

HOW UPPER ARM MUSCLES PRE-ACTIVITY AFFECTS THE COMPETITION RESULTS IN ARM WRESTLING

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INTRODUCTION

Arm wrestling (AW) may be the most popular popular game/sport in pubs or clubs from ancient times to modern world. However, studies of arm wrestling have been very limited. Technique and strength are the greatest contributing factors to winning an arm wrestling match (Hong, Lin, Liao, Hong, & Wang, 2011). In simulate AW, pectoralis major (PMJ) increases electric activity from initial to final positions, therefore PMJ may be a well contributing muscle for winner (Silva et al., 2009). Because an advantaged posture could help players win an AW match, how to take an advantaged posture is important. In AW, just before the game starts, the muscle pre-activity may be an important technique that makes huge differences to the results of the match.

METHODS

A total of normal male 10 subjects (ages: 22±2yrs; height: 175±6.8cm; weight: 67±9.6 kg; BMI: 21.8±2.1) who had performed their exercise habits. Participants were grouped into pairs who were similar in body weight (Difference: 1.4±1.3 kg). Therefore, total of 5 trails of AW competition were analysed. The raw electromyograph (EMG) signals were digitized at 1000 Hz by the EMG system (MA300-16, Motion Analysis Corporation, USA) with the surface electrode to record the activity of PMJ, latissmus dorsi (LSD), anterior deltoid (AD), and , biceps brachii short head (BB) and comparison of the muscle activities between winners and losers was to be done. The 3seconds before the AW competition would be recorded and analyzed. This study observed the American Armsport Association rules and regulations. The materials of AW (the size of table, chairs and pads) followed the World Armwrestling Federation while the situation in the sit position.

RESULTS AND DISCUSSION

The muscle pre-activity results from the AW competition were shown in Table 1 and Figure 1. The result of this experiment showed that winner had more muscle pre-activity than loser in PMJ (winner=0.21±0.10; loser=0.15±0.11) and AD (winner=0.38±0.33; loser=0.22±0.16). PMJ and LSD had high correlations ($r>0.8$) between winners and losers. AD had moderate correlation ($r=0.74$). However, all muscles had no statistical significance between winners and losers ($p>.05$). The significant influence of PMJ on arm wrestling match indicated that PMJ was the important muscle in arm wrestling. That could be explained that elbow flexion and

closeness between the trunk and the table would benefit arm wrestling match because of PMJ muscle length (Hong, et al., 2011).

CONCLUSIONS

This study shows that PMJ and AD had more activity in winners than losers before AW competition started. However, all statistic data showed no significant differences, which might be due to the small sample size. The upper arm muscles pre-activity has little influence on arm wrestling results in this study.

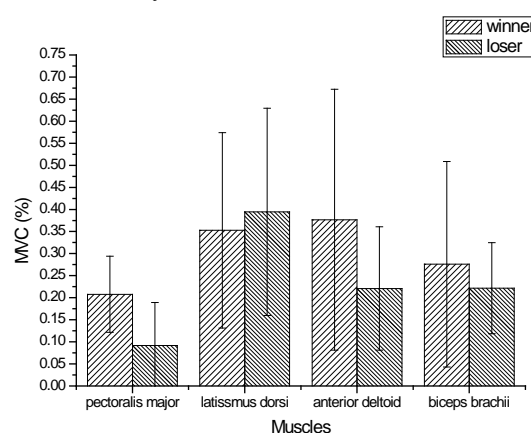


Figure 1: The mean EMG of muscles pre-activity in AW competitions

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Table 1: Upper arm muscles pre-activity between winner and loser.

Muscles	Winners (N=5)		Loser (N=5)		p	correlation	p
	M	SD	M	SD			
PMJ	0.21	0.10	0.15	0.11	0.105	0.821	0.088
LSD	0.35	0.25	0.40	0.26	0.575	0.820	0.089
AD	0.38	0.33	0.22	0.16	0.218	0.744	0.149
BB	0.28	0.26	0.22	0.12	0.634	0.430	0.470