



## COMBINED INFLUENCE OF STRENGTH AND PLYOMETRIC EXERCISE PROGRAMME ON DESIGNATED MOTOR FITNESS COMPONENTS OF FEMALE KABADDI PLAYERS

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### Abstract

The purpose of the present study is to assess the combined influence of strength and plyometric exercise programme on designated motor fitness components of female kabaddi players. Forty eight (48) female inter collegiate kabaddi players were selected from affiliated colleges of Bharathidasan University. These players were classified into two groups namely strength and plyometric training group (SPTG: 24) and control group (CG: 24). 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 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 pre and post data were collected from both SPTG and CG. The collected data was evaluated using Analysis of Covariance (ANCOVA). Paired t test was calculated to assess the changes within a group before and after nine weeks of training intervention. The result of the study clearly shows that there is significant difference between groups on speed ( $F = 109.46$ ,  $p = 0.000$ ) and power ( $F = 11.57$ ,  $p = 0.001$ ). However, agility ( $F = 0.025$ ,  $p = 0.875$ ) 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 of male intercollegiate kabaddi players.

**Keywords:** Combined Strength and Plyometric Training, Kabaddi, Speed, Power, Agility.

### INTRODUCTION

Motor fitness is defined as the ability of the neuromuscular system to perform specific tasks. Motor fitness is a more comprehensive term which includes 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.

Kabaddi is a traditional sport which originated from India. The word Kabaddi is derived from a Tamil word Kai-pidi, literally meaning "(let's) Hold Hands", which is indeed the crucial aspect of play. It is the national game of Bangladesh, and the state game of Tamil Nadu, Punjab and Andhra Pradesh in India. Kabaddi players require speed, power and agility in executing the movement in a faster manner while riding and catching. This clearly shows that players require greater physical fitness and body composition to perform optimally during game. The coaches and trainers designed various training packages to improve strength and power simultaneously among athletes. Now they found a way to improve both strength and power of athletes by incorporating both type of training in a

combined form which is more versatile than training performed separately. Many published studies cite the advantages of, and strategies for, combining weight training and plyometric training for explosive power and improved performance (Adams et al. 1992; Bauer, Thayer & Boras 1990; Blakey & Southard 1987; Chu 1998; Clutch et al. 1983; Ford et al. 1983). Therefore, the purpose of the present study is to assess the combined effect of strength and plyometric training on selected motor fitness components of male kabaddi players.

### METHODOLOGY

#### SELECTION OF THE SUBJECTS

To achieve the purpose of the present study Forty eight (48) female inter collegiate kabaddi players were selected from affiliated colleges of Bharathidasan University. These players were classified into two groups namely strength and plyometric training group (SPTG: 24) and control group (CG: 24). These players age  $24.26 \pm 4.58$  years, weight  $73 \pm 6.50$  kg and height  $173.25 \pm 6.85$  cm. These players represented their college in inter collegiate kabaddi and have more than six years of playing experience.

## VARIABLES

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.

## COLLECTION OF DATA

The selected female 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.

## 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.

## STATISTICAL ANALYSIS

All statistical analysis was calculated by the SPSS statistical package. The results are reported as mean and standard deviations (SD). The collected data was 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.  $p < 0.05$  was considered as statistically significant.

## RESULTS

The result of the study clearly shows that there is significant difference between groups on speed ( $F = 109.46$ ,  $p = 0.000$ ) and power ( $F = 11.57$ ,  $p = 0.001$ ). However, agility ( $F = 0.025$ ,  $p = 0.875$ ) 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 in speed ( $t = 12.85$ ,  $p = 0.000$ ) and power ( $t = 4.73$ ,  $p = 0.000$ ) (Table 1). In contrast, control group showed no significant changes from pre to post in all selected motor fitness components. It is inferred that combined strength and plyometric training significantly improved speed and power of female kabaddi players.

**TABLE 1**  
**CHANGES OBTAINED IN SELECTED MOTOR FITNESS COMPONENTS**

| Variables     | Groups | Pre-test         | Post-test        | % of changes | t                | F                 |
|---------------|--------|------------------|------------------|--------------|------------------|-------------------|
| Speed (sec)   | SPTG   | 5.96 $\pm$ 0.263 | 5.81 $\pm$ 0.254 | 2.52         | 12.85<br>(0.000) | 109.46<br>(0.000) |
|               | CG     | 5.99 $\pm$ 0.267 | 5.98 $\pm$ 0.262 | 0.16         | 1.83<br>(0.079)  |                   |
| Power (cm)    | SPTG   | 47.75 $\pm$ 7.20 | 49.62 $\pm$ 7.20 | 3.91         | 4.73<br>(0.000)  | 11.57<br>(0.001)  |
|               | CG     | 47.54 $\pm$ 7.20 | 47.08 $\pm$ 6.65 | 0.96         | 0.76<br>(0.452)  |                   |
| Agility (sec) | SPTG   | 9.86 $\pm$ 0.433 | 9.85 $\pm$ 0.374 | 0.10         | 0.249<br>(0.806) | 0.025<br>(0.875)  |
|               | CG     | 9.87 $\pm$ 0.412 | 9.86 $\pm$ 0.439 | 0.10         | 0.080<br>(0.937) |                   |

## DISCUSSION ON FINDINGS

The present study clearly shows that speed and power are improved by ten weeks of combined strength and plyometric training on female 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 consists 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

It is concluded that ten weeks of combined strength and plyometric training is effective in improving speed and power of intercollegiate female kabaddi players in a short term. This type of training can be administered during preparatory phase of training.

## REFERENCES

1. Adams, K., O'Shea, J.P., O'Shea, K.L. and Climstein, M. (1992). The effect of six weeks of squat, plyometric and squat-plyometric training on power production. *Journal of Strength and Conditioning Research* 6,36-41.
2. Chu, D.A. (1998). *Jumping into plyometrics*, 2nd edition. Human Kinetics, Champaign, IL.
3. Fatouros, I.G., Jamurtas, A.Z., Leontsini, D., Kyriakos, T., Aggelousis, N., Kostopoulos, N. and Buckenmeyer, P. (2000) Evaluation of plyometric exercise training, weight training, and their combination on vertical jump performance and leg strength. *Journal of Strength and Conditioning Research* 14,470-476.
4. Fleck, S.J. and Kraemer, W.J. (2004) *Designing resistance training programs*. 3rd edition. Human Kinetics, Champaign, IL.
5. Polhemus, R., Burkhart, E., Osina, M. and Patterson, M. (1981) The effects of plyometric training with ankle and vest weights on conventional weight training programs for men and women. *National Strength and Conditioning Association Journal* 2,13-15.
6. Bauer, T., Thayer, R.E., Boras, G. (1990). Comparison of training modalities for power development in the lower extremity. *J Appl Sports Sci Res*, 4:115-121.
7. Blakey, J.B., and Southard, D. (1987). The combined effect of weight training and plyometrics on dynamic leg strength and leg power. *J. Appl Sports Sci. Res*, 1:14-16.
8. Clutch, D., Wilton, M., McGown, C., and Bryce, G. R. (1983). The effect of depth jumps and weight training on leg strength and vertical jump. *Res Q*, 54: 5-10.