

Differences in Male and Female Scapular Strength and the Relationship to Sprint Swimming Performance

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During freestyle swimming, the hand enters the water as the body rotates around the longitudinal axis, and the scapula protracts and upwardly rotates. Once at full reach, the scapula retracts, initializing the stroke's catch, and continues to retract through the stroke. It is currently unknown if the amount of strength produced from these movements is directly related to, and important for propulsion and sprint swimming performance. In addition, as males are generally stronger than females, it is not known if scapular strength plays an important role in sprint swimming performance for both sexes. **PURPOSE:** To examine the relation between scapular strength and swimming performance in males and females. **METHODS:** Eleven female (21.0 ± 2.3 years, 167.0 ± 6.8 cm, 62.8 ± 8.7 kg) and 7 male (21.3 ± 2.4 years, 179.6 ± 6.6 cm, 74.8 ± 7.7 kg) healthy swimmers completed an isokinetic dynamometer test to assess scapular protraction (SPro) and retraction (SRet) strength ($60^\circ/\text{s}$, 5 repetitions each). Variables included peak force (PkF), peak force normalized to weight (PkFW), time to peak force (TPkF), distance to peak force (DPkF), and average power (AvP). Subjects also swam 50 and 200 yard (yd) swims for time. All data were assessed for normality using Shapiro-Wilk tests. Gender differences in strength were compared using independent T-tests or Mann-Whitney U tests, as appropriate. Pearson and Spearman correlation coefficients were calculated, as appropriate, to analyze the association between both the 50 and 200 yd performance swims. Statistical significance was set at $p < 0.05$ *a priori*. **RESULTS:** TPkF ($p < 0.001$) and DPkF ($p = 0.006$) were statistically different when comparing SPro between genders, and PkF ($p = 0.039$) when observing SRet between genders. A statistically significant correlation was found between male 50 yd swim to SPro PkFW ($r = 0.872$; $p = 0.022$); and while not significant, male SRet PkFW ($r = 0.730$; $p = 0.062$) was also related to 50 yd swim time. **CONCLUSION:** The PkFW was not statistically different between genders, however male PkFW was found to correlate with faster times over the shorter sprint distance, suggesting that males utilize this to aid 50 yd freestyle performance. A lack of correlation at 200 yard freestyle suggests that longer distances may not be influenced by peak scapular strength.

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