

TO WRITE OR TO TYPE – THAT IS THE QUESTION!



Handwriting difficulties are almost always present in children who have coordination difficulties. Handwriting is a very complex skill that requires the child to integrate postural control, visual and motor abilities. These physical demands, combined with the attention, memory, cognitive and language demands are often overwhelming for a child who has coordination difficulties.

Children who have developmental coordination disorder (DCD) may:

- be slow and laboured when printing or writing;
- produce work that is disorganized and illegible;
- rush through written work and make many errors,
- avoid writing and stall, argue, or act out when it is time to do seat work or homework;
- generate a written product that is inferior to their verbal language abilities.

Poor handwriting can impact on children's academic progress, result in poor grades, set up conflicts with teachers and parents, and leave a child feeling embarrassed or discouraged. The use of a computer or word processor is often suggested as an alternative strategy to writing and is frequently included as an accommodation in a child's Individual Education Plan (IEP). Some of the things that parents and teachers need to think about when considering typing with a child with DCD are addressed below.

Why should children with DCD use a computer/word processor?

In order to print or write a letter, the child needs to:

- hold a pencil with a suitable grip
- apply a moderate amount of pressure
- coordinate the small movements of the muscles of the fingers and thumb
- visualize what the letter looks like
- remember the motor pattern that makes that letter
- draw the letter

- monitor whether the motor commands are correct to make the muscles move with the right amount of force and distance
- make the letter the correct size
- place the letter neatly on a line
- leave the correct amount of space between that letter and the one that comes next.

Computers/word processors have several advantages over pencil and paper for the child who struggles with written work. The task demands are significantly lower in typing.

In order to type a letter, the child needs to:

- isolate a finger
- recognize the letter
- locate the letter on the keyboard
- press the key.

When typing, the page doesn't move around when the child writes and the letter appears formed and placed correctly. The distance that the key moves up and down, the layout of the keyboard and the location of the letter stays the same.

For both writing and typing, spelling, sequencing, and grammar come into play when the child moves to words, sentences, and longer passages. The basic production of a letter, however, is still much simpler with a keyboard. The finished typed product is always neat and legible. For a child who is struggling with handwriting, the reward of a readable product may be motivational and may boost their confidence and willingness to write.

Does keyboarding mean we are giving up on writing?

Absolutely not! Rather than thinking about one method or the other, we need to think about the two skills as developing in parallel. If a child learns to ride a scooter, they can still learn to ride a bicycle. The rules about cars, helmets and stop signs are the same and both are means of transportation that children enjoy. The effort and balance required, and the choice of timing for each method might differ.

Typing and writing are two socially acceptable ways to produce written work. Children need to know how to do both. Although computers are widely accepted in our society, it is not always possible, desirable or convenient to use a computer. Children will always need to be able to write their names, their homework lists or reminder notes with some proficiency. They do not, however, need to produce every science project or English essay in neatly formed handwriting. A healthy balance needs to be achieved

between the content that is to be learned and the written product that results. For example, if the goal is to improve handwriting then the product should be handwritten, if the goal is to display the learning that has been mastered, there is no necessity for it to be handwritten.

What about printing versus cursive writing?

Children in the public school systems are usually taught cursive writing in grade 3. For some children with DCD, cursive writing is actually easier than printing. Writing has more fluidity and flow. The letters all start from the same place and issues around sizing and spacing often disappear with cursive writing. It is important to expose children to both methods of handwriting, to allow them ample teaching and practice and then decide which is most effective for that child. The other important thing to remember is that children need to learn to read cursive writing even if they don't use it themselves as many adults write rather than print.

If children have fine motor problems, can they learn to type?

Children with motor difficulties can learn to type, even to touch type (that is, typing without looking at one's fingers), efficiently and effectively. It may take some children a bit longer, though, and require more practice and instruction. The motor demands are less in typing than in handwriting and are easier for children with DCD to learn. Every time one presses a key, the force and direction of that finger is the same as the next time that one presses the same key. Every time one prints a letter, the coordination of the muscles change depending on the angle of the paper, the pressure of the pencil, the size between the lines and the location of the letter within the sentence. Once learned, the motor program that a child needs to put in place is actually much more simple and repetitive in typing. This makes typing an easier motor skill for children with DCD to learn than handwriting.

