SENSORY PROCESSING FUNCTION AND DYSFUNCTION: APPROPRIATE ACCOMMODATION AND THERAPEUTIC STRATEGIES

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PHYSICAL THERAPY

KINETIC EDGE
SENSORY SYSTEMS

Hearing
Taste
Smell
Sight
Touch
Movement/Vestibular
Body Position/Proprioceptive
WHAT IS SENSORY PROCESSING?

Definition: The everyday neurological procedure of organizing the information we take in from our bodies and the world around us for use in daily life.
SENSORY PROFILE (WINNIE DUNN, 1999)

Poor Registration

Sensation Avoiding

Sensory Seeking

Sensitivity to Stimuli
SENSATION AVOIDING

- Low neurological thresholds; tendency to counteract these thresholds
- Sensory thresholds are met too often. This can be uncomfortable or frightening. Child either withdraws or has an emotional outburst to get out of the situation.

- Resistant to change
- Reliant on rigid rituals
- Limit unfamiliar input and broaden the sensory processing range within acceptable rituals
POOR REGISTRATION

- High neurological threshold; act in accordance to those thresholds
- Low energy levels and appear overly tired.
- Brain requires increased stimulation to generate a response.

- Recommend experiences concentrated with sensory information so that threshold can be met and child will notice and respond appropriately to cues.
SENSATION SEEKING

- High neurological threshold; act in accordance to the need to meet those high thresholds
- Active
- Continuously engaging
- Fidgety, and excitable

- Incorporate additional sensory input into the child's routines so that thresholds can be met while conducting daily life
SENSITIVITY TO STIMULI

- Low neurological thresholds and a tendency to act in accordance with those thresholds
- Distractible, hyperactive.
- Respond to the newest stimulus, drawing their attention away from current task

- Provide child with sensory experiences as part of ongoing performance that supports him to continue task, and minimize chances for thresholds to be fired separately
MODULATION

Scores are scattered between high and low thresholds
May require increased time to get used to new task or environment
SENSORIMOTOR PERFORMANCE ANALYSIS

ATNR
STNR
Anti-gravity Extension
Anti-gravity Flexion
Body Righting/trunk flexibility
Head Righting
Equilibrium/Protective Extension

Vestibular Function
Visual Processing
Tactile Processing
Bilateral Integration
Motor Planning
Tone and Strength
Stability/Mobility
REFLEX INTEGRATION

Moro/Startle
Palmar
ATNR
STNR
TLR
Spinal Galant
SYMPTOMS OF A RETAINED MORO REFLEX:

- Physical timidity
- Motion sickness, poor balance and coordination (ball)
- Sensitive to light, difficulty with black print on white paper, poor tolerance to fluorescent lighting
- Cycle of hyperactivity followed by excessive fatigue
- Difficulty making decisions
- Low self-esteem or insecure
SYMPTOMS OF A RETAINED MORO REFLEX:

- Lowered immunity, prone to allergies and infections of upper respiratory tract/ear
- Hypoglycemic, or the tendency to experience low blood sugar sooner than is normal.
- Anxiety (test, separation)
- Mood swings, difficulty accepting criticism
- Dislike of change or surprise, emotionally sensitive
SYMPTOMS OF A RETAINED PALMAR REFLEX:

- Poor finger dexterity or coordination
- Lack of a “pincer” grip
- Lack of tripod grasp when writing
- Speech and articulation difficulties
- Red around the mouth from licking
- Tongue is protruding with any motor use of the hands/body
- Ticklish or sensitive palm of hand(s)
SYMPTOMS OF A RETAINED ASYMMETRICAL TONIC NECK REFLEX (ATNR):

- Poor balance
- Convergence problems
- Difficulty crossing midline
- Right/left confusion
- Difficulty moving opposite limbs in rhythm; marching or skipping
- Poor handwriting
- Poor expression of ideas on paper
SYMPTOMS OF A RETAINED ASYMMETRICAL TONIC NECK REFLEX (ATNR):

- Poor ability to move eyes together in scanning a line of words; eyes “twitch” when at midline or middle of the line
- Poor expression of ideas in written form
- Visual perceptual problems: reversals of b/d, u/n, saw/was beyond 1st grade
- Mixed dominance
- Poor handwriting
SYMPTOMS OF A RETAINED SYMMETRICAL TONIC REFLEX (STNR):

- Poor posture
- Ape-like walking
- Sits with head on desk when writing’ “slumped over”
- Prefers to sit in “w” leg position on the floor

- Poor eye-hand coordination; messy eater, clumsy
- Hard to change focus from desk to board in school
SYMPTOMS OF A RETAINED SYMMETRICAL TONIC REFLEX (STNR):

- Near focusing problems
- Poor attention-wandering
- Poor swimming skills
- Tracking problems
- Convergence problems
- Slowness at copying tasks
SYMPTOMS OF A RETAINED TLR REFLEX:

- Poor sense of balance
- Poor posture
- Spatial problems (fine motor planning, awareness of body in surroundings)
- Visual problems (unable or uncomfortable to cross eyes; convergence problems, eye teaming dysfunction)
SYMPTOMS OF A RETAINED TLR REFLEX:

- Poor sequencing skills needed for decoding, spelling, math
- May cause motion sickness
- Poor sense of timing and rhythm
- Poor organizational skills
- Dislike or avoidance of sports
SYMPTOMS OF A RETAINED SPINAL GALANT:

