

A Preschool Teacher's Back to Basics Guide to Hand and Fine Motor Skill Development

By Rachel Rudman, MSOTR/L
Missouri State University

Hand development requires the use of fine motor skills associated with picking up, grasping, holding, and manipulating objects. Since preschool is considered a foundation period in a child's life, promoting hand development at this stage is crucial and will help children develop a solid basis for future skills, such as feeding, cutting, handwriting, and drawing. Young children who develop these skills benefit since they are able to keep up with their peers (Lefrancois, 1995). Unfortunately, today many teachers are observing that children are lacking these hand and fine motor skills, while at the same time, the U.S. Department of Education is advocating all children in America will start school ready to learn.

One of the greatest contributing factors to the lack of age-appropriate fine motor and hand skills in children is societal change. The following are four examples of these changes.

One of the greatest contributing factors to the lack of age-appropriate fine motor and hand skills in children is societal change.

- "Tummy time" has been limited for young children as a result of the recommendation regarding Sudden Infant Death Syndrome (SIDS).
- Watching television in the home has replaced play, which encourages use of hand skills.
- Single-purpose electronic toys have replaced basic toys and equipment in some homes and classrooms.
- Curriculum used in some classrooms focuses more on cognitive competence, as opposed to physical and social/emotional, and therefore is developmentally inappropriate.

In 2005, the American Academy of Pediatrics recommended that infants be placed on their backs in the crib in order to prevent SIDS, the unexpected, inexplicable death of a child under the age of one (2005). When infants lie on their stomachs, the extensor muscles and the arches of the hands begin to develop. Up until this recommendation,

children placed on their stomachs would explore naturally while lying in their cribs. Without the opportunity to sleep on their stomachs, some infants and toddlers lack the opportunity to develop muscles that are later critical for fine motor development. To compensate, “tummy time” activities need to be included in infants’ daily activities to promote the development of their extensor muscles and arches of the hand. For example, infants can be placed on the floor with interesting toys within their vision and grasp.

Television, Computers, and Electronic Toys

Most homes in the United States have at least one television set, and most have more. Typically, children between two and six years of age watch $1\frac{1}{2}$ – $2\frac{2}{3}$ hours of television each day. Girls tend to watch slightly less than boys. Moreover, babies as young as six months spend at least one hour per day exposed to television. With the exception of sleep, Berk (2006) reported that children in the United States spend more time watching television than any other activity. Thus, screen time is preventing young children from refining their basic motor skills.

While strolling through the aisles of a toy store, it is apparent that many toys today are electronic or need an electronic component to use. Many of these toys have only one use and thus limit children’s development. To illustrate, when using a single-purpose toy, children push a button and the toy will respond by moving or talking. Some of these

toys provide children with unbelievable opportunities to gain information and promote their cognitive development. Young children learn letter, animal, or vehicle sounds by pushing a button. But these one-use-only technological toys may be limiting the child’s emerging imagination and motor development (Van Hoorn, Nourot, Scales, & Alward, 2003).

The Power of Play and Intentional Teaching

Play drives young children’s growth and development. Young children need many opportunities throughout the day to learn through the physical experience of play.

Hand skills are not developed by only touching a button. Children need to experience and explore by pushing, pulling, digging, pouring, turning pages, and building with blocks. Through repetition, they learn cause and effect, how things work, and problem-solving skills.

The coordination and sequence of motor development

depends both on physical maturation and experience (Lamb, Bornstein, & Teti, 2002). However, teachers need to model how to hold writing tools, such as crayons and chalk, and provide opportunities for children to practice. Children should be encouraged to work with their peers to develop coordination and dexterity skills since they often learn skills better by observing and imitating them. Furthermore, teachers have to intentionally plan the classroom so all areas contain interesting and stimulating manipulative materials to promote optimal development (Epstein, 2007).



