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Influence Of Weight Training And Combined Weight And Plyometric Training On Strength Endurance And Body Mass Index Among Male Kabaddi Players

Mr. Jakkartha Srishailam, Ph.D., Research Scholar

&

Dr. R. Venkatachalapathy, Associate Professor & Research Supervisor

Department of Physical Education, Annamalai University

Abstract

The purpose of the study was to find out the effect of weight training and combined weight and plyometric training, on strength endurance and body mass index. Forty five male kabaddi players aged between 19 and 25 years were selected for the study. They were divided into three equal groups, each group consisting of fifteen subjects in which two experimental groups and one control group, in which the group I (n=15) underwent weight training, group II (n = 15) underwent combined weight and plyometric training for three days (alternative days) per week for twelve weeks and group III, acted as control, which did not participate in any training apart from their regular kabaddi game practice. The subjects were tested on selected criterion variable as strength endurance and body mass index at prior to and immediately after the training period. For testing the strength endurance, the sit-ups test was used and body mass index was found out after applying the Quetelet index. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between the experimental groups and control group on selected criterion variable separately. Since there were three groups involved in the present study, the Scheffé S test was used as post-hoc test. The selected criterion variables such as strength endurance was improved significantly and body mass index was significantly decreased for all the training groups when compared with the control group. But it was found that there was no significant found between the training groups on selected criterion variables.

Key Words: weight training, combined weight and plyometric training, strength endurance and body mass index.

INTRODUCTION

Exercise has a greater physical impact when accompanied with scientifically sound studies or experience. Sports science investigates the type of training that improves athletes' talents. Studying a variety of topics helps to improve coaching philosophy and approaches. Under the science of training, players work for their coach or sports scientists, who have access to as much information as possible.

Physical activity induces physiological, anatomical, metabolic, and psychological changes. It enhances an individual's performance by varying the length, intensity, tempo, load, frequency, and repetition of workouts. Because functional and psychological characteristics will be presented during competition, a dynamic training regimen should incorporate predetermined components. To attain this goal, the number of hours spent training in a session or period leading up to a competition should be confined to physiological, psychological, or physical characteristics (Zatsiorsky, 1995).

Kalf and Arnheim (1963) describe training as a systematic process of learning and acclimatisation that requires incremental work over time. The word "training means" refers to a range of physical activities, as well as other items, techniques, and procedures used to create, maintain, and restore preparation and performance capability.

In order to improve athletic performance and compete in a variety of sporting events, sports tutoring is based on a planned, organised, and scientifically structured educational approach that affects performance ability and preparation. The goal of a training program is to increase a player's capacity and endurance while getting them ready for a particular competition. The ability of the athlete to execute motor actions with different levels of strength, speed, resistance, and skill in order to complete individual and group tasks—the divisions of sports training technique—was initially used to determine the intensity of sports training in any athletic event (Simon, Mihaila, and Stanculescu, 2011).

The best results from strength training come from consistent intervals, a healthy diet, adequate recovery, and a progressive increase in exercise intensity (overload). Compared to endurance exercise, weight training burns fewer calories. Although its ability to lower body weight is limited, it will promote muscular growth. This does not imply that the athlete will become rigid or lose their freedom of movement. Muscles develop strength and explosive force in addition to moving at a constant speed (Fox, 1989).

Numerous studies have demonstrated that resistance training causes muscle fibres to increase their cross-sectional area and force-generating potential (Moore et al., 2004). Hypertrophic and neuro adaptations are commonly used to increase the pace of force generation and create structural changes in muscle morphology (Verkhoshansky, 2006). Furthermore, plyometric and power training are essential for improving muscular performance throughout the stretch shortening cycle (Komi, 2000). In conclusion, adaptations to strength training increase muscle power output, broaden the body's capacity for energy-producing systems, and improve motor power potential in competitive circumstances.

Plyometrics, which aim to boost power output, is derived from two Greek words: plio, which means more, and metric, which means to measure (Whyte, Spurway, and MacLaren, 2006). Furthermore, it

increases the potential of early concentric forces and makes the athlete more resistant to stronger eccentric muscle pressures. Plyometric training maximises an athlete's benefits in high-speed and high-power activities (Knudson, 2007). It employs the stretch shortening cycle, which consists of an instantaneous concentric contraction after a rapid eccentric contraction (Porter, 2013). This workout routine is intended to improve power output, coordination, and rapid neuromuscular responses at maximum intensity and velocity.

It is an optional program aimed to enhance athletic performance and decrease musculoskeletal injuries (Kisner, Colby, & Borstad, 2017). Furthermore, it necessitates stepping up, side lunging, single-leg pushing, and jumping or hopping (Kraemer and Hakkinen, 2008).

Workouts like the heel lift and straight leg leap, lunge and split jump, bench press, and plyometric push-up are examples of partnered workouts that target the same muscle group. The weight used in these exercises must be more than 70% of one repetition maximum (1RM) in order to target muscular fibres that provide power, speed, and fast twitch. To increase physical strength and perform at their best in sports, athletes must combine plyometric and weight training. Plyometric exercise and high-load weight training both cause physiological alterations that support the growth of athletic power (Ebben and Blackard, 1997).

Ancient India is where kabaddi first appeared. The game was played in a variety of ways around the nation. In Western India, it was called HU-TU-TU; in Eastern India and Bangladesh, it was called HA-DO-DO; in Southern India, it was called Chedugudu; and in Northern India, it was called Kanubada, among other names. It is said that the word "Kanubada," which translates to "challenge to the opponent," is where Kabaddi got its start. The three main game types are Sangeevini, Gemini, and Amar. With different rules, the game was played in accordance with the scenario. All of these variants were combined to create the modern form of kabaddi.

