

ASSESSMENT OF CONCURRENT AEROBIC AND RESISTANCE TRAINING AND DETRAINING IMPACT ON GAME SKILL OF BASKETBALL PLAYERS

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ABSTRACT

The aim of this research work is to inspect the influence of concurrent aerobic and resistance training and detraining impact on game skill performance of basketball players. To attain the study purpose, forty male inter-collegiate level basketball players from different colleges affiliated to Christ University, Bangalore, Karnataka state, India were considered as participants. The chosen basketball player's age, was ranged from 18 to 23 years. The chosen basketball players were randomly allocated into two equivalent groups of 20 basketball players in both. Group-I basketball players performed concurrent aerobic and resistance training whereas group-II basketball players were acted as control. After the completion of twelve-weeks training period the subjects of group-I and II were physically detrained for thirty days. The data collected pre, post experimentation and during detraining were statistically analyzed by using two way (2 x 5) factorial ANOVA with last factor repeated measures. Statistical analysis found significant improving in gamer skill performance due to concurrent aerobic and resistance training and significant decline during detraining period.

Keywords: *Concurrent training, Detraining, Game skill and Basketball players.*

INTRODUCTION

Basketball game has been depicted as an intermittent sport that is physically very demanding, requiring players to frequently repeat bouts of intense actions (sprinting, shuffling, jumping) with jogging, walking, or short periods of recovery (Drinkwater, Pyne & McKenna, 2008; Conte et al., 2015). Thus, elite basketball players show specific anthropometric (Ben-Abdelkrim, El-Fazaa & El-Ati, 2007) and physical performance characteristics (Hoffman et al., 2000) that can affect their game strategy and, consequently, their success in competitions. Therefore, a certain level of physical fitness is essential to the correct execution of a technique as well as to sustain the technical-tactical regimens required to achieve a high performance level (Moreira, 2008).

The enhancement of motor skills, regulations and psychomotor processes are the special requirements for all the success in various group and individual sports. There is a need to quench the thirst of athletes that they require an intensive training load, in order to face dynamic sports like basketball. The level of confidence which the player had in the field and

the concentration of the nuances of the games may support the player to achieve a successful play in a cool and relaxed state. The intellectual focus to the core play will help to reach the victory finally. Especially in basketball, presence of mind and the speed trail of decision may lead the team to get the success. The speed of the game and the skilful handling will ultimately help to predict the result of the game. Psycho-physiological research has helped to withstand the relationship between physiological activity and psychomotor efficiency (Bazonava & Shtark, 2007).

Although numerous research studies have been conducted on the effects of resistance training, and aerobic training, limited number study was found that addresses the combined effects of above mentioned training to progress basketball player's game performances. Consequently, the researcher was paying attention to explore the effectiveness of concurrent aerobic and resistance training protocols on skill performance of basketball players.

Regarding detraining, there is a lack of investigation about their impacts on skill performance of basketball players. The available literature concerning basketball players is scarce on these domains (detraining). It seems reasonable to hypothesize that concurrent training increases skill performance of basketball players and that detraining periods will have some impacts in the maintenance of fitness levels. Consequently, the aims of the present study were to determine the effects of (a) concurrent training on skill performance of basketball players and (2) detraining impact on skill performance increases previously attained.

METHODOLOGY

To attain the study purpose, forty male inter-collegiate level basketball players from different colleges affiliated to Christ University, Bangalore, Karnataka state, India were considered as participants. The chosen basketball player's age, was ranged from 18 to 23 years. The chosen basketball players were randomly allocated into two equivalent groups of 20 basketball players in both. Further, the researcher was interested in finding out the detraining impact on game skill (passing ability). The data on game skill (passing ability) was collected by administering 'Johnson Basketball Ability Test' battery. Pretest data were collected prior to the training programme and posttest data were collected immediately after the twelve-weeks of training programme from both the experimental and control groups. During the detraining period the data were collected once in ten days for 30 days from both the experimental and control groups.

Training Protocol

The experimental group performed concurrent aerobic and resistance training. The resistance training routine was a full-body workout that involved three sets of six exercises with six repetitions each, working all the major muscle groups. The intensity of each week was calculated as a percentage of the one repetition maximum for each exercise for each subject. The aerobic training protocol consists of 2minutes continuous running with planned repetition as well as sets at 60- 80%HRR. Running intensity was determined by a percentage of heart rate reserve (HRR). The intensity was increased as training progressed. Concurrent aerobic and resistance training group performed resistance training during every odd numbered week and aerobic training during every even numbered week After the completion of twelve-weeks training period the subjects of group I and II were physically detrained for thirty days.

Statistical Technique

The data collected from the two groups prior to and post experimentation and during detraining were statistically analyzed by using two way (2 x 5) factorial ANOVA with last factor repeated measures. The simple effect and the Scheffe's test were used as follow up and post hoc test. The analysis of data on game skill (passing ability) is presented in table-I to V.

