



Study of the Effect of Weight and Circuit Training on Players Speed

Gamit Indiraben Babubhai

Ph.D. Scholar

Veer Narmad South Gujarat University,
Surat

Dr. Ketan R. Nizama

(Principal)

Akm Science & Commerce college,
Tarsadi, Surat

Abstract : The present investigation was undertaken to determine the influence of weight training and circuit training on the speed performance of Kabaddi players. For the purpose of the study, 90 Kabaddi players between 14 and 17 years of age were selected randomly as participants. The selected players were divided into three equal groups, comprising 30 players in the weight training group, 30 players in the circuit training group, and 30 players in the control group. The speed ability of the participants was assessed through the 50-yard running test. To examine the differential effects of the two training programmes, the data were statistically analysed by applying a one-way Analysis of Covariance (ANCOVA). The significance of differences among the adjusted group means was determined at the 0.05 level of significance. Subsequently, the Least Significant Difference (LSD) Post Hoc test was employed to identify the specific group differences. The results obtained from the statistical analysis were as follows. The subjects selected from the twelve (12) week weight training and circuit training program showed significant improvement in speed.

Introduction :

Speed is one of the most important components of physical fitness and sports performance. It refers to the ability of an individual to perform a movement or cover a given distance in the shortest possible time. In many competitive sports such as athletics, football, basketball, volleyball, kabaddi, hockey and handball, speed plays a vital role in determining the effectiveness of a player. A player with better speed can move quickly, respond to changing situations, reach the ball or opponent faster, and perform sport-specific skills more efficiently. Therefore, the development of speed has become an important objective of systematic sports training.

Speed is influenced by several factors, including muscular strength, explosive power, neuromuscular coordination, reaction ability, flexibility, body composition and technique. Among these factors, muscular strength and power are particularly important because rapid movement requires the muscles to produce force in a short period. Weight training is a widely used method for developing muscular strength and power. It involves performing exercises against external resistance, such as free weights, weight machines or other forms of resistance. Progressive weight training can improve the force-producing capacity of muscles and may consequently contribute to improved acceleration and sprint performance. Strength training provides an important foundation for the development of power and speed in athletes.

Circuit training is another effective method of physical conditioning. It consists of a series of exercises arranged at different stations and performed consecutively, with planned work and recovery intervals. Circuit training can simultaneously develop several components of fitness, including muscular strength, muscular endurance, power, agility and cardiovascular endurance. Because exercises can be selected according to the requirements of a particular sport, circuit training provides a flexible and systematic approach to athletic conditioning. It also enables athletes to perform a relatively large amount of training within a limited period.

The relationship between strength development and speed performance has received considerable attention in sports training. Resistance exercises can improve neuromuscular function and the ability to apply force against the ground, which are essential characteristics of sprinting and other rapid movements. However, the effect of training may depend on the type, intensity, volume, frequency and duration of the programme, as well as the training experience of the players. Therefore, an appropriately designed training programme is necessary to obtain desirable improvements in speed.

Circuit training may offer an additional advantage because it combines different physical exercises in an organized sequence. Exercises such as squats, lunges, jumping movements, shuttle runs and other resistance-based activities can be incorporated to stimulate the muscular and neuromuscular systems required for faster movement. According to Fleck and Kraemer (2014), resistance training can produce adaptations that are relevant to athletic performance when the programme is appropriately designed and progressively administered.

Accordingly, the present investigation was undertaken to determine the effects of weight training and circuit training programmes on the speed performance of players. The study may help determine whether systematic weight training and circuit training can produce meaningful improvements in speed performance. The findings may also provide useful guidance to physical education teachers, coaches and sports trainers in selecting appropriate conditioning methods for improving speed among players.

Purpose and Objective of the Investigation:

The present investigation was conducted to assess the impact of weight training and circuit training on the speed performance of players.

Selection and Recruitment of Participants:

The participants for the present investigation were Kabaddi players between 14 and 17 years of age. A sample of 90 players was selected through a random sampling procedure. The selected participants were equally distributed among three groups, with 30 players assigned to the weight training group, 30 players to the circuit training group, and the remaining 30 players to the control group.

