The Relationship Between Body Fat, Injury, And Musculoskeletal/physiological Performance In Naval Special Warfare Operators

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Abstract:
Naval Special Warfare (NSW) Operators complete extremely demanding training and occupational tasks. Body composition is an important component of fitness and has been identified as a risk factor for injury, yet little research has investigated body fat (BF%) as it relates to injury and performance in this population. PURPOSE: To determine the relationship between BF%, injury history, and musculoskeletal/physiological performance in NSW Operators. METHODS: A total of 237 NSW Operators (Age: 28.4±6.0 yrs, Height: 1.78±0.1 m, Mass: 85.6±9.4 kg) completed testing for a self-reported injury history questionnaire; BF% using air displacement plethysmography; isokinetic strength (average peak torque normalized to body weight) of shoulder internal/external rotators (SIR/SER), knee extensors and flexors (KE/KF), and lumbar extensors and flexors (LE/LF); anaerobic power (AP) and capacity (AC) during a 30s cycle sprint; and aerobic capacity (VO2Max) and lactate threshold (LT) during a maximal treadmill test. Pearson or Spearman’s Rho correlation coefficients were used to determine the relationship between BF% and two-year retrospective injury count, strength, and physiological variables (p<0.05). Loess best-fit plots determined inflection point thresholds for BF% with respect to injury and performance. RESULTS: Injury count was positively correlated with BF%, but did not reach significance (r=0.12, p=.057). All strength variables except for LF strength were significantly, negatively correlated with BF% (r=-0.31 to -0.49, p<.05); AP, AC and VO2Max were significantly, negatively correlated with BF% (r=-0.22 to -0.69, p<.01). Best-fit plots determined 15% BF as a threshold (inflection point) for increased injury, decreased strength, and decreased power. The best-fit plot of BF% and VO2Max demonstrated a negative, linear relationship with no inflection point. CONCLUSIONS: Results indicate that increased BF% is associated with both increased injury and decreased performance in NSW Operators. Intervention programs should aim to preserve optimal body composition throughout an operational career in order to promote injury prevention as well as physical and tactical readiness. This work was supported by the Office of Naval Research #N00014-11-1-0929.
Author Disclosure Information: K.F. Allison: None.
Category (Complete): 0806. Environmental and Occupational Physiology - occupational or military physiology and medicine
Keyword (Complete): Body Fat; Injury; Military
Unlabeled/ Investigational Products (Complete):
: No

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