Strategies to Support Children with Down syndrome in the Classroom

Hina Mahmood, M.OT
Registered Occupational Therapist

Occupational Therapy

Enable children to engage in & perform the occupations that are important & meaningful to them

- **Occupations**: activities that a child wants & needs to do within their day

Develop a child’s independence in the areas of:
- **Self-care** – toileting, dressing, hygiene, eating
- **Productivity** – academic tasks at school, employment
- **Leisure** – participation in recreational or social activities, hobbies
Optimal Performance occurs when:
➢ A child is motivated to perform a task
➢ The task demands are at the ‘just right challenge’
➢ The environment is adapted to facilitate success

A child performs at their best when there is a balance between:
➢ **Person**
  ▪ Internal factors & motivation
➢ **Occupation**
  ▪ The task & it’s demands
➢ **Environment**
  ▪ External factors in the environment

**Person Factors**

**Motivation & interests**
• Preferred toys & favourite activities

**Cognitive skills**
• Difficulty taking in, organizing & remembering information
• Difficulty with planning, reasoning & problem solving

**Learning style**
• Visual memory is stronger than auditory memory
• Preference for repetition & sameness
Person Factors

Physical factors of children with DS
- Hypotonia
- Decreased strength
- Short limbs
- Hypermobility
- Sensory processing challenges
- Medical conditions

Occupation Factors

The task & it’s demands

What is involved in the task?
- What are the steps of this task?
- What are the skills that are necessary to complete this task?

What are the child’s skills?
- What tasks can they do?
- How can we adapt this to be the just right challenge?
Environment Factors

- Important to determine the environmental factors that may be impeding learning & engagement in a specific setting.

- The physical environment, along with the availability of supports, have an impact on the child’s optimal performance in a setting.

- Adapt the environment to suit the needs of the child.

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**Life Skills**

- Self Care Skills: toileting, grooming, dressing

**Fine Motor Skills**

- Bilateral coordination, dexterity

**Gross Motor Skills**

- Postural control/stability, muscle tone, strength

**Sensory Systems**

- Visual, auditory, tactile, gustatory, olfactory, proprioception, vestibular
Sensory Processing

Ability to take in, organize & make sense of the sensory information received by the brain from the sensory systems, & respond appropriately
Sensory Processing Challenges

- Research suggests that approximately 49% of individuals with DS experience sensory processing challenges compared to approx. 5 - 16% of the general population.

- Children with DS can experience differences in the way they process & respond to sensory information.

Sensory Systems

**Visual** *(sight)*

**Auditory** *(sound)*

**Tactile** *(touch)*

**Gustatory** *(taste)*

**Olfactory** *(smell)*

**Proprioception** *(body awareness):* tells us where our bodies are in space & how different muscles & joints are moving.

**Vestibular** *(movement):* maintain our balance and posture & understand where & how fast our bodies are moving.

**Interoception:** sensations that are registered by our internal organs such as hunger, thirst, pain, temperature and bladder/bowel fullness.
Importance of Sensory Processing

Children with sensory processing challenges may experience:

• Reduced participation in activities of daily living
• Impaired self-esteem & increased levels of anxiety
• Increased levels of frustration
• Difficulties with self-regulation
• Reduced participation in sensory experiences can limit a child’s learning opportunities – children learn about their world through active exploration & experimentation with their environments
Sensitivity vs Seeking

<table>
<thead>
<tr>
<th>Sensory Sensitivity</th>
<th>Sensory Seeking</th>
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</thead>
<tbody>
<tr>
<td>Children can be over sensitive to specific sensory input</td>
<td>Children are under sensitive to specific sensory input</td>
</tr>
<tr>
<td>Children may be fearful or avoid certain sensations</td>
<td>Children seek out greater than average amounts of sensory input (more intense)</td>
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<td><em>E.g.</em> Unexpected loud noises – School announcements/School bell</td>
<td><em>E.g.</em> Intentionally falling or bumping into objects</td>
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Children can fall into either categories for each of the sensory systems.

