

Effect of Physical Fitness on the Risk of Stress Fracture Injury in Army Basic Training

Rossi, S., Hauret, K., Jones, B. FACSM. U.S. Army Public Health Center, Aberdeen, MD

The 10-week Army basic training course (BT) includes a high volume of weight bearing activity that increases risk for stress fracture. These injuries limit the ability to train and increase the risk for attrition. Previous studies have shown that the injury risk for women in BT is 3.4 – 6.5 times higher than for men. Some studies have found that the overall injury risk for women is significantly reduced when multivariate models adjust for the fitness levels of women and men. **PURPOSE:** The purpose of this retrospective study is to examine the stress fracture risk for women and men in BT while adjusting for aerobic fitness and muscle endurance of new recruits. **METHODS:** Demographics, stress fracture incidence, and performance data on the initial (1st week of BT) Army Physical Fitness Test (APFT) were linked for 34,931 women and 136,797 men in BT in fiscal years 2010 through 2013. The APFT consists of maximum number of pushups and sit-ups in 2 minutes and a timed 2-mile run. Gender neutral quintiles were created for the pushup and sit-up events and the 2-mile run. The 2-mile run time was used as an indicator of aerobic fitness (Q1 [fastest] -> Q5 [slowest]) and pushup and sit-up records were used as an indicator for muscle endurance (Q1 [low] -> Q5 [high]). Unadjusted and adjusted (adjusted for aerobic fitness) risk ratios for stress fracture (women [w]:men [m]) were compared to evaluate the effects of aerobic fitness and gender on stress fractures. Combinations of demographic and fitness variables were evaluated to determine the best model to estimate risk. **RESULTS:** Overall, 3.7% of women and 0.8% of men experienced a stress fracture while in BT. The unadjusted risk for women compared to men (w:m) was 4.54 (4.19-4.91). After adjusting for runtime, the Maental-Hansel risk ratio (w:m) dropped to 2.37 (2.16-2.60). **CONCLUSION:** Overall, women have a higher risk of stress fracture than men; however, when adjusting for fitness, the relative risk decreases by 47%. Though the risk decreases when adjusting for aerobic fitness, female gender remains an important risk factor for stress fractures.

Disclaimer: The views expressed in this article are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense or the U.S. Government. Approved for public release, distribution unlimited. This research was supported in part by an appointment to the Postgraduate Research Participation Program at the U.S. Army Public Health Center administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S. Department of Energy and USAPHC.