Newsletter 144th Edition

August 2025

OUR MISSION

To reach out and empower people affected by limb loss to achieve their full potential through education, support, and advocacy, and to raise awareness of limb loss by becoming actively involved in our community.

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EDITOR'S NOTE – by Elaine Skaggs

There's not much that needs to be said in my weather report for last month except, IT'S HOT! I hope everyone found a little relief from the heat, and was able to find a remedy for the sweating that I'm sure happened due to the extreme temperatures. Although I'm happy to say we are on the downhill side of summer. We are already beginning the planning and preparations for our Fall Picnic, and will soon begin plans for the Christmas Party. You won't want to miss those events, so be sure to check back here often for the details.

We enjoyed both of our July meetings with something a little different for us, a very interesting discussion on Para-fencing. Our guests for the meetings were from the Louisville Fencing Center, Coaches Jim Martin and his son, fencer Edward Depp and his mother Candace. Edward did a great job explaining all of the equipment and protective gear they wear, as well as what makes Parafencing different. They have graciously invited us to join their group and learn how to fence, as well as participate in a beginners tournament. If you missed the meetings but are interested in learning more or participating in any of their events you can contact Edward via text or email at 502-602-7096, or eddepp10@icloud.com.
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We are introducing a new section in our newsletters this month, where you will hear from a different member of the board each month. They will be writing about anything that's on their mind, sharing ideas and visions for the group, and discussing issues that we all face as amputees. So be sure to check out the new Officers Corner, and get to know your people a little better. Remember, we're here for you, and this is your group!

UPCOMING EVENTS

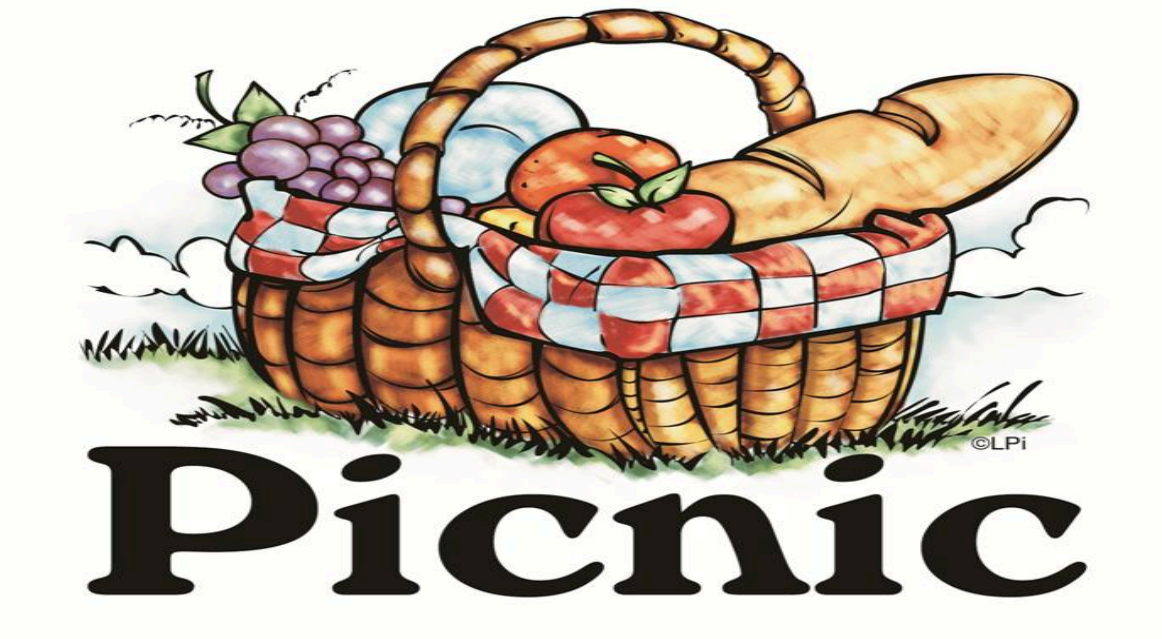
MONDAY August 18, 6:30pm - 8:00pm The IN meeting will take place at PAM Rehabilitation Hospital, 2101 Broadway Street, Clarksville IN.

SATURDAY August 23, 2:00pm - 4:00pm The Louisville meeting will take place at Baptist Health Rehab Hospital, 11800 Bluegrass Pkwy, Louisville KY

MONDAY September 15, 6:30pm - 8:00pm Our IN meeting will take place at PAM Rehabilitation Hospital, 2101 Broadway Street, Clarksville IN.

