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Assistive Device for Patients with Somatosensory Impairment in the hands

Patients with neurological conditions, particularly stroke patients, often suffer from somatosensory impairment, or loss of feeling, in their hands. Because they can't gauge the force of their grip, they have difficulty picking up items and may inadvertently crush or drop them, causing embarrassment and reduced quality of life. While there are products that can measure grip forces they are not integrated into a practical solution for assisting patients with everyday tasks or therapy. Further, they are bulky and cumbersome to wear with little to no real-time feedback capabilities.

Researchers at Arizona State University and their collaborators have developed a novel wearable medical device implementing sensors and actuators that measures grasping force and provides real-time feedback to the wearer. The visual or physical feedback provided by this device can give patients a better sense of and control over their grip force. This lightweight and compliant device takes approximately 30 seconds to don and doff and can comfortably be worn for extended periods of time.

Somatosensory impairment can be debilitating, but, using this device, which is both discreet and comfortable, patients may once again have the ability to perform normal, everyday activities.

Potential Applications

- Feedback to help with somatosensory deficiency
 - o Patients who have or had: a stroke, multiple sclerosis & other neurological conditions/CNS diseases
 - o Useful in daily living as well as therapeutic sessions

Benefits and Advantages

- Takes less than 30 seconds to don or doff
- Provides real-time visual cues or physical feedback that is easy to interpret

- Lightweight (<250 grams), discreet and comfortable to wear for extended periods of time
 - o Doesn't impede day-to-day activities
- Works with individuals having limited to no pressure sensation in their hands
- Made of durable materials
- Can detect large and light grasping forces
- At least 39 hours battery life, with real-world expectations closer to 45 hours on a single charge
 - o Recharging takes 50-60 minutes

For more information about the inventor(s) and their research, please see

[Dr. Sugar's departmental webpage](#)