

Customizable finger brace eases rehab, arthritis care

By Dennis Thompson | October 17, 2025



A team in the Interactive Structures Lab developed a fully customizable finger brace that can easily switch from stiff to flexible with the push or flex of a finger. It can also be 3D printed and requires no assembly. (Carnegie Mellon University)

Finger braces used to treat arthritis or sprains can be a pain in the neck for working people, who must take them on and off throughout the day to function.

But an innovative new finger brace that can easily switch from fixed to flexible might make it easier for patients to stick with their rehab and speed up recovery times, researchers at Carnegie Mellon

University in Pittsburgh said in a news release.

The brace — two rigid pieces connected by an elastic band — can be easily released when a patient pushes down on it and bends their finger, researchers said.

Then, when the patient extends their finger, the elastic band snaps back into place, properly immobilizing the finger.

“We wanted to understand how we could help people, and what patients needed right now,” researcher Alexandra Ion, director of the Interactive Structures Lab at Carnegie Mellon, said in a news release. “We wanted to add our expertise to build this new, unexpected thing.”

The idea came from a friend’s struggle with arthritis, said

researcher Yuyu Lin, a doctoral student at Carnegie Mellon's Human-Computer Interaction Institute.

The friend wore finger braces to relieve arthritis in her knuckles, but had to remove them to be able to type on a computer keyboard.

Lin imagined that a new type of finger brace that could toggle between stiff and flexible without needing to be removed could help her friend, as well as other patients.

"For this work, we were trying to think from the perspective of the patient, and how to get them to wear this brace and complete their rehabilitation routine more easily," Lin said.

Working with medical professionals, researchers identified the tendons on the second knuckle of the hand where such a brace could be useful.

Usual finger braces are fixed, immobilizing the digit, but this can lead to unnecessary stiffness. Doctors usually ask that the brace be removed for rehab exercises, but kept on while healing, putting patients in a challenging position.

The brace designed by the team is customizable as well as flexible, researchers said. It can be 3D printed to fit each patient's specific anatomy, and it requires no assembly.

To build the brace, a person's finger dimensions must be taken with a

ruler, and a force gauge used to judge their finger strength. A protractor also is needed to gauge the angle of a person's finger when it's fully extended.

Researchers presented the new brace at the Association for Computing Machinery's Symposium on User Interface Software and Technology conference in Busan, South Korea, on Sept. 29.

Findings presented at medical meetings should be considered preliminary until published in a peer-reviewed journal.