



US DEPARTMENT OF DEFENSE

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Extremity Trauma Rehabilitation Incidence and Correlates of Secondary Musculoskeletal Conditions after Combat-related Lower Limb Amputation

Traumatic lower limb amputations present a unique medical and rehabilitation challenge for the military healthcare system, as the care of the young, otherwise healthy Service members with limb amputations requires providing opportunities for maintaining long, active, and productive lives. Whether the Service member who has sustained an amputation plans to return to active duty or transition to civilian life, the common goal of their rehabilitation has been to maintain highly active lifestyles. However, lower limb loss not only leads to limited mobility, but also increases the risk of developing secondary musculoskeletal impairments that can result in further mobility deficits and could have a long-lasting influence on the Service members' quality of life.

A series of studies by the Extremity Trauma and Amputation Center of Excellence (EACE; Bethesda, Maryland; San Diego, California; San Antonio, Texas) researchers in collaboration with the Naval Health Research Center (San Diego, California) has focused on developing rates of secondary overuse musculoskeletal conditions after lower limb amputation. Overall, the incidence of developing at least one overuse musculoskeletal injury within the first year after lower limb amputation was very high at 59-68 percent (*Farrokhi, Mazzone, Eskridge, et al. 2017*). Service members with unilateral lower limb amputation were almost twice as likely to develop an overuse lower or upper limb injury as compared to Service members with mild, combat-related injury not requiring extensive medical attention. Additionally, Service members with bilateral lower limb amputation were more than twice as likely to develop a lumbar spine injury and four times more likely to develop an upper limb overuse injury within the first year after amputation as compared to those with mild combat-related injury. The higher incidence of spine-related musculoskeletal conditions but not upper limb issues appear to be in part associated with greater reliance of Service members with bilateral lower limb amputation on wheelchair use for early mobility (*Myers et al. 2017*). Other efforts related to this line of research also include identifying effective physical therapy practice patterns associated with prevention of secondary overuse musculoskeletal conditions in Service members with lower limb amputation. For instance, recent findings suggest that earlier use of active physical therapy treatments such as therapeutic exercise and gait training can lower the risk of developing upper and lower limb musculoskeletal overuse conditions (*Mazzone et al. 2017*; Figure 1).

In summary, the incidence of developing at least one overuse musculoskeletal injury within the first year of amputation is over 60 percent. These EACE studies document this clinical evidence and will help inform clinical practice.

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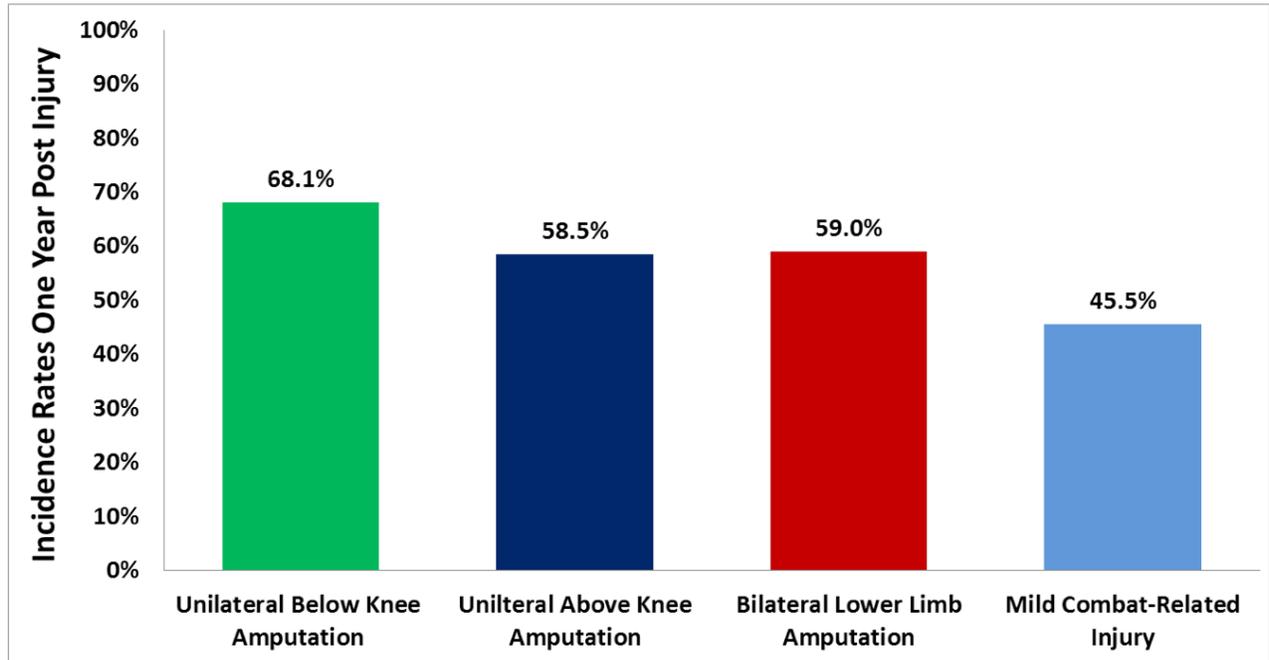


FIGURE 1: Incidence of developing at least one overuse musculoskeletal injury within the first year after combat-related lower limb amputation. (Figure used with permission from the authors)

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Farrokhi, S., Mazzone, B., Eskridge, S., Shannon, K., and Hill, O. T. 2017. "Incidence of Overuse Musculoskeletal Injuries in Military Service Members with Traumatic Lower Limb Amputation." *Arch Phys Med Rehabil.* doi: 10.1016/j.apmr.2017.10.010.

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Mazzone, B. N., Eskridge, S. L., Shannon, K., Hill, O., Moore, J., and Farrokhi, S. 2017. "Early Physical Therapy Utilization Patterns and Incidence of Secondary Musculoskeletal Conditions after Lower-Limb Amputation." *journal of Orthopaedic & Sports Physical* 47 (1):A17.