RESULTS

The basketball game skill (passing ability) data obtained during 5 different testing periods from the two groups, were analyzed and the derived mean values and standard deviation scores are shown in table-I.

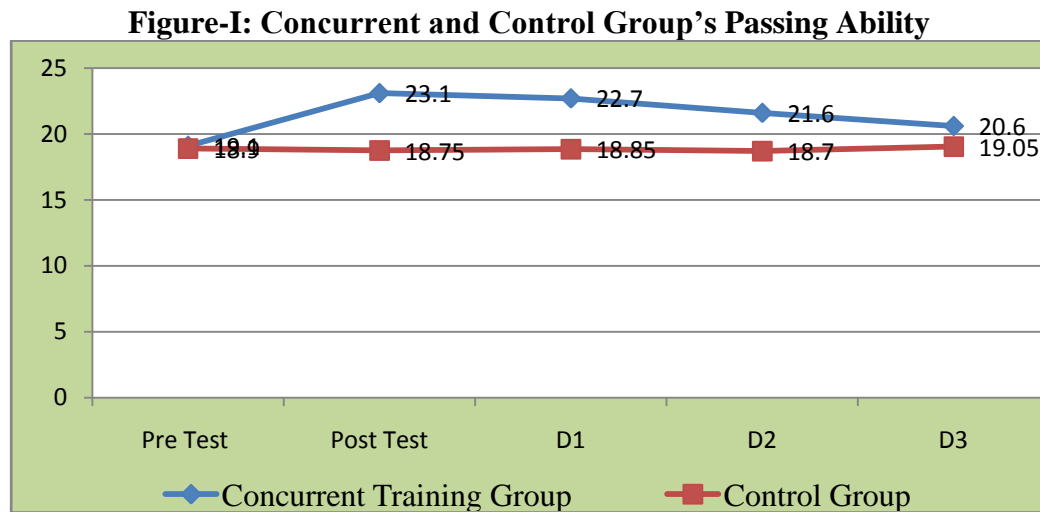
Table-I: Descriptive Analysis Results on Passing Ability of Concurrent and Control Groups

		before and after Training		Tests during Detraining Period		
Groups		Pre	Post	First	Second	Third
Concurrent Training Group	Mean	19.10	23.10	22.70	21.60	20.60
	S.D	1.48	1.48	1.12	1.23	1.23
Control Group	Mean	18.90	18.75	18.85	18.70	19.05
	S.D	1.37	1.61	1.56	1.71	1.76

The concurrent group's game skill (passing ability) mean values and standard deviation scores of pre, post and three detraining period data are 19.10 ± 1.48 , 23.10 ± 1.48 , 22.70 ± 1.12 , 21.60 ± 1.23 and 20.60 ± 1.23 . Similarly, the control group's basketball throwing

accuracy mean values and standard deviation scores of pre, post and three detraining period data are 18.90 ± 1.37 , 18.75 ± 1.61 , 18.85 ± 1.56 , 18.70 ± 1.23 and 20.60 ± 1.23 .

The chosen all two group's found mean values on game skill (passing ability) are displayed graphically in figure-I.



In order to verify the impact of detraining, all the two preferred group's collected passing ability data during five various testing periods were further calculated by two(2x5) way factorial (2x5) ANOVA as in table- II.

Table –II: Results of Two Factor ANOVA on Passing Ability of Groups at Different Tests

Source of Variance (SoV)	Sum of Squares(SS)	df	Mean Squares (MS)	Derived "F" ratio
Factor-I(Groups)	330.24	1	330.24	61.18*
Group Error	205.11	38	5.39	
Factor-II(Tests)	96.73	4	24.18	22.09*
Factors- I&II (Interaction) (Groups & Tests)	115.73	4	28.93	26.54*
Error	207.54	190	1.09	

[Table values for df 1&38, 4&190 are 4.10 & 2.37 (.05level)]

This ANOVA statistics results authenticate that the factor-I 'F' value 61.18 (df=1&38) is better ($61.18 > 4.10$) than needed table value(4.10). Likewise, the factor-II 'F' value 22.09 (df=4&190) is also better ($22.09 > 2.37$) than needed table value (2.37). It substantiate that, irrespective of all tests the game skill (passing ability) of the concurrent as well as control

groups basketball players differ from one another. Similarly, irrespective of groups the basketball player's game skill (passing ability) differs among all five tests.

Further, the 'F' value (26.54) acquired for Interaction effect is also better ($26.54 > 2.37$) than the table value 2.37 required for df 4 & 190 at .05 level. This result on basketball throwing accuracy confirm that, major deviation subsist between each tests of both groups and also among tests of within every group.

