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Developing Fine Motor Skills in Preschool Age Children

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DEVELOPING FINE MOTOR SKILLS IN PRESCHOOL AGE CHILDREN

By

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

University of North Dakota

In Partial fulfillment of the requirements for the degree of

Master's of Occupational Therapy



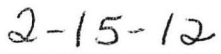
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This Scholarly Project Paper, submitted by Linnea Starkey in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under who the work has been done and is hereby approved.



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ABSTRACT

Based on the findings of the literature review, fine motor skills are an important skill to develop during the preschool years. Marr, Cermak, Cohan and Henderson (2003) described the importance of fine motor skills to engage in valued occupations in addition to educational activities. A child's occupations that demand fine motor skills may be dressing, tying shoes, play, among other daily tasks. If a child has difficulty with fine motor skills it could have a negative outcome on their daily lives and how they perform in school. Children who have difficulty coordinating the small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school (Losse et al., 1991).

The acquisition of fine motor skills is an important aspect of children's developmental growth as fine motor skills enable children to participate in valued occupations in the areas of activities of daily living, education, play and social participation. National education goals describe fine motor skills as one of the dimensions needed by kindergarten children for learning readiness (National Education Goals Panel, 1993).

With opportunities imbedded in their day, preschool children increase the refinement of fine motor skills. Fine motor skills are an important component of handwriting and manipulating classroom objects. Handwriting is both a means of communication and necessary life skill. Handwriting is still the most immediate form of graphic communication (Sasson, 1990).

Research has shown that it is important to develop good writing habits early. Early childhood educators and pediatric occupational therapists should focus on developing fine motor skills in preschool children to enhance readiness for learning (Case-Smith, 2000; Kagan, Moore, & Bredekamp, 1995). Difficulty in fine motor skills can interfere with academic achievement. No other school task requires as much synchronization as handwriting (Levine, Oberklaid, & Meltzer, 1981). Feder and Majnemer (2007) found the percentage of children with handwriting difficulties ranged from 10-30%.

The purpose of this scholarly project is to educate parents, teacher and occupational therapist of the importance of developing good fine motor skills in preschool age children. This will ensure that a child will have the opportunity to reach their maximal potential in the area of handwriting and completing classroom work.

A resource was developed that could be used by parents, educators and daycare providers to promote fine motor skill development in preschool age children. This project is a resource manual that contains fine motor activities that

can be incorporated throughout the day to provide children the opportunities to work on fine motor skills.

The methods used in this project included an extensive review of literature including scholarly articles, books, and educational resources available for teachers and parents. The benefit of this project includes increased awareness about the importance of fine motor skills development in preschool age children and the developmental milestones associated with the age, and activities to incorporate into the daily life to benefit fine motor skill development.

CHAPTER I

Introduction

Occupational Therapists (OT) work in a variety of settings including hospitals, outpatient facilities, nursing homes, mental health facilities, schools and community settings. In the school system, which includes early intervention for children birth to three, the role of the OT in early intervention is to evaluate and assess children. If a child qualifies for occupational therapy services, the OT together with their parents or guardians creates an OT goal for the child. During OT sessions, provided in the child's natural setting of the home or a daycare situation, suggestions and strategies will be provided by the OT to the caregivers in order to allow the caregiver to work on the OT goal with the child between therapy sessions. These suggestions include, but are not limited to, modification or adaptations of tasks or activities. In addition to educating caregivers of developmental milestones for typical development of children through either verbal instructions or handouts, adaptive equipment with instruction or demonstration from the OT may also be given

Statement of the Problem

School readiness has been defined as a process of acquiring the foundational skills needed to learn new activities (Slavin, Karweit, & Wasik, 1994). The U.S. Department of Education and the National Center for Research Statistics have proposed a conceptual framework of readiness (West, 2000). The

framework is based on the assumption that the development of readiness for school begins at birth and continues until the child enters school. The framework identifies the development of fine motor skills as an outcome of growth and development, but this development clearly is influenced by all the other factors in the framework.

Marr, Cermak, Cohan and Henderson (2003) described the importance of fine motor skills to engage in valued occupations in addition to educational activities. A child's occupations that demand fine motor skills may be dressing, tying shoes, playing, and other daily tasks. If a child has difficulty with fine motor skills, it could have a negative outcome on their daily lives and how they perform in school. Children who have difficulty coordinating the small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school Losse et al. (1991).

Purpose of the Product

An educational manual was created to educate parents and childcare workers about the importance of fine motor skill development during the preschool years. Activities and suggestions were given on how to incorporate fine motor activities throughout the day. This manual was created to be used by preschool teachers to integrate fine motor skills into their curriculum. The manual will be provided by the consulting occupational therapist to the preschool teachers. Activities adults could use to encourage children to participate fine motor activities on a daily basis are included and terminology defined.

Preschoolers need daily experience with developmentally appropriate fine motor activities so they can build the confidence and skills they will need later in life (Bredenkamp & Copple, 2009). Children learn pre-writing skills best by participating in play and daily life activities (Benbow, 1990; Case-Smith & Pehoski, 1992; Exner, 2005). Difficulty in fine motor skills can interfere with academic achievement. No other school task requires as much synchronization as handwriting (Levine, Oberklaid & Meltzer, 1981).

According to (Exner, 2005) by the time a child arrives in preschool, most children should be able to perform the following basic fine motor actions.

- 1- Reach: moving his/her arm forward to grasp or touch an object.
- 2- Grasp: using his/her fingers to get an object into his/her hand.
- 3- Carry: using his/her hand to move an object from one place to another place.
- 4- Release: letting go of an object he/she holds in her hand.
- 5- In-hand manipulation: using his/her fingers to adjust an object inside their hand.
- 6- Bilateral hand use: using his/her two hands together in an activity.

Some schools or parents may push for children to begin formal handwriting before the children are developmentally ready to participate in this activity. If children are pushed to write before their hands are physically ready, it may have a negative impact on the children's interest in writing. Preschoolers who have yet to develop the precursors for higher-level fine motor skills are at risk for developing poor pencil grasp, illegible handwriting, and slow handwriting

(Benbow, 1990; Bredekamp & Copple, 2009; Case-Smith & Pehoski, 1992; Exner, 2005).

A study by Myers (1992) suggested that early practice with pencil and markers may result in a poor pencil grasp partly because the child may be using writing tools before his or her hands are ready. If too much pencil work is done with the immature grasp, pencil posture may become fixed at an intermediate level of skills.

Theoretical Model

The educational manual was created based on findings from an extensive review of literature and is guided by the Ecological Model of Human Performance frame of reference. This framework addresses the uniqueness of the circumstance and the person.

The Ecological Model of Human Performance consists of four equally important elements: person, task, context, and performance. This frame of reference is client centered and recognized that each child has specific skills, experiences and interests. The child is surrounded by outside influences including environment, experiences and people around them. Tasks are the steps or the building blocks needed to accomplish a goal or an objective. Context refers to whom or what surround the child. In the Ecological Model of Human Performance there are two types of context, temporal and environmental. The temporal context includes the chronological age, developmental stage, and health status. Environmental is composed of physical, social norms, cultural and religious beliefs. Performance occurs when the child engages in tasks or

activities within the context. When working with preschool children an OT needs to recognize the importance of the environment or context in task performances (Dunn, W., Brown, C., & Youngstrom, M.J., 2003).

The Ecological Model of Human Performance outlines five intervention approaches: establish/restore, adapt/modify, alter, prevent, and create (Dunn, W., Brown, C. & Youngstrom, M.J. 2003). Intervention is directed by what the person wants and or/needs. Using the intervention establish restore strategy, the OT's goal is to improve a child's skills. With young children, a skill will be taught in order to establish a skill. If a skill has been lost the OT would work on restoring the skill. When using the alter intervention strategy, the OT focuses on the context or the environment where the child performs the desired task. The child's skills and abilities are taken into account when determining the best option for the child in regard to context.

Adapt/modify intervention is used to modify the context of performance, specific tasks, and environment to support performance. OTs use the prevent strategy to influence the course of events by changing person, context, or task variables in order to prevent negative outcomes. Create focuses on creating opportunities that support optimal performances. This intervention does not assume that a disability problem exists or is likely to occur. Create strategies maximize performance by targeting person, context, and/or task variables. When using the product they can be modified or adapted in order to meet the specific needs of the child. The manual can also be used to focus on a specific skill(s) in order to develop or refine a skill.

When applied to this scholarly project the Ecological Model of Human Performance addresses the uniqueness of a child. The four elements: person, task, context, and performance take a holistic look at the child. This model considers the relationship among person, task, and context and how these three elements affect performance. In addition it takes into account the adult who is working with the child and what is available in their environment. The child will determine which intervention or combination of interventions will be used.

Summary

Terminology that was used throughout this project is defined in the Appendix A. Chapter II contains the results of the research that was conducted for creating this product. Chapter III describes the methodology that was used to create the manual. Chapter IV is the preschool manual. The final chapter, V, contains the rationale for developing this product and recommendations and instruction for using this product with preschool age children.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Development of appropriate fine motor skills is an important life skill. In early childhood fine motor skills affect everything from completing activities of daily living (ADLs) successfully to manipulating objects to explore their environment. Fine motor skill development is essential for pre-academic and academic skills such as writing, typing and using scissors. Handwriting is an essential skill for early elementary students to develop so that they can actively participate in classroom activities and is a lifetime skill.

Chapter II is a review of literature and research that was the foundational to developing the educational manual. This chapter is divided into sections which address the importance of developing good fine motor skills and poor handwriting and how occupational therapy interventions that may be beneficial to address deficits.

Importance of Fine Motor Skills

Fine motor skills affect every aspect of one's daily life; therefore it is important to develop good fine motor skills. Marr, Cermak, Cohan, and Henderson (2003) described the importance of fine motor skills to engage in valued occupations in addition to educational activities. A child's occupations that demand fine motor skills may be dressing, tying shoes, play, among other

daily tasks. If a child has difficulty with fine motor skills it could have a negative outcome on their daily lives and how they perform in school. Children who have difficulty coordinating the small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school Losse et al. (1991).

The acquisition of fine motor skills is an important aspect of children's developmental growth as fine motor skills enable children to participate in valued occupations in the areas of activities of daily living, education, play and social participation. National education goals describe fine motor skills as one of the dimensions needed by kindergarten children for learning readiness (National Education Goals Panel, 1993).

Inconsistent Fine Motor Development

Darrah, Senthilselvan, and Magill-Evans (2009) completed two longitudinal research studies which involved eighty-three children who had no cognitive or developmental concerns per parent report. In the infant study the children were evaluated at 9, 11, 13, 16, and 21 months of age using the Peabody Developmental Motor Scales (PDMS). In the preschool study, the children were assessed at 4, 4½, 5, and 5½ years of age using the Peabody Developmental Motor Scale, second edition (PDMS-2). When comparing boys and girls in the area of gross motor skills the scores were similar. This was not the case when fine motor tests were given, the girls performed better in the infant and preschool trial.

