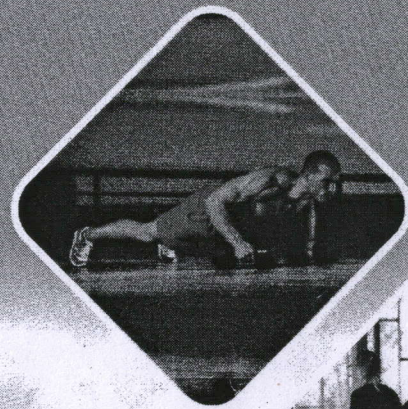
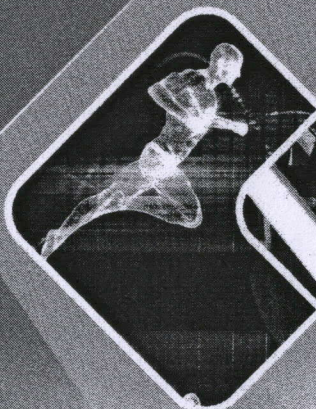
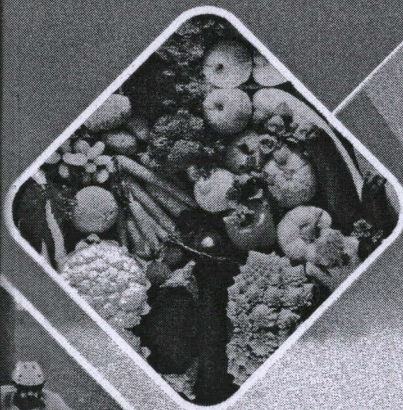


# PROCEEDINGS



## International Conference on Exercise Physiology and Nutrition for Enhancing Health, Fitness and Sports Performance



TAMIL NADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

March - 5<sup>th</sup> to 7<sup>th</sup> 2019

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TAMILNADU PHYSICAL EDUCATION AND  
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Chennai - 600 127.



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## References

- Harrison AJ, Bourke G (2009). The Effect of Resisted Sprint Training on Speed and Strength Performance in Male Rugby Players. *J Strength Cond Res* 23: 275-283.
- Laursen PB, Shing CM, Peake JM, Coombes JC, Jenkins DG (2005). Influence of High Intensity Interval Training on Adaptations in Well-Trained Cyclists, *J Strength Cond Res*. 19(3):527-33.
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## EFFECTS COMBINATION OF STRENGTH AND PLYOMETRIC TRAINING ON SELECTED MOTOR FITNESS COMPONENTS OF MALE KABADDI PLAYERS

Dr. L. Karuppiah\* & Dr. R. Sathesh Franklin\*\*

### Abstract

The purpose of the present study is to assess the effects of combination of strength and plyometric training on selected motor fitness components of male kabaddi players. Sixty (60) male inter-collegiate kabaddi players were selected from affiliated colleges of Madurai Kamaraj University, Madurai, Tamilnadu. These players were classified into two groups namely strength and plyometric training group (SPTG: 30) and control group (CG: 30). These players represented their college in inter-collegiate kabaddi tournament and have more than six years of playing experience. In the present study speed, power and agility were selected as dependent variables. 50 yard dash, vertical jump test and shuttle run test was used to measure speed, power and agility. The combined training of strength and plyometric training was administered for ten weeks three days per week. The combination of training program consists of a combined of both strength and plyometric training programs in which two sessions a week of plyometric and one strength training sessions in even weeks and one plyometric and two strength training sessions in odd weeks were accomplished. The selected kabaddi players were tested on speed, power and agility prior to training and after ten weeks of training. Subjects performed each test according to test procedure and the scores of best trials were taken for this study. The pre and post-test were collected from both strength and plyometric training group and control group. The collected data were evaluated using Analysis of Covariance (ANCOVA). Paired 't' test was calculated to assess the changes within a group before and after ten weeks of training intervention. The  $p < 0.05$  was considered as statistically significant. The result of the study clear shows that there was significant difference between groups on speed and power. However, agility showed no significant difference between the groups. It is inferred that ten weeks of combined strength and plyometric training showed significant improvement in speed and power of male inter-collegiate kabaddi players.

### Introduction

Motor fitness is defined as the ability of the neuromuscular system to perform specific tasks. Motor fitness is a more comprehensive term which include five motor performance components (power, speed, agility, balance and reaction time), which are important mainly for success in sports. Fundamental motor skills are common motor activities with specific observable patterns. Most skills used in sports and movement activities are advanced versions of fundamental motor skills.

\* Hostel Superintendent cum Physical Training Officer, Government Industrial Training Institute, Viralimalai, Trichy, Tamilnadu.

\*\* Director of Physical Education, St. Xavier's College of Education, Palayamkottai, Tirunelveli.

Strength is the use of resistance other than the weight of the body to develop specific areas of the body. Generally, it is used to develop muscular strength and power. It also develops muscular endurance, elasticity and co-ordination. Strength training is the use of systematic exercises with weight and it is used merely as a mean to increase resistance of the muscle contraction. The primary objective is not to learn to lift as much weight as possible, but to increase strength and power for application to some other sports. The subject of weight training is a controversial one. Many physical educationists believe that it makes participants "muscle bound" but muscles in a permanent state of partial contraction, limits and reduces speed, causes the learning of sports skills. It is generally agreed and accepted that muscles increase in size through weight training that strength is increased, that chemical changes take place and to some extent perhaps that the speed of muscular contraction is also increased.

