

Climbing to Maturity Hand over Hand

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By Loretta Marmer

Not so long ago, early-childhood educators forced children who naturally wrote with their left hands to switch to the right. These teachers may have been doing considerable harm, says Rhoda Erhardt, MS, OTR, FAOTA, a private practice owner in Maplewood, MN. Which hand to use in performing a task should always be the child's choice, she said.

The issue of hand dominance is a controversial one, admits Erhardt, and there is no universally accepted theory regarding the age at which hand dominance should emerge. Many OTs, she says, believe that if a child hasn't established dominance early in his or her development, it will interfere with learning and the brain's ability to process information.

"I'm not so sure that's true," Erhardt told ADVANCE.

In reviewing the literature, Erhardt found several experts who assume that by the age of one or two a child should clearly demonstrate hand preference. Yet researcher Dr. Arnold Gesell wrote that hand dominance doesn't emerge in many children until age three, and that in some children, it is not well integrated until eight or nine years of age.

In light of the mixed messages, "I would like therapists not to assume anything, but to gather as much information as they can, and make decisions based on that," she said. Handouts Erhardt distributed at her handedness workshop, presented as an institute at the AOTA conference in Orlando last month, include a documentation form which organizes observations of hand preference and quality of performance.

Dr. Gesell's theory is that there is a developmental progression infants follow in the first year of life. Babies generally begin using one hand, but gradually begin to favor the other. They generally go through periods of alternating hands and using both hands together as they develop a variety of skills, then settle on one hand for certain tasks, Erhardt related.

In the 1930s and '40s, Dr. Gesell conducted extensive research into the factors involved as humans establish hand dominance. Situational factors, he believed, largely influence which hand a person will use for a certain task.

For example, the placement of an object affects which hand you reach with, Erhardt said. "If an object is at midline, both babies and adults tend to reach with both hands when the size or shape of the object requires it," she added. One hand is often more skilled at precision tasks, while the other is more appropriate for tasks requiring power, regardless of dominance.

The issues are similar in typically developing and delayed children. Erhardt advises therapists working with young children to survey the literature on hand dominance, but, she warns, read critically and be aware of discrepancies among the many published studies.

Erhardt reminds OTs that one of the profession's great leaders was way ahead of her time in her knowledge of, and critique of, hand dominance theories. In her first book, *Sensory Integration and Learning Disorders*, published in 1972, Jean Ayres acknowledged the conflicting information in the literature.

"She felt that errors were made in much of the literature (regarding) cortical and hemispheric dominance," Erhardt said. Many early studies, for example, suggest a correlation between eye and hand dominance. According to Erhardt, Ayres was not convinced that handedness is always equated with dominance of the eye, foot, or ear.

Ayres further disputed the idea that cortical dominance indicates neurological maturity. The brain may be mature even though a person has not established clear hand dominance, Erhardt elaborated.

"Jean Ayres' theories are compatible with today's theories," Erhardt said. "She saw our whole evolutionary process moving toward specialization of cortical function--certain hemispheres are responsible for certain functions." For example, the left hemisphere features more focal organization, while the right hemisphere is more diffuse. However, she noted that many functions are shared by the left and right hemispheres.

Erhardt believes that hemispheric specialization theories do have merit, but cautions that there may be no connection between a child who has learning problems and the fact that he has mixed hand dominance.

While early researchers attempted to isolate specific functions of the brain, today's scientists take a more holistic view of hemispheric function. In 1989, the department of human movement at the University of Western Australia found that task requirements often override asymmetrical brain influences, showing that the relationship between movement and laterality is dynamic, adapting to environmental demands.

"(Ayres) said even if one hemisphere is (usually) dominating, the other may dominate sometimes," Erhardt said. "She believed each (hemisphere) works better if it has the resources of the other."

According to Erhardt, Ayres was concerned that if therapists forced lateralization by encouraging the use of one hand, it may result in the child skipping important developmental steps. "(Ayres) felt the best way to approach the handedness problem is to investigate the underlying factors interfering with motor development and remediate those deficits," Erhardt explained. Ayres suggested that the brain can then continue the normal maturation goal of establishing at least one hand for skilled work. If children do have delays, it is the result, not the cause, of handedness problems.

Just as educators used to push students to use their right hands in developing graphic language skills, some experts still advise professionals working with young children to encourage the child to develop proficiency in only one hand, be it the right or left.

Erhardt questions this advice. "Quite a number of people are ambidextrous and are extremely functional." Erhardt agrees with developmental psychologist F.M. Crinella, who in 1971, wrote that the ability to use both hands provides the organism with a more balanced repertoire for adaptive behavior.

Based on her own research and experiences, Erhardt recommends that OTs gather information on individual youngsters using task analysis. While there are several evaluations available, Erhardt has yet to discover one that takes into account all the elements affecting hand dominance. "There are no universally accepted rules for measuring (hand dominance)," she said.

She believes OTs should look not only at a child's unilateral skills, but also at the child's bilateral skills. Bilateral skills can be divided into several subcategories. Both hands can be performing the same task symmetrically, or one hand may be leading while the other is assisting in the activity. The most advanced bilateral skill is demonstrated when each hand performs entirely different aspects of an activity, as in tying shoelaces or using scissors. Some therapists may concentrate only on helping a child gain skills in repetitious one-handed tasks, neglecting the other hand, Erhardt noted. "I use my own test, the Erhardt Developmental Prehension Assessment (EDPA), to find missing components in the development of a child's unilaterality and bilaterality."

Erhardt suggests that OTs working on hand function with young children:

- * sharpen their clinical observation skills;
- * document those observations;
- * incorporate those observations into treatment programs;
- * plan intervention to insert the missing development components; and
- * adapt the environment to facilitate function.

In particular, examine what hand a child uses for what tasks, for how long, and the quality of work the child produces. "Be aware of all the factors of why a child uses one hand over another; for example, children with low muscle tone who are mildly delayed may switch hands because they get tired when they are writing," she added.

The decision of which hand to use for a task should ultimately rest with the child, Erhardt stressed, because most children have very good reasons for what they do. "It's our job to figure out what (those reasons) are."

* Look for Rhoda Erhardt's special series on hand function in ADVANCE, beginning in June.

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