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Investigation of the Changes on Selected Speed Related Parameters in Response to Resisted Sprint Training

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Abstract

Resisted sprint training has been the basic training practice of some very successful sprinters. It is a common training method for improving sprint-specific strength. The purpose of the study was to find out the effect of resisted sprint training on speed, stride length, stride frequency and anaerobic power among male sprinters. The resisted sprint training exercises included in this training programme was weighted vest, harness running and weighted sled. The response to resisted sprint training was characterized in thirty male sprinters in the age group of eighteen to twenty two years. The selected dependent variables were measured using standard tests and procedures. Analysis of covariance was used to determine the significant difference between pre test and posttest on selected dependent variables. The findings of the study indicate that speed, stride length, stride frequency and anaerobic power increased by 5.91%, 2.79%, 3.44% and 5.19% respectively due to eight weeks of resisted sprint training. These results suggest that the resisted sprint training is an effective means of enhancing the sprinting ability, by bringing out significant changes in speed parameters.

Keywords: Resisted Sprint Training, Speed, Stride Length and Frequency, Anaerobic Power.

Introduction

Training and technique are very important in developing or improving a sport skill. Generally as the adaptation to training takes place, the efficiency of the skill improves. This can be seen in an improved running style (Martin & Coe, 1991). Speed training, like strength, flexibility and mental skills training have now become an important ingredient in the total programme, particularly where speed of movement is essential in the sport. The aim of resisted sprint training is to condition the athlete to move at high velocity, employing maximal power when needed. In order to do this, the neuromuscular system must be conditioned to very fast movements and training need to be very specific, with a very high anaerobic component.

Resisted sprint training can be defined as the systematic addition of weight to the player's body in any form (uniform, vest pants (or) shirts) or to the implements used in sports (sticks, bats, balls and so on). Resisted sprint training is a technique designed to improve explosive concentric movements such as sprinting speed. Resisted sprint training along with strength training speed endurance training, plyometrics and over speed training produce the greatest changes in the exercises fast twitch muscle fibers. Athletes of all ages can use this resisted sprint training programme.

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Different resisted speed strategies are in practice including towing, uphill sprints, sand sprints, and weighted sprints. In fact, resisted towing can involve an athlete towing a weighted sled, tire, speed parachute, or some other device over a set distance (Faccioni, 1994). Various studies have demonstrated that the resisted sprint training can produce significant changes in running speed and running kinematics. However the longer-term training adaptations after resisted sprint training on speed parameters remain unclear. Hence, the investigator was much interested to conduct a study to investigate the effect of resisted sprint training on speed related parameters.

Methods

For the purpose of this study, thirty inter-collegiate level male sprinters in the age group of 18 to 22 years were recruited, with their consent. The selected dependent variables namely speed, stride length, stride frequency and anaerobic power, were assessed using standard tests and procedures, prior to and immediately after the training protocol. Speed was measured by 50 metres run. While the subjects were allowed to run fast about 50 metres to measure speed the measurement of the length of the stride was taken. The average of two stride of the subject was the individual stride length. Stride frequency was calculated by dividing the number of strides taken by the time elapsed gives the number of strides ran in one-second. The anaerobic power was assessed by using Margaria Kalamen anaerobic power test. The standard instruments such as electronic

stopwatches, measuring tape and digital timer with switch mats were used.

Training Protocol

The experimental group underwent the resisted sprint training alternatively three days in a week for eight weeks. The resisted sprint training exercises included in this training programme was weighted vest, harness running and weighted sled. More specifically, the training distance comprised of 30-50 meters and the initial intensity was fixed at 75% and it was increased once in two weeks by 5%. The subjects performed these runs with the specified intensity. The rest interval between repetitions was 2 minutes where they stay active and between sets they performed other balance or trunk activities for 5 minutes. The control group did not participate in any specialized training during the period of study.

Experimental Design and Statistical Procedure

The experimental design used for the present investigation was random group design involving thirty subjects. Analysis of covariance (ANCOVA) was used as a statistical technique to determine the significant difference, if any, existing between pretest and posttest data on selected dependent variables. The level of significance was accepted at 0.05 level.