Sensory Sensitivities

Common sensory processing difficulties in DS:

- **Visual** – dislike bright lights, overwhelmed or distracted by too much visual information
- **Auditory** – react strongly to unexpected or loud noises, or distracted by background noises
- **Tactile** – dislike messy play or touching certain textures, or tags in clothing can be uncomfortable
Sensory Seeking

- **Proprioception (body awareness)** – Enjoys jumping & crashing, bumping into others, enjoys being squeezed/squished

- **Vestibular (movement)** – needs to move constantly, can’t sit still, rocks or fidgets in chair

- **Tactile** – seeks out opportunities to feel textures on hands/feet or other body parts

- **Visual** - takes more visual information to react, seeks bright environments, reflective flashing or spinning lights & objects

Sensory Strategies

- Adapt the environment to manage *sensory sensitivities*

- Incorporate *sensory seeking* needs into safe & fun activities that provide the desired intensity of the sensory input

  - Create more *functional* & appropriate ways to allow for *sensory seeking* behaviors in the classroom
Sensory Strategies (Visual Sensitivities)

Decrease visual input & minimize visual clutter:

• Position child close to the teacher & at the front of the classroom
• Ensure classroom desks are clean & clear; with only the necessary materials
• Define visual space & keep it consistent
  *E.g.* *same desk*
• Use a *study carrel* or a *folding privacy screen*
Sensory Strategies (Visual Sensitivities)

**Techniques**

- Add cabinets with doors
- Add simple shelves with uniform bins
- Cover materials with solid curtains
- Use solid rugs
- Decrease patterns & pictures on the walls & ceiling

Consider lighting in the classroom

- Seat child away from the window
- Cover florescent classroom lights with a *light filter* or use *dim light bulbs*
- Provide child *tinted glasses* or *sunglasses*
- Paint classroom walls/ceilings cool, calm colors
Sensory Strategies (Visual Seeking)

Build toys that provide visual input into functional play activities:

- Bubbles
- Lava lamps
- Glitter wands
- Strobe lights
- Bright flashing toys
- Spin tops
- Kaleidoscope
- Pinwheels
- Balloons

Sensory Strategies (Audio Sensitivities)

Remove sources of unpredictable noise in the classroom

- Seat child close to the teacher & away from door/hallway
- Provide noise canceling head phones, ear buds or ear plugs
- Provide access to a space for a quiet retreat if child shows signs of becoming over aroused
- Quiet retreat – sensory calming items (bean bag chair, pillows, stuffed animals, books)
Sensory Strategies (Audio Sensitivities)

Provide child with warning when there will be increased noise

*E.g.* Fire alarm

- Warn child prior to entering a noisy environments & slowly encourage participation in such environments

![Visual schedules](image1)

![Visual timers](image2)

Useful for providing predictability & to decrease anxiety

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Sensory Strategies (Tactile Sensitivities)

Encourage exploration of new textures at child’s own pace

- **Tactile bins** – cornmeal, oatmeal, water, sand, lentils
- **Treasure hunt** – hide small objects in Play-Doh or tactile bins
- **Draw/print** – in finger paint, foam soap or shaving cream
- **Feelie bag/book** – different textures
Sensory Strategies (Tactile Seeking)

Incorporate fidget toys that provide tactile input into functional play activities:

- Silly putty
- Stress balls
- Soft/squishy/stretchy toys
- Slinkys
- Fidget for your digit
- Pencil fidgets
Sensory Strategies (Proprioceptive / Vestibular Seeking)

*Sensory break activities* can be incorporated into child’s school day to provide required sensory input. These can be completed prior to higher demanding tasks & spread out throughout the entire day.
Sensory Strategies (Proprioceptive / Vestibular Seeking)

