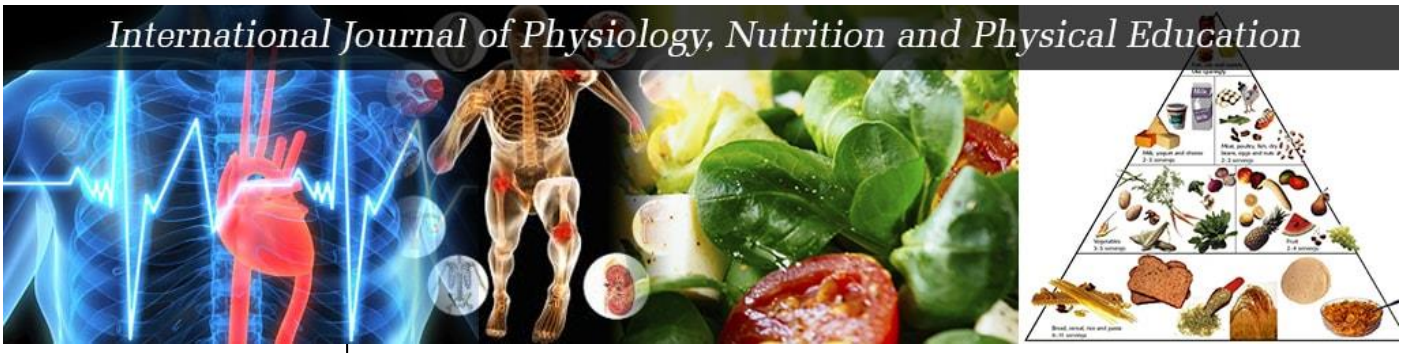

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Effect of assisted and resisted sprint training on stride frequency of Athletes

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Abstract
The purpose of the study was designed to find out the effect of assisted and resisted training on Stride Frequency performance of athletes. For the purpose of the study sixty(N=60) athletes studying various affiliated college to Rani Channamma University, Belagavi, Karnataka state, India, were randomly selected as subjects. The subjects were assigned at random into four groups of fifteen each (n=15). Group-I underwent Assisted Sprint Training (n=15), Group-II underwent Resisted Sprint Training (n=15), Group-III underwent combined Assisted and Resisted Sprint Training (n=15) and Group-IV acted as Control. Stride Frequency only selected and it was assessed through 50 meters run test. The Experimental groups underwent their respective training for 12 weeks duration. And the number of session was conformed into three days per week. All the subjects were tested prior to and immediately after the training for the selected variable. Data were collected and statistically analyzed using ANCOVA. Scheffe's post hoc test was applied to determine the significant difference between the paired means. In all the cases 0.05 level of significance was fixed. The results of the study showed that there was a significant difference among all the Experimental groups' namely assisted training, resisted training and assisted and resisted training. Further the results showed combined assisted and resisted training group was found to have greater impact on the group concerned than the assisted training group, resisted training group and control group in enhancing the performance of Stride Frequency.

Keywords: Assisted training, resisted training, combined assisted and resisted training, stride frequency

Introduction

There are a variety of ways to train straight-ahead sprinting speed. Some tools involve assisted sprinting and resisted sprinting. Assisted sprinting helps the athlete run faster in training than he/she is normally capable of. The idea being that this trains the nervous system and muscles to move faster and this will eventually carry over to unassisted sprinting. Resisted sprinting makes the running process more difficult by providing resistance that the athlete must sprint against. The idea here being that the resistance will require the athlete to recruit more muscle fibers/motor units to sprint, which will eventually carry over to un resisted sprinting – making the athlete faster.

Both training tools are effective, though each has drawbacks. The biggest one being that too much disrupts running mechanics which may cause the athlete to develop bad sprinting habits. While both are effective, both are not for every athlete, every sport, or every situation. Like a lot of training tools, these are best for athletes that have reached a certain level of development (Mero *et al*., 1992) [2].

Assisted or supra 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 a parachute release while at a maximum speed. It has been shown that these over speed training techniques improve velocity by increasing unassisted stride frequency (Paradisis and Cooke, 2006) [3].

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. The objective of the overload is to elicit a greater neural activation and to increase the recruitment of fast-twitch muscle fibers (Alcaraz *et al*., 2008) [1].

