Dr. Sandra Petersen and her team observed with cautious optimism as the dementia therapy treatment they were administering made a woman cry. Weeping was not the usual response to their therapy, but any reaction at all could be a sign of hope. For treatment, the woman was handed a robotic biofeedback device resembling a baby harp seal and was asked to help care for it. The device, called a PARO robot, mimics a real baby seal and is designed to evoke a nurturing response in the person holding it.

This patient, whom we will call Belle, had begun to cry. Belle was in the later stages of progressive dementia and had not spoken in years. “At first we weren’t really sure if she liked it and how she was going to do with the treatment,” said Petersen, an associate professor in The University of Texas at Tyler family nurse practitioner program. “One patient had been so combative that he was at risk of transfer to a more restrictive facility, but he was spared that fate because the seal treatments calmed him. In others, like Belle, it brought them out of their shells. Belle previously sat in her wheelchair and stared in silence while not interacting with others or even looking around; that is, until she was introduced to the seal.”

Petersen hypothesized that the seals would alleviate the patients’ anxiety and depression, thereby decreasing their reliance on psychotropic medications. Petersen’s project, conducted from May through July, was the largest randomized controlled study on the subject in the world and the first to be done in the United States. Workers who administered therapy sessions for the study found that most patients relaxed immediately when holding and stroking the seal, said DeeAnn Stone, a registered nurse and regional health care coordinator for Legend Senior Living’s five assisted living/memory care communities in Dallas-Fort Worth, where the study was done. The project received a $30,000 grant through Baylor Health Care System from the Deerbrook Charitable Trust to purchase PARO robots for each of the facilities.

Workers who administered therapy sessions for the study found that most patients relaxed immediately when holding and stroking the seal.
Stone concurred: “To see any reaction like that at all is actually a positive, because it’s like a link back to reality.”

**THE SYNERGY OF GREAT MINDS**

For years, Petersen has investigated the concept of neuroplasticity, which is the brain’s plastic-like ability to self-mend and flexibly adapt as needed by forming new neural cells and pathways. The brain can do so with certain stimuli, enabling people with memory impairment to reconnect with old memories and build new ones.

Petersen was developing memory care programming for dementia patients based on that principle when she learned about the robotic seals a couple years ago at a health care technology presentation. It included video of a nonverbal man who began to speak after exposure to the seals.

“I realized this would be a great tool for me as a geriatric nurse practitioner, because I have numerous patients in my practice who are like that,” she said. “It can enhance neuroplasticity by tapping into their emotions, because so many people have a really strong emotional attachment to their pets.”

The presenter introduced her to Dr. Takanori Shibata, the scientist in Japan who invented the PARO robotic seal, and Petersen began to formulate her study. Her primary goal was to determine if robotic pet therapy could decrease the anxiety and depression experienced by dementia patients, and thus decrease their medicinal intake.

“Most patients who come into this setting are on anywhere from 14 to 30 medications a day, which is very expensive. And of course in an 85-year-old body, it’s not very good for them to take that much medicine.” Petersen said. “Sometimes it sedates them and can even cause them to fall or have organ failure, so there’s a downside to giving them all these meds.”

Though the robots have been studied and used to treat dementia in some other countries, Shibata took an interest in Petersen’s study because it was the first of its kind to be done in the United States, where the seals are uncommon. He visited Texas several times during the 12-week study to provide insight and feedback to Petersen regarding the use of the PARO seals.

Subjects in the treatment group were given the pet seal therapy, individually or in small groups, for 20 minutes three times a week. Meanwhile, facility staff members took a number of readings, including pulse rate, galvanic skin response, and oxygen saturation, to measure stress.

Vanessa Porter was among the graduate students in the family nurse practitioner program who assisted with the project through independent study with Dr. Petersen last spring. Students helped interview patients, train staff to take measurements, and do other preparations in advance of the trial.

“When Dr. Petersen told us about her research and the opportunity for us to help with the project, we were all very excited about it. We had never thought something like that could totally change someone’s behavior.” — Vanessa Porter, UT Tyler Student-Researcher

Petersen’s study found that robotic seal therapy reduced patient symptoms, resulting in a 30 percent overall decrease in the amount of as-needed medications they were given to control anxiety.

Vanessa Porter was among the students who helped with the project. “Her research may result in improved quality of life for people with dementia,” he said.

On a small scale, the seal robots have already made a big difference for several individuals like Belle. A process that began in Belle’s first therapy session with her own tears ultimately spawned tears of joy from her family.

A couple days after Petersen’s team introduced the seal to Belle, they reintroduced it to her in a second session, yielding yet another breakthrough—Belle began talking for the first time in more than a decade, to the seal, then to the nurse.

“We videotaped it and sent it to her family,” Petersen said. “Her daughter called crying and saying, ‘I can’t believe I have actually heard my mother’s voice! She hasn’t spoken for 12 years.’”

**REPLACING PILLS WITH SEALS**

Petersen’s study found that robotic seal therapy reduced patient symptoms, resulting in a 30 percent overall decrease in the amount of as-needed medications they were given to control anxiety in elderly dementia patients.

In July, she joined Shibata in speaking at the U.S. Department of Health and Human Services’ international Healthy Aging Summit, where she presented her research. Petersen hopes the strong empirical and qualitative elements of her study will result in robotic pet therapy becoming a mainstream dementia treatment.

“So instead of patients popping a pill, you would give them a 20 minute treatment with the robotic pet,” she said, noting that psychotropic medications for a dementia patient cost $800 to $1,200 a month.

The results of Petersen’s study could provide strong scientific evidence of the therapeutic effects of PARO seals and result in Medicare covering the cost of robotic pet medical treatments in the future, Shibata said. PARO is already approved by the Food and Drug Administration as a neurological therapeutic medical device.

The mind-body connection her research illustrated has huge implications for the elderly, a population that is growing due to people living longer, said Dr. Yong Tai Wang, dean of UT Tyler’s College of Nursing and Health Sciences.

“Her research may result in improved quality of life for people with dementia,” he said.

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