



TO STUDY THE EFFECTIVENESS OF “SOMSHRI KIT: THE HAPPY HANDWRITER- A PATH TO INDEPENDENCE” IN THE MANAGEMENT OF HANDWRITING DIFFICULTIES IN SCHOOL GOING CHILDREN AGED BETWEEN 06-12 YEARS

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Abstract. The development of writing ability isn't only important in building a child's self-esteem, but is taken into account an important ingredient for fulfillment in class. Children spend 31 to 60% of their school day performing handwriting and other fine motor tasks, and difficulty during this area can interfere with academic achievement. Frequently, children who got to pay considerable attention to the mechanical requirements of writing have difficulty with other higher-order learning processes, like dictation or story writing, reading, spelling, comprehension, mathematics and other academic learning. Illegible handwriting can create a barrier to accomplishing other higher-order skills like spelling and story composition. Problems with handwriting are one among the foremost common reasons for referring school-aged children to Occupational therapy. **Objective:** To find the efficacy of “SOMSHRI KIT: The Happy Handwriter- A path to Independence” for the subjects with handwriting difficulties. **Methods:** Thirty regular school going students aged between 06-12 years participated in the study. The students have handwriting difficulties. **Results:** Result reveals that there was significant improvement in pencil grip, Children's Posture and Handwriting Skills of subjects with handwriting difficulties. Large percentage of children had dynamic tripod pencil grip. Handwriting style of 63% (N=19) children was manuscript and 37% (N=11) children had cursive handwriting format. **Conclusion:** The study showed that “SOMSHRI KIT: The Happy Handwriter- A path to Independence” was effective in children with handwriting difficulties.

Index Terms: Handwriting, Pencil Grip, Handwriting Skills, Occupational Therapy, etc

INTRODUCTION

Handwriting is a complex process of managing written language by coordinating eyes, arms, hands, pencil grip, letter formation and body posture. (American occupational therapy association-2019). With respect to children, academic school activities can be considered as a major domain of their occupational work performance. Handwriting is an important tool that enables the expression, recording, and transmission of ideas of students throughout their educational careers. It has been estimated that elementary school-age students may spend up to one-quarter to one-half of their school day engaged in paper-and-pencil tasks, with writing as the predominant task.

It is reported that the prevalence of handwriting difficulties among school-age children varies between 10%–34% depending on grade, selection criteria, and instruments used. The handwriting difficulties can be characterized by inappropriate spacing between letters or words, improper letter formations, size, alignment, poorly graded pencil pressure/pencil holding, poor writing speed, letter inversions, and mixing of different letter forms (i.e., script and square).

Trunk control becomes a more significant issue when writing skills move from scribbling to more complex coloring and letter formation. To begin writing tasks the child must be able to sit independently. The child must be seated correctly with their feet on the ground (or a stool or footrest) and a table at an appropriate height. The table height should be slightly above the kid's bent elbow position when the child is seated. If the table is too low or too high it will affect the child's pencil control. The development of pre-writing, coloring and handwriting skills rely heavily on the development of upper limb joint stability at the shoulder, elbow and wrist. Without good upper limb joint stability it will be difficult to control the writing tool within the hand effectively. When one hand is consistently used quite the opposite hand and has more control and skill then it's considered to be the dominant hand. Hand dominance is much more beneficial for a child to develop strength and dexterity in one hand as this will develop accuracy and speed with fine motor tasks especially handwriting. The other non-dominant hand plays a crucial role because the "helper" hand and this could be encouraged. The helper hand is important for stabilizing the page.

Pencil grip is very important component of handwriting; pencil grip problems can affect child's academic performance at school. The most efficient thanks to hold a pencil is that the dynamic tripod grasp where the pencil is positioned between the thumb and index with pencil resting on middle finger. All children love to colour. Colouring skill is a crucial skill because it are often wont to help develop pencil grasp, pencil control and awareness of boundaries within an image and prepares the kid for handwriting.

Scissoring skills play an important role in development of handwriting skills. The opening and shutting motion of cutting with scissor helps children develop the tiny muscles in their hands, which are crucial for holding pencil and crayon. It also helps in developing eye-hand coordination and bilateral coordination.

There are various approaches, adaptive devices, procedural adaptations and environmental modification used by occupational therapist to address handwriting difficulties. Several curriculum-based handwriting programs have been developed like Handwriting without Tears, the Write Start program, Braingym Program. Developmental and remedial procedures for teaching and letter formations used by occupational therapists are modelling, physical prompts and cues, tracing, copying, self-verbalization, repetition, self-correction and reinforcement.

