

Effect of Hockey Specific Training Program on Strength, Speed and Agility in Collegiate Hockey Players

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Abstract

Background: Hockey is a fast-paced and high-intensity sport that requires players to possess various physical attributes, including strength, power, agility, and endurance. It requires explosive movements, quick changes in direction, and constant upper and lower body coordination

Purpose: There are a number of training programs that are focused on improving strength, speed, and agility. There is less data available on hockey-specific training for field hockey players. Thus, the need for this study is to investigate the effect of a hockey-specific training program on strength, speed, and agility.

Materials and Methods: Total of thirty collegiate hockey players who are continually playing hockey for more than 3 to 4 years, the age between 18-25 were selected from SIMATS, Chennai. Strength, Speed and agility were measured using 1RM squat for lower limb, 1 RM bench press for upper limb, 10 meter DASH run test and Illinois agility test respectively. The players were randomly allocated into two groups, one group received hockey specific training program 4 days per week for 8 weeks. Another group perform regular training program.

Results: A t test analysis was used to compare the effectiveness of hockey specific training programme and regular training programme, which shows statistically significant improvement in hockey specific training programme group with a p value of < 0.0001

Conclusion: Here by we concluded that hockey specific training program will improve the strength, speed and agility in collegiate hockey players.

Key Word: Speed, Agility, strength, Hockey specific training program, 1 RM Squat, Bench press, 10 meter DASH run test, Illinois agility test.

Introduction

Field hockey is a sport with unique demands that requires players to possess a combination of physical attributes like agility, speed, strength, and endurance and specific skills like dribbling, passing, and shooting accurately. To achieve a high level of

performance in this sport, players must engage in a specific training program that improves their fitness level and skills while minimizing the risk of injury¹. Players need to have the ability to move quickly, have strength to tackle opponents, and agility to avoid defenders. Therefore, it is essential to understand

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the importance of these attributes for field hockey players and their performance².

Speed is a crucial element in field hockey, especially while attacking and defending. Speed helps players to run faster, reach the ball quicker, and ultimately make more successful plays. This is particularly important when defending penalty corners, where the player needs to run quickly to the goalpost and cover it³.

Agility is the ability to change direction quickly while maintaining balance and control. In field hockey, agility is vital when dribbling past defenders or avoiding tackles⁴.

Strength is fundamental in optimizing a field hockey player's ball control and shooting power. A stronger physique allows players to exert more force when striking the ball, resulting in more powerful shots. Strength training exercises focusing on the upper body, especially the core and upper arm, can enhance a player's ability to accurately and forcefully strike the ball⁵.

Hockey-specific strength training emphasizes compound exercises that engage multiple muscle groups, functional movements that mirror on-field action, and exercises that improve core strength. Enhanced strength empowers players to exhibit more powerful shots, execute decisive tackles, and maintain an advantage in physical contests⁶.

Optimizing performance gains necessitates the implementation of periodization and progressive overload within a training program. Periodization refers to organizing training into specific cycles, each with its own goals and training intensities⁷. Progressive overload involves gradually increasing the demands placed on the body to elicit continued adaptation. This can be achieved through manipulating variables such as intensity, volume, and exercise selection throughout the training program⁸.

On the other hand, regular exercise programs can help improve the general fitness level of players. Such programs focus on improving cardio-respiratory and muscular endurance, strength, and flexibility⁹.

Regular exercise programs usually consist of cardiovascular training, weight training, and flexibility exercises. Although regular exercise

programs can improve the overall fitness of field hockey players, they may not necessarily be sufficient to address the specific needs required for playing hockey¹⁰.

Aim

The purpose of this study is to compare the effect of a Regular Training Program with a Hockey-Specific Training Program on collegiate hockey players' strength, speed, and agility.

Materials and Methodology

A total of thirty subjects were selected from Saveetha Institute of Medical and Technical Science; Informed consent was obtained from the subjects. A Random sampling method was used to gather the sample. The period of study was from July 2022 to December 2022.

Inclusion criteria:

- Subjects who were continually playing hockey more than 3 to 4 years
- Age between 18-25 years
- Only male players

Exclusion criteria:

- Players who are injured recently
- Players who are in recovery states

Outcome Measures

1. RM squat, bench press, Illinois agility test, 10 meter DASH run test were used as outcome measure which measures lower limb muscle strength upper limb muscle strength, agility and speed respectively

