

# Evaluation of the Effectiveness of Craft Activities (Finger Painting and Origami) to Improve Fine Motor Skills in Children with Developmental Delay

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## Abstract:

### ➤ *Background:*

Fine motor skills are essential for tasks like writing, drawing, and self-care, and are crucial for cognitive and social development. These skills may develop more slowly in children with developmental delays, affecting academic performance and daily functioning.

### ➤ *Aim and Objective:*

To find the effectiveness of craft activities in improving fine motor skills in children with developmental delay.

### ➤ *Materials and Methods:*

A quasi-experimental (pre-test and post-test) design was employed to evaluate the effectiveness of craft-based activities in improving fine motor skills in children with developmental delays. The study included 15 children aged 2-5 years diagnosed with developmental delay. Participants underwent a 6-week intervention with 5 sessions in a week, each lasting 45 minutes, involving finger painting and origami. Fine motor skills were assessed using the Peabody Developmental Motor Scale-2 (PDMS-2), administered both before and after the intervention to evaluate improvements in grasping and visual-motor integration.

### ➤ *Results:*

Data analysis using the SPSS software showed significant results, with a p-value of 0.001 for the Peabody Developmental Motor Scale-2 (PDMS-2). This is considered statistically significant as the p-value is less than 0.05.

### ➤ *Conclusion:*

The findings demonstrate that the craft activity has a significant positive impact on fine motor skills in children with developmental delays, as the mean score increased from 61.20 in the pre-test to 65.40 in the post-test, with a t-value of -7.359 and a p-value of 0.001, indicating the effectiveness of the intervention.

**Keywords:** *Developmental Delay, Fine Motor Skills, Craft Activity, PDMS-2.*

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## I. INTRODUCTION

### ➤ Human Development

Human development involves physical, cognitive, and psychosocial changes that occur throughout a child's life. These developmental areas generally progress sequentially and independently over time, and they also interact and influence one another, specifically around the fourth week of gestation. It continues throughout pregnancy with rapid growth in early childhood. This growth remains active through adolescence and into the mid-20s, with ongoing development throughout a person's lifespan. (6)

### ➤ Developmental Delay

Developmental delay occurs when a child does not reach developmental milestones at the expected time compared to peers within the same age range. Based on severity, developmental delay can be classified into three categories:

- Mild (functional age less than 33% below chronological age),
- Moderate (functional age 34%-66% of chronological age), and
- Severe (functional age less than 66% of chronological age). (Ying Ying Choo, 2019)

Developmental delay may affect a single domain, referred to as isolated developmental delay, or multiple domains called as global developmental delay (GDD). Global developmental delay is a significant delay in two or more developmental domains in children under five years of age. Abnormal developmental patterns can also include developmental disorders, developmental arrest and regression, and developmental disabilities. (1)(2)

### ➤ Fine Motor Skills

Fine motor skills are vital for children's overall development. At the age of 3-4 years, there are various fine motor skills developmental milestones that should be achieved, such as using precision (tripod) grasp on pencil or crayon, colouring within lines, copying simple shapes; copying letters, using scissors to cut, cutting simple shapes, constructing three-dimensional design (e.g., three-block bridge) and manipulating objects within the hand. (8)

At the age of 4-5 years, the child should be able to draw using a dynamic tripod grasp, copying simple shapes, completing puzzles of up to 10 pieces, using scissors to cut out square and other simple shapes, colouring within the lines, using two hands together well, one stabilizing paper or object and the other manipulating object, draw stick figure or may begin to draw trunk and arms, copying own name, stringing small beads and dressing and undressing without help (8). These abilities significantly influence many daily tasks and support their independence. These skills involve the coordination of small muscles, particularly in the hands and fingers. The development of fine motor skills is influenced by the maturation of the central nervous system and the variety of motor experiences a child engages in.

### ➤ Fine Motor Skills in Developmental Delay

Motor delays are the first or most obvious sign of global developmental delays. A study shows that fine motor delays are common in different developmental disorders, highlighting that fine motor skills are an important but sensitive area of development in children with delays. (5) Craft activity for fine motor skills (origami and finger painting). Origami is the Japanese art of folding paper to create formed objects, such as flowers, insects, and other objects (Sriwahyuni et al., 2020). According to a different viewpoint, origami is a paper-based handicraft method used to make toys, decorations, useful items, props, and other inventions. (3) Fine motor movements involved in folding activities are precise actions that engage specific body parts and are controlled by small muscles. (7) Children's social skills and physical motor development both can be enhanced by origami play. The art of origami involves precise folding of paper, requiring a high level of focus and coordination between the eyes and fingers. Additionally, its benefits include enhancing memory, developing fine motor skills, and improving concentration and patience.

