Effects of Six Weeks Plyometric and Marked Ratio Training Programme on the Performance of Male Triple Jumpers

Bhupinder Singh[1], Simarjeet Singh[2], Jasmail Singh[3], V.K. Verma[4]

ABSTRACT

The aim of the study was to find out effect of plyometric and marked ratio training on the performance of male triple jumpers. The subjects for the present study were 15 triple jumpers ranging between 25 to 30 years of age, who had participated at the national level competitions. The subjects were randomly divided in to three equal groups. The groups were named as experimental group l, experimental group ll and control group. Each group consisted of five subjects. Measurements for standing triple jump, triple jump from full approach, were taken at the beginning –pre-test and after six weeks-post –test. Six week training programme was prepared for the experimental groups. Experimental group l underwent plyometric training consisting of the double leg jumps, standing 5 hops on right leg , standing 5 hops on left leg, standing 5 bounds during the first day of every week; hopping on right leg, hopping on left leg, bounding, rhythm (hop-step-hop-step) for the second day of the week; and double leg jumps, single leg (Right leg), single leg (Left leg), rhythm (Hop-step Hop step) from jumping box in ascending order. Experimental group ll worked on marked ratio 35:30:35 and the 3rd group did not participate in plyometric training and marked ratio training and followed the normal training designed for general and specific abilities of the jumpers. 't' test was applied to find out significance difference between pre and post test values. A significant difference was observed between pre and post test values of experimental group l & ll. But a non-significant difference was seen between pre and post test values of control group and marked ratio values of experimental group ll.

INTRODUCTION

Triple jump among the horizontal jumps, is one of the most challenging events in Track & Field. It demands a well coordinated technique with speed, strength, flexibility. However, the reactive strength is one of the vital parameters in triple jump. Muthiah (1976) Uzlov (1979) Jarver (1981) consider speed and strength as major contributors in triple jump performance.

The legs of jumpers need to be strong enough to propel themselves forward as well as strong enough to propel in an upward motion. To accomplish both of these goals, the athlete needs to create a strength training programme for triple jump that includes plyometrics. Plyometrics is the application of jumping as a form of conditioning. Plyometrics is also known as "jump training". It has been demonstrated to improve jumping ability (Bosco et al, 1979; Blattner & Noble, 1979; Polhemus & Burkhardt, 1980). Such "bounce" training is widely utilized in strength programmes designed to develop power or speed-strength

An athlete's plyometric needs are

1. M.Sc. Sports Coaching , SAINSNIS, Patiala
2. Scientific Officer(GTMT), SAINSNIS, Patiala
3. Athletic coach, SAINSNIS, Patiala

developed by two major training techniques. Short-distance, quick jumps are good for improving explosive power. Longer distance jumps improve muscle endurance and the development of takeoff timing for arms and legs. The minimum height for boxes used for jump training is 30 inches for short, explosive jumps and 43 inches for strength and power activity. Veroshanski (1969) proclaimed 0.80 m as the ideal height for achieving maximum speed in switching from eccentric contraction to concentric phase of the stretch shortening cycle and 1.1mm developing maximal dynamic strength.

Dursenev and Raevsky (1979) felt that depth jumps from two meters or higher were superior for improving muscle strength.

The literature reveals that ratio in triple jump is considered to be another performance deciding factor. Ratios in triple jumping are the relative values of the various jumping phases i.e. hop, step and jump. It is related to the actual distance covered in each of the three phases, which is governed by triple jump technique. According to the Russian Coach Vershoshanski (1979) to obtain the maximum distance the jumps should follow these percentages in the hop, step and jump phases 37.8% :28.9% :33.3%, respectively.

Susanka et al (1987) analyzed the percentage patterns of the twelve finalists of 1987 world championship and concluded that 18m can be achieved by several variations of technique. The athletes who stand the best chance are those with percentage patterns of 36.0: 30.5: 33.5 (6.5 + 5.50 + 6.00 i.e. Markov), and 34.5: 31.0: 34.5 (6.20 + 5.60 +6.20 m i.e. Conley). These "optimal "percentage patterns are, essentially, what we have called the Russian Style and the Polish Style, respectively.

METHODOLOGY

The present study was conducted on 15 triple jumpers ranging between 25 to 30 years of age, who had participated at the national level competitions. The subjects were randomly divided into three equal groups. The groups were named as experimental group I, experimental II and control group. Each group consisted of five subjects.

Measurements for the selected variables were taken at the beginning –pre-test and after six weeks-post –test.

