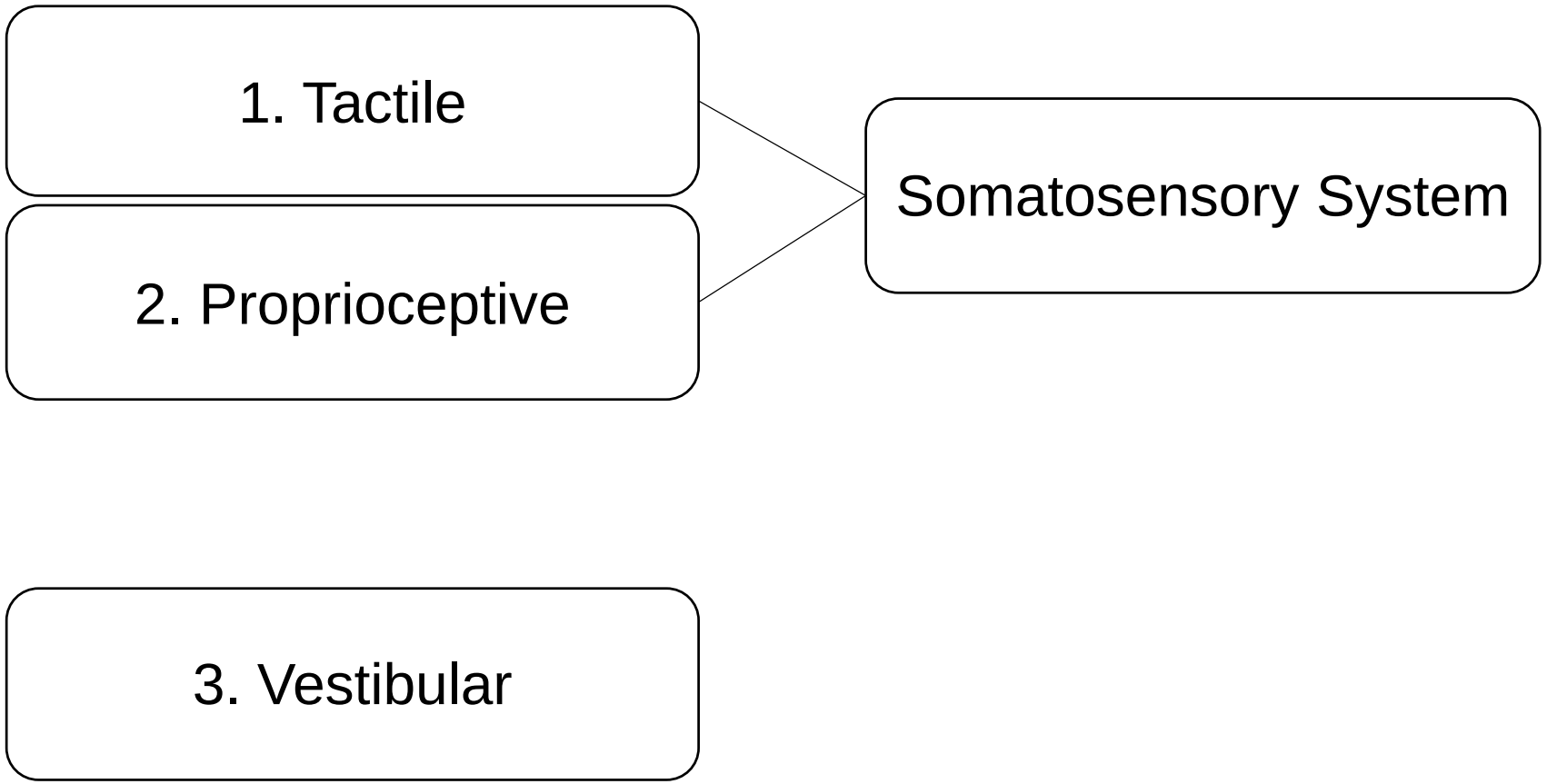
Sensory Integration Theory

- Established by Jean A. Ayres
- She defines SI as “the organization of sensation for use”
- Focused on the age groups of 4-9

Ayres, 1972, 1979/2005

What are the Body-Centered Senses?



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Tactile Sensory System

- Perception of information from touch receptors on the skin

- Functions include:
  - Emotional and arousal regulation
  - Object perception
  - Contributes to body scheme and praxis
  - Associated with fine motor skills

Lederman & Klatsky, 2009
Dijkerman & deHaan, 2007

Proprioceptive Sensory System

- Perception of information regarding body/limb position and movement

- Functions include:
  - Detection of joint position and movement
  - Force sensations related to muscle contraction
  - Sensations related to conscious timing of motor action
  - Orientation of body parts to each other for effective movement

Gandevia, Refshauge, & Collins, 2002
Giummarra, Gibson, Georgiou-Karistianis, & Bradshaw, 2008
Grob, Kuster, Higgins, Lloyd, & Yata, 2002

Vestibular Sensory System

- Enables us to navigate our physical world so our head and body position are oriented appropriately to the pull of gravity

- Functions include:
  - Muscle tone that supports holding us up against gravity
  - Posture, equilibrium, and balance
  - Contributes to a stable visual field
  - Emotional and physical security

Ayres, 1978

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True or false: Gravitational insecurity is considered a sensory dysfunction.

