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November | December 2015

The Living Well With Limb Loss Magazine

Research and Technology

TOP TECH

Tools You Can Use Now and Developments on the Horizon

Phantom Sensation and Pain Incidence, Causes and Common Treatments

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The anterior toe spacer, plates and fasteners were redesigned, adding additional durability for the highest



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Research & Technology The Shape of Things to Come

Bill Dupes, Editor-in-Chief

The long and winding road to the computerized leg (and arm) began about 1500 B.C. and has been evolving ever since.

Today's healthcare and prosthetic technology are an amazing improvement over limb-loss treatments of the past. Then, amputations were performed with crude or no anesthesia or antibiotics, assistive devices consisted of a tree branch fashioned into a crutch, and prostheses were made of whatever materials a soldier could find after losing a limb in battle.

These people usually relied on instinct and knowledge that was not supported by a body of research. They simply did what needed to be done in their particular situation. What worked and what didn't was usually not widely shared, so people tended to make the same mistakes, sometimes fatally.

Now, as scientists and researchers combine humanity's knowledge of computers, engineering, physiology, mathematics, chemistry, etc., with increased funding and accelerated information-sharing systems, we see that the whole is more than the sum of its parts.

The line between reality and science fiction is becoming blurred by exciting advances in technology as we envision concepts that were once unimaginable, such as microscopic robots that can diagnose disease at the cell level and perform perfectly targeted surgery from within the body without an incision; immediate, on-demand production of organs, limbs and skin, and so much more.

And these possibilities are not just limited to technology. Changes are also occurring in other areas. We see, for example, that even the best technology is not enough without proper rehabilitation, therapy and training, and that prevention is still the best medicine. We realize that standards must be set so that medical care is consistent and based on what we know to be the best practices in the field and not merely based on guesswork.

It's easy to get caught up in the hype of shiny new technology at times, but there is still much to be learned. Even so, advancements such as these are important reminders that there is still much to discover – and still much to be hopeful for – in helping amputees live their lives to the fullest.



~ Arthur C. Clarke, English physicist & science fiction author



BE AN INFORMED READER

Editorial content (articles, news items, columns, editorials, etc.) in *inMotion* often contain healthcare information. As an informed reader, you should never make a decision about managing or treating your condition without consulting your own clinicians: They know you best.

Sometimes, in our interviews with people who are amputees, the person being interviewed will say something about his or her personal experience that may not be entirely consistent with standard practice. In these cases, we print what the person said because we think it gives readers insight into that individual's experience that we believe will resonate with others. But: We urge you to always check with your medical team before changing your own healthcare regimen.

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I'mPOSSIBLE

Since she was a little girl, Carrie Davis knew she was unique. Born without her left arm, she often wondered "Why me?" She longed to be known for her contributions, not what she was missing.

A prosthetic wearer since she was nine months old and long-time Hanger Clinic patient, today Carrie is the face and personality of AMPOWER, the leading peer-to-peer support network for those living with limb loss or difference. Carrie finds the answer to "Why me?" through helping others.

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YOURSELF. IT'S ABOUT

CREATING YOURSELF."



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contents November | December 2015

Jestions

- 16 Upper-Limb Perspectives Angel Giuffria Blazes Trails and Encourages Others to Follow Her Path
- **19** Parenting Getting a New Prosthesis: A Parent's Perspective
- 22 Federal Affairs Restoration as Motivation
- 40 Technology Review A Randomized Control Trial: Performance Differences in Energy-Storing and Shock-Absorbing Prosthetic Feet in High-Functioning Transtibial Amputees
- 44 Perspectives Preparing for the Real Thing

in every issue

- 3 Message From the Editor
- 8 Advocacy in Action
- 10 Special Message
- 12 Events Calendar
- 14 Who Is Your Amputee Hero?
- 46 Advertiser Index



A roundup of tools you can use now and developments that could improve your future.



Phantom Sensation and Pain:

Incidence, Causes and Common Treatments Backed by Evidence

Cover photo: Angel Giuffria

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A Publication of the Amputee Coalition

InMotion magazine publishes unbiased journalism that seeks to "empower and motivate" living well and thriving with limb loss. The magazine targets amputees and their families and is provided free electronically to all friends of the Amputee Coalition and in hard copy to all subscribers. Each issue covers health, well-being, exercise, life issues and advocacy for amputees and their families. Stories showcase amputees living and thriving with limb loss and profile Amputee Coalition programs and services.

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advocacy in action



Earlier this year, the Medicare Administrative Contractors (MACs) issued a draft proposal that would revise Medicare's Local Coverage Determination (LCD) for lower-limb prosthetics. The Amputee Coalition, the profession and the industry put together an unprecedented response to address the proposal's significant changes, which would negatively impact patients and their access to appropriate prosthetic care. The Amputee Coalition was able to generate over 15,000 letters sent to the MACs, federal legislators and the President, and our Facebook community helped lead the charge to exceed the 100,000 signatures needed on the White House "We the People" petition raising concerns with the proposal. The limb loss community responded with full force to let Medicare know about the potential impacts this ill-conceived proposal would cause – but the fight isn't over.

While any proposed changes to Medicare coverage will not occur until a final determination has been published, we continue to raise significant concerns and are continuing to ask Medicare and the MACs to rescind this proposal and meet with appropriate parties to better determine the path of amputee care and device delivery. Since that proposal was first published, the Amputee Coalition and others raised significant concerns with Medicare that the proposed changes would impact far more than just Medicare beneficiaries. With many private insurance payers often following Medicare's lead in how they provide coverage, the truth was that this proposal would likely eventually affect *all* amputees. Just this fall, we've already seen United Healthcare follow one change that was a part of the LCD, and as of October 1, 2015, United Healthcare has decided to eliminate coverage for elevated vacuum sockets (active suction).

Many people are looking for an update, and are asking what they can do. As of this writing, we know what Medicare has told us to this point. Medicare has told us that they've heard the community loud and clear and that they do not want to negatively impact patient care and access to appropriate devices. We have not been told yet if they will rescind the proposal, but they have indicated that a determination on the LCD is anticipated to come out in the next few weeks and we are hoping for



To find out more about the proposal and the Amputee Coalition's response, visit amputee-coalition.org.

V V

The Amputee Coalition has outlined the following significant concerns with the draft proposal published on July 16, 2015:

Medicare would no longer consider your *potential* functional abilities with an appropriate device when determining your prosthetic needs.

If you are using an assistive device such as a cane, crutch or walker, you would be limited to less functional prosthetic devices. If you have a higher functional level, Medicare would not pay for you to have a wheelchair.

Combining feet and ankles into a single code and limiting access to advanced technology would significantly harm your access to the feet and ankles that best meet your individual needs.

You and your medical team would not necessarily be able to select the necessary socket systems or liner inserts to ensure the most appropriate fit for your needs.

