

Does
your **CHILD**
have **DIFFICULTY**
with **PRINTING**
and hand **WRITING?**

Occupational Therapy Can Help

Printing and Handwriting programs are based
on developmental, cognitive and sensory
motor approaches.

Location: West Vancouver
3 children per group; 12 sessions, once/week
cost: \$425 including screening
Summer camp and spring break programs available

for more details and to register contact

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Skilled Kids Occupational Therapy
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OCCUPATIONAL THERAPY PROGRAMS

KINDERGARTEN READINESS

MULTISENSORY PRINTING WORKSHOP

MULTISENSORY HANDWRITING WORKSHOP

Course Administrator: Mahshid Hosseini MSc(OT)

Location: West Vancouver

Frequency:

- Weekly during the school year
- Summer camp and Spring break programs available

Cost per child: \$425

Number of children per group: 3

Number of sessions: 12

Children's age group for kindergarten readiness: 4-6 years of age

Children's age group for printing workshop: 6-9 years of age

Children's age group for handwriting workshop: 8-12 years of age

Program Goal: To optimize children's printing and handwriting skills using sensory integration and sensorimotor approaches.

The programs are based on sensory-motor and multisensory approaches. Children who have difficulties with written output, fine motor performance and children with learning difficulties, DCD, ADHD and /or developmental delays could highly benefit from the workshop.

There is a lot of research in effectiveness of occupational therapy in schools. Handwriting and printing problems are very common reasons for referrals as they are foundation skills for literacy and learning. Occupational therapists generally have a long waiting list of clients and many parents are interested in a 12 week work shop that is cost effective and utilizes a hands-on approach to teach their children.

Kindergarten Readiness

Designed for children in their pre-kindergarten and kindergarten year, this program focuses on multisensory mechanism and sensory motor performance components that underlie fine motor coordination and printing.

Special attention is given to:

- Strengthening of upper body
- Enhancing fine motor skills (scissoring, building, coloring, handling of small objects)
- Improving visual motor control (e.g. making strokes, shapes, tracing and copying)
- Strategies to improve pencil grasp
- Improving visual perception
- Improving posture
- Letter and number recognition
- Learning letters of child's name and capital letters



During this program, children are assisted through a combination of approaches to improve pre-requisite skills to printing. Sensory Integration, sensory motor, neurodevelopmental, bio-mechanical, cognitive and behavioural frames of references are used to teach children. A developmental program based on the book “handwriting without tears” is utilized.

Printing Workshop

Designed for children in grades 1- 3, this program focuses on multisensory mechanism, sensory motor performance components and ergonomic factors influencing written output.

The developmental printing programs, “Proud to be Printing” and “handwriting without tears” are utilized.

The following will be addressed: Strengthening of upper body, posture, enhancing fine motor skills, improving visual motor coordination (e.g. copying of shapes, letters and drawing through paths) ,Increasing in-hand manipulation skills (handling of small objects in the palm) , and visual-spatial awareness.

Special attention is given to:

- Improving strength of upper extremity and posture
- Pencil grasp
- Correct letter and number formation

- Sizing and alignment of letters
- Spacing between letters and words

During this program, children are assisted through a combination of approaches to improve letter formation, legibility and speed of handwriting. Sensory Integration, sensory motor, neurodevelopmental, bio-mechanical, cognitive and behavioural frames of references are used to teach children. A developmental program “Proud to be Printing” is utilized.



Handwriting Workshop

Designed for children in grades 3-5, this program focuses on multisensory mechanism, sensory motor performance components and ergonomic factors influencing written output.

The following will be addressed: Strengthening of upper body, posture, enhancing fine motor skills, improving visual motor coordination (e.g. copying of shapes, letters and drawing through paths), ,Increasing in-hand manipulation skills (handling of small objects in the palm) , and visual-spatial awareness.

Special attention is given to:

- Improving strength and posture
- Pencil grasp, pencil pressure
- Correct letter and number formation
- Sizing and alignment of letters
- Spacing between letters and words

During this program, children are assisted through a combination of approaches to improve letter formation, legibility and speed of handwriting. Sensory Integration, sensory motor, neurodevelopmental, bio-mechanical, cognitive and behavioural frames of references are used to teach children. A developmental handwriting program, “handwriting without tears” is utilized.



Factors relating to Handwriting/Printing performance

Many factors relating to handwriting performance are cited in the literature (Hosseini, 2000). These factors can be broadly categorized into three groups:

1. Sensory Motor components that are intrinsic to the child.
2. Ergonomic factors that are in the child's environment.
3. Instructional practice.

