



Sensory Processing Disorder

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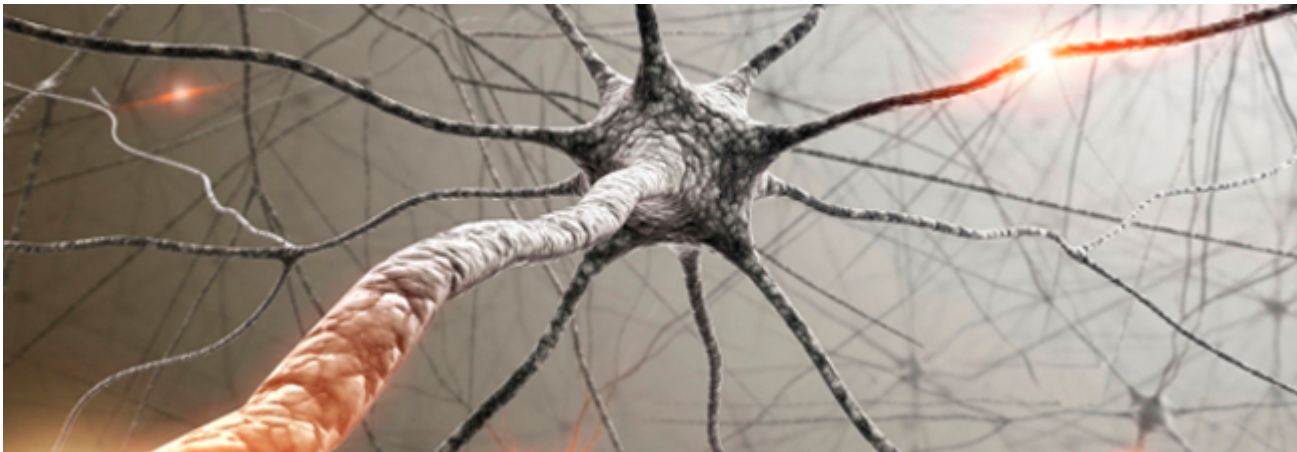
DBP Resident Tutorial, 11/5/2013

SPD: terminology

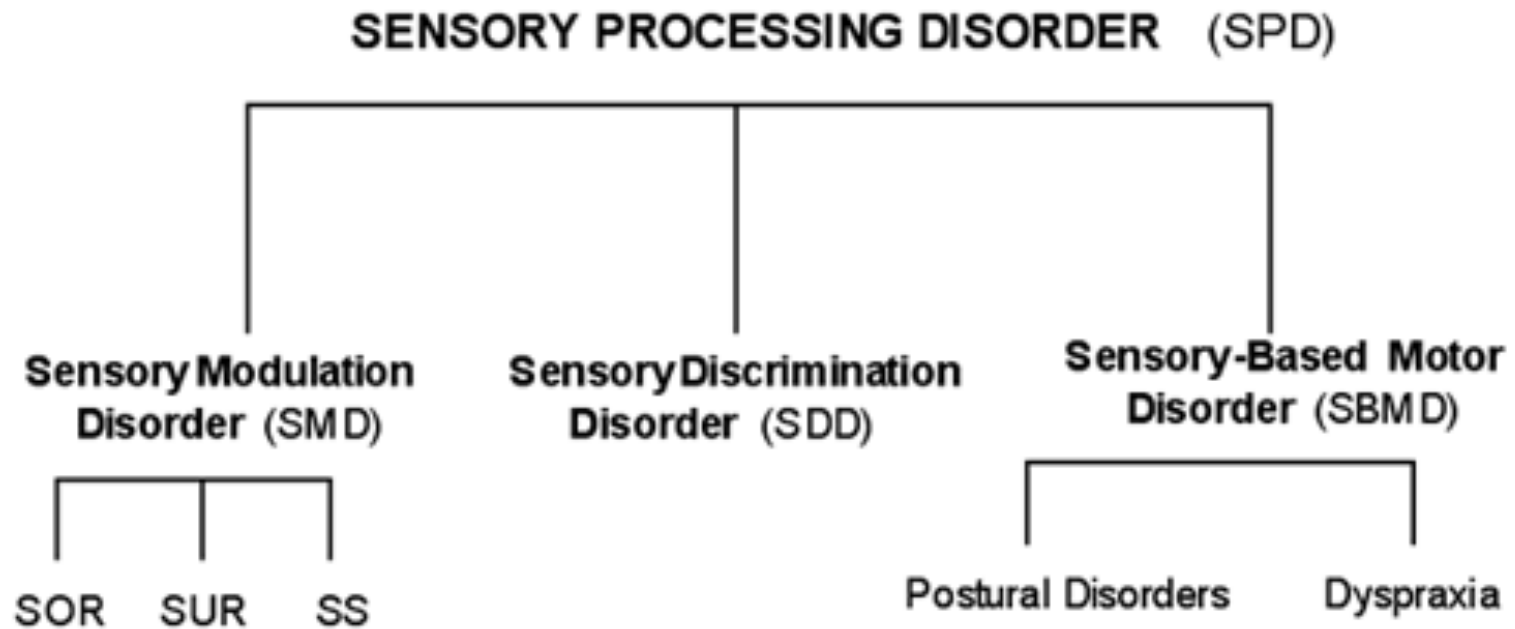
- Per AAP guidelines there is no universally accepted definition ⁴
- Not in the DSM 5
- Problems organizing and using sensory information from environment and from one's self ¹
- Issues interpreting, modulating, detecting or responding to these stimuli