Method and procedure

For the purpose of the study sixty (N=60) athletes studying various affiliated college to Rani Channamma University, Belagavi, Karnataka state, India, were randomly selected as subjects. The subjects were assigned at random into four groups of fifteen each (n=15). Group-I underwent Assisted Sprint Training (n=15), Group-II underwent Resisted Sprint Training (n=15), Group-III underwent combined Assisted and Resisted Sprint Training (n=15) and Group-IV acted as Control. Stride Frequency only selected and it was assessed through 50 meters run test. The Experimental groups underwent their respective training for 12 weeks duration. And the number of session was conformed into three days per week. All the subjects were tested prior to and immediately after the training for the selected variable.

Analysis of the data

The data collected from the experimental groups and control group on prior and after experimentation on selected variables were statistically examined by analysis of covariance (ANCOVA) was used to determine differences, if any among the adjusted post test means on selected criterion variables separately. Whenever they obtained f-ratio value was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases 0.05 level of significance was fixed.

The results of the Analysis of Covariance on Stride Frequency of the pre, post, and adjusted test scores of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group are presented in Table –1.

Table 1: Analysis of Covariance on Stride Frequency of Experimental Groups and Control Group

Test	Assisted Sprint Training Group	Resisted Sprint Training Group	Combined Assisted and Resisted Sprint Training Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	F ratio
Pre Test Mean	3.84	3.82	3.83	3.84	Between	0.004	3	0.001	0.43
					Within	0.19	56	0.003	
Post Test Mean	4.18	4.19	4.22	3.86	Between	1.26	3	0.42	152.48*
					Within	0.15	56	0.003	
Adjusted Post Test Mean	4.18	4.19	4.22	3.86	Between	1.26	3	0.42	150.13*
					Within	0.15	55	0.003	

* Significant at 0.05 level of confidence

(Stride Frequency Scores in Numbers)

Table value for df (3, 56) at 0.05 level = 2.76 Table value for df (3, 55) at 0.05 level = 2.78

The above table-1 shows that the pre-test mean values on Stride Frequency of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group are 3.84, 3.82, 3.83 and 3.84 respectively. The obtained 'F' ratio of 0.43 for pre-test scores was lesser than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Stride Frequency.

The post test mean values on Stride Frequency of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group are 4.18, 4.19, 4.22 and 3.86 respectively. The obtained 'F' ratio of 152.48 for post-test scores was higher than the table value of 2.76 for degrees of freedom 3 and 56 required for significance at 0.05 level of confidence on Stride Frequency.

The adjusted post-test means on Stride Frequency of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group are 4.18, 4.19, 4.22 and 3.86 respectively. The obtained 'F' ratio of 150.13 for adjusted post-test scores was higher than the table value of 2.78 for degrees of freedom 3 and 55 required for significance at 0.05 level of confidence on Stride Frequency.

The results of the study indicate that there are significant differences among the adjusted post test means of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group in Stride Frequency performance.

To determine which of the paired means have a significant difference, the Scheffe's test is applied as Post hoc test and the results are presented in Table - 2.

Table 2: The Scheffe's test for the differences between the adjusted post test paired means on Stride Frequency

Adjusted Post-test Means				Mean Difference	Confidence Interval
Assisted Sprint Training Group	Resisted Sprint Training Group	Combined Assisted and Resisted Sprint Training Group	Control Group		
4.18	4.19			0.01	0.06
4.18		4.22		0.04	0.06
4.18			3.86	0.32*	0.06
	4.19	4.22		0.02	0.06
	4.19		3.86	0.33*	0.06
		4.22	3.86	0.35*	0.06

* Significant at 0.05 level of confidence

Table-2 shows that the adjusted post test mean differences on Stride Frequency between Assisted Sprint Training group and Control group, Resisted Sprint Training group and Control group and Combined Assisted and Resisted Sprint Training group and Control group are 0.032, 0.33 and 0.35 respectively, which are greater than the confidence interval value of 0.06 on Stride Frequency at 0.05 level of confidence.

Further the table-2 shows that the adjusted post test mean differences on Stride Frequency between Assisted Sprint Training group and Resisted Sprint Training group, Assisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Resisted Sprint Training group and Control group are 0.01, 0.04 and 0.02 respectively, which is less than the confidence interval value of 0.06 on Stride Frequency at 0.05 level of confidence.