Procedure

Written informed consent was obtained from the participants who met a pre defined inclusion and exclusion criteria. Players were randomly allocated into hockey specific training program group (15 members) and regular training program group (15 members). Lottery method was used for random allocation. Pre test values for speed, agility and strength was measured using 10 meter dash run test, Illinois agility test, 1RM squat for lower limb and bench press for upper limb respectively. Selected Participants were trained for hockey specific training

program for 8 weeks period of time, 4 days per week, in that strength training was given on Monday and Thursday, speed and agility training were given on Tuesday and Friday, Wednesday is considered as off. Subjects in regular training group perform structured regular exercise training. Post test values of strength, speed and agility are taken at the end of the 8 th week and documented for statistical analysis

Intervention Protocol:

Hockey Specific Training Programme

Strength

(Week 1to 4)

- Hang clean
- Dead lift
- Reverse lunge
- Split squat
- Shoulder press
- Plank rocks
- Hip thrust

(Week 4to8)

- Hang clean
- Dead lift
- Reverse lunge
- Split squat
- Shoulder press
- Plank rocks
- Hip thrust
- Abdominal drawing and crunch
- Banded adduction

SETS AND REPETITION

- WEEK (1-2) 2×10
- WEEK (3-4) 3 ×8
- WEEK (4-6) 3 ×10
- WEEK (7-8) 4 ×8

SPEED

(WEEK 1-8)

- 20m sprinting drills
- High knee
- Shuttle run

- High step jogging
- Double switch
- Triple swith
- Box jump

WEEK (1-4) 2 Circuits

WEEK (5-8)3 Circuits

AGILITY

(WEEK 1-8)

- Side shuttle run
- T drills
- Corico sideways jump
- Zig Zag drills
- Figure 8 cross over

WEEK (1-4) 2 Circuits

WEEK (5-8)3 Circuits

Regular Training Program

STRENGTH

- Squat
- Lunge
- Calf raise
- Hamstring curl
- Bench press
- Push up
- Pull up
- Overhead press

SPEED

- High step walking
- Run shuffle
- Run speed
- Skipping
- Triple jump
- Lateral low hurdle run
- Split jump

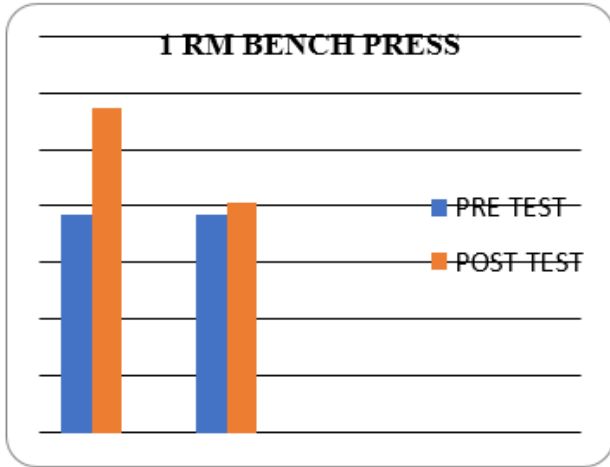
AGILITY

- 3 Cone drills
- L Drills
- Tuck jump

- Deceleration drills
- Lateral plyometric jump
- Laterals drills

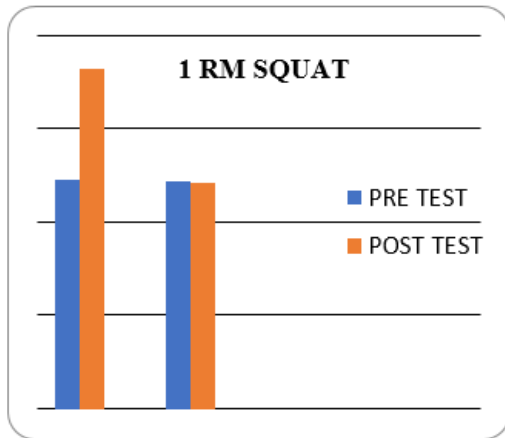
Data Analysis

The Pre and Post test values of strength (1 RM bench press & Squat) , agility (Illinois agility test) and speed (10 meter DASH run test) were mentioned in graph 1,2,3 and 4.



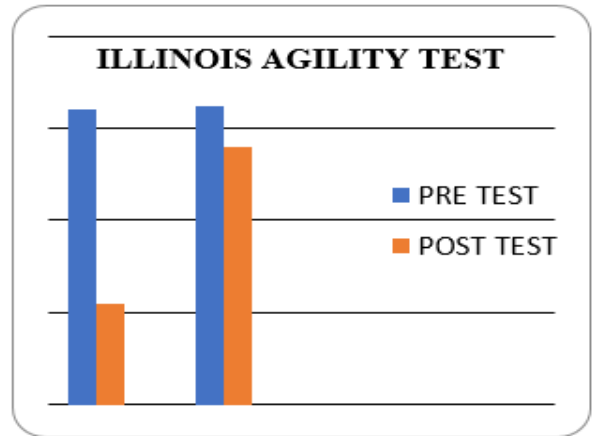
Graph No: 1

INTERPRETATION: Graph No: 1 shows hockey specific training group is effective than regular training group in terms of upper limb strength (1RM bench press)



