Ms. Ida Mary Siromani. MOT, FAOT
Paediatric Occupational Therapist

SENSORY PROCESSING IN CHILDREN WITH VISUAL IMPAIRMENT – IDENTIFICATION AND MANAGEMENT
LEARNING OBJECTIVES

• Why is vision an important sense?
• Impact of visual impairment
• Defining visual impairment and sensory processing
• Use of information from other sensory systems
• Response to auditory and tactile system
• Object concept behaviour
• Sensory modulation
• Need for intervention
• Enhancing sensory processing, modulation and integration
WHY IS VISION AN IMPORTANT SENSE?

- Understanding the environment
- Interpreting the relationship among people, objects and surroundings
- Integrating multi sensory information
- Confirming other sensory inputs
- Scanning the environment (distance, movement and space)
- Discriminating features of objects and symbols (size, shape, colour)
IMPACT OF VISUAL IMPAIRMENT

Did you know? 85%
of what a child learns, they learn incidentally through sight before the age of five.
Defining VISUAL IMPAIRMENT functionally

Loss of or deficit in visual function (vision, visual perception, interpretation of visual input) owing to pathology or processing problems in one or more components of the visual system (structures of the eye, visual pathways and the brain) that limits the individual’s ability to engage in and participate in daily occupations.
Defining SENSORY PROCESSING

**RESPONSE**
A response is generated.

**SENSORY INPUT**
Sensory receptors are stimulated.

**PROCESSING**
Sensory information is organised and interpreted, stored and related to previous experiences.
SENSORY SYSTEMS
VISUAL AND SENSORIMOTOR INTEGRATION

VISUAL SKILLS
- VESTIBULAR
- PROPRIOCEPTIVE
- AUDITORY
- TACTILE

OTHER SENSORY SYSTEMS

FUNCTIONAL SKILLS
- ORIENTING RESPONSES
- PROTECTIVE REACTIONS
- SPATIO TEMPORAL ORIENTATION
- EYE- HAND COORDINATION
- EYE – FOOT COORDINATION
- PERCEPTUAL SKILLS
- SELFCARE INDEPENDENCE
- PLAY AND SOCIAL INTERACTIONS
- ACADEMIC SKILLS

Sensory Processing in Children with Visual Impairment
Ms.IDA(OT) : NCORE 2018
USE OF INFORMATION FROM OTHER SENSORY SYSTEMS

• COMMON ASSUMPTION
  - compensation through increased use of other senses
  - heightened performance of the remaining senses

• TO REMEMBER
  - A child is in the process of building experiences that affect the developing brain
  - A child with VI starts to learn differently

• COMPETENT AND INDEPENDENT
  - Sensory associations are made to form perceptions
  - If the remaining sensory systems are intact
  - If the child is healthy
Evidence:

1. Glass (2004) – infants with visual impairment may have a heightened behavioural response to auditory stimuli.

2. Murray and Passmore (2010) – indicated that atypical sensory processing is strongly related to Stereotypical movements not just in autism but also in vision loss.

3. Elaine and Liberman (2003) – children most likely to rock were those with retinopathy of prematurity who underwent lengthy hospital stays and who were blind from birth.
RESPONSE TO AUDITORY INPUT and TACTILE SYSTEM

- Difficulty in connecting auditory input with external objects
- Difficulty in locating the objects in a specific location
- Difficulty in using the information to reach for objects and locate it
- Child has to expend energy trying to interpret sound at the expense of exploratory motor behaviour
- Child uses haptic perception to develop concepts of objects
- Tactile system offers some compensatory strategies
OBJECT CONCEPT BEHAVIOUR

- Concept of objects is similar in children with VI during the first year and a half.
- But performance on tasks involving complex spatial relations that cannot be tracked only by audition and touch is more difficult.
- Spatial understanding is more of a problem than object conceptualization.
- Conceptual understanding takes longer to develop.
- Learning in parts to understand the whole with discrete sensory inputs. Eg. Furry dog.
- Concept of whole may be inaccurate and incomplete.
- Remaining senses does not substitute with sufficient information about the contexts in which the object exists.
SENSORY MODULATION