You would be provided a less functional prosthesis or denied a device just because you may not be able to attain the "appearance of a natural gait," or if your medical record referenced certain health complications.

The Medicare proposal would redefine the rehabilitation process for amputees and forces new amputees to rehab on out-of-date technology that they would not even use once they received their permanent prosthetic device.

a positive outcome. We will continue to encourage Medicare to rescind the proposal, but in the meantime, the Amputee Coalition is also being proactive and working to put together an appropriate group of patients, professionals, payers and partners to work on establishing an appropriate path for amputee care, functional abilities and device delivery.

In addition to the future coverage concerns outlined in the sidebar, there is also significant potential that the long-term effects of this draft proposal (especially if finalized as initially published) would significantly impact future advancements in research and technology to improve prosthetic care.

If this proposal is enacted without addressing the Amputee Coalition's and others' concerns, amputees

may find themselves in situations where it will be more difficult to get the most appropriate device for their needs. Professionals may be restricted in the levels of devices they can provide. Manufacturers may reduce investments in research advancements out of fear that the technology won't be covered. Research in socket advancement, device materials, device construction, microprocessor advancements, and more could all come to a grinding halt.

We need your voice now more than ever on this issue and many others. We must continue to work together as a community to ensure appropriate access to care. The fight is far from over, and the Amputee Coalition will continue to work with patients, professionals, Medicare, private payers, and members of Congress to ensure amputees are able to continue to receive the most appropriate prosthetic device for their needs. At this time, we continue to encourage you to contact your members of Congress and ask them to send a letter to Medicare outlining your concerns with the proposal and the impact it will have. You can use the Amputee Coalition's talking points on our Web site at amputee-coalition.org. We must continue this fight to ensure that individuals have access to appropriate care and that companies are able to pursue advances in research and technology to advance accessibility for all amputees. 💫



2015: A Year in Review

new fact sheets translated in Spanish

Translated our "Working Together for a Successful Outcome" brochure, produced in conjunction with the American Academy of Orthotists and Prosthetists, into Spanish

Produced eight educational videos to help individuals with limb loss, receive peer support, eat healthy, be physically active, and take an active role in their rehabilitation. Certified or recertified over 1,200 voluteer peer visitors

by Mic<mark>helle</mark> Wolfe

As 2015 comes to an end, we reflect back on another successful year and all that we are thankful for. We are most grateful for the opportunity we have each day to change the lives of amputees all across the United States.

The Amputee Coalition is a national, donorsupported, nonprofit organization. Without the support of our generous donors, we wouldn't be able to provide all of the empowering and life-changing programs and services that we have to offer.

Thanks to your support in 2015, we were able to accomplish all of these items.

As 2015 wraps up, and you begin to give thanks for all the many blessings you have in your life, please consider giving a taxdeductible year-end gift to the Amputee Coalition and help us continue to be a blessing for all amputees.



Sent more than **15,000**

letters to CMS and members of Congress on proposed CMS changes





Held our Limb Loss Education Days in three states, with an average of 80 attendees

> Published and distributed our bimonthly premier magazine inMotion for

free

Supported over

250 active support groups Convened a Limb Loss Task Force summit to discuss developing a model system of care for amputees similar to the spinal cord injury and traumatic brain injury model systems

kids, ages 9-18, sent to youth camp

Developed sample curriculum addressing the psychosocial adaption to amputation for use by orthotic and prosthetic graduate programs

Mailed out resource materials to amputees

media trainings conducted for approximately 40 amputees, many of whom are support group leaders Conducted a study exploring the efficacy of the Coalition's Well-Being Program to address the emotional and mental health needs of individuals with limb loss



Produced a six-part video series on the rehabilitation process following an amputation

Obtained over

signatures to petition the White House on proposed CMS changes

Increased the number of peer visits by

Developed statistical profiles on the state of limb loss in nine states Increased our Facebook presence, with over

likes

Submitted comments and met with Medicare (CMS) concerning proposed coverage changes for prosthetic devices Made an average of

peer visits every day

Held our National Conference in Tucson, Arizona, attended by nearly

people

Assisted with eliminating the "one limb per lifetime" limit in New York state health plans



Published *Primer Paso,* the Spanish language version of *First Step:* A Guide for Adapting to Limb Loss



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AMERICAN DIABETES MONTH diabetes.org

events calendar

DIABETIC EYE DISEASE MONTH nei.nih.gov/health/diabetic

FAMILY CAREGIVERS MONTH caregiveraction.org/national-familycaregivers-month

HEALTHY SKIN MONTH nhpco.org

NATIONAL HOSPICE MONTH aad.org

NATIONAL MARROW AWARENESS MONTH bethematch.org

1

Veterans Day www1.va.gov/opa/vetsday

World Diabetes Day worlddiabetesday.org

17

Prematurity Awareness Day marchofdimes.com

19

Great American Smokeout cancer.org

22

South Florida Tour de Cure Ft. Lauderdale, FL diabetes.org



Note: Dates listed for events are subject to change. Check Amputee Coalition online calendar and listed Web sites for current information.



SAFE TOYS AND GIFTS MONTH preventblindness.org/make-safe-toysand-gifts-priority



International Day of Persons With Disabilities un.org/disabilities

6 – 12 National Influenza Vaccination Week cdc.gov/flu/nivw

12 – 20 American Queen Steamboat Cruise easyaccesstravel.com



Coming up in the January/February Issue of inMotion... Advocacy

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You will now be able to read *inMotion*, the Amputee Coalition's latest blog, connect with other amputees on Facebook, check out our inspirational and educational videos on YouTube, and see what's happening on Twitter anywhere and everywhere!

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WHO IS YOUR AMPUTEE HERO?

THE GIFT OF TIME

by Ashley Kurpiel

Having been touched by so many wonderful people in my life, I find it difficult to pick just one "hero."

However, at this time, I find it easy to give you the name of my hero this year, and in years past: David Paskowitz.

David befriended me during my time at the 2010 Amputee Coalition Conference in Irvine, California. He donated his time at the very last minute to help take amputees surfing for the first time. I was taken by his unselfish attitude toward us and the time he gave.

I have fibrodysplasia ossificans

progressive (FOP), a rare, genetic condition that causes bone to form in soft tissue such as muscles. I had never tried surfing but was eager to learn. David and his friend Van Curaza took me out on a board for the very first time and gave me the joyful experience of feeling



the water beneath me and the wind and ocean taking me to a place I've never experienced before.

David and his wife and daughters have made me feel like a part of their family and they have helped me connect to a more enjoyable part of life. His humor has no boundaries and he has reminded me to find humor in myself because even though my disease is not funny, we must laugh at ourselves to connect with others.

If I had to shine a spotlight on just one of his contributions to my happiness, it would have to be the time he took from his professional schedule to fly to Washington, D.C.

overnight, rent a car, pick up my mother and me and continue on to Russia for a TV interview and meet another victim of my rare disease. He spoke and sang to the audience, met the victim there in Moscow, then caught the next flight back to California to fulfill an obligation to another organization.