Finger painting is another method to help toddlers develop their fine motor abilities, which involves painting directly with the finger over a flat surface, such as paper, and letting the colour mixture run freely on paper, helping the child to explore free ideas to develop his fine motor skills. Children can feel the sensation on their fingers when they paint with their fingers because this is a hands-on activity. Children find finger painting to be a fairly simple activity. It helps to improve a child's fine motor skills. Using their hands and fingers, as well as having significant importance in building their coordination, encouraging feelings associated with hand movements, and helping them express themselves through media that uses hand movements.

### ➤ Aim and Objectives

#### • Aim:

- ✓ To evaluate the effectiveness of craft activity (origami and finger painting) to improve fine motor skills among children with developmental delay.

#### • Objectives:

- ✓ To assess (pre-test) fine motor skills in children with developmental delay using PDMS-2.
- ✓ Intervention was provided using origami and finger painting activities for fine motor skills.
- ✓ To reassess (post-test) fine motor skills in children with Developmental delay using Peabody developmental motor scale-2 (PDMS-2).
- ✓ To compare pre-test and post-test scores to establish the effectiveness of craft activity.

### ➤ Need of the Study

The prevalence of developmental delay in India is 14.9%, with global developmental delay at 3.5% and fine motor delay at 5%. Fine motor skills are essential for daily

activities, and delays in their development can impact a child's functional independence. Engaging children in creative activities such as finger painting and origami can be an effective way to improve fine motor skills. These activities enhance hand strength and coordination and provide a fun and engaging medium for therapy. This study aims to explore the effectiveness of craft activities (origami and finger painting) to improve fine motor skills among children with developmental delays.

## II. REVIEW OF LITERATURE

- A study was conducted by Aghnia Nur Anisa et al., (2021) to evaluate the effect of origami activities on fine motor skills development in children aged 4-5. Using an experimental one-group pre-test and post-test design, 15 children participated in the study. Data were collected using observation and documentation, with assessments based on 18 indicators of achievement and a four-point Likert scale. The pre-test findings indicated that children's motor skills were in the "Starting to Develop" (MB) category, with an average score of 26 out of 72. Following the intervention, which consisted of four origami sessions, the children's skills improved to the "Developing as Expected" (BSH) category, with an average post-test score of 58 out of 72. The post-test outcomes showed that 6.67% of children remained in the "Starting to Develop" category, 40% were "Developing as Expected," and 53.3% were "Well Developing." The study concluded that origami activities effectively enhance fine motor development in children.
- Arfan Syahroni et al., (2023) conducted a study on How Origami Games Help Stunted Children (ages 3-5) Develop their Fine Motor Skills. This quasi-experimental study uses a non-randomized control group pretest-posttest design to examine the impact of origami activities on the fine motor skills of stunted children aged 3-5 years. The intervention group (30 participants) engaged in origami activities for 1 hour daily over 14 days, while the control group (30 participants) received no intervention. Fine motor skills were assessed before and after the intervention using questionnaires and observations. A paired t-test was used to analyze differences in fine motor scores between the groups. This study concludes that origami activities can enhance fine motor development in children with stunting.
- Sulistiyowati (B) et al., (2023) conducted a study on the impact of origami play on preschoolers' fine motor development at Putra Buana Kindergarten in Lamongan Regency. Preschool is a time for the development of fine motor abilities. Origami activities' impact on preschoolers' fine motor development is examined in this study in Indonesia. It employed a one-group pre-test and post-test strategy in a pre-experimental design. Additionally, there were 47 preschoolers at Putra Buana Kindergarten, ages 3-6. Using basic random sampling, 42 children made up the sample. The Denver II Developmental Screening Test was the tool. It shows that, before the intervention, 25 respondents were suspected to have delays in fine motor

development, while 17 respondents displayed normal development. Following the intervention involving origami games, 30 respondents demonstrated normal fine motor development, whereas 12 respondents were still suspected of having delays. Thus, it may reduce the likelihood of fine motor deficits in kids aged 3-6.

- Maelany et al., (2022) conducted a quantitative case study to evaluate the impact of finger painting on fine motor development in preschool children aged 3-5 years. The study involved five participants, selected based on inclusion criteria such as health and cooperation, with data collected through observations and interviews. Observation sheets and Standard Operating Procedures (SOPs) were used as tools, and results showed that two children demonstrated very good development, one child developed as expected, while two showed no development. The findings suggest that finger painting can stimulate fine motor skills by engaging small muscle movements and supporting nerve development.

