Effect of Proprioceptive Neuromuscular Facilitation on Selected Speed Parameters among College Men Sprinters

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Abstract

The purpose of the study was to find out the effect of proprioceptive neuromuscular facilitation on selected speed parameters among college men sprinters. In order to achieve the purpose of the study 24 college men sprinters were selected randomly and they were equally divided in to two groups of 12 each as experimental and control group. The experimental group and control group undergone normal routine athletic training and in addition the experimental group undergone proprioceptive neuromuscular facilitation (PNF) training for one hour in the morning before starting the athletic training. The control group was not given any special training. The period of training was 8 weeks in a schedule of weekly 5 days. The data were collected on the selected variables before and after the training period. Analysis of Covariance (ANCOVA) was used to analyze the data. To test the significance 0.05 level of confidence was fixed. Based on the results the study it was concluded that the proprioceptive neuromuscular facilitation significantly improved the speed parameters among college men sprinters.

Key words: Proprioceptive neuromuscular facilitation, Speed, Stride length, Stride frequency.

Introduction

Proprioceptive neuromuscular facilitation was discovered in the late 1940s and was initially used in the rehabilitation of stroke victims, and over the years became a standard tool for all types of rehabilitation. In more recent times this approach had been adopted by physiotherapists, osteopaths and massage therapists, who call their application muscle energy technique and also in sports training to enhance the performance. Proprioceptive Neuromuscular Facilitation is an advanced form of flexibility training, which involves both stretching and contraction of the muscle group. It targets specific muscle groups and aids in enhancing the flexible nature of the body and of course, builds muscle strength. It is used to stimulate the neuromuscular system in an effort to excite proprioceptors (sensory organs in muscles, tendons, bones, and joints) in order to produce a desired movement. (Mark Damian Rossi, 2011)

Proprioception is an automatic sensitivity mechanism in the body that sends messages through the central nervous system (CNS). The CNS then relay information to rest of the body about how to react and with what amount of tension. Human beings “train” for proprioceptive training to enhance neuromuscular co-ordination, balance, strength endurance which is close relevant to speed parameters like speed, stride length and stride frequency. Proprioceptive is an automatically sensitivity mechanism in the body that sends messages through the central nervous system. (Brooks G.A. 1996)

Speed

Speed is the quickness of movement of a limb. Whether this is the legs of a runner or arm of the shot putter. Speed is an integral part of every sport can be expressed as anyone or combination of maximum speed, elastic strength (power) and speed endurance. (Uppal A.K, 1983)

Stride Length

Stride length is distance from the heel print of one foot to the heel print of the other foot .This is the distance travelled forward by a single leg. (John W Burn, 1964)

Stride Frequency

Stride frequency is measured by the number of strides taken in a given amount of time or over a given distance .The more often the feet touch the ground , the faster the potential running speed. (John W. Burn, 1964)

Review of Literature

Caplan, N, et al.,(2009) were examined that the effect of proprioceptive neuromuscular facilitation and static stretch training on running mechanics of 2 methods of stretch training (static and proprioceptive neuromuscular facilitation [PNF]) on high-velocity running. Eighteen rugby league players were assessed for maximum sprinting velocity. They were randomly allocated into 2 stretch training groups: PNF or static. Each group trained their hamstrings 4 d x w (-1) for 5 weeks. Pre- and post-training subjects were video analysis while running at 80% of maximum velocity. The video was digitized to identify biomechanical changes in hip flexion (HF), knee extension (KE), stride length (SL), stride rate (SR), and contact time. Stretch training resulted in gains ($p < 0.05$) in HF for the static stretch (SS) (4.9%) and PNF (7.6%) groups. There were reductions in KE ($p < 0.05$) for SS (1.0%) and PNF (1.6%) groups. Stride mechanics were also altered after training. There were increases in SL ($p < 0.05$) for SS (7.1%) and PNF (9.1%) and a concomitant reduction in SR ($p < 0.05$) for SS (1.9%) and PNF (4.3%). No changes were observed in tc in either group. In conclusion, both SS and PNF training improved HF ROM and running mechanics during high-velocity running. These findings suggest that stretch training undertaken at the end of regular training is effective in changing running mechanics.