He still continues to check on me and plan for my next trip to California and help with my cause for FOP. Last year he arranged a fundraiser for my organization, the International FOP Foundation, to support the continuation of research being done for my rare disease. David is one of the most unselfish individuals I know, who not only gives of himself, but shines as an example to me and his wife and daughters.

Who is your amputee hero, and why?

Whether they're an amputee or not, the special person who inspires you to live well with limb loss can be a relative, a friend or someone you've never met. We invite you to send us an article (350 words or less) for consideration to be included in *inMotion* (editor@amputee-coalition.org).



Do you feel confident on challenging terrains?



élar

At Endolite, we understand that every person desires certain features and benefits of their prosthetic device and we understand that you would like your prosthetic to feel as natural as possible. We also know that you encounter various terrains that require stability and confidence. That's why we have developed the only full range of hydraulic ankle/feet. These revolutionary feet were designed to provide stability and security on some of the most common terrains. From gravel and mulch, to snow and grass, the hydraulic ankle/feet self aligning properties allow you to walk confidently and comfortably to help you *get busy living*



Jupper-limb perspectives

She's Figuring It Out

Angel Giuffria blazes trails and encourages others to follow her path

In her 26 years, Angel Giuffria has been called many things – from "that one-armed girl" to "inspiration," and many things in between, none of which she seeks out. For the past few months people have been calling her "bionic," a moniker she wears, proudly and literally, on her sleeve.

Angel is one of the first people to wear the small Steeper bebionic arm, the first one specifically made for women and children. It is touted as the world's most lifelike, comfortable, functional and intuitive myoelectric hand available.

"With my new hand," Angel says, "I am able to do a lot of things faster and more precisely, like tying

by Amy Di Leo



my shoes, braiding my hair, opening a water bottle, or even picking up dimes or stacking quarters. One of the biggest benefits is being able to use both sides of my body equally, taking stress off my right hand, elbow and shoulder."

An amputee since birth (she was born without her left forearm), Angel is no stranger to prosthetics. She got her first passive arm when she was six weeks old and she's likely the youngest person to wear a myoelectric prosthesis – she was four months and 10 days old when she first started wearing one. Today she wears either a cosmetic arm or her myoelectric arm, and she's also been known to just go without.

Growing up in Slidell, Louisiana, a small town 30 miles northeast of New Orleans, Angel says there weren't any other amputees around, but that didn't stop her from doing most anything.

"Congenital amputees have things different because we start figuring out things early as kids. We don't have to relearn things; we're learning as we go." Whether it's using a curling iron, tying her shoes or throwing her long brown hair into a ponytail or braid, "can't" just isn't in this young lady's vocabulary.

"My parents always made me feel like I was special – or more so that there was nothing wrong with being different – that, in fact being different is awesome." And that's a big part of what makes Angel who she is today.

"I love that I have one arm. I accepted myself a long time ago and I don't ever remember a time that I wished I had two hands. Yeah, you may be sad about it, but you don't want to change yourself. You are who you are for a reason." A big part of Angel's self-confidence is her outgoing, silly, somewhat jokester personality.

"I used to pull a lot of pranks as a kid. From throwing my prosthesis in the pool during adult swim to throwing my arm off the school bus or hiding it in a teacher's desk drawer during naptime. Oh, and who can forget shaking hands with the substitute teacher and letting go?" She adds that she also enjoyed coming up with stories about how she lost her arm – with alligator attack being one of her favorites.

But, she adds, it wasn't always easy. "I did get teased a decent bit as a kid, she shares. "Throughout my life, there have been times where I was completely fine and confident and comfortable and other days where I was very aware that I had one arm and that people saw me as different."

Angel ran track and was a cheerleader in high school but says she also was prevented from participating in certain activities by "well-meaning" coaches and teachers concerned about her safety.

Today, it seems nothing holds her back. Angel is a bundle of energy with grand aspirations and the commitment to see her dreams come to fruition. Maybe she wasn't allowed to join power-lifting in high school, but today weight lifting is a regular part of her workout routine.



rutchA

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She is a cyclist, a yogi and nearly certified as a kickboxing instructor. She even types 70 words per minute, which is handy since Angel is also working on her Master's degree in psychology.

These days, acting is also a big part of Angel's life. She already has several movie credits to her name, including her first film, *The Green Lantern*. Although her scene didn't make the final cut in *The Hunger Games: Mockingjay, Part 1*, she did have an off-screen moment with its star, Jennifer Lawrence. Angel says her most exciting role to date is her first speaking part, where she did a scene with John Lithgow in the new Ben Affleck movie, *The Accountant*.

"I'm hoping to book more roles where I can portray an amputee, but I'm also hoping to eventually get to the point where I can go out and audition for a role as me – either wearing my bionic prosthesis or not wearing a prosthesis, because amputees are normal people."

One place for Angel where the prosthesis isn't required is at 13th Gate Haunted House, a popular seasonal attraction in Baton Rouge where she works every fall. "I've been a zombie for the last three years, and this year I get to be a character from the *Evil Dead* film series who cuts off her arm with an electric knife. It's really bloody and lots of fun. The best part is, I get to scare people who *want* to be scared!"

Angel also finds time to volunteer. For the past two years she's been a counselor at the Amputee Coalition Paddy Rossbach Youth Camp, which she calls "amazing:" "This year, a bunch of upper-limb amputees got together and I helped them learn to tie their shoes and fix their own hair – some of these kids never even thought to do these things themselves. I just wanted them to know they *could*. All I really want is for them to see me and realize they're also capable. I don't want to be an 'inspiration,' I just want them to know that they can figure it out too."





Getting a new prosthesis A parent's perspective

The research for my first functional prosthesis as an adult was a big reason how I found out about the Amputee Coalition and attended my first conference. As a parent of a preschooler, I had very specific needs and things to consider in a prosthesis. The following issues were at the top of my list:

- 1. The ability to carry my child on my prosthetic arm was important, since different types can have different weight tolerances. I have a hybrid that can tolerate up to 50 pounds on the forearm.
- 2. I needed the specific function that could allow me to pick up small objects like toys and books, as I seem to do a lot more of that with a little one around.
- 3. Since I wanted a good-looking hand and also something that could handle slightly rougher usage, including water (at least on the terminal device), I opted for an additional hook.
- 4. In addition to light housework, some other tasks that I wanted to accomplish as a parent were buttoning or zipping up my son's clothes, holding books while

by Harleen Chhabra Gupt

I point out pictures and words, and playing different games with him that could require simple tasks of holding or supporting things.

5. Child-proofed care of the prosthesis at home meant finding a spot out of reach of those little hands that could be used to charge the batteries too. When left unattended, switching the prosthesis off along with locking the elbow and the hand, and making sure it stayed away from the tub and any water play were some best practices I established at home.