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Sensory-Related Dysfunctions

There are two main patterns of sensory dysfunction:

Sensory modulation → impacts arousal (emotional responses and attention)

Perception/Discrimination → impacts motor control

Ayres, 1972, 1979/2005

Tactile-Related Dysfunctions

1. Tactile Defensiveness
   - Difficulty modulating tactile input affects an individual's state of arousal

2. Tactile Discrimination Deficit
   - Often associated with praxis and fine motor challenges

Ayres, 1972

Proprioceptive-Related Dysfunctions

1. Proprioceptive-Seeking Behaviors
   - Initiating actions that elicit intense proprioceptive input

2. Poor Proprioceptive Discrimination
   - Difficulty interpreting what the proprioceptive input is telling the brain

Blanche & Schaaf, 2001

Vestibular-Related Dysfunctions

1. Modulation of Vestibular Sensations
   - Gravitational insecurity
   - Vestibular under-responsiveness

2. Vestibular-Bilateral Difficulties
   - Postural control and bilateral coordination

Ayres, 1972

Postural Control and Bilateral Coordination

1. Vestibular-Ocular Functions
2. Vestibular-Spinal Functions
3. Bilateral Motor Coordination and Sequencing

Ayres, 1972

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True or false: Using a Sensory Profile or Sensory Processing Measure is the only way to assess for sensory deficits.

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Evaluation and Assessment Tools

- Parent interview and sensory histories
- Unstructured clinical observations
- Structured clinical observations
- Standardized Tests

Tactile System Assessments

Parent Interviews and Sensory Histories

- Sensory Profile and Sensory Processing Measure

Unstructured Clinical Observations

- Play choices with various tactile experiences
- Awareness and reaction to these experiences
- Various body areas tactile input is sought versus avoided
- Tolerance to both unexpected and self-initiated tactile input

Dunn, 1999
Parham & Ecker, 2007

Tactile System Assessments, Part 2

Structured Clinical Observations

- Localization/identification of sensation
- Play with various textures
- Stereognosis
- Manipulation of objects

Standardized Testing

- Touch Inventory for Preschoolers
- Touch Inventory for Elementary School-Aged Children
- Tactile subtests of the SIPT

Royeen, 1987
Royeen & Fortune, 1990

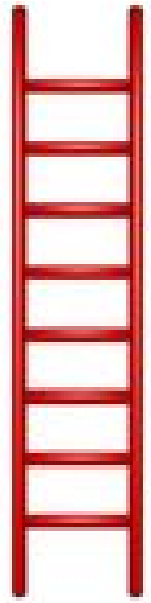
Proprioceptive System Assessments

Parent Interviews and Sensory Histories

- Sensory Profile and Sensory Processing Measure

Unstructured Clinical Observations

- Weight-bearing and weight-shifting
- Joint alignment and muscle tone
- Force exertion
- Sensory and movement preferences
- Play choices



Blanche & Schaaf, 2001

Proprioceptive System Assessments, Part 2

Structured Clinical Observations

- Finger to nose
- Slow ramp movements
- Supine flexion

Standardized Testing

- Clinical Observations of Motor and Postural Skills (COMPS)
- Clinical Observations of Proprioception (COP)
- Structured Observations of Sensory Integration-Motor (SOSI-M) and Comprenesive Observation of Proprioception (COPr)

Blanche, Bodison, Chang, & Reinoso, 2012
Blanche, Reinoso, & Keifer (2021)
Wilson, Pollock, Kablan, Law, & Faris, 1992

Vestibular System Assessments

Parent Interviews and Sensory Histories

- Sensory Profile and Sensory Processing Measure

Unstructured Clinical Observations

- Movement play choices or avoidance
- Extensor tone and neck stability
- Stabilization of visual field
- Balance
- Activity level
- Bilateral coordination

Blanche, Reinoso, & Keifer (2021)

Vestibular System Assessments, Part 2

Structured Clinical Observations

- Postural control with vision occluded
- Eye tracking
- Single foot balance and heel-toe
- Jumping down from a chair
- Postrotary nystagmus
- Forward/backward roll on yoga ball

Standardized Testing

- Parts of the Movement Assessment Batter for Children-2 (MABC-2)
- Parts of Bruininiks-Oseretsky Test of Motor Proficiency-2

Blanche, 2002

Sensory-Related Assessments in Development

- Evaluation of Ayres Sensory Integration
- Sensory Processing Three Dimensions Scale (SP-3D)
- Screening Assessment of Sensory Integration (SASI)

Mailloux, et al, 2014
Schoen, Miller, & Green, 2008
Schoen, Miller, & Sullivan, 2014

Evaluating Sensory Integration in Autism

The varying levels of Autism are why it is important to perform multiple types of sensory assessments to get a true picture of sensory integration within this population

- Focus on parent questionnaires and unstructured clinical observations if engagement and imitation are limited
- Modeling
- Patience and time
- Get creative
- Establish trust or rapport
- Involve the parents

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A six-year-old child was referred for an OT evaluation due to difficulties getting dressed, avoidance of playground equipment, slouching in his desk chair, and engaging with novel adults. Which would be an appropriate combination of sensory assessments?

