



## EFFECTS OF COMBINATION OF ASSISTED AND RESISTED SPRINT TRAINING ON ANAEROBIC POWER AMONG MALE SOCCER PLAYERS

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### ABSTRACT

The aim of the study was to find out the effects of combination of assisted and resisted sprint training on anaerobic power among male soccer players. To achieve this purpose of the study, sixty college male soccer players from Udumalpet, Tirupur District, Tamilnadu, were selected at random as subjects. The age of the subjects was ranged from 18 to 23 years. The selected subjects were divided into four groups, Group - 1 those who underwent assisted sprint training (AST) Group - 2 those who underwent resisted sprint training (RST), Group - 3 those who underwent combined assisted sprint training (AST+RST) and Group - 4 was served as control participants.

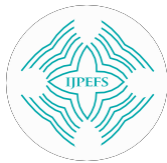
The anaerobic power was selected as dependent variable and it was measured by Margaria-Kalamen power test. All the subjects of four groups were tested on anaerobic power prior and immediately after the study period of nine weeks. ANCOVA was used to find out significant adjusted post test mean difference of four groups. The results of the study revealed that anaerobic power of the male soccer players significantly differ and found high in combination of assisted and resisted training than other groups, similarly comparison with control group also showed significant changes consequent to nine weeks of selected training programme. It is concluded that combination of assisted and resisted sprint training significantly improves the anaerobic power of male soccer players.

**Keywords:** Assisted Sprint, Resisted Sprint, Anaerobic power, Watts, ANCOVA

### Introduction

Physical training is exposing the organism to a training load or work stress of sufficient intensity, duration and frequency to produce a noticeable or measurable training effect, that is, to improve the functions for which training is aimed. To achieve such a training effect, it is necessary to expose the organism to an overload (i.e., a stress) that is larger than the one regularly encountered during everyday life. It is a common conception in training environments that “to build up, one must

first break down.” Admittedly, exposure to the training stress is associated with some catabolic processes, such as break down of glycogen, followed by an overshoot or anabolic response that causes an increased deposition of the molecules that were mobilized or broken down during training. As to the effect on other cellular components, this is the best an imprecise statement. Today, the molecular mechanisms involved in training responses have started to emerge, but the pictures are still far from complete. As a basis for studying the training



process, however, one can safely state that all cells and tissues of the body, regardless of the presence or absence the training, are subject to some kind of continuous exchange and remodeling.

On the cellular level, molecules have a restricted lifetime and are constantly replaced by new molecules of the same kind or by another isoform of the same molecules if so demanded by current activity level [1].

The game of Football demands a high level of fitness that will enable the players to run strongly, to move quickly off the mark in any direction to control, to pass accurately and to tackle efficiently throughout the game. Football requires a high standard of physical fitness along with skills. Since the game of Football is played for 90 minutes (if necessary an extra period of 30 minutes for the match ends in a draw in knock out tournament) it demands a high level of physical fitness and the training programme should be planned accordingly. The player in good physical condition is generally throughout to have the ability to do sustained work over a longer period. Football, at any age, is a physical game. It involves running.

## METHODS

### *Subjects and Variable*

Sixty (60) college male soccer players from Udumalpet, Tirupur District, Tamilnadu, were selected at random as subjects. The age of the subjects was ranged from 18 to 23 years. The selected subjects were divided into four groups, Group - 1 those who underwent assisted sprint training (AST) Group - 2 those who underwent resisted sprint training (RST), Group - 3 those who underwent combined assisted sprint training (AST+RST) and Group - 4 was served as control participants. The

It involves twisting and turning. It involves jumping, kicking, and tackling. In addition, as young players mature, the stresses and strains of the competitive environment become greater and greater. Football is fitness dominating sports along with technical and tactical skills [2]. Physical fitness is used to denote the sum five components like strength, speed, endurance, flexibility endurance and their complex form. Assisted Sprint Training (AST): Assisted or super maximal sprint training includes gravity assisted modalities, such as downhill sprinting and external tools such as high speed towing using a harness or stretch tubing and parachute release while at a maximum speed [3]. Resisted Sprint Training: Resisted sprint training (RST) includes gravity resisted modalities, such as uphill or upstairs sprinting and modalities designed to create an overload effect such as the parachute, sled, harness, or weighted vest [4]. In this study an attempt is made to find out the effects of combination of assisted and resisted sprint training on anaerobic power among male soccer players.

anaerobic power was selected as dependent variable and it was measured by Margaria-Kalamen power test.

