

## Physical Performance Differences in Sea, Air and Land (SEAL) Operator Cohorts Separated by Demographics

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U.S. Navy SEALs must maintain elite physical fitness throughout their careers, but there is little previous research investigating how rank and injury rates impact SEAL fitness.

**PURPOSE:** Investigate differences in a performance testing protocol and self-reported injury history survey between cohorts grouped by similar rank and prior musculoskeletal injuries. **METHODS:** A total of 255 Operators (age:  $28.5 \pm 5.9$  years, height:  $70.1 \pm 2.5$  inches, weight:  $188.7 \pm 20.8$  pounds) participated in testing of body composition (%), muscular strength (%BW), flexibility ( $^{\circ}$ ), anaerobic power/capacity (W/kg), aerobic capacity (mL/kg/min), peak vertical ground reaction force (%BW) and joint landing angles ( $^{\circ}$ ). The groups were stratified based on similar-level ranks (younger officers: O1-O3, older officers O4-O6, younger enlisted E4-E6, older enlisted E7-E9) and above or below the mean ( $3.4 \pm 2.9$  injuries) for self-reported injury history throughout the lifespan. Significant results had a p-value of  $< 0.05$ . **RESULTS:** O1-O3 and E4-E6 had greater shoulder external rotation strength than E7-E9 ( $46.7 \pm 7.0$ ,  $37.9 \pm 7.7$ ;  $42.8 \pm 6.5$ ,  $37.9 \pm 7.7$ ). O1-O3 and E4-E6 had less body fat ( $15.8 \pm 5.7$ ,  $19.9 \pm 7.3$ ;  $16.1 \pm 5.1$ ,  $19.9 \pm 7.3$ ) and higher aerobic capacity ( $52.4 \pm 7.6$ ,  $46.6 \pm 6.0$ ;  $51.1 \pm 6.1$ ,  $46.6 \pm 6.0$ ) than E7-E9. Subjects reporting  $\leq 3$  injuries demonstrated greater strength in shoulder external rotation ( $47.6 \pm 11.9$ ,  $44.3 \pm 7.3$ ), ankle inversion ( $39.6 \pm 5.6$ ,  $37.9 \pm 6.7$ ), and ankle eversion ( $50.9 \pm 7.8$ ,  $48.0 \pm 9.4$ ) than those reporting  $> 3$  injuries. Subjects with  $\leq 3$  injuries had greater left hip extension ( $17.7 \pm 3.0$ ,  $16.9 \pm 2.9$ ) and left trunk rotation range of motion ( $58.3 \pm 11.2$ ,  $54.8 \pm 10.5$ ) than subjects with  $> 3$  injuries. Subjects with  $\leq 3$  injuries had lesser peak vertical ground reaction force ( $189.5 \pm 48.0$ ,  $211.7 \pm 75.4$ ), lesser hip abduction angle at initial contact ( $-6.0 \pm 3.1$ ,  $-4.5 \pm 3.7$ ), and lesser knee varus angle at initial contact ( $2.8 \pm 3.0$ ,  $3.9 \pm 2.9$ ) than subjects with  $> 3$  injuries. **CONCLUSION:** Differences in job requirements could negatively affect performance measures in higher-ranked Operators. SEALs with numerous injuries throughout their lifespan may benefit from strengthening the dynamic stabilizers of the ankle, balancing side-to-side range of motion, and practicing optimal landing mechanics to prevent further injuries.

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