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Sensory Integration Interventions and Autism

- True SI interventions based on Ayres SI Theory are individualized and long-term
- Focus on active rather than passive engagement to promote change
- Overall goal – provide opportunities for sensory experiences to create an adaptive response
- We want to keep a child within an optimal threshold when considering modulation interventions

SI Intervention is NOT the same as sensory strategies.

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Variety of Intervention Strategies

- Ayres SI Intervention
- Environmental modification
- Sensory stimulation protocols
- Specific sensory strategies
- Sensory-focused group interventions

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Things to Consider During Intervention

- Safe environment with adequate space and multiple sensory materials to access
- Build on a child's inner drive, motivation, and interests
- We want the child to feel successful
- Establish a rapport
- Child and therapist collaborate together to create tasks

Blanche, 2002

Tactile Interventions

Modulation

- Provide opportunities for graded tactile input while pairing with inhibitory input
  - Tactile bins
  - Light touch, deep touch, vibration
  - Textures on sensory equipment

Discrimination

- Full body tactile experiences while navigating space

Blanche & Bodison, 2016

Proprioceptive Interventions

- Activities that provide muscle co-contraction
- Tasks that require graded force
- Heavy work tasks

Blanche & Bodison, 2016

Vestibular Interventions

<u>Modulation</u>

Gravitational Insecurity:

- Choose tasks close to the ground
- Always allow for vision
- Encourage linear vertical input

Under-Responsiveness:

- Providing the child with opportunities for angular, orbital, and linear movement paired with inhibitory input if necessary

Blanche & Bodison, 2016

Vestibular Interventions, Part 2

<u>Vestibular-Bilateral</u>

- Activities that require symmetrical and asymmetrical patterns
- Tasks that facilitate coordinated hand and eye movements
- Postural control tasks

Blanche & Bodison, 2016

Conclusion

- We have three body-centered senses
- Multiple dysfunctions can come from these senses
- Use multiple types of assessment tools for a comprehensive evaluation of sensory integration challenges
- Consider a collaborative approach and provide meaningful activities for the best outcomes

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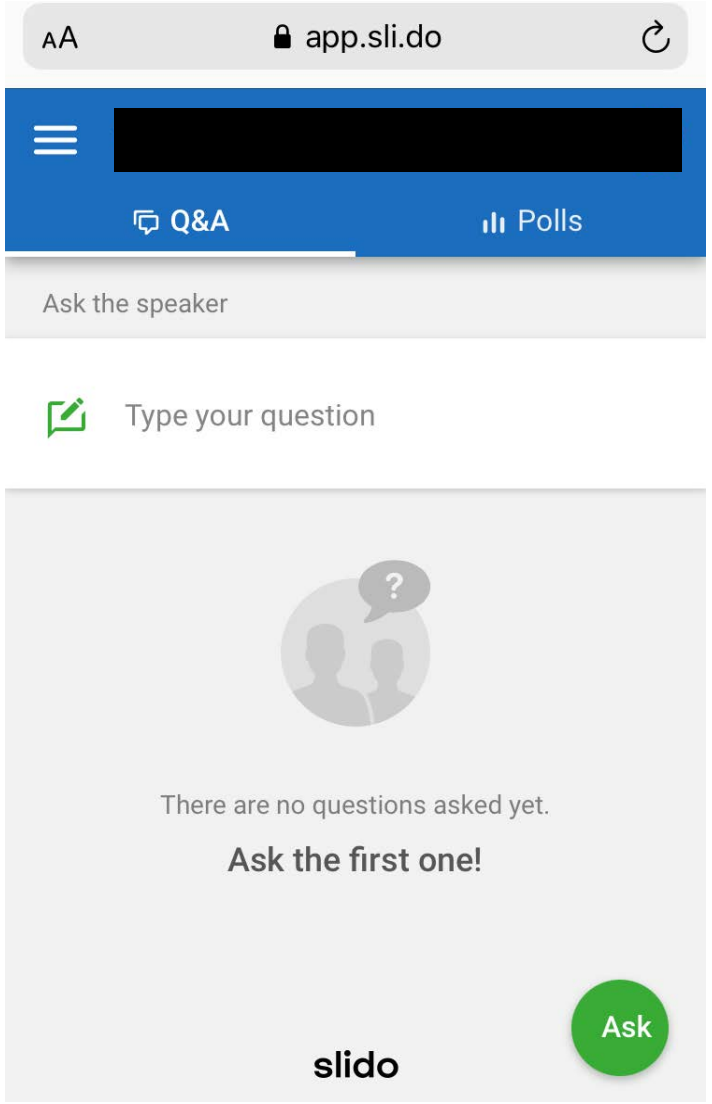

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