SATURDAY September 27, 2:00pm - 4:00pm Our Louisville meeting will take place at Baptist Health Rehab Hospital, 11800 Bluegrass Pkwy, Louisville KY

SATURDAY October 4, time to be determined. Join us at the park for our annual Walk and Roll fall picnic, lots of great food, outdoor games, and a walk around the park. We'll be at Sam Peden Community Park, 3037 Grant Line Road, New Albany IN 47150



A Prosthesis Driven By The Nervous System Helps People With Amputation Walk Naturally

A new surgical procedure gives people more neural feedback from their residual limb. With it, seven patients walked more naturally and navigated obstacles.

State-of-the-art prosthetic limbs can help people with amputations achieve a natural walking gait, but they don't give the user full neural control over the limb. Instead, they rely on robotic sensors and controllers that move the limb using predefined gait algorithms.

Using a new type of surgical intervention and neuroprosthetic interface, MIT researchers, in collaboration with colleagues from Brigham and Women's Hospital, have shown that a natural walking gait is achievable using a prosthetic leg fully driven by the body's own nervous system. The surgical amputation procedure reconnects muscles in the residual limb, which allows patients to receive "proprioceptive" feedback about where their prosthetic limb is in space.

In a study of seven patients who had this surgery, the MIT team found that they were able to walk faster, avoid obstacles, and climb stairs much more naturally than people with a traditional amputation.

"This is the first prosthetic study in history that shows a leg prosthesis under full neural modulation, where a biomimetic gait emerges. No one has been able to show this level of brain control that produces a natural gait, where the human's nervous system is controlling the movement, not a robotic control algorithm," says Hugh Herr, a professor of media arts and sciences, co-director of the K. Lisa Yang Center for Bionics at MIT, an associate member of MIT's McGovern Institute for Brain Research, and the senior author of the new study.

Patients also experienced less pain and less muscle atrophy following this surgery, which is known as the agonist-antagonist myoneural interface (AMI). So far, about 60 patients around the world have received this type of surgery, which can also be done for people with arm amputations. Most limb movement is controlled by pairs of muscles that take turns stretching and contracting. During a traditional below-the-knee amputation, the interactions of these paired muscles are disrupted. This makes it very difficult for the nervous system to sense the position of a muscle and how fast it's contracting — sensory information that is critical for the brain to decide how to move the limb. People with this kind of amputation may have trouble controlling their prosthetic limb because they can't accurately sense where the limb is in space. Instead, they rely on robotic controllers built into the prosthetic limb. These limbs also include sensors that can detect and adjust to slopes and obstacles.

To try to help people achieve a natural gait under full nervous system control, Herr and his colleagues began developing the AMI surgery several years ago. Instead of severing natural agonist-antagonist muscle interactions, they connect the two ends of the muscles so that they still dynamically communicate with each other within the residual limb. This surgery can be done during a primary amputation, or the muscles can be reconnected after the initial amputation as part of a revision procedure. "With the AMI amputation procedure, to the greatest extent possible, we attempt to connect native agonists to native antagonists in a physiological way so that after amputation, a person can move their full phantom limb with physiologic levels of proprioception and range of movement," Herr says.

In a 2021 study, Herr's lab found that patients who had this surgery were able to more precisely control the muscles of their amputated limb, and that those muscles produced electrical signals similar to those from their intact limb. After those encouraging results, the researchers set out to explore whether those electrical signals could generate commands for a prosthetic limb and at the same time give the user feedback about the limb's position in space. The person wearing the prosthetic limb could then use that proprioceptive feedback to volitionally adjust their gait as needed. In the new Nature Medicine study, the MIT team found this sensory feedback did indeed translate into a smooth, near-natural ability to walk and navigate obstacles. "Because of the AMI neuroprosthetic interface, we were able to boost that neural signaling, preserving as much as we could. This was able to restore a person's neural capability to continuously and directly control the full gait, across different walking speeds, stairs, slopes, even going over obstacles," Song says.

A Natural Gait

For this study, the researchers compared seven people who had the AMI surgery with seven who had traditional below-the-knee amputations. All of the subjects used the same type of bionic limb: a prosthesis with a powered ankle as well as electrodes that can sense electromyography (EMG) signals from the tibialis anterior the gastrocnemius muscles. These signals are fed into a robotic controller that helps the prosthesis calculate how much to bend the ankle, how much torque to apply, or how much power to deliver. The researchers tested the subjects in several different situations: level-ground walking across a 10-meter pathway, walking up a slope, walking down a ramp, walking up and down stairs, and walking on a level surface while avoiding obstacles.