When reviewing the data the researchers discovered that a typical developmental course for fine motor and gross motor skills is characterized by fluctuations in an individual's percentile scores over time. Over 50% of children in this sample had an absolute change in scores of at least 40 percentiles during the infant assessments. This finding suggests that motor skills emerge at an uneven rate. The researchers point out that clinically the use of norms and the expectation of stable patterns of normative scores in infants persist, especially in the area of developmental screening. It is still widely accepted by persons screening for developmental problems that screening measures can be used by clinicians to predict long-term outcomes based on children's rate of acquisition of specific developmental milestones in early infancy. Parents often assume that their children should maintain the same percentile rank over time on a test, and they need to understand that a fluctuation in percentile rank scores is typical, (Darrah et al., 2009).

The researchers showed there were different growth curves for fine motor and gross motor skills in the infant and preschool data. The age of skill emergence is different for each child. A more accurate indicator of motor skill development may be to look at fine motor and gross motor growth separately instead of a combined category. The data also implies that infant scores cannot be used to accurately predict preschool scores. Preschool data was a better indicator of future success due to the scores being more stable.

Inconsistent Grasp Pattern

A study completed by Yakimishyn and Magill-Evans (2002) looked at grasp patterns of children who were 23 months of age. The children were given the choice of a pencil, marker and crayon. The children were observed writing on a table and on a vertical surface. The researchers found that when the children used a crayon on the vertical surface the children will use a more mature grasp when drawing on a vertical surface compared with a horizontal surface but only when using the crayon. No significant difference in grasp use between table and easel was found with either the marker or the pencil. This study supports Myers' (1992) suggestion that the use of a small piece of chalk on a vertical surface would facilitate a more mature grasp (tripod) in children not yet using a tripod grasp. Myers suggested at 2 years of age, a tripod grasp is not automatically used on a vertical surface without manipulating the tool or instructions. Yakimishyn and Magill-Evans (2002) found that none of the 2 year olds used the same grasp for all 14 trials which included crayons, makers and pencils. Children this age were very variable in the grasps they used to complete the activity. Very few of these 2 year olds would seem to have a preferred grasp pattern. The most common grasp used during the study was the digital pronated grasp as well as grasp with extended fingers.

Facilitating Mature Grasp Patterns

Burton and Dancisak (2000) found that 3-5 year olds used more mature grasps as the diameter of the writing tool decreased. This supports the findings of others (Burton & Dancisak, 2000; Myers, 1992) that thinner or shorter writing

tools facilitate the use of a more mature grasp. Writing tools to facilitate mature grasp development are preschool crayons and small pieces of chalk (Myers, 1992). A crayon has been reported to provide support for the child's hand when held in an open web space posture and used on a vertical surface. A broken crayon requires the child to hold the crayon with the tips of the thumb, index, and middle fingers, precluding a fist, whole hand or five-finger grasp. The most efficient grasp will be used for a particular task in a particular environment (Kamm et al., 1990).

Using a vertical writing surface may facilitate a mature pencil grasp. Myers (1992) suggested that vertical surfaces are important for appropriate hand and wrist position for fine motor and handwriting activities. Benbow (1990) indicated that wrist extension facilitated balanced use of the hand's intrinsic muscles. When writing with broken chalk on a vertical surface this facilitates a child to use a tripod grasp, and the vertical surface, which encourages wrist extension, combines to provide a strong task constraint.

In Tseng's (1998) study, almost half of the children 36 to 42 months of age had developed a static tripod pencil grasp compared with 30% of children 30 to 35 months of age. The study implies that 2 years old is a reasonable age to expect a pronate grasp and that many children will use a tripod grasp by 4 years of age. Saida and Miyashita (1979) found that grasp patterns were more advanced in 3-year-old girls than in 3-year-old boys.

It should be noted that the study by Myers (1992) suggested that early practice with pencil and markers may result in a poor pencil grasp partly because

the child may be using writing tools before his or her hands are ready. If too much pencil work is done with the immature grasp, pencil posture may become fixed at an intermediate level of skills.

Fine Motor Skill Development

Fine motor skills include reach, grasp, carry, release, in-hand manipulation, and bilateral hand use. Grasp success is dependent upon normalization of development, which is directly influenced by postural control, motor planning, eye-hand coordination, tactile and proprioceptive input (Edwards, Buckland, & McCoy-Powlen, 2002):

In-hand manipulation skills are defined as the process of using one hand to adjust an object for more efficient object placement in that hand prior to use, placement or release: the object remains in that hand and usually does not come in contact with a surface during in-hand manipulation (Exner, 1992). In-hand manipulation without stabilization begins to emerge as early as 18 months and with repeated opportunities matures into complex in-hand manipulative use. Hand skills surge around the age of 2 years. In-hand manipulation skills begin to develop prior to the age of three, primarily hand skills surge between two and two and a half. They require the ability to separate movement between the ulna and radial side of the hand (Thompson, 2004). In-hand manipulation skills are one of the most critical precursors for success in handwriting. If children do not develop adequate prerequisite hand skills, negative compensatory patterns of grasp will develop; this will limit the child's potential to regain an efficient grasp and it will have a negative impact on their academic work (Sprouse & Webb, 1994).

Exner (1992) noted that bilateral hand use is present in children typically between two to three years of age. Once bilateral hand use is present, the child begins to engage in highly differentiated activities such as cutting with scissors.

Environmental Factors Affecting Preschooler's

Fine Motor Development

In Hong Kong children learn to eat with chop sticks by age 2 years old and many children can write 30 Chinese characters in addition to the English Alphabet by 4 years of age. Compared to children in the United States, children in Hong Kong have more developed fine motor skills but are lacking in gross motor skills (Chow, Henderson, & Barrett, 2001).

In 2002, Rule and Stewart studied 101 preschool students who were given 50 different fine motor activities to complete over a 6 month period. There were 2 control groups that were given the same amount of time to complete the activities in the classroom. The results showed that the experimental group outperformed the control group. The researchers concluded that the nature of the activities and how children are instructed in completing them appear to be important factors. The more opportunities given to children for practice, the more they develop movements and refine the fundamental motor skills (Cleland & Gallahue, 1993).

There are many factors and experiences that affect motor development. We live in a complex world with a wide variety of influences and varied experiences. A few examples include family structure, culture, experience or lack of experience in preschool. Of the things that can be changed, direct

instruction appeared to have a higher rate of mastery when the children were given standardized tests (Rule & Stewart, 2002). This is an area that occupational therapists could be involved for developing parent education as well as educating the teacher(s) on how important it is to implement fine motor activities throughout the day. If students have good fine motor skills they have an increased probability of developing good handwriting (Chow, Henderson & Barrett, 2001; Cleland & Gallahue, 1993).

Importance of Preschool

Winsler, et al. (2008) conducted research to determine if a high quality preschool program would impact school readiness in ethnically and linguistically diverse children in pre-kindergarten (pre-k) programs in Miami, Florida. The school had an enrollment of 3,838 low income students that attended the Miami School Readiness Project. The students were assessed at the beginning and end of their pre-kindergarten year in the areas of cognitive, language, and fine motor development. The results showed that students who attended a pre-k program at a public school made greater gains than that of their peers. A point that the researchers made was that the teachers at the school were college graduates with early childhood training. The results of the Learning Accomplishment Profile-Diagnostic Edition Screens (LAP-D) assessment indicated that when the test was given at the beginning of the year to the 4 year olds they ranked in the 32nd to 43rd percentile ranking compared to national norms in the areas of language, cognition, and fine motor skills. However, at the end of the year, they students scored in the 47th to 52nd percentile.

This research demonstrated the importance of early intervention for children, especially children who live in poverty. With proper instruction and opportunities to practice different skills these students made significant gains within the school year and learned skills that they potentially will bring with them when they enter kindergarten.

Children who fall behind their peers early on not only experience academic difficulty at school entry, but also because they lack basic requisite school readiness skills when they enter school, they often fall further behind their peers on a number of school skills throughout grade school Winsler et al. (2008).

Children From Low Economic Families

Preschool children from families with limited financial resources may be at risk for delayed skills including fine motor skills, limiting their readiness for kindergarten. West, Denton, and Germino-Hausken (2000) found that children from families with income below poverty who attended Head Start in the prekindergarten year had significantly lower fine motor skills in kindergarten than children from families with incomes above poverty who had not attended Head Start. These results suggest that preschool children from families with low income are at risk for delayed fine motor skills that may influence their school performances in the early elementary years.

Performance on the Developmental Test of Visual Motor Integration (VMI) (Beery, 1997) was reported in a national study of 22,000 kindergarteners conducted by the U.S. Department of Education. The VMI relies on fine motor skills as children must use a pencil to copy geometric shapes. The study found

that 44% of kindergartners from families using Assistance to Families with Dependent Children (AFDC) scored 1 or more standard deviations below the mean on fine motor skills indicating they are possibly at risk for later fine motor developmental difficulties (West et al., 2000).

A study by Marr et al. (2003) compared Head Start classrooms to kindergarten classrooms in the 4 categories: fine motor nonacademic; fine motor with academics; non-fine motor with academics; and non-fine motor nonacademic. In Head Start, fine motor nonacademic activities and non-fine motor nonacademic activities constituted a majority of the in-class activity (90% of the total), while time in the kindergarten was more evenly split between the four categories. Children in Head Start spent, on average, 37% and kindergarten children spent 46% of their classroom activities engaged in fine motor activities. A breakdown found that Head Start children spent 35% of their day in fine motor, nonacademic activities with only 2% in fine motor with academic activities. Children in kindergarten spent more equal amounts of time in fine motor, nonacademic (26%) and academic (20%). Paper and pencil activities were defined as any activity involving writing or coloring with a pencil, crayon, or marker, or painting with a paint brush. It represented 10% of total fine motor time in Head Start and 42 % of total fine motor time in kindergarten. Forty-one percent of paper and pencil time in Head Start was teacher-directed whereas the teacher-directed paper and pencil time during the kindergarten day was 93%. Children in Head Start spent about 33% of their day in fine motor activities while kindergarten students spent about 50% of their day engaged in fine motor

activities. The difference in paper and pencil activity is something that Head Start students will face in kindergarten. A high-quality early childhood program can have a positive impact on children's learning and development (Burchinal et al., 2000), and the relationship between the quality of preschool and child outcomes is even stronger for disadvantaged young children (Dickinson & Sprague, 2001).

