

Handwriting muscles may feel weaker with less practice, device overuse

Writing by hand may feel difficult for many of us as we engage less in fine motor activities and use devices more

By Gina Rich

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Aisha Attah used to write by hand a lot, whether for schoolwork or in her journal. But after the pandemic began, Attah, 20, found herself spending more time online — and less with a pen and paper. Months later, in a meeting at her first job, Attah tried taking notes by hand. “It was incredibly uncomfortable,” said Attah, a brand marketing executive in Southampton, England.

Handwriting is a fine motor skill that isn’t innately learned; it needs to be taught and practiced. It also is a skill that benefits us by stimulating our brain: We remember information better when we write it down by hand, [research shows](#).

But for many of us, handwriting can feel difficult as we turn to smartphones, other devices and even robots for many of our hand tasks.

And with cursive dropped from Common Core State Standards in 2010 in the United States, children have few opportunities to learn and practice; for some, handwriting has been relegated to an [extracurricular activity](#).

The problem isn’t only that we’re practicing less. Technology has changed the way we use our hands. Also, the more time we spend on our devices, the greater the probability of problems with our hands and wrists, such as pain, weakness and nerve changes.

“It’s like going to the gym,” said Mellissa Prunty, an occupational therapist at Brunel University London and chair of the [National Handwriting Association](#) in the United Kingdom. “When you write for long periods of time but you don’t do it often, you are going to feel tired and fatigued.”

Why handwriting matters

The hand-brain connection is stronger when we write something by hand vs. typing it, said [Paula Heinricher](#), an occupational therapist and national presenter for Learning Without Tears, which trains educators in subjects, including handwriting. Although we might be able to take more notes on a keyboard than by hand, “there’s also research that shows when you write by hand, there is a deeper brain connection and a deeper understanding, and you retain that information longer,” she said.

A [2020 meta-analysis](#) concluded that college students performed worse in their classes when they typed notes into a device vs. writing them by hand. And a [2014 study](#) found that students who took notes by hand understood the information better than those who used laptops for note taking.

The ability to write quickly and legibly also has a critical link with academic performance. A [2013 study](#) found that children who had good handwriting skills in preschool performed better in reading and math in second grade. And in a [2019 study](#) of 141 first-graders in four schools in Italy, children who were taught cursive developed better reading and writing skills compared with a control group.

Prunty has worked with children who have above-average reading, spelling and vocabulary skills. But because of fine motor coordination difficulties, “those kids, although they’re bright, will write less, and it’s less interesting to read. That’s because their speed is impacted,” she said.

Fewer fine motor activities

If our hand muscles don’t feel particularly sprightly, it’s easy to point the finger at our devices: We send a text instead of writing a note. Or we type a grocery list into an app rather than scrawling it by hand.

While there is little hard evidence that fewer students are taking notes or completing assignments by hand now compared with years past, [children’s use of devices has increased](#), especially in the pandemic years, parents said.

But devices aren’t the only culprit. In general, we’re not engaging in as many fine motor activities as in the past, said [Ritu Goel](#), a certified hand therapist at the University of Maryland Medical Center.

With keyless entry, for instance, many of us no longer turn a key to unlock our car or the front door; instead, we push a button or tap out a code. So the lateral pinch, a fine motor motion, “is becoming a little less used in day-to-day activity,” Goel said.

The effects of device overuse

Overuse of technology can have an effect on our handwriting muscles; the main ones being the flexor pollicis longus, the flexor digitorum superficialis and the flexor digitorum profundus. The flexor pollicis longus enables us to flex the thumb, while the other muscles allow for finger flexion. We also use these muscles for other fine motor tasks such as picking up small objects.

In a small 2015 [study](#) of student smartphone users, researchers found that the flexor pollicis longus tendon — which originates as a muscle in the forearm — was larger on participants' dominant side than the non-dominant side. That was true for all participants, irrespective of how much they used their smartphones.

The size difference, though, was biggest in those who used their devices the most. In that same high usage group, the median nerve — a sensory and motor nerve beginning at the armpit and ending at the fingers — was significantly larger on the dominant side than the non-dominant side.

Researchers theorized that smartphone overuse caused the differences. With the repetitive pinching motion of texting, “only one muscle is doing really hard work,” said study author [Esra Erkol Inal](#), associate professor of physical therapy and rehabilitation at Reyap Hospital Istanbul. There's no benefit to using one part of the hand so extensively, Inal said, but there are risks.

Overworking specific muscles can enlarge tendons enough to cause noticeable symptoms. The tendons controlling our hands begin as muscles in the forearm and run out to our fingertips through the tight space of the carpal tunnel. Bigger tendons crowd the median nerve, which essentially gets squished, said [Lisa Kruse](#), a hand surgeon and assistant professor of orthopedics and rehabilitation at the University of Wisconsin School of Medicine and Public Health. The result: carpal tunnel syndrome, which causes numbness, pain and weakness in the hand and forearm.

A [study](#) of neurology patients at a Turkish university found that people diagnosed with carpal tunnel syndrome spent more hours per day on their smartphones than those without hand or wrist complaints.

[Grip strength](#) — which enables us to hold a pen or pencil — may also be affected: A small [study](#) of students at a university in Lahore, Pakistan, found a significant association between high levels of smartphone usage and a weaker grip.

While more research is needed, it's possible that the more we use our mobile devices, the higher the risk for some type of hand dysfunction. Device overuse changes the balance of our hand muscles and could cause damage in the future, Inal said.

Help for handwriting muscles

Even as we continue to use technology and devices, we can bolster our handwriting muscles with a few strategies.

Make sure your smartphone isn't too big. If our smartphone is large relative to our hand, we wind up reaching across it more, which can cause thumb pain, Goel said. You should be able to hold your smartphone comfortably in one hand with a good grasp.

Use devices mindfully: Her teenage patients scoff, but Goel advises texting with the index finger — not thumbs — while holding the smartphone in the other hand. Give yourself cues to take breaks from scrolling, such as by setting alarms on your phone. And don't forget posture: When working at a desk, Inal stores her phone in a smartphone stand and strives to keep herself vertical, rather than hunched over.

Stretch and strengthen: If your hands are cramping, Goel recommends tendon gliding exercises, movements to bend and straighten different joints. You can also perform what's called a prayer stretch by bringing your palms together with your elbows out and pointing your fingertips upward for a wrist extension. Reverse the exercise with a wrist flexion, directing your fingertips down so the backs of your hands touch. In addition, Goel suggests rolling your hands across therapeutic putty, Play-Doh or a small rolling pin.

Completing tasks without assistive devices will help strengthen the small stabilizing muscles in your hands. For instance, using a manual can opener engages your gripping and pinching muscles, Kruse said. One strengthening exercise she suggests: Place your hand on its pinkie finger side on a surface. Bring your index finger upward to engage the dorsal interosseous muscle, located between your thumb and index finger. Work toward adding resistance, such as a rubber band.

When in doubt, get it checked out: If you have hand, wrist or forearm discomfort that interferes with daily activities, seek a medical evaluation. An occupational or physical therapist can perform an ergonomic assessment to identify any problematic environmental factors — a workstation set too high, for example, Goel said. Sometimes hand fatigue is related to writer's cramp, a type of dystonia or involuntary muscle contractions, which can be treated.

Handwriting, typing and even dictation-to-text methods are all valuable ways to express ourselves. And while it's not realistic or necessary to avoid our devices, it's worth bringing back that handwritten note on occasion and encouraging your children to do the same, Heinricher said.

“The reality is that we are a hybrid world. So it's about having different tools in your literacy toolbox,” Prunty said.