**INDOORS**
- Scooter board - pushing with arms/legs
- Therapy ball activities – bounding up/down in seated position
- Carry a heavy back pack
- Jumping on a trampoline
- Rocking chair

**OUTDOORS**
- Hang from monkey bars
- Climb on playground equipment
- Throw/kick or push large exercise ball

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Sensory Equipment (Movement)

- Trampoline
- Scooter board
- Exercise ball
- Heavy backpack
- Theraband
Sensory Equipment (Seating)

- T-stool or NeoRok Stool
- Peanut ball
- Ball chair
- Rocking chair
- HowdaHUG chair

Sensory Equipment (Cushions)

- Wedge cushion
- Disco sit cushion
- Senseez vibrating cushion
Life Skills

Self Care Skills
toileting, grooming, dressing

Fine Motor Skills
bilateral coordination, dexterity

Gross Motor Skills
postural control / stability,
muscle tone, strength

Sensory Systems
Visual, auditory, tactile, gustatory, olfactory,
proprioception, vestibular

Gross Motor Development
Foundations for gross motor development

- Muscle tone
- Strength (*upper limbs, trunk, arms*)
- Postural control & Stability
Muscle Tone

Children with DS exhibit low muscle tone, where muscles have less tension & feel “floppy”

- Muscle tone is what enables us to keep our bodies in a certain position
- A child with low muscle tone may need to exert more effort when doing an activity to activate their muscles
- As a result may have difficulty maintaining their postural stability & may fatigue more quickly due to the extra effort required

Muscle Strength

Children with low muscle tone often display:

- Decreased muscle strength
- Decreased activity tolerance & endurance
- Rounded shoulder posture

All these physical factors contribute to reduced ability to sustain a proper posture to meet the demands of an activity

A stable base of support is necessary to facilitate hand function for fine motor tasks
Postural Support & Stability

Important to provide proper postural support while seated due to child’s low tone & hypermobility

A stable base of support is necessary to facilitate hand function for fine motor tasks
▪ Stability begins at the trunk progressing to\n  \textit{elbow} \rightarrow \textit{wrist} \rightarrow \textit{hand}

Supportive seating - Supporting an upright posture may improve muscle tone
▪ Pressure distribution
▪ Decreases fatigue & strain
▪ Decrease tendency to ‘lock’ joints

Gross Motor Activities

Increase \textit{muscle tone}
▪ 10 star jumps
▪ Jumping jacks
▪ Running on the spot
▪ Stomping, jumping rope
▪ Ball games – catching, throwing, bouncing

Improve \textit{strength & postural control}
▪ Animal walks
▪ Wheelbarrow / Scooter board races
▪ Playground equipment – climbing, swings, monkey bars
▪ Yoga
Positioning

Floor time / Circle time

Avoid ‘W’ sit – this doesn’t engage the core

- Does not allow for development of strong trunk muscles
- Strain on hips & knees
- Restricted movement at the hips
- Inability to rotate upper body
- Difficult to reach across the body
- Difficult to shift weight

Different seating options (carpet circles, disco sit, supportive seat)
Alternate Postures

'Scriss-Cross Apple Sauce'  
Long Sitting  
One leg bent

Sitting against a wall can provide more support

Floor & Circle Time Seating

Howda HUG Chair  
Disc-O-Sit  
Carpet Circles  
Bean bag chair
Positioning

Proper Chair Size
- Feet flat on floor
- Ankles, knees, hips bent at 90 degrees

Proper Chair Position
- Seated comfortably, bend forward at the waist leaving a small space
- Arm should be 30 degrees angle from the body

Proper Desk Size
- The height of the top of the desk should be approx. 90 degrees
- Arms rest comfortably on desk top
- Clearance for knees, thighs/feet

Increasing Muscle Tone

Warm up activities / stretches
- Yoga, animal walks
- Therapy ball exercises
- Chair push ups, jumping jacks, cleaning chalkboard

