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Investigation Of Changes In The Speed Of Basketball Players Due To The Isolated And Combined Effects Of Plyometric And Weight Training

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Abstract

This study investigated changes in the speed of basketball players due to the isolated and combined effects of plyometric and weight training. To achieve this purpose of the study, sixty basketball players from in and around Kottayam, Kerala, India, whose ages ranged between 18 and 25 years, were selected as subjects. The selected subjects were divided into four equal groups. Group – I - (n = 15) underwent plyometric training, group – II - (n = 15) underwent weight training, group – III - (n = 15) underwent combined training, and group – IV - (n = 15) acted as the control group which does not participate in any special training. This study's training program was carried out thrice weekly for twelve weeks. The selected dependent variable speed was measured by a 50m dash test before and after training. The assessed data of the four groups were calculated through ANCOVA statistics. When the 'F' (adjusted) score in ANCOVA was high, the post hoc (Scheffe's) test was followed. A confidence level of 0.05 was set. Due to the isolated and combined effect of plyometric and weight training, the speed of basketball players notably progressed; however, the combined training group was much superior to the plyometric and weight training group in improving the speed of basketball players. The weight training group was much superior to the plyometric training group in improving the speed of basketball players.

Keywords: Plyometric training, Weight training, Basketball, Speed

INTRODUCTION

Basketball is an athletic game that involves its participants in a range of demanding motor skills. These skills vary in kind, from being able to run quickly with precision and good timing on a small, sometimes congested court area to the fine hand-eye coordination skills of catching and dribbling, shooting, or passing what appears to be quite a large basketball.

Plyometrics, by definition, is a type of exercise using explosive movements to develop muscular power, esp. bounding, hopping, and jumping. This is a somewhat narrow interpretation. Plyometrics or "Shock method training" is the term now applied to exercises rooted in Russia, where it was first known simply as jump training drills. Weight training is an essential aspect of sports or physical body training, and everybody knows its effects on the body's muscles and tendons. Many researchers and analysts also

believe that weight training with the right cardio exercises is known to reduce and control hypertension and support the cardiovascular health functions of the body. The most significant benefit of weight training on the body is the creation of lean body mass, which helps burn calories.

Speed is one of the key components of an individual's physical abilities, mainly dependent on the highest velocity that can be reached to some distance. It is the capability to accomplish sequential movements of the same work at faster rates. Speed is one of the most important physical fitness components, essential for many physical activities. Speed is essential in basketball for shooting and travelling from one corner to the forecourt.

Statement of the Problem

This study investigated changes in the speed of basketball players due to the isolated and combined effects of plyometric and weight training.

METHODOLOGY

To achieve this purpose of the study, sixty basketball players from in and around Kottayam, Kerala, India, whose ages ranged between 18 and 23 years, were chosen as subjects. The selected subjects were divided into four equal groups. Group – I - (n = 15) underwent plyometric training, group – II - (n = 15) underwent weight training, group – III - (n = 15) underwent combined training, and group – IV - (n = 15) acted as the control group which does not participate in any special training. This study's training program was carried out thrice weekly for twelve weeks. The selected dependent variable speed was measured by a 50m dash test before and after training.

Statistical Technique

Analysis of covariance (ANCOVA) was employed as a statistical approach to ascertain whether there was, in fact, a significant difference between the data from the chosen dependent variable's pretest and post-test. Scheffe's post hoc test was used after the computation of Ancova to differentiate the mean differences of each group. The accepted level of significance was P 0.05.

Table –i

Ancona on Speed of plyometric training, weight training, combined training and control groups

	PTG	WTG	CTG	CG	SOV	SS	df	MS	'F'
Pre-test mean	7.6880	7.7120	7.7187	7.7260	**B**	.012	3	.004	0.934
SD	.04395	.05797	.09425	.05692	**W**	.244	56	.004	
Post-test mean	7.6373	7.6120	7.5687	7.7260	**B**	.198	3	.066	14.973*
SD	.04399	.05797	.09425	.05889	**W**	.247	56	.004	
Adjusted post-test mean	7.661	7.611	7.561	7.711	**B**	.187	3	.062	23.747*
					W	.001	55	.005	

(The table values of 2.78 and 2.77 were needed for significance at the 0.05 significance level with df 3 and 36 and 3 and 55.)

