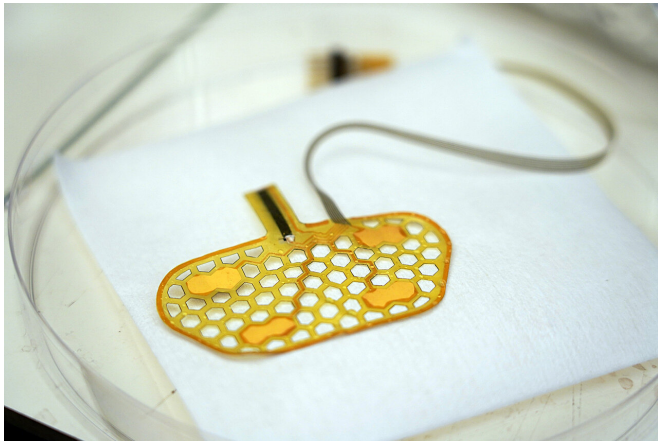


Millions with swallowing problems could be helped through new wearable device

17 December 2019, by Chris Adam



Purdue researchers created wearable technology to help people with swallowing disorders. Credit: Jared Pike/Purdue University

A wearable monitoring device to make treatments easier and more affordable for the millions of people with swallowing disorders is about to be released into the market.

Georgia A. Malandraki, an associate professor of speech, language, and hearing sciences in Purdue University's College of Health and Human Sciences, and Chi Hwan Lee, an assistant professor of biomedical engineering and [mechanical engineering](#) in Purdue's College of Engineering, founded Curasis LLC and serve as an acting chief executive officer and [chief technology officer](#), respectively. They started the company to commercialize their wearable technology and move it as quickly as possible to clinics and people with swallowing difficulties.

The technology is presented in the Dec. 13 edition of *Science Advances*.

"We want to provide a reliable, patient-friendly and affordable way to treat the millions of people with

swallowing disorders," Malandraki said. "Many devices to help these people are expensive, not able to be taken home and not accessible in many rural areas."

The researchers created a skin-mountable sensor sticker that attaches firmly to the neck area and is connected with small cables to a wireless transmitter unit.

The skin-mountable sensor sticker measures and records muscle activity and movement associated with swallowing. The information is then sent wirelessly by a separate unit clipped on the wearer's shirt to software that stores it for later analysis by a doctor.

Successful completion of a swallow requires the precise coordination of more than 30 pairs of muscles of the head and neck, six pairs of cranial nerves, and complex circuitry in the brainstem and several brain areas. Any disruption in these pathways can result in severe swallowing disorders.

More than 9 million adults and more than 500,000 children experience severe swallowing disorders each year in the U.S.

"Our device is unique in that we specifically created it to work well with the small and intricate muscles associated with swallowing events," Lee said. "The sensor sticker is stretchable and flexible to work well with the skin and curvilinear head and neck shape, while the connected unit has electronic chips and more rigid components."

The sensor stickers are disposable, designed with inexpensive components and meant to be used about 10 times before they are thrown away.

Malandraki and Lee have completed pre-clinical tests of the device and are currently conducting clinical trials. They are working with the Purdue

Research Foundation Office of Technology
Commercialization on patenting their technology.
They are seeking additional partners.

More information: Min Ku Kim et al. Flexible submental sensor patch with remote monitoring controls for management of oropharyngeal swallowing disorders, *Science Advances* (2019).
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