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Effects Of Repeated Sprint Training On Selected Speed Performances Among Athletes

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Abstract: The intention of the present study was to find out the effect of repeated sprint training on selected speed performances among Athletes (Stride length and Stride frequency). Thirty (30) male athletes were ranged from aged 20 to 25 years were randomly selected from Anna Stadium, Tirunelveli, Tamil Nadu State. They selected subjects (30 male sprinters) have been randomly divided into two equal groups namely Repeated sprint training (RST) group (RSTG) (N=15) and Control Group (CG) (N=15). Six weeks repeated sprint training (RST) programme has been formulated to see the effectiveness of given training programme on Stride length and Stride frequency of male athletes. The Stride length has been tested by 'Stride Length Test (10m Marking Method) and Stride frequency has been tested by Stride Frequency Test (5-Second Sprint Method) on before the training starts and after completion of six weeks repeated sprint training (RST) programme. Significant positive changes occur in Stride length and stride frequency has been found by analysing and comparing the pre-test and post-test score through paired sample 't' test and ANCOVA among the male athletes of RSTG and CG. So, this study was concluded that six weeks of repeated sprint training (RST) programme was shown effective in the improvement of Stride length and Stride frequency among male athletes. However, the control group had not shown any significant positive changes on Stride length and Stride frequency while because they were not engaged to participated in to any specific training programme apart from their routine works.

Keywords: Repeated sprint training (RST), Stride Length, Stride Frequency, Speed Performance, Athletes

1. INTRODUCTION

Speed is a critical component in many sports, influencing performance outcomes in track and field, soccer, basketball, and other competitive events. Sprinting ability is determined by several biomechanical and physiological factors, with stride length and stride frequency playing essential roles in achieving optimal velocity (Weyand et al., 2000). The balance between these two components dictates an athlete's overall sprinting efficiency and acceleration capabilities (Mero et al., 1992).

Stride length refers to the distance covered in a single step during sprinting. It is influenced by factors such as lower limb strength, flexibility, and explosive power (Hunter et al., 2004). Training methods that enhance muscle force application, such as resistance training and plyometrics have been shown to improve stride length by enabling athletes to cover more ground per step (Clark & Weyand, 2014). However, increasing stride length excessively may lead to overstriding, which can hinder sprint mechanics and increase the risk of injury (Bezodis et al., 2008).

Stride frequency, on the other hand, is the number of steps taken per unit of time and is directly related to neuromuscular coordination and reaction time (Nagahara et al., 2018). High-frequency sprinting is essential for maintaining top speed, particularly in short-distance races. Studies suggest that repeated repeated sprint training (RST) can significantly enhance stride frequency by improving fast-twitch muscle fiber recruitment and reducing ground contact time (Morin et al., 2012).

Repeated repeated sprint training (RST) is a widely used method to improve both stride length and stride frequency. It involves multiple short, high-intensity sprints with brief recovery periods, targeting anaerobic energy systems and neuromuscular efficiency (Buchheit & Laursen, 2013). This type of training is beneficial for athletes who require explosive bursts of speed, such as sprinters and team sport players.

The objective of this study is to assess the impact of an eight-week RST program on stride length and stride frequency among trained athletes. By analysing pre- and post-training sprint performances, this research aims to provide empirical evidence supporting the integration of RST into athletic training programs to optimize sprinting efficiency.

2. METHODS AND MATERIALS

This research stays in quantitative research, although in terms of the method used in this research, it is a quasi-experimental research. Based on data analysis using quantitative analysis, the intervention group was assessed by providing the kind of exercise in the form of repeated sprint training to raise the ability of the Stride length and Stride frequency among male athletes. The samples in this study were all male athletes and their age were ranged from 20 to 25 years were randomly selected from Anna Stadium, Palayamkottai, Tirunelveli, Tamilnadu, India. The selected subjects have been randomly divided into two equal groups namely Repeated sprint training (RST) group (RSTG) (N=15) and Control Group (CG) (N=15). Six weeks repeated sprint training (RST) programme has been formulated to see the effectiveness of given training programme on Stride length and Stride frequency of male athletes.

REPEATED SPRINT TRAINING PROTOCOL

Repeated sprint training (RST) is designed to enhance speed endurance and sprint mechanics by engaging athletes in high-intensity sprint efforts with short recovery periods. The experimental group followed an eight-week RST program consisting of three sessions per week. Each session included 6-10 sprints of 30 meters performed at 95-100% intensity, with 30-60 seconds of recovery between sprints. The training was structured progressively, increasing the sprint repetitions and maintaining high intensity to induce neuromuscular adaptations. This protocol aimed to optimize both stride length and stride frequency, leading to improved overall sprint performance.

STATISTICAL ANALYSIS

Significant positive changes occurs in Stride length and Stride frequency has been found by analysing and comparing the pre-test and post-test score through paired sample ‘t’ test and to find out the difference exists between both groups were analysed through one way ANCOVA at the level of significance at 0.05. The collected data were statistically analysing with use of SPSS 17.1 trail version.

3. ANALYSIS OF DATA

Table-1

Means and Paired Sample-‘t’ Test for the Pre and Post Tests on Stride length and Stride frequency of RSTG and CG

Criterion variables	Test	RSTG	CG
Stride length (meters)	Pre test	1.95	1.96
	Post test	2.08	1.97
	‘t’-test	3.92*	0.58
Stride frequency (numbers)	Pre test	5.2	5.2
	Post test	6.1	5.2
	‘t’-test	3.87*	0.23

*Significant at .05 level. (Table value required for significance at .05 level for‘t’-test with df 9 is 2.26)

The table-1 shows that the pre-test mean value of RSTG and CG on Stride length and Stride frequency were 1.95 & 1.96 and 5.2 & 5.2 respectively. The post test mean value of RSTG and CG on Stride length and Stride frequency were 2.08 & 1.97 and 6.1 & 5.2 respectively. The obtained paired sample t-ratio values between the pre and post-test means of RSTG and CG were 3.92 & 0.58 and 3.87 & 0.23 respectively. The required table value for significant difference with df 14 at 0.05 level is 2.14. From the above table the paired sample t-test value of Stride length and Stride frequency between pre and post-tests means of RSTG was greater than the table value 2.26 with df 14 at .05 level of confidence, it was concluded that the RSTG had significant improvement in the Stride length and Stride frequency when compared to CG.