Influence of Visual-Motor Integration

The Developmental Text of Visual-Motor Integration (VMI) is used to identify proficiency in visual-motor integration with children ages 3 to 14 and to help prevent learning and behavioral problems through early screening identification (Berry & Buktenica, 1997). The VMI which is used by occupational therapists as a screening tool to determine visual-motor integration proficiency is a good indicator if a child will be able to copy letters. A result of a study conducted by Oliver (1990) support the idea the VMI is a useful tool to determine the writing readiness of early elementary age students. Researchers Daly, Kelley, and Krauss (2003) found there was a correlation between visual-motor skills and the ability to copy letters legibly. Kindergartners who could copy at least 9 geometric shapes on the VMI performed better on handwriting tasks compared to students who could not copy the shapes. This supports the findings of the Weil and Amundson study conducted in 1994 in which 60 typically developing kindergarten children were examined for printing ability and performance on the VMI. Findings indicated that children, who were able to copy the first 9 VMI forms, including the oblique cross, were able to copy significantly

more letters than those who could not copy the first 9 forms. Barnhardt (2005) found that visual motor skills are an important component of handwriting and play an important role in school performance. Students who performed poorly on the VMI made more errors in spacing letters, words, and number problems when completing a simulated classroom activity

Family Influence of Development

The mother is a central person in the child rearing process and plays an irreplaceable role in her child's development, per several studies. Researchers suggest that the mother's role has an increasing effect as the child grows. Durmazlar, Ozturk, Ural, Karaagaoglou and Anlar (1998) suggested that the mother's influence on a child becomes stronger after the age of 3 years old. One thousand and ninety-one children aged 0-72 months who were administered the Denver II Assessment (Frankenburg, Dodds, & Archer 1992) participated in their study. The results indicated that children with mothers having higher education developed earlier, particularly in fine motor and language skills. The differences between the "high educated mother" group and the "low educated mother" group were more marked in the 37-72 month old group.

Low social class and family problems can negatively affect a child's development by age 1 (Klebanov, Brooks-Gunn, McCarton & McCormick, 1998). A study was conducted by To, Gadarette, and Liu (2001) of 6,982 children aged 0-3 years. According to the results low maternal education, maternal depression, parenting practices and low income adequacy begin to play a role in child's development at 2 years of age.

In a family, an older child initially performs a task while a younger sibling watches, observing the performance of the older sibling. The younger child replicated the movements of the older sibling four times as frequently as the older sibling performed the act (Erbaugh & Clifton, 1984). This finding suggests that the older sibling often serve as a model for the younger sibling regarding motor skills. Children who were only children were more likely to achieve higher scores when assessed at entry than children from families who had siblings. Research documents the educational advantages of being an only child and it may be that this is the result of the higher level of adult attention and interaction awarded to children without siblings (Breland, 1974).

Dunsmuir and Blatchford (2004) found that if parents valued literacy development and made certain their child developed good skills for reading and writing, their child made progress regardless of the quality of writing in school. A mother's educational level, who was the primary caregiver, was significantly related to writing ability at 5 years old. Students who did not have supportive home backgrounds were more susceptible to perform poorly due to inadequate teaching, even where literacy instruction was considered to be good, these pupils still did not progress as well as those from supportive homes.

Learning to Write

The development of handwriting begins with early scribbling, which becomes more intentional with time (Ajuriaguerra & Auzias, 1975; Oliver, 1990). Age 1-2 is the random scribbling stage. By age 2, a child may start to label their scribbles (Church, 2005). As the child develops, design patterns evolve into

more precise shapes and then letters. Letter shapes can often be seen in children's drawings which can be viewed as an apprenticeship for writing (Willats, 1985). A child learns to print letters by first imitating geometric shapes beginning with vertical strokes (2 years old), followed by horizontal strokes (2 years 6 months) and circles (3 years). Imitation and then copying of a cross typically occurs at age 4 years, copying a square occurs at 5 years, and a triangle at 5 years 6 months (Berry & Buktenca, 1989). The ability to copy geometric forms, particularly the oblique cross, is seen as an indication of writing readiness in the young child, as it requires crossing the body midline and has been implicated as the root of many reversal problems (Berry & Buktenca, 1989; Benbow, Hanft, & Marsh, 1992). Age 5-6 is the symbolism stage: children begin creating simple representational drawings (self-portraits, pets, and family) with more details. They have more motor control over the lines they draw. They may use the letters of their name (or other letters they know) repeatedly to write a message (Church, 2005).

The writing process appears to emerge in stages. Children engage in picture drawing and scribbling that looks like writing. Then scribbling begins to take on the characteristics of print. Finally, they recognize that words are represented by letters; they then enter the more traditional phases of spelling development. Writing is a mechanical skill that needs to be taught to or modeled for the child. If a child has not been explicitly taught how to write, he or she will not possess writing skills (Drouin & Harmon, 2009).

Most preschool children are capable of some form of emergent writing (Hall, 1987). It is important that preschool teachers are aware of the importance of early intervention for teaching correct letter formation to their students. As a child's fine motor co-ordination develops and as letter shapes appear in emergent writing, specific guidance on correct letter formation should be given and taught. Handwriting is a fundamental fine motor skill for children to acquire. The motor skills which reinforce writing follow a regular sequence of development which emerges as the child matures neurologically. Once the writing patterns are established they are extremely difficult to modify (McMurray, Drysdale, & Jordan, 2009).

Fine Motor Control Needed for Writing

The fine motor and perceptual components related to handwriting performance include fine motor control (in-hand manipulation, bilateral integration, and motor planning), visual-motor integration, visual perception, kinesthesia, sensory ability, and sustained attention (Amundson, 1992; Cornhill & Case-Smith, 1996). In-hand manipulation is included in fine motor control and is the process of adjusting objects within the hand after grasp. After grasping a pencil, it must be shifted, which is defined as the linear movement of the tool by the fingers, in order to adjust it for writing. Translation, a type of in-hand manipulation task, is the ability to move an object from the fingers to palm or palm to finger pads. Rotation, another in-hand manipulate task, involves movement of the pencil around an axis and is essential for turning the pencil from grasp position to placement for writing or erasing. Bilateral integration, the ability

to perform symmetrical and asymmetrical movements of the body during an activity and motor planning are also important elements of fine motor control affecting handwriting (Exner, 1989). Motor planning is the child's ability to plan, sequence and execute letter forms and ordering of letters in words. The ability to motor plan is particularly important when children first learn to write, due to the fact that a child needs to have the ability to perform novel or unfamiliar movements (Amundson, 1992). The motor control approach is a combination of process oriented and the task oriented perspectives. The approach includes motor control, motor learning, and motor development. These areas account for how motor control is organized, how skills are acquired, and how motor behaviors can change (VanSant, 1991). Visual-motor integration is an important variable in handwriting performance, particularly when copying or transposing from text to cursive or manuscript writing (Cornhill & Case-Smith, 1996). Amundson (1992) defines visual-motor integration as the ability to coordinate visual information with a motor response, allowing the child to reproduce letters and numbers for written school assignment.

Research has shown that some children are not able to write due to the physical demands, such as poor hand strength which negatively affects how children holds their pencils and affects letter formation. Due to the physical demands it may cause the cognitive process to be suppressed at the same time. After handwriting becomes automatic it does not take such a toll cognitively and a student can use their energy to deal with other aspects of the writing process,

such as composition. Writing fluency is reported to have a fine motor component as well as a cognitive piece (Dunsmuir & Blatchford, 2004).

Writing One's Own name

The developmental course of writing appears to begin with circular scribbles. When asked to write their name names, children produce scribbles distinctly different from those generated when attempting to draw a picture by age 3 (Brenneman, Massey, Machado, & Gelman, 1996; Hildreth, 1936). As a child matures, name writing transitions from circular scribbles to continuous linear scribbles, which look increasingly like letter forms (Clay, 1982; Hildreth, 1936; Lieberman, 1985). Ferreiro (1984) reported that children attempts to write their name will be the first "stable string" of letters that they produce, and that learning to do this is highly significant.

In a research study conducted by Drouin and Harmon (2009) of 114 preschoolers, many children could either write their names but not recognize the letters in their names, or recognize the letters in their names but not write them. When comparing the two groups of children, the children who were categorized as a having higher letter recognition skills but could not write their name had significantly higher letter knowledge scores compared to children who could write their name but had difficulty with letter recognition. This would suggest that writing one's name, in itself, did not appear to correspond to a literacy advantage. It has been suggested that children's early writing skills usually emerge at about the same time as their letter skills, and both appear to be related to later reading ability.

Handwriting Versus Typing

Longcamp, Zerbato-Poudou, and Velay (2005) conducted a study involving children ages 3 to 5, to determine what effect handwriting and typing training had on their letter identification. The children were separated into groups with half of the students receiving handwriting training and the other group receiving typing training.

A pre-test and post-test of letter knowledge was given to the students. Only 12 capital letters were used (B, C, D, E, F, G, J, L, N, P, R and Z). The children were shown the 12 letters on the computer screen. On each screen there were 4 options of the letter and they had to choose the correct letter; the students were told that there was only one correct answer on the screen. One of the choices was the mirror image of the correct letter; the other choice had a stroke added or missing from the letter and the corresponding mirror image. To avoid the risk of a child guessing and therefore getting the correct answer, the choices were given twice during the trials and the child had to pick the correct answer both times for the score to count.

The older children who were taught handwriting had an increase in correct responses on letter recognition between the pre-test and the post-test. The typing group, with the older students, also made some gains but these were not as significant as the handwriting group (Longcamp et al., 2005) These results may support the claim that when a child is old enough, learning handwriting facilitates the child's ability to memorize the form of a letter which makes him or her more successful with letter recognition.

Fine Motor Skills in Kindergarten and Academic Achievement

Pagani, Fitzpatrick, Archambault, and Janosz (2010) looked at 1,155 kindergarten students in Quebec, Canada, who were involved in a longitudinal study that followed the children from birth until school age. The researchers examined: cognitive, attention, motor skills, classroom engagement, and socioemotional characteristics of the kindergarten students. The researchers wanted to know if they could predict readiness for second grade math, reading, and general achievement based on the results of the kindergarten students' performance and abilities.

The results of the research demonstrated that fine motor skills in kindergarten had a significant correlation in predicting a student's success in the second grade for reading, math, and general achievement. The researchers found that fine motor skills in kindergarten demonstrated an association with later achievement above and beyond the key elements of school readiness. This finding highlights its unique contribution as an early factor in predicting later achievement. In fact, fine motor skill was better at predicting second grade math and general achievement than kindergarten receptive language skills. The researchers established a potential link between kindergarten cognitive, attention, fine motor and later academic performance.

Reno (1995) found a moderate correlation between fine motor ability in young children and early literacy performance. Share, Jorm, Maclean, and Matthews (1984) found interdigital dexterity to be a strong predictor of reading achievement. Blatchford (1991) reported a relationship between good

handwriting skills at school entry and later writing ability and hypothesized that this underpinned a more general familiarity with written language, which successfully supported subsequent development.

Snow, Barnes, Chandler, Goodman, and Hemphill (1991) considered school factors that were associated with progress in writing and reported that the 5 to 7 year-old children in their longitudinal study who were most successful in learning to write, were those who had been provided with regular extended writing experiences across a range of forms. They made greater progress than pupils in the majority of the classrooms whose teachers provided fewer and narrower writing opportunities.

Fine Motor Demands For School Age Students

McHale and Cermak's (1992) observations of the fine motor activities in typical 2nd, 4th, and 6th grade classrooms help us understand the fine motor demands in these grades. Across the three grades, a range of 30% to 60% of the children's school day was spent in fine motor activities. An average of 85% of the total fine motor time across the three grade levels was spent on paper and pencil activities. These findings indicate the high demand for fine motor skill in middle to older elementary children.