History

- A. Jean Ayres PhD occupational therapist first described the concept of sensory integration in 1970s.
- Deficits in sensory neuronal function can lead to deficits in development, learning or emotional regulation.⁴



Classification of SPD (Miller et al)



SOR = Sensory Over -Responsivity
SUR= Sensory Under -Responsivity
SS= Sensory Seeking / Craving

Sensory Modulation Disorder: impairment in regulating intensity of responses

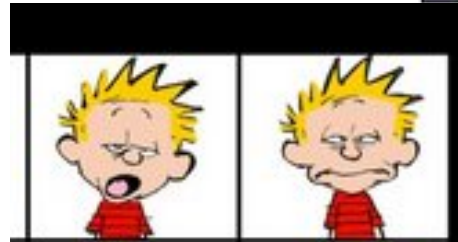
Over responsive: high arousal, distractive, fight or flight state, impulsive, aggressive



Sensory avoidant- seems calm, hypervigilant, scanning for threat, fearful, anxious,



Sensory under responsive- decreased arousal, inattentive, flat affect, passive



Sensory seeking- arousal heightened, overexcited with stimuli, impulsive, takes risks



Categories

- Sensory discrimination disorder- deficit in discrimination between sensory stimuli : visual, tactile, proprioception)
- Sensory-based motor disorders
 - Dyspraxia- difficulty with planning and executing complex motor acts
 - Postural disorder- thought to be associated with poor processing of vestibular and proprioception.

Epidemiology

- More common in boys than girls
- Estimated incidence of 5-16% of children
- Often co-morbid with ADHD, autism²

Etiology

- Unknown
- Theories: children with over-responsiveness to sensory stimuli have abnormal autonomic responses

Diagnosis:

