

Effect of sprint training on audiovisual reaction time in gymnasts: Randomized controlled trial

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Abstract

Background: Reaction time is the interval between the onset of a signal (stimulus) and the initiation of a movement response. Reaction time is affected by factors such as age, gender, number of simultaneous stimuli, nutrition, physical activity, training and physical fitness and fatigue. Reaction time is a decisive factor affecting success in sporting competitions. The present study was carried out to compare the effects of 6 weeks of sprint interval training on audiovisual reaction time in gymnasts. **Methods:** The present study is an Interventional Randomized Controlled Trial. Twenty gymnasts aged 15 to 25 years were enrolled for the study. Informed consent was taken from all the participants. They were randomly distributed into 2 groups. Group- 1: Controls: Players undergoing regular training. Group-2: Players undergoing Sprint Training along with regular training. They underwent sprint training for 10 minutes a day, 5 days a week. Audiovisual reaction time was measured by Medicaid RTM -604, before starting the training and after 6 weeks of training. **Results and Conclusion:** Sprint Interval training led to significant improvement in audio and visual reaction time whereas there was no significant change in the audio and visual reaction time among the regular training group. Hence, Sprint Interval training can be suggested as a method to improve audiovisual reaction time in gymnasts.

Keywords: Gymnasts, reaction time, sprint interval training.

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Received Date: 26/03/2015 Revised Date: 08/04/2015 Accepted Date: 10/04/2015

Access this article online

Quick Response Code:



Website:

www.medpulse.in

DOI: 12 April 2015

INTRODUCTION

Reaction time is a decisive factor affecting success in sporting competitions. Learning of motor skills is a crucial factor in the performance of a sportsperson. Motor learning has been defined as “a relatively permanent change in the motor behaviour”. Changes in motor behaviour are an outcome of maturation, motivation or the training factors such as improvements in the speed.¹ The rate at which learning occurs and the final task performance is found to be affected by the amount of training, conditions under which training is done and also the quality of training.² As the reaction time includes the

central as well as peripheral components and their function, reaction based testing can be used as a tool for assessing the athletes’ preparedness for the competition. According to Lofthus³, “Reaction time provides an indirect index of the processing capability of central nervous system and a simple means of determining sensorimotor performances”. It has been reported that high speed dynamic training of a muscle may cause earlier motor unit activation, extra doublets and enhanced maximal firing rate due to which there may be an increase in the speed of voluntary muscle contraction which in turn may improve reaction time.⁴ The present study was done to assess the effect of 6 weeks of sprint interval training on audiovisual reaction time in Gymnasts.

MATERIAL AND METHODS

The present Interventional Randomized Controlled Trial was carried out to compare the effects of 6 weeks of sprint interval training on audiovisual reaction time in gymnasts. The Institutional Ethics Committee approval was taken for the study protocol. Twenty gymnasts aged 15 to 25 years were enrolled for the study. Informed consent was taken from all the participants. They were randomly distributed into 2 groups.

Group-1: Controls: Players undergoing regular training.
Group-2: Players undergoing Sprint Training along with regular training. They underwent sprint training for 10 minutes a day, 5 days a week. Ten minutes were split into 4 cycles each of 2.5 minutes. Each cycle included maximal speed and effort running for one minute followed by one and half minute of cooling down period. Audiovisual reaction time was measured in the dominant hand by Medicaid RTM -604, before starting the training and after 6 weeks of training. Three readings were taken and the best results were included as audio reaction time and visual reaction time. Paired t test was used to compare the changes in audiovisual reaction time before and after the intervention.

RESULTS

Table 1: Baseline characteristics

Parameter	Sprint Training Group	Control group
Age (years)	19.8 ± 3.7	19 ± 2.7
Weight (kg)	55.5 ± 9.4	55.7 ± 5.9
Height (cm)	162.4 ± 8.4	163.7 ± 9.7
BMI (kg/m ²)	20.9 ± 2.3	20.8 ± 2.2

Table 2: Audio-visual reaction time of Sprint Training group and Controls in Gymnasts

Parameter	Sprint Training Group		Control group	
	Pre	Post	Pre	Post
Audio reaction time (milliseconds)	136 ± 7	120 ± 7	132 ± 7	129 ± 7
p value	0.0006 (HS)		0.15 (NS)	
Visual reaction time (milliseconds)	159 ± 8	137 ± 7	156 ± 6	152 ± 9
p value	<0.0001 (HS)		0.1 (NS)	

HS: statistically highly significant; NS: statistically not significant.

DISCUSSION

Our study has demonstrated that Sprint Training can improve the audiovisual reaction time in Gymnasts which can help to increase the competitive ability of players. There are research reports which support our findings regarding improvement in the audiovisual reaction time after training. Barbara M Quaney *et al.* [4] have reported that there is evidence to show that aerobic exercise improves the speed of information processing, motor learning, implicit memory, and motor function. Davranche *et al.* [5] have shown that physical exercise

facilitates motor processes in simple reaction time performance. Ross A *et al.* [6] have highlighted that Nerve conduction velocity (NCV) may increase in response to a period of sprint exercise training. They have also mentioned that sprint exercise training can induce neural adaptations which may not only have beneficial effects on contraction speed and muscle power but also increase the working muscle mass and thus the anaerobic capacity.

CONCLUSION

Sprint Interval training led to significant improvement in audio and visual reaction time whereas there was no significant change in the audio and visual reaction time among the regular training group. Hence, Sprint Interval training can be suggested as a method to improve audiovisual reaction time in gymnasts.

ACKNOWLEDGEMENT

We are very grateful to Dr Makrand Joshi and his team of gymnasts from Marathwada Sanskrutik Mandal, Aurangabad for their kind cooperation. Without their timely help this study would not have been possible.

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Source of Support: None Declared
 Conflict of Interest: None Declared