

## Practical Strategies and Problem Solving for Sensory Processing Challenges at Home and School

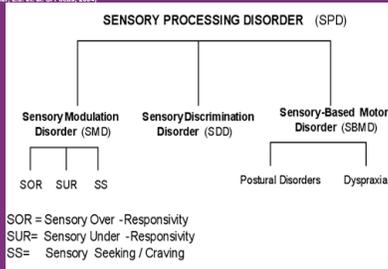
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## Session Layout

- Background Information
- Importance of Recent Research
- Practical suggestions and discussions that encompass
  - Sensory Diet
  - Direct Intervention
  - Environmental Modifications
  - Instructional Accommodations
  - Behavioral strategies
- Wrap-up and Questions

## Sensory Processing Disorders

(Miller, L.J. et al. In Focus, 2004)



## Dunn's Model of Sensory Processing

Threshold	Passive Response	Active Response
High	Low Registration	Sensory Seeking
Low	Sensory Sensitivity	Sensory Avoiding

### Prevalence

- 10 - 12 % general population
- 5% school aged population
- 30 - 100% children in the autistic spectrum
- 30% people with developmental disorders
- Also found across multiple disability groups (ADHD, CP, TBI, Fragile X)

## Sensory Processing Disorder (SPD)

- Individuals with SPD are unable to process sensory information correctly. SPD affects the way their brains interpret the information they take in and also how they act on that information with emotional, attentional, motor and other responses
- A comment about normal variations
- What individuals with autism have taught us...

## Subtypes

- Sensory Modulation Disorders
  - Sensory Over-responsivity (Sensory Avoiding)
  - Sensory Under-responsivity (Low Registration)
  - Sensory Seeking
- Sensory Discrimination Disorders
- Sensory-based motor disorders
  - Postural Disorders
  - Dyspraxia

## Sensory Modulation Disorder

- Problem in regulating and organizing the degree, intensity, and nature of responses to sensory input in a graded manner
- Over-response
- Under-response
- Fluctuating response-idea of a very small window

## Sensory Over-responsivity (Sensory Avoiding)

- Respond too intensely or too easily
- Response to non noxious stimuli is a fear response: fright, flight, fight, freeze
- Associated with anxiety, hyper vigilance, hyperactivity, aggression, withdrawal
- Interferes with engagement in occupations
- Resistant to change, non-adaptable
- Difficulty focusing or attending
- Limited variety of social responses
- Sensory defensiveness, tactile defensiveness, hypersensitivity

## Sensory Under-responsivity (Sensory Seeking)

- Insatiable desire for sensory stimulation
- Appear hyperactive, impulsive, constantly on the move, fidgeting
- Unawareness of touch or pain, touch others too hard or too often-may appear aggressive
- Lack of safety awareness while seeking out sensation
- Provide self with extra sensory input from "all channels"
- Very negative, resistant, "bored" if unable to engage in sensory activities
- Hyposensitivity, low registration

## The Questions

- Are sensory symptoms a component of core deficits or a co-morbid phenomenon with different diagnostic conditions?
- What is the role of developmental maturation on behavioral reactivity to sensation?
- Do sensory symptoms stand alone independent of diagnostic classifications?

## Qualifications of a Core Symptom

- Universal: present in almost all individuals with that syndrome/condition
- Unique: differs from individuals with other clinical diagnoses
- Specific: differs from other core symptoms

## Autism

- Sensory Processing and Behavioral Responsiveness (Baker, et al)
  - higher VABS Maladaptive Behaviour domain and DBC-P total scores were associated with lower SSP scores.
  - Underresponsive pattern most frequent
- Sensory Processing and Social Competence (Hilton, et al)
  - SP quadrant scores and the SRS scores indicates that the SP quadrant scores are related to autism severity and have significant importance for understanding the neurobiology of autism
  - The SP atypical quadrant scores were found to discriminate well between the levels of deficits in social competence, as measured by the SRS.

## Autism

- Ben-Sasson, A., Hen, L., Fluss, R., Cermak, S.A., Engel-Yeger, B., & Gal, E. (2008). A meta-analysis of sensory modulation symptoms in individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, DOI 10.1007/s10803-008-0593-3
- Computed effect sizes for 14 studies to measure differences in sensory symptoms between children with ASD, DD and typical children
  - Individuals with ASD had significantly lower sensory scores (higher presence) than typically developing children
  - Underresponsiveness had the greatest magnitude of effect size in ASD relative to the typical groups, followed by overresponsivity and seeking, most exaggerated symptom
  - Increase in seeking and overresponsivity up to age 6-9 years of age and then a decrease thereafter....no pattern for underresponsivity
  - Lower seeking behavior in 0-3 ASD group compared to typical group (less active exploration?...may seek sensation later on when it is not age appropriate?)