My son had seen me with one arm since the day he was born, so I needed to properly introduce him to the prosthesis. Calling it an Iron Wo/Man arm was a simple explanation that he liked. The "cool factor" of the blue light sensors, the lock button for the mechanical elbow and the whizzing of the electronic wrist and fingers was enough to make him love this contraption. The more difficult part for him was to understand that this was not a toy for him to play with! I am still working on that one... 🔁

Do You Have Phantom Limb Pain?

If so, you might be eligible for a research study that aims to decrease and/or resolve phantom limb pain in people with an upper- or lower-limb amputation.

The purpose of this research study is to determine if putting local anesthetic (numbing medication) through one or two tiny tube(s) placed next to the nerve(s) that go to an amputated limb will decrease and/or resolve phantom limb and residual limb pain. The procedure, device and infusion are all FDA approved and have been used for over 20 years to decrease pain immediately after surgery.

Participants will receive \$100 following each catheter insertion plus \$50/day during the 6-day infusion(s), up to a maximum of \$800/subject.

This study is being conducted at the University of California (San Diego, California); Cleveland Clinic (Cleveland, Ohio); Walter Reed National Military Medical Center (Bethesda, Maryland); Veterans Affairs Palo Alto Medical Center (Palo Alto, California); and Naval Medical Center (San Diego, California).

- No surgery involved
- Either lower or upper limb amputations
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Restoration as *Motivation*

by Leif Nelson, DPT, ATP, CSCS

A short drive from the Rock and Roll Hall of Fame, on the west side of Cleveland, you can hear a man urging other locals living with disabilities: "Get up, don't give up!" Anthony "Tony" Green, 54, then pulls up his pant legs to show off the prosthetic legs he uses to assist him in his full-time work as a general contractor. His prostheses also serve him well as he races around engaging in his favorite hobbies, "cooking every type of food that has a spice in it" and creating lyrical poetry over hip-hop basslines.

Green was born when 8-tracks were the popular way to listen to rhythm & blues recordings. During this time, he began to learn the meaning of responsibility with his first job. At age 8, he was working on a bread truck. Eight years later, when the cassette tape had dubbed the 8-track obsolete, Green was unknowingly acquiring the skills he would need in his 50s to overcome his limb loss. He worked for his father, the foreman, laying asphalt and began to integrate his dad's work ethic into his own character. The lessons learned continued at home where his father called the TV "the idiot box" and labeled the bed as "only good for dreaming and making babies." Adopting these ideals, Green served in the U.S. Army Signal Corps from 1980-1982, where he was responsible for managing communications and information systems. As difficult as his training and service was, his most challenging battle came many years later.

Green went on to work three jobs to support his family, and during the era of CDs he developed a passion for remodeling homes. Now, in a time where digital music reigns, a resonating determination to push himself has led him to overlook his own mounting health concerns. In 2013, uncontrolled diabetes advanced into a bone infection in Green's right foot. Unable to overcome this challenge to his health, he lost his right leg below the knee. Just 12 months later, Charcot foot syndrome, another complication of diabetes, resulted in the need for a left below-knee amputation.

Joseph Boncser, amputation rehabilitation coordinator at the Louis Stokes Cleveland VA Medical Center, recalls trying to educate Green about the likely long course of rehabilitation to possibly return to work. The amputation care team, including the physician, physical therapist and prosthetist, found that they had to unite their efforts to prevent setbacks by pacing the hypermotivated Green.

Boncser recalls, "Our initial goal was to get him beyond using a walker as fast as possible, but his motivation made us revamp our goals almost daily. Once he could walk with a cane, we were outside tackling hills and uneven surfaces." Community mobility training outside of the clinic is standard practice for Boncser and any patients who are going to be mobile in the community. When the weather is limiting, training indoors uses cutting-edge virtual reality technology for gait and fall-avoidance training through harnessed immersive treadmill walking. Boncser is an advocate for using all resources that are available to help patients reach their goals.

Prosthetic component technology is also used by the amputation care team that has recently replaced Green's



From left to right:

Elizabeth Hardin, PhD preps Green to walk on the instrumented treadmill of the V-Gait virtual reality system.

Green works to correct his foot placement using virtual reality technology.

Green transitions from grass to sidewalk under Boncser's supervision.



fixed-ankle carbon fiber feet, which were holding him back when he returned to work. Kimberly Sarvis, certified prosthetist at Louis Stokes Cleveland VA Medical Center, explains, "We use a patient-centered approach, and we have the freedom to modify our treatment plan to meet the patient's specific goals." For Green, this meant outfitting him with microprocessor-controlled articulating ankle units. Sarvis describes these as an excellent option for patients who negotiate hills or uneven surfaces, which are encountered by Green every day. Green now helps Sarvis by functioning as a peer visitor. "He has such a positive attitude," Sarvis says, "and helps other patients, telling them that life isn't over – it's just different."

Whether Green is remodeling a home, revamping a beat with his lyrics or restoring confidence and motivation in a fellow veteran, it is always done with determination and a smile. Just like the vinyl LP record, Green has continued to impact the people of Cleveland for over half a century.

Just like the vinyl LP record, Green has continued to impact the people of Cleveland for over half a century.



For more information on the Louis Stokes Cleveland VA Medical Center, visit www.cleveland.va.gov





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A roundup of tools you can use now and developments that could improve your future.

By Karen Henry

Individuals with amputation or secondary conditions related to amputation rely on an endless array of processes, developments and tools that help to improve function, mobility, access and overall health – the majority of which rely on advances in technology.

> In this article, we will look into a number of developments that can help you in your daily lives now, as well as several that have the potential to help you in your future.



THOUGHT-CONTROLLED

The sensors are between 3mm and 5mm wide and are implanted with a needle while the patient is under local anesthesia. The procedure is minimally invasive and takes about 15 minutes. Recovery takes between 10 and 14 days. The sensors are designed to last a lifetime, Ingvarsson says.

Gummi Olafsson is one of two individuals to beta test the implants. He was hit by an oil truck when he was nine years old, and lived with chronic pain for 28 years until electing to have his foot amputated in 2004.

"As soon as I put my foot on, it took me about 10 minutes to get control of it," he says. "I could stand up and just walk away. Come back, sit down, use my muscles to move my foot in the position I wanted to use it." In trying to explain how it felt to move his ankle, he says, "It was like...I was moving it with my muscles. There was nobody else doing it, the foot was not doing it, I was doing it."

Ingvarsson says the ideal candidate for the IMES surgery is someone with an above-knee amputation who wants to move from walking to running. He adds that clinical trials to YMBIONIC LEG assess the technology are ongoing, and it is too early to offer a timeline for when it might be available to amputees in the United States. IMES is designed to work with Össur's line of bionic lower-limb prosthetic devices.

Note: This content is for information/educational purposes only. The Amputee Coalition does not endorse these applications and cannot vouch for their medical accuracy.

