Utility of Plyometric Training Method for Improving Explosive Power of Leg and Speed of Hockey Players

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1.0 Introduction

Being an intermittent endurance sport, field hockey requires a mixture of extraordinary aerobic fitness, anaerobic power, and speed and agility, in addition to optimal skills. It also requires continuous dribbling of the ball, quick changes of direction, walking and sprinting throughout the competitive game where players cover the entire field during an attack, and exquisite defence tactics. Appropriate training and continual monitoring are needed to achieve peak player performance. Hence, newer and more effective training protocols are always in high demand, which can ensure enhancement of the player's performance (Sharma and Kailashiya, 2018). There is a recognized need for sport-specific targeted training regimens and guidelines for coaches that help in developing desired characteristics in players of various games including field hockey (Melton et al., 2008).

Amongst many types of training techniques, plyometrics is one such popular training regimen that improves human performance. Though initially designed for athletes participating in the Olympics, the ability of plyometrics to improve muscle contractions in a specific pattern, subsequently generating powerful contractions, has gained popularity in sports such as field hockey. Plyometrics begins with an initial rapid muscle lengthening followed by a short rest phase and then a robust concentric muscle contraction. Enhancing speed-centred power is an additional benefit of plyometrics (Minj, 2015). In the backdrop of importance of training in the development of the hockey player's physical fitness, impact of plyometric training has been assessed in this study.

2.0 Methodology

2.1 Population and Selection of the Subjects

All the hockey players of Nagpur District aged between 18-23 years were considered as population of the study. Out of the above mentioned population 120 hockey players who have participated in Collegiate Level Hockey Tournaments were selected by using random sampling method.

2.2 Design of the study

The design of the study was random group design.

2.3 Criteria Measure

In order to determine the changes in physical fitness of hockey players in relation to their participation in eight weeks plyometric training program their explosive power of legs and speed was evaluated by conducting standing broad jump and 50 yard dash tests respectively.

2.4 Reliability of data

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

2.5 Statistical Techniques

The primary data collected from hockey players was analyzed by using standard statistical tests. The descriptive statistics, such as mean, standard deviation, standard error, etc. were computed. The comparative assessment of the data collected before and after eight weeks plyometric training was carried out by using 't' test procedure. The significance level was set at 0.05.

3.0 Results and Discussion

Results of the 50 Meter Dash Test

Table 1: Before and after plyometric training speed test scores of hockey players

	Before Training	After Training
N	120	120
Minimum	6.8	6.2
Maximum	7.8	7.7
Mean	7.1 sec.	6.4 sec.
Std. Deviation	±0.24	±0.14

Table 1 shows characteristics of data obtained for 50 meter dash test of hockey players of Nagpur District, participated in collegiate level tournaments before and after undergoing plyometric training. It was observed that the before training time needed to complete 50 meter dash was 7.1±0.24 sec. and varied between 6.8 and 7.8 sec. Furthermore after eight weeks training time needed to complete 50 meter dash was 6.4±0.14 sec. and varied between 6.1 and 7.5 sec.

Results of the Standing Broad Jump Test

Table 2: Before and after plyometric training explosive power test scores of hockey players

	Pre - Training	Post - Training
N	120	120
Minimum	1.68	1.95
Maximum	3.22	3.48
Mean	2.18	2.69
Std. Deviation	±0.21	±0.17

Table 2 shows characteristics of data obtained for standing broad jump test of hockey players of Nagpur District, participated in collegiate level tournaments before and after undergoing plyometric training. It was observed that the before training distance covered to complete standing broad jump was 2.18±0.21 met. and varied between 1.68 and 3.22 met. Furthermore after eight weeks training distances covered to complete standing broad jump was 2.69±0.17 met. and varied between 1.95 and 3.48 met.

Effect of Plyometric Training on Speed of Hockey Players

Table 3: Comparison of speed of hockey players before and after plyometric training

	N	Mean	SD	MD	t	P
Before Training	120	7.1	0.24	0.7	3.154	<0.05
After Training	120	6.4	0.14			

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

Table 3 shows comparison of 50 meter dash test data of hockey players of Nagpur District, participated in collegiate level tournament, before and after undergoing plyometric training for 8 weeks. It was evident from the results that time needed to complete 50 meter dash before undergoing training was 7.1±0.24 sec., whereas after training it was 6.4±0.14 sec. It was clear from the comparative analysis that there is significant ($p<0.05$) difference in the test scores with the test score after training was less. This shows that the plyometric training had positive impact on the speed of hockey players.

Effect of Plyometric Training on Explosive Power of Hockey Players

Table 4: Comparison of explosive power of hockey players before and after plyometric training

	N	Mean	SD	MD	t	P
Before Training	120	2.18	±0.21	0.51	2.564	<0.05
After Training	120	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 comparison of standing broad jump test data of hockey players of Nagpur District, participated in collegiate level tournament, before and after undergoing plyometric training for 8 weeks. It was evident from the results that distance covered to complete standing broad jump before undergoing training was 2.18±0.21 met., whereas after training it was 2.69±0.17 met. It was clear from the comparative analysis that there is significant ($p<0.05$) difference in the test scores with the test score after training was high. This shows that the plyometric training had positive impact on the explosive power of hockey players.

4.0 Conclusions

4.1 Speed – Before Plyometric Training

- It is evident from the study results that the average time needed to complete 50 meter dash was 7.1±0.24 sec.

4.2 Speed – After Plyometric Training

- It is apparent from the study results that the average time needed to complete 50 meter dash was 6.4±0.14 sec.

4.3 Explosive Strength of Legs – Before Plyometric Training

- It is observed that the average distance covered through standing broad jump by hockey player was 2.18±0.21 met.

4.4 Explosive Strength of Legs – After Plyometric Training

- It is evident from the study results that the average distance covered through standing broad jump by hockey player was 2.69±0.17 met.

4.5 Effect of Plyometric Training on Speed of Hockey Players

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

4.6 Effect of Plyometric Training on Explosive Power of Hockey Players

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

5.0 References

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