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COMPARATIVE ANALYSIS OF SELECTED VISUAL MOTOR SKILLS BETWEEN JUNIOR AND SENIOR NATIONAL LEVEL MEN'S HOCKEY PLAYERS

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Abstract

The significance of sports science in unraveling the complexities of field hockey performance cannot be overstated. Field hockey, a sport known for its fast-paced nature and strategic game play, demands a unique blend of physical powers and cognitive acuity. This study aimed to investigate and compare selected visual motor skills between junior and senior national level men's hockey players. The research involved 15 subjects for each group from Lakshmibai national institute of physical education Gwalior comprising both junior and senior national level hockey players. To assess the specified visual motor skills, a battery of tests was administered, employing standardized methodologies. The variables of interest included time movement anticipation, visual reaction time, and peripheral awareness. The independent t-test was employed as the statistical tool to analyze the differences between the two groups, with a significance level set at 0.05. The findings of study revealed significant difference between junior and senior national men's hockey players incase of time movement anticipation and visual reaction time. However incase of peripheral awareness there was no significant difference found between both groups.

Keywords: Visual reaction time, Time movement anticipation, Peripheral awareness and Visual motor skills

Introduction

In the realm of sports, the synergy between physical education and sports science plays a important role in enhancing athletic performance across various disciplines. Sports science, as a multidisciplinary field, provides a systematic framework for comprehending, evaluating, and optimizing athletic capabilities (Miller & Jackson, 2021). Sports science, a field covering physiology, biomechanics, and psychology, plays a crucial role in unraveling how humans move and perform. This paper explores the connection between sports science, visual motor skills, and field hockey, examining how these factors shape the development of athletes. At the core of an athlete's toolkit are visual motor skills – the seamless integration of vision and movement. These skills involve the ability to anticipate, react, and move in sync with the dynamic demands of sports.

In the context of Field hockey, a sport known for its agility and strategic finesse, a player's proficiency in visual motor skills becomes a key factor in achieving success. Field hockey, with its fast-paced and strategic game play, provides an engaging platform to understand visual motor skills. The intricate interplay between stick and ball demands not only physical agility but also cognitive sharpness. As players navigate the field, concepts like time movement anticipation, peripheral awareness, and visual reaction time become

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essential for success. Among the essential cognitive aspects, visual motor skills stand out as critical components that significantly influence a player's effectiveness on the field (Clark & Thompson, 2018). The ability to swiftly process visual information, make precise decisions, and execute accurate motor responses is fundamental to achieving success in the dynamic environment of field hockey.

Field hockey players, like watchful guardians, need acute peripheral awareness. Expanding their field of vision allows them to track teammates, opponents, and the ball simultaneously. This heightened awareness sets the stage for quick decision-making, ensuring players are attuned to the ever-changing dynamics of the game. Time movement anticipation is about executing precise movements within specific time constraints, determining the opportune moments for passes, tackles, and goal-scoring maneuvers. Similar to a chess player predicting an opponent's move, is crucial for reading game scenarios and positioning advantageously. Visual reaction time becomes the keystone in field hockey, connecting perception and action. The speed at which players process visual information and translate it into a response defines their effectiveness on the field. A split-second can make the difference between a successful play and a missed opportunity

In the upcoming sections, this paper explores a comparative analysis of selected visual motor skills between junior and senior national men's hockey players. The aim is to contribute to the understanding of field hockey while adding to the broader discussion on how science and athletic excellence go hand in hand.

Methodology

For this study 30 (15 junior national level and 15 senior national level) participants were purposively selected from Lakshmibaii national institute of physical education, Gwalior (M.P.) India. The age of the subjects was between 18 to 26 years.