Advances in control systems have made lower-limb prosthetic systems much more responsive to environmental changes. However, the prosthesis is still largely a passive device, requiring the user to perform a specific act or actions to get it to move in a desired way. Össur has developed a new control system that allows users to control bionic prosthetic legs with their thoughts.

Prosthetic control is enabled through tiny implanted myoelectric sensors (IMES) that are surgically embedded in a lower-limb amputee's residual muscle tissue. The IMES triggers the desired movement via a receiver located inside the prosthesis.

"Movement in able-bodied individuals generally begins subconsciously," says Thorvaldur Ingvarsson, MD, PhD, the orthopedic surgeon who leads Össur's research and development efforts and spearheaded the mind-controlled prosthetics project. For example, the desire to walk up a flight of stairs "triggers electrical impulses inside the body that catalyze the appropriate muscles into action," he says. "Össur's new technology replicates that process in an amputee." But instead of the electrical impulses causing the muscles to contract, the electrical impulses are picked up by the sensors, which cause the prosthesis to "react as your brain wants."





AFFORDABLE 30 PRINTED WATER LEG

If an amputee could have one additional prosthesis, what kind would it be? This is the question Jeff Huber had in mind when he started Standard Cyborg in San Francisco, California. As it turns out, he didn't have to go farther than his own bathroom shower for an answer.

Huber was born with fibular hemimelia and had his left leg amputated below the knee when he was an infant. One of the most frustrating daily routines for him – and many other amputees – is showering. The company's flagship 3D printed shower/swim prosthesis was designed with the goal of making "the best water prosthesis possible that everyone can afford," Huber says.

It all starts with a 3D scan of an individual's current prosthesis. From that scan, Huber 3D prints a single plastic core "replica" of the prosthesis. He then covers the plastic core with a carbon-fiber sleeve for strength and durability and seals it with a laminate. The end result is a lightweight, fully waterproof prosthetic leg.

The water leg is not designed to take the place of a traditional prosthesis, but it's perfect for getting to and from the shower, walking on the beach, or a 30-minute dip in the ocean. While it is currently only available for below-knee amputees, Huber says he is working on creating a functional above-knee version.

WATER LEG

COING ALL IN FOR WHEELCHNIR LIFT SNFETY

How do you ensure 100 percent safety on a mass transit wheelchair lift? That is the question Phill Bell, director of product performance at BraunAbility had in mind when he initiated the Sentinel Project, a safety research initiative Braun is conducting in partnership with researchers at Purdue University.

Because Braun's mass transit wheelchair lifts are typically very safe to begin with, creating a statistically significant database of real-world lift accidents was not possible. Instead, the Purdue researchers created a computer model that simulates how people navigate their wheelchairs onto a lift platform given different environmental distractions. Using this model, the Purdue researchers are "trying out" various lift designs and measuring whether and how much safety is improved.

"The Sentinel Project is entering its second year, and the Purdue scientists will start publishing their findings during this academic year," Bell says.

Braun also wanted to know how it could make the industry better across all disciplines, so the knowledge gained through the Sentinel Project will be carried on through the Accessible Technology Manufacturers Consortium. Created by Brad Duerstock, PhD, associate professor of engineering practice at Purdue, the purpose of this group of researchers and fellow manufacturers is to continue the work started by the Sentinel Project and apply it to other accessibility products, such as wheelchairs and accessible vehicles. "We want to make the industry better across all disciplines," Bell says.

Braun is also partnering with Purdue on the Queensland Project. Started in January of this year, the goal of the Queensland Project is to create "a brand-new wheelchair lift that is quiet while riding, lighter weight, and designed for aesthetics," Bell explains. "The first practical findings from the Sentinel Project will be incorporated into the Queensland lift when we introduce it," he adds, which is anticipated to be in 2016.



Wheelchair Assistant



GIVING WHEELCHNIRS N LIFT

As we age, our muscles naturally atrophy, making it more difficult for lower-limb amputees who use wheelchairs to get out of them. An engineering student at Purdue University has developed a wheelchair assist device that incorporates an electric seat lift and a walker that helps users get out of a traditional wheelchair more easily.

Similar to a lift recliner, the seat lift is activated by pressing a button on a remote control. The walker is deployed by extending the wheelchair's armrests, locking a crossbar, and lowering a pair of scissor legs to the ground and locking them.

Dubbed the Wheelchair Assistant, the seat lift and walker device are designed to be retrofitted onto a conventional wheelchair by removing the existing seat and armrests. It can be set onto the bars of the existing seat with the brake switches attached to the legs of the front wheels. The walker glides connect to the seat lift structure.

The Purdue Research Foundation's Office of Technology Commercialization has applied for a patent and is currently looking for industrial partners to further develop and manufacture the innovation, noting it could also be developed as a standalone product.

TAKING ON TYPING SINGLE-HANDEDLY

Hunting and pecking on a traditional keyboard is hard enough with two hands. For individuals who have only one hand, it can be downright tedious. Canadian company Tek Gear has made one-handed typing a lot easier with the introduction of Twiddler 3, a lightweight, pocket-sized, fully functioning keyboard, mouse and a 2 MB USB storage device designed to be held in one hand.

The Twiddler has 19 keys and uses a function called chording. Just like you play a chord on a piano by striking several keys at once, the Twiddler uses a combination of single keystrokes and chords to produce all the letters, characters, symbols and commands found on a standard keyboard. Function keys and mouse actions are controlled by the thumb, while all keystroking is done with the fingers.

The Twiddler looks similar to an ergonomic joystick and can be configured for right- or left-hand use. It comes

with a strap that wraps around the back of your hand to keep it in position while you are typing.

An online tuner allows you to customize chords and mouse functions, and an online typing tutor teaches you how to use the device.

> The keyboard can go anywhere and connect to just about any device – tablets, computers and phones – via Bluetooth. It operates in both a wired and wireless mode.

If you have diabetes, you already know how important – and difficult – it is to manage your blood glucose. There are roughly 1,000 diabetes-related smartphone apps. So how do you choose? Here are a couple of highly rated diabetes apps, as well as a few others that are designed to help you, your caregivers, and anyone else looking for additional personal safety:



Diabetes Buddy

Diabetes Buddy by Vitility replaces your paper diary and allows you to keep track of your blood glucose values, insulin use and carbohydrate intake. The app is designed to connect to your glucose meter, and you can set reminders to measure your blood glucose levels and inject insulin. Your personal information is stored on your device, and you can send your food diary to your physician.

The app is designed for iPad, iPhone and Android devices, and is available for free.



Glucose Buddy

Glucose Buddy by SkyHealth is a diabetes logbook manager. You can manually enter your glucose numbers, carbohydrate consumption, insulin dosages and activities, and synch your logs to a free online account. Glucose Buddy is integrated with CalorieTrack, a database of 100,000-plus food items and more than 200 activities. The app includes push notifications that remind you when it's time to log.

