

A COMPARATIVE ANALYSIS OF SPECIFIC PHYSICAL ATTRIBUTES AMONG MADHYA PRADESH TABLE TENNIS, BADMINTON, AND TENNIS PLAYERS

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Abstract

This research paper aims to investigate and compare specific physical attributes among table tennis, badminton, and tennis players in Madhya Pradesh. 60 All India, Inter University and National level players of Madhya Pradesh were selected as the subject. 20 male players from each game (table tennis, badminton and tennis) participated. The variables were agility, flexibility and reaction time. The data obtained were analyzed by applying one way ANOVA test to determine the physical differences between the three game players. The level of significance was set at 0.05. The results of the study found significant differences between Madhya Pradesh table tennis, badminton and tennis players. The study focuses on understanding how the demands of each sport influence the development of distinct physical characteristics in athletes. The research includes a comprehensive analysis of key parameters such as agility, endurance, strength, and flexibility to provide insights into the unique physiological adaptations associated with each sport.

Keywords: *Physical Attributes, Racket games, Physical Components, Athlete Profiling*

Introduction:

The physical background of physical education encompasses various aspects related to the study and practice of physical activity, movement, and sports. Physical education (PE) is a field that focuses on the development and maintenance of the human body through structured physical activities. The physical background of physical education draws on various scientific disciplines to promote a holistic understanding of the human body, movement, and health. This knowledge is essential for designing effective and safe physical education programs that contribute to the overall well-being of individuals.

Physical variables play a crucial role in the performance of athletes in racket sports. Racket sports, such as tennis, badminton, and table tennis, require a combination of physical fitness, agility, strength, endurance, and coordination. Here are some key physical variables and how they are related to racket sports:

Agility-

Agility is the ability to change direction quickly and efficiently. In racket sports, players need to move rapidly across the court, respond to the opponent's shots, and make split-second decisions. Agile athletes can cover the court more effectively and gain an advantage during rallies.

Agility is a critical component in racket sports, influencing a player's ability to move quickly and efficiently around the court. Here's how agility is related to racket sports, including tennis, badminton, and table tennis-

- Court Coverage
- Rapid Changes in Direction
- Reacting to Shots
- Baseline Defense
- Footwork for Stroke Execution

Flexibility-

Flexibility is crucial for executing a wide range of shots and movements in racket sports. Players need to stretch and reach for shots, perform lunges, and move dynamically around the court. Adequate flexibility helps prevent injuries and allows for a more extensive range of motion.

Flexibility plays a significant role in racket sports, contributing to an athlete's overall performance, injury prevention, and stroke execution. Here's how flexibility is related to racket sports, including tennis, badminton, and table tennis:

- Range of Motion for Stroke Execution
- Reducing the Risk of Injuries
- Improved Reach and Court Coverage
- Dynamic Stretching for Warm-up
- Adaptability to Different Playing Conditions
- Recovery and Muscle Soreness

Reaction Time-

Reaction time is the time it takes for a player to respond to a stimulus, such as the opponent's shot. Quick reaction times are crucial for returning serves, anticipating the direction of shots, and being proactive during rallies. Reaction time can be trained through specific drills and exercises.

Reaction time is a critical factor in racket sports, influencing a player's ability to respond quickly and effectively to the opponent's shots. Here's how reaction time is related to racket sports, including tennis, badminton, and table tennis:

- Returning Serves
- Shot Anticipation
- Defensive Maneuvers
- Quick Changes in Direction
- Return of Smashes

Table tennis, often referred to as ping pong, is a captivating and dynamic sport that combines lightning-fast reflexes, precision, and strategic thinking within the confined dimensions of a tabletop.

Originating in Victorian England as a parlour game, table tennis has evolved into an internationally recognized Olympic sport, captivating millions of enthusiasts worldwide. The roots of table tennis can be traced back to the late 19th century, where it emerged as a popular after-dinner pastime among the upper class. Initially known as "whiff-whaff" and "gossima," the game gained prominence as a form of competitive entertainment. In the early 20th century, the sport saw a surge in popularity in Asian countries, particularly China, and it became an official Olympic sport in 1988.

Badminton, a sport of finesse, speed, and strategic precision, has established itself as one of the most popular and engaging racket sports globally. Originating centuries ago, this shuttlecock-based game has evolved into a dynamic and highly competitive sport that demands agility, endurance, and exceptional hand-eye coordination. The roots of badminton can be traced back to ancient civilizations, with variations of the game being played across cultures. It gained formal recognition in British India during the mid-19th century, where it was initially referred to as "Poona" – named after the city where British army officers stationed there discovered and popularized the game. The sport's name evolved, and in 1873, the Bath Badminton Club established the first official rules, providing a structured foundation for the game.