1. Sensory motor performance components are intrinsic to the child and are pre-requisite skills and building blocks to learning pre-printing, printing and handwriting skills. Sensory motor difficulty is the inability to process sensory information adequately, which leads to difficulty with executing motor activities such as printing and handwriting. Sensory motor performance components include: visual motor control, eye-hand coordination, visual perceptual skills, kinesthetic abilities, in-hand manipulation, stereognosis, handedness, crossing the body midline, and motor planning.

2. Ergonomics is the study of work which involves interaction between human capabilities and the demands of a task such as handwriting (Smith, 1989). A number of ergonomic factors influence a child's sensory motor abilities and production of written output. These include desk size, desk surface support, writing instrument, paper surface, paper position, lines, room temperature, lighting, adaptive devices, and adaptations to the environment.

3. Instructional practice. The instructional programs used by occupational therapists are based on developmental and acquisitional theories. Handwriting as a complex skill and can be improved through practice, repetition, feedback and reinforcement. Developmentally speaking some letters are harder than others. The harder ones are those which have diagonal lines, are reversible, or change direction during a stroke. Children gradually develop the ability to copy forms in certain order. Capital letters are easier to learn than lower case letters as they are all the same height, all start at the same place, all occupy the same vertical place and are easier to recognize and identify (Olsen, 1994). Some of the letters such as "o, l or t" are easier to learn than "a, q, or g". Use of developmental programs therefore would simplify learning.

Cognitive and Behavioral status of a child are also considered when designing an intervention program (Hosseini, 2000).

FRAMES OF REFERENCE

The following frames of reference are used to teach Pre-printing, Printing and Handwriting Skills:

Sensory Integration and Multisensory

The ability of human to use his/her hand with the dexterity and skill to perform a task such as handwriting is a result of major changes in the control of the extremities by the central nervous system. The primary cortex contains neurons that make direct connections with motor neurons that control the muscles of the hand through the pyramidal tract (Henderson & Pehoski, 1995). The input from the motor cortical neurons underlies the ability to control muscles of the hand and allows the fingers to move individually or in combination, with speed and accuracy. The somatosensory input from the periphery is sent to the primary somatosensory cortex and then transfers to the primary motor cortex through corticocortical pathways. Many neurons in the primary motor cortex that initiate muscle responses respond to the somatosensory input from the periphery (Henderson & Pehoski, 1995). Sensory input, therefore is critical during the learning of a new skill and without somatosensory input the actions of the hand are severely limited.

When a child performs as complicated task such as handwriting, sensory and motor information need to be integrated. The integration of the sensory modalities take place in the primary somatosensory cortex. Handwriting is a very complex task and is as a result of interaction of primary motor mechanisms, sensory mechanisms and integration of sensory information. All of these systems need to be intact in order to produce legible handwriting (Henderson & Pehoski, 1995).

The sensory input includes a number of sensory mechanisms such as visual, tactile, kinesthetic and auditory. Input from all these modalities, multisensory input, enhances the motor response by activating a great number of motor neurons. Research suggests that multisensory writing programs that are aimed at improving handwriting, employ various sensory modalities through the use of activities. The use of various sensory modalities improve feedback from the sensory systems. This supports the use of multisensory programs to remediate the writing problems of children with sensory motor difficulties (Oliver, 1989).

Many children with handwriting difficulties demonstrate sensory motor problems (Case-Smith et al., 1996; Lockhart & Law, 1994). Sensory motor difficulty is defined as the inability to process sensory information adequately leading to difficulty in the output of appropriate motoric responses (Lockhart & Law, 1994). Sensory motor difficulties may be due to problems with any of the three areas of primary cortex mechanisms, sensory mechanisms and integration of sensory information. Children with sensory motor problems may have difficulty with taking in, assimilating and interpreting sensory information. They may also have problems with the organization of sensory information into meaningful motor patterns (Case-Smith et al, 1996). For example, they may have problems with planning movements or executing them, they may be slow at planning and carrying out an unfamiliar action, and they may have difficulty with precision and accuracy when engaged in an activity such as handwriting. Furthermore, children with sensory motor problems may have problems with their

neuromuscular abilities which include muscle tone, strength, endurance, postural alignment and control (Case-Smith et al.,1996; Reed, 1991)

Research has supported effectiveness of OT intervention to improve the sensory motor difficulties and the effect of multisensory programs on improving letter formation and handwriting performance (refer to the list of references for supporting research) (M. Hosseini, 2000).

Multisensory approach utilizes all senses in the learning process and is the most effective method to teach printing/handwriting. Multisensory approach provides multiple sensory cues and addresses the fact that children have strengths in different sensory areas. The sensory mechanisms include:

Proprioceptive: The sensory system which detects limb position and movement.