Table I displays the mean pre-test scores for the following: 7.6880, 7.7120, 7.7187, and 7.7260 for the plyometric training, weight training, combined training, and control group,

respectively. Pre-test scores yielded an "F" value of 0.934, less than the 2.78 "F" value, which needed to be significant at the 0.05 level. This demonstrates no appreciable differences between the groups at the beginning and that the players' random assignment into four groups was successful. Examining the post-test scores demonstrates notable differences between the groups; the obtained "F" value of 14.973 is higher than the necessary "F" value of 2.78. This proves that there is a significant difference among the post-test means of the subjects. Adjusted mean scores are computed and statistically treated, considering the group's pre- and post-test results. The necessary table "F" value of 23.747 exceeds the obtained "F" value of 2.77. This demonstrates that the twelve weeks of varied training on speed caused a significant difference among the adjusted means.

Scheffe's confidence interval test may be used for post hoc data analysis because the findings show a considerable improvement. The findings are shown in Table II.

Table-ii

Post hoc test scores on speed

PTG	WTG	CTG	CG	M.D	C.I
7.661	7.611	--	--	0.05*	0.0136
7.661	--	7.561	--	0.1*	
7.661	--	--	7.711	0.05*	
--	7.611	7.561	--	0.05*	
--	7.611	--	7.711	0.1*	
--	--	7.561	7.711	0.15*	

**Significant at 0.05 level.*

A significant difference is discovered because the obtained values exceed the needed value of 0.0136, and the confidence interval must be necessary at 0.05 levels. Figure I provides a bar graphic that illustrates the ordered adjusted means of speed to help understand the study's findings.