The app is designed for iPad, iPhone and Android devices. It is available in a free version and a \$6.99 pro version.



Anna Cares

Meet Anna. She is a smart virtual assistant designed to help people with chronic health conditions. She keeps track of your appointments, reminds you to take medicine or do more exercise, tracks your eating habits, and connects you with your provider and care network.

Anna Cares is an iPad app developed by Clevertar, a South Australian company that specializes in "relational agents" – aka virtual assistants – for assistive care. According to Clevertar's co-founder, Martin Luerssen, PhD, interacting with a virtual character encourages people to do more exercise than a typical wellness app. Because Anna looks and reacts the way a real human would, users are more likely to interact with the app similarly to how they would react to a real person.

He says that Anna is not artificial intelligence, but she does improve with use. Anna Cares is essentially a well-scripted program that knows how to deal with a variety of situations. Anna's reactions change based on past interactions, how long it takes you to respond to her, and a host of other variables.

The app is currently only available to clients of community care service providers, but clients can open up their care network to family members and others who care for them.

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Medical ID

Apple iPhones include a feature called Medical ID. Essentially, it is an enhanced version of the In Case of Emergency (ICE) feature. You can access Medical ID through the Health app or through your "Me" contact card in your iOS contacts. You can list medical conditions, medical notes, allergies, medications, blood type and an emergency contact. Medical ID can be viewed when your iPhone is locked by tapping Emergency and then Medical ID.



ICEcard

Not all Android phones come with an emergency contact feature, but there are apps that allow you to add emergency contact information to your Android phone's lock screen.

ICEcard allows you to store an emergency contact list, as well as height, weight, blood type, medical conditions, medications, allergies and other information. An alarm button allows you to send an emergency SMS message to all the people in your contact list.

Contact the Amputee Coalition at 888/267-5669 or amputee-coalition.org motion 31

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Phantom Sensation and Pain:

Incidence, Causes and Common Treatments Backed by Evidence

by Jason T. Kahle, MSMS, CPO, FAAOP, Tyler Klenow, CP, M. Jason Highsmith, PhD, DPT, CP, FAAOP, Anthony V. Florschutz, MD, Paul Lunseth, MD, and Jan Ertl, MD

Introduction

Whenever an amputation occurs, the normal anatomy of the patient is disrupted. The disruption to the nervous system of the amputee can be exceptionally impactful. Amputees commonly report pain in the residual limb or stump, referred to as stump pain, and also sensations where the amputated limb used to reside. Phantom pain is common in the early stages of amputation; however, it will usually subside with prosthetic use. Phantom limb pain includes pain in the absent limb that can manifest itself as a stabbing, burning, throbbing, itching, and tingling or any other unpleasant feeling. It is not common for pain to remain a chronic issue. Phantom limb sensation is the perception of any sensation in the absent limb, such as touch or pressure, other than pain.



FIGURE 1

When a person loses their limb, the wiring to their brain is still intact and can send signals of pain and sensation.

Phantom sensation is noted in almost all amputees at some point, with phantom pain being present in as many as 60 to 85 percent of amputees. Amputation-related pain is related to phantom sensation, as almost all amputees who have phantom or residual limb pain have some type of phantom sensation, whereas



approximately 5 percent of patients who have phantom pain have no phantom sensation. A phenomenon known as phantom telescoping has also been known to occur. This involves the distal portion of the absent limb (hand or foot) feeling that it is moving

gradually closer to the end of the limb, eventually feeling within the remaining limb itself. Telescoping usually results in a hybrid phantom/limb pain.

Phantom pain is noted more often in upper-limb amputations than lower-limb, in females than males, and in traumatic amputees than any other type of amputee. Phantom sensation and pain is least common in congenital amputees, at only 3 percent. The onset of phantom pain can be immediately postoperatively or several years later, although 75 percent of patients who develop phantom pain do so within the first week. Other common times for the onset of phantom pain are one month and one year following amputation. Phantom pain will decrease for approximately 50 percent of amputees, disappear in about 15 percent of amputees, and increase in only 3 percent of sufferers. There are several risk factors for the development of phantom pain, including chronic preoperative pain and poorly adjusted personalities, such as those who internalize situations.

Causes

There is no recognized mechanism for phantom pain in the scientific community. However, most agree that it is a coping mechanism of the nervous system in response to disruption caused by the amputation. It was originally believed that resected nerves within the residual limb develop into neuromas (bundled nerves). Within these neuromas is a high sodium concentration, which affects the way that nerve impulses develop; some believe this is the cause of phantom pain, as the message (afferent stimulus) is garbled and

FIGURE 2 Telescoping

misinterpreted by the brain as pain. Some believe it is a result of a common surgical technique in which the vasculature is bundled and fused with the nervous anatomy. The constant stimulation of nerves by the pulse of the arteries causes limb pain and could cause phantom pain as well. Further theories include

the sympathetic nervous system (i.e., pain is brought on by the nervous excitation of stressful situations).

Other common causes are speculated to occur at the level of the spinal cord and brain. Disruption of the peripheral nerves in the amputated limb causes an abnormal connection between the connections at the spinal cord called "axon sprouting." Due to the absence of signals coming from the amputated limb, the spinal nerves become more receptive to any signal coming from that pathway, resulting in an excitement of the spinal cord and upregulation of neurotransmitters. This is a cascade effect called the "windup phenomenon." In the brain, the areas assigned to accept input from and send messages to move the amputated limb are reassigned to neighboring areas. This reorganization can cause false perceptions, resulting in phantom pain. Phantom pain is also commonly associated with depression and anxiety development following amputation.

Treatment Modalities

There are a variety of methods to treat phantom limb pain with a mix of supporting scientific literature. One such treatment that is commonly used with anecdotal support is the ingestion of mustard with the onset of phantom pain. Another common method is massage of the residual limb, which relaxes the musculature, increases blood flow, and reduces nervous excitement to the area. Introducing an additional nervous stimuli, pressure in this case, can redirect the perception of pain in the brain. This is the same mechanism by which someone pinching an arm will reduce pain in a stubbed toe, for example.



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FIGURE 3 Mirror therapy

There are many treatments that have been scientifically evaluated. In mirror therapy, the intact limb

and amputated limb are usually placed in a mirror box so that the amputee sees the reflection of the sound limb when looking at the amputated limb. This helps resolve visual-proprioceptive dissociation in the brain. In other words, it tricks the brain into thinking the limb is there. This can be used in patients who feel that part of their amputated limb is causing pain to itself, as in cramps that won't relax, or in patients who feel that they have an itch they cannot scratch. A motion that would resolve these issues in an intact limb can be reflected in the mirror, which appear reversed to the patient in the reflection, thus convincing the brain the issue is resolved.

