

## Prosthesis maker answers military's call to arms

*by Jasmin Persch*

About 3 1/2 years ago, the Department of Defense rang John Miguelez in Redondo Beach, Calif., to ask if he'd evaluate five upper-limb amputees at Walter Reed Army Medical Center in Washington, D.C.

A plane awaited him at Los Angeles International Airport.

Miguelez was used to traveling worldwide to see amputees.

ADVANCED ARM - John Miguelez, owner of Advanced Arm Dynamics, evaluates a prosthesis for Phong Tran, who lost his right arm while working as a machinist. CNS Photo courtesy of Advanced Arm Dynamics."There are not a lot of them; we have to go to patients," he said. The call to help five amputees eventually led to a clientele of more than 125 as the Department of Defense placed Miguelez's Redondo Beach-based company, Advanced Arm Dynamics, on the front line of upper-limb prosthetic care for soldiers returning from the wars in Iraq and Afghanistan.

Miguelez works as an upper-extremity prosthetist who helps amputees choose, wear and use artificial arms that allow them to carry out their desired activities. Options include cosmetic ones that look good, resembling amputees' real arms, but don't provide much functionality. Others, such as a hook, will allow them to grip but will stand out. Amputees usually have two or more for different occasions.

Since that first call, a team of artificial-arm specialists from the company has traveled regularly to Walter Reed to replace amputees' lost arms with advanced prosthetics and train them to use the technology.

The Department of Defense has awarded Advanced Arm Dynamics numerous contracts, most recently a three-year contract for about \$36 million.

The wars in Iraq and Afghanistan accelerated artificial-arm progress previously slowed down by its limited number of patients. Now soldiers, shielded by fortified armor, are returning home alive but some without a hand or arm. This new type of amputee - young and active - is prodding progress.

## PREPARING FOR AN ACTIVE LIFE

"We're introducing new technology and getting incredible feedback (from soldiers)," Miguelez said. "They're 18 to 23, grew up with computers, want hand-eye coordination. Their focus is to get back to being 'with my group of guys' in Iraq."

Army Sgt. Brian Doyne is one of them. He lost his left hand during an explosion in Iraq last year. Doyne, who worked as a bomb disarmer, originally wanted to continue his job in Iraq, but the Army advised against it. So he left the military and now is an anti-terrorism instructor.

After receiving medical treatment in Iraq and Germany, Doyne came to Walter Reed. At first, the idea of an artificial arm turned him off.

"The only one I'd ever seen was the old-fashioned hook and cable," Doyne said. Another soldier, also an amputee, encouraged him at his hospital bed, showing him his prosthesis.

"Your life isn't over," Doyne recalls him saying. "You're still going to be able to function." After meeting with people from Advanced Arm Dynamics, he was surprised by what the world of prosthesis offered. He was fitted with a hand prosthesis that he could move by flexing certain muscles.

"The hardest part was getting muscle memory down, flex this to open and that to close, to get it to become second nature," the 27-year-old Doyne said.

Like many upper-limb amputees at Walter Reed, he was determined to learn to use his prosthesis.

"He kept on coming to us and telling us what wasn't working," said Kristi Wolfgram, a liaison between patients and channels that provide them prosthetics, including manufacturers, physicians and insurance companies.

Doyne said Advanced Arm Dynamics helped him find prostheses that allow him to swim, do push ups and lift weights. "They were always willing to work with me, what I wanted to accomplish and my lifestyle," he said. The company is working on getting him an artificial arm for rock climbing.

Doyne said being at Walter Reed with other amputees with similar experiences made his recovery easier. But self-pity was not tolerated.

"We're a tough crowd," he said. "The morbid jokes we tell would shock a lot of people. I'd rather poke fun of myself rather than be pitied."

## CIVILIANS ALSO BENEFIT

Advanced Arm Dynamics' close relationship with prosthesis manufacturers allows it to test new technology and point out glitches. The novel prosthetics are introduced at Walter Reed first but eventually trickle down to civilians.

Phong Tran has worn his prosthesis for three years. He's eager for an upgrade. "It's time for a change," he said. Tran lost his arm about 3 1/2 years ago while working as a machinist in Oregon. He connected with

Advanced Arm Dynamics almost immediately. Although he regained an arm, he struggled to land a machinist's job.

"You need two arms to qualify," Tran, 35, said.

Kristin Gulick, an occupational therapist from Advanced Arm Dynamics, said as a savvy machinist, he quickly learned to grip with his prosthetic. "When people see a person with one arm, they say no way," she said. "Most people have no idea how capable a person with one arm is."

Almost three months ago, Nike Inc. in Beaverton, Ore., hired Tran. He inserts Air-Soles into sneakers with his real arm and throws scraps in the trash with his artificial one.

Gulick, who works primarily in Oregon with occasional trips to Walter Reed, said some amputees seek her help after seeing a general practitioner. "They show up with a prosthesis in a bag and say, 'What do I do with this?'" she said.

Amputees' attitudes influence how fast they pick up the new technology, she said. "They're tools, not a replacement for an arm," she said. They must leave their first therapy session with some functionality so they see the value in wearing it. Miguelez said amputees won't use this tool "if there's not a functional advantage."

He founded Advanced Arm Dynamics in 1998 because of the need for artificial-arm consultants. Few clinicians specialize in it, due to the limited number of such amputees. The company that started with Miguelez filling in where general physicians lacked expertise grew into a full service for upper-extremity amputees. They were not only fitted with prosthetics and trained to use them, but also received insurance assistance, physical therapy, psychological counseling and rehabilitation.

Advanced Arm Dynamics began offering its services under one roof when it opened facilities in areas with higher numbers of upper-limb amputees, including Texas and Iowa. The headquarters overlooking the Redondo Beach pier is the administrative office that takes care of paperwork for patients, the government and research studies.

Advanced Arm Dynamics always has been on the forefront of artificial-arm innovation by researching and working closely with prosthesis manufacturers.

Miguelez said it aims to fit and train patients with prosthetics almost immediately after their amputation because the faster they incorporate the technology in their lives, the more likely they are to use it. Miguelez said his company has had a 94 percent success rate, based on patients who use their artificial arms a year later.

Miguelez, who travels three-quarters of the year, spends about half his time away from his home at Walter Reed. No matter how familiar the hospital becomes, he's still occasionally reminded that he's among military folk. He recalls accidentally stepping on Bubble Wrap that had fallen on the floor from a package holding a prosthetic. A patient in the room hit the floor.

"Kids right out of a combat environment, the first thing they do is get on the ground," Miguelez said.

His interest in patching up people emerged in childhood. When his friend got a splinter, 8-year-old Miguelez retrieved tweezers and removed it.

"Even then, I thought it was cool," he said. "I knew I wanted to help people."

Another interest, technology, also stuck with Miguelez, who built robots as a boy. His passion for medicine and technology led to his career as an upper-extremity prosthetist.

"I married two loves," 44-year-old Miguelez said.

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