Tennis, a sport that marries athleticism with finesse, has long captured the imagination of enthusiasts around the world. With its roots dating back centuries, tennis has evolved into a dynamic and globally celebrated game, showcasing powerful serves, skillful rallies, and moments of strategic brilliance on the court. The origins of tennis can be traced to medieval Europe, where it emerged as a crude form of handball played against monastery walls. The game evolved over time, with courts and standardized rules emerging in the 19th century. Tennis, as we know it today, became popular in England and France, and it quickly spread across the globe, gaining recognition as a sport that combines physical prowess with strategic acumen.

Objectives:

The primary objectives of this research are to-

- a. Identify and analyze specific physical attributes in table tennis, badminton, and tennis players.
- b. Compare the physical attributes among players from these three sports.
- c. Investigate the potential correlation between physical attributes and performance outcomes.

Methodology:

Selection of Subjects

The study participants were badminton, tennis and table tennis players from Madhya Pradesh, aged between 18 and 25, who represented All India, National and Inter-University competitions.

Selection of Variables

There are the following selected variables for this study:

Physical Variables

- Agility
- Flexibility
- Reaction Time

Criterion Measure

SL. No.	Variable	Test /Equipments/ questionnaires	Unit
1.	Agility	Shuttle Run	Seconds
2.	Flexibility	Wells and Dillon Sit and Reach Test	Centimeter
3	Reaction Time	Nelson Hand Reaction	Centimeter

Procedure

The chosen volunteers (N = 60) for this study were players of table tennis, badminton, and tennis. The researcher gave them instructions on how to administer the test and how to proceed. The Shuttle Run Test, Sit and Reach Test, and Nelson Hand Reaction Test were used to evaluate the chosen parameters, which were Agility, Flexibility, and Reaction Time. The results were represented in seconds, centimeters, and seconds. The researcher conducted a thorough explanation and demonstration of the test prior to its administration. The motivation aspect was taken into account when giving the test to pique the subject's interest. At the end of the test administration, participants received a proper explanation of the purpose and nature of the study in exchange for their acknowledgement, and they were welcome to ask any questions they had.

Statistical Technique

In order to determine the statistical significance between Madhya Pradesh's national, interuniversity, and all-India badminton, tennis, and table tennis players, one way analysis of variances and descriptive statistics were utilized. The significance level for the Anova test was set at 0.05.

Result and Discussion:

Table-I (A)

Descriptive Statistics of Agility of Table Tennis, Badminton and Tennis Players

Groups	No. of students	Mean	S.D.
Table Tennis	20	11.19	± 0.83
Badminton	20	10.94	± 1.17
Tennis	20	12.00	± 1.52

Table I (A) shows the mean and S.D. of Agility of Table Tennis players were 11.19 ± 0.83 , Badminton players were 10.94 ± 1.17 & Tennis players were 12.00 ± 1.52 . It is clear that the mean of Agility of Tennis players was greater than the other two groups.

Figure – I



Graphical Representation of Agility of Table Tennis, Badminton & Tennis Players

Table-I (B)

One Way Analysis of Variances of Agility among the Three Groups

Source	Degree of freedom (DF.)	Sum of Squares (SS)	Mean Squares (MS)	'P' – Value
Between Groups	2	12.2034	6.1017	0.020
Within Groups	57	83.9975	1.4736	
Total	59	96.2009		

Level of significant- 0.05 (2 57)

Table –I (B) shows that P-value of three groups was 0.020, which was less than 0.05 level of significance. Thus, we can say that there were significant differences of Agility among the three groups.

The result of Agility shows that there was statistically significant difference, Badminton players have grater Agility others than two groups.

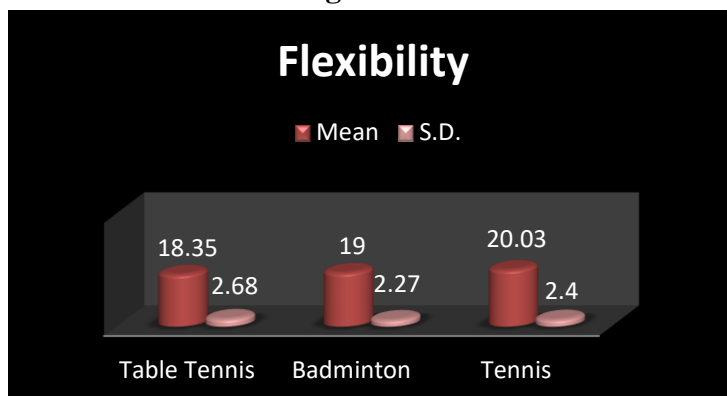
Table-II (A)

