

Knee isokinetic strength and fat free mass correlate to anaerobic output among Air Force Operators.

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Air Force Special Tactics (ST) Operators have unique tactical demands requiring optimal body composition, strength, and anaerobic energy to perform operationally relevant tasks, i.e. casualty carry or sprints between cover positions. Identified modifiable injury risk factors such as body composition and strength could affect anaerobic performance. **PURPOSE:** To determine relationships of fat free mass and knee isokinetic strength to anaerobic power and capacity in ST Operators. **METHODS:** A total of 158 ST Operators (Age= 27.57 ± 4.95yrs, Height=177.60 ± 5.92cm, Mass=84.23 ± 8.33kg) participated. Subjects underwent right and left knee flexion (RKF, LKF) and extension (RKE, LKE) strength testing using an isokinetic dynamometer. A BodPod measured fat mass (FM) and fat free mass (FFM). A Wingate testing protocol for anaerobic power (PAnP) and capacity (MAnP) was conducted using the Veletron. The variables included RKF, LKF, RKE, LKE (average peak force), FM, FFM, PAnP and MAnP. Non-parametric statistical analysis was utilized with Spearman's rho significance set at $p < 0.05$ *a priori*. **RESULTS:** Pairwise correlations were statistically significant for RKF and PAnP/MAnP ($r=0.449$, $p=0.001$ / $r=0.454$, $p=0.001$), LKF and PAnP/MAnP ($r=0.515$, $p=0.001$ / $r=0.503$, $p=0.001$), RKE and PAnP/MAnP ($r=0.511$, $p=0.001$ / $r=0.443$, $p=0.001$), LKE and PAnP/MAnP ($r=0.525$, $p=0.001$ / $r=0.419$, $p=0.001$), FFM and PAnP/MAnP ($r=0.731$, $p=0.001$ / $r=0.803$, $p=0.001$). **CONCLUSION:** Air Force ST Operators' isokinetic knee strength and FFM significantly correlated to anaerobic power and capacity. Additional muscle fiber recruitment availability and increased torque generation at the knee could explain these anaerobic output relationships. Optimizing anaerobic pathways could improve Operator tasks requiring short bouts of energy and movements needing power. Knee strengthening and gaining lean mass while decreasing fat mass could reduce injury risk for the Operator. Human performance programming addressing knee strength, body composition, and anaerobic power could positively affect tactical readiness.

Opinions, interpretations, conclusions, and recommendations are those of the author and not necessarily endorsed by the Department of Defense, US Air Force, or US Air Force Special Operations Command.

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