## Autism

- Baranek, G.T., Boyd, B.A., Poe, M.D., David, F.J., & Watson, L.R. (2007). Hyperresponsive sensory patterns in young children with autism, developmental delay, and typical development. *American Journal on Mental Retardation*, 112(4), 233-245.
  - Used Observational assessment of hyperresponsiveness based on Habituation, and level of Aversion
  - ASD and DD demonstrated more aversion responses
  - Sensory aversion scores declined with Chronological Age and increasing Mental Age
  - Support that Sensory Hyperresponsiveness is a general deficit with various developmental disabilities and likely not specific to autism
  - Hyperresponsiveness may not be useful for differential diagnosis but may have important implications for development and adaptive behavior

## Recommendations

- Need to study non-socially related underresponsivity symptoms to determine if this is a function of social withdrawal or sensory based (Ben-Sisson et al)
- Need to look at longitudinal relationships between Sensory Processing and Diagnostic Groups—does it change with age?
- Implications for practical suggestions: Analysis of sensory/social vs. sensory/non-social in school and home environments, age and developmental related changes

## Sensory Modulation Disorder in Context

- What is the **impact** of sensory modulation disorders in home, school, work, community environments and how does it vary?
- To what **extent** does it impact the individual?
- Are their goodness or poorness of fit characteristics between sensory processing and environment?
- A word about..."freaking out when they get home from school" .....

## Use of Sensory Input for Intervention

1. Concept of sensory diet - the right amount, type and frequency of sensory experiences to obtain and maintain optimal functioning.
  - Regular vs. Crash vs. Starvation Diet
  2. Provide the child with predictability and control (choice).
  3. Use touch, movement and proprioception to attain a calm, alert state.
- Key Principle: IT IS **HOW** YOU THINK...NOT WHAT YOU USE

## Use of Touch, Movement and Proprioception to influence arousal

Inhibition	Facilitation	Considerations
Rhythmical	Arrhythmic	Type
Sustained	Uneven	Location
Slow	Rapid	Direction
Expected	Unexpected	Intensity
		Frequency
		Position

## Calming Stimulation

- Slow, heavy, rub downward
- deep tactile pressure
- Proprioception - jumping, running & moving
- Massage
- slow, rhythmic rocking
- Vibration
- Increased oxygen
- Predictability
- Structure
- Purposeful movement
- Focus

## Alerting Activities

- Brisk rub
- Variety of textures
- Bouncing
- Jiggling
- Tickling
- Quick rocking
- Quick changes in direction
- Wrestling
- Rough play
- Unpredictable changes
- Being off balance
- Novelty

## When In Doubt....Prop it Out.....

-Meryl Samuels Turner  
OT, ASD Nest Program  
New York Department of  
Education

## Proprioceptive Based Interventions

- Affect arousal level
- Increase body awareness
- Modulate vestibular and tactile input
- Increase feedback a child receives from a motor response
- Self initiated actions

## What type of input (and intensity) are they looking for?

- Crashing, bumping, leaning: Combination of deep pressure and proprioception
- Biting, holding, and pinching: Need for muscle, joint and tendon input
- Running, crashing, jumping: Combination of vestibular and proprioceptive input

## A way to “prop” (rhymes with cope) with a busy day....

- Weighted blanket to bed
- Wake up, jump on the bed
- Heavy “prop” breakfast (bagels, fruit leathers, apples, suck thickened shake)
- Heavy backpack on lap on bus
- Help teacher pull down all the chairs
- Collect all library books from classrooms with buddy and take to library
- Pressure Vest for circle time
- Sit-o-disc cushion for seat work
- Power/Movement breaks
- “waiting” snacks
- Assigned door holder
- Unstructured time upon arrival home...or when can I just run around? (video games are not heavy prop....but some are getting closer!)