Selection of variables

1. Standing Triple Jump.
2. Triple jump from full approach

Training regimen

During training period, the experimental group I underwent plyometric training consisting of the following exercises:

Day - 1

Exercise Name	Foot Contacts					
	1st week	2nd week	3rd week	4th week	5th week	6th week
Double leg jumps	30	30	50	50	30	30
Standing 5 hops on Right Leg	50	50	80	80	50	30
Standing 5 hops on Left Leg	50	50	80	80	50	30
Standing 5 bounds	60	60	80	80	50	30

Day - 2

Exercise Name	Distance X Sets					
	1st week	2nd week	3rd week	4th week	5th week	6th week
Hopping on right leg	30x5	50x5	50x8	50x8	30x5	30x3
Hopping on left leg	30x5	50x5	50x8	50x8	30x5	30x3
Bounding	30x5	50x5	50x8	50x8	30x5	30x3
Rhythm (hop-step-hop-step)	-	50x5	50x8	50x8	30x5	30x3

Day - 3

Exercise Name	Foot Contacts					
	1st week	2nd week	3rd week	4th week	5th week	6th week
	3 box in ascending order	3 box in ascending order	4 box in ascending order	5 box in ascending order	4 box in ascending order	4 box in ascending order
Double leg jumps	50	50	50	50	30	30
Single leg (Right leg)	50	80	80	80	50	30
Single leg (Left leg)	50	80	80	80	50	30
Rhythm (Hop-step Hop step)		50	50	50	50	30

Experimental group ll worked on marked ratio 35:30:35. The distance covered during pre tests full approach run triple jump was divided in to 35 % hop distance, 30 % step distance and 35 % jump distance. Marking was made on the jumping arena as per the individual performance and practice was carried out till the quality of execution was maintained. The 3rd group did not participate in plyometric training and marked ratio training and followed the normal training designed for general and specific abilities of the jumpers. 't' test was applied to find out significance difference between pre and post test values.

RESULT & DISCUSSION

Table-1: Mean, S.D. of Height, Weight and Age of the Triple jumpers (N-15)

Tests	Mean	SD
Height	180.43	5.644
Weight	75.5	6.757
Age	23.19	3.69

Table - 2 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Standing Triple Jump (Experimental group I)

	Groups	N	DF	Mean	S.D.	't'
Standing Triple jump	Pre	5		9.53	0.15248	
			8			4.505*
	Post	5		9.92	0.12402	

*Significant at 0.05 level.

Table - 3 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Triple Jump from full approach (Experimental group I)

	Groups	N	DF	Mean	S.D.	't'
Triple jump from full approach	Pre	5		15.40	0.51769	
			8			2.390*
	Post	5		16.10	0.50878	

*Significant at 0.05 level.

Results presented in Table 2 and 3 showed a statistically significant difference between pre and post test values after six week plyometric training as the obtained 't' value (4.505) for standing triple jump and (2.39) for triple jump with full approach are greater than the table value.

Table - 4 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Standing Triple Jump (Experimental group II)

	Groups	N	DF	Mean	S.D.	't'
Standing Triple jump	Pre	5		8.97	0.18574	
			8			2.799*
	Post	5		9.36	0.14361	

Table - 5 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Triple Jump from full approach (Experimental group II)

	Groups	N	DF	Mean	S.D.	't'
Triple jump from full Approach	Pre	5		14.85	0.10667	
			8			2.508*
	Post	5		15.03	0.12042	

*Significant at 0.05 level.

Table - 6 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Hop, Step and Jump Ratio (Experimental group II)

	Groups	N	Pre-Mean	Post-Mean	Difference .	't'
Hop, Step and Jump Ratio	Hop	5	38.90	36.84	2.06	2.248
	Step	5	27.60	29.11	1.51	1.978
	Jump	5	33.50	34.05	0.75	0.292

*Significant at 0.05 level.

Table 4 & 5 show that experimental group ll indicate a statistically significant improvement in standing triple jump and triple jump from full approach with 2.799 and 2.508 values respectively. Marked ratio training did not lead to expected change in hop, step and jump ratio(Table 6). Results presented in table 7 and 8 show a non-significant change in standing triple jump and triple jump from full approach performance.

Table - 7 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Standing Triple Jump (Control Group)

	Groups	N	DF	Mean	S.D.	't'
Standing Triple Jump	Pre	5		8.14	0.19494	
			8			0.637
	Post	5		8.22	0.20187	

Table - 8 : Mean, SD and 'T' Value Difference between Pre-Test and Post-Test in Triple Jump from full approach (Control Group)

	Groups	N	DF	Mean	S.D.	't'
Triple jump from full Approach	Pre	5		14.33	0.11235	
			8			0.773
	Post	5		14.42	0.17536	

CONCLUSION

On the basis of results of the study, we can conclude that plyometric training, known as "jump training", to improve jumping ability (Bosco et al, 1979; Blattner & Noble, 1979; Polhemus & Burkhardt, 1980) is an effective means for the development of specific strength required for higher performance in triple jump.

Indian jumpers fall in the hop dominating category and as per the recommendation (Hop-37.8% :Step-28.9% :Jump-33.3%) made by Vershoshanski (1979)are having better chances to achieve maximum distance. Six week marked ratio training was not sufficient to achieve expected change in hop, step and jump ratio, but the marked

ratio drills being similar to plyometric drills lead to improvement in triple jump performance.

Marked ratio predominantly determined by the motor coordination processes needs to be perfected during early days. It is very difficult to make major changes in the complex skills like triple jump of high level performers.

It is also suggested that strict ratios should not be assigned because of the great difference in athletes. It is very probable that changes in ratio will occur as the athlete gains skill. But, at the same time, at junior or sub junior level marked ratio training can be utilized as junior level jumpers can be molded in any shape.

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