Naval Special Warfare SEAL Operators must possess musculoskeletal and physiological characteristics necessary to meet mission related tasks, preserve health and physical fitness, and maintain physical readiness. Previous reports of physical training and fitness characteristics of SEALs are not contemporary and have not investigated these characteristics as they relate to tactically-relevant activities. **PURPOSE:** To examine the relationship between musculoskeletal and physiological laboratory measures and tactical task performance of SEAL Operators. **METHODS:** Thirty eight SEAL Operators (Age: 30.4±5.8 yrs, Height: 1.8±0.1 m, Mass: 88.2±13.2 kg) completed testing for body fat (BF%), fat mass (FM), and fat free mass (FFM); aerobic capacity (VO2Peak) and lactate threshold (LT); isokinetic shoulder strength, knee strength, and lumbar strength; and tactical events, including a medicine ball toss, broad jump, 5-10-5 agility drill, 25 lb pull ups, body weight bench press, 1 RM dead lift, and 300 yd dash. A correlational analysis (α=0.05) was performed to determine the relationship between lab variables, individual tactical task performance, and a cumulative tactical task ranking (CTTR). **RESULTS:** The following significant correlations were revealed: CTTR with BF%, FM, FFM, VO2 @ LT, shoulder strength, knee strength, and lumbar strength (r=-0.61 to 0.55, p<0.05); medicine ball toss with FFM (r=0.73, p<0.001); broad jump with BF%, FFM, shoulder strength, knee strength, and lumbar strength (r=-0.56 to 0.71, p<0.05); 5-10-5 drill with BF%, FM, VO2 @ LT, shoulder strength, knee strength, and lumbar strength (r=-0.57 to 0.46, p<0.05); pull ups and bench press with BF, FM, VO2Peak, shoulder strength, and knee strength (r=-0.67 to 0.58, p<0.05); dead lifts with FFM and knee strength (r=0.33 to 0.43, p<0.05); 300 yd dash with BF, FM, VO2Peak, knee strength, and lumbar strength (r=-0.66 to 0.70, p<0.05). **CONCLUSION:** Laboratory-based physiological and musculoskeletal characteristics are significantly correlated to tactically-relevant tasks. Optimizing these characteristics through physical training may enhance a SEAL Operator’s overall tactical readiness. These results may provide practical implications for assessing the tactical readiness of Navy SEALs.

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