Methods

The goal of this study was to determine how weight training and combination of wight and plyometric exercise, affected strength endurance and body mass index. 45 male kabaddi players who were enrolled at various colleges, those who were represented in inter-collegiate tournaments, around Srisailam, Andhra Pradesh for the academic year 2024–2025 were chosen as subjects to fulfil the goal. They were divided into three equal groups of fifteen each and further divided as two experimental groups and one control group, in which the group I (n=15) underwent weight training, group II (n = 15) underwent combined weight and plyometric training for three days (alternative days) per week for twelve weeks, and group III (n=15) acted as control which did not participate in any special training apart from the regular kabaddi game practice.

There will be changes to the playing ability and systems with every training regimen. After consulting with the specialists, the researchers decided to use the following variables as criteria: 1. Strength endurance, 2. Body Mass Index.

Analysis of the Data

The differences, if any, between the corrected post test means on several criteria variables were examined independently using analysis of covariance. The Scheffé S test was used as a post-hoc test if the adjusted post test mean's "F" ratio was shown to be significant. To evaluate the "F" ratio discovered using analysis of covariance, the level of significance was set at 0.05 level of confidence.

Table – I

Analysis of Covariance and 'F' ratio for strength endurance and body mass index of weight training group, combined weight and plyometric training group, and control group

Variable Name	Group Name	Weight training Group	Combined weight and plyometric training Group	Control Group	'F' Ratio
Strength endurance (in Kg)	**Pre-test Mean ± S.D.**	68.00 ± 4.14	67.63 ± 3.68	67.07 ± 4.42	0.24
	Post-test Mean ± S.D.	70.13 ± 4.17	69.40 ± 3.68	66.93 ± 4.38	2.52
	Adj. Post-test Mean	69.806	69.138	67.522	33.65*
Body Mass Index (in w/h^2)	**Pre-test Mean ± S.D.**	20.52 ± 0.50	20.57 ± 1.06	20.71 ± 1.36	0.13
	Post-test Mean ± S.D.	19.53 ± 0.62	19.87 ± 1.08	20.69 ± 1.39	4.66*
	Adj. Post-test Mean	19.599	19.902	20.588	12.67*

* Significant at .05 level of confidence. (The table value required for significance at .05 level of confidence with df 2 and 42 and 2 and 41 were 3.21 and 3.23 respectively).

Table – I show that the strength endurance pre- and post-test "F" ratio value of 0.24 and 2.52 was less than the necessary table value of 3.21 for significant with df 2 and 42 at 0.05 level of confidence. For the adjusted post-test mean 'F' ratio value of 33.65 for the adjusted post-test scores was greater than the necessary table value of 3.24 for significant. The body mass index pre-test values 'F' ratio of body mass index value was 0.13 which was insignificant. For post-test and adjusted post-test mean 'F' ratio values of body mass index were 4.66 and 12.67 was greater than the necessary table value of 3.24 for significant. Further, to find out which training group has significant improvement on selected criterion variables, Scheffe S post-hoc test was applied and presented in table – II.

Table - II
Scheffĕ S Test for the difference between the adjusted post-test mean of strength endurance, and body mass index of training groups and control group

Weight training Group	Combined weight and plyometric training Group	Control Group	Mean Difference	Confidence Interval at 0.05 level
Adjusted Post-test Mean for Strength endurance				
69.806	69.138		0.668	0.722
69.806		67.522	2.284*	0.722
	69.138	67.522	1.616*	0.722
Adjusted Post-test Mean for Body mass index				
19.599	19.902		0.303	0.515
19.599		20.588	0.999*	0.515
	19.902	20.588	0.686*	0.515

* Significant at 0.05 level of confidence.

Results

The adjusted post-test mean difference in strength endurance between weight training group and control group and combined weight and plyometric training group and control group was 2.284 and 1.616, respectively, and these differences were significant at the.05 level of confidence, according to Table II. The table II also indicate that there was no significant difference was occurred between the training groups (0.175). Based on the study's findings, it can be said that weight training group and combined weight and plyometric training group considerably boost the strength endurance.

The adjusted post-test mean difference in goal body mass index between weight training group and control group, combined weight and plyometric training group and control group was 0.999 and 0.686, respectively, and these differences were significant at the .05 level of confidence, according to Table - II. The body mass index was not significantly differed between the training groups (0.303). Based on the study's findings, it can be said that weight training group and combined weight and plyometric training group significantly improved the body mass index.

Conclusions

After completing weight training and combined weight and plyometric training, the study's results shown a notable increase in selected criterion variables such as, strength endurance and body mass index. There was no statistically significant difference between the weight training group and the combined weight and plyometric training group. The findings of Jothi, Vinu and Eleckuvan, (2010) is in line with the present study, in which, strength training has improved the strength endurance. Ganie, Sheikh and Hayyat, (2016) found that there was a significant improvement in strength endurance after the combined strength and plyometric training. The results of the study show that both the weight training group and the combined weight and plyometric training group saw significant decrease in body mass index after completing their respective training regimens. Dewangga, et al. (2024) found that the weight training has

significantly decrease the BMI among obese women college students. Carvalho, Mourão and Abade, (2014) also found that there was a significant decrease in body mass content after the weight training.

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