The results of the study showed that there was a significant

difference between Assisted Sprint Training group and Control group, Resisted Sprint Training group and Control group and Combined Assisted and Resisted Sprint Training group and Control group on Stride Frequency.

Further the results of the study showed that there was no significant difference between Assisted Sprint Training group and Resisted Sprint Training group, Assisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Resisted Sprint Training group and Control group on Stride Frequency.

The above data also reveal that Combined Assisted and Resisted Sprint Training group had shown better performance than Assisted Sprint Training group, Resisted Sprint Training group and Control group in Stride Frequency.

The pre and post mean values of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group on Stride Frequency are graphically represented in the Figure -1.

The adjusted post mean values of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group on Stride Frequency are graphically represented in the Figure –2.

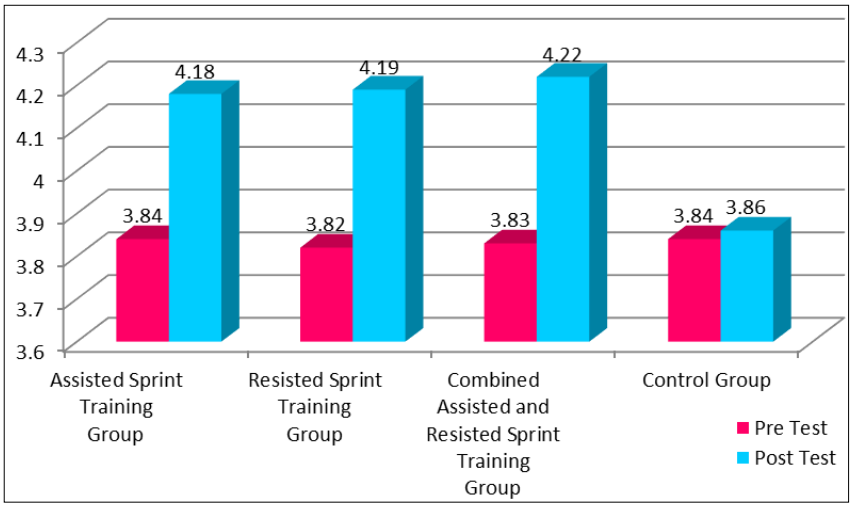

Fig 1: The Pre and Post test Mean values of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group on Stride Frequency (In Numbers)

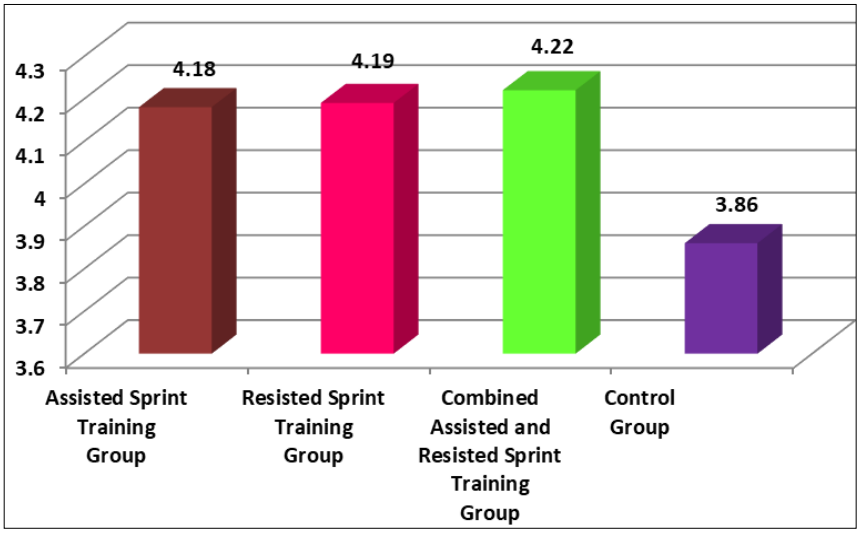

Fig 2: The Adjusted Post Mean values of Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group and Control group on Stride Frequency (In Numbers)

Conclusion

From the analysis of the data, the following conclusions were drawn.

1. The Experimental groups namely, Assisted Sprint Training group, Resisted Sprint Training group and Combined Assisted and Resisted Sprint Training group had significantly improved in Stride Frequency.
2. The Combined Assisted and Resisted Sprint Training group was found to have greater impact on the group concerned than the Assisted Sprint Training group, Resisted Sprint Training group and Control group in enhancing the performance of Stride Frequency.

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