Kinesthetic: The sensory system which detects movement and the effects of gravity. Feedback from large joints and muscles regarding how the letter strokes are formed in space.

Tactile: Sense of touch. Feedback from the skin receptors provides extra information on pressure, and light touch.

Visual: Sense of sight. This sense enables us to see and process visual input.

Auditory: Sense of hearing. This sense enables us to hear verbal cues regarding direction of movement (Hosseini, 2000).

Sensory-motor

Sensory motor performance components include the following:

Motor Planning: Motor planning is ability to plan movements. Motor planning is a complex process, which begins with the idea of performing a certain action, breaking it down to small components and executing the motor action. To increase motor planning, a child has to constantly be exposed to movements that are not familiar to him in a graded (gradual) manner.

Fine –motor control: Is the ability to control small muscles of our hand required to perform fine tasks such as manipulating objects in our palm, building, coloring and printing.

Visual Motor Control: This is the ability to see and translate what we see to movement. It is the ability of eye to guide hand movement. It is required to trace or cut a line, copy a shape or print.

Visual Perception: Refers to the process which we see and process visual input. We constantly process and analyze what we see; much of what we learn comes in through the visual channel. Visual perception can be looked at in a lot of ways. “Discrimination” is our ability to see details and decided what is the same and different about what we see. Visual spatial awareness (three-dimensional awareness) is the ability to perceive differences in position of details, while visual memory refers to our ability of remember what we process visually. Visual closure is the ability to “see” the “whole” when only part is visible. Visual figure ground is the ability to see a stimulus, when a lot of distracting, extraneous input is mixed in with it. Visual Perceptual abilities are required to write and read.

Handedness: Is the development of the dominant hand that one uses for handwriting. Dominance needs to be established prior to teaching printing or handwriting.

Crossing the body mid-line: The ability to cross the body mid-line is required to teach diagonal letters and letters with curves.

Stereognosis: Is the recognition of familiar objects by the hand without use of vision. (Hosseini, 2000)

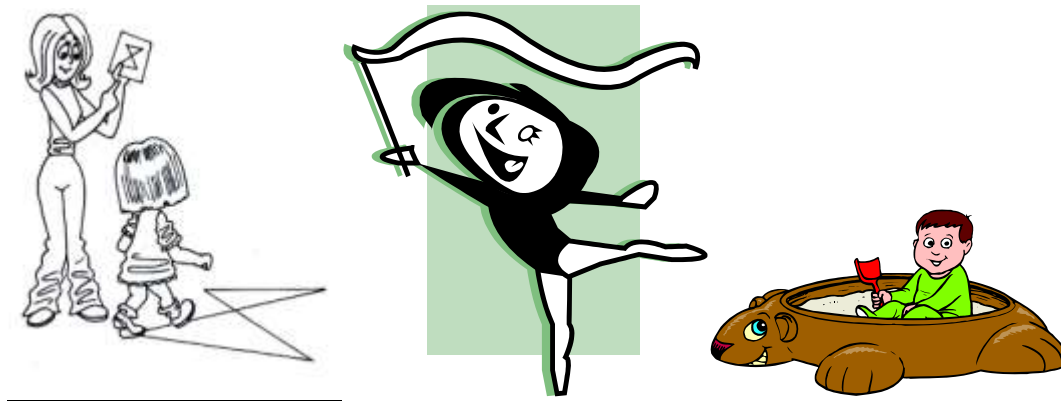
Neurodevelopmental

This frame of reference addresses poor postural control, proximal stability, cocontractions through the neck, automatic reactions, and arm control. Decreased, increased or fluctuating muscle tone, inadequate righting and equilibrium responses, and poor proximal stability may interfere with successful performance in fine motor activities and written output. Preparing the child's body for handwriting should be the preliminary ingredient of handwriting intervention, occurring approximately 5-10 minutes prior to instructional program begins (Case-Smith et al.,1996).

Biomechanical

This frame of reference addresses range of motion, strength, and endurance. Strength refers to the degree of tension created in muscles and is closely related to the amount of work that muscle can do. In addition endurance is a quality of strength which relates to how long muscles can work before giving out or becoming fatigued. For example, in writing on an easel, strength is not only needed to manipulate the fingers, but to hold the shoulder girdle in a stable position. Strength of core muscles is required to maintain an upright posture when writing.

Ergonomic factors are addressed as part of Biomechanical frame of reference.



Other information about the program

Children will learn printing and handwriting skills while having fun. The programs use a child friendly playful approach to learning. Many of my private clients are sad when their printing program is over and feel very proud about their accomplishments at the end of the program. They are provided with certificates at the end of each level and a final certificate for completing the program. The program utilizes a reward system to reinforce self-confidence and joy of learning.