Occupational therapy models of practice that guide services to improve handwriting includes: neuro-developmental (postural and arm preparation activities), sensori-motor (multi-sensory systems are tapped within handwriting program to enhance learning) and biomechanical (ergonomic factors such as sitting posture, paper position, pencil grasp, writing instruments and type of paper can influence writing quality).

Objectives of the study are:-

- To assess the Pencil Grip ,Posture and Handwriting Skills.
- To find the efficacy of "SOMSHRI KIT: The Happy Handwriter- A path to Independence" for the subjects with handwriting difficulties.

HYPOTHESIS

Experimental Hypothesis:- "SOMSHRI KIT: The Happy Handwriter- A path to Independence" helps in reducing Handwriting difficulties in school going students.

Null Hypothesis:- There will be no effect of "SOMSHRI KIT: The Happy Handwriter- A path to Independence" in reducing Handwriting difficulties in school going students.

METHODOLOGY.

STUDY DESIGN: Pretest- Posttest, Experimental, Prospective, Single centre

SAMPLE DESIGN: Thirty subjects with handwriting difficulties were taken, which Consisted of both boys & girls.

SAMPLING : Random Sampling

Independent variable: "SOMSHRI KIT: The Happy Handwriter- A path to Independence"

Dependent variable : Hand writing Difficulties

Subjects. The subjects of this study were 30 regular school going children from the area of South District of Delhi. These children had no learning, physical, or behavioral problems, as reported by their parents or classroom teachers. Fifteen boys and 15 girls had handwriting difficulties. The above classification of good or poor handwriting skills was made by the child's teacher and by three independent raters. The teacher and the three raters were asked to rate the child's handwriting on the basis of six characteristics judged to be either good or poor (Rubin & Henderson, 1982). The raters used a handwriting sample of a copied sentence and the printed alphabet obtained from each subject. The children who received a rating of poor handwriting were taken for the study. Inclusion of each child in the study required that at least two of the three raters agree with the teacher's classification of poor handwriting.

OUTCOME MEASURES/SCALES

1. **Schneck and Henderson's (1991) developmental grip scale.** Schneck and Henderson's (1990) developmental grip scale describes 10 pencil and crayon grips and in 1991 she collapsed the 10 grips in the original scale into five levels. Pencil grip posture was assessed with a 5-point scoring system with 5 being the very best score possible.
2. **New York posture rating scale (NYPR):** It is cheap, easily and rapidly applicable postural assessment method. The rating chart is used to assess 10 areas of body and a score is allocated as: 10 (correct posture), 5 (fair posture), and 0 (poor posture). The scores of the 10 body alignment segments are summed, allowing a range of overall score between 0 and 100, with a score of 100 representing ideal posture.
3. **Test of Handwriting Skill- Revised (TSH-R):** The THS-R is a standardized test developed by Michael Milone, to measure how a child writes with his or her hand, letters and words and sentences and numbers, either spontaneously or from dictation or by copying and can be

administered individually or to a group of children with age range up to 18 years, 11 month. This test includes 10 subtests and comprised of both manuscript and cursive method of writing. The THS-R also assesses writing speed, letter reversal, and case substitutions.

PROCEDURE:

- Permission was taken from the principal of the school and also from the parents of each subject.
- The teacher was asked to rate the child's handwriting as either good or poor .
- A total of 30 Subjects aged between 06 to 12 years participated in the study, which consisted of both boys & girls.
- Students were asked to fill all the three scales. Firstly, the child was requested to perform the developmental grip scale from which pencil grip and posture were observed and recorded. Secondly, New York posture rating scale was administered to determine the ideal posture. Thirdly, the child was administered Test of Handwriting Skill- Revised for evaluation of manuscript and cursive method of writing. The THS-R also assesses writing speed, letter reversal, and case substitutions.
- After the pre-test measures the child was given intervention using the “SOMSHRI KIT: The Happy Handwriter- A path to Independence”
- After the intervention, post –test measures were taken.

“SOMSHRI KIT: The Happy Handwriter- A path to Independence”

Occupational therapists can also design many kind of therapy tool kits depending upon the need of child (fine motor, gross motor, visual motor, dressing, oral motor, etc.). Occupational therapy tool kits are a great way to make a therapist’s job easier when planning, preparing and documenting. These kits are great way for therapists to have what they need in an organized kit and ready to use with many kids at any time⁸. Hence, a self designed kit was made depending upon the needs of the children.