## III. METHODOLOGY

- Research Design: Quasi-experimental (single group pre and post-test) design.
- Study Setting: Cross Disability Early Intervention Centre (CDEIC) Occupational Therapy –NIEPMD, Muttukadu Chennai.
- Sampling Technique: Convenience sampling
- Age Group: 3-5 years
- Sample Size: 15
- Sample Population: Children diagnosed with developmental delay

### ➤ Selection Criteria:

#### • Inclusion Criteria:

- ✓ Both genders
- ✓ Children diagnosed with developmental delay
- ✓ Children aged between 3 to 5 years

#### • Exclusion Criteria:

- ✓ Children with physical disability that severely limit hand and finger movement
- ✓ Visual impairment
- ✓ Seizure disorder/ Epilepsy

### ➤ Duration of the Study:

The total duration of the study was 6 months. The intervention was given for 6 weeks, each session carried out 45 minutes for 5 days a week.

### ➤ Variables:

- Independent Variable: Craft activity (finger painting and origami)
- Dependent Variable: Fine motor skills

➤ *Tool Used*

- Peabody Developmental Motor Scale -2 (PDMS-2)

➤ *Intervention Protocol*

Table 1 Finger Painting

	<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>	<b>Week 5</b>	<b>Week 6</b>
First session	Orientation (Free painting)	Rainbow finger painting( dot painting)	Immitating the line pattern (straight, zig zag and curve line)	Making painting patterns on blank paper(star, heart, moon etc)	Painting fruits and vegetable (With an outline)	blending two colours to fill a flower drawing (Free painting)
Second session	Making palm and finger stamps	Rainbow finger painting (dot painting inside given outline)	Immitating basic shapes like circle, square and triangle	Making painting patterns on blank paper ( star, heart, moon etc)	Painting a basic house design (Free painting)	blending two colours to fill a flower drawing (with an outline)
Third session	Making palm and finger stamps	Connecting dots. (Follow line to connect dots)	Immitating basic shapes like circle, square and triangle	Filling colours in basic drawing shapes (large size)	Painting a basic house design (with an outline)	Draw object around
Fourth session	Making tree image (thumb prints)	connecting dots	Creating simple patterns with shapes (square, circle, triangle)	Filling colours in basic drawing shapes (smaller size)	Animal painting (using palm and fingers)	Draw object around
Fifth session	making tree image (thumb prints)	Immitating the line pattern (straight, zig zag and curve line)	Creating simple patterns with shapes (square, circle, triangle)	Painting fruits and vegetables (Free painting)	Animal painting (using palm and fingers)	Creating simple landscape

Table 2 Origami

	<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>	<b>Week 5</b>	<b>Week 6</b>
First session	Paper squeezing with 5 fingers	Paper fan (Imitating instruction)	paper dog face (imitating instruction)	Paper hat (imitating instruction)	Paper fish (imitating instruction)	Paper boat (Imitating instruction)
Second session	Bending a paper producing a crease	Paper fan (with thick colourful paper)	paper dog face (with thick colourful paper)	Paper hat (with thick colourful paper)	Paper fish (with thick colourful paper)	Paper boat (with thick colourful paper)
Third session	Paper folding (Folding paper in half with edges parallel to each other)	Paper fan (With A4 sheet)	Paper dog face (with A4 sheet)	Paper hat ( with A4 sheet)	Paper fish (with A4 sheet)	Paper boat ( With A4 sheet)
Fourth session	Fold paper in four half	Paper fan (With newspaper)	Paper dog (With newspaper)	paper hat (With newspaper)	Paper fish (With newspaper)	Paper boat (With newspaper)
Fifth session	Fold paper in four half	Paper fan (Time limitation)	paper dog face (time limitation)	Paper hat (Time limitation)	Paper fish (Time limitation)	Paper boat (Time limitation)

**IV. RESULT**➤ *Statistical Analysis*

The data was analysed using a paired p-test. Wilcoxon rank test was used to analyse pre-test and post-test, and

SPSS software was used for all analyses. The study aimed to evaluate the effectiveness of craft activity in improving fine motor skills in children with developmental delays. This chapter shows the analysis of the results obtained.

Table 3 Number of Males and Females who Participated in the Study

Gender	Frequency	Percentage
Male	10	66.7
Female	5	33.3
Total	15	100

The total number of participants in the study was 15, 10 males (66.7%), and 5 female (33.3%).

Paired -t / Wilcoxon Signed Rank Test was performed to compare the Pre and post-test scoring regarding Grasping in children with developmental delay at a 5% level of significance was observed.

