Effect of Concurrent and Complex Training on Muscular Strength of Rural Area Kabaddi Players

Mr. S. Anandabaskaran**,** *Ph.D-Research Scholar, Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India.*

Dr. Aranga. Panbilnathan, *(Research Guide), Assistant Professor, Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India.*

ABSTRACT

The aim of this study was to measure the effect of concurrent and complex training on muscular strength of rural area kabaddi players. To achieve the purpose of the study, the investigator selected forty five rural area kabaddi players as participants in the age group of 15 to 18 years. Of the forty five rural area kabaddi players, fifteen players performed concurrent training (group-I), another fifteen performed complex training and the remaining fifteen acted as control. The muscular strength was selected as dependent variable. By conducting leg press test, the data was collected before as well as after training. Pre and post test random group design was adopted. The assessed data of the three group's through standardized tests was analyzed to discover the significant variation between two tests (pre & post) through paired 't' test. Additionally, magnitude (%) of changes was also calculated. To abolish the early mean disparity, the three group's data (pre&post) were calculated through ANCOVA statistics. When the 'F' (adjusted) score in ANCOVA was high, the post hoc (Scheffe's) test was followed. The confidence level 0.05 was set. After 12 weeks of treatment, concurrent (6.07%) and Complex training (9.92%), group's muscular strength enhanced considerably.

Key Words*: Concurrent and complex training, Muscular strength, Rural area kabaddi players*

INTRODUCTION

A scientific analysis of the player's performance with respect to their skills might help in a much more positive way. This will enable not only the right type of selection based on scientific data but also help in maximizing the player's potentials by regrouping and synchronizing the team talents that are available. Hence, the selection, the training, the performance and monitoring of game strategies can be updated by a study on scientific training and performance of the players. Though the players of the team are drawn from a particular age group, as in the case of University Teams, and their general skills measure to a standard level which has ensured their selection in their respective University Teams, their performance levels may vary, deciding the success or failure of their teams. In sports, successful performance in competition depends substantially on the physical characteristics,

body composition, muscular performance, neuromuscular capability and mental ability of the players.

In performance and high performance sport, a great importance is given to the physical condition. It is in fact the preoccupation for the adaptation of the sports man's body to growing physical and mental efforts, to which all the parts of the human body participate. The contemporary Kabaddi game, characterized by high intensity motor activities, places upon players a wide spectrum of requirements on all their capabilities. One can hardly single out any ability or a characteristic which is not engaged in the performance of Kabaddi players. Kabaddi is a strength game. Without endurance the player cannot perform well, in the same time the player's need all the characteristics i.e. speed, agility, flexibility, endurance etcetera. Nowadays most of the players having good height can perform well in the game situation. Without physical characteristics players cannot achieve the aim of the game, so physical characteristics is very essential for the better performance of Kabaddi.

Athletes in predominately strength and endurance sports are frequently given training programs designed to induce positive changes in both endurance and strength attributes, particularly during the off-season. Strength and conditioning professionals prescribing aerobic exercise for their strength and endurance athletes often cite the benefit of enhanced recovery during the limited rest periods which intersperse the supramaximal work efforts. Recovery from anaerobic exercise is highly dependent upon aerobic metabolism. Thus, aerobic endurance training may help athletes recover more quickly between anaerobic work intervals, such as multiple sets in resistance training or repeated sprints. Strength and endurance athletes may perform endurance exercise in order to maintain an optimal body weight or to reduce body fat levels.

Complex training has gained popularity as a training strategy combining weight training and plyometric training. Anecdotal reports recommend training in this fashion in order to improve muscular power and athletic performance. Recently, several studies have examined complex training. Despite the fact that questions remain about the potential effectiveness and implementation of this type of training, results of recent studies are useful in guiding practitioners in the development and implementation of complex training programs. In some cases, research suggests that complex training has an acute ergogenic effect on upper body power and the results of acute and chronic complex training include improved jumping performance. Improved performance may require three to four minutes rest between the weight training and plyometrics sets and the use of heavy weight training loads.

Though many types of trainings prevail to develop physical fitness and game performance the role of concurrent and complex training is an undisputed one. Lot of researches had been carried out on the effects of concurrent and complex training, but still the bone of contention is about the duration to get the maximum benefit. Experts differ in their views based on their studies. Hence, the purpose of the present study was to evaluate the effect of concurrent and complex training on muscular strength among rural area kabaddi players.