Administration of test

A. Time movement anticipation (Bassin Anticipation Timer): Dr. Stanley Bassin originally developed the Bassin Anticipation Timer at California State Polytechnic University, Pomona. One of the applications of the unit is to test the area of human visual acuity related to eye-hand coordination and anticipation. The subject is instructed to watch a light as it travels down the runway. They must anticipate the light reaching the target and press a pushbutton.
B. Visual Reaction Time Test (Ruler Drop Test): The ruler is held by the tester between the outstretched index finger and thumb of the athlete's dominant hand so that the top of the athlete's thumb is level with the zero-centimeter line on the ruler. Participant were instructed to catch the ruler as soon as possible after it has been released. The tester records the distance between the bottom of the ruler and the top of the participant thumb where the ruler has been caught.
C. Peripheral awareness (Cruifix Ball Drop): The researcher stands with arms stretched out to the sides, at shoulder level, with a tennis ball held in each hand. The participants were instructed to crouch in front of the researcher with their hands by their sides. The researcher dropped one of the tennis ball and the participant has to respond to which ball has been dropped and attempt to catch it before it hits the

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ground. If the participants makes a clean catch before the ball touches the ground they are given 2 points, if not then given 1 points. 10 balls are dropped, giving a maximum 20 points.

To compare the selected visual motor skills between junior national and senior national level hockey players the independent 't-test' was applied at 0.05 level of significance.

Findings

Findings pertaining to the comparison of Junior and Senior level national players on the selected visual motor skills variables has been presented.

TABLE NO. 1
COMPARISON OF TIME MOVEMENT ANTICIPATION AMONG JUNIOR AND SENIOR LEVEL NATIONAL HOCKEY PLAYERS.

Group	Mean	Std. Deviation	df	Mean Diff.	Std. Error Mean	T-Value	P-Value
Junior	.044	.026	28	.023	0.74	2.41	.023
Senior	.067	.027					

Significant at 0.05 level of Significance t (28)(0.05) = 2.048

The independent samples t-test for "time movement anticipation" revealed statistically significant difference between the JN and SN groups. The t-statistic of 2.41, with 28 degrees of freedom, resulted in a p-value of 0.023, falling below the conventional significance level of 0.05. Graphical representation of above table is given in figure no. 01.

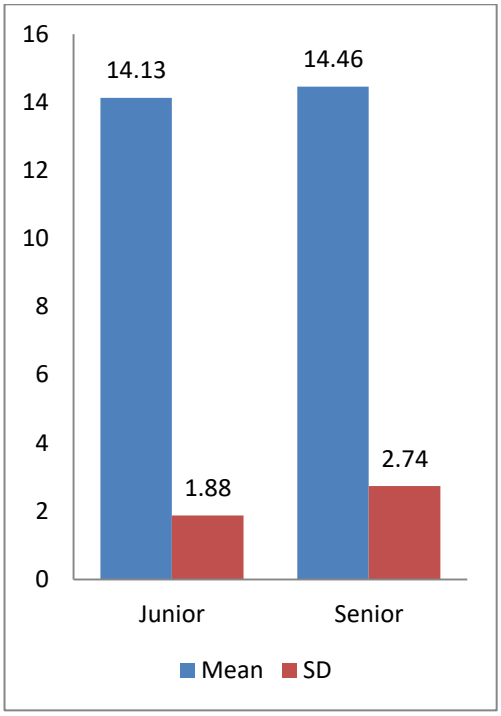

Fig. no 01: Mean and Standard Deviation values of time movement anticipation of Junior and Senior level National Hockey players.

TABLE NO. 2
COMPARISON OF TIME VISUAL REACTION TIME AMONG JUNIOR AND SENIOR LEVEL NATIONAL HOCKEY PLAYERS.

Group	Mean	Std. Deviation	df	Mean Diff.	Std. Error Mean	T-Value	P-Value
Junior	8.83	2.88	28	2.69	.74	2.22	.035
Senior	11.52	3.70					

Significant at 0.05 level of Significance t (28)(0.05) = 2.048

The independent samples t-test for "visual reaction time" revealed statistically significant difference between the JN and SN groups. The t-statistic of 2.22, with 28 degrees of freedom, resulted in a p-value of 0.035, falling below the conventional significance level of 0.05. Graphical representation of above table is given in figure no. 02.