### *Collection of Data and training interventions*

Before taking experimentation of study, the subjects were oriented about the purpose of the study. The investigator explained the testing procedure of assisted sprint, resisted sprint and combination of assisted and resisted sprint. The subjects had experienced these testing procedures several times before the commencement of the



experiment. Pilot study was conducted to assess the initial capacity of the subjects to fix the load and to design the training program. Three groups were given training concurrently for 5 sessions for nine weeks (Table 1, 2 & 3). The initial load of the subjects was fixed and the training programme for selected training was designed separately based on the performance in the pilot study. While

constructing the training programme the basic principles of sports training were followed. Each day the training schedule was conducted only in the morning session that lasted for ninety minutes. Prior to and after every training session players of experimental groups had given each ten minutes of warm –up and ten minutes of warm down exercise involving jogging, mobility and stretching exercise.

**Table 1**

**ASSISTED SPRINT TRAINING**

Drills	Repetition	Set	Recovery in between each drills	Recovery in between set
(1-3Weeks)				
Partner assisted Let-Go’s	10m x 3	3	2 Min	3 Min
Partner tubing – assisted acceleration drill	10m x3	3		
Towed running	10m x3	3		
“With the wind” speed runs	10m x3	3		
Partner tubing assisted speed runs	10m x 3	3		
(4-6 Weeks)				
Partner assisted Let-Go’s	10m x5	3	2 Min	5 Min
Partner tubing – assisted acceleration drill	10m x 5	3		
Towed running	10m x 5	3		
“With the wind” speed runs	10m x 5	3		
Partner tubing assisted speed runs	10m x 5	3		
(7-9 Weeks)				
Partner assisted Let-Go’s	10m x 7	3	2 Min	-
Partner tubing – assisted acceleration drill	10m x 7	3		
Towed running	10m x 7	3		
“With the wind” speed runs	10m x 7	3		
Partner tubing assisted speed runs	10m x 7	3		

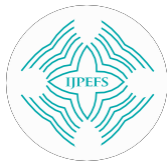


**Table 2**  
**RESISTED SPRINT TRAINING**

Drills	Repetition	Set	Recovery in between each drills	Recovery in between set
1-3 Weeks				
Partner Resisted Starts	10m x 3	3	2 Min	3 Min
Weighted Starts	10m x 3	3		
Sand running	10m x 3	3		
Light sled/Tire pulls	10m x 3	3		
Stadium stairs	10m x 3	3		
4-6 Weeks				
Partner Resisted Starts	10m x 5	3	2 Min	5 Min
Weighted Starts	10m x 5	3		
Sand running	10m x 5	3		
Light sled/Tire pulls	10m x 5	3		
Stadium stairs	10m x 5	3		
7-9 Weeks				
Partner Resisted Starts	10m x 7	3	2 Min	-
Weighted Starts	10m x 7	3		
Sand running	10m x 7	3		
Light sled/Tire pulls	10m x 7	3		
Stadium stairs	10m x 7	3		

**Table 3**  
**COMBINATION OF ASSISTED SPRINT TRAINING AND RESISTED SPRINT TRAINING**

Drills	Repetition	Set	Recovery in between each drills	Recovery in between set
Assisted Sprint Training - AST (1-3 Weeks)				
Partner assisted Let-Go's	5m x 3	3	2 Min	3 Min
Partner tubing – assisted acceleration drill	5m x 3	3		
Towed running	5m x 3	3		
“With the wind” speed runs	5m x 3	3		
Partner tubing assisted speed runs	5m x 3	3		
Resisted Sprint Training - RST (1-3 Weeks)				
Partner Resisted Starts	5m x 3	3		