Another common therapy is transcutaneous electrical nerve stimulation (TENS), where nerves are stimulated electrical current for therapeutic purposes. These stimulations block nervous excitement from the peripheral nerves to the central or spinal nerves that the brain perceives as pain. These devices, including implantable versions, have been shown to be effective in the treatment of chronic pain and



also in chronic phantom pain cases when highintensity and lowfrequency pulses are used. Further, the influence of

gel liners with electromagnetically protecting properties have been found to reduce phantom sensation and pain.

Acupuncture has also been used to treat phantom limb pain. Acupuncture is the insertion of thin needles into the body. The traditional use of acupuncture is to correct imbalances in the flow of energy throughout the body, but it is believed to affect neurotransmitters and hormone levels that can cause pain, in addition to the immune system. Common acupuncture sites in treating phantom pain include the residual limb, the intact limb, and the scalp or ear. Cryoneuroblation (the direct application of cold to a nerve) has been used sparingly to treat phantom pain. It causes a targeted degeneration of the nerve, which reduces the amount of nervous stimulation, which can reduce pain. Other methods include biofeedback, guided imagery, relaxation techniques, hypnosis and cognitive behavioral therapy, although these have had limited research to support their effectiveness or appropriateness in treating phantom pain.



FIGURE 4

Phantom Limb Treatment Options – Speak to your Doctor or Therapist. There are many non-surgical and non-drug-related therapies. Some can be done on your own and some require physical and occupational therapy.

Pharmacological Treatments

There are several pharmacological treatments that have been shown to reduce phantom pain in some capacity. The use of non-steroidal anti-inflammatory drugs (NSAIDs) in the treatment of phantom pain is the most common. These drugs, such as ibuprofen (Motrin) and naproxen (Aleve), reduce the amount of enzymes in the body. which leads to a decrease of the hormone prostaglandin, one of the stimulators of nociceptors, the nerve receptors that perceive pain. They also reduce inflammation in the residual limb, which can interrupt signals leading to the spinal cord and brain.

Antidepressants are also used to treat phantom pain. Tricyclic antidepressants (TCAs) are common in the treatment of neuropathic pain, including phantom pain. These drugs can reduce pain by reducing the amount of neurotransmitter uptake and sodium channel mechanism action. Serotonin norepinephrine reuptake inhibitors (SNRIs) and selective serotonin reuptake inhibitors (SSRIs) are effectively used in treating diabetic nerve pain. There is a small amount of evidence to support its use in treating phantom pain.

The mechanism by which anticonvulsants decrease phantom limb pain is unclear, although they do have an effect on sodium channels. However, these drugs are used in the treatment of many conditions in a similar manner. Gabapentin is most commonly used for generalized phantom pain, as are oxcarbazepine, pregabalin and lamotrigine. Carbamazepine has been shown to reduce brief bouts of stabbing pain in the phantom limb.

Opioids have limited use in the treatment of phantom pain and are controversial, as there has not been much scientific research to support its effective use and there are a number of side effects, including potential for abuse and addiction. These drugs bind to receptors throughout the body



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FIGURE 5

Pharmacological Treatments – Speak to your Doctor. There are also many systemic and local drug-related therapies, with some good evidence to guide you and your physician.

that reduce pain. It has also been proposed that opioids may disrupt reassignment of parts of the brain that lead to phantom pain. Opioid medications have been shown to be more effective when used with other medications, and less potent types, such as tramadol, have had the most benefits as tolerance and dependence are uncommon. A recent case series found that an opioid agonist-antagonist of buprenorphine and naloxone was effective in treating chronic phantom pain that was resistant to several other types of medication.

Management of phantom pain can begin before the operation, as use of analgesics and anesthesia 48 hours before until 48 hours after amputation has been shown to reduce phantom pain. Immediate postoperative use of the painkiller ropivacaine has also been shown to reduce phantom pain. Hormone therapy, through the use of calcitonin, has been found to be effective in treating acute phantom pain. Other medications used to treat phantom pain include calcitonin, beta blockers and calcium channel blockers. Little evidence of their effectiveness for this purpose exists.

Conclusion

Many people living with limb loss experience phantom sensation to varying degrees. There is some good science for understanding the causes and treatments. however there is still much to be discovered and explored by researchers, physicians, therapists and prosthetists. If you are experiencing phantom sensation or pain and it is interfering with your life, begin with speaking to your prosthetist, who can help you evaluate the severity and appropriately refer you to a physician or therapist. 🔁

The views expressed in this article are not the opinion of the U.S. Department of Veterans Affairs.

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A Randomized Control Trial: Performance Differences in Energy-Storing and Shock-Absorbing Prosthetic Feet in High-Functioning Transtibial Amputees

> by Jason T. Kahle, MSMS, CPO, FAAOP, and M. Jason Highsmith, DPT, PhD, CP, FAAOP

J-shaped feet are the best option when running in a straight line, or when there is minimal turning or maneuvering. An amputee who is in the military may need to negotiate different terrains, or go from walking to running; J-shaped feet are not practical for these situations. (Pictured: Gideon Connelly, a study participant, and Loi Ho, clinical prosthetist of the study.)

The recent wars in the Middle East have resulted in approximately 2,000 amputees. Most of these individuals are lower-limb amputees. Many of them are young and very high-functioning, and wish to return to duty or maintain high function in civilian life (MFCL 3 or 4). Many of these combat-injured amputees will participate in active sports, work out, bike, run, chase their kids around the yard and many other active endeavors. The use of their prostheses far exceeds basic ambulation.

The Department of Defense (DOD) cares greatly about understanding how the best prosthesis and prosthetic components can maximize the function of active duty, veteran and civilian amputees alike. The DOD has been active in funding prosthetic and amputee research projects to explore the best options for amputees. One such study was conducted at the University of South Florida and Prosthetic Design and Research in Tampa, Florida.

There are an estimated 200 types of prosthetic feet available to amputees, while the benefit regarding those feet is still being determined in many cases. We know that "J-shaped" running feet are great for running, mostly in a straight line. We have even seen an amputee compete in the Olympics with prosthetics. But what about climbing over a wall, a cargo net, stairs or a hill? Hiking requires a heel, and "J-shaped" feet are impractical. Many feet have features such as torsion and vertical shock absorbers, while others are extremely lightweight and boast maximum energy return. The DOD wanted to know, what is the best all-around foot for extremely high-activity amputees? What foot would allow personnel to hike through the mountains and streets of Afghanistan and then run and dodge bullets should a firefight occur? The DOD requested that we explore this issue.

Energy-storing prosthetic feet have been studied for preference, biomechanical and energetic differences. Below-knee amputees prefer energy-storing feet, and they increase ankle motion and return energy better than feet that are not energy-storing. Further, energy-storing feet can increase gait speed. Multi-function feet, such as vertical or torsional shock absorption combined with energy-storing, are poorly studied. Military below-knee amputees currently have increased return to duty rates but assessments to determine who is a candidate to return to duty is still under examination. Military obstacle courses are one way to assist in determining eligibility for return to duty and for differentiating abilities between prosthetic feet and those with below-knee amputations. This study's purpose was to determine differences in functional abilities between energy-storing feet, with and without vertical and torsional shock absorption, and compare those amputees using these feet to non-amputees.

