



US DEPARTMENT OF DEFENSE

# BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

## Health Outcomes Following Extremity Trauma Biomechanical Variability with Changes in Cognitive Demand during Ambulation for Service Members with Lower Limb Amputations

Learning to walk with a prosthetic device following lower limb loss poses distinct challenges on cognitive and motor functions, and the long-term implications on performance in each task has not been identified. Assessments of biomechanics and cognitive function while performing a dual task by researchers funded by the Center for Rehabilitation Sciences Research (CRSR) at the Uniformed Services University of the Health Sciences (USUHS) have demonstrated that ambulation imposes an additional cognitive workload for both individuals with and without lower limb loss, and there may be additional considerations for individuals with limb loss because of a potential added cognitive workload required to ambulate with a prosthesis. This additional workload may require the body to reduce attentional resources from walking mechanics when there is a need to focus on a secondary task, potentially increasing the risk of falls in these individuals. Additional treatment techniques, to include novel rehabilitation training and/or more intuitive prosthetic componentry, may need to be developed to reduce this additional workload in the lower limb loss population, reducing the cognitive burden and risk of falls. Gaining a better understanding of the mental/subconscious workload of walking with a prosthesis can help identify treatment techniques to diminish this burden, potentially reducing mental fatigue and/or the risk of falls from distracted walking.