Frequent breaks – prevent fatigue
- Stand up and stretch / March in place
- Music / dance / singing breaks
- Play Simon Says
Exercise

Positioning Equipment

- Stool
- Adjustable desks
- Adjustable chairs
  - Supportive Cushions
  - Supportive Wedge
- Easels or slant boards
Stools

Jett Step Small Wooden Footrest

Collapsible Foot Stool

Adjustable Desks

Classroom Select Classic Study Top Desk

Classic Square Table

Adjustable Height Folding Table
Chairs

Classic Birch Transition Chairs

Adapted Setup

Cushions & Wedges

Position wedges/cushions

Foam Cushions

Foam Wedges

Howda HUG Chair
Easels & Slant Boards

- Slant Script Board
- Double Adjustable Easel

Life Skills
- Self Care Skills: toileting, grooming, dressing

Fine Motor Skills
- *bilateral coordination, dexterity*

Gross Motor Skills
- postural control/ stability, muscle tone, strength

Sensory Systems
- Visual, auditory, tactile, gustatory, olfactory, proprioception, vestibular

Developmental Progression
Fine Motor Development
Performing functional tasks through small movements of the hands, wrists & fingers
• Drawing & Printing
• Cutting
• Fasteners (buttons and/or zippers etc.)
• Eating with utensils

Fine Motor Development
• Foundational skills are important for FM development
• Children build on previously learned skills as they progress towards more complicated tasks
• Children will best learn skills through meaningful activities

Building blocks of optimal fine motor development:
◦ Tactile perception
◦ Postural control
◦ Bilateral coordination
◦ Dexterity
Tactile Perception

• **Tactile perception** involves sensory receptors sending information to the brain about what the fingers and hands are touching.

• Touch sensation enables us to feel things, and to understand what we feel making it an important component for developing FM skills

• Helps the child learn to guide their finger movements so that fine motor skills can be more automatic

**Difficulties with tactile perception:**
- Appear clumsy and drop objects
- Hold pencils very tightly
- Issues with pencil pressure

Develop Tactile Perception

Providing children with a variety of sensory experiences where they can feel and do with their hands

• Better able to anticipate, discriminate and adjust their hand and arm muscles in response to sensory input

**Activities** can include:
- Hand and finger massages prior to fine motor activities
- **Tactile adventure bins** – sand, cornmeal, lentils
- **Treasure hunt** – hide small objects in playdoh
- **Finger painting** – paint, foam soap, shaving cream
Postural Control

Ability to stabilize the body by integrating sensory input about body position with the motor output to coordinate the action of the body’s muscles

Important for:
1. Effective writing, drawing and cutting skills
2. Sit up in a chair without slouching
3. Sit cross-legged on the floor
4. Using the right amount of pencil pressure and pressing down on the paper

Bilateral Coordination

Use of both sides of the body together in a coordinated manner to perform a functional task

Developmental Progression

**Gross symmetric bilateral skills**
- Holding objects with 2 hands, clapping, banging objects together

**Stabilize object with one hand while manipulating with other**
- Holding a container while putting an object in it

**Complementary two hand use**
- Manipulating objects with both hands simultaneously
Development Of Bilateral Coordination

Gross symmetric bilateral skills
- Playing with toy instruments; banging drums, triangle, cymbals
- Playing catch / throw games to encourage coordinating both hands

Stabilize object with one hand while manipulating with other
- Stringing uncooked pasta on yarn or beads on pipe cleaners/ string

Complementary two hand use
- Pinching, pulling, squeezing, play-doh (finding hidden objects, etc.); as well as using the play-doh “tools”
- Snipping/ cutting with scissors- yarn, string licorice, play-doh, construction paper (thicker), coupons, etc.
Dexterity

**Skillful, precise and efficient hand movements**

- Grasp *(pencil, utensil use etc.)*
- Finger Control and Coordination
- Hand and wrist movements