Descriptive Statistics of Flexibility of Table Tennis, Badminton and Tennis Players

Groups	No. of students	Mean	S.D.
Table Tennis	20	18.35	± 2.68
Badminton	20	19.00	± 2.27
Tennis	20	20.03	± 2.40

Table II (A) shows the mean and S.D. of Flexibility of Table Tennis players were 18.35 ± 2.68, Badminton players were 19.00 ± 2.27 & Tennis players were 20.03 ± 2.40. It is clear that the mean of Flexibility of Tennis players was greater than the other two groups.

Figure – II



Graphical Representation of Flexibility of Table Tennis, Badminton & Tennis Players

Table-II (B)

One Way Analysis of Variances of Flexibility among the Three Groups

Source	Degree of freedom (DF.)	Sum of Squares (SS)	Mean Squares (MS)	'P' – Value
Between Groups	2	39.4333	19.7167	0.045
Within Groups	57	344.7454	6.0482	
Total	59	384.1787		

Level of significant- 0.05 (2 57)

Table –II (B) shows that P-value of three groups was 0.045, which was less than 0.05 level of significance. Thus, we can say that there were significant differences of Flexibility among the three groups.

The result of Flexibility shows that there was statistically significant difference, Tennis players have greater Flexibility others than two groups.

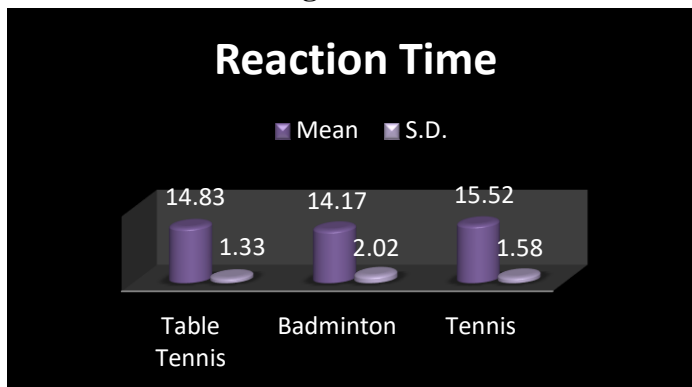
Table-III (A)

Descriptive Statistics of Reaction Time of Table Tennis, Badminton and Tennis Players

Groups	No. of students	Mean	S.D.
Table Tennis	20	14.83	± 1.33
Badminton	20	14.17	± 2.02
Tennis	20	15.52	± 1.58

Table III (A) shows the mean and S.D. of Reaction Time of Table Tennis players were 14.83 ± 1.33 , Badminton players were 14.17 ± 2.02 & Tennis players were 15.52 ± 1.58 . It is clear that the mean of Reaction Time of Badminton players was less than the other two groups.

Figure – III



Graphical Representation of Reaction Time of Table Tennis, Badminton & Tennis Players

Table-III (B)

One Way Analysis of Variances of Reaction Time among the Three Groups

Source	Degree of freedom (DF.)	Sum of Squares (SS)	Mean Squares (MS)	'P' – Value
Between Groups	2	18.133	9.0665	0.046
Within Groups	57	159.0779	2.7908	
Total	59	177.2109		

Level of significant- 0.05 (2 57)

Table –III (B) shows that P-value of three groups was 0.046, which was less than 0.05 level of significance. Thus, we can say that there were significant differences of Reaction Time among the three groups.

The result of Reaction Time shows that there was statistically significant difference, Badminton players have Faster Reaction Time others than two groups.

Significance of the Study:

Understanding the distinct physical attributes associated with table tennis, badminton, and tennis can guide coaches, sports scientists, and fitness trainers in optimizing training regimens for athletes. Additionally, the findings may assist in talent identification and the development of more effective sports-specific conditioning programs.

Conclusion:

In conclusion, this study contributes valuable data to the field of sports science, offering a foundation for designing targeted training interventions that can enhance the performance and well-being of table tennis, badminton, and tennis players in Madhya Pradesh. The insights gained from this research can serve as a guide for coaches and athletes seeking to optimize their training strategies and ultimately elevate the level of play in these sports within the region.

This research aims to contribute valuable insights into the physical attributes that characterize table tennis, badminton, and tennis players in Madhya Pradesh. The outcomes of this study

may have implications for enhancing athlete performance, training methodologies, and overall sports development in the region.

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