

A man with a prosthetic lower limb is standing in a clinical setting, possibly a rehabilitation center. He is wearing a white t-shirt and dark shorts with a white cross design. He is looking to the right. The background shows a blurred clinical environment with other people and equipment.

RAPID REHABILITATION OF AMPUTEES

One of the most visible wounds of the decade-long conflicts in Iraq and Afghanistan is extremity trauma. The loss of a limb is a life-altering event. In addition to the physical disfigurement, an amputee faces challenges in rehabilitation, retraining, and mental trauma associated with the loss. Amputation of the lower limb has a serious impact on the functional status, well-being, and survival of the wounded service member. In addition to walking and changing direction on a variety of surfaces, amputees must be able to manage uneven terrain, crowded environments, stairs, ramps, and hills.

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Geneva is currently partnering with the staff of the Comprehensive Combat and Complex Casualty Care rehabilitation program at Naval Medical Center San Diego, the Mayo Clinic (Rochester, MN), and the University of Illinois at Chicago. Using only one of four state-of-the-art Computer-Assisted Rehabilitation Environment (CAREN) systems in the Department of Defense, Geneva is supporting a research study to train wounded warriors with lower extremity amputations to increase their balance and fall recovery while wearing prosthetics. This will assist with increasing the service members' trust in their prosthesis and reduce falls, the largest problem for a lower extremity amputee, which can result in serious health risks. The CAREN is a fully immersive (visual, auditory, vestibular, and tactile sensory inputs) virtual reality environment. Using the CAREN and a variety of walking surfaces, Geneva is helping amputees regain confidence walking without the fear of falling. During the study, wounded warriors wear a full body harness that attaches them to the CAREN through a safety support system. Initially, amputees focus on regaining a steady walking pattern. After a steady walking pattern is achieved, the amputee is introduced to a more challenging simulated tripping protocol. This tripping protocol works to train the amputee to navigate more abnormal walking surfaces or recover from tripping. Through using virtual reality, specialized treadmills, and extensive gait analyses, this important research is giving amputees the self-assurance that they can prevent injury and recover from potential falls.

The fundamental goals of this research are to improve the rehabilitation rate and quality of life for amputee patients who suffer lower limb amputation as a result of their service in Operation Iraqi Freedom and Operation Enduring Freedom. An outcome of the research will be to shorten the time required for injured U.S. service men and women to return to active duty or to a productive civilian life. Positive results have already been documented, and amputees who have participated in the research to date have reported improved dynamic stability and increased functional performance.

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