Understanding Development and the Sequence of Hand Development

If children are provided opportunities during the preschool years, their motor skills improve markedly. Although each child is unique, the basic patterns or principles of growth and development are universal, orderly, and predictable (Herr, 2008). Understanding the *cephalocaudal* and *proximodistal* principles of development is important for teachers

and parents of young children. According to the cephalocaudal principle, development proceeds from the head downward. First, the child gains control of the head, then the arms, and then the legs. Development also proceeds from the center of the body, which is referred to as the proximodistal principal. According to this principle, the spinal cord develops before other parts of the body. As a result, children's arms develop before their hands. Fingers and toes are the last to develop.

Table 1

Small Motor Development Milestones: One to Four Years of Age			
12–18 months	18–24 months	24–36 months	36–48 months
Picks up objects with pincer movement	Rolls, pounds, squeezes, and pulls clay	Turns pages in a book one at a time	Copies a cross
Releases a toy in a container	Builds a tower of six cubes	Strings large beads	Builds a tower of nine to ten cubes
Builds a tower consisting of two 1-inch cubes	Holds a crayon	Copies a vertical and horizontal line	Cuts a 5-inch line within ½ inch of the line
Turns pages of a book two or three at a time	Squeezes a soft toy	Uses one hand consistently for most activities	Draws a person with three parts
Hurls a ball		Holds scissors correctly	Completes simple puzzles
Scribbles vigorously		Opens and closes scissors	Wiggles thumb
Uses cup for drinking		Copies a circle	Traces a diamond
Places six round pegs in a pegboard		Snips paper with scissors	Exhibits hand preference
Removes shoes			Unbuttons clothing
Uses a spoon awkwardly			Dresses and undresses with assistance
Throws objects to floor			Zips and handles simple clothing fasteners
Feeds self efficiently			Spreads butter, peanut butter, and jam on toast
Holds two cubes in one hand			
Uses a cup for drinking			

Hand and Fine Motor Development

Understanding the developmental norms for hand and fine motor skill development will help teachers facilitate these skills. According to the HELP for Preschoolers Chart, three-year-old children should be able to cut a curved line and string small beads (Vort Corporation, 1995). Four-year-old children should be copying a model of a square, making stick people, and cutting out small shapes with scissors. Diagonal patterns should not be expected until around age 4½, meaning that until then, children are not expected developmentally to copy letters. Letter copying involves the ability to copy vertical, horizontal, diagonal, and circular strokes. Table 1 contains developmental milestones in small motor development for children from one to four years of age (Herr, 2008; Puckett & Black, 2005).

Societal pressures are forcing formal education practices down to younger and younger children. Preschool children are not developmentally ready to start writing. Their hands lack the muscular control required and their minds are not ready for copying skills. If forced, children may develop negative feelings about writing and poor habits for grasping writing tools.

Hand Function

It is amazing how much function comes from our hands. Without providing too much detail on the actual anatomy of the hand, it is important to have a basic appreciation of its intricacies. Before fine motor control comes

trunk stability. People need to have the strength in their core, the chest and stomach area, in order to have control of their fingers. The wrist is the joint where the bones of the hands attach. When the wrist is positioned up, the *intrinsic* or small muscles of the hands can work. Using the easel is a great classroom tool for promoting hand development since it naturally facilitates the small muscles in the hands. There are 27 bones and 19 muscles in the hand. Between ages one and two, the small muscles in the hand develop and the arches of the hands become functional (Case-Smith, Allen, & Pratt, 1996).

When the wrist is positioned down, it is more of a power-grasp position, like in opening a jar. Examining the palm, one can see the hand's arches. The arches of the hand help control the power of the fingers, enabling children to pick up different-sized objects and helping with thumb usage in grasping.



Intentional Teaching

In order to achieve maximum results for preschoolers, teachers need to carefully assess and plan experiences for young children. They must have an understanding of growth and development as well as a repertoire of instructional strategies for helping children develop hand and small muscle skills. Simple environmental changes can help enable children to achieve optimal success.