Weighted Starts	5m x 3	3	2 Min	3 Min
Sand running	5m x 3	3		
Light sled/Tire pulls	5m x 3	3		
Stadium stairs	5m x 3	3		
Assisted Sprint Training - AST (4-6 Weeks)				
Partner assisted Let-Go's	5m x 5	3	2 Min	5 Min
Partner tubing – assisted acceleration drill	5m x 5	3		
Towed running	5m x 5	3		
“With the wind” speed runs	5m x 5	3		
Partner tubing assisted speed runs	5m x 5	3		
Resisted Sprint Training - RST (4-6 Weeks)				
Partner Resisted Starts	5m x 5	3	2 Min	5 Min
Weighted Starts	5m x 5	3		
Sand running	5m x 5	3		
Light sled/Tire pulls	5m x 5	3		
Stadium stairs	5m x 5	3		
Assisted Sprint Training - AST (7-9 Weeks)				
Partner assisted Let-Go's	5m x 7	3	2 Min	-
Partner tubing – assisted acceleration drill	5m x 7	3		
Towed running	5m x 7	3		
“With the wind” speed runs	5m x 7	3		
Partner tubing assisted speed runs	5m x 7	3		
Resisted Sprint Training - RST (7-9 Weeks)				
Partner Resisted Starts	5m x 7	3	2 Min	-
Weighted Starts	5m x 7	3		
Sand running	5m x 7	3		
Light sled/Tire pulls	5m x 7	3		
Stadium stairs	5m x 7	3		

### Statistical technique

The collected data was evaluated using Analysis of Covariance (ANCOVA). Beside this mean and standard deviation were also calculated. SPSS statistic software package (SPSS Company, America, version 17.0) was used. The  $\alpha$  value of 0.05 was set for statistical significance.

### Results

The pre test mean and standard deviation on anaerobic power scores of G1, G2, G3 and G4 were  $971.33 \pm 16.42$ ,  $977.33 \pm 11.00$ ,  $973.33 \pm 14.47$  and  $972.00 \pm 13.73$  respectively (Table 4). The obtained pre test F value of 0.55 was lesser than the required Table F value of 2.68. Hence the pre test means value of assisted sprint; resisted sprint



and combination of assisted and resisted sprint and control group on anaerobic power before start of the respective treatments were found to be insignificant at 0.05 level of

confidence for the degrees of freedom 3 and 56. Thus this analysis confirmed that the random assignment of subjects into four groups were successful.

**Table 4**  
**ANALYSIS OF COVARIANCE ON ANAEROBIC POWER OF DIFFERENT GROUPS (Scores in Watts)**

Testing Conditions		Group 1 (AST)	Group 2 (RST)	Group 3 (AST+RST)	Group 4 (CP)	S V	SS	D f	MS	F
Pre test	Mean	971.33	977.33	973.33	972.00	B	325.00	3	108.33	0.55
	S.D.	16.42	11.00	14.47	13.73	W	11040.0	56	197.14	
Post test	Mean	991.33	996.00	1004.67	972.67	B	8218.33	3	2739.44	12.78*
	S.D.	16.42	12.98	15.06	13.87	W	12000.0	56	214.29	
Adjusted post test	Mean	993.55	992.08	1004.84	974.20	B	7208.83	3	2402.94	304.61*
						W	433.88	55	7.89	

\* Significant at .05 level of confidence. Required table value for test the significance was 2.68, and 2.76, with the df of 3 and 56, 3 and 55.

The Post test mean and standard deviation on anaerobic power scores of G1, G2, G3 and G4 are  $991.33 \pm 16.42$ ,  $996.00 \pm 12.98$ ,  $1004.67 \pm 15.06$  and  $972.67 \pm 13.87$  respectively (Table 4). The obtained post test F value of 12.78 was greater than the required Table F value of 2.68. Hence the post- test means value of anaerobic power show significant at 0.05 level of confidence for the degrees of freedom 3 and 56. Thus the results obtained proved that the interventions namely assisted sprint, resisted sprint and combination of assisted and

resisted sprint on anaerobic power produced significantly different improvements among the four groups.

Adjusted Post - Test: The  $AM \pm SD$  post - test anaerobic power scores of G1, G2, G3 and G4 are 993.55, 992.08, 1004.84 and 974.20, respectively (Table 4). The obtained adjusted post - test F value of 304.61 was greater than the required Table F value of 276. Hence the post - test means value of anaerobic power show significant at 0.05 level of confidence for the degrees of freedom 3 and 55. Since the observed F

value on adjusted post test mean among the groups such as assisted sprint, resisted sprint and combination of assisted and resisted

sprint on anaerobic power produced significantly different improvements among the four groups.

