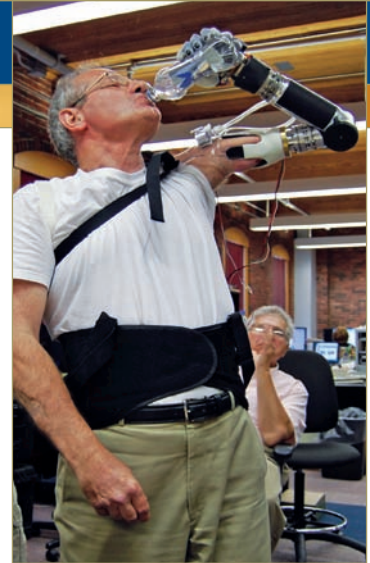




## Prosthetics/Amputations

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 lifestyle and require versatile, high-performance prostheses.



### *Examples of VA Research Advances*

**Advanced prosthetic arm** – VA has launched a three-year “optimization study” of an advanced prosthetic arm developed by DEKA Integrated Solutions through funding from the Defense Advanced Research Projects Agency (DARPA). The arm represents a huge leap forward for prosthetic arms: It has six pre-programmed hand grasps, and more can be programmed in. This allows users to perform a wide range of tasks, from picking up a key to using power tools. Current artificial hands basically only open and close. The eight-pound DEKA arm also has a “tactor”—a small device that sits on the user’s skin and vibrates to signal the strength of the grasp. Users can raise, twist and bend the arm, and even raise it overhead, almost as they would a natural arm. In the VA study, participants with upper-limb amputation will be custom-fitted with the arm, use it for two weeks, and provide feedback to guide the further development and optimization of the arm.

**Biohybrid limbs** – Researchers at the Center for Restorative and Regenerative Medicine—a collaboration among VA, Brown University, and MIT—are working to improve function for people who have lost limbs. Their overarching goal is to develop high-tech “biohybrid” limbs that merge biological and non-biological materials and work in a natural, lifelike manner. The effort involves investigators with expertise in orthopedics, tissue engineering, neurotechnology, prosthetic design, and rehabilitation. One project involves a brain-computer interface that may allow people to control prosthetic devices and other devices using only their thoughts.

### Facts About Prosthetics

As of Aug. 1, 2008, the Department of Defense had reported 1,214 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 caused by 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 who have experienced the loss of a limb.