Focusing on positioning is the first step to creating an environment where children can reach their maximum fine motor potential. Children need to have their feet flat on the floor while they are sitting at their tables.

This creates stability for the child to improve focus and fine motor control. Not all of the children's feet will be flat on the floor. Many classrooms have adjustable tables, yet children are of varying heights. One solution is to group children at tables by size, using smaller chairs at the lower tables. Another solution is to use footrests made out of old telephone books taped together.

Without shoulder and core strength, children will experience difficulty controlling their small muscles. Shoulder stability is underdeveloped when crayons and scissors are grasped too tightly; another sign of underdevelopment is when children are practically touching their shoulders to their ears while sitting and coloring or cutting. By squeezing the shoulders tight, they are able to compensate and achieve more stability in their hands.

There are many fun activities that teachers can use to improve shoulder stability in preschool. Children love learning when movement is incorporated. Teachers can plan, develop, and introduce obstacle courses for children to engage in wheelbarrowing and crab walking. Games can be introduced where children squirm like snakes on the carpet or move like airplanes in the sky.

Children could also go on movement journeys while the teacher tells stories during circle time. With children lying on their tummies, when the teacher says, "Start your airplane engines," they can extend up to a flying position by lifting their legs and arms off the floor for as long as possible during the journey. If there are any children who have significant difficulty with shoulder stability, teachers may want to encourage

those parents to introduce age-appropriate gymnastics or other sports.

The preschool classroom has all the tools necessary to develop hand skills. In order to develop the proper grasp pattern for eventual pencil use, avoid introducing pencils at this age. Broken tips of crayons, approximately one inch in width, are the perfect coloring tools. When holding the 1-inch crayon tip, children cannot grip the wrong way. This size eliminates first-finger- or thumb-wrap grasp since children are forced

to use the correct grasp pattern. By not having an option for an alternate grasp, the stress level is reduced and children can focus on the fun of creating. Another good option is small cone-shaped stackable crayons.

Animal markers are also perfect for developing little hands by forcing children to open the hand and develop the arch. Taping a piece of sandpaper to the table with regular paper on top creates a resistive strengthening effect with the crayon tips. The bumpy feedback on the hands from the sandpaper also helps the child remember the feeling of the correct grasp. Using an easel or simply taping papers to

the wall is also an excellent way to promote development in the small muscles of the hand. When children work at an easel, their wrists are tilted upward and they can't move from their shoulders. In this position, only the small muscles of the hand can work.

Introducing toaster tongs or strawberry hullers is a terrific low-budget strategy for working on hand-strengthening activities and simultaneously teaching additional learning skills such as patterns, counting, and sorting.



Using tongs or less complex tools is a great rehearsal for scissors, allowing children to practice controlling the open and close motion without the stress of having to involve the many other components. This playful strategy takes the stress out of cutting. Children can use tongs to pick up small objects or game pieces.

Understanding the basics of how our hands develop, teachers can apply this knowledge to use typical classroom materials with a new purpose. Although cutting may seem like a straightforward task, it actually involves many *performance components* or steps. To begin, children need to have the planning ability to know how to hold scissors, to control the opening and closing of the hand, and visually follow the line they are trying to cut. For some children, this comes naturally, but for

many children, it is a learned skill. The correct position of holding scissors is the thumbs-up position. Children need to always place the thumb in the upper loop. The middle finger is always at the bottom, and the pointer finger is used as a pointing guide.

Teachers often observe that, when cutting, many children's mouths open and close in the same pattern that their scissors do. This action is called an *associated reaction*. This movement requires such intense concentration that they are mirroring their mouths to the same movement. Similarly, many women can relate to the associate reaction when applying mascara. How many women look in the mirror and have their mouths wide open while trying to carefully coat their lashes? The reason for this is that the brain is working hard on multiple levels.