• Child with VI often demonstrate stereotypical or repetitive behaviours – hand flapping, eye poking or self rocking
• It could also be due to the underlying cause of blindness – children with multiple disabilities
• Stereotypic behaviours – hypothesized as sensory seeking activities or because of severely limited repertoires of movement
• Some have tactile hypersensitivity, postural instability or gravitational insecurity
  ❑ May withdraw his / her hand from an object
  ❑ May object to being touched
  ❑ May be fearful of moving through space
  ❑ May be afraid to get on playground equipment

contd......
SENSORY MODULATION

• Restricted interaction with environment and develop few typical motor and manipulative experiences
• Motor experiences are limited and maybe fearful
• Have a unique Characteristic postural and movement patterns
• More fearful when moving through open space
• Fearful when climbing on play ground equipments that moves ( swing, tricycle )
• More cues and strategies needed for managing new tactile and other sensory inputs
• Caregivers become over protective and prevent or restrict children with VI from movement and exploratory activities
• They experience less bumps and bruises
POSTURAL AND MOTOR CHARACTERISTICS SEEN IN CHILDREN WITH VISUAL IMPAIRMENT

• Overall low muscle and postural tone. Including instability in shoulder girdle and hips
• Head tilted to one (visual or auditory accommodation)
• Head forward or hyperextended, resting on neck
• Head movements (swaying)
• Maintaining a wide base of support when standing or when walking
• Tendency to move in straight planes (decreased trunk rotation)
• High-guard posture when walking
NEED FOR INTERVENTION

• Child must use vestibular, proprioceptive and auditory information to orient to gravity, move though space and maintain postural alignment

• Child must use other sensory systems to use her ability to explore, learn from the environment, interact with family members, develop play skills and master ADL

• To integrate these systems, the child must have opportunities to actively engage in and experience in a variety if situations
ENHANCING SENSORY PROCESSING, SENSORY MODULATION AND SENSORY INTEGRATION

1. DEVELOPMENTALLY AGE APPROPRIATE ACTIVITIES
   - Activities that provide tactile, auditory, proprioceptive and vestibular input
   - Promote body concept
   - Postural control
   - Tactile discrimination
   - Spatial relation perceptions

contd...
ENHANCING SENSORY PROCESSING, SENSORY MODULATION AND SENSORY INTEGRATION

2. SENSORI-MOTOR ACTIVITIES

- Bilateral hand use
- Praxis
- Activities in suspended equipment and playground equipment
- Activities in the natural environment on a regular basis

(movements need to be controlled and amount of input within his or her range of adaptive responses)
TOUCH WITH CUES

- Functional or Low vision vs Total blindness
- Firm touch vs light touch
- With verbal cue vs No clue
- Tactile stimulation in isolation vs context of real life activities
- Graded exposure vs flooding of exposure
- Active participant vs passive recipient
ORAL HYPERSENSITIVITY

- Graded food
- Liquid textures
- Tactile or proprioceptive
  - use of straw
  - Thickened liquid
  - Blowing
POSTURAL CONTROL AND MOVEMENT IN SPACE

• Provide a variety of movement experiences
• Caregivers can use different carrying positions
• Activities to encourage lifting of head and proper alignment
• Facilitation to move through space – push toys, riding toys, different heights, density, firmness and textures
• Movement strategies with feedback of performance and results

(s motor learning principles)
DEVELOP BODY AWARENESS AND SPATIAL ORIENTATION

• Teaching spatial contexts like left-right, up-down, over-under, in-out, around.
• Describe the movement and direction of movement
• Very important that contribute to child’s development of mobility, orientation and language
DEVELOP TACTILE PROPRIOCEPTIVE PERCEPTUAL SKILLS

• Discrimination function is needed to learn about features and properties of objects
• To adjust grasp according to size, shape and weight
• To grade the amount of pressure force and speed needed to manipulate
• Finger painting, finding hidden objects – tactile awareness and discrimination – braille
MAXIMIZE THE FUNCTIONAL VISION

• More a child uses visual pathways, the better vision develops
• Tracking games and localizing targets
• Appropriate Assistive aids and devices and apps
REFERENCES

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I hear and I forget
I see and I remember
I do and I understand
- Confucius -

THANK YOU