About the course administrator:

Mahshid is the owner of Skilled Kids Occupational Therapy practice and has over 10 years of experience in pediatric occupational therapy.

Mahshid's Master's thesis was in the area of handwriting and printing performance of children with sensory motor difficulties. Through her own research, an extensive literature review and clinical experience working with children in schools, Mahshid has developed a broad knowledge of pre-printing, printing and handwriting skills of children with sensory motor difficulties.

Bachelor - Occupational Therapy, University of Western Ontario
Masters - Rehabilitation Science, Queen's University

Registered with the College of Occupational Therapists of British Columbia; and British Columbia Society of Occupational Therapists.

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Case-Smith J (2007) Effectiveness of school-based occupational therapy intervention on handwriting. *American Journal of Occupational Therapy* ;56 (1):17-25

OBJECTIVE: This study investigated the effects of school-based occupational therapy services on students' handwriting. **METHOD:** Students 7 to 10 years of age with poor handwriting legibility who received direct occupational therapy services (n = 29) were compared with students who did not receive services (n = 9) on handwriting legibility and speed and associated performance components. Visual-motor, visual-perception, in-hand manipulation, and handwriting legibility and speed were measured at the beginning and end of the academic year. The intervention group received a mean of 16.4 sessions and 528 min of direct occupational therapy services during the school year. According to the therapists, visual-motor skills and handwriting practice were emphasized most in intervention. **RESULTS:** Students in the intervention group showed significant increases in in-hand manipulation and position in space scores. They also improved more in handwriting legibility scores than the students in the comparison group. Fifteen students in the intervention group demonstrated greater than 90% legibility at the end of the school year. On average, legibility increased by 14.2% in the students who received services and by 5.8% in the students who did not receive services. Speed increased slightly more in the students who did not receive services. **CONCLUSION:** Students who received occupational therapy services demonstrated improved letter legibility, but speed and numeral legibility did not demonstrate positive intervention effects.

Case-Smith J (2007) Effects of occupational therapy services on fine motor and functional performance in preschool children. *American Journal of Occupational Therapy* ;54 (4):372-80

PURPOSE: This study examined how performance components and variables in intervention influenced fine motor and functional outcomes in preschool children. **METHOD:** In a sample of 44 preschool-aged children with fine motor delays who received occupational therapy services, eight fine motor and functional performance assessments were administered at the beginning and end of the academic year. Data on the format and intervention activities of each occupational therapy session were recorded for 8 months. **RESULTS:** The children received a mean of 23 sessions, in both individual and group format. Most of the sessions (81%) used fine motor activities; 29% addressed peer interaction, and 16% addressed play skills. Visual motor outcomes were influenced by the number of intervention sessions and percent of sessions with play goals. Fine motor outcomes were most influenced by the therapists' emphasis on play and peer interaction goals; functional outcomes were influenced by number of sessions and percent of sessions that specifically addressed self-care goals. **CONCLUSION:** The influence of play on therapy outcomes suggests that a focus on play in intervention activities can enhance fine motor and visual motor performance.

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Miller L, Anzalone M, Lane S, Cermak S, and Osten E (2007) *Concept Evolution in Sensory Integration: A Proposed Nosology for Diagnosis*. *American Journal of Occupational Therapy* Vol 61 No 2, 135-140. This article defines terminology for Sensory Processing Disorder diagnosis for eventual inclusion in the Diagnostic and Statistical Manual V.

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OBJECTIVES: This study examined the relationships between sixth-grade students' handwriting speed and legibility and their keyboarding speed and error rate. A second purpose was to examine how well handwriting performance discriminates students as slow or fast in computer keyboarding. **METHOD:** After participation in a school-required keyboarding class, 40 sixth-grade students were asked to copy a familiar poem using handwriting and keyboarding. Handwriting legibility and speed and keyboarding speed and errors were measured. Relationships among these variables were analyzed using Pearson product-moment correlations and discriminant analysis. **RESULTS:** Keyboarding speed correlated with handwriting legibility ($n = 38$, $r = .361$, $p = .026$), suggesting that handwriting performance accounts for 12% to 13% of the variance in keyboarding performance. Handwriting speed and legibility together accurately categorized 71% of students as slow or fast in keyboarding. On average, students were able to keyboard faster than handwrite. Of the 20 slowest handwriters, 75% achieved more text production with keyboarding than with handwriting. **CONCLUSION:** Keyboarding performance demonstrated low to moderate correlation with handwriting performance, suggesting that these forms of written expression require distinctly different skills. Most students who were slow at handwriting or had poor legibility increased the quantity and overall legibility of text they produced with a keyboard. These results suggest that keyboarding has the potential to increase and improve a student's written output.

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