**Table 5**

**SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON ANAEROBIC POWER  
AMONG FOUR GROUPS  
(Scores in watts)**

Group 1 (AST)	Group 2 (RST)	Group 3 (AST+RST)	Group 4 (CP)	Mean Differences	Confidence Interval Value
993.55	992.08	-	-	1.47	3.63
993.55	-	1004.84	-	11.29*	3.63
993.55	-	-	974.20	19.35*	3.63
-	992.08	1004.84	-	12.76*	3.63
-	992.08	-	974.20	17.87*	3.63
-	-	1004.84	974.20	30.64*	3.63

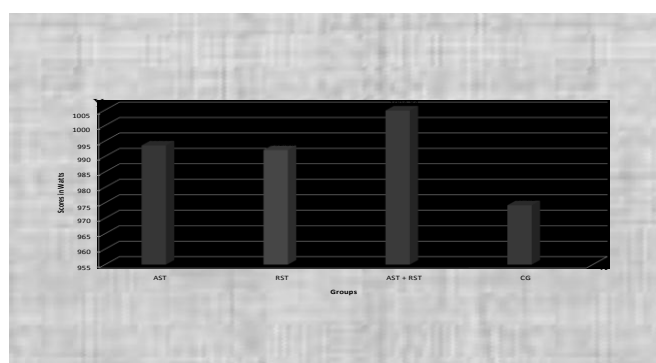
\* Significant at .05 level of confidence.

Table 5 clearly shows the significant difference of paired adjusted post test means of assisted sprint, resisted sprint, combination of assisted and resisted sprint and Control group on anaerobic power. The obtained mean differences between assisted sprint group and resisted sprint groups were 1.47. Hence this

comparison was found not significant. Remaining all comparisons mean differences value was greater than confidential value of 3.63, hence remaining comparisons was significant. The difference in anaerobic power is graphically presented in figure 1.

**Figure 1**

**THE ADJUSTED POST TEST MEAN VALUES OF DIFFERENT GROUPS ON  
ANAEROBIC POWER**







## Discussion

In today's techno-scientific age, the world has undergone a complete change in all aspects due to innovation and research. Thus, in the field of Football also there has been a dramatic change with the help of scientific training and coaching. The players are being trained on scientific guidelines with highly sophisticated means, for effective improvement enabling the coaches to derive optimum performance within legitimate time span. The players during training are being exposed to such exercises that are helpful and beneficial for achieving the higher standards. Training denotes the process of preparing one for some task. Sports training are undertaken for improving sports performance [5]. The performance variables are highly important in the achievement of outstanding results in sports performance. However, one of the performance variables likes power as an innate quality, proper and scientific training tends to improve most of the performance variables. In the case of majority of sports events and competitions it is the performance variables such as speed, power, strength, endurance, agility and cardio respiratory endurance, that often decide the fate of the event [6]. High-level performance of a Football player may be depending upon its physical capabilities supported by other factors. In most of advanced and developed countries, the awareness of the fitness, motor learning and skill development among children in early age itself are very much scientific to realize their dreams of high achievements in sports [7]. High level of general fitness with motor abilities like speed, power, strength,

endurance, agility, cardio respiratory endurance, jumping activity etc., are essential qualities required to be developed by Football performance [8]. Anaerobic power: In order to enhance the fitness of football players the study was conducted with various experiments. The results of the study clearly indicated that there was significant improvements from pre test to post test study among the three groups, viz, Assisted Sprint Training group Pre (971.33±16.42) to post (991.33±16.42) Resisted Sprint Training group from pre (977.33±11.00) to Post (996.00±12.98) and Combination of assisted and Resisted Sprint Training group from Pre (973.33±14.47) to post (1004.67±15.06) Further the present study demonstrated, an increase in Anaerobic power of 0.02%, 0.19% and 0.31% for Assisted Training group, Resisted training group and combination of assisted and resisted and Resisted Training group respectively, whereas, the control group did not show any significant improvement on anaerobic power.

## Conclusions

The three experimental training groups namely, assisted sprint training (AST) resisted sprint training (RST) and combined assisted and resisted sprint training (AST+RST) significantly improved on anaerobic power of the male soccer players.

Among the training groups Combined sprint training (AST+RST) has greater influence on anaerobic power, among male soccer players, where as Resisted sprint training (RST) training has the next best level of performance on anaerobic power. However assisted sprint training also influenced to certain extent among the soccer players





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