



MULTIPLE STRATEGY INTERVENTION FOR EXERTING MORE PRESSURE IN WRITING: A SINGLE - CASE STUDY

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Introduction:

Handwriting is an important skill for school-aged children. Legible handwriting is more important to express, communicate our own thoughts, ideas and learned concepts as well as for educational development. (1) It can be viewed as an occupational performance and it is an expected skill necessary for functioning in mainstream education. (2)

Handwriting is one of the complex task which many performance components like Fine motor control, bilateral and visual-motor integration, motor planning, in-hand manipulation, proprioception, visual perception, sustained attention, sensory awareness of the fingers (3) (4) and tactile, kinaesthetic sensitivities. Good handwriting requires maturation and integration of these components as well as motor planning and control of spatial, temporal and force elements inherent in this task. (2)

As Handwriting is being considered as a functional activity which makes impact individual's satisfaction, creativity, productivity and academic performance, it is an essential to consider. (2) Other than academic performance, it determines child's self-esteem level. (3) In addition to these, 30% to 60% of children's school days are spent in the performance of fine motor tasks, consisting primarily of handwriting. (5) Hence, it is considered as an important area to find various intervention strategies for handwriting training.

Development of handwriting occurs at various level and age group. Generally, child learns to draw vertical strokes at 2 years of age, followed by horizontal strokes at 2 years 6 months, and circle at 3 years. Imitation of cross typically occurs at 4 years, copying square at 5 years and triangle at 5 years and 6 months. (3)

As it is mentioned, handwriting is a complex task and which needs integration between the components, some children may find difficult to produce legible handwriting due to kinaesthetic feedback, poor visual perception, and problems in visual-motor integration, fine motor skills, and motor planning are factors often cited in the literature to account for handwriting difficulties. (6)

Handwriting difficulties may be the result of intrinsic factors as well as extrinsic factors also like include sitting position, chair/desk height, writing instrument used type of paper used and its placement on the desk, environmental lighting and noise and blackboard distance also affects handwriting performance. (3)

Slow handwriting, illegible handwriting, exerting more pressure or less pressure in writing are common problems in handwriting tasks. According to Levin 1987, children have impaired kinaesthetic feedback; exert excessive pressure on the pencil which serves to provide increased kinaesthetic feedback. The result of this compensation is an inability to attain the dynamic tripod grip, and need constantly to do visual monitor of their work and their writing becomes laborious rather than automatic. (7) Smits et al mentioned in their study that 12% to 30% of children fail in the motor learning of handwriting (8).

There is evidence indicates that 10 to 30% of school children have handwriting difficulties and do not resolve it without proper interventions. (3) Difficulty with handwriting or drawing is often why children in public schools are referred for occupational therapy service. (9) More number of clients is being referred to occupational therapy services for fine motor problems as well as handwriting problems from public schools. (1) (10)

Handwriting evaluation traditionally does by comparing to a series of graded samples, legibility of letters, and speed of writing. (11) Sometimes, screening tools may be used for evaluation to distinguish handwriting problems. Other than these, quantitative or standardised scales, some informal method of handwriting evaluation also felt important to the overall process. It gives more information about varies aspects of writing components like attention, behaviour and paper angle. (2) In a cross- Canada survey of occupational therapists formal handwriting assessments were rarely used, possibly reflecting lack of availability of evaluation tools. (3)

Occupational therapist has unique role in doing handwriting evaluation, they find the deficits in postural, motor, and sensory integrative, sensorimotor, perception or behavioural elements which may be interfering with legible handwriting performance. (2) (12)

Feedback is considered here as sensory information that arises from movement (13). Not properly processing the feedback generated by handwriting movements could result in poor handwriting and hence impact the academic success of the child. (4)

Considering motor skills in general, based on memorized information, it is distinguished as proactive control and retroactive control. Proactive refers to the components of the movement that are anticipated and prepared before the movement. Retroactive refers to all the aspects of the movement which have to be controlled during ongoing movement of the basis of sensory feedback. Skilled handwriting in particular involves with proactive as well as retroactive model. (4)

