



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Extremity Trauma Rehabilitation and Treatment Identifying Predictors of Osteoarthritis in Service Members with Unilateral Lower Extremity Amputations

Increased or abnormal loading on the intact limb contributes to the relatively high risk of knee osteoarthritis in individuals with unilateral lower limb loss. This abnormal loading may occur through various methods of locomotion, (e.g., walking and running), but one method, hopping, may be a unique form of locomotion for this population whose mechanical effects are unknown. Loading rates during single-limb hopping was assessed in healthy controls in a study conducted by researchers at the Extremity Trauma and Amputation Center of Excellence (EACE) and Center for Rehabilitation Sciences Research (CRSR) researchers at Walter Reed National Military Medical Center (WRNMMC).¹ Hopping loads were compared to loading rates and patterns of more common methods of locomotion, walking and running, to determine if this form may be contributing to the higher rates of osteoarthritis in the limb loss population. The findings demonstrated that kinetic measures at the knee joint are greater in hopping compared to walking. Therefore single-leg forward hopping should be limited, and alternatives such as the use of a crutch or wheelchair should be encouraged in the limb loss population until osteoarthritis risk is fully understood. Understanding why individuals with lower limb loss develop knee osteoarthritis in their uninjured limb at higher rates will allow for the development of medical interventions to reduce the factors that increase the risk.

1 Krupenevich, R. L., Pruziner, A. L., & Miller, R. H. (2016). Knee Joint Loading during Single-Leg Forward Hopping. *Medicine and Science in Sports and Exercise*. <https://doi.org/10.1249/MSS.0000000000001098>