Ultimately, the goal of typing is that children will be able to reduce the amount of mental energy they have to expend on producing legible printing/writing and increase their ability to focus on the content of what they are writing. Studies that have looked at the relationship between typing proficiency and underlying components, such as motor coordination, finger recognition, integration of eyes and hands, and visual perception, have demonstrated weak relationships. In other words, improving pinch grip or learning to recognize same from different shapes will not help a child type more easily. These types of practice exercises do not help a child print more efficiently either. Learning to type is a new skill for all children. As with many other tasks such as tying shoes, cutting with a knife and fork, and catching a ball, children with DCD will require practice with the actual activity, as well as support and encouragement, in order to become proficient.

When should I introduce keyboarding?

Evidence from the research literature and expert opinions are varied on this question. The eventual goal is to learn to touch type so that children can increase their keyboarding accuracy and speed. It is likely that children in Grade 2 or 3 can learn to touch type. The question is whether an earlier introduction to the keyboard will be advantageous or whether younger children will just learn poor habits (e.g., hunt and peck method) that might be harder to unlearn later.

There is very little evidence to support either claim in the research literature. Children who are exposed to the keyboard early, who use it to type short passages, write emails and spelling lists, show an increase in typing speed even without typing instruction. They learn to use the functions of the keyboard and mouse, to become familiar with the key locations and to start to use two hands to type. Early exposure does not seem to prevent children from learning to touch type. If keyboard use is introduced but touch typing is delayed until the child is much older, it is not clear how easy it will be for them to learn new motor programs. For the child with DCD, recognizing that typing is a challenging but useful task to learn, the early exposure and practice is probably a good idea.

What is the best method of instruction?

Most keyboarding instruction programs follow a similar progression with only minor variations. There is no escape from the need to learn the locations of individual keys or the need to increase speed and accuracy through repetition and drill.

Typing programs differ in:

- the order of instruction,
- the use of graphics,
- the type and timing of the feedback,
- the degree of repetition and pacing;
- the specific games that are used to maintain motivation.

An excellent review of instructional typing programs can be found at <http://www.superkids.com/aweb/pages/reviews/typing/>

Computer-based instruction programs typically cost about \$20-30 (Canadian) and are available through major computer and electronics chain stores, some educational supply stores and on the internet. It is important to choose a typing program that is of greatest interest to the child so they will be motivated to practice.

Some agencies and local associations such as learning disability groups offer keyboarding classes and these can be very supportive if the child likes to learn in groups. The instruction that children receive through school computer labs, however, is often not sufficient for children with DCD. They need to start earlier and practice more often if they are to become proficient. The literature suggests that most children who do not have coordination problems need at least 25 hours of instruction and practice to learn to touch type: children with DCD may need even more. It is best to do this in short (15-20) minutes sessions that are scheduled frequently (3-4 times/week). Some of the typing programs have wonderful built-in reward programs that are very reinforcing to the child.

What if the child also has a learning disability?

There is a high rate of co-occurrence of learning disabilities and DCD, so this question is pretty common. Keyboarding and the use of the computers are even more important for children who have coordination and learning difficulties. Many assistive learning technologies are extremely helpful for the struggling reader or writer. Word prediction software, graphic organizers, read back programs and even simple spelling- and grammar-checking can make a world of difference to the child who has learning difficulties. There is some evidence that computer-assisted writing programs are generally quite effective in improving children's written language abilities.

When should a child use voice-to-text software?

Increasingly, software programs are becoming available that completely eliminate the need to write or type. In the past, many of these programs were inaccessible as they required many, many hours for the computer to learn to respond to the sound and pattern of the individual's voice. Although this feature has vastly improved, voice-to-text software is still not very useful for most young children. Children's voices fluctuate and are unstable in both volume and pitch. As children mature, their voices change in ways that are often unrecognizable by the trained software program. The speech patterns used for oral communication are also quite different than the protocols used in writing and children need to learn these rules for written language. As a result, voice-to-text software is not generally recommended until children are moving into adolescence.

As a final observation, children with DCD are almost always able to learn to type so the emphasis should be placed on encouraging the development of this skill. If a child *also* has a learning disability, has quite severe motor coordination issues or has not mastered touch typing by secondary school, then voice-to-text software may be a very appropriate consideration.

To type or not to type . . . what is the answer?



In today's society, keyboarding is an important skill for all children to learn, but it is particularly important for children with motor coordination difficulties. With support and appropriate instruction, even young children with coordination difficulties can learn to be very proficient typists. The computer can open up a world of possibilities for learning and for success at school.

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Freeman, A., MacKinnon, J., & Miller, L. (2005). Keyboarding for students with handwriting problems: A literature review, *Physical and Occupational Therapy in Pediatrics*, 25, 119-160.

**For more information about children with DCD, visit the
CanChild Centre for Childhood Disability Research website:**

www.fhs.mcmaster.ca/canchild

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