



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Extremity Trauma Health Outcomes

Timing of Delayed Amputation with Acute Lower Extremity Injuries

Extremity injuries comprised the largest proportion of injuries in Operation Iraqi Freedom and Operation Enduring Freedom, representing 41 to 54 percent of all combat injuries. Despite medical interventions to preserve the viability and functionality of the injured limb(s), delayed amputations and long-term impairments may occur because of these injuries. Researchers at the Naval Health Research Center (NHRC; San Diego, California) sought to determine how specific acute lower extremity injuries are related to the timing of delayed amputations. NHRC's Expeditionary Medical Encounter Database was queried for battle-related lower extremity delayed amputations (amputation occurring after injury date) between 2003 and 2014 with clear documentation of the injury and amputation dates, which totaled 286 injury episodes. The occurrence frequency of acute open tibia and calcaneus fractures, as well as lower extremity nerve and vessel injury was determined. Delayed amputation timing was categorized into eight categories (1-14 days, 15-30 days, 31-90 days, 91-182 days, 183-365 days, 365-547 days, 548-730 days, and >730 days) and the relationship of acute injuries to delayed amputation timing was examined using proportions by time period.

In the sample of 286 Service members with a delayed amputation:

- Overall, most common injury was open tibia fracture, followed by lower extremity vessel injury, open calcaneus fracture, and lower extremity nerve injury (Figure 1)
- Delayed amputation rate within each time period was between 10 and 14 percent, although time periods were not equal in terms of number of days, there were similar delayed amputation rates in each time period (Figure 2)
- Significant difference in delayed amputation over time for open calcaneal fractures and lower extremity vessel injuries (Figure 3)
- Delayed amputation rates dropped off in the first 90 days postinjury, but acute injuries continue to influence amputations after 90 days
- Proportion of lower extremity nerve injuries were highest 1.5–2 years postinjury (548-730 days) (Figure 4)

These results demonstrate that acute injuries can influence delayed amputation years after injury and may be useful to both providers and patients when considering the most appropriate route of care (*Eskridge, Clouser, et al. 2017*).

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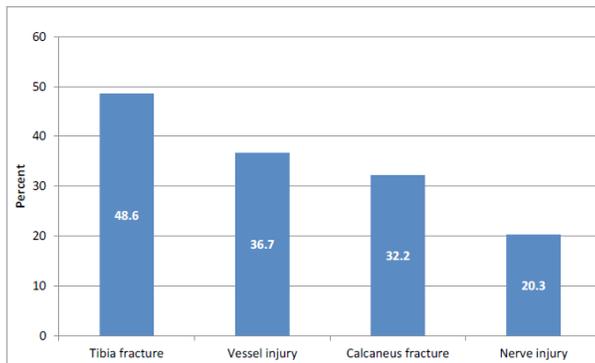


FIGURE 1: Proportion of acute injuries. Total percent greater than 100 due to more than one injury per Service members. (Figure from Eskridge, Clouser, et al. (2017) used with permission from the authors)

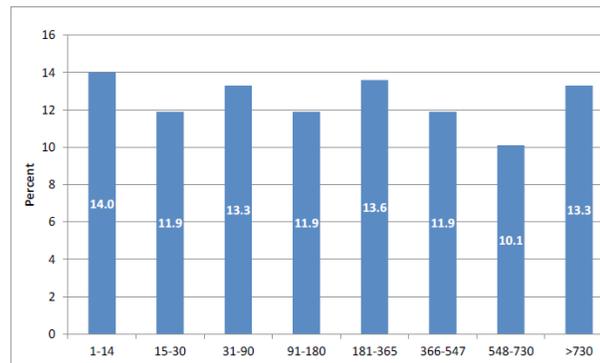


FIGURE 2: Delayed amputation rate per period. (Figure 3 from Eskridge, Clouser, et al. (2017) used with permission from the authors)

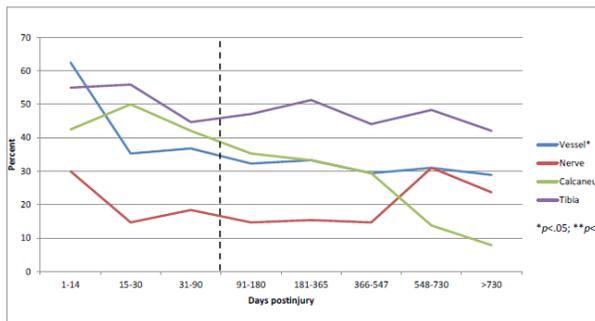


FIGURE 3: Delayed amputation by acute injuries and time period. (Figure 4 from Eskridge, Clouser, et al. (2017) used with permission from the authors)

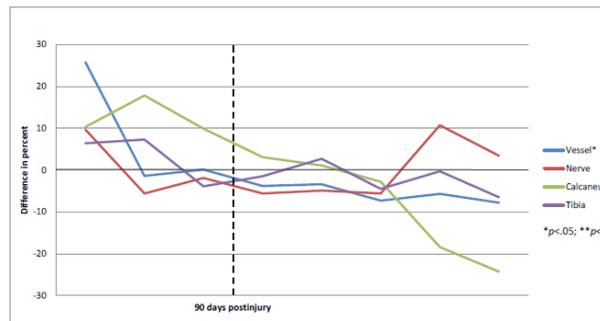


FIGURE 4: Absolute proportion of delayed amputations by acute injuries. (Figure 5 from Eskridge, Clouser, et al. (2017) used with permission from the authors)

REFERENCES:

Eskridge, S. L., Clouser, M. C., Hill, O., and Galarneau, M. R. 2017. "The Timing of Delayed Amputation with Acute Lower Extremity Injuries." Military Health System Research Symposium (MHSRS), Kissimmee, FL, August 27-30, 2017.

