**RELATIONSHIP BETWEEN ATHLETIC PERFORMANCE AND MUSCLE FORCE OUTPUT OF TORSO ROTATION MOVEMENT IN FEMALE JAVELIN THROWERS.**

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In javelin throw, it is a very important factor to using torso rotation movement during throwing javelin. Even thought several studies reported that focus on the relationship between throwing performance and muscle power and strength in male throwers, no study has focused on for correlation of female throwers with muscle power and strength especially torso rotation. Therefore the purpose of this study was to clarify the relationship between javelin performance and muscle power and strength of torso rotation movement in female javelin throwers.

The subjects were ten female Japanese right-handed javelin throwers including national champion (age: 20.0$\pm$0.7 yrs, height: 163.0$\pm$3.6 cm, body weight: 62.7$\pm$2.6 kg, fat free mass: 49.8$\pm$2.9 kg). The javelin performance (JP) was adopted own personal record (48.17$\pm$3.21m).

The peak torque of isokinetic torso rotation during concentric action for right (PTR)and left direction (PTL) was measured at velocities of 30, 60, 180, 120 and 240 deg/sec used by isokinetic dynamometer (Biodex system3), and highest peak torque was adopted from each angler velocities. All the subjects performed torso rotation movement for right and left directions with maximal effort. The position in turn to front of trunk was defined 0degrees, and right hand side rotation was defined plus degrees, left hand side rotation was minus degrees, and measured rotate ranges were each side 60 to -60 degrees.

The results were as follows: PTR was closely related to the JP in right side rotation (30deg/sec: r = 0.624, 60deg/sec: r = 0.709, 120deg/sec: r = 0.732, 180deg/sec: r = 0.844, 240deg/sec: r = 0.779). Similarly there are significant correlation coefficients observed between PTL and JP in left side rotation (30deg/sec: r = 0.729, 60deg/sec: r = 0.787, 120deg/sec: r = 0.786, 180deg/sec: r = 0.887, 240deg/sec: r = 0.762).

From these results, it is closely related to athletic performance and muscle force output of torso rotation movement. Therefore, muscle power and strength of torso rotation may to developing factors for javelin performance in female throwers. Furthermore, it was considered that increasing muscle power and strength of torso rotation in training can be expectation of better javelin performance.

Reference

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