COMPARISON OF POWER AND PEAK TORQUE OF SELECTED MUSCLES AMONG SOCCER PLAYERS

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ABSTRACT

The purpose of the study was to investigate the power and peak torque of selected muscles among soccer players. For this study Quadriceps, Hamstrings, Gastrocnemius and Tibia muscles were selected as criterion variables. Power and Peak torque of each muscles were measured by isokinetic machine. Thirty seven subjects were selected from soccer team. The collected data was statistically analyzed by using dependent 't' test. It was found that there was significant difference on power between Quadriceps and Hamstrings and peak torque between Quadriceps and Hamstrings and Gastrocnemius and Tibia muscles of soccer players. However no significant difference was found on the power between Gastrocnemius and Tibia muscles of soccer players.

Key Words : *- Soccer, Isokinetic Machine, leg muscles, leg strength.*

INTRODUCTION:

Soccer is very strenuous game, consisting of short bursts of movements with rest pauses, between. The players have to be very active and alert during the play. It is not only the speed of movement, but also the tactics of movement. Because the player has to perform number of zigzag movements and straight runs with high speed, in accordance with the requirements of the game. Movements are made possible only through the contraction of muscle in a coordinated manner. Power of muscle produces effective and efficient movement. The isokinetic dynamometer can be used to produce torque-velocity, power-velocity and torque angle plots. Isokinetic strength is the torque developed by a muscle or muscle group in a maximal muscle action, which may be concentric and or eccentric through a specified range of motion at a constant angular velocity. Whole curve and time based scores can be gained and comparisons made between agonists and antagonists, concentric and eccentric phases as well as the contra lateral limb. Measurement reliability and objectivity is easy to gain with this form of testing, however, its functional relevance is questioned in the single, isolated joint assessments that are made as well as the absence of acceleration and the stretch shortening cycle. Additionally it cannot be presumed that data from one form of isokinetic dynamometer will be the same as that

derived from another (Abemethy et. al., 1995). Isokinetic dynamometer can therefore be seen to have high internal and apparently low external validity. Perrine and Edgerton (1975) found a high correlation continues to be borne out in a number of similar research protocols which physiological or genetic factors are most responsible for the inhibition of unlimited increases in both muscular power and peak torque remains uncertain. No single neurological biomechanical, or physiological component has been identified in limiting potential strength and power expression. From evidence suggesting that the contractile components seems to determine the upper level of muscular size and strength, some authors have hypothesized that the geometrical dimensions of the muscle-tendon ratio, within the musculo-tendinous unit, constrain muscle mass development and influence bio-motor abilities. Therefore, the aim of the study was to examine the Muscle-Tendon Ratio hypothesis.

In this context the investigator made an attempt to analyze the effect of maximal power training on selected speed, power and leg strength.

METHODOLOGY:

To achieve the purpose of the study thirty seven subjects were selected from under 19 soccer team. For this study Gastrocnemius. Hamstrings, Quadriceps and Tibia muscles were selected as criterion variables. All the subject's power and peak torque of above mentioned muscles were tested by isokinetic machine.

The obtained data from the defenders and strikers were statistically analyzed with dependent 't' test. The level of confidence was fixed at 0.05 levels for all the cases to test the hypothesis.

ANALYSES AND INTERPRETATION OF DATA:

The analysis of dependent 't' test on the data obtained for selected variables have been analyzed and presented in Table no. 1.

Table - 1

Mean and Dependent 't'-Test on Power and Peak Torque Between Quadriceps and Hamstrings Muscles of Soccer Team

Criterion Variables	Mean Value		't' value
	Quadriceps	Hamstrings	
Power	71.66	30.04	15.20*
Peak torque	117.30	75.45	15.11*

Significant at .05 level.

From the table the dependent 't' test value of power and peak torque between quadriceps and hamstrings are 15.20 and 15.11 respectively, which is greater than the table value of 2.03 with df36 at .05 Level of confidence. From the results of the study it was concluded that there was significant difference of power and peak torque between quadriceps arid hamstrings of soccer players.

Table - 2

Mean and Dependents 't' Test on Power and Peak Torque Between Gastrocnemiun and Tibia Muscles of Soccer Team

Criterion Variables	Mean Value		't' value
	Gastroncnemius	Tibia	
Power	9.96	10.47	0.73
Peak torque	29.31	17.06	9.77*

Significant at .05 level.

From the table the dependent 't'test value of peak torque between gastrocnemius and tibia is 9.77 which is greater than the table value of 2. 03 with df36 at .05 level of confidence. From the result of the study it was concluded that there was significant difference of peak torque between gastrocnemius and tibia of soccer players.

CONCLUSION:

The following conclusions were drawn from the results of the study:-

1. It was concluded that there was significant difference of power and peak torque between quadriceps and hamstrings of soccer players.
2. It was concluded that there was significant difference of peak torque between gastrocnemius and tibia of soccer players.
3. It was concluded that there was no significant difference of power between gastrocnemius and tibia of soccer players.

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