**Importance of dexterity**

Accomplish functional tasks such as dressing, feeding, and school related Activities *(printing, coloring, cutting)*

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### Developing Dexterity

- **Puzzles**
- **Wind Up Toys**
- **Toys with buttons / switches**
- **Play Doh Embedded beads/marbles**
- **Finger Rhymes**
- **Action Songs**
Fine Motor Skills

- Pencil Grasp / Dominance
- Pre-printing Skills
- Printing Skills
- Drawing & Coloring
- Cutting Skills

Grasp Development
Development of functional tripod grasp
Developing Tripod Grasp

• Play with puzzles that have pegs for the children to grasp
• Build with Legos
• Playing games like *Operation* with tweezers to manipulate items
• Crafts
  o Tearing paper to make a collage
• Squirt toys

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Hand Dominance

• Refers to the consistent favouring of one hand over the other for the skilled part of an activity
• Typically begins to emerge in pre-school years and established by Kindergarten

**What is Crossing Midline?**

• One hand spontaneously moves over to the opposite side of the body
• Before this develops, children use the left hand on the left side of the body and the right hand on the right side of the body
• Crossing the midline needs to be established so the dominant hand receives the practice it needs to become skilled
Development Of Hand Dominance

Adapt the environment to facilitate crossing the midline of the body:

For example

1. Wiping down large tables
2. Draw/trace large Figure 8’s
3. Ball passing games
4. Worksheets or drawings

Pre-Printing Development

Children begin experimenting with colors and strokes on paper – working on directing their hands

Developmental Sequence

- *Scribbling & random marks on paper*
- *Separate strokes: vertical, horizontal lines*
- *Diagonal lines: X and +*
- *Simple shapes: square, triangle*
- *First letters: capital letters of name*
Printing – Teaching Sequence

1. Tracing
2. Imitating
3. Copying
4. Printing Independently

Fine Motor Warm Ups

Activities to increase *muscle tone*

Shoulder warm ups:
- *Chair or desk push ups*
- *Shoulder shrugs*

Arm and hand warm ups:
- *Playdough, plasticine or theraputty* – roll, pinch, squeeze, pound and make sausages, balls and pinch
- *Spray bottles* – water plants or make pictures by squirting water on the concrete
- Dig a small patch in the garden
Printing Strategies

Handwriting Without Tears
- Build letters
  - Wooden letter pieces
  - Roll a dough letters (Playdoh)
- Stamp and see screen
- Big line, little lines, big curve, little curve

Wet dry try
- Slate chalk board
- Sponge cubes
- Little chalk pieces
Drawing Development

Developmental progression in **drawing**

- Scribbles, traces of movement, and linear strokes
  1. **Intentional figures**
     - Generic circle for face; lines for arms & legs
  2. **Recognizable figures**
     - More parts, accuracy in placing parts, may resemble subject
  3. **Figure in Scene**
     - Dimensional figure with familiar objects

Coloring Development

**Ability to color a picture**
- Covering large paper with color
- Coloring medium sized area
- Coloring small design with attention to detail

**Ability to use color**
- Using color randomly / 1 per picture
- Using some colors appropriately
- Using colors appropriately

**Ability to control stroke**
- Coloring with random lines
- Accommodating paper to fit stroke direction
- Adjusting stroke to fit area
Developing Drawing & Coloring

**Drawing**
- Introduce shapes and strokes in developmental order
- Build Mat man *(HWT)*
- Sing along CD *(HWT)*
- Step by step drawing

**Coloring**
- Use *wiki stix* or *bold outlines* to teach coloring inside the lines
- Provide coloring opportunities in different mediums
  - Paints, pencil crayons, markers, colored chalk
  - Large barrel crayons / markers for smaller hands
- Use vertical surfaces
  - Slant boards, easels or taping a picture to a wall