## General Rules for Movement

- If you are using vestibular input, give consideration to activities that provide stimulation;
  - in all body (head) positions and in all planes of 3 dimensional space
  - Look at existing playground spaces
  - Be wary of the swing you are not allowed to swing on....and other absurdities
  - Can we switch recess and lunch?
  - Vary movement....games with head inversion, rotation of the head as they pass the “answer ball”
  - We need movement breaks....
  - Behave then you can move....vs, move then you will behave

## Gravitational Insecurity

- With movement, excessive emotional reaction or fear which is out of proportion to real threat or actual danger.
- Occurs especially when the head is inverted or goes “backwards” or the feet are off the ground
- Viewed as a Sensory Modulation Disorder or Sensory Over-responsivity-hypothesized to be poor modulation of the otoliths
- Key principles
  - Establish a trusting relationship-trust is the most important element!
  - Grounded activities-do movement games as you roll, in contact with “mother earth”
  - Activities in prone
  - Provide an end point for backwards movement

## Aversion/Intolerance to Movement

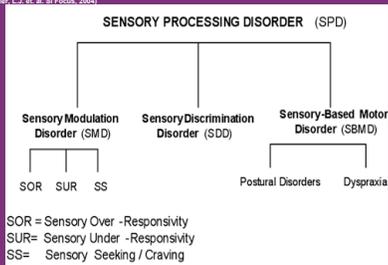
- Nausea, dizziness, vertigo, vomiting, other discomfort that is associated with autonomic nervous system stimulation
- Not considered a sensory modulation disorder
- Be sympathetic to the Sympathetic Nervous system-when aversive responses occur-remove source of aversive stimulus (take a break from the car, avoid the ride, etc.)

## Your turn

- Sensory Diet
- Direct Intervention
- Environmental Modifications
- Instructional Accommodations
- Behavioral strategies
  - For a child who needs a combination of Proprioception and Vestibular inputs in home and school environments to function effectively

## Sensory Processing Disorders

(Miller, L.J. et al. SI Focus, 2004)



## Sensory Based Motor Disorders

- Dyspraxia—have a somatosensory base (tactile and proprioceptive) i.e. if you can't feel your body..very hard to use it
- Postural Disorders—have a vestibular base
  - Postural Ocular Motor Disorders and Bilateral Integration and Sequencing Deficits

## In Their Own Voices...

- "My body feels like cement"(Paul)
- "I can't think and move at the same time"(Paul)
- "I know what you want me to do, I just can't make my body do it." (Nick)
- "I can't move how I want – no muscles work."(Nick)
- "I understand everything [but] I cannot initiate anything without a prompt"(Chammi)

## Dyspraxia

- Praxis is the ability to have an idea of what we want to do, plan and sequence the action and execute the action. In turn we learn through this process from the sensory and environmental feedback of our efforts.
- However, the idea, plan and ability to act is based on the sensory motor understanding of our body and what it can do.
- And, the body needs to respond to our commands

## Who is dyspraxic?

- Often called Developmental Coordination Disorder and can co-occur with Sensory Processing Disorders, Learning Disabilities, Fragile X, Autism and a variety of developmental disabilities
- Involves the ability to 1) have an idea, 2) formulate a plan, and then 3) execute
- Most children break down with the idea or a faulty plan

## Dyspraxia and Emotional Responses

- Some people with autism cannot feel their body. This is **frightening**
- For some their body will not do what they command it to do. This is **frustrating**.
- For some there is a need for constant movement just to feel where their body is. This is **exhausting**.
- Some cannot initiate an action without a physical or external cue. This is **humiliating**.

## Dyspraxia and Communication

- Dyspraxia can be found in the face and mouth which interferes with facial expressions and speech.
- It can be found in the whole body and impact functional ability and the ability to gesture.
- In spite of dyspraxia, receptive language and cognitive ability can be intact.

## Evidence for Dyspraxia in ASD

Ayres (1985) SIPT Manual

Ayres, A.J. & Tickle, L.S. (1980) AJOT, 24,6,375-381

Minshew N.J., Sung,K. et al (2004) Neurology. 63,112056-2061

Nayate, A., Bradshaw, J.L., Rinehart, N.J. (2005) Brain research Bulletin, 22,2, 92-101

Weimer, A.K., Schatz, B.A., Lincoln, A., Ballantyne, A.O. & Trauner, D.A. (2001) Developmental and Behavioral Pediatrics 22,2,92-101

## Dyspraxia and ASD

*Dziuk, Gidley Larson, Apostu, Mahone, Denckla, & Mostofosky (2007). Dyspraxia in autism: Association with motor, social and communicative deficits. Developmental Medicine and Child Neurology, 49, 734-739*

- Dyspraxia not accounted for by "lack of physical grace and agility" or basic motor skills
- After accounting for basic motor skill, the ASD group show significantly poorer praxis scores
- Praxis performance was a strong predictor of the defining features of autism
- **Praxis in children with autism is strongly correlated with the social, communicative and behavioral impairments used to define autism**