Difficulty in fine motor skills can interfere with academic achievement. No other school task requires as much synchronization as handwriting (Levine, Oberklaid, & Meltzer, 1981). Tseng and Murray (1994) found that motor planning ability was the best predictor of legibility in poor handwriting.

McHale and Cermak (1992) found that only a small percentage of the school day is spent completing fine motor and other academic activities simultaneously, such as writing while listening to a teacher provide instruction. Students with fine motor difficulties struggled to focus on the physical aspect of writing while simultaneously focusing on the oral content being presented. These students may have difficulty completing assignments in a timely manner which may limit the quality of their work.

Therapeutic Interventions

Wallen and Froude (2007) compared the effects of occupational therapy's (OT) sensorimotor intervention, therapeutic practice or no intervention on handwriting performance and the sensorimotor components considered to be associated with handwriting difficulty. The study included thirty-eight children between the ages of 6 to 11 who had no cognitive concerns and no physical problem affecting handwriting. The students were described as students who had poor handwriting. Both treatment groups received 30 minutes of intervention, 4 times per week for 5 weeks. Sensorimotor intervention sessions addressed sensorimotor areas on a rotational basis: visual perception, visual-motor integration, proprioception/ kinesthesia and in-hand manipulation. Therapeutic practice focused on different letters in each session and was based on motor-learning strategies, involving writing.

The results from Wallen and Froude (2007) research indicated that OT therapeutic practice resulted in modest improvements in children's handwriting when compared with sensorimotor intervention. Surveys of occupational therapy

practice in the area of handwriting have found sensorimotor based treatments, in combination with other approaches such as practice, to be the most commonly reported. There is evidence that occupational therapy intervention can improve handwriting skills in primary school age children.

Handwriting Difficulty

Feder and Majnemer (2007) found the percentage of children with handwriting difficulties ranged from 10-30%. In a survey, 72% of teachers stated that assignments were graded on quality of handwriting and 80% stated legible handwriting was considered important or very important when determining acceptable handwriting (Hammerschmidt & Sudsawad, 2004).

Research completed by Cahill (2009) determined that handwriting is closely linked to academic achievement; children who continue to have difficulty with handwriting beyond first grade may not fully develop as a proficient writer. Students who have difficulty with automatic text production often have difficulty switching their attention between the motor process of handwriting and what they actually want to say. As a result, the content and the length of the piece are compromised. Some students, who are able to tell the answer to a question or verbally explain a concept at length, may struggle with automatic handwriting, may give up on written assignments, and experience frustration.

Research suggests that there is a high correlation between handwriting speed and typing speed; many children who struggle with automatic handwriting may also struggle with automatic keyboarding. The kinesthetic process of writing

letters has been found to be favorable for the development of composition skills (Cahill, 2009).

Students with learning disabilities have been found to minimize the use of other writing processes and spend as much time thinking about handwriting and what their papers actually look like as they do on the content of their papers. To develop good writing skills, students need to be taught using formal handwriting instruction. Lack of formal handwriting instruction may be especially problematic for children who have underdeveloped foundational skills and produce letter forms illegibly (Cahill, 2009).

Practice is also considered to be a key component of motor learning. Children with handwriting difficulties require blocked and constant practice to master letter formation without the pressure of worrying about content and grammar. Blocked practice provides children with the opportunity to work on emerging skills during a task that follows a predictable sequence. Blocked practice can take the form of writing different letters until the formation is consistent or even writing common sight words. Blocked handwriting practice may lead to automatic and increased writing speed. Automatic handwriting allows students to spend all of their energy on writing content instead of having to divide their attention between content and text production (Cahill, 2009).

Students who struggle with handwriting benefit from extra support early in their school careers. Systematic handwriting instruction, supplemental skill development, and practice with functional tasks can help increase handwriting skills. By incorporating these strategies, students will have the opportunities to

develop handwriting skills, free up cognitive energy to better focus on writing content, and potentially increase their academic achievement. If typing is suggested it is important that the student receive proper instruction and have the ability to practice (Slavin, Karweit, & Wasik, 1994).

Tait (1998) reported that approximately 98% of occupational therapists working in the school setting noted receiving referrals for students with inadequate handwriting. Occupational therapists working in school setting report handwriting problems are the most common reason for referrals (Case-Smith, 2000).

Students Who Suffer From Dyspraxia

McMurray, Drysdale, and Jordan (2009) looked at motor processing difficulties related to handwriting. Many children with dyslexia may also have a diagnosis of dyspraxia. They state that it is important to understand the power and permanence of motor memory once learning becomes established; also the difficulty that is presented in attempting to unlearn incorrect motor plans. Every movement that is made is repeated over and over again to reproduce the same end result; for example, the formation of a letter is dependent on a correctly learned motor plan or sequence. Children can adhere to changes when their primary focus is forming a letter in a particular way but when another task is the primary focus, for example thinking of ideas and writing independently, then the over-learned motor sequence swings into action and handwriting reverts to what has been erroneously learned and firmly established. Once the writing patterns are established they are extremely difficult to modify.

It is important to recognize that sloppy writing is not an indicator of ability, and although correct letter formation, increased legibility and improved writing speed are an important outcome of an OT intervention, greater emphasis should be placed on content than presentation. For students with dyspraxia, handwritten work that is done precisely may be an unrealistic expectation.

Children with dyspraxia may benefit from repetition and additional practice when learning handwriting. A person will never grow out of dyspraxia; however, classroom teachers with the help of an occupational therapist can develop strategies to minimize the difficulties they experience.

Occupational therapists should look at organizational difficulties in children referred for therapy who have been diagnosed with dysgraphia or display other handwriting deficiency along with all of the mechanics involved in handwriting. This is an important skill since 30–60% of a students' school day is spent performing fine motor tasks, consisting primarily of handwriting. Ten to 34% of school-aged children are failing to develop efficient handwriting performance required to cope at school (Feder & Majnemer, 2007). To create a written outcome, a student is required to activate sensory motor and cognitive skills simultaneously, in order to formulate an idea, plan the syntax and spelling of each sentence, make a motor orthographic integration to produce the text, and evaluate the outcome. All these phases require intact organization in space and time (Rosenblum, Aloni, & Josman, 2010).

Need For OTs in the Schools

Research has shown that it is important to develop good writing habits early. As well as the importance of educating teachers on the importance of providing their students the opportunities to participate in fine motor activities. Early childhood educators and pediatric occupational therapists focus on developing fine motor skills in preschool children to enhance readiness for learning (Case-Smith, 2000; Kagan, Moore, & Bredekamp, 1995). It is an important skill to develop good habits and help create proficient writers. Case-Smith (2002) reported students with poor handwriting legibility can make significant improvements in visual motor control, in-hand manipulation, and overall legibility following occupational therapy intervention over the course of a school year.

Fine motor skills are important skills to be developed. The research has shown that with opportunities imbedded in their day, preschool children increase the refinement of fine motor skills. Fine motor skills are an important component of handwriting and manipulating classroom objects. Handwriting is both a means of communication and necessary life skill, as in writing a letter or telephone message, completing an application form, or writing a cheque. Handwriting is still the most immediate form of graphic communication (Sasson, 1990).

Summary

The purpose of this scholarly project is to educate parents, teachers and occupational therapists of the importance of developing good fine motor skills.

This will ensure that a child will have the opportunity to reach their maximal potential in the area of handwriting and completing classroom work. In the following chapters, a manual will be presented for use by occupational therapists working with preschool age children and to be provided for educators and parents of children who receive OT services or children who could benefit from the fine motor activities.

CHAPTER III

METHODOLOGY

The methodology used to create this product included an extensive review of literature and articles, including published research articles, textbooks and standardized tests. The purpose of the review of literature was to determine what was effective to promote fine motor skill development in preschool age children and establish a baseline of fine motor development based on standardized tests and research that has been done in this area. Research has shown a positive correlation between preschool students who have good fine motor skills and successful accomplishment of academic tasks in elementary school.

Literature review demonstrates fine motor skills affect every aspect of daily life therefore it is important to develop good fine motor skills at a young age. Marr, Cermak, Cohan, and Henderson (2003) documented the importance of fine motor skills for engaging in self care skills and educational activities. Children who have difficulty coordinating small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school (Losse et al., 1991).

Resources and activities geared towards preschool teachers and occupational therapists were examined for the product. Activities that would

encourage the development of fine motor skills were critiqued. After they were evaluated, they were included if they met the criteria of being developmentally appropriate for preschool children and if they encouraged the refinement of fine motor skills.

The activities in this manual were compiled so that parents, caregivers, or teachers of preschoolers could implement the activities throughout the day. The majority of the activities could be done individually or in a supervised group setting. There is a wide selection of options in the activities so that children can have various experiences: this also increases the likelihood that the activities could be a natural part of their day. With the correct instruction children will be able to participate in the activities and as a result develop good fine motor skills. There are some costs associated with the activities but they are relatively low and many of the activities could be used multiple times.

The majority of the activities were broken down into: the purpose of the activity, the materials that are needed, and the instructions. If the adult understands why they are allowing the child to play a specific activity it may help to encourage the child to work on fine motor skill development. This product provides adults working with children activities that will be fun for the children to complete and encourage the development of good hand skill development.

Summary

In Chapter IV occupational therapy is described and the role of the occupational therapist in early intervention is explained. Important terminology relating to early intervention is defined. The importance of play in preschool and

pre-writing strokes is also addressed in the following chapter. Chapter IV includes selected activities beneficial to promote hand skill development for preschoolers. Occupational therapists will provide this product to parents, preschool educators, and day care providers, based upon their clinical reasoning and the child's need for facilitation of good hand skill development.

CHAPTER IV

PRODUCT

This manual was created to educate parents and childcare workers in order to incorporate fine motor activities throughout the day. This manual was also created to be used by preschool teachers to integrate fine motor skills into their curriculum. Activities adults could use to encourage children to facilitate fine motor activities on a daily basis are included with terminology defined.

Occupational Therapy Defined

The American Occupational Therapy Association (AOTA, 2011) states the purpose of occupational therapy (OT) is: the therapeutic use of occupations, including everyday life activities with individuals, groups, populations, or organizations to support participation, performance, and function in roles and situations in home, school, workplace, community, and other settings.

Occupational therapy services are provided for habilitation, rehabilitation, and the promotion of health and wellness to those who have or are at risk for developing an illness, injury, disease, disorder, condition, impairment, disability, activity limitation, or participation restriction. Occupational therapy addresses the physical, cognitive, psychosocial, sensory-perceptual, and other aspects of performance in a variety of contexts and environments to support engagement in occupations that affect physical and mental health, well-being, and quality of life.

OT is a profession that focuses on the person's ability to engage in everyday life activities (i.e., occupations). OT services are available through educational settings, community agencies or hospital settings. The specific areas in which the occupational therapist has knowledge and training include: activities of daily living (e.g., eating, dressing, etc.); education (e.g., handling materials/tools, speed and dexterity, handwriting, etc.); play (e.g., play activities); social participation (e.g., interpersonal skills, social conduct); and work (e.g., work habits, preparing for work, completing work).