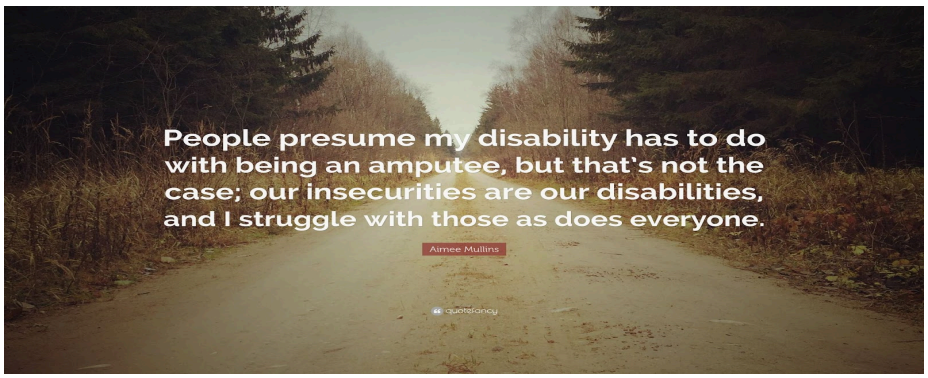
In all of these tasks, the people with the AMI neuroprosthetic interface were able to walk faster — at about the same rate as people without amputations — and navigate around obstacles more easily. They also showed more natural movements, such as pointing the toes of the prosthesis upward while going up stairs or stepping over an obstacle, and they were better able to coordinate the movements of their prosthetic limb and their intact limb. They were also able to push off the ground with the same amount of force as someone without an amputation.

“With the AMI cohort, we saw natural biomimetic behaviors emerge,” Herr says. “The cohort that didn’t have the AMI, they were able to walk, but the prosthetic movements weren’t natural, and their movements were generally slower.”

These natural behaviors emerged even though the amount of sensory feedback provided by the AMI was less than 20 percent of what would normally be received in people without an amputation. “One of the main findings here is that a small increase in neural feedback from your amputated limb can restore significant bionic neural controllability, to a point where you allow people to directly neurally control the speed of walking, adapt to different terrain, and avoid obstacles,” Song says. “This work represents yet another step in us demonstrating what is possible in terms of restoring function in patients who suffer from severe limb injury. It is through collaborative efforts such as this that we are able to make transformational progress in patient care,” says Matthew Carty, a surgeon at Brigham and Women’s Hospital and associate professor at Harvard Medical School, who is also an author of the paper.

Enabling neural control by the person using the limb is a step toward Herr’s lab’s goal of “rebuilding human bodies,” rather than having people rely on ever more sophisticated robotic controllers and sensors — tools that are powerful but do not feel like part of the user’s body.

“The problem with that long-term approach is that the user would never feel embodied with their prosthesis. They would never view the prosthesis as part of their body, part of self,” Herr says. “The approach we’re taking is trying to comprehensively connect the brain of the human to the electromechanics.” Anne Trafton | MIT News



Mom's Zuchinni Bread

Ingredients

3 cups all-purpose flour

1 teaspoon baking powder

1 tablespoon ground cinnamon or to taste

1 cup vegetable oil

3 teaspoons vanilla extract

1 cup chopped walnuts

1 teaspoon salt

1 teaspoon baking soda

3 large eggs

2 ¼ cups white sugar

2 cups shredded zucchini

Directions

Gather all ingredients. Preheat the oven to 325 degrees F (165 degrees C). Grease and flour two 8x4-inch loaf pans.

Sift flour, salt, baking powder, baking soda, and cinnamon together in a large bowl.

Beat eggs, oil, sugar, and vanilla together in a separate large bowl with an electric mixer until combined; add flour mixture and beat well. Stir in shredded zucchini and chopped walnuts until well combined. Pour batter into the prepared pans.

Bake in the preheated oven until a toothpick inserted into the center comes out clean, about 40 to 60 minutes. Cool in the pans on a wire rack for 20 minutes.

Run a table knife around the edges to loosen. Invert carefully onto a wire rack and let cool completely

Officer's Corner

Being a parent, you pretty much mark your calendar based on if school is in or out… school is about to begin again in the Grey-Parker household! We began this group when my kids were 2 and 4, so, not even in school yet, and here we are creeping both kids into high school… I'm not quite sure how this happened so fast!!!

It's been an interesting summer… starting with the ton of cicada's we had in our area. The cicada's were so loud that from May to mid-June we had a murmur of them in our woods throughout the day and then a loud symphony of them in the evenings. Then lots of rain which ended up cancelling most of our baseball games this year. I'm not quite sure where all of it came from, but my garden (and water bill) is certainly happy about it.

I am about to head out right now and harvest some fresh tomatoes and squash, then look over my huge pumpkin plants (no pumpkins yet). Have you grown any flowers or veggie garden this summer? If so, I'd encourage you to email some pictures of them so that we can add them to our next newsletter!

I hope that all of you have had a fun and safe summer. I'll be looking for you at our next meeting or event!

~Kelly

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