



Son: I'm not going back to school tomorrow!

Father: Why not?

Son: Well, I've been there a whole day, I can't read, I can't write and they won't let me talk, so what's the use? »

Handwriting is



Learning to read and write is a “rite of passage” for children. But mastering handwriting can be difficult; as many as 20% of school children have writing problems. Failure with such an important skill can be devastating and frightening. For success, children must be developmentally ready to write, and the writing tasks, tools, and environment must fit the child.

So, when is a child ready to write?

Writing requires both proximal stability and distal mobility. Postural muscles stabilize and allow for dynamic movement to use the hand.

Unfortunately, today's children are inactive and prone to postural problems. Inactivity can begin in infancy. Parents often avoid positioning babies on their tummies in response to fears of sudden infant death syndrome (SIDS). This “prone on tummy” stage is crucial for postural control and balance. Motor competence develops through movement and exploration. Early and excessive use of plastic “exo-skeletal” devices restrains children and limits exploration. Decreased motor competence can result and be detrimental for hand control.

Today's children spend much of their time indoors watching TV and using computers. While becoming “couch potatoes” they can also develop awkward sitting habits and poor postures. Children need visual skills such as ocular mobility, binocularity and accommodation to write. If absent, both handwriting and school performance can suffer.

Hold off on handwriting activities until the child develops hand dominance. Children without expressed dominance can have difficulty figuring out which hand to use to write.

Right of center

Our Western cultural system of reading and writing is biased for right-handers. Reading and writing moves from midline to the right. Left-handed children must write from their outside towards their midline. This movement is unnatural for them, and impedes their learning to write. Some children (especially girls) begin “writing” as early as 2 1/2 years of age and before they are developmentally ready. The latter part of kindergarten (between five and six) is often the best time to learn to print. At this age, the basic motor skills, attention and recall needed to form letters are present. Hold off on cursive writing until the beginning of second grade, when children can chain movement sequences and combine letters into words.

Getting a grip

Functional writing requires a mature grip. The child must be able to: (1) open and stabilize the thumb-index web space; (2) develop and stabilize the hand arches; (3) separate the two sides of the hand at a motor level; and (4) coordinate precise movements. Early recognition is important. Children lacking the prerequisite hand functions for a mature grip will adopt immature grips. Once established, these are difficult to change and can continue into adulthood.

s Child's Work!

By Cindy Burt, OTR

How can ergonomists' promote functional handwriting skills?

Guidelines for designing effective learning environments include:

1. Promoting stable postures.

Design environments that meet the postural needs of the children who use them. Size adjustable furniture to the child users. The single size desk environment based on age is even less effective for children than for adults.

Select chairs that provide low back support and allow the student's heels to contact the floor for weight shifting and support. Forward sloping seats

a sloped writing surface. Consider cutout work surfaces to optimize trunk control and provide forearm support, especially with children with postural instability.

2. Optimizing the learning environment.

Some children are not developmentally ready to work on horizontal surfaces until they are about 7 years old. Make sure chalkboards and easels are available in kindergarten and elementary schoolrooms for these children. Vertical surfaces promote wrist extension and mature grip patterns. They

when writing. Recommend pencils and pens that are weighted near the writing end rather than at the top.

Encourage children to experiment with different writing tools. Try ballpoint pens, markers, calligraphy pens and varying hardness of lead in pencils. Avoid ballpoint pens and markers that smudge; this inhibits all writers, especially left-handers.

Some children prefer unlined paper, but most work best using high-lighted base lines for orientation. Select line rule size on the writing tool and the child's grip excursion, rather than on the child's age, size or grade.



(10-15 degrees) help promote upright postures when writing on a desk surface. Avoid rounded or curved seats that encourage slouched postures; seats with a distinct angle between the base of the spine and thighs are best.

The chair-desk relationship is important. The edge of the desk should overlap the seat. Ability to adjust the space between the desk and chair can optimize upright postures.

Recommended desktop height is 2 inches above seated elbow level. At this level, forearms are supported while shoulders remain relaxed. Desktops that slope between 15 and 25 degrees can help decrease neck flexion and reduce forward sitting postures. If sloped desk surfaces are not available, use horizontally positioned 3" binder notebooks to provide

also help children to keep their hand below the writing line during writing tasks. Encourage children with low postural stability to stand at easels and chalkboards to write.

3. Promoting the use of appropriate tools.

The size, shape and surface texture of the writing tool affect grip. Chalk or crayons broken into 1/2" – 1" pieces encourage use of a mature grip. Try using large diameter, rubber and foam pencils, markers, crayons, and pens that are easier to grip. Positioning devices such as the Pencil Pal can provide a higher point of stability to reduce awkward gripping positions. Rubber bands can be used to check pencil angle to decrease tension in the fingertips

Promote use of high contrast paper and marking ink for easy visibility.

Don't take the ability to learn to write for granted. Adults can easily forget how mysterious and daunting writing can be for children. And remember, once learned, writing habits last a lifetime. "Writing friendly" ergonomic environments can help children avoid bad habits that can be difficult to change. 

Note: Information presented is based on the Handwriting chapter by Cindy Burt and Mary Benbow in the upcoming book *Children's Ergonomics*, edited by Rani Lueder and Valerie Rice, Taylor and Francis, New York.

Cindy Burt is the manager of the UCLA Ergonomics Program. Visit the UCLA website at www.ergonomics.ucla.edu to learn more about the program and available resources.