Samuel Deva Backiaraj (2008) investigated the effect of speed training and combined training of speed and proprioceptive neuromuscular facilitation on selected speed performance variables. To achieve the purpose sixty students were selected at randomly they were equally divided in to three groups consisting of 20 subjects' difference among the experimental and control group. ANCOVA was used for statistical analysis on basis of conclusions were drawn. There was significant improvement in speed, stride length and stride frequency due to the influence of speed training and combined training of speed and proprioceptive neuromuscular facilitation on selected speed performance variables.

Methodology

The purpose of study was to investigate the effect of proprioceptive neuromuscular facilitation on selected speed parameters among college men sprinters. In order to achieve the purpose of the study 24 college men sprinters were selected randomly and they were equally divided in to two groups of 12 each as experimental and control group. The experimental group and control group undergone normal routine athletic training and in addition the experimental group undergone proprioceptive neuromuscular facilitation training (PNFG) for one hour in the morning before starting the athletic training. The control group (CG) was not given any special training. The period of training was 8 weeks in a schedule of weekly 5 days. The data were collected on the selected variables before and after the training period. Analysis of Covariance (ANCOVA) was used to analyse the data. To test the significance 0.05 level of confidence was fixed.

Training Schedule

The proprioceptive neuromuscular facilitation training was explained in the table I and II

Table-I
Proprioceptive Neuromuscular Facilitation [PNF] Stretching Techniques for I and IV Weeks

Exercise	Holding duration	Duration of relaxation	I-II Weeks [Number of repetition]	III-IV Weeks [Number of repetition]
Hold Relax	7-15 Second	20 Second	2	3
Hold-Relax-Swing	7-15 Second	20 Second	2	3
Slow Reversed-Hold-Relax	7-15 Second	20 Second	2	3
Rhythmic Rotation	7-15 Second	20 Second	2	3
Hold-Relax-Contract	7-15 Second	20 Second	2	3

Table-II
Proprioceptive Neuromuscular Facilitation [PNF] Stretching Techniques for V and VIII Weeks

Exercise	Holding Duration	Duration of Relaxation	V-VI Weeks [Number of repetition]	VII-VIII Weeks [Number of repetition]
Hold Relax	7-15 Second	20 Second	4	5
Hold-Relax-Swing	7-15 Second	20 Second	4	5
Slow Reversed-Hold-Relax	7-15 Second	20 Second	4	5
Rhythmic Rotation	7-15 Second	20 Second	4	5
Hold-Relax-Contract	7-15 Second	20 Second	4	5

Results and Discussion

The analysis of covariance on the data obtained on speed, stride length and stride frequency due to the effect of experimental and control group have been analyses and presented in table III.

Table-III
Analysis of Covariance of Experimental and Control Groups on Selected Variables

Variables	Adjusted post test means		Source of Variance	SS	DF	MS	'F' Ratio
	PNFG	CG					
Speed	7.19	7.45	Between	0.378	1	0.38	14.62*
			With in	0.021	21		
Stride Length	1.68	1.61	Between	0.031	1	0.03	30.00*
			With in	0.011	21		
Stride Frequency	3.47	3.85	Between	0.755	1	0.76	10.78*
			With in	0.07	21		

*Significant at 0.05 level of confidence. df (1, 21) = 4.32.

Table two shows that the obtained 'f' ratio value were 14.62, 30.00 and 10.78 which were higher than the table value 4.32 with df 1and 2 required to be significant at 0.05 level. Since the obtained 'f' ratio is higher than the table value and if indicates that there was a significant different among the adjusted post-test means of the experimental group and control group on selected speed parameters.

Discussion

In the resent times Proprioceptive neuromuscular facilitation is offered as a better method for developing speed, stride length and Stride frequency. The results and discussions of the present study proved that the said training procedure was beneficent for improving the speed parameters of sprinters and this study was supported the study conducted by Caplan,N,et al., (2009) and they found that two months of PNF training improves high velocity running in order to stride length, stride rate and knee extension.

Conclusions

In the basis of results and discussion the following conclusion were drown.

1. The Proprioceptive neuromuscular facilitation had significantly improved the speed, stride length and stride frequency.

2. There was significant difference among the adjusted post-test mean of ex perimental group and control group on selected speed parameters.

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