

The Effect of Plyometric Training on Explosive Power and Speed of Handball Players

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1.0 Introduction

Handball is a sport which is rapidly gaining popularity all over the world and India is not an exception. Though in India, people are generally accustomed to watching sports such as cricket, football, basketball, volleyball, etc. Handball is speedily moving in the group of above mentioned sports. Handball is basically designed by combining aspects of basketball, soccer and baseball. The game is unique, with a rapid and physical yet simultaneously skillful and strategic style of play. Handball teams across the world have received growing interest during the past decades. Hence, understanding the technical and physical demands of the sport is essential for talent identification, injury prevention and the design of position-specific training programs both in developing and professional players. Till date, on-court physical and physiological demands during games have been only partially studied and the influence of various training methods like the plyometric exercises on the physical fitness has been overlooked.

Long-term training processes in handball, along with appropriate selection, lead to the formation of an optimal, specific bio-motor structure responsible for achievement of top performance in handball. This is a very complex sport where successful performance depends on a number of basic abilities in particular strength, power, speed and endurance. Creativity in combination with speed and strength as well as coordination makes this sport very attractive but tough to play. In the backdrop of importance of training in the development of the handball player's physical fitness, impact of plyometric training has been assessed in this study.

2.0 Methodology

2.1 Population

All the handball players of Nagpur District aged between 15-19 years were considered as the total population of the study.

2.2 Selection of the Subjects

Out of total population 50 handball players of 16-19 year age group from Nagpur District and those who have participated in State Level Handball Tournaments were selected by using random sampling method. Prior to selection, the purpose of research was explained to the subjects and they were motivated to put in their best efforts during each attempt.

2.3 Design of the study

The design of the study was random group design as 50 handball players of 16-19 year age, from Nagpur District, participated in state level tournament selected as subjects randomly.

2.4 Criteria Measure

Dimension	Name of test items	Recommended Measures
Physical fitness	i) Standing broad jump	Explosive power
	ii) 50 yard dash	Speed

Above tests were administered on handball players before and after providing 8 weeks standard plyometric training program to the players which was designed by the researcher.

2.5 Administration of Tests

First of all researcher called the assembly of players then he gave instructions about the test which are being performed during the research. He demonstrated the test to the players so they will get a brief idea about the test. For the prevention of the injury researcher made sure that the body of the player was warmed prior to tests. Standing broad jump test was used to check the explosive power and 50 yard dash test was used to determine the speed of handball players.

2.6 Reliability of data

The reliability of data was ensured by establishing the instruments reliability, tester's competency and reliability of the test.

2.7 Statistical Techniques

- **Descriptive statistics:** The primary data collected from the handball players was analyzed following standard statistical tools. The descriptive statistics, such as mean, standard deviation, standard error, skewness, kurtosis, etc. were computed.
- **Comparison:** The comparative assessment of the data obtained before and after providing eight weeks plyometric training to handball players was carried out by using ‘t’ test procedure.
- **Significance level:** The level of significance was set at 0.05.

3.0 Results and Discussion

Speed – Pre and Post training 50 Meter Dash Scores

Table 1: Pre and Post training speed scores of handball players

	Pre - Training	Post - Training
N	50	50
Minimum	6.4	6.1
Maximum	7.9	7.5
Mean	7.2 sec.	6.9 sec.
Std. Deviation	±0.21	±0.19
Skewness	-0.748	-0.624
Kurtosis	0.424	0.101

Table 1 shows characteristics of data obtained for 50 meter dash test of handball players of Nagpur District, participated in state level tournaments before undergoing plyometric training. It was observed from the analysis that the mean time needed to complete 50 meter dash pre-training was 7.2±0.21 sec. and varied between 6.4 and 7.9 sec. However, Skewness and Kurtosis values for the dataset were -0.748 and 0.424 respectively. Furthermore mean time needed to complete 50 meter dash post training was 6.9±0.19 sec. and varied between 6.1 and 7.5 sec. In addition to its Skewness and Kurtosis values for the dataset were -0.624 and 0.101 respectively.