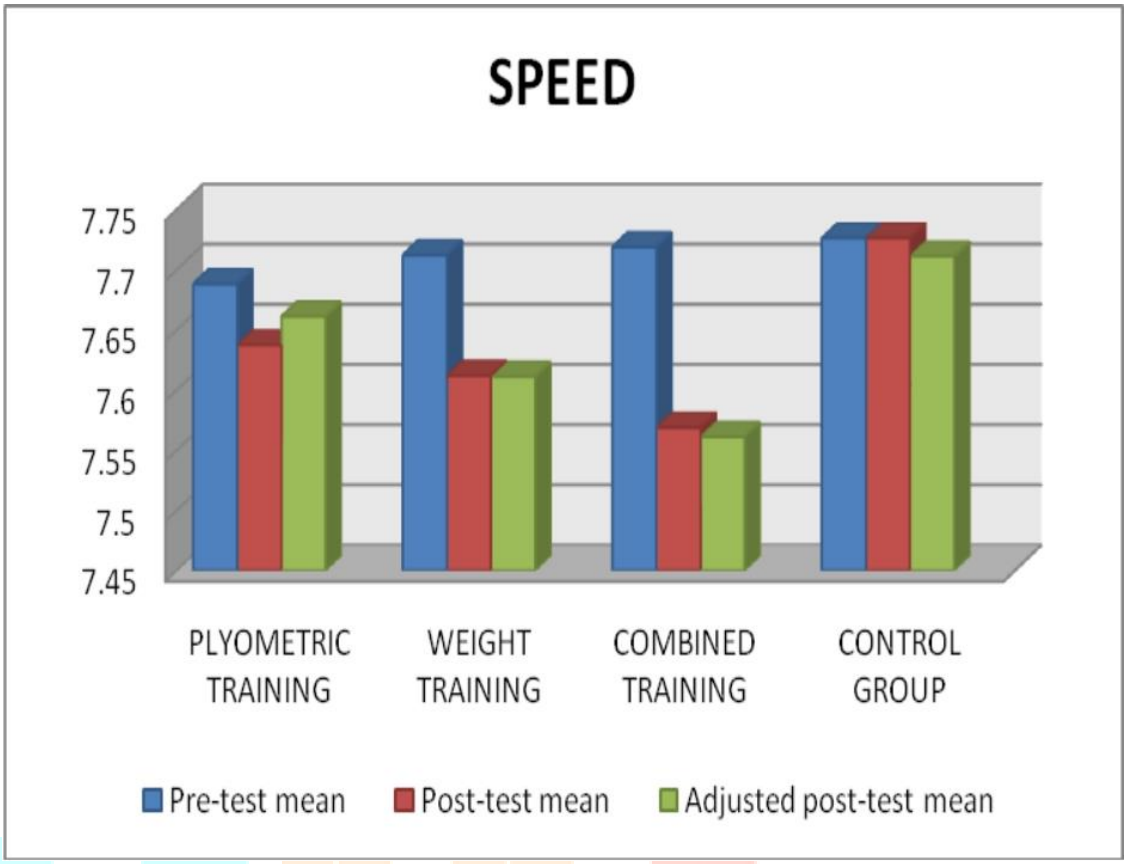

Figure I –Mean values on speed of isolated and combined plyometric training and weight training group and control groups

Discussion

This study's findings confirm that systematic training treatments markedly improve quickness in basketball players. The research indicated that plyometric, weight, and combination training resulted in significant enhancements in speed relative to the control group, with the combined training group exhibiting the most pronounced changes. This corresponds with the findings of Omorczyk et al. (2017) and Paktas (2021), who highlighted the efficacy of diverse training methodologies in improving overall athletic performance. Plyometric training, recognised for enhancing neuromuscular efficiency and explosive power, proved helpful but was less effective than weight training in this investigation, aligning with the findings of Cigerci & Genc (2020). The finding that weight training surpasses plyometric training in boosting speed corroborates Kumar & Yadav (2018), who emphasised the significance of resistance training in augmenting force output, thereby enhancing sprint performance. The 12-week intervention length corresponds with other research, including Anitha et al. (2018), which showed that comparable training periods resulted in notable physical enhancements in volleyball players. Nevertheless, several studies, such as Nagaraja & Prabhu (2017), demonstrate that brief treatments, such as eight weeks, can produce substantial improvements, indicating that more studies are necessary to ascertain the ideal time for speed enhancement in basketball players. The notable enhancements shown in the combined training group support the idea that strength and explosive training are mutually beneficial, with weight training establishing fundamental strength and plyometrics improving power application, resulting in enhanced sprinting performance. This corroborates earlier research in sports science indicating that diversified training methodologies are optimal for enhancing sport-specific speed. The results include significant practical implications for basketball training regimens, emphasising the necessity of using both strength and plyometric activities instead of depending only on a single approach. Coaches and trainers may utilise this knowledge to develop conditioning programs that optimise speed enhancement, guaranteeing that athletes cultivate both muscular power and swift movement efficiency. This study concentrated on basketball players aged 18-23; however, subsequent research might investigate the impact of analogous training regimens on younger or older athletes to ascertain if age affects training adaptations. Furthermore, examining the influence of these training methods on additional performance metrics, including agility, endurance, and reaction time, would augment the relevance of these findings to basketball and other dynamic sports. This study provides significant insights into speed training for basketball players and highlights the efficacy of integrating plyometric and resistance training for enhanced athletic performance.

Conclusion

The study's conclusion indicated an enormous improvement in speed for the three training groups in contrast with the control group. In addition, the results of the tests show a significant difference between the experimental groups and the control group in terms of speed. Due to the isolated and combined effect of plyometric and weight training, the speed of basketball players notably progressed; however, the combined training group was much superior to the plyometric and weight training group in improving the speed of basketball players. The weight training group was much superior to the plyometric training group in improving the speed of basketball players.

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