



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Extremity Trauma Rehabilitation Five Year Health Outcomes for Upper Limb Amputation and Serious Upper Limb Injury: An Update

U.S. Service members who sustained combat amputations to the upper limbs in the Iraq and Afghanistan conflicts present new challenges for military and the U.S. Department of Veterans Affairs (VA) providers. Approximately 90 percent of these amputations were caused by blast injuries (*Melcer, Sechriest, et al. 2017*). Little research has been done to track their health outcomes beyond the short-term due to the difficulty of integrating military and VA health data. This study described the physical and psychological outcomes for Service members during the first five years following injury in Iraq and Afghanistan (2001-2008). A comparison of clinical diagnoses for patients with upper limb amputations to individuals with serious upper limb injuries without amputation was conducted.

Researchers at the Naval Health Research Center (NHRC; San Diego, California), the Naval Medical Center San Diego (San Diego, California) and the San Diego VA hospital identified study patients and injury-specific data in NHRC's Expeditionary Medical Encounter Database. A retrospective review of military and VA health databases for patients who sustained an above elbow (AE; n = 51) or below elbow (BE; n = 80) amputation or a serious arm injury (Abbreviated Injury Scale [AIS] score > 3) without amputation (NO AMP, n = 187) in the Iraq or Afghanistan conflicts (2001-2008) was conducted. Injuries were coded by trauma nurses. Military and VA health diagnoses were followed for five years postinjury for all patients.

Most patients were injured by blast weaponry causing serious to severe injuries (Figure 1). All groups had a high prevalence of adverse physical and psychological health diagnoses during the first five years postinjury (Figures 2 and 3). The prevalence for nearly all wound complications and many physical and psychological disorders decreased substantially after postinjury year one. However, the prevalence of posttraumatic stress disorder increased substantially from postinjury year one (20 percent) to three (36 percent). The prevalence of pain and psychological disorders remained high during postinjury year five (24-53 percent). After adjusting for covariates, AE amputation patients had increased likelihood for some physical and psychological disorders (e.g., pulmonary embolism, cervical pain, osteoarthritis, obesity, and mood and adjustment disorders) relative to BE or NO AMP control groups. BE amputation patients had decreased likelihood for osteomyelitis, and AE and BE patients had decreased likelihood for fracture nonunion and joint disorders relative to controls (*Melcer, Sechriest, et al. 2017*).

These findings can help refine existing treatment strategies to minimize the impact of early wound complications and other physical and psychological health complications on rehabilitation outcomes. The results also can be used to guide development of postinjury treatment pathways for patients with upper limb amputations and other serious arm injuries.





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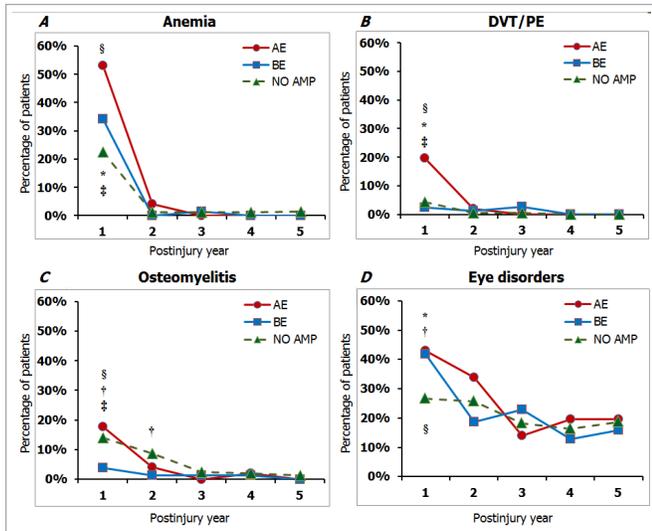


FIGURE 1: Prevalence of selected wound complications by postinjury years one and five. NO AMP-No Amputation-Serious upper limb injury [AIS > 3], * $p < 0.05$, AE versus NO AMP; ++ $p < 0.05$, AE versus BE; $p < 0.05$; +BE versus NO AMP. § $p < 0.05$, postinjury years). (Figure used with permission from the authors)

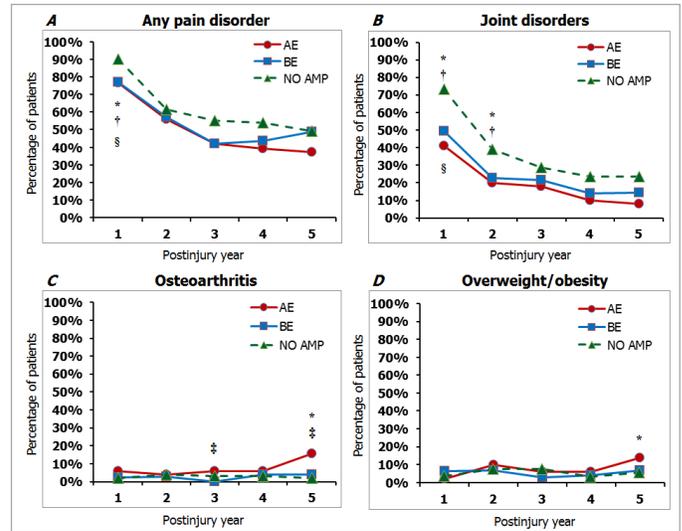


FIGURE 2: Prevalence of selected physical heal complications by postinjury years one through five. NO AMP-No Amputation-Serious upper limb injury [AIS > 3], * $p < 0.05$, AE versus NO AMP; ++ $p < 0.05$, AE versus BE; $p < 0.05$; +BE versus NO AMP. § $p < 0.05$, postinjury years). (Figure used with permission from the authors)

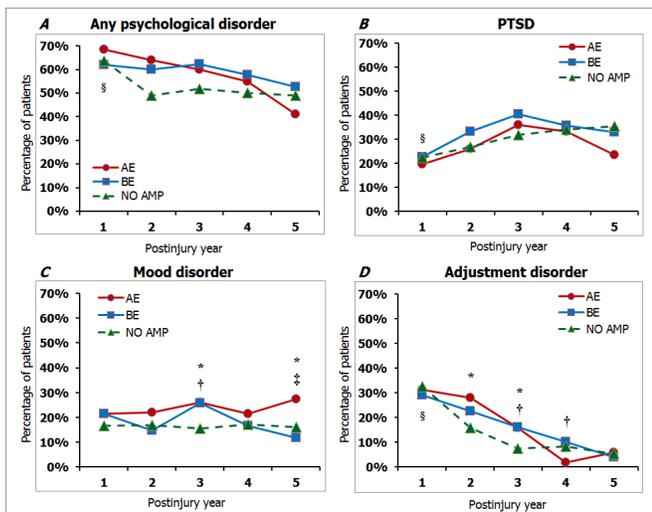


FIGURE 3: Prevalence of psychological disorders by postinjury years one through five. (NO AMP-No Amputation-Serious upper limb injury [AIS > 3], * $p < 0.05$, AE versus NO AMP; ++ $p < 0.05$, AE versus BE; $p < 0.05$; +BE versus NO AMP. § $p < 0.05$, postinjury years). (Figure used with permission from the authors)

REFERENCES:

Melcer, T., Sechrist, V. F., Walker, J., Bhatnagar, V., Richard, E., and Galarneau, M. 2017. "A Comparison of Five Year Health Outcomes Following Upper Limb Amputation and Serious Upper Limb Injury in the Iraq and Afghanistan Conflicts." Military Health System Research Symposium (MHSRS), Kissimmee, FL, August 27-30, 2017.