Analysis of the Data

Analysis of covariance was used to determine the impact of resisted sprint training on selected speed related parameters and it is presented in table-I.

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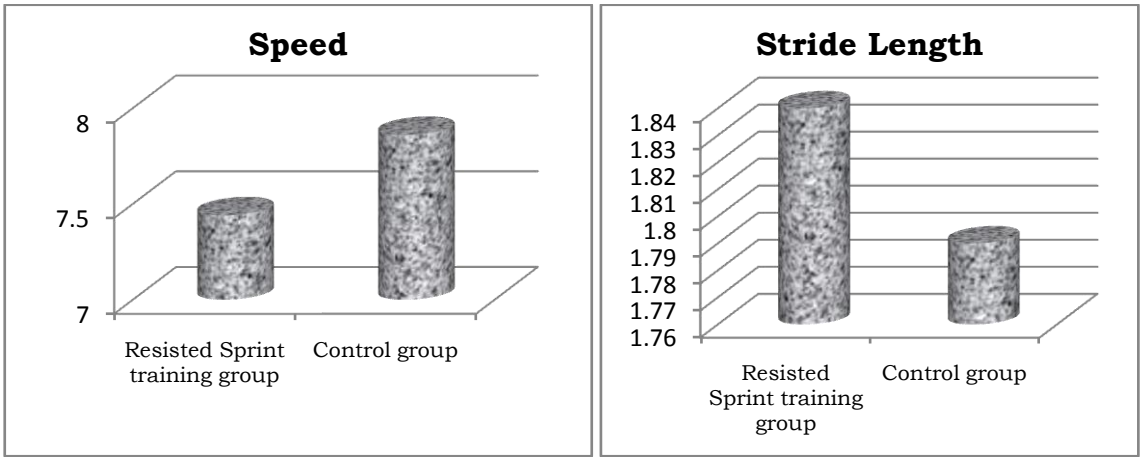
Table I. Analysis of Covariance on Selected Speed Parameters of Resisted Sprint Training and Control Groups

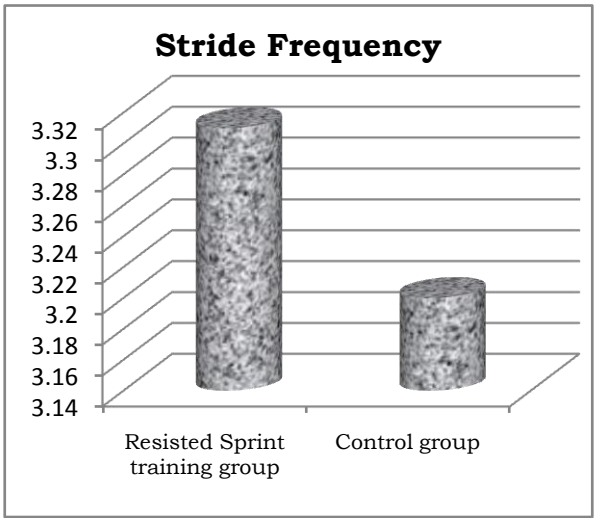
Variables	Groups	Adjusted Mean	SOV	Sum of Squares	df	Mean Square	'F' ratio
Speed	Experimental	7.44	B	2.16	1	2.16	72.00*
	Control	7.86	W	0.75	27	0.03	
Stride Length	Experimental	1.84	B	104.29	1	104.29	30.58*
	Control	1.79	W	92.14	27	3.41	
Stride Frequency	Experimental	3.31	B	0.13	1	0.13	6.50*
	Control	3.20	W	0.46	27	0.02	
Anaerobic Power	Experimental	91.57	B	4.96	1	4.96	10.33*
	Control	87.05	W	13.02	27	0.48	

