

Medical News

First man with two mind-controlled prosthetic limbs



A Colorado man has made history at the Johns Hopkins University Applied Physics Laboratory (APL), becoming the first bilateral shoulder-level amputee to wear and simultaneously control not one, but two modular prosthetic limbs (MPL). Most importantly, Les Baugh – who lost both of his arms in an electrical accident forty years ago – was able to operate the system by simply thinking about moving his limbs, performing a variety of tasks during a short training period.

During two weeks of testing, Baugh took part in a research effort to further assess the usability of the MPL technology, developed over the past decade as part of the revolutionising prosthetics program. Before putting the limb system through the paces, Baugh had to undergo a surgery at Johns Hopkins Hospital known as targeted muscle reinnervation

“It’s a relatively new surgical procedure that reassigns nerves that once controlled the arm and the hand,” explained Johns Hopkins Trauma Surgeon Albert Chi, M.D. “By reassigning existing nerves, we can make it possible for people who have had upper-arm amputations to control their prosthetic devices by merely thinking about the action they want to perform.”

After recovery, Baugh visited the Laboratory for training on the use of the MPLs. First, he worked with researchers on the pattern recognition system. “We use pattern recognition algorithms to identify individual muscles that are contracting – how well they communicate with each other – and their amplitude and frequency,” Chi explained. “We take that information and translate that into actual movements within a prosthetic.” Then Baugh was fitted for a custom socket for his torso and shoulders

that supports the prosthetic limbs and also makes the neurological connections with the reinnervated nerves. While the socket got its finishing touches, the team had him work with the limb system through a Virtual Integration Environment (VIE) — a virtual-reality version of the MPL.

The VIE is completely interchangeable with the prosthetic limbs and through APL’s licensing process currently provides 19 groups in the research community with a low-cost means of testing brain–computer interfaces. It is used to test novel neural interface methods and study phantom limb pain, and serves as a portable training system. By the time the socket was finished, Baugh said he was more than ready to get started. When he was fitted with the socket, and the prosthetic limbs were attached, he said “I just went into a whole different world.” He moved several objects, including an empty cup from a counter-shelf height to a higher shelf, a task that required him to coordinate the control of eight separate motions to complete.

“This task simulated activities that may commonly be faced in a day-to-day environment at home,” said Courtney Moran, a prosthetist who worked with Baugh. “This was significant because this is not possible with currently available prostheses. He was able to do this with only 10 days of training, which demonstrates the intuitive nature of the control.” Moran said the research team was floored by what Baugh was able to accomplish. “We expected him to exceed performance compared to what he might achieve with conventional systems, but the speed with which he learned motions and the number of motions he was able to control in such a short period of time was far beyond expectation,” she explained. “What

really was amazing – and was another major milestone with MPL control – was his ability to control a combination of motions across both arms at the same time. This was a first for simultaneous bimanual control.”

Principal Investigator Michael McLoughlin: “I think we are just getting started. It’s like the early days of the Internet. There is just a tremendous amount of potential ahead of us, and we’ve just started down this road. And I think the next five to 10 years are going to bring phenomenal advancement.” The next step, McLoughlin

said, is to send Baugh home with a pair of limb systems so that he can see how they integrate with his everyday life.

Baugh is looking forward to that day: “Maybe for once I’ll be able to put change in the pop machine and get pop out of it,” he said. He’s looking forward to doing “simple things that most people don’t think of. And it’s re-available to me.”

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Medical Jokes

Short of hearing ?

A man goes to his ENT doctor and says, "I don't think my wife's hearing isn't as good as it used to be. What should I do?" The doctor replies, "Try this test to find out for sure. When your wife is in the kitchen doing dishes, stand fifteen feet behind her and ask her a question, if she doesn't respond keep moving closer asking the question until she hears you."

The man goes home and sees his wife preparing dinner. He stands fifteen feet behind her and says, "What's for

dinner, honey?" He gets no response, so he moves to ten feet behind her and asks again. Still no response, so he moves to five feet. Still no answer. Finally he stands directly behind her and says, "Honey, what's for dinner?" She replies angrily, " You deaf old man, I SAID CHICKEN! for the fourth time."

Collected by

Dr Md Sohel Parvez Sumon
Central Resource Person
IPHN, Mohakhali, Dhaka