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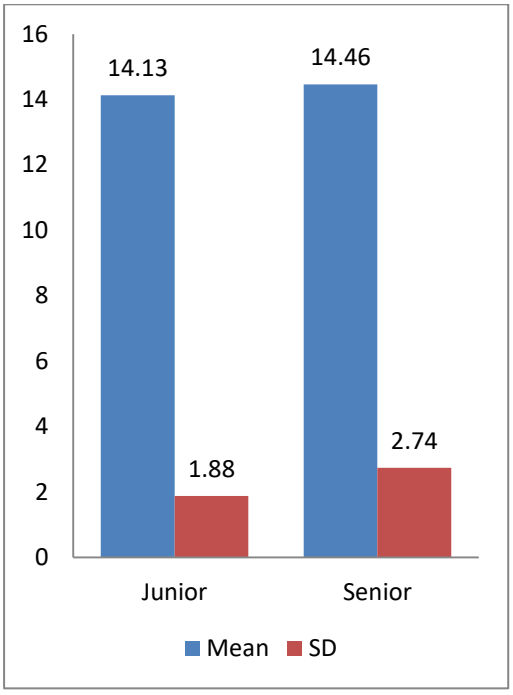

Fig. no 02: Mean and Standard Deviation values of Junior and Senior players of visual reaction time

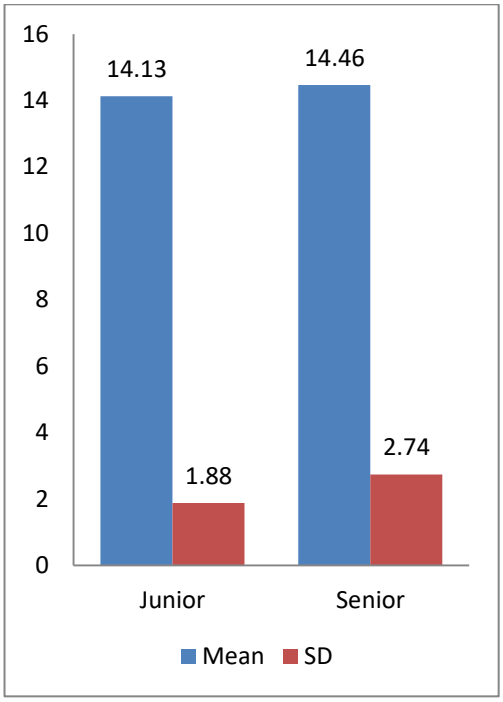

Fig. no 03: Mean and Standard Deviation values of Junior and Senior players of peripheral awareness

TABLE NO. 3
COMPARISON OF PERIPHERAL AWARENESS AMONG JUNIOR AND SENIOR LEVEL NATIONAL HOCKEY PLAYERS.

Group	Mean	Std. Deviation	df	Mean Diff.	Std. Error Mean	T-Value	P-Value
Junior	14.13	1.88	28	.333	.70	.387	.701
Senior	14.46	2.74					

Significant at 0.05 level of Significance t (28)(0.05) = 2.048

The independent samples t-test for "peripheral awareness" revealed no statistically significant difference between the JN and SN groups. The t-statistic of 0.387, with 28 degrees of freedom, resulted in a p-value of 0.701, surpassing the conventional significance level of 0.05. Graphical representation of above table is given in figure no. 03.

Conclusion

Junior players' surprising outperformance of senior players in specific visual motor skills, despite their relative inexperience and youthfulness, suggests intriguing dynamics within skill development. This unexpected outcome may stem from the agility and quick reflexes inherent in youth, coupled with a greater potential for adaptation and learning. Additionally, the fearless mindset often observed in junior players, combined with the absence of senior-level pressure and expectations, could facilitate proactive decision-making on the field. Junior athletes often outperform senior athletes in specific visual motor skills, such as reaction time and agility, due to their inherent quick reflexes and

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greater adaptability. This phenomenon is supported by studies indicating that younger athletes benefit from rapid skill acquisition and a fearless mindset, which enhances their proactive decision-making on the field (Forni et al., 2022). The unexpected result regarding peripheral awareness could be attributed to factors such as its lesser susceptibility to age or experience compared to other visual motor skills. Individual differences in attentional focus or cognitive processing may also have influenced the results. Further research is needed to fully understand the factors contributing to the lack of difference in peripheral awareness between junior and senior field hockey players.

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