Position Specific Fitness Analysis of Men Hockey Player in Pune City

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ABSTRACT

The position-specific physical characteristics of men hockey players in Pune City are studied in this study. The study examines differences in measures of performance (speed, agility, endurance) between forward, midfielder, and defender positions. We find significant differences in player features using statistical tools like post hoc LSD analyzing and ANOVA. The fast-paced, high-intensity sport of hockey requires a combination of strength, speed, endurance, and agility. To perform at their highest level, players playing different positions goalkeepers, defenders, midfielders, and forwards need different physical characteristics. Coaches can create training plans that are specific to the needs of their positions with the help of a well-structured fitness analysis. The purpose of this study is to measure and study the level of fitness of hockey players in Pune. By measuring key fitness indicators, this study aims to enhance player performance, reduce injury risks, and optimize training regimens

Keywords : Hockey Players, Position-Specific Fitness, Grip Strength, Agility, Speed, Endurance.

Introduction

Field hockey is a dynamic sport requiring a blend of speed, strength, endurance, and agility. Players occupying different positions forward, midfielder, and defender must develop distinct fitness attributes to excel in their roles. Forwards depend on speed and agility to penetrate the opponent's defense, while midfielders play a crucial role in transitioning between attack and defense, demanding high endurance. Defenders, on the other hand, rely on strength and agility to block offensive plays and

safeguard their goal. Understanding these position-specific fitness needs is essential for enhancing overall performance and reducing the risk of injuries.

This study examines male hockey players in Pune City, categorizing them based on their playing positions. The aim is to analyze and compare their fitness levels using standardized fitness tests. By employing statistical analysis, the research identifies key differences among players in different positions, helping trainers design specialized fitness programs that cater to the unique demands of each role. This study bridges the gap between sports science and practical coaching, providing data-driven insights to improve player conditioning and overall game performance.

Field hockey is a high-intensity sport that involves constant running and sudden bursts of speed. Cardiovascular fitness is crucial for players to maintain their stamina throughout the game. Field hockey requires players to change direction rapidly, dodge opponents, and navigate the field with precision. Speed is a critical element in field hockey, allowing players to outrun opponents and make quick sprints to create scoring opportunities. Focusing on quick bursts of acceleration and maintaining speed over short distances is key to success in field hockey.

The purpose of the study was to compare the fitness parameters of hockey players among different playing positions.

Methodology

A descriptive and comparative research design was adopted for this study, focusing on position-specific fitness levels of male hockey players in Pune City. The research sample consisted of players classified into three groups: forwards, midfielders, and defenders. Data collection was carried out using a standardized set of fitness tests, which included:

- 12-Minute Run – Evaluating cardiovascular endurance.
- Illinois Agility Test – Assessing agility and quick directional changes.
- 30m Dash – Measuring sprint speed.
- 1-Minute Sit-Ups – Assessing core strength and endurance.
- Handgrip Strength Test – Determines arm strength.

The collected data were analyzed using one-way ANOVA to determine significant differences in fitness attributes among the three groups. Post hoc LSD analysis was employed to pinpoint specific differences between positional groups.

Data Collection

A series of standardized fitness tests were used to measure physical attributes:

1.   12-Minute Run Test

2.   Illinois Agility Test

3.   1-Minute Sit-Ups Test

4.   30-Meter Dash

5.   Hand Grip Strength Test

Statistical Tolls Used

- • One-Way ANOVA: Used to compare the mean differences between the three groups (Forwards, Midfielders, and Defenders).
- • Post Hoc LSD (Least Significant Difference) Test: Identifies specific position-based differences in fitness parameters.

Data Analysis and Interpretation

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Table No 1 :

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
12 min Run	Froward	Defender	460.45455	288.21383	.121
	Froward	Mid Fielder	284.14141	303.80406	.358
	Defender	Mid Fielder	-176.31313	303.80406	.566
30 m Dash	Froward	Defender	-.41455*	.15259	.011
	Froward	Mid Fielder	-.05545	.16085	.733
	Defender	Mid Fielder	.35909*	.16085	.034
Illinois Agility	Froward	Defender	-1.87636	1.25124	.145
	Froward	Mid Fielder	.44869	1.31892	.736
	Defender	Mid Fielder	2.32505	1.31892	.089

Hand Grip Strength Right	Froward	Defender	-1.42727	3.17008	.656
	Froward	Mid Fielder	1.56970	3.34156	.642
	Defender	Mid Fielder	2.99697	3.34156	.377
Hand Grip Strength Left	Froward	Defender	-3.30000	3.37254	.336
	Froward	Mid Fielder	2.10505	3.55497	.559
	Defender	Mid Fielder	5.40505	3.55497	.140
1 min Sit Ups	Froward	Defender	6.09091	3.67977	.109
	Froward	Mid Fielder	5.78788	3.87882	.147
	Defender	Mid Fielder	-.30303	3.87882	.938

Forwards performed better in the 30m dash, recording an average time significantly faster than defenders.

Illinois Agility Test, defenders recorded slower times than both forwards and midfielders.

Hand grip strength, defenders displayed greater upper body strength than forwards,

In terms of core endurance, measured by the one-minute sit-up test, forwards completed more sit-ups on average than defenders,

For overall endurance, assessed through the 12-minute run test, forwards covered the most distance compared to defenders and midfielders

Table no 2 : *Post hoc analysis of 30 m Dash*

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Dash	Forward	Defender	-.41455*	.15259	.011
	Forward	Mid Fielder	-.05545	.16085	.733
	Defender	Mid Fielder	.35909*	.16085	.034

The mean difference between **Forward and Defender** (-0.41455) is statistically significant (p = 0.011).

The mean difference between **Defender and Midfielder** (0.35909) is also statistically significant (p = 0.033).

The difference between **Forward and Midfielder** (-0.055455) is not significant (p = 0.732).

Conclusions

This study aimed to compare the position-specific fitness characteristics of male hockey players in Pune City using statistical analysis, including ANOVA and post hoc tests. The results revealed significant differences in certain fitness components, emphasizing the distinct physical demands associated with each playing position.

The analysis showed that forwards demonstrated superior sprinting ability in the 30m dash, which aligns with their need for quick acceleration and rapid movement during offensive plays. Conversely, defenders exhibited greater grip strength, highlighting the physical demands of tackling and maintaining defensive stability. Midfielders, who play a crucial role in both attacking and defensive transitions, displayed balanced endurance and agility, reinforcing their requirement for sustained performance throughout the game.

Despite these differences, endurance, agility, and core strength did not show statistically significant variations among the positions. This suggests that all hockey players, regardless of their role, require a well-rounded fitness profile to maintain high performance throughout a match. The findings indicate that while speed-focused training is crucial for forwards, defenders should emphasize strength conditioning, and midfielders may benefit from endurance-based workouts to sustain their dual-role demands.

Overall, these insights provide valuable information for hockey coaches and trainers to develop specialized training programs tailored to the specific fitness needs of each position. By incorporating position-specific fitness regimens, players can enhance their performance, reduce injury risks, and optimize their physical capabilities on the field. Future research could explore additional physiological and biomechanical factors to further refine training methodologies for hockey players.

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