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O22. Assessment of the upper-limbs propulsive force at front crawl

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INTRODUCTION

At front crawl, the upper-limbs are responsible for nearly 90% of the forward propulsion (Zamparo, 2006). Therefore, the assessment of the upper-limb propulsive force is of major importance. Usually, this is assessed based in tethered swimming (Morouço, Keskinen, Vilas-Boas, & Fernandes, 2011). However, it might be claimed that tethered swimming may infer constrictions while simulating the swim technique. Hence, the aim of this study was to assess the upper-limb propulsive force at front crawl based in a sensor system, allowing to measure it while swimming (i.e., with displacement).

METHODS

Five collegiate swimmers (3 males and 2 females) were recruited. Swimmers performed a 25m bout at maximal front crawl. The mean propulsive force and the peak force of each stroke (dominant and non-dominant limb) were analyzed during three consecutive stroke cycles, during the intermediate 15m were analyzed. The Aquanex system (v4.2 C1211, Richmond, USA) was used to acquire the data. The mean difference (Δ) was used to assess the differences between limbs, and Cohen's d to assess the magnitude of the effect size.

RESULTS

Table 1 presents the descriptive data (with 95% confidence interval: 95CI) and the differences between limbs, for the mean and peak propulsive force.

	Males				Females			
	Mean \pm 1SD	95CI	Δ	d	Mean \pm 1SD	95CI	Δ	d
Mean dominant [N]	37.39 \pm 12.99	(28.87;37.60)	23.70	0.65	32.42 \pm 8.79	(32.20;32.64)	17.64	0.80
Mean non-dominant [N]	28.53 \pm 14.11	(28.19;28.87)			26.70 \pm 4.97	(27.10;26.31)		
Peak dominant [N]	77.86 \pm 9.47	(77.71;78.01)	19.74	1.96	61.22 \pm 2.95	(61.89;60.56)	17.74	2.84
Peak non-dominant [N]	62.49 \pm 5.79	(62.35;62.93)			50.37 \pm 4.52	(50.80;49.93)		

CONCLUSIONS

For both males and females, a substantial difference with a large effect size, was observed between the upper-limbs (dominant versus non-dominant) for the mean and peak propulsive force.

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