Based on Motor control domain, Knowledge of the Results is provided after the performance of action, Knowledge Performance can be provided either after or during the performance. Note sometimes therapist give on-line feedback, when they give a verbal comment about the movement or when they hold the writer's hand to mimic the expected movement in order to make them feel the correct movement. Two types of sensory feedback visual and proprioceptive are naturally used in handwriting training. (4)

In principle, tactile perception conveyed by cutaneous receptors is not directly included in proprioception. However, it cannot be considered separately from proprioception, because when patients lose proprioception, they also lose tactile perception. Tactile feedback from skin receptors can inform about the pressure exerted by the fingers onto the pen and thus about the forces exerted during handwriting. Researchers observed that blocking cutaneous sensation (tactile) did impair the ability to write, as judged by an increase in the movement time and in acceleration fluctuations. These findings highlight the importance of touch in handwriting. (4)

Occupational therapy, handwriting interventions are based on Sensory Integration approach, biomechanical approach, neuro developmental approach, sensorimotor approach, perceptual-motor approach, motor learning and teaching-learning strategies. (2) (3) (9) Occupational therapist designs activities to improve the performance components that appear delayed and seem to be interfering with handwriting skill. (14)

Many Occupational therapists' intervention is based on clinical judgement and clinical reasoning. Although, practice in handwriting is certainly one strategy, it may be more effective when paired with multiple strategies like i. teaching techniques that capitalize on the child's strengths, ii. Remediation procedures that develop foundation or performance components or iii. Compensation methods. (1) (14)

Ergonomics factors are those that relate to design of tools, tasks, jobs and environments for safe, comfortable, and effective human use. In fact, clinicians and researchers have noted that biomechanical ergonomic factors related to body position and pencil use are characteristic of non-proficient hand writers. (5) Advantages of using a pen rather than a pencil, was that the point was always the same and never had to be sharpened. (9) Researchers encourage children who demonstrate very poor graphomotor skills to use smaller diameter implements, which may elicit higher level grips.

Heavy pressure through the writing instrument can slow writing output significantly. We know that many children with dyspraxia struggle to monitor pressure through their limbs due to what is termed poor proprioception, therefore we need to help the child to develop an awareness of amount of pressure placed through the upper limb. (15)

Heavy pencil pressure may be because the child has poor awareness of finger placement and movement or poor control of the smaller muscles of the hand. Some ideas for helping the child:

- ✓ Use pencil which tip break easily so the child has to lean to control the amount of pressure used. (16)
- ✓ Verbal cues "to write lightly" prior to writing may be helpful. (16)

Case Report:

An 11 year-old boy, diagnosed as Learning Disability, referred to Department of Occupational Therapy for handwriting training, for exerting more pressure in writing. During the interview process, his mother reported that he gave more pressure due to writing, and took more time to complete the writing task.

A list of 20 words were given him to write, he took 198 seconds to complete, during the task, tip was broken for 6 times. In addition to these, Subjective evaluation was done about the writing impressions on the following note papers, writing time and number of time tip broken were evaluated and then multiple strategy based handwriting training was given for 30 minutes session for weekly twice, 6 weeks at Department of Occupational therapy.

In order to provide awareness about exerting more pressure, Microtip (0.5) pencil was given for his writing, when he gave more pressure to write, the tip would break. In addition to these, verbal cues were given to prompt him to provide appropriate pressure. Further to these, tactile input (pressure) was used as physical prompting as well as somatosensory input to exert appropriate pressure in writing.

After 6 weeks of intervention program, the same 20 words list was given him to write, he took 107 seconds to complete, and during writing he didn't break the pencil tip. Further to these, a significant improvement was seen in the writing impression on the following papers.

Conclusion:

In our society, handwriting means it is a necessary life skill as well as communication. (6) Hence, it was decided to find out effective handwriting training to avoid exerting more pressure in writing. With the references to the supportive researches, reviews and clinical judgement, multiple strategy intervention was developed for handwriting training. One of the strengths of the training is, it showed better result in short duration intervention and easy to train with less resource, even possible to provide as Home program. The changes in the exerting pressure shows impact on the writing speed. The findings suggest that when a student is identified as exerting more pressure in writing, the intervention strategy in this study may be an effective intervention for the problem.

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