Table 4 Data Analysis for Grasping

Grasping		Mean	N	Std. Deviation	t - Value/ Z - Value (P - Value)
Raw Score	Pre	39.20	15	1.612	-9.000
	Post	41.00	15	1.604	(0.001)*
Age Equivalent	Pre	13.13	15	1.552	-3.348
	Post	17.60	15	6.116	(0.005)*
Percentile	Pre	0.87	15	1.246	-2.919
	Post	2.13	15	2.386	(0.004)*
Standard	Pre	2.73	15	0.799	-2.972
	Post	3.53	15	1.060	(0.003)*

Indicates Statistically Significant

Paired -t / Wilcoxon Signed Rank Test was performed to compare the Pre and post-test scoring regarding Grasping

in children with developmental delay at a 5% level of significance was observed.

Table 5 Data Analysis for Visual Motor Integration

Visual Motor Integration		Mean	N	Std. Deviation	t - Value/ Z - Value (P - Value)
Raw Score	Pre	93.07	15	9.490	-9.000
	Post	100.47	15	10.350	(0.001)*
Age Equivalent	Pre	24.07	15	4.743	-3.348
	Post	27.73	15	5.946	(0.005)*
Percentile	Pre	3.23	15	1.598	-2.919
	Post	5.20	15	3.509	(0.004)*
Standard	Pre	3.93	15	1.280	-2.972
	Post	4.93	15	0.799	(0.003)*

Indicates Statistically Significant

A paired -t-test was performed to compare the Pre and post-test for Fine Motor Skills in children with

developmental delay at. A 5% level of significance was observed.

Table 6 Data Analysis to Compare Pre and Post-Test for Fine Motor Skills

PDMS-2		Mean	N	Std. Deviation	t -Value/ Z - Value (P -Value)
Total Fine Motor Score	Pre	61.20	15	3.299	-7.359
	Post	65.40	15	4.222	(0.001)*

Indicates Statistically Significant

## V. DISCUSSION

Improving fine motor skills in children with developmental delays. It was conducted in the Occupational Therapy Department, NIEPMD, Chennai. Fifteen children between the ages of 3 and 5 participated in the study. Five of the 15 children were girls, and 10 were boys.

Different patterns were used for training in origami, graded from easy to difficult levels based on the number of steps or folds involved. To ensure effective gradation, a variety of materials were utilised, including thick paper, A4 sheets, and newspaper. Similarly, for finger painting, patterns were graded from simple to complex by varying the shapes and techniques required.



Table 3 presents the gender distribution among 15 children with developmental delay, showing that 5 participants are female, while 10 participants are male.

Table 4 shows the grasping score of pre-test to post-test among children with developmental delay. There were increases in raw scores, age equivalents, percentiles, and standard scores, with statistically significant differences found at the 5% significance level ( $p < 0.05$ ), indicating enhanced grasping abilities. Grasping involves the use of small muscles in the fingers and hands, which are essential for fine motor skills. Activities like finger painting and origami involve moving fingers repeatedly and pressing and handling small objects, which helps to improve grasping abilities.

Table 5 shows the VMI score of pre-test to post-test among children with developmental delay. There were increases in raw scores, age equivalents, percentiles, and standard scores, showing significant improvement ( $p < 0.05$ ), confirming the effectiveness of intervention in enhancing VMI skills. This shows the positive impact of the intervention on fine motor skill development in the participants. Finger painting and origami improve visual motor skills by enhancing eye-hand coordination and fine motor control. Finger painting encourages the use of hands and fingers to shapes and patterns. Origami involves folding paper, which strengthens fine motor skills and the ability to follow visual instructions. these activities help coordinate visual input with physical movement.

Table 6 represents a significant improvement in fine motor skills among children with developmental delays following the 6-week craft-based intervention. This improvement suggests that engaging in craft activities, such as finger painting and origami, effectively enhances fine motor skills. Inne Nurjanah (2023) states that activities such as colouring, squeezing, folding, and drawing play a significant role in helping toddlers develop their fine motor skills.

## VI. CONCLUSION

Fine motor skills are essential for children's overall development and are vital for their ability to perform daily tasks independently. Craft-based activities such as finger painting and origami provide valuable opportunities for children with developmental delays to enhance their fine motor abilities. These activities promote hand-eye coordination, strength, and precision, which are crucial for tasks like writing, dressing, and eating. The findings of this study suggest that craft activities, such as finger painting and origami, can significantly improve fine motor skills in children with developmental delays.

## VII. LIMITATIONS AND RECOMMENDATIONS

### ➤ Limitations:

- The sample population had unequal gender distribution.
- The study was conducted at only one place- NIEPMD

### ➤ Recommendations:

- Craft activities (finger painting and origami) can be used in other conditions to improve fine motor skills
- A large sample size can be considered for the study.

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