METHODOLOGY

Subject and Variable

To achieve the purpose of the study, the investigator selected forty five rural area kabaddi players as participants in the age group of 15 to 18 years. Of the forty five rural area kabaddi players, fifteen players performed concurrent training (group-I), another fifteen performed complex training and the remaining fifteen acted as control. The muscular strength was selected as dependent variable. By conducting leg press test, the data was collected before as well as after training.

Training Programme

Of the forty five rural area kabaddi players, fifteen players (group-I) performed concurrent training (Combination of Resistance & Aerobic Training), another fifteen performed complex training (Combination of Resistance & plyometric Training) and the remaining fifteen was act as control.

Concurrent (resistance & aerobic) training groups performed resistance training during every odd numbered week and aerobic training during every even numbered week. The resistance training program was a total body workout consisting of 3 sets of 6-10 repetitions on 6 exercises that trained all the major muscle groups. A percentage of each subject's one-repetition maximum for each exercise was used to determine the intensity of each week. The intensity (60- 85% of 1RM) and number of repetitions performed for each exercise was progressively increased. The aerobic training group performing continuous running of two minutes duration for proposed repetitions and sets, alternating with active recovery based on work-rest ratio. The running intensity was determined by a percentage of maximum heart rate (HRmax). The intensity (60- 85% of HRmax) was amplified as training progressed.

Complex (resistance & plyometric) training groups performed resistance training during every odd numbered week and plyometric training during every even numbered week

as prescribed in the appendix-III. The resistance training program was a total body workout consisting of 3 sets of 6-10 repetitions on 6 exercises that trained all the major muscle groups. A percentage of each subject's one-repetition maximum for each exercise was used to determine the intensity of each week. The intensity (60- 85% of 1RM) and number of repetitions performed for each exercise was progressively increased. The plyometric training program consists of variety of exercises designed for the upper and lower extremity. Training volume ranged from 90 foot contacts to 140 foot contacts per session. Less intensive plyometric exercises was incorporated during the early stages of training to gradually condition the subjects and more demanding exercises was included when training progress.

Statistical Technique

To find out the pre and post test mean differences paired't' test was applied. Percentage of improvement was also calculated. Further, the data collected from the three groups prior to and post experimentation on muscular strength was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since three groups were involved, whenever an obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance.

RESULT

The kabaddi player's muscular strength was analyzed statistically and presented in table- 1-3.

Table – 1: Paired 't' Test Results and % of Changes on Muscular Strength of Chosen Three Group's

Group	Test	N	Mean	SD	DM	't' - ratio	%
Concurrent Training	Pre	15	65.9333	3.15021	4.000	7.135*	6.07%
	Post	15	69.9333	3.69298			
Complex Training	Pre	15	67.2000	3.46822	6.667	9.895*	9.92%
	Post	15	73.8667	2.13363			
Control	Pre	15	65.6000	3.39748	0.867	2.827	1.32%
	Post	15	64.7333	3.97252			

*Table value for df 14 is 2.15(*significant)*

The pre and post values of both training groups differ considerably since the 't' values of concurrent (7.135) as well as Complex training (9.895) groups were greater than the table value (df14=2.15). After 12 weeks of treatment, concurrent (6.07%) and Complex training (9.92%), group's muscular strength enhanced considerably.

By using ANCOVA statistics, the muscular strength of all 3 groups were analyzed and exhibited intable–2.

Table – 2: ANCOVA Statistics Output on Muscular Strength of Chosen Three Group's

	Concurrent Training	Complex Training	Control	SoV	SS	df	MS	'F' ratio
Adjusted Mean	70.187	73.089	65.258	B	453.941	2	226.970	56.450*
				W	164.851	41	4.021	

*(Table value for df 2 & 41 is 3.23)*Significant (.05 level)*

The ANCOVA result proved that the adjusted final means (CCT=70.187, CPT=73.089 & CG=65.258) on muscular strength of all 3 chosen groups significantly differs, as the derived 'F' value (56.450) is better than the required value (*df 2 & 41* =3.23).

As the adjusted final means is significant, the follow up test was applied as put on view in table-3.