Occupational Therapy in Early Intervention

Occupational therapists in early intervention typically work with a team of other early childhood providers. The other team members include, but are not limited to: physical therapists, speech language pathologists, preschool teachers, social workers, autism consultants, and behavior consultants. In the districts I serve, there is also a teacher for the deaf and blind in addition to a mobility consultant for children who are visually impaired once they start walking or are mobile. An important team member is the family and/or day care provider who carries out the therapy suggestions with the child when the therapists are not there. She (he) also provides the therapist with information about what works, what does not, and generally how the child is doing overall.

Outside of our team, we may also receive information from doctors, surgeons, nurses, private therapists and a nutritionist (if the concern/issue is related to feeding). If a child goes to daycare or a play group, parents or teachers may pass along that information to the team as well. For children who

are in foster care, we may receive information from the social worker, biological parents, and current or past foster parent(s).

Occupational Therapy and Interventions

Occupational therapists, who work with early childhood and preschool students' interventions, focus on improving and developing the child's skills to enable them to develop a child's skill set. When working with a child, the therapist will remediate a skill that has not yet developed or try to restore a skill that is in decline. An activity or environment may be modified or adapted in order to facilitate the child achieving the skill and enhance their performance. In some cases, modification or adaptations are made to prevent injury to a child. The goal when working with children is to develop skills that a child will be able to retain and build upon, in order to improve a child's ability to perform activities and skills and to increase independence.

It is important for an OT to educate and train family members and caregivers about what is being done for occupational therapy and the reason why it is being done. Open communication and trust is important to create a good working environment for the child.

The following glossary of OT specific terms has been provided to assist in the explanation of terms used throughout the scholarly project. The purpose of providing this glossary is to provide the reader with the author's intended use for each term. It is the author's intent to provide a comprehensive glossary of terms and preschool grasp patterns.



Glossary

Bilateral Integration: the use of two hands to support or manipulate an object; hands may be working in unison or performing different but complementary actions at the same time.

Biomechanics: the position of a child in his/her desk to promote optimal use of hands during classroom activities; considers the position of the paper and the dimensions of the desk and chair relative to the child.

Cognitive Development: the process of thinking, learning, perception, and reasoning.

Developmentally appropriate: activities and educational experiences that match the child's age and stage of development

Developmental delays: occurs when children have not reached milestones by the expected time.





Digital pronate grasp: object is held with all fingers, wrist straight, and forearm moves with hand. Typical grasp for 2 to 3 year olds.

Dynamic tripod grasp: object is held with fingertips on thumb, index, and middle fingers; ring and little fingers bent; hand moves separately from forearm. Typical grasp for 4 ½ to 6-year olds. Mature grasp pattern.

Dysgraphia: is a learning disability resulting from the difficulty in expressing thoughts in writing and graphing. It generally refers to extremely poor handwriting.

Dyspraxia is a disorder that affects motor skill development. People with dyspraxia have trouble planning and completing fine motor tasks.

Environment: the external physical and social environment that surrounds the student and in which the child's daily life occupations occur.

Eye-hand coordination: the integration of visual perceptual information with the purposeful movements of the hand and arm.





Figure ground: the ability to locate an object within a three dimensional presentation.

Fine motor coordination: use of small muscle groups for precise movements, particularly in object manipulation with thumb, index, and middle fingers.

Finger isolation: using only one finger.

Gross motor coordination: use of large muscle groups in the whole body to carry out skills such as balancing, running and jumping.

Hand Dominance/Handedness: the hand that develops strength, skill, and precision to perform fine motor tasks. A preference for using one hand over the other.

In-hand manipulation: the adjustment of a grasped object within one hand while it is being held: includes translation, shift and rotation.

Kinesthesia: the perception of position or movement of limbs and the weight and resistance of objects without vision.





Letter formation: the ability to make a letter on a page using eye-hand coordination, correct posture, directionality, and visual motor memory.

Motor planning: the ability to organize, plan, and then execute new or unpracticed fine motor or gross motor activity.

Occupational Therapist (OT): A healthcare professional who helps person overcome physical or social problems due to illness or disability. OTs provide services for the purpose of promoting health and wellness through the use of everyday activities. OTs are skilled in adapting the environment so that a child can participate in the occupations of childhood: play, school and self-care. As well as, providing opportunities for individuals to participate in roles and situation in home, school, workplace, community, and other settings.

Occupations: activities that people engage in throughout their daily lives to fulfill their time and give life dynamic transaction among the client, the context, and the activity.

Open-ended activities: Materials or projects used to create without fixed limits or restrictions. For example, drawing on a blank sheet of paper rather than a coloring book.





Pincer grasp: using index fingers and thumb to hold an object.

Proprioception: The unconscious awareness of sensations coming from the muscles and joints that provides information about where each part of the body is and how it is moving.

Quadripod grasp: held with fingertips of thumb, index, middles, and ring fingers; little finger bent; hand moves separately from forearm. More mature grasp pattern.

Release: Using fingers to let go of an object.

Rotation: an in-hand manipulation movement when an object is turned in the fingers; consists of two types simple-rotation turning an object less than 90°, and complex-rotation or turning an object between 90° - 360° using thumb and finger movement.

Sensorimotor- combining the functions of the sensory and motor activities.

Shift: an in-hand manipulation movement where there is slight adjustment of an object on or by the finger pads.





Sociodramatic Play: refers to play involving acting out scripts, scenes, and plays adopted from cartoons, books. Children take/assume roles using themselves and/or characters like dolls, figures, and puppets as they interact together on common themes. A facilitator may assist ideas for characters, settings or props and use the children's ideas for a story. Typically occurs between 3 - 4 years of age. As a child matures, themes, sequences, plans, problem solving, characters and so forth become more rich and they begin to organize other children for role play with independence (around 5 years of age).

Static tripod grasp: held with crude approximation of thumb, index, and middle fingers; ring and little fingers are only slightly bent: grasped high on the utensil. Typical grasp for 3 ½ to 4 year olds.

Translation: an in-hand manipulation movement when an object is moved in a linear direction between the palm and the fingertips; includes moving an object from palm to fingertips and from fingertips to the palm.

Visual motor integration: the coordination of visual information with movement; often associated with the ability to copy geometric forms.





Visual perception: the ability to recognize, discriminate, and process information through the eyes and central nervous system.

Writing readiness: development of skills necessary to successfully perform handwriting activities.

The terms used here were adapted from: AOTA (2008); Case-Smith (2005); Feder and Majnemer (2007); Isbell (2010); Pehoski and Henderson (2006).



The Importance of Play in the Preschool Setting

Preschoolers develop fine motor skills through play with appropriate materials and objects. Preschoolers also learn through repetition and experimentation. A learning environment with a wide variety of open-ended materials such as paper and small blocks provides a young child with a variety of opportunities. Preschoolers who have the chance to create their own knowledge and who can work at their own levels will be more engaged in learning and more capable of developing their fine motor skills (Bredekamp & Copple, 2009).

Three and four year olds should spend more time playing with manipulatives than practicing writing skills. Some schools or parents may push for children to begin formal handwriting before the children are developmentally

ready to participate in this activity. If children are pushed to write before their hands are physically ready, it may have a negative impact on the children's interest in writing. Preschoolers who have yet to develop the basic precursors for higher level fine motor skills are at risk for developing poor pencil grasp, illegible handwriting, and slow handwriting (Benbow, 1990; Bredekamp & Copple, 2009; Case-Smith & Pehoski, 1992; Exner, 2005).

It is important to remember each child creates or expresses themselves in media differently. When a class of preschoolers finishes a fine motor activity, their products should not all look alike. Preschoolers typically develop their fine motor skills at their own rate while interacting with their peers, and from participation with adults.

If children are involved in an open-ended environment in which young children can explore and participate in various activities at their own interest levels, a preschooler may be more willing to try new things and expand their learning potential. Children learn fine motor skills best during play, centers that provide unique and appropriate tools and play materials work well in a preschool classroom (Parham & Fazio, 2007),

Sociodramatic centers present fine motor activities in a real-life setting and help children transfer the skills they develop there in new environments like the home and community. For example, in a bakery and cooking center, preschoolers can practice rolling out, pinching, and cutting dough. In a restaurant center, preschoolers can design menus, write customers orders, and create place mats for the tables (Isbell, 2008).

Fine Motor Skills Needed in Preschool

In-hand manipulation without stabilization begins to emerge as early as eighteen months and with repeated opportunities matures into complex in-hand manipulative use. Hand skills surge around the age of two years. In-hand manipulation skills begin to develop prior to the age of three, primarily hand skills surge between two and two and a half. They require the ability to separate movement between the little finger and thumb side of the hand (Thompson, 2004). Preschoolers need daily experience with developmentally appropriate fine motor activities so they can build the confidence and skills they will need later in life (Bredekamp & Copple, 2009)

As each child develops at his/her own pace, you will see differences in a child's rate of hand skill development. Several factors may influence a child's fine motor development, such as muscle tone, body build, and temperament (Henderson & Pehoski, 2006; Thelen & Smith, 1994).

Research suggests that gender differences exist in the way children acquire fine motor skills. Girls are frequently more competent than boys of the same age at performing fine motor skills, such as drawing and cutting with scissors. Discrepancies between the genders exist in handwriting particularly. Girls are more likely to write faster and more legibly than boys at the same age (Trawick-Smith, 1997; Tseng & Cermack, 1993; Tseng & Chow, 2000)

According to (Exner, 2005) by preschool, most children should be able to perform the following basic fine motor actions.

- ° Reach: moving his/her arm forward to grasp or touch an object.

- ° Grasp: using his/her fingers to get an object into his/her hand.
- ° Carry: using his/her hand to move an object from one place to another place.
- ° Release: letting go of an object he/she holds in his/her hand.
- ° In-hand manipulation: using his/her fingers to adjust an object inside his/her hand.
- ° Bilateral hand use: using his/her two hands together in an activity.

If a child has difficulty with fine motor skills it could have a negative outcome on their daily lives and how they perform in school. Children who have difficulty coordinating the small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school (Losse et al, 1991).

Pre-writing Skills

Children learn pre-writing skills best by participating in play and daily life activities (Benbow, 1990; Case-Smith & Pehoski, 1992; Exner, 2005).

In general, the pre-writing sequence begins sometime around the age of two. Most children will be able to copy a triangle and a diamond by the time they are four-and-a half years old. Once a child can copy all forms and shapes, that child should be ready to begin writing letters (Beery, 1997).

Research has shown that it is important to develop good writing habits early. One way to accomplish this is by teachers, caregivers, and parents providing children the opportunities to participate in fine motor activities. Early

childhood educators and pediatric occupational therapists focus on developing fine motor skills in preschool children to enhance readiness for learning and writing (Case-Smith, 2000; Kagan, Moore, & Bredekamp, 1995).

