



Editor's Spotlight/Take 5

Editor's Spotlight/Take 5: Disability after Deployment Injury: Are Women and Men Service Members Different?

Seth S. Leopold MD

As a profession, we can do a great deal more for the least among us. But women are not the least among us—women are half of us, and there is considerable evidence that biomedical research is not serving them well [8, 11]. That concern drove the 2014 research

symposium called Sex Differences in Musculoskeletal Disease and Science, which was cosponsored by the Association of Bone and Joint Surgeons®, the parent society of *Clinical Orthopaedics and Related Research*®. We are proud to present selected papers from that symposium in this issue of *CORR*®.

We have covered this topic before [7]. Our editors work with the authors of each paper we publish to determine whether subanalyses by sex and gender are appropriate, and, when appropriate, to frame each paper's discussion in the context of this important topic. The contents of this month's sex-differences symposium in *CORR*® demonstrate not only that it is possible, but also why it is so necessary to evaluate sex and gender in orthopaedic research. This month's Editor's Spotlight paper evaluates the impact of gender on a topic that may not come right to mind as we think about

orthopaedic outcomes: How men and women experience disability differently after war injuries.

The history of orthopaedic surgery has not been written in ink, but rather in the blood of conflicts past. Sadly, we continue to update that history. As blood continues to be spilled in ongoing conflicts around the world, we continue to learn hard lessons about trauma care from them. Nearly 100 years ago, World War I made clear that even short delays in resuscitation after severe injury substantially increase the risk of death [13]. More recent conflicts helped clarify the best approaches to caring for patients with battlefield amputations [1], as well as the often-devastating functional and emotional sequelae of these injuries [2]. We continue to improve the care of patients with some of the most common orthopaedic injuries—such as open fractures—based on lessons learned during wartime [5]. This topic is both so foundational and so current that *CORR*® will run a symposium called “Lessons Learned after a Decade of War” next month.

But left unstudied in most of the science on battlefield injury—as in so many other important areas of

Note from the Editor-In-Chief: In “Editor's Spotlight,” one of our editors provides brief commentary on a paper we believe is especially important and worthy of general interest. Following the explanation of our choice, we present “Take Five,” in which the editor goes behind the discovery with a one-on-one interview with an author of the article featured in “Editor's Spotlight.”

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biomedical research [8, 11]—is the question of how war wounds affect not only the men who fight our battles but also the women. In particular, we need to know more about how the lingering impact of these injuries (residual disability) affects men and women differently.

Enter the work of Jessica C. Rivera MD and her colleagues. In “Disability after Deployment Injury: Are Women and Men Service Members Different?” Dr. Rivera and her team from the US Army Institute of Surgical Research and the San Antonio Military Medical Center analyzed women and men injured during deployments between 2001 and 2011. Using a registry, they found that women were less likely to develop chronic or neurogenic pain, but they experienced more severe post-traumatic stress disorder (PTSD) and had a lower likelihood of returning to active duty than men after deployment-related injuries. During the period in question, women were excluded from frontline combat units. Despite this, the high levels of disability experienced by military women suggest that much more attention should be directed to caring for them, and that gender-focused studies of injury prevention, protection, and postinjury care to mitigate disability indeed warrant specific study.

As in so many other areas of orthopaedic surgery, it is not difficult to imagine that the lessons learned here

during war will transfer into our efforts to prevent and treat peacetime civilian disability in industrial, occupational, and law enforcement settings, both for men and women. Join me in going behind the discovery on that topic and others with the first author of this paper, Dr. Rivera, in the Take-5 interview that follows. I almost missed the opportunity to interview Dr. Rivera because of duties related to her recent military deployment, so please join me also in thanking Dr. Rivera for her service.

Take Five Interview with Jessica C. Rivera MD, lead author of “Disability after Deployment Injury: Are Women and Men Service Members Different?”

Seth S. Leopold MD: *Congratulations on this fascinating work. As you know, most of our readers are not in the armed forces, but your study has important civilian implications. What do you see as the major nonmilitary impact of your main findings?*

Jessica C. Rivera MD: This work adds to the growing body of literature exploring how sex differences influence medical and surgical outcomes [3, 6] Civilian orthopaedic surgeons should consider that there are both physiologic and anatomic differences

between their male and female patients that affect how some disorders manifest and how our treatments influence outcomes [14]. This applies across all orthopaedic subspecialties.

Dr. Leopold: *Women make up a large proportion of the civilian workforce, as well as a substantial portion of the armed forces. Why do you think our understanding of the disability landscape as it pertains to women lags so far behind that of men in both civilian and military settings?*

Dr. Rivera: Unfortunately, orthopaedic disability outcomes are not the only arenas where the potential for sexual dimorphisms has gone unappreciated. Foundations of medical knowledge along the translational spectrum are based on data collected from limited demographic groups. In the military, this is not as obvious an issue because the military is predominantly (85%) male. Outside of the military, the lag is another symptom of the lack of research attention to sex differences [10].

Dr. Leopold: *Another important set of ramifications of your study pertains to those women who could not return to duty. Presumably, many of them will eventually exit from military service and return to civilian life. What particular hurdles do women with service-connected disabilities face as they transition out of the military, and how*

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Fig. 1 Jessica C. Rivera MD.

might they differ from the hurdles that men face in making this same transition?

Dr. Rivera: In another work we published recently on the experience of female amputees [12], we found that women amputees experience their limb loss differently from their male counterparts, especially pertaining to body image and concern for personal safety. Women veterans in general may in fact perceive their deployment experiences and injuries in ways that challenge reintegration. Women who deploy in support roles may not be taken as seriously as veterans. Both physical and emotional scars can make it difficult for women veterans to meet social expectations and reassume certain family roles.

Dr. Leopold: *What questions remain on the important topics your study raised,*

and what kinds of future research should be done to answer them?

Dr. Rivera: Because of the cultural barriers to seeking mental, behavioral, and psychological health assistance in the military, I believe the most obvious next question should be about comorbid psychological sequelae—especially PTSD [4]. Our study found that PTSD in women was considered more severe—a finding also supported in civilian trauma populations [9, 14]. Future research on how mental health treatments should be tailored between the genders would help reduce mental health disability both for men and women. As far as next steps in orthopaedics, we need additional work on identifying and clarifying the mechanisms behind the observed gender differences before we can begin to propose tailored treatments.

Dr. Leopold: *What do you see as the major military (or Defense Department) implications of your study? What should change or be done in response to your findings?*

Dr. Rivera: The military health system has an opportunity to determine how to meet the needs of a growing female force, given that women may need different types of support following deployment and injury, and also to work on addressing the pressing concerns pertaining to the reintegration women after deployment and injury.

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