Adaptive Equipment
Printing, Coloring, Drawing

- *Pencil grips*
- *Triangle Pencils*
- *Twist n’ Write Pencils*
- *iPad Stylus*
- *Slant Board*
- *Wiki Stix*
- *Easel*
Cutting Development

Developmental sequence
Interest
Holding
Opening & Closing
Snipping
Cutting Forward
Cutting a Line
Cutting Straight-Edged Shapes
Cutting Rounded Shapes
Cutting Complex Designs
Cutting Other Materials

Develop Cutting Skills

Fine Motor Games
Squeeze Games
Tweezer games
Ripping Paper
Adapted Equipment

Choice of Scissors
- For small hands use scissors that don't require a lot of movement to open/close
- Metal blades work better than plastic *(with rounded tips for safety)*

Paper
- Paper with slightly heavier weight and stiffness is easier to cut when in the learning stage

Learning Strategies
- Motivation
- Visuals
- Task Analysis
- Grading
- Backwards Chaining
Learning Strategies

Motivation

- Provide social praise, reinforcements & rewards
  - Preferred toys
  - Favourite activities
- Make it fun!
- Children learn best through play
- Incorporate preferences

Create routines & use repetition to teach new tasks

Children with DS are visual learners

- Use visual schedules
- First → Then visuals
- Visual choice boards
Teaching Skills – Task Analysis

Task analysis is the process of breaking a skill down into smaller, more manageable components.

**Step By Step**
1. Break down the task into small steps
2. Determine which step the child is having trouble with and begin support there
3. Use sufficient supports at first, then slowly fade to promote independence (maximal to minimal support)

**Grading**
1. Progressively increasing or decreasing the difficulty, duration or frequency of a task/activity

Task Analysis

**Handwriting**

**Steps**
1. Sitting at a table / desk
2. Holding pencil in one hand
3. Stabilizing paper with helper hand

**Skills needed**
1. Maintain proper posture at table or at a desk
2. Use hands in coordinated manner
3. Manipulate writing tool
4. Hand & finger strength
5. Visual motor skills
Task Analysis - Handwriting

Child's skills
- Ability to attend to the task
- Ability to maintain their posture & hold a writing tool
- Functional pencil grasp for printing

Adapt Task
- Providing the 'Just Right Challenge'

Task Analysis - Example

Putting on a jacket

1. Orient the jacket
2. Put right arm in
3. Put left arm in
4. Pull to shoulders
5. Grasp zipper
6. Hook zipper
7. Grasp jacket
8. Zip up zipper
Teaching Skills - *Backwards Chaining*

Breaking down the steps of a task and teaching them in reverse order – motivates and facilitates success

**Putting on Jacket**
1. Orient the jacket
2. Put right arm in
3. Put left arm in
4. Pull to shoulders
5. Grasp zipper
6. Hook zipper
7. Grasp jacket
8. Zip up zipper

Help kids perform steps 1-7 and then let them complete the task by performing step 8

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When to Consult an OT?

A few signs that a child may benefit from OT:

- Hesitates to climb on playground equipment
- Difficulty learning a new motor task or appears clumsy
- Dislikes or has difficulty completing puzzles
- Has difficulty with small manipulative toys
- Difficulty cutting with scissors, drawing or printing
- No clear hand dominance
When to Consult an OT?

- Avoids getting hands messy
- Difficulty using a spoon, fork or cup
- Difficulties with toilet training, dressing or grooming tasks
- Does not accept changes in routine
- Overly sensitive or heightened reactivity to any sensory system (sound, touch, or movement)
- Constantly moving, jumping, crashing and bumping into things
- Inability to calm down once upset
Equipment Resources

School Specialty Canada
  ◦ www.schoolspecialty.ca

Wintergreen Learning Materials
  ◦ www.wintergreen.ca

Flaghouse
  ◦ www.flaghouse.ca

Odin Books
  ◦ www.odin.com

References


References


Questions?