The acquisition of fine motor skills is an important aspect of children's developmental growth as fine motor skills enable children to participate in valued occupations in the areas of activities of daily living, education, play and social participation. National education goals describe fine motor skills as one of the dimensions needed by kindergarten children for learning readiness (National Education Goals Panel, 1993). Difficulty in fine motor skills can interfere with academic achievement. No other school task requires as much synchronization as handwriting (Levine, Oberklaid & Meltzer 1981).

Activities to promote fine motor skill development are included on the following pages. Supervision due to safety concerns are recommended at all times when children are participating in these activities. Many of the activities require the use of small items that could be a choking hazard. When working in small groups there are items that children could possibly hurt each other with. Instruction is recommended before you start each activity so that the child will learn how to complete the skill correctly to promote fine motor skill development.



**Activities Intended to Promote Fine Motor Skills Development in the Home,
Preschool or Classroom Setting.**



Chalkboard

Purpose: To offer kinesthetic feedback. The activity also focuses on fine motor development: tripod grasp, visual-motor coordination; visual-perception; wrist extension; proximal stability and crossing midline.

Materials: Chalk, chalkboard and eraser or a cloth to wipe off the chalk from the chalk board.

Instruction:

1. Give each student a small piece of chalk to facilitate a static tripod grasp.
2. Allow the student to explore on their own. The student can trace, copy, draw dot-to-dot or write independently.
3. Students can work on developmental/pre-writing strokes
4. Students should be on a vertical surface. Place the chalkboard on the floor or an easel.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Clothespins

Purpose: If held correctly this activity can increase the intrinsic muscle strength needed for writing and cutting. Have the student grasp the clothespin with the first three fingers with the thumb on top. These activities focus on fine motor skills: tripod grasp; intrinsic muscle development; thumb opposition; motor sequencing and forearm supination/pronation.

Materials: Wooden clothespins are required for all of the activities.

Activity suggestions:

1. Create a color pattern for the student to repeat
2. Write numbers or letters on the clothespin. Have your student put the clothespins in sequential order either on a string or cardboard.
3. Write numbers or letters on the clothespin. Have your student put the clothespins in sequential order, or by matching around the lip of a can.
4. Write letters on the end of the clothespin and have your child spell words either independently or matching letters on a prewritten card.
5. Pick up items with clothespins like you would use tongs.
6. Create animals and have you student place clothespins to create bones, teeth, etc.
7. Clothespin items from smallest to largest.

Adapted from Thompson, 2008

Cutting

Purpose: The student will cut through a variety of media starting with the easiest and progressing to the most difficult. These activities focus on the fine motor skills: eye-hand coordination and bilateral integration/sequencing.

Materials: All activities include child safety scissors and a variety of media listed below.

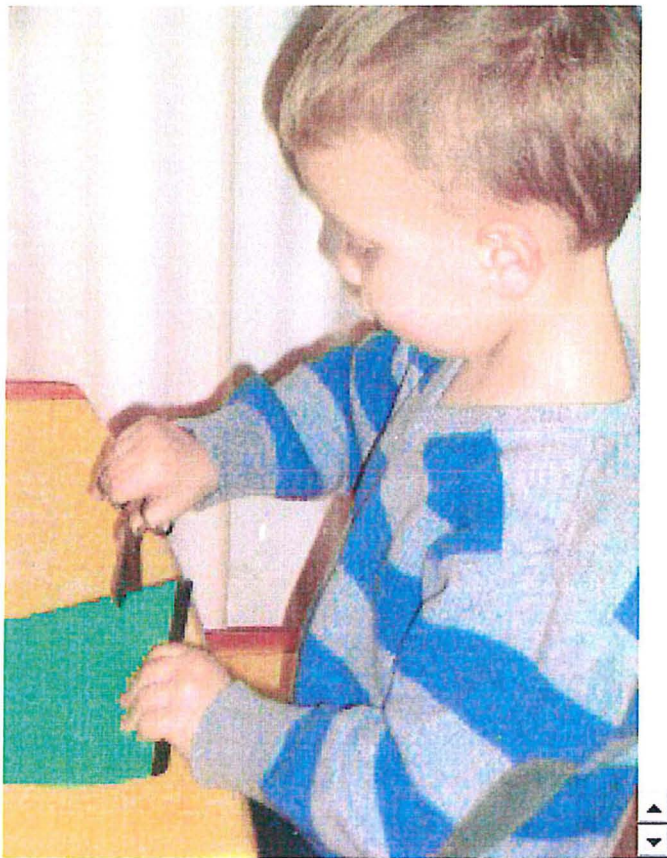
Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns. Generally the thicker and smaller the media, the easier it is for the child to cut. When cutting the elbow should be at the student's side and not stabilized by their body or other outside force (table, etc). The student should use their dominant hand to cut with the wrist in extension and the non-dominant hand should hold the object that the student is cutting.

Description of activity

- Cutting straws
- Snipping playdough
- Snipping Index cards
- Cutting card stock strips
- Cutting card stock

- Snipping regular paper
- Cutting regular paper

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Hole Punch

Purpose: The student will use a hole punch to punch out shapes or designs.

These activities focus on the following fine motor skills; intrinsic muscle development; thumb opposition; hand archers/separation.

Materials: Hand held hole punch, paper, writing utensil.

Instruction: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns. When using the hand hole punch have the student squeeze the lever down by alternating the fingers that they use with their thumb. Tell the student to hold the hole punch in their dominant hand and hold the material in their non-dominant hand. Have a student use a hold punch to punch out a variety of items. Start with easier tasks like shapes and progress to letters and eventually their name or an art project. For materials you could use regular paper, construction paper, stock paper or paper plates. Draw where you want your student to punch out.

Adapted from Thompson, 2008

Macaroni Bin

Purpose: The student will take small elbow macaroni and inserts them one at a time through a resistive hole in the top of a plastic container for example a yogurt container. This activity focuses on the following fine motor skills: pincer control; tripod grasp; intrinsic muscle strength; finger translation.

Materials: Elbow macaroni and a plastic container. This activity can also be modified by using beans, coins or other small objects. Instead of using a plastic container a racquetball or tennis ball can be cut so that a child can squeeze the ball to make it look like a mouth. The students can “feed” the items to the mouth.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the small pieces and choking hazards.

Draw different shapes/numbers/letters on the lids and ask the student to push the macaroni through the lid.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Nuts n' Bolts

Purpose: The student will match various sized nuts, bolts and PVC piping and screw them together. Fine motor skills used in this activity: finger translation; manipulate small parts; distal finger control; proximation/supination and proximal stability.

Materials: Various sized nuts, bolts and PVC piping

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns because this activity has small pieces that could be a choking hazard. Have the student match various sized nuts and bolts and PVC piping and screw them together.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Wikki Stix

Purpose: Fine motor skills used: distal use of fingers; eye-hand coordination; hand separation; hand arches; wrist extension and proximal stability

Materials: Wikki Stix, surface to draw shapes, letters or mazes on. Other mediums include but are not limited to marbles, cotton balls, cars or pencil.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group for proper instruction and to make sure the children do not eat the Wikki Stix. Provide sample shapes, lines, numbers or letters for the student to replicate with their Wikki Stix. They can either copy or place the Wikki Stix directly on the drawn sample. You could also use Wikki Stix to construct a maze that a student can navigate through using a pencil or other medium (marbles, cotton balls, cars, etc.)

Adapted from Thompson, 2008

Water Play

Purpose: The student will play with a variety of materials in the water. Fine motor skills used: thumb opposition, hand arches, pronation/supination, and intrinsic muscle development.

Materials: Small container to hold water for example a pail or old ice cream container, eye droppers, sponges, squirt bottles, squeeze toys, plastic syringes, cups or buckets and washcloths. Food coloring could also be added to the water

Instruction: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns with children playing around water and the small toys and materials. The student can play with the material in a container or they can use the materials to transfer the water from one container to the other.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

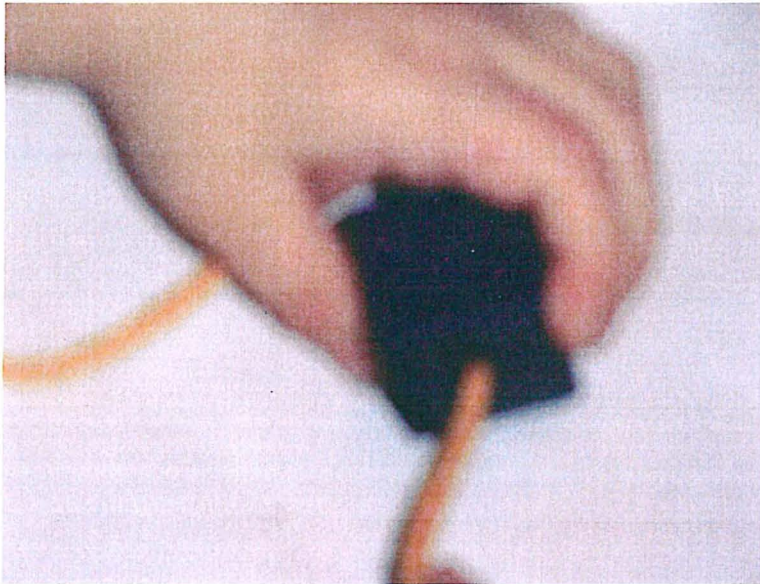
Stringing Beads

Purpose: The student will string beads onto a string. Fine motor skills used: thumb opposition, separation of the hand; intrinsic muscle development and finger translation.

Materials: Beads of different shapes and sizes and string. Pipe cleaners and buttons can also be used.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns because of the small pieces that create a choking risk and string that a child could wrap around their neck. The student should hold the string with their dominant hand and the beads with their non-dominant hand. Elbows should be at the student's side and not supported by an outside force.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Tongs

Purpose: Fine motor skills used: hand separation; intrinsic hand muscle development; motor sequencing; thumb opposition and eye-hand coordination.

Materials: Tongs, strawberry hullers could also be used. Tongs can be used that are different sized and resistances. Items can be found in a typical classroom.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns. Tongs should be held with the fingertips

Activity suggestions for using Tongs:

- Write numbers inside of plastic containers (2, 4, 6, etc.) and have the student put the correct amount of items in each dish.
- Have the students sort the items according to the first letter of the object, by color or size.
- Have tong races- have the student hold an item in their tongs and place the item in the appropriate container across the room .
- Have the student pick up different size and weighted objects.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey

Playdough

Purpose: A student can use their imagination and fine motor skills at the same time. Fine motor skills used: tripod grasp; in hand manipulation; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Playdough, clean work surface, child safe scissors, cookie cutters. In some of the activities theraputty could be used.

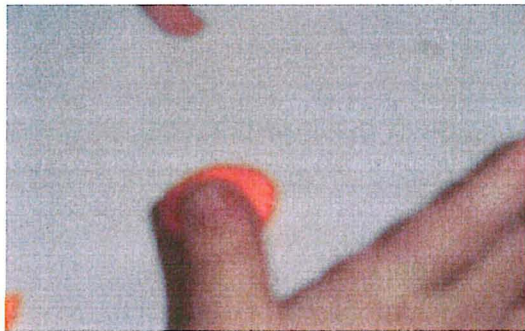
Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns regarding an eating/choking risk and using materials with sharp edges. Have the child sit at a table or desk with enough playdough and if applicable other materials to complete the activity.