Explosive Power

Pre and Post training Standing Broad Jump Test Scores

Table 2: Pre and Post training standing broad jump scores of handball players

	Pre - Training	Post - Training
N	50	50
Minimum	1.68	1.95
Maximum	3.22	3.48
Mean	2.18	2.69
Std. Deviation	±0.21	±0.17
Skewness	1.157	1.259
Kurtosis	2.412	1.097

Table 2 shows characteristics of data obtained for standing broad jump test of handball players of Nagpur District, participated in state level tournaments before undergoing plyometric training. It was observed from the analysis that the mean distance covered through standing broad jump by handball player pre training was 2.18±0.21 met. and varied between 1.68 and 3.22 met. However, Skewness and Kurtosis values for the dataset were 1.157 and 2.412 respectively. Furthermore mean distance covered through standing broad jump by handball player post training was 2.69±0.17 met. and varied between 1.95 and 3.48 met. Furthermore, Skewness and Kurtosis values for the dataset were 1.259 and 1.097 respectively.

Effect of Plyometric Training on Speed of Handball Players

Table 3: Comparative assessment of speed of the handball players pre and post plyometric training

	N	Mean	SD	MD	t	P
Pre – Training	50	7.2	0.21	0.3	2.987	<0.05
Post – Training	50	6.9	0.19			

N- Number of Players; SD- Standard Deviation; SE- Standard Error; MD- Mean Difference; t- t value; P- Probability

Table 3 shows comparative assessment of data of 50 meter dash performed by handball players of Nagpur District, participated in state level tournament, before and after undergoing plyometric training for 8 weeks. It was apparent from the information that mean time needed to complete 50 meter dash before undergoing training was 7.2±0.21 sec., whereas mean time needed to complete 50

meter dash after undergoing training was 6.9 ± 0.19 sec. It was apparent from the comparative analysis of data that time needed for completing 50 meter dash test by the handball players after plyometric training was significantly ($p < 0.05$) less than the time needed by the handball players before plyometric training.

Effect of Plyometric Training on Explosive Power of Handball Players

Table 4: Comparative assessment of explosive power of the handball players before and after plyometric training

	N	Mean	SD	MD	t	P
Pre – Training	50	2.18	± 0.21	0.51	2.564	< 0.05
Post – Training	50	2.69	± 0.17			

N- Number of Players; SD- Standard Deviation; SE- Standard Error;

MD- Mean Difference; t- t value; P- Probability

Table 4 shows comparative assessment of data of standing broad jump performed by handball players of Nagpur District, participated in state level tournament, before and after undergoing plyometric training for 8 weeks. It was apparent from the information that mean distance covered in standing broad jump by handball players before undergoing training was 2.18 ± 0.21 met., whereas mean distance covered in standing broad jump by handball players after undergoing training was 2.69 ± 0.17 met. It was apparent from the comparative analysis of data that distance covered in standing broad jump by handball players by the handball players after plyometric training was significantly ($p < 0.05$) more than the distance covered in standing broad jump by handball players before plyometric training.

4.0 Conclusions

4.1 Pre-training 50 Meter Dash Scores

- It is evident from the study results that the average time needed to complete 50 meter dash was 7.2650 ± 0.35215 sec.

4.2 Post-training 50 Meter Dash Scores

- It is apparent from the study results that the average time needed to complete 50 meter dash was 7.0233 ± 0.31696 sec.

4.3 Pre-training Standing Broad Jump scores

- It is observed that the average distance covered through standing broad jump by handball player was 2.24 ± 0.20683 met.

4.4 Post-training Standing Broad Jump scores

- It is evident from the study results that the average distance covered through standing broad jump by handball player was 2.3650 ± 0.19295 met.

4.5 Effect of Plyometric Training on Speed of Handball Players

- It may be concluded from the study results that there is significant improvement in the speed of handball players of Nagpur District after undergoing the plyometric training.

4.6 Effect of Plyometric Training on Explosive Power of Handball Players

- It may be concluded from the study results that there is significant ($P < 0.05$) improvement in the explosive power of handball players of Nagpur District after undergoing the plyometric training.

5.0 References

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