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Baseline Biomarkers do not Discriminate Bone Stress Injury Risk during Marine Corps Officer Candidates School

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Bone stress injuries (BSI) are burdensome to military and athletic populations. Efforts to understand early signals or risk factors may help mitigate injury by allowing for prevention and early intervention strategies to be employed. **PURPOSE:** To compare baseline differences in biomarker concentrations between individuals who experience a BSI while attending Marine Corps Officer Candidates School (OCS) and those who do not (Non-BSI). **METHODS:** OCS candidates completed a blood collection at the start of the 10-week training program. Of those who completed pre-training blood collection, 17 suffered a BSI (age 25.0±0.1 yrs; height 171.2±8.8 cm; weight 73.0±11.8 kg; BMI 24.9±2.4 kg/m^2) as identified by OCS medical staff. A control group, matched for age, sex, and BMI, but that did not suffer a BSI during training, was also assessed (n=21, age 24.9±2.9 yrs; height 171.8±10.5 cm; weight 73.5±12.3 kg; BMI 24.9±2.1 kg/m^2). Blood samples were analyzed via commercial ELISA for sclerostin, osteocalcin, tartrate-resistant acid phosphatase 5b (TRAcP5b), procollagen 1 N-protease (P1NP), and cortisol. Group differences were assessed using an independent samples t-test or Mann-Whitney U test; $\alpha = 0.05$. **RESULTS:** As designed, there were no significant differences in age, height, weight, or BMI between the two groups ($p>0.05$). Furthermore, there were no differences observed between the Non-BSI and BSI groups for sclerostin (Non-BSI: 23.61±12.28 pmol/L, BSI: 22.68±11.99 pmol/L, $p = 0.78$), osteocalcin (Non-BSI: 18032.8±6102.9 pg/mL, BSI: 18053.6±5964.8 pg/mL, $p = 0.97$), TRAcP5b (Non-BSI: 2.8±0.9 U/L, BSI: 3.0±0.7 U/L, $p = 0.51$), P1NP (Non-BSI: 36899.5±30240.3 pg/mL, BSI: 35494.2±29828.6 pg/mL, $p = 0.41$), or cortisol (Non-BSI: 11.1±4.9 ug/mL, BSI: 9.2±2.8 ug/mL, $p = 0.21$) concentrations. **CONCLUSION:** Baseline concentrations of bone related biomarkers, such as sclerostin, osteocalcin, TRAc5b, P1NP, and cortisol, did not discriminate between those who did and did not suffer a BSI during OCS. These particular biomarkers may have limited utility in anticipating or forecasting the occurrence of BSIs, and thus, may not be reliable tools for proactively preventing such injuries. **SIGNIFICANCE/NOVELTY:** This data may help to refine potential determinants for the prevention of BSIs in military personnel. By identifying individuals at increased risk for certain injuries, enhanced injury prevention strategies and the provision of tailored care to mitigate these risks can be developed. The implementation of such measures holds the potential to reduce the financial burden incurred by the military in treating these injuries, as well as the necessity for rescheduling or repeating training cycles.

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