Activities:

- Roll playdough into small little balls with the fingertips.
- Roll playdough into large balls with palms of your hands and fingers straight.
- Roll playdough into snakes and cut them into piece using a plastic knife.
- Construct 3-D designs like snowman
- Make pancakes with the palm of your hand and use cookie cutters to cut out shapes

- Cut playdough with scissors.
- Form letters, numbers or shapes using playdough
- Hide small objects in the playdough and have students dig them out.

Adapted from Thompson, 2008



Picture used with Permission of Mike and Linnea Starkey.

Tear and Paste

Purpose: A student can use their imagination, organization skills and fine motor skills at the same time. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Manilla paper, construction paper, paste or glue

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group so that the children have proper instruction for the activity. And due to the safety concerns about eating the materials that the children are working with. Have the student rip up the construction paper in order to make artwork. Have the children glue the piece of construction paper onto the manilla paper. This project could be worked into a theme or a holiday. For example, in the fall, a student could make a picture of a tree with turning leaves. Provide the student with brown construction paper for the trunk of the tree and have the child tear up different colors of construction paper to be put on a tree for leaves.

Adapted from Knight and Decker, 1994

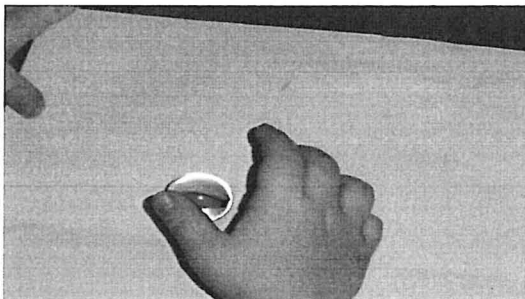
Marble Painting

Purpose: A student can use their imagination, organization skills and fine motor skills at the same time. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Pan or small box without a lid; marble; paper; paint and a spoon.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the small pieces and proper instruction to complete the task. Cut the paper to fit the pan or box and line the bottom of the pan or box with paper. Have the child dip a marble into the paint with a spoon and place the marble on the paper. Have the child hold the pan or box with two hands so she can have the marble move about the paper. If a child wants to they could use additional colors.

Adapted from Isabell, 2010



Picture used with Permission of Mike and Linnea Starkey.

Toy Workshop

Purpose: A student can use their imagination, organization skills and fine motor skills at the same time. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor

Materials: Tools such as plastic screwdrivers and hammers. Different sizes of nuts and bolts that children can fit together. A variety of different sizes of PVC piping and connectors that fit together. Sturdy plastic or wooden toys that can be fixed or work on in the workshop.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the risk of a child hurting themselves or their classmates. Provide a variety of tools and toys in the workshop.

Demonstrate how the tools work, in addition to how the various materials work together. Encourage the children to build new toys and observe how the children use the toys and materials in play.

Adapted from Isabell, 2010



Picture used with Permission of Mike and Linnea Starkey.

Floor Drawing

Purpose: A young student will develop the foundations for fine motor skills. An older student can refine their fine motor skills. The student will gain upper body strength. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: For inside: large sheets of paper, tape, variety of drawing tools such as crayons or markers. For outside: chalk and a clear area to write on such as concrete.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group so that the child will have proper instruction and to make sure that the children do not write on each other or different surfaces. Have the child lay on the floor to create drawings. Have a clear area where the child can draw in a designated area with the drawing tools.

Adapted from Isbell, 2010

Corn Picking

Purpose: A student can use their motor planning and fine motor skills at the same time. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Indian corn and a sand or water table or large plastic containers. Fill the container or table with sand, toys, buckets, shovels, spoons, funnels, etc.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group to make sure that the children will not put non edible items in their mouth. Place several ears of Indian corn in the sand table or plastic container. Have the students pick the corn kernels off the ears and put them into the sand table or the container.

Adapted from Isbell, 2010



Picture used with Permission of Mike and Linnea Starkey.

Mini-Muffin Sorting

Purpose: A student can improve their grasp of small objects and organization skills. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and eye-hand coordination.

Materials: Mini-muffin pans and small items to sort, such as buttons, stones, marbles, coins, small animals or paper clips.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns associated with small pieces. Give a student a mini-muffin pan. Encourage the student to sort the items into matching groups or same color.

Adapted from Isbell, 2010

No-Mess Finger Painting

Purpose: A student can develop finger isolation and work on pre-writing or writing skills. Fine motor skills used: finger isolation; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Resealable small plastic freezer bags and finger paints.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns. A child could eat the paint or suffocate in the plastic bag. Give each student a resealable plastic freezer bag filled with their favorite color paint. Close and seal the bag and make sure to get out all of the excess air, tap the bag for extra security. Place the sealed bag flat on the table or floor. Show the student how to use their index finger to make lines or shapes in the paint.

Adapted from Isabell, 2010

Crayon Rubbing

Purpose: A student can use their imagination, organization skills and fine motor skills at the same time. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and visual-motor.

Materials: Crayons with paper peeled off and white paper. Flat objects that have textures for example leaves, plants or coins.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns associated with small pieces. Have the student close their eyes and feel the object with their fingers. Place the flat object under the white paper and have the child color over the object.

Adapted from Isbell, 2010

Dressing Up

Purpose: A student can improve their grasp of small objects and organization skills. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and eye-hand coordination.

Materials: Dress up clothes with a variety of clothing fasteners, zippers, buttons, snaps.

Instructions: Provide clothing that includes a variety of clothing fasteners. Dolls and stuffed animals can also be used. Demonstrate and encourage the children to use the fasteners independently. If the child is unable to begin the fastening independently, start the process and allow them to finish. For example, place the button in the buttonhole and have them pull the button through. Or hand over hand engage the zipper and have the student pull the zipper up.

Adapted from Isbell, 2010

Toy-Terrain Vehicles

Purpose: A student can improve their grasp of small objects and organization skills. Fine motor skills used: tripod grasp; pincer grasp; bilateral integration; intrinsic muscle development; proprioceptive and eye-hand coordination and finger isolation.

Materials: Sand table or a large plastic container. Various types of "terrain" surfaces, such as potting soil, pebbles, pea gravel, and mulch. A variety of small toy trucks or construction vehicles.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the chance that a child could eat the "terrain" surfaces. Prepare one "terrain" on each part of the table or container. Invite the student to drive their vehicles through the "terrain". Add structures or build hills or mountains with the terrain materials. Students could add roads for their vehicles to follow.

Adapted from Isbell, 2010



Picture used with Permission of Mike and Linnea Starkey.

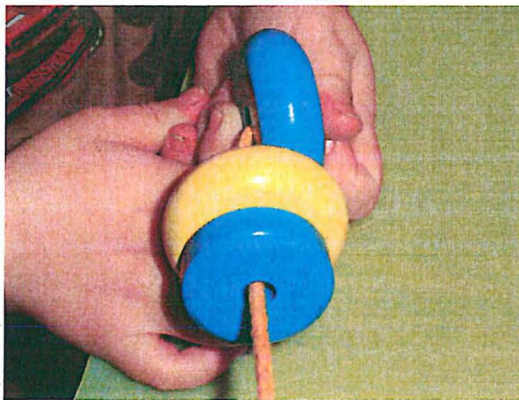
Bead Jewelry

Purpose: bilateral integration, eye-hand coordination

Materials: Small beads (1/2" diameter or smaller). Non-skid plastic drawer liner cut for place mats so the beads will not roll away. Plastic thread and child safe scissors.

Instructions: This activity should be completed with adult supervision in a one to one setting or in a small group due to the safety concerns related to eating or choking on the beads or strangulation with the thread. Place beads on non-skid mat. Have the student decide if they want to make a necklace or a bracelet and then have the child cut the thread accordingly. Tie a knot on the end of the thread and have the students string beads. When finished, tie the other end. To make this activity more challenging, have a child create a pattern with the beads.

Adapted from Isbell, 2010



Picture used with Permission of Mike and Linnea Starkey.

These lists include therapists' favorite ideas for home and classroom activities that use readily available materials. These activities require multiple different component hand skills. Compiled by Lauri Jennisch, Grant Wood AEA O.T., Winter 2001.

Hand Skill Development Activities

- Use a vertical plane to do activities whenever possible. Draw, paint, finger paint, use chalk/wet sponges, place stickers, use magnetic letters, and trace templates on a wall-mounted chalkboard, on mural paper, or on an easel.
- Use ink stamps to create pictures
- Make pictures and collages from tissue paper or other torn papers
- Crumble newspaper to stuff animals or other creations
- Make textured rubbings with leaves and other items
- Make seed, rice, bean, cereal, or paper mosaics
- Draw with a partner by having the adult and child take turns completing a drawing.
- Match, sort, and sequence small objects such as erasers, coins, buttons, cotton balls, marshmallows, and beans.
- Pick up small objects (listed above) with Zoo sticks, tweezers, pickle pickers, tongs or strawberry hullers.
- Play bingo (color, number, shape, and letters) with chips or other small markers

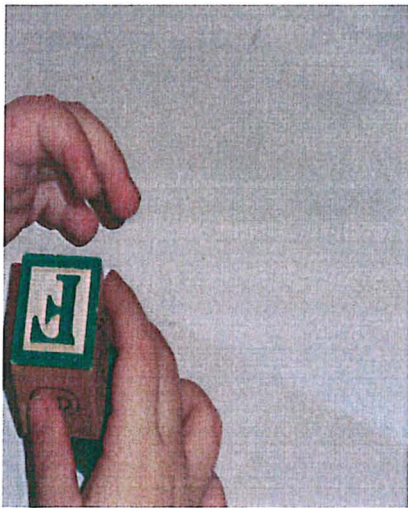
- Use small manipulatives to demonstrate math concepts
- Cup hands to shake and roll dice-use math activities and games
- Make dice towers by using small pink pencil tope erasers as tools
- Shape, pinch, and search for items in clay, playdough, or theraputty
- Line up dominoes on narrow end and then bush them over.
- String beads and other items such as Cheerios and cut-up straws
- Dress dolls and stuffed animals
- Play dress up in oversized clothing with zippers, buttons, and snaps
- Use spray bottle to clean plants, spray colored water designs in the snow, clean tables, and in games (e.g. "melt the monster: by spraying a monster drawn with marker).
- Wring out sponges and wash clothes
- Play finger games such as the Itsy, Bitsy Spider
- Use "puppet fingers" to tell stories
- Use stapler, paper punch, and other punches
- Pop bubble wrap
- Play cards
- Good games that can be bought at local stores include Magna Doodle, Lite brite, Barrel of Monkeys, Slinky, Lego's, Tinker Toys, Pick-up-Sticks. Don't Spill the Beans and travel sized games.