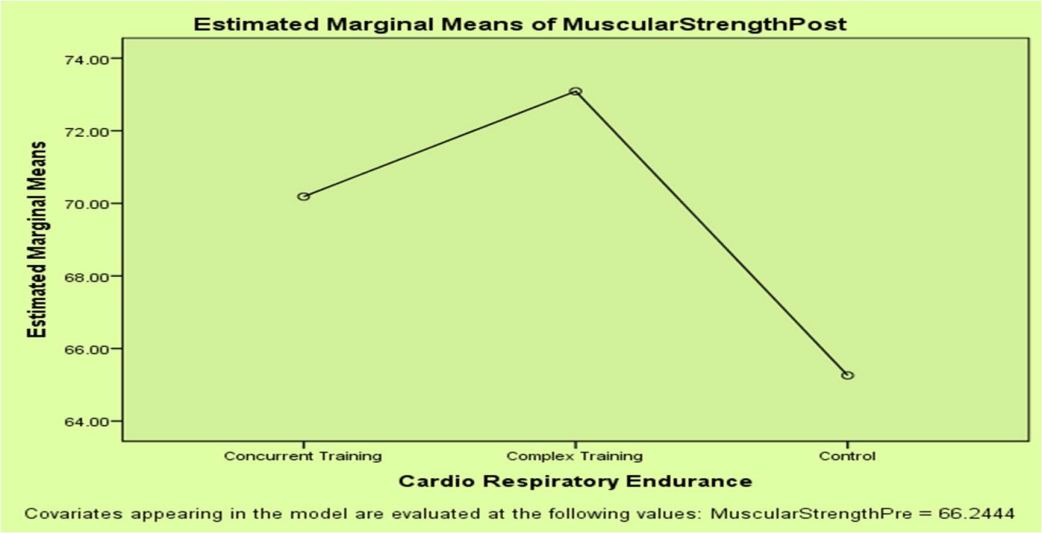
Table – 3: Scheffe's Test Outcome on Muscular Strength of Three Groups

Variable	Concurrent Training	Complex Training	Control	MD	CI
Muscular Strength	70.187	73.089		2.902*	1.86
	70.187		65.258	4.929*	1.86
		73.089	65.258	7.831*	1.86

**Significant (.05)*

It proved that due to Concurrent (4.929) and Complex training (7.831) the muscular strength was greatly enhanced. Though, Complex training was much better than Concurrent training (2.902) since the mean differences (4.929, 7.831& 2.902) are higher than CI value (1.86). Chosen three group's muscular strength scores are illustrated in diagram-1.

Figure – 1: Chart Showing Muscular Strength of Chosen Groups



DISCUSSION

This study's results indicate that the kabaddi players from rural areas increased their overall fitness as a result of participating in a concurrent 12-week resistance and aerobic training program. These results are consistent with the supporting findings. Muscular strength (leg press) increased after joining the program. The improvements in strength endurance that the combined training in this test revealed are comparable to, or even more significant than, those reported in previous tests that used the same test, such as the 1 RM squat (Gravelle & Blessing, 2000; Hunter et al., 1987; McCarthy et al., 1995). Sale et al., (1990) reported no differences in strength improvements and upgrades between resistance training and concurrent training bunches in the 1 RM squat, with scores of 23 and 22 percent. The 1 RM leg press and 1 RM seat press increments in resistance training and concurrent training groups also closely resemble the degree of advancement reported by earlier experts (Hennessy & Watson, 1994; Kraemer et al., 1995; McCarthy et al., 1995). According to McCarthy et al., (1995), the strength increases in the concurrent group were comparable to the increases in the resistance training group alone.

The findings of this study imply that the muscular strength of rural kabaddi players are positively impacted by twelve weeks of combined resistance and plyometric training. The use of weight training in conjunction with plyometric activities to enhance overall muscle power and vertical leaping ability is supported by a study conducted in 2000 by Fatouros et al., and Toumi et al., (2004) found that athletes who received combination training significantly improved their height jump performance (muscle strength) during the countermovement leap. Burger and colleagues (2000) looked at the efficacy of a complex training group in comparison to a group that completed all of the weight training exercises following the plyometric activities in another training study assessing complex training. In terms of body fat percentage, bench press, squat, power clean and medicine ball throw both groups showed progress. In contrast to the non-complex training group, the complex training group showed appreciable improvements in muscular strength between groups.

CONCLUSION

After 12 weeks of treatment, concurrent (6.07%) and complex training (9.92%), group’s muscular strength enhanced considerably. Although, complex training is much superior to concurrent training in developing muscular strength of male kabaddi players. The majority of evidence has demonstrated that concurrent and complex training can be used to simulate the overall demands of competition. From a practical perspective, concurrent and

complex training should be supplemented with more traditional conditioning to simulate the high-intensity demands of competition.

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