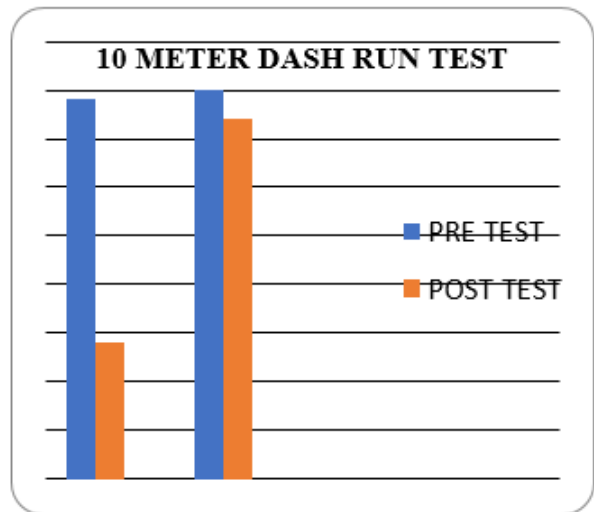
Graph No: 2

INTERPRETATION: Graph No: 2 shows hockey specific training group is effective than regular training group in terms of lower limb strength (1RM Squat)



Graph No: 3

INTERPRETATION: Graph No: 3 shows hockey specific training group is effective than regular training group in terms of Agility (Illinois agility test)



Graph No: 4

INTERPRETATION: Graph No: 4 shows hockey specific training group is effective than regular training group in terms of speed (10 m DASH run test)

Result

In hockey specific training programme group the Mean value of 1RM bench press and 1RM squat in before intervention values were 77.20 ± 3.55 & 122.53 ± 6.95 and after intervention values were 114.60 ± 7.19 & 181.60 . In regular training programme group the Mean value of 1RM bench press and 1RM squat in before intervention value was 77.30 ± 4.10 & 121.80

± 7.24 and after intervention value was 181.00 ± 5.71 & 121.07 . Both groups showed statistically significant improvement in post test values, but compared to regular training programme group hockey specific training group shows better improvement.

The mean value of 10 meter dash run test, for hockey specific training programme was 1.99 ± 0.76 in pre-test and 1.74 in post-test with a p value of < 0.0001 it shows statistically significant improvement when compared to regular training group which has a pre-test value of 2.0 ± 0.83 and post-test value of 1.97 ± 0.05

In hockey specific training programme group the Mean value of Illinois agility test in before intervention values were 17.10 ± 0.59 and after intervention value was 16.05 ± 0.71 . In regular training programme group the Mean value of Illinois agility test in before intervention value was 17.12 ± 0.56 and after intervention value was 16.90 ± 0.69 .

Discussion

This study was conducted to assess the effectiveness of a hockey-specific training program on field hockey players' strength, speed, and agility. The study shows a considerable difference following a particular training regimen. Consequently, the players' performance is enhanced.

The study conducted by Neha Ingale Chaudhary on specific speed and agility drills to improve the performance of field hockey players and states that after receiving rigorous Speed and Agility training, the number of slow-twitch muscle fibers increased, allowing for prolonged strength of contraction over several minutes to hours. This directly lowers the risk of injury and improves performance, which makes the player faster

Agility training emphasizes proprioception and kinaesthetic awareness, which allow athletes to have an enhanced sense of body positioning, movement, and limb control. This perceptual ability is vital for responding rapidly to external stimuli and making split-second decisions during play¹¹.

One key aspect of speed training is the development of muscular power and strength. The ability to produce force quickly and efficiently is

vital for speed improvement. Muscular power is a measure of the force generated per unit of time. Speed training not only improves muscular strength but also enhances neural adaptations¹².

The study conducted by sankarmani concluded that plyometrics positively improves the vertical jumping ability and increases the neuromuscular efficiency¹³.

Resistance training, a key component of hockey-specific training, involves the use of external loads, such as free weights or resistance machines, to induce muscular adaptations. This method helps increase muscle mass, improves neuromuscular coordination, and enhances force production ability⁵.

Conclusion

Field hockey players require a training program that is tailored to the specific demands of their sport. Hockey-specific training programs are designed to improve the specific skills that are necessary for playing hockey, such as speed, agility, and strength, and have been shown to be more effective in improving hockey-specific skills than regular exercise programs that are more generalized. For field hockey players looking to improve their on-field performance, a hockey-specific training program may be the best solution.

Conflict of Interest: Nil

Funding: Nil

Ethical clearance: Approved by Institutional Scientific Review Board

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