MATERIALS REQUIRED INCLUDED:-

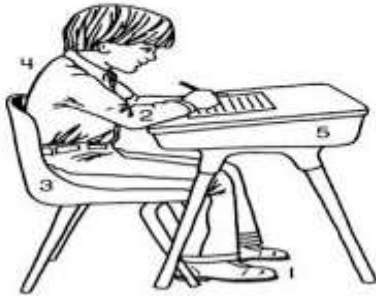
- Medium beads
- Thread
- Cloth pins
- Clay
- Tissue paper
- Rubber band
- Markers
- Paper bracelets
- Highlighted tapes
- Smiley ball with written letters
- Finger spacer
- Socks
- Introduction cards
- Glitter bordered shapes
- Work sheet
- Sand paper scrap book.



DIMENSIONS OF BOX Size: 34cm x 24cm x 14cm




The Subjects were given the following intervention five times a week for one hour daily for a duration of two and a half months.

S.NO	HANDWRITING COMPONENT	EQUIPMENT	PURPOSE OF EQUIPMENT	ILLUSTRATIONS
1.	Writing posture	Flash cards	To influence the efficiency of writing process and final handwritten product	<p>GOOD POSTURE</p> <ol style="list-style-type: none"> 1. Both feet on the floor 2. Elbows off edge of desk 3. Sit back in the chair 4. Shoulders slightly forward 5. Proper desk height  <p>GOOD HANDWRITING</p>

2.	Paper position	Flash cards	Proper angling of paper and stabilizing paper with non-dominant hand to facilitate proper hand and wrist position while writing.	
3.	Pencil grip	PG1-Socks PG2-Moldable gripper using clay PG3-Thick gripper/crayon PG4-Beads /clip activity PG5-Thick Marker	Facilitate ideal grasp (Tripod grasp). To improve legibility, speed and accuracy of writing.	
4.	Writing tool position	WT1-Rubber band gripper WT2-Cloth pin pencil grip	Writing tool angled appropriately on paper	

5.	Hand dominance	Paper/ craft bracelets	For developing hand preference in child.	
6.	Letters Identification	LI1-Introduction cards LI2-Letters on smiley ball	To make child familiar with letters	
7. LEGIBILITY				
	Letter formation	LF1-Sand paper scrap book LF2-Powder tray	To emphasize the starting point and direction of strokes in letters. Concept of standing and sleeping line, slant line and curves.	
	Alignment	A1-Lined paper (with highlighted lines) A2-Shapes with glitter boundary	To facilitate colouring, writing within lines (concept of top, middle and bottom lines)	

				
	Spacing	Finger spacer	To facilitate spacing between letters and words	
8.	Orientation	O1-Highlighter tape O2-Star stickers	To facilitate Top-Bottom and Left- Right concept	
9.	Writing pressure	WP1-Clay writing WP2-Tissue paper writing	For appropriate pressure of writing tool on writing surface.	

10.	Scissoring	Safety scissors	For developing scissoring skills	
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DATA ANALYSIS

Complete data was gathered in the form of a master chart made on Microsoft Excel 2010. The statistical analysis was conducted using Statistical Package for the Social Sciences 21 (SPSS v.21). Statistical significance at $p \leq 0.05$ was assumed. A paired-samples t-test was conducted to analyse the effect of SOMSHRI kit on posture alignment and handwriting skills. Descriptive analysis included percentages, means and SD.

RESULT

Table 1: Participant Characteristics (N = 30)

CHARACTERISTICS	FREQUENCY	Percentage
Age (M = 8.9 years, SD = 1.86 years)		
6 years old	5	16.6%
7 years old	5	16.6%
8 years old	5	16.6%
9 years old	4	13.3%
10 years old	6	20%
11 years old	3	10%
12 years old	2	6.6%
Gender		
Girls	16	53%
Boys	14	47%
Grade Level		
First	5	16.6%
Second	5	16.6%
Third	4	13.3%
Fourth	6	20%
Fifth	6	20%
Sixth	4	13.3%
Handwriting Format		

Manuscript	19	63%
Cursive	11	37%
Handedness		
Right	24	80%
Left	6	20%

Table 2: Percentage Analysis

PERCENTAGE ANALYSIS				
	Pre		Post	
	Frequency	Percentage	Frequency	Percentage
NYPR SCORE-(Postural alignment)				
Poor Posture	20	67%	2	6%
Fair Posture	4	13%	5	17%
Good Posture	6	20%	23	77%
Pencil Grip Score				
Static Grip	13	43%	5	17%
Four Finger Grip	5	17%	2	6.5%
Crossed Thumb Grip	5	17%	2	6.5%
Lateral Tripod Grip	4	13%	4	13%
Dynamic Tripod Grip	3	10%	17	57%