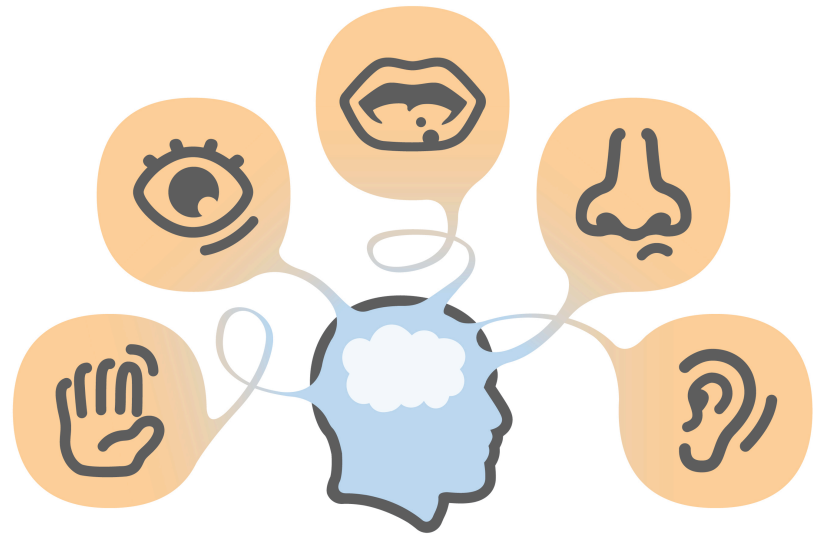
- Per AAP guidelines: no diagnosis should be made, as SPD may be seen with many other disorders. Parents should be aware that evidence basis for sensory integration therapy is not strong.⁴
- Per Zuckerman Parker handbook: consider if patient has poor self regulation of arousal, attention, affect or action. **ONLY IF INTERFERES** with function.
 - History: low normal development, unusual sensory avoidances or unusual enjoyment of sensory stimuli

Sensory Profile

- 125 items, 5 point Likert scale filled out by parents
- 6 areas: Visual, Auditory, Activity Level, Taste/Smell, Body Position, Movement, Touch, Emotional/Social
- “ $\frac{3}{4}$ of items on scale were uncommon for children without disabilities.”⁵

Assessment

- Occupational therapist driven
 - Standardized tests
 - Sensory integration and praxis test (SIPT)
 - Sensory Processing Measure (SMP)
 - Informal observation
- Multidisciplinary team evaluation
 - Indicated for children who may have other learning, developmental, or behavioral problems



Sensory Integration Therapy

- Occupational/Physical therapists
- Highly individualized
- Goal: facilitate organization of the brain so it can learn effectively from the environment
- Based on principles to guide controlled sensory input:
 - 1) “Just Right Challenge”
 - 2) “Adaptive Response”
 - 3) “Active Engagement”
 - 4) “Child-directed”

Equipment



Parent education

- Important component of therapy is parental education and home component of therapy
- Help the parents understand their children's unique needs and how these can be addressed in the home environment



Efficacy of therapy

- Through the years:
 - 1982 meta-analysis: literature provided suggestive support for the effects of SI therapy
 - 1988-1994: 4 lit reviews concluded evidence was insufficient to support SI therapy efficacy
 - 1999 meta-analysis: trend in literature, with earlier studies showing greater efficacy than recent studies
 - 2004, 2007 AAP policy statements: scientific legitimacy of SI interventions have not been established for children with motor disability and ASD

2012 AAP Policy Statement

- Policy statement for children with developmental and behavioral disorders
- Recommendations:
 - 1) Pediatricians should not use sensory processing disorder as a diagnosis – consider other disorders
 - 2) Pediatricians should communicate with families about the limited data on the use of sensory-based therapies
 - 3) If a patient is receiving sensory-based therapies, teach families how to determine whether a therapy is effective and safe

Remaining questions



- Is sensory integration disorder truly a “disorder” of sensory pathways?
 - No studies showing SID exists outside of other developmental and behavioral disorders
- Is sensory integration therapy effective and should it be included in the comprehensive treatment of these children?

New Modalities to Diagnose?

- Owen, JP. Marco EJ, Desai S. et al. Abnormal white matter microstructure in children with sensory processing disorders. Neuroimage: Clinical. Volume 2, 2013 P. 844-853.
- DTI (Diffusion Tensor Imaging) acquired in 16 males 8-11 yo, with SPD.
- 24 age matched and handedness matched , IQ Matched controls.
- “Microstructural characteristics of white matter tracts, such as axonal diameter, fiber density and myelination are crucial for determining the speed and bandwidth of information transmission in the human brain.”
- Diagnosis of SPD: based on the Sensory Profile

References

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5. Dunn W, Westman K et al. The sensory profile: the performance of a national sample of children without disabilities. *Am. J. Occup Therapy*. Jan ; 51 (1): 25-34.
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