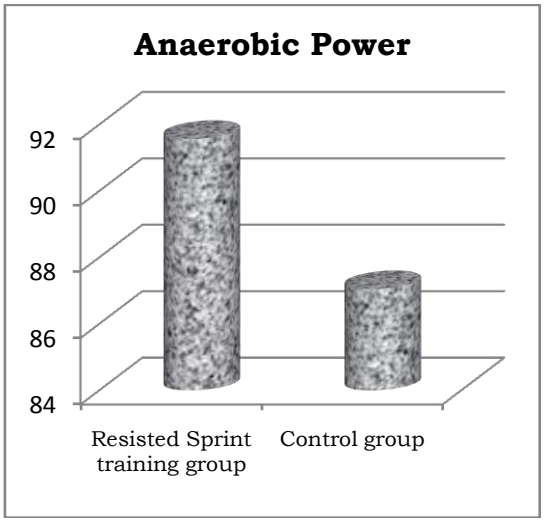
Required table value for significance at 0.05 level of confidence for df of 1 and 27 is 4.21
** Significant at 0.05 level.*

The findings of the study shows that significant difference existing between resisted sprint training group and control group on speed, stride length, stride frequency and anaerobic power, since the obtained 'F' ratio of 72.00, 30.58, 6.50 and 10.33 respectively were greater than the required table value of 4.21 for significance at 0.05 level of confidence for df of 1 and 27. Hence it is concluded that eight weeks of resisted sprint training can produce significant changes on speed, stride length, stride frequency and anaerobic power of male sprinters. The adjusted post test mean values of selected speed parameters were graphically represented in figure-I.

Figure I. Bar Diagram Showing the Adjusted Post Test Mean Values of Resisted Sprint Training and Control Groups on Speed, Stride Length, Stride Frequency and Anaerobic Power







Results and Discussions

Based on the statistical analysis of the data it is concluded that eight weeks of resisted sprint training can produce significant changes on speed, stride length, stride frequency and anaerobic power of male sprinters. Knicker (1997) examined the effects of external resistance on sprinting mechanics and found that even small resistance loads could result in considerable changes in kinematics and coordination of muscular activity as seen in EMG patterns of lower limb muscles. Zafeiridis *et al*., (2005) found that sprint training with 5 kg sled pulling for 8 weeks improves acceleration performance. It has been well documented by Cavanagh and Kram (1990) that humans increase both stride length and stride frequency as running velocity increases. These results support the previous observation by Eicher (1975) that, an increase in speed might cause an increase in stride frequency or stride length or either of the parameters. The study undertaken by Medbo and Burgers (1990) reveals that six weeks of training increased the anaerobic capacity by 10%.

Hence, it is suggested that competition exercises with additional loads are "the most specific exercises" and important training means. This seems to be that resisted sprint training techniques will somehow impact on the athlete's nervous system to induce greater stride rates. The present data suggest that the greater average running speed in response to resisted sprint training might be due to increases in stride length.

Conclusions

The result of this study demonstrated that, speed, stride length, stride frequency and anaerobic power of male sprinters increased by 5.91%, 2.79%, 3.44% and 5.19% respectively due to eight weeks of resisted sprint training resisted sprint training. Hence it is suggested that the adaptational changes of resisted sprint training exercise are very dynamic and variable to individual.

References

1. Cavanagh, P., and Kram, R. (1990). *Biomechanics of Distance Running*, Champaign, IL: Human Kinetics.pp. 35-63.
2. Eicher, T. (1975). "Improving Sprinting Speed through Strength Training", *Athletic Journal*, 65, p .12.
3. Knicker, A., (1997). "Neuromechanics of Sprint Specific Training Skills", In J Wilkerson, K Ludwig & W Zimmermann (Eds.), *Biomechanics in Sports*, XV (pp.17-21). Denton, TX: Texas Woman's University Press.
4. Martin, D., and Coe, P. (1991). *Training Distance Runners*, Champaign, IL: Human Kinetics.
5. Medbo, JI., and Burgers, S. (1990). "Effect of Training on Anaerobic Capacity", *Journal of Medicine, Science, Sports and Exercise*, 22:4, pp. 501-507.
6. Zafeiridis, A. *et al*., (2005). "The Effects of Resisted Sled Pulling Sprint Training on Acceleration and Maximum Speed Performance", *Journal of Sports Medicine Physical Fitness*, 45:3, pp. 284-90.

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