Physical/Physiological Comparison between Cohorts of Naval Special Warfare SEAL Operators and SEAL Qualification Training Students
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Physical readiness decrement and musculoskeletal injury may result from the operational demands and requirements of training and deployments. Specific human performance training and prevention strategies are necessary to promote physical readiness and mitigate musculoskeletal injuries throughout the tactical life cycle. **PURPOSE:** To examine the effects of deployment and service time on musculoskeletal and physiological characteristics of SEAL Operators following SEAL Qualification Training (SQT).

**METHODS:** A total of 255 Operators (Age: 28.5 ± 5.9 years, Height: 178.1 ± 6.4 cm, Mass: 85.8 ± 9.5 kg) and 180 SQT Students (Age: 24.2 ± 2.6 years, Height: 179.1 ± 5.8 cm, Mass: 84.4 ± 8.0 kg) participated. Testing included isokinetic strength (knee, shoulder, torso), flexibility (hamstrings, shoulder, hip flexors), aerobic capacity, anaerobic power/capacity, body composition, and landing biomechanics. Independent t-tests were used to evaluate significant between group differences (p < 0.05).

**RESULTS:** SQT Students demonstrated greater knee flexion (144.9 ± 23.5 %BW, 130.4 ± 23.6 %BW) and torso extension strength (400.0 ± 132.4 %BW, 337.7 ± 82.6 %BW), and less torso rotation strength (168.9 ± 32.7 %BW, 179.7 ± 37.7 %BW). SQT students demonstrated greater shoulder internal rotation (55.2 ± 8.2°, 50.1 ± 6.7°), posterior shoulder (111.0 ± 7.7°, 97.9 ± 4.3°), and hip extension (24.1 ± 4.7°, 17.6 ± 3.2°) flexibility. SQT Students demonstrated lower body fat (14.0 ± 4.1 %BF, 16.8 ± 5.7 %BF), and higher aerobic capacity (54.7 ± 4.6 ml/kg/min, 50.6 ± 6.6 ml/kg/min), lactate threshold (80.5 ± 5.5 %VO2, 73.5 ± 8.9 %VO2), and anaerobic capacity (9.6 ± 0.64 w/kg, 8.4 ± 0.66 w/kg). SQT Students demonstrated higher vertical ground reaction forces during a landing task (556.3 ± 107.5 %BW, 454.8 ± 46.0 %BW).

**CONCLUSIONS:** The results demonstrate several areas of physical readiness differences between SQT Students and experienced Operators that may be related to the demands of training and deployment cycles. These findings suggest the need to focus on human performance training in order to limit physical readiness loss. Future research should incorporate longitudinal testing and surveillance to assess Force-wide decrement that occurs over the course of the tactical life cycle. Supported by the Office of Naval Research #N00014-11-1-0929.