Fine motor activities to help develop the proper way to hold a pencil

- Have the child pick up small objects to sort, string, put away – one at a time: beads, buttons, money, silverware, napkins, paper clips, marbles, playing cards, and poker chips
- Provide opportunity to eat small pieces of food, one at a time, such as: potato chips, cheetos, M&Ms, and raisins.
- Use hand held paper punchers to punch out holes, have him/her pick up the little circles.
- Stick small objects into playdough so they stick out and have the child pull them out. (small toys, paper clips, pennies, beads)
- Squeeze clothes pins onto things (coffee cans, etc)
- Link paper clips, safety pins,, or small pop beads.
- Pick up coins and insert them in a bank
- Roll a large marble up and down or across a wall using thumb, index and middle finger.
- “Paint” with small piece of sponge and water on the basement wall, or any other appropriate surface
- Provide opportunities for the child to make lines, marks and scribble with his fingertip in sand, finger paint, shaving cream, cornstarch and water, and other substances.
- Have him/her hold a small piece of chalk, short regular pencil, or broken crayon with one end fitting into the palm of his/her hand and his/her

fingers holding the writing tool at its writing end. Tape large sheets of paper to the wall at eye level and ask the child to draw on it, encourage him/her to reach up and “drop” a line, to swing the arm and make an arc or a circle, to make wiggly marks, broken lines, wandering and straight lines. A large basement wall or blackboard is ideal. A small piece of sponge can be used to erase the wall or blackboard if chalk is used.

- When the child is drawing or coloring at a desk, have him/her use a small piece of chalk, short regular pencil, or broken crayon with one end fitting into the palm of his/her hand and his/her fingers holding the writing tool at its writing end. Place the paper on a three-ring binder to create and incline board for a writing surface.



Picture used with Permission of Mike and Linnea Starkey.

Recommended Activities to Strengthen Hands

- Encourage the child to play with lots of small blocks. Bristle blocks are particularly good. He/she can connect a lot of the together or pull apart
- Pull apart and put together pop beads
- With the child's wrist resting on a surface, have him/her tap rhythms with fingers and then one finger at a time
- Sewing cards, threading toys
- Practice using a hole puncher, first on regular paper, then construction paper, then cardboard
- Practice "shooting" small wads of paper that the child has made. Shooting is done by flicking middle or index finger against the thumb.
- Practice "shooting" marbles at a specific target on a table top
- Practice with clothing fasteners: buttons, zippers, safety pins
- Put on and remove clothespins from the rim of a can or shoe box
- Fold and crease paper of varying thickness
- Tear paper of varying thicknesses. Then try to tear the paper down a straight line and around simple shapes
- Tape paper bags or large sheets or paper to the kitchen table and walls and ask the child to stand next to it and color.
- Color on the sidewalk with sidewalk chalk
- Create sculptures with pipe cleaners
- Manipulate toys that require winding, screwing, spinning, etc

- Make shapes and designs by putting colored rubber bands around pegs
- Practice opening large and small jar lids.
- Squeeze small spray bottle to wash windows, mirror, counters
- Squeeze mustard, catsup, salad dressing bottles
- Squeeze flour sifter, plastic squeeze bottles, turkey baster, and juice from fruit
- Open small milk carton and pour milk into a glass.
- Spread butter, cream cheese, or peanut butter with a knife.
- Use dull knife to cut cheese
- Open cereal boxes, tearing cardboard and plastic bag with cereal.
- Twist putty, large sponge or washcloth using a wringing motion
- Squeeze water out of sponge to water plant.
- Brush wall with large paint brush
- Peel fruit such as lemons or oranges
- Use tongs for picking up objects
- Turn keys in a lock
- Deal cards
- Manipulate clay, or playdough, The pieces should be large enough so he/she can squeeze it, pinch it, poke it, pull it apart, roll it, roll it out with rolling pin, use cookie cutters, and cut the dough.
- Make sculptures and small balls out of playdough. Hide small objects in them and have him/her pull the objects out
- Play in a mixture of cornstarch and water in a pan

- Roll cooking dough into balls, or make rice crispy bars
- Stir in cookie dough, bread dough, flour and water, kool-aid, frozen juices or any substance in a large bowl, pitcher, pan
- Crunch newspaper, paper bags and other paper into balls
- Make a balloon exercise for everyone in the home: Put flour into a balloon through a funnel, tie the balloon end. Squeeze for fun, exercise, and relaxation.
- While the child is doing activities such as reading, coloring or watching T.V. have the child lie on his/her belly and rest on his/her arms
- Let the child carry things for you. Have him/her lift and carry light objects a long distance, and other times ask him/her to pick up and carry heavy objects a short distance.
- Fill a laundry basket or a large box with books, clothes, canned goods, or toys. Have the child do the following with it.
 - Push it across the floor
 - Pull it across the floor
- Do activities that require reaching forward and up at shoulder level: Put away dishes or books, toys on shelves: pick up wheelbarrow handles and push: shoot baskets
- Pulling wagon weighted with books, groceries, etc.
- Push open heavy doors.
- Pull self up on rope or bar
- Tug-of-war

- Wheel barrow walk
- Crab walk
- Toy workbench- equipped with sturdy wooden hammer, screwdriver, nuts and bolts and vice bench can be taken apart and put together again.

CHAPTER V

SUMMARY

Based on the findings of the literature review, fine motor skills are an important skill to develop during the preschool years. Marr, Cermak, Cohan and Henderson (2003) described the importance of fine motor skills to engage in valued occupations in addition to educational activities. A child's occupations that demand fine motor skills may be dressing, tying shoes, and playing, among other daily tasks. If a child has difficulty with fine motor skills it could have a negative outcome on his/her daily life and how he/she performs in school. Children who have difficulty coordinating the small muscle groups in their hands have difficulty dressing, feeding themselves, and manipulating pencils, crayons and scissors. This difficulty may prevent them from meeting the demands of school Losse et al, (1991)

Fine motor skills are important skills to be developed. The research has shown that with opportunities imbedded in their day, preschool children increase the refinement of fine motor skills. Fine motor skills are an important component of handwriting and manipulating classroom objects. Handwriting is both a means of communication and necessary life skill, as in writing a letter or telephone message, completing an application form, or writing a cheque.

Handwriting is still the most immediate form of graphic communication (Sasson, 1990).

An educational manual was created to educate parents and childcare workers about the importance of fine motor skill development during the preschool years. Activities and suggestions were given on how to incorporate fine motor activities throughout the day. This manual was created to be used by preschool teachers to integrate fine motor skills into their curriculum. Activities adults could use to encourage children to participate in fine motor activities on a daily basis are included and terminology defined.

This project will be distributed to local preschools, daycare providers, parents, and head start programs to be used in the classroom through out the day. This manual will also be made available to other team members who work with early access (birth-3 years) and preschool children (3-5 years old).

The purpose of this product is to encourage children to develop good fine motor skills in the preschool years. By encouraging the use of this manual with preschool children, it is predicted that children will develop good fine motor skills. If a problem is noted in regards to fine motor skills, it would also let the adults in that child's life look into occupational therapy and how the expertise of an occupational therapist could benefit their child.



APPENDIX





Appendix A

Permission for use of List of Fine Motor Activities





From: Lauri Jennisch [Add to Address Book](#)

To: 'Linnea Starkey'

Date: Friday, January 06, 2012 11:28:57 AM

Subject: RE: help
t:

I would be very happy to have you include the list of fine motor ideas I compiled!
CONGRATULATIONS on your masters, too. I didn't know you were doing that!

Lauri Jennisch, MS, OT/L
Grant Wood AEA Occupational Therapist
and Career Connections Program Coordinator
E-mail ljennisch@gwaea.org





Appendix B
Pre-writing Strokes





PRE-WRITING STROKES

1 year 4 months

- Spontaneous scribble

1 year 9 months

- Contained scribble

2 years

- Imitate a vertical line

2 year 6 months

- Imitate a horizontal line

2 year 10 months

- Imitate a circle

3 years old

- Copy a vertical line and circle

4 years one month

- Copy a cross

4 years 4 month

- Copy a diagonal (right to left)

4 years 6 month

- Copy a square

4 years 7 months

- Copy a diagonal line (left to right)

4 years 11 months

- Copy an X

5 years 3 months

- Copy a triangle

Berry, K.E., Berry, N.A., & Buktenica, N.A. (2010). *The Beery-Buktenica Developmental Test of Visual-Motor Integration Berry VMI sixth edition*. Bloomington, MN: Pearson.





Appendix C

Fine Motor Skills for Ages and Stages for Children Birth to Five





Fine Motor Skills

0-3 months

- closes fingers when light pressure is applied to open palm
- hold a rattle for 5-10 seconds before dropping
- reaches for object with both hands, often misses

3-6 months

- holds a toy for 10-15 seconds
- holds small objects
- brings hands together when laying on back
- Shakes and plays with a rattle for several minutes
- Reaches towards object often times reaches them
- grasps object voluntarily
- Recovers rattle dropped on face
- Pulls covers of clothes over their face

6-9 months

- rakes or scoops small object with hand
- Transfers objects from one hand to another
- Picks up small objects easily
- bangs in midline
- Shakes bell
- Pulls out large peg
- Holds small objects between thumb and index finger

9-12 months

- can poke with index finger
- claps hand
- corrals ball with arms and hands when sitting with legs spread apart
- Index finger begins to point or poke into holes and pulls
- holds crayons makes marks





12-18 months

- drops object into a small container
- removes lid of box to find toys
- inserts round shape in foam board
- stack 2-4 objects on top of one another
- turns pages in a book
- enjoys pushing or pulling toys when walking
- holds crayon with fingers, hand on top, forearm turned so thumb is directed downwards

18-24 months

- scribbles vigorously with crayons or markers
- places 10 cubes in a cup
- imitates vertical strokes
- build tower with 5-7 cubes
- 4 block train
- throws a small ball overhand or underhand at least 3 feet
- complete 3-piece puzzle (circle, triangle, square)

24-30 months

- imitates circular, vertical and horizontal strokes
- rolls, pounds or squeezes clay or play dough
- stack 6-7 blocks
- snips paper with scissors
- uses one hand consistently in most activities
- catches ball from straight arm position, trapping ball against chest
- attempts to fold paper
- turn books of page one at a time
- unscrews lids

30-36 months

- threads 4 small beads on a string
- copies a circle and cross
- holds pencil with finger and thumb instead of fist
- builds a tower of 8-10 cubes





36-42 months

- uses vertical, horizontal, and circular motions when drawing
- hammers nails or pegs.
- pedals and steers small bike
- adds 2 parts to an incomplete person
- holds scissors and open and shuts
- snips paper
- cut on a straight line

42-48 months

- copies a cross when drawn
- holds crayon between first two fingers and thumbs, not fist.
- forms simple shape out of clay (e.g. ball, clay, snake, pancake, etc.)

48-54 months

- cuts circle with scissors
- sorts objects one by one
- stacks 9-10 blocks
- build steps with 6 blocks
- draws a straight line to connect two lines that are 5 inches apart

54-60 months

- mature grasp on pencil, fine motor present in hand
- copies a square when drawn
- completes 8 piece puzzle with trial and error
- cuts simple shapes
- colors within the lines

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Appendix D

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