Table 2

Simple Activities for Enhancing Preschool Hand and Small Motor Skills		
Puzzles	Hammering	Etch-a-Sketch
Tweezers or tong activities	Stamping games	Finger puppets Tug-of-war
Building activities (Legos or Zoobs)	Rubber band geoboards	Crab walking
Coloring with 1-inch crayons	Stencils	Lacing cards
Easel painting	Hole punchers (can create confetti)	Sand table
Stringing beads	Building with 1-inch cubes	Climbing on playground equipment
Playdough	Sticker activities	Dress-up play
Table blocks	Fastening zippers, snaps, and button	Thumbprint art
Snap beads	Clothespin activities	Hand tracing
Finger paints	Rapper Snappers	Taping sandpaper under paper before coloring
Pop beads	Tear or snip pieces of paper to make a collage	Playing with manipulatives
Pegboards	Sponge painting	Placing coins in a piggy bank or charity box
Lacing		
Squeezing glue		

Another effective way to get children comfortable with cutting is to allow them to cut things without limits. Junk mail or old coupons and magazines along with paper, scissors, and glue allow children to do free-form cutting. There are no rules; they can cut and paste any way they choose. When working on cutting out patterns, children need to have a higher level of scissor control. Provide children with designs to cut out of a heavier grade of paper. Thicker paper enhances the control. On regular weight paper, children are more apt to experience the feeling that the scissors are almost running away from them. Each cutting stroke on a cardstock paper is more deliberate. Each stroke takes a calculated effort. Practicing on thicker paper also strengthens the muscles in the hand used for cutting.

In conclusion

Technological and societal changes have impacted children's hand and small motor skill development. To ensure that children are able to meet our nation's goal of being prepared to learn when they enter school, teachers need to be intentional. This includes understanding development, planning developmentally appropriate activities, and introducing a stimulating environment with interesting materials. Along with repetition, all these components are necessary to promote optimal hand and small muscle development.

AUTHOR NARRATIVE:

Rachel Rudman MSOTR/L is an occupational therapist with an advanced degree in early intervention. Her full time private practice services children ranging from three to thirteen. Rachel gives workshops for parents and teachers and has recently developed the Grasshopper Preschool Preparation Program.

References

- American Academy of Pediatrics. (2005). AAP SIDS policy recommendations. Retrieved March 5, 2009, from <http://www.aap.org/healthtopics/sleep.cfm>
- Berk, L. E. (2006). *Child development* (7th ed.). Boston: Allyn & Bacon.
- Case-Smith, J., Allen, A. S., & Pratt, P. N. (1996). *Occupational therapy for children*. St. Louis, MO: Mosby.
- Epstein, A. S. (2007). *The intentional teacher: Choosing the best strategies for young children's learning*. Washington, DC: The National Association for the Education of Young Children.
- Herr, J. (2008). *Working with young children* (6th ed.). Tinley Park, Illinois: Goodheart-Willcox Company, Inc.
- Lamb, M. E., Bornstein, M. H., & Teti, D. M. (2002). *Development in infancy* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lefrancois, G. R. (1995). *Of children: An introduction to child development* (8th ed.). Belmont, CA: Wadsworth Publishing.
- Puckett, M. B., & Black, J. K. (2005). *The young child: Development from prebirth through age eight* (4th ed.). Upper Saddle River, NJ: Pearson Education, Inc.
- Van Hoorn, J., Nourot, P. M., Scales, B., & Alward, K. R. (2003). *Play at the center of the curriculum* (3rd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.
- Vort Corporation. (1995). *HELP for preschoolers: Assessment and curriculum guide*. Santa Cruz, CA: Author.



The Child Development Associates (CDA) competencies that can be linked to this article are:

- To advance physical and intellectual competence

For more information on the CDA competency requirements, contact the Council for Early Childhood Recognition at 800-424-4310 or visit www.cdacouncil.org.

The Certified Childcare Professionals (CCP) professional ability areas linked to this article are:

- The ability to enhance physical development of young children
- The ability to reliably assess children's development

For more information on the CCP certification, contact the National Child Care Association at 800-543-7161 or visit www.nccanet.org.