Evaluation of Musculoskeletal and Physiological Performance Differences in Sea, Air and Land (SEAL) Operators Grouped by Age

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The natural consequences of aging negatively impact physical performance. Naval Special Warfare (NSW) requires the maintenance of peak physical condition in its Operators across the lifespan. Evaluating musculoskeletal and physiological characteristics in SEAL Operators in age cohorts may demonstrate the need to progressively modify human performance programming to account for age-related changes. **PURPOSE**: To compare musculoskeletal and physiological performance levels in Operators ≤22, 23-28, 29-34 and ≥35 years old. **METHODS**: A total of 255 Operators (age: 28.5±5.9 years, height: 70.1±2.5 inches, weight: 188.7±20.8 pounds) participated in testing body composition, muscular strength, anaerobic power and capacity, and aerobic capacity. The groups were stratified based on the standard deviation of the age. **RESULTS**: NSW≥35 had lesser strength than NSW23-28 in shoulder internal rotation (65.7±20.7 %BW, 75.1±14.6 %BW; p=0.004), knee flexion (114.9±31.8, 135.9±23.4 %BW; p=0.024), trunk flexion (192.4±60.6%BW, 216.5±47.2%BW; p=0.002) and trunk extension (283.5±82.7%BW, 348.8±80.5%BW; p=0.012). NSW≥35 also had lesser trunk extension (283.5±82.7%BW, 332.0±73.5%BW; p=0.046) than NSW29-34. NSW≥35 had a lesser VO₂Max than NSW23-28 (46.7±5.9 ml/kg/min, 52.9±5.7 ml/kg/min; p=0.001) and lesser mean anaerobic power (7.6±0.8 W/kg) than NSW≤22 (8.5±0.6 W/kg; p=0.001), NSW23-28 (8.6±0.6 W/kg; p=0.001), and NSW29-34 (8.1±0.6 W/kg; p=0.02). NSW≥35 had greater body fat (21.9±6.7%) than NSW≤22 (19.9±3.8%; p=0.011), NSW23-28 (15.2±4.8%; p=0.001), and NSW29-34 (20.6±7.5%; p=0.013). NSW29-34 had a lesser VO₂max at lactate threshold than NSW23-28 (31.7±5.1 ml/kg/min, 38.7±5.1 ml/kg/min; p=0.013). **CONCLUSION**: Operators ≥35 had significantly less muscular strength and poorer physiological performance, including higher percentage of body fat and lesser mean anaerobic power performance. Training strategies should be emphasized for Operators as they age, particularly approaching 35 years or older, in order to lessen the negative impact of aging on musculoskeletal strength and physiological performance. Further analysis is needed to investigate if these deficiencies are based solely on age or amplified by factors of military service.

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