In this study, 14 amputees (subjects) under the age of 45 received three different feet. A cover was put over the feet so they could not see the foot being tested. The amputee subject had to be either active duty military,



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first responder, a veteran or an accomplished civilian athlete. The non-amputees they were compared to were local SWAT team members. The amputees were fit with three study feet (Össur Re-Flex Rotate, Össur Vari-Flex, Endolite Elite Blade) that were chosen because of their preference among young active users. The amputees were trained by SWAT personnel to complete a 17-task, military obstacle course. All 14 amputee subjects completed the obstacle course at three times, each time with one of the different feet. Additionally, we tested biomechanical and energetic measures for both the amputees and the non-amputee groups in the laboratory.



Team 2 being fit in the three different study feet by the study prosthetists. It is important to try different feet when being fit with a prosthesis, as personal preference is the most important aspect of choosing a foot.

Results

The amputees were an average age of 31, while the average age of the non-amputees was 38. Prosthetic feet were aligned to patient preference. The multi-function foot with torsion and shock absorption (Össur Re-Flex Rotate) made the prostheses significantly heavier than the other two feet. Average obstacle course completion times were similar between all three prosthetic feet, as was the perceived exertion reported after completion. Non-amputees were able to complete the course approximately 32 percent faster than the amputees, while they also reported it to be less exerting. Similar observations between controls and the amputees were found in laboratory measures; however, the energy-storing Elite Blade decreased the need for oxygen during walking and running.

Discussion and Conclusion

High-functioning below-knee amputees can complete a military equivalent obstacle course, and are returning to duty after amputation. However, performance is slightly compromised compared to non-amputees performing on the same obstacle course. All three prosthetic feet tested meet the high energy demands of completing an obstacle course. The Elite Blade, the lightest foot tested, was preferred





The Endolite Blade was the lightest of the three feet and was slightly preferred because of that feature.

in this study because it offers a bioenergetic advantage in sustained, linear activity. The heaviest foot with increased functional features, such as shock and torsion absorption, tended to not be preferred relative to lighterweight alternatives. However, someone who could benefit from these features, like an individual with back problems or a golfer, may prefer the features to the lightweight nature of the other feet. As always, personal preference is the most important aspect to choosing a prosthetic component. It is important to see a prosthetist who will discuss and offer you a chance to try different types of feet.

We are so lucky to have brave men and women to protect us during war; amputation is an unfortunate consequence. There are approximately 1 million lower-limb amputees in the U.S. While most of them did not lose their leg during war, being able to run, jump, remain active, and play with children are important aspects of life when living with limb loss, whether you are military, veteran or civilian. We are thankful to the Department of Defense for recognizing the need to explore differences in prosthetic feet and funding the opportunity to explore those benefits. Our hope is that all people living with limb loss can benefit from the knowledge we gain from these DODsupported studies. 💫

The views expressed in this article are not the opinion of the U.S. Department of Veterans Affairs.

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Preparing for the real thing

by Hugh Boyd



My alarm wakes me from a peaceful sleep. I roll out of bed and dress into my contractor's gear. It's a very hot and humid day. In a few hours, I am going to have a very horrible day. I am going to lose my leg in a terrible explosion in a small village in a faraway hostile country. Luckily for me, this is not real – it's just a role-playing job simulating a scenario that United States Marines may face while serving our country. My job today is to play a "victim" of a bomb blast, which will help Marines face a realistic training scenario based on an Afghanistan landscape.

06:00

Myself, a make-up artist and about 14 Afghan role-players (foreign

language specialists) all load into three vans as we depart our comfy hotel in Stafford, Virginia and make the short drive to Quantico, Virginia. When we arrive at the front gate, we unload again and go through a security check. Everyone involved in our group has been hired by Glacier Technical Solutions, LLC (GTS). GTS was created by the Bristol Bay Native Corporation (BBNC), one of 13 Alaska Native Regional Corporations (ANCs), and is contracted to provide a qualified pool of training support personnel (including role-players, such as an ARP like myself) in mission operations for the U.S. Armed Forces.

An ARP (amputee role-player) portrays scripted and improvisational roles associated with victims of combat wounds while interacting with other roleplayers and military trainees within a realistic village erected on a military training site.



At this time, Madison Ceballos-Rivera, our make-up artist, starts to

get ready to work on numerous Afghan role-players to transform them into burn victims. Madison works for KBZ, a special effects make-up provider subcontracted by GTS. The previous days have been peaceful, with the Marines learning how to interact



with the Afghan role-players while simulating a hostile environment in an unfamiliar country. Some role-players are dressed as Afghan police officers, while others are dressed in typical Afghan attire.

My turn to get moulaged, and Madison does a great job. My

residual limb has the look of being freshly injured. My pants are cut to shreds and my shirt has fake blood spatter on it. I am situated in a van, ready for my role to begin.







The battlefield effects technicians (BFX) set off a thunderous boom

and the van drops me off at my destination near the Marines' gate. The Afghan role-players are nearby, simulating burn victims, and I am lying on the ground screaming in pain and pleading for help. This presents some serious chaos for these young Marines, who must prioritize safety, first aid and realistic pressure all at once. Within minutes I am carried away on a stretcher to a safe location. Tourniquets are placed on my leg and I am assessed by some medical personnel. Off to my right, I can see Doc Christopher Courtney using his smart phone to time events as they are unfolding. He is a Marine mass casualty evaluator. His job is to evaluate the Marines in the course of these situations to time how fast they apply tourniquets, prioritize patients and monitor all their moves from a medical and safety point of view. After our exercise is over, he will provide a debrief with each Marine involved and explain what they did right or wrong. In my case, I did not get my tourniquet on until after the three-minute mark, which is slower than what they want to see (two minutes or less)

This is why the training is so important. It will help save lives and provide a firsthand look at realistic wounds and simulated hostile environments.

This has been my third role-playing assignment for GTS, and so far it has been very educational. My experience



working along Somali, Afghan and Iraqi role-players has been a great learning experience and I have so much respect for the work they do. They are helping save our soldiers' lives. I also was thanked numerous times for being an amputee role-player because the realism we provide helps Marines when confronted with the horrors of war.



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Hanger Clinic 4
Human Research Protections Program20
Motion Control

Neuros Medical	32
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Scott Sabolich	47
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HUGH BOYD

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A Publication of the Amputee Coalition

InMotion magazine publishes unbiased journalism that seeks to "empower and motivate" living well and thriving with limb loss. The magazine targets amputees and their families and is provided free electronically to all friends of the Amputee Coalition and in hard copy to all subscribers. Each issue covers health, well-being, exercise, life issues and advocacy for amputees and their families. Stories showcase amputees living and thriving with limb loss and profile Amputee Coalition programs and services.

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