Table 3: T test values for different factors

Variables (N=30)	PRE	POST	t- value	Significance level
	M±SD	M±SD		
NYPR	47.93±11.93	60.33±12.58	11.01*	0.000**
TEST OF HANDWRITING SKILL				
MEMORY	77.7±14.74	92.6±17.33	9.26	0.000**
DICTION	87.66±13.29	95.10±12.07	15.66	0.000**
COPIED	91.96±13.34	97.93±12.39	8.60	0.000**

*: significant at 0.05 level, **: significant at 0.01 level, NS: not significant

RESULTS AND DISCUSSION

PARTICIPANTS

A total of 30 (n=30) children from school participated in the study. The mean age of children was 8.9 years (M = 8.9 years, SD = 1.86 years). Out of 30 children 53% (N=16) were girls and 47% (N=14) were boys. 80% (N=24) were right handed and 20% (N=6) children were left handed. Handwriting style of 63% (N=19) children was manuscript and 37% (N=11) children had cursive handwriting format. Bensen and Geschwind (1968) suggested that a child who develops a hand preference early is likely to develop motor activities demanding coordination and fine dexterity earlier than a child who develops hand preference late.

PENCIL GRIP

A developmental scale of pencil and crayon grips developed by Schneck and Henderson (1991) was used to assess children's pencil grip. Our data showed that larger percentage of children had static tripod pencil grip before implementation of treatment. Out of 30 children, 43% (N=13) had Static Grip, 17% (N=5) had 4 finger grip, 17% (N=4) had crossed thumb grip, 13% (N=4) had lateral tripod grip, 10% (N=3) had dynamic tripod grip.

When the effectiveness of SOMSHRI kit on children pencil grip was assessed it was found that there was significant improvement in pencil grip with larger percentage of children had dynamic tripod pencil grip. 17% (N=5) children had Static Grip, 6.5% (N=2) had 4 finger grip, 6.5% (N=2) had crossed thumb grip, 13% (N=4) had lateral tripod grip, 57% (N=17) had dynamic tripod grip. This is supported by Colleen M. Schneck (1991), Rosenbloom and Horton (1971), who proposed that a relationship exists between the development of a preferred hand and the development of the dynamic tripod grip. This proposition was documented in an earlier study (Schneck, 1989). This finding suggests that hand preference should be evaluated in children with low pencil-grip scores.

POSTURE

New York posture rating scale was used to assess children's Postural Alignment. The participants overall (summed) score ranged from 34-75 before implementation of treatment and 35-95 after treatment implementation on scale of 0 (poor) to 100 (ideal posture) and 50 representing (fair posture). Result showed that 67% (N=20) children had poor posture, 13% (N=4) had fair posture and 20% (N=6) had ideal posture before implementation of treatment.