## Autism profile on the SIPT

### Scores below -1.0 (N= 7)

- |                                |       |
|--------------------------------|-------|
| • Manual Form Perception       | -1.08 |
| • Praxis on Verbal Command     | -2.09 |
| • Postural Praxis              | -2.46 |
| • Oral Praxis                  | -1.84 |
| • Sequencing Praxis            | -2.38 |
| • Bilateral Motor Coordination | -2.18 |
| • Standing & Walking Balance   | -1.57 |

Other 10 scores were within the normal range (visual, tactile, motor i.e. Mac, DC, CPr, PRN)

## What do you do?

- 3 principles are key
  - Use activities that incorporate a lot of flexion
  - Use activities that require the child to have an idea and then expand on those ideas (therapist plays "dumb")
  - Use activities that require heavy work (as previously discussed a lot of heavy proprioception)
  - All of this works to increase body scheme and motor planning

## Developing a Body Scheme

- Introduce the person to activities and pastimes that provide touch-pressure, use of heavy work muscles and movement.
- Introduce activities that require use of his total body and ways of maintaining a sense and perception of his body.
- Try to provide experiences that can be found in the natural environment – but be creative at home.

## Sequence of Motor Planning or Projected Action Sequences

- Often it is helpful to begin in the following sequence and increase complexity of the projected action sequence:
  - Stationary object—Stationary child: Child kicks soccer ball
  - Stationary child—Moving Object: Child kicks soccer ball rolled to him
  - Moving Child—Stationary Object: Child runs up to soccer ball and kicks it
  - Moving Child—Moving Object: Child plays soccer
  - Think about this when you are doing your new motor activity...it will probably be easier if you or the object is not moving!

## Postural Disorders

- Postural Ocular Movement Disorders
- Bilateral Integration and Sequencing Deficits

## Postural Disorders

- Inability to assume or maintain prone extension (superman ) posture
- Extensor muscle hypotonicity
- Looking for more input than their seat can give them
- Poor proximal joint stability
- Often craves movement experiences
- Depressed scores on Post rotary nystagmus (back and forth movement of the eye after spinning)
- Poor equilibrium and balance

## Postural Disorder

- Considerations
  - Provide intense vestibular input-coupled with an adaptive motor response
  - Do many activities that require anti-gravity extension
  - Work on balance and equilibrium reactions

## Bilateral Integration and Sequencing (BIS) Deficits

- The inability to use two sides of the body together in a coordinated manner-also may see right-left confusion, avoidance or inability to cross midline of the body, poor projected action sequences
- Related to Postural Ocular Movement Disorder as a basis, then as those skills get better, may still see BIS problems

## Bilateral Integration and Sequencing (BIS) Deficits-cont.

- Use of vestibular input in combination with activities that requires increasingly difficult projected action sequences and use of two sides of the body together in symmetrical (i.e. jumping jacks) and asymmetrical (i.e. reciprocal stride jumps) patterns
- Emphasize sequencing
- Emphasize crossing the midline....with eyes, figure eights, "goalie"

## Sensory Discrimination Disorders

- Decreased ability to discriminate properties, sounds, textures, visual and spatial discrimination
- Auditory Processing and Perceptual Skills
- Tactile Discrimination
- Visual Perceptual Skills

## Assessment Issues

- What is the impact of inadequate sensory processing and praxis on a child's functional abilities? (Impact)
- What is the contribution of the sensory processing disorder to the developmental delay? (Extent)

## Issues

- Fidelity as an issue
- Relevant Outcomes
- Learn to count better
- Natural Settings
- Service Delivery Models
- Sensory Stimulation vs. Sensory Diets vs. OT/SI
- Demonstration of Treatment Efficacy

## Yes, but can this be done in the school?

- ASD Nest Program in conjunction with the NYC Department of Education... "if you can make it there..."
- Educating kids with high functioning autism in their neighborhood public schools
- Key elements: Integrated related services, Social Development Instruction, Utilization of sensory strategies for successful classroom performance, training and professional development, Inclusive setting, small classrooms, team meetings

## Yes but can I do this at home?

- Parents know best....and what works....
- Natural routines
- Not a need to look like therapy
- Taking time out...all of you....and great sensory and learning based activities are typically what happens
- What you going to do with that input?
- The beauty (and curse) of "You Tube" and other user generated content

## Contact Information

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