Table-2
Computation of Mean and Analysis of Covariance Stride length and Stride frequency of RSTG and CG

Adjusted Post Mean	RSTG	CG	Source of Variance	Sum of Squares	Df	Mean Square	F
Stride length	2.15	2.0	BG	0.153	1	0.153	19.18*
			WG	0.215	27	0.008	
Stride frequency	6.5	5.5	BG	3.92	1	3.92	24.66*
			WG	4.30	17	0.159	

* Significant at 0.05 level. Table value for df 1, 27 was 4.21

Table-2 shows that the adjusted post-test means values on Stride length and Stride frequencyof RSTG and CG are 2.15 & 2.0 and 6.5 & 5.5. The obtained f- ratio of adjusted post-test mean value was 19.18 & 24.66 which was greater than the required table value 4.21 with df 1 and 27 required for significance at 0.05 level of confidence. The results of the study indicated that there was a significant mean difference exist between the adjusted post-test means of RSTG and CG on Stride length and Stride frequency.

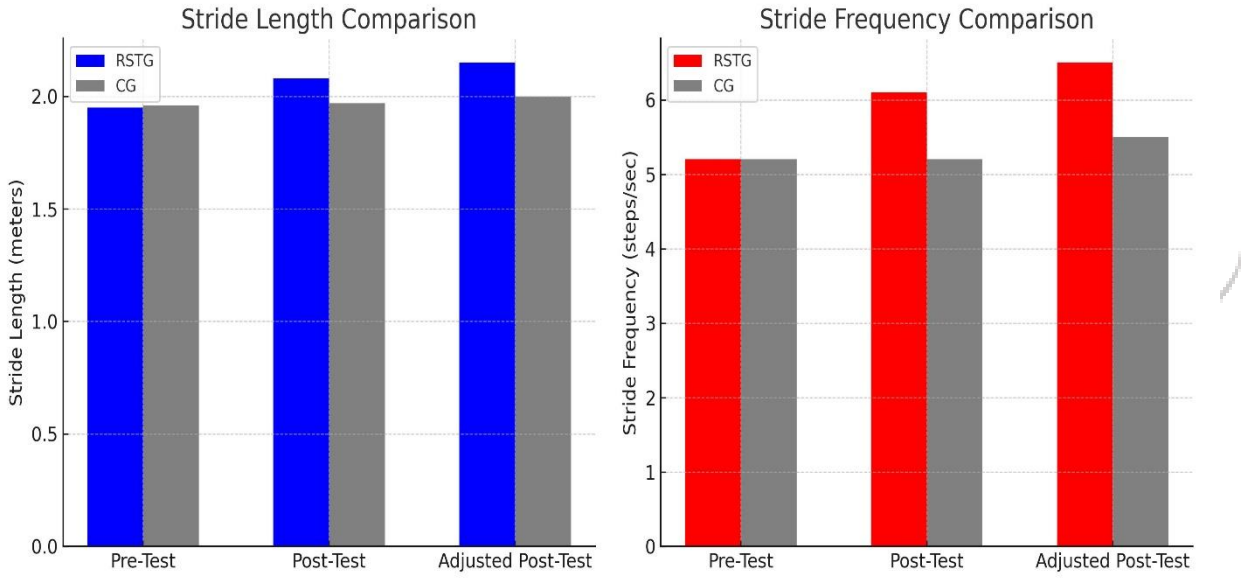

Figure-1 shows that the mean values of pre, post and adjusted post tests on Stride length and Stride frequency of RSTG and CG.

4. DISCUSSION ON FINDINGS

The present study aimed to identify statistically significant improvements in stride length and stride frequency**,** demonstrating the positive impact of Repeated Sprint Training (RST) among male athletes**.** The findings align with previous research, indicating that high-intensity sprint repetitions enhance neuromuscular adaptation, speed mechanics, and anaerobic power**.** Several studies support the outcomes of this research**.** Buchheit & Laursen (2013) analysed the physiological and performance adaptations to repeated sprint training**,** confirming improvements in stride efficiency, sprint mechanics, and fatigue resistance**.** Girard et al. (2011) examined neuromuscular and metabolic responses to repeated sprint efforts**,** highlighting enhanced stride frequency and acceleration capabilities**.** Rampinini et al. (2007) explored sprint-based training interventions**,** emphasizing the role of repeated high-intensity efforts in improving explosive power and movement efficiency**.** Additionally**,** Iaia et al. (2009) determined the impact of repeated sprint exercises on anaerobic capacity and running performance, further validating the training method's effectiveness**.** The results of this study demonstrated significant differences between the RST group and the control group**.** The RST group showed substantial improvements in stride length and stride frequency**,** whereas the control group exhibited no notable changes. Furthermore, the RST group displayed enhanced sprinting economy, reduced ground contact time, and improved power output**,** reinforcing the effectiveness of Repeated Sprint Training as a key method for developing speed-related performance**.**

5. CONCLUSIONS

There was significant improvement on Stride length and Stride frequency due to the impact of repeated sprint training practices among male athletes. There was significant differences exist between RSTG and CG on Stride length and Stride frequency. However the control group had not shown any significant improvement on any of the selected variables.

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