Assessment Criteria and Measurement Procedures

Sl.	Variable	Test	Measurement
1	Speed	50 Yard Desh Run	Second

Research Design and Methodological Framework

The participants were randomly assigned to three equal groups, with 30 subjects in each group. Prior to the training intervention, a pre-test was administered to determine the speed performance of all participants. Subsequently, Group A underwent a structured weight training programme, while Group B participated in a cyclical training programme for a period of 12 weeks. Group C did not receive any specific training intervention and served as the control group. Upon completion of the 12-week training period, a post-test was conducted for all three groups to assess the changes in speed performance.

Statistical Analysis and Data Processing

The effects of the weight training and circuit training interventions were evaluated through a one-way Analysis of Covariance (ANCOVA). The adjusted mean scores of the groups were examined for statistical significance at the 0.05 level, and the Least Significant Difference (LSD) Post Hoc procedure was subsequently employed to identify significant differences between the group means.

Results Obtained Through the Investigation:

Table - 1

“Covariance-Based Analysis of Speed Performance Across Two Experimental Groups and a Control Group”

Test	Group			Variation covariance analysis				
	Weight Training	Circuit Training	Controlled	Sum of square (SS)		Degree freedom (df)	Mean sum of square (MSS)	F
Per test Mean	9.981	9.631	9.781	A	0.255	2	0.129	0.161
				W	38.341	87	0.671	
Post test Mean	10.806	10.562	10.509	A	16.006	2	8.609	19.682*
				W	45.867	87	0.761	
Adjusted Mean	9.903	9.778	10.719	A	16.198	2	8.791	23.846*
				W	65.387	86	0.662	

*Significance level 'F' = 0.05 (2,87) = 3.101 & (2,86) = 3.103 at 0.05 level

The findings presented in Table 11 indicate that the obtained 'F' ratio for the pre-test scores of speed test performance was 0.161. Since this value was lower than the corresponding table value of 3.101, the difference among the three groups was not statistically significant at the 0.05 level. However, the 'F' ratio obtained for the final-test scores was 19.682, which exceeded the required table value of 3.101 and, therefore, indicated a statistically significant difference among the groups at the 0.05 level. This result suggests that the respective training programmes contributed significantly to the improvement in the speed performance of the participants. Further, the analysis of the adjusted post-test means yielded an 'F' ratio of 23.846. As this value was greater than the table value of 3.103, the difference among the adjusted group means was statistically significant at the 0.05 level. Thus, the adjusted mean scores demonstrated a significant difference in speed performance among the two experimental groups and the control group. To determine the specific differences between the adjusted means and to identify whether weight training or circuit training produced greater improvement in speed performance, the adjusted mean differences were further examined using the critical difference criterion. The results of this post hoc comparison are presented in Table 2.

Table - 2

Critical Difference Analysis of Speed Test Mean Scores Among the Two Experimental Groups and the Control Group

Mean			Mean Different	Critical Different
Weight Training	Circuit Training	Controlled		
9.903	9.778		0.125	0.372
9.903		10.719	0.816*	
	9.778	10.719	0.941*	

*Significance level at 0.05 level

Table 2 presents the comparison of the adjusted mean scores obtained by the two experimental groups and the control group in the speed test. The mean differences reported in the table represent the pair-wise comparisons between the weight training and circuit training groups, the weight training and control groups, and the circuit training and control groups. By comparing these mean differences with the corresponding critical difference value, the effectiveness of the respective training programmes can be determined across the groups. The comparison revealed that the difference in speed performance between the two experimental groups was not statistically significant. This indicates that neither weight training nor circuit training demonstrated a significantly greater effect over the other experimental programme. In contrast, significant differences were observed when each experimental group was compared independently with the control group. Hence, both weight training and circuit training were found to produce a significant improvement in the speed performance of the participants when compared with the control group.

Conclusion :

- The selected subjects demonstrated a statistically significant improvement in speed following the twelve-week weight training and circuit training programmes.

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