Then the simple effect test was applied and the final outcomes are accessible in table-III.

Table-III: Simple Effect Test Results of Groups at Different Tests on Passing Ability

Source of Variance (SoV)	Sum of Squares (SS)	df	Mean Squares (MS)	"F" ratio
Groups at Pretest	0.40	1	0.40	0.37
Groups at Posttest	189.22	1	189.22	173.60*
Groups at 1 st detraining	148.22	1	148.22	135.98*
Groups at 2 nd detraining	84.10	1	84.10	77.16*
Groups at 3 rd detraining	24.02	1	24.02	22.04*
Tests of Group- I	210.96	4	52.74	48.39*
Tests of Group-II	1.50	4	0.37	0.34
Error	207.54	190	1.09	

[Table values for df 1&190, 4&190 are 3.84 & 2.37 (.05level)]

The derived follow-up test result ('F' ratio) for post test of two groups (173.60), both groups during first detraining stage (135.98), both groups during second detraining stage (77.16), and both groups during third detraining stage (22.04) are superior (> 3.84) to the needed table value 3.91 for significant. Thus, the game skill (passing ability) scores of both group basketball players be different during the pre, post and detraining periods. The derived follow-up test result ('F' ratio) for pre test of two groups (0.37) did not differ significantly.

While comparing all five tests within each groups independently, the calculated 'F' value (48.39) for tests within concurrent training group is superior ($48.39 > 2.37$) but, all five tests within control group 'F' (0.34) is lesser than the needed table value 2.37 for significant. Consequently, all five tests within concurrent training group vary noticeably while; all five tests within control group didn't be different on game skill (passing ability). As the derived 'F' ratio outcome is much greater, the post hoc test statistical procedure was followed (table-IV).

Table – IV: Scheffe's Test Results of Concurrent Training Group at Different Tests on Passing Ability

Training Period		Detraining Period			MD	CI
Pre	Post	I	II	III		
19.10	23.10				4.00*	0.51
19.10		22.70			3.60*	0.51
19.10			21.60		2.50*	0.51
19.10				20.60	1.50*	0.51
	23.10	22.70			0.40	0.51
	23.10		21.60		1.50*	0.51
	23.10			20.60	2.50*	0.51
		22.70	21.60		1.10*	0.51
		22.70		20.60	2.10*	0.51
			21.60	20.60	1.00*	0.51

*Significant(.05 level)

The basketball player's enhanced basketball passing ability due to training (concurrent) were sustained during the first(10days) detraining period afterwards it was started decline towards pre test value from the 2nd (20days) detraining stage.

DISCUSSION

Present findings besides established that 12 weeks of concurrent aerobic and resistance training had positive effects on selected skill performance variables such as basketball throw for accuracy, dribbling ability and shooting ability of basketball players. The presented concurrent aerobic and resistance training programs, can and should be individually corrected and applied in practice. In conclusion, basketball coaches should consider including concurrent aerobic and resistance training into their strength and conditioning programmes because it seems to be a successful technique to enhance basketball players' quickness and acceleration as well as skill performance. The findings of this study are significant in terms of basketball competition performance. These details could be useful to basketball coaches as they organize preseason practice sessions. Basketball players may see a decline in power and skill performance during the in-season if concurrent aerobic and resistance training is not properly planned. Coaches could make training more focused in order to speed up the transfer of training benefits to game performance for optimum basketball conditioning.

Concurrent training (CT) researchers have recently attempted to understand its effects by examining the detraining phase following a CT programme (Sousa et al., 2019; Sousa et al., 2018; Joo, 2018). Only three researches examined the impact of CT intensities during

training pause during the detraining period (Joo, 2018; Sousa et al., 2018). These investigations show that a brief detraining phase (2-4 weeks) may undermine the training-induced improvements, resulting in a return to baseline levels. A 4-week break from training following CT with various resistance or aerobic training loads deteriorate the training-induced improvements in young men, as shown by Sousa et al., (2018 & 2019). Only 2 weeks of detraining following a competitive season significantly reduced performance found in Joo's (2018) study. Accordingly, it can be inferred from the study's findings that concurrent aerobic and resistance training can be included in all training regimens for all sports to reach the highest level of performance. Additionally, skill performance adaptations are susceptible to inactivity periods; when detraining takes place, the increased performance returns to normal.

CONCLUSION

The results of the study showed significant improvement on game skill (passing ability) due to Concurrent training. It is also observed in the present study that throughout the detraining period, the gradual decline of game skill (passing ability) for Concurrent training group was found. However, the improved game skill (passing ability) of the participants were sustained only for 10 days during determining period, there after it was started decline towards the base line. Since gradual loss of training induced adaptations on game skill (passing ability) was found, it is suggested that the athlete must resume training within ten days of detraining.

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