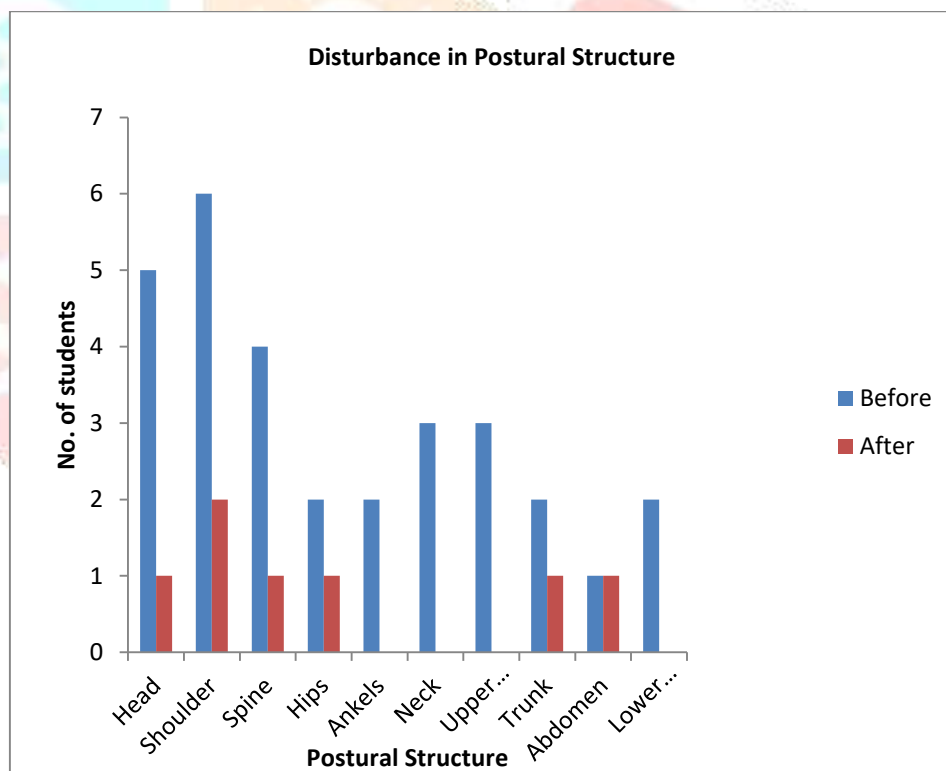
When children used SOMSHRI kit it was found that there was significant improvement in children's posture with 6% (N=2) children had poor posture, 17% (N=5) had fair posture and 77% (N=23) had ideal posture before implementation of treatment. Poor body positioning may be a manifestation of atypical muscle tone that impacts on the child's ability to stabilize aspects of the upper trunk and arm while simultaneously moving other body parts (Tseng & Cermak). In fact, the results of a recent study by Smith-Zuzovsky and Exner (2004) indicated that optimal body positioning is a significant factor in determining performance in in-hand manipulation skills, something which would seem to be highly relevant in the performance of handwriting tasks. In addition, the researchers observed that children with poor positioning moved frequently in their seats in an attempt to find a more stable and/or comfortable seating position. They suggested that poor body positioning of schoolchildren not only affects the quality of their performance as a result of the biomechanical constraints, but that their attention to the tasks may have been negatively affected. Obviously attention to task is a critical factor in performance of complex activities such as handwriting.

Mean overall postural alignment score for children before treatment was 47.93 (SD=11.93) and after treatment was 60.33 (SD=12.58), significant difference in mean score is showing the significant improvement in postural alignment.

Result of paired t-test comparison revealed a significant difference ($p < 0.5$) in overall postural alignment before and after treatment, $t = 11.01$, $p = 0.00$.

Disturbance in Postural Structure on New York posture rating scale before and after the treatment.

Postural structure	Before	After
Head (Left/ Right)	5	1
Shoulder (Left/ Right)	6	2
Spine (Left/ Right)	4	1
Hips (Left/ Right)	2	1
Ankles	2	0
Neck	3	0
Upper Back	3	0
Trunk	2	1
Abdomen	1	1
Lower Back	2	0



HANDWRITING SKILLS

Handwriting skill was assessed using Test of Handwriting skill, which incorporates 10 subtests that uses memorized, dictated and copied stimuli to elicit written number, letters and words. In the current study we compared the student's handwriting performance on:

MEMORY SUBTEST: (1, 2), DICTATION SUBTEST: (3-4 and 10), COPYING: (6-9).

Study showed the many improvement in Handwriting Skills of youngsters before and after the treatment ($t=8.60$, $p=0.00$). Our hypothesis suggest that children receiving intervention would show significant improvement in Handwriting skills compared to those that didn't receive intervention. Sandler et al. found that children with writing disorders had a bent towards lower mathematics achievement, low verbal IQ, and increased attentional difficulties compared with controls. the rationale underlying a child's writing difficulty may often be unclear as elements of the writing process are closely interwoven, e.g. difficulty in spelling can contribute to difficulty in note-taking or expression of ideas. No other school task requires the maximum amount synchronization as handwriting. it's clear writing difficulties can overshadow a child's capabilities in other areas, making success at college less easily attainable. Children with handwriting problems typically have

difficulty maintaining with the quantity of written work required during the grade school years, which can impede academic progress and cause lowered self-esteem and behavioural problems. In fact, it's common for these children to be mislabeled as noncompliant, lazy, or lacking motivation, which causes further frustration and disappointment. Handwriting is usually judged and seen as a mirrored image of an individual's intelligence or capabilities as illustrated by several studies during which lower marks were consistently assigned to students with poor handwriting and better marks given to those with legible handwriting despite similar content.

CONCLUSION

The experimental hypothesis of the study was accepted and null hypothesis was discarded. The result of this study revealed that **“SOMSHRI KIT: The Happy Handwriter- A path to Independence”** significantly reduces the handwriting problems in school going children between the age group 06 to 12 years.

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