Plyometric training trains the nervous system as well as the muscular system. To increase speed of the movement of a group of muscles, there will be several factors involved. These factors include intramuscular coordination, neural pathway development, myostatic reflex and much more. In general, plyometric training boils down to the muscles (or the sensory organs) receiving a stimulus, then sending this stimulus to the spinal cord to read the demand placed on the muscle and sending back a response to meet the demands placed on the muscle. If the nervous system can become more efficient in responding to the stimulus, the muscular action will be more explosive and reactive.

### **Methodology**

The purpose of the present study is to assess the effects of combination of strength and plyometric training on selected motor fitness components of male kabaddi players. Sixty (60) male inter-collegiate kabaddi players were selected from affiliated colleges of Madurai Kamaraj University, Madurai, Tamilnadu. These players were classified into two groups namely strength and plyometric training group (SPTG: 30) and control group (CG: 30). These players represented their college in inter-collegiate kabaddi and have more than six years of playing experience. In the present study speed, power and agility were selected as dependent variables. 50 yard dash, vertical jump test and shuttle run test was used to measure speed, power and agility. The combined training of strength and plyometric training was administered for ten weeks three days per week. The combination of training program consists of a combined of both strength and plyometric training programs in which two sessions a week of plyometric and one strength training sessions in even weeks and one plyometric and two strength training sessions in odd weeks were accomplished. The selected kabaddi players were tested on speed, power and agility prior to training and after ten weeks of training. The testing session consists of warm-up and test interspersed with rest. All tests were explained and demonstrated. Before testing, subjects were given practice trials to become familiar with the testing procedures. All tests were counterbalanced during pre and post-testing to ensure that testing effects were minimized. Subjects performed each test according to test procedure and the scores of best trials were taken for this study. The pre and post-test were collected from both strength and plyometric training group and control group. The collected data were evaluated using Analysis of Covariance (ANCOVA). Paired 't' test was calculated to assess the changes within a group before and after ten weeks of training intervention. The  $p < 0.05$  was considered as statistically significant.

### **Training Protocol**

The combined training of strength and plyometric training was administered for ten weeks three days per week (Monday, Wednesday and Friday). The combined training program consists of a combination of both strength and plyometric training programs in which two sessions a week of plyometric and one strength training sessions in even weeks and one plyometric and two strength training sessions in odd weeks had accomplished. The strength training load was fixed based on 1RM (repetition maximum) and plyometric training based on foot contact. The strength training intensities for first three weeks were 60%, fourth to six week 70 % and last three weeks were 80% of the one repetition maximum 1-3 sets, 12 repetitions per set with 3 minutes rest between sets. Similarly, plyometric training volume ranged from 90 to 140 foot contacts per session.

## Results

The result of the study clearly shows that there was significant difference between groups on speed ( $F = 110.09$ ,  $p = 0.000$ ) and power ( $F = 12.89$ ,  $p = 0.001$ ). However, agility ( $F = 0.035$ ,  $p = 0.875$ ) showed no significant difference between the groups. It is inferred that ten weeks of combined strength and plyometric training showed significant improvement in speed and power. It is noted that 2.52% and 3.91% of improvement is elicited in SPTG on speed and power. The changes obtained in SPTG from pre to post-test in speed ( $t = 12.90$ ,  $p = 0.000$ ) and power ( $t = 4.78$ ,  $p = 0.000$ ) (Table 1). In contrast, control group showed no significant changes from pre to post-test in all selected motor fitness components. It is inferred that combined strength and plyometric training significantly improved speed and power of male kabaddi players.

**Table-1 Changes Obtained in Selected Motor Fitness Components**

Variables	Groups	Pre-test	Post-test	% of changes	t	F
Speed (sec)	SPTG	5.97 ± 0.265	5.80 ± 0.256	2.53	12.90 (0.000)	110.09 (0.000)
	CG	5.99 ± 0.267	5.99 ± 0.264	0.17	1.85 (0.079)	
Power (cm)	SPTG	47.77 ± 7.22	49.64 ± 7.23	3.95	4.78 (0.000)	12.89 (0.001)
	CG	47.60 ± 7.26	47.15 ± 6.60	0.99	0.79 (0.453)	
Agility (sec)	SPTG	9.88 ± 0.433	9.87 ± 0.373	0.11	0.240 (0.805)	0.035 (0.875)
	CG	9.89 ± 0.412	9.89 ± 0.432	0.12	0.090 (0.937)	

## Discussion

The present study clearly shows that speed and power are improved by ten weeks of combined strength and plyometric training on male kabaddi players. In the present study SPTG elicited improvement of 2.52% in speed and 3.91% in power. Results from several investigations involving adults suggest that combining plyometric training with resistance training may be useful for enhancing muscular performance (Adams et al. 1992; Fatouros et al. 2000). The plyometric training which consist of a rapid eccentric muscle action followed by a powerful concentric muscle action are important for enhancing the rate of force development whereas strength training is needed to enhance muscular strength (Fleck and Kraemer, 2004). Thus the effects of plyometric training and resistance training may actually be synergistic, with their combined effects being greater than each program performed alone.

Studies also suggest that changes in motor performance skills resulting from the performance of combined resistance training and plyometric training are greater than with either type of training alone (Adams et al. 1992; Fatouros et al. 2000; Polhemus et al. 1981). Thus, both resistance training and plyometric training are typically recommended for adults when gains in motor performance are desired.

## Conclusion

The result of the study clearly shows that there was significant difference between groups on speed and power. However, agility showed no significant difference between the groups. It is inferred that ten weeks of combined strength and plyometric training showed significant improvement in speed and power of male inter-collegiate kabaddi players.

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