ABOUT PROSTHETICS

• VA’s involvement in providing prostheses to Veterans began in 1921, when the Veterans Bureau, a predecessor agency to the Department of Veterans Affairs, was given the responsibility to provide artificial limbs and appliances to World War I Veterans.

• VA provides a full range of equipment and services to Veterans. These range from items worn by the Veteran such as artificial limbs and hearing aids; to those that improve accessibility, such as ramps and vehicle modifications; to devices surgically placed in the Veteran, such as hips and pacemakers.

• The department has more than 70 locations at which orthotics and prosthetics are custom-fabricated and fitted, using state-of-the-art componentry. The American Board accredits each for Certification in Orthotics, Prosthetics and Pedorthics, the Board of Orthotic/Prosthetic Certification, or both.

VA RESEARCH ON PROSTHETICS: OVERVIEW

• To help meet the lifestyle and medical needs of Veterans who have lost limbs, VA researchers develop and test a wide variety of prosthetic devices. VA's goal is to offer Veterans prosthetics that will restore them to their highest possible level of functioning within their families, communities, and workplaces.

• Some VA researchers are working on developing high-functioning artificial limbs that are very similar to their natural counterparts. Others are working on advanced wheelchair designs that promote mobility and independence for wheelchair users, and make it easier to use a wheelchair.

• Still other VA researchers are using functional electrical stimulation and other technologies to help those with weak or paralyzed muscles, and developing and testing state-of-the-art adaptive devices to help those with vision or hearing loss.

• Many of the latest innovations and discoveries in prosthetics research in the United States take place at VA centers. These centers generally work in close partnership with affiliated universities, and sometimes with other universities, as well as with commercial partners and other federal agencies.

• VA laboratories specializing in prosthetics development include the Advanced Platform Technology Center, in Cleveland; the Center for Functional Electrical Stimulation, also in Cleveland; the Human Engineering Research Laboratories in Pittsburgh; the Center of Excellence for Limb Loss Prevention and Prosthetic Engineering in Seattle; and the VA Center of Excellence for Neurorestoration and Neurotechnology in Providence, Rhode Island.

SELECTED MILESTONES AND MAJOR EVENTS

1947 – Introduced the first mobility and orientation rehabilitation-training program for blinded Veterans

2007 – Unveiled the first powered ankle-foot prosthesis, as part of a team with researchers at MIT and Brown University

2013 – Reported on new technology to help restore the sense of touch for those who have lost an upper limb and use an artificial hand

2014 – Published results of a study on how users and clinicians feel about the DEKA arm, the first prosthetic arm capable of performing multiple simultaneous powered movements

2015 – Invented a wheelchair allowing users to crank up the push rims to a standing position, providing them with increased functionality and independence

2015 – Began the first human study in the United States to investigate osseointegrated prosthetics, in which implants are firmly anchored in place by integrating implanted material in living bone

(Continued on back)
2016 – Determined that knee replacement surgery could benefit some patients aged 85 and older

RECENT STUDIES: SELECTED HIGHLIGHTS

- A 10-year trial of a surgically implanted electrical stimulation system for people with spinal cord injuries (SCIs) was completed by researchers at VA’s Cleveland Functional Electrical Stimulation (FES) Center and Case Western University in 2015. By stimulating muscles, the system activates muscles to allow for standing, better balance, and exercise. A study of 15 people with SCIs who had received the system found that the patients had incorporated the neuroprostheses into their lives; that the system worked as well for patients after a year as it had when they first received it; and that the neuroprosthesis was safe and reliable to use. (Archives of Physical Medicine and Rehabilitation, May 2012)

- The DEKA advanced prosthetic arm is the first prosthetic arm capable of providing multiple simultaneous powered movements. VA researchers and colleagues collected data on the DEKA arm over four years at four VA sites, and it is now approved by the U.S. Food and Drug Administration. In a 2014 study led by researchers from the Providence VA Medical Center and Brown University, 24 upper-limb amputees were fitted with a second-generation arm, and 13 were fitted with a third-generation arm, and were surveyed about their experiences. In all, 95 percent of Gen 2 users and 91 percent of Gen 3 users indicated that they were able to perform new activities they had been unable to perform with their existing prosthetic device. (Prosthetics and Orthotics International, December 2014)

- BrainGate is a neural prosthesis that allows people whose arms and legs are paralyzed to control robotic arms or computer cursors with their thoughts. It was developed by a research team of VA, Brown University, Harvard University, and Massachusetts General Hospital investigators in the 2000s. Recently, the research team found that advances in the system enabled those using it to acquire “targets” on a computer screen, such as letters on a keyboard, more than twice as quickly as before. Another study found that the system can allow point-and-click communication by people with locked-in syndrome, who are fully conscious but unable to move any muscles except for those that control eye movement. (Science Translational Medicine, Nov. 11, 2015: Neurorehabilitation and Neural Repair, June 2015)

For more information on VA studies on prosthetics and other key topics relating to Veterans’ health, please visit www.research.va.gov/topics