



Prosthetics/Amputations

VA researchers are exploring the use of leading-edge technology such as robotics, tissue engineering, and nanotechnology to design and build lighter, more functional prostheses that look, feel, and respond more like real arms and legs. They are also exploring new methods to improve and maximize the reconstruction of injured extremities. Additionally, researchers are studying how best to match available prosthetic components to the needs of amputees, especially those who seek to maintain an active, demanding lifestyle and require versatile, high-performance prostheses.

Examples of VA research advances

— **New bionic ankle**—The first powered ankle-foot prosthesis, an important advance for lower-limb amputees, was unveiled this past summer at the Providence VA Medical Center. The device was developed by Dr. Hugh Herr of MIT and the Center for Restorative and Regenerative Medicine, a collaboration among VA, MIT, and Brown University. The ankle-foot propels users forward using tendon-like springs and an electric motor. It was demonstrated at the Providence VA event by Dr. Herr, himself a double amputee, and by an Army veteran who lost a leg after a bomb blast in Iraq.

— **Clinical trials under way for high-tech arm**—Biomedical engineer Dr. Richard Weir at the Chicago VA and Northwestern University and colleagues at other institutions are working to create the world's most advanced prosthetic hand-and-arm system, with funding from the Revolutionizing Prosthetics Program of the Defense Advanced Research Projects Agency (DARPA). Initial prototypes are currently being tested in clinical trials. The goal is a limb that is almost identical to a natural one, including brain control.

— **Limb loss prevention**—Researchers at VA's Center of Excellence for Limb Loss Prevention and Prosthetic Engineering in Seattle recently studied 400 CT scans of diabetic feet to identify which foot types are at highest risk for the ulcers that often lead to amputation.

Facts About Prosthetics

As of June 30, 2007, the Department of Defense had reported 1,005 service members who suffered limb loss in operations Enduring Freedom and Iraqi Freedom (OEF/OIF). Many are now in care in the VA system. Foot ulcers from diabetes, which affects more than a quarter of VA patients, are another major cause of amputations. In the U.S., people with diabetes account for about two-thirds of all lower-limb amputations. VA has long been a world leader in prosthetics research and care, and is now in the forefront of developing and testing innovative prosthetic devices for OEF/OIF veterans returning home with limb loss.