- Inability to sit still or remain silent, fidgeting
- Racing concentration
- Poor short term memory
- Continued bed wetting above the age of 5 years
- Sensory integration problems
- Auditory processing difficulties
- Near focusing problems
- Difficulty with reading
Figure 1-3. Printed with permission. © Taylor/Trott 1991

1-4 "How does your engine run?"
AROUSAL/ALERT THEORY

Self-regulation
- The ability to attain, maintain, and change arousal appropriately for a task or situation
THE ALERT PROGRAM (WILLIAMS AND SHELENBERGER, 1996)

- Help children learn to monitor, maintain, and change their level of alertness so that it is appropriate to a situation or task.
- SI and cognitive approach
- Ages 8-12, but can be adapted for younger children
- Used with other appropriate therapies
THE ALERT PROGRAM IS DESIGNED TO:

• Teach children, parents, and teachers how to recognize arousal states as they relate to attention, learning, and behavior

• Help children recognize and expand the number of self-regulation strategies they use in a variety of tasks and settings

• Give therapists, parents, and teachers a framework to help children recognize and regulate their own arousal states
**SENSORIMOTOR PLANNING WORKSHEET**

<table>
<thead>
<tr>
<th>Taste/Smell</th>
<th>Oral Texture</th>
<th>Tactile</th>
<th>Vestibular Movement</th>
<th>Vestibular Gravity</th>
<th>Visual</th>
<th>Auditory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet/Vanilla</td>
<td>Suck/Blow</td>
<td>Joint and muscle activity, Cool to neutral warmth</td>
<td>Joint and muscle activity</td>
<td>Vertical</td>
<td>Light/Dark Color</td>
<td>Vibration Sounds Loud/Soft</td>
</tr>
<tr>
<td>Salt/Brine</td>
<td>Bite/Chunch</td>
<td>Deep pressure Moderate temperatures</td>
<td>Oscillation (bouncing)</td>
<td>Horizontal</td>
<td>Form (boundaries)</td>
<td>Rhythm Music Sing-song speech Rhyme</td>
</tr>
<tr>
<td>Sour/Citrus Spice</td>
<td>Chew</td>
<td>Touch pressure Moderate temperatures</td>
<td>Linear movement (swinging)</td>
<td>Out of straight planes (diagonals)</td>
<td>Place (location)</td>
<td>Vocalization/speech sounds</td>
</tr>
<tr>
<td>Bitter/Smoke</td>
<td>Lick</td>
<td>Light touch (may be unexpected) Extreme temperatures</td>
<td>Rotary movement (spinning or partial rotation)</td>
<td>Upside down/backwards space</td>
<td>Movement through time and space</td>
<td>Language</td>
</tr>
</tbody>
</table>

Rhythmic input over time – decreases arousal level

Arhythmic input over time – increases arousal level

**From** How Does your Engine Run? Figure 1-8. ©1991. Patricia Oetter, MA, OTR, FAOTA Printed with permission.
GENERAL ORGANIZING SENSORY ACTIVITIES

• Safe, firm pressure
• Quite corner
• Quite music during independent work
• Breathe before transitions
• March from one activity to the next
• Oral input
• Wall push ups, chair push ups
• Hand fidgets
• Movement breaks
AUDITORY/HEARING ACTIVITIES TO ENHANCE SENSORY DIET

<table>
<thead>
<tr>
<th>Music</th>
<th>Rhyming</th>
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</thead>
<tbody>
<tr>
<td>Environmental sounds</td>
<td>Soft/rhythmic al v.</td>
</tr>
<tr>
<td>Instruments</td>
<td>loud/irregular</td>
</tr>
<tr>
<td>Ear phones</td>
<td>Instruction variations</td>
</tr>
<tr>
<td>The Listening Program</td>
<td>Ear dominance</td>
</tr>
</tbody>
</table>
ASSOCIATED ORAL MOVEMENTS
ORAL ACTIVITIES TO ENHANCE SENSORY DIET

• Cotton ball math or alphabet games
• Drink or chew
• Bubble gum
• Straws
• Camelbak water bottles
TACTILE ACTIVITIES TO ENHANCE SENSORY DIET

• Hot Dog Roll
• Clothing
• Hand fidgets
• Deep pressure hand hugs
• Deep/firm/predictable v. light/ticklish/unpredictable
• Vary textures
• Pencil grips
PROPRIOCEPTION ACTIVITIES TO ENHANCE SENSORY DIET

Bottom-up Inhibition by engaging cerebellum (info from muscles and joints), sending info to center of the brain (responsible in part for level of alertness)

Activities
- Heavy Work
- Deep Pressure
- Gentle Wrestling
- Crash Pad
- Bottle Babies
- Stretchy bands
- Fabric Tube Tricks
- Obstacle Course
BALANCE AND MOVEMENT ACTIVITIES TO ENHANCE SENSORY DIET

- Jumping
- Rolling
- Swinging
- Rocking
- Spinning
- Obstacle courses
- Upside down
- Slow/rhythmical v. fast/irregular

- T-Stool
- Move ‘n Sit cushion or beach ball
- Theraband on legs of chair
- “Alive, Awake, Alert, Enthusiastic”
VISION/SIGHT ACTIVITIES TO ENHANCE SENSORY DIET

- Space
- Visual Perception
- Soft lights/colors v. bright/twinkling
- Calming tent/box
- Lighting
- Colors and Patterns

- Guesstimation with Objects
- Metronome Code
- Eye Spy
- Remove some of visual information from paper