

PHYSICAL FITNESS PROFILING OF STATE AND NATIONAL LEVEL TENNIS PLAYERS OF MANIPUR

Monika Oinam

Research Scholar, Department of Physical Education and Sports Science

Prof Maibam Chourjit Singh

Faculty, Department of Physical Education and Sports Science

Sonamani Samjetshabam

Research Scholar, Department of Physical Education and Sports Science

Received: 10th July, 2025

Revised & Accepted: 15th November 2025

Published: December, 2025

DOI: <https://doie.org/10.65985/AS.2026398666>

Abstract: In tennis, sport-specific technical skills are the elements of a successful performance. It also requires a complex interaction of several physical fitness. A tennis match is characterized as intermittent whole-body effort, alternating a few seconds' intense activity and short recovery activity interrupted by several resting periods with a typical average match time of 1.5 hours up to more than 5 hours. Tennis requires players to perform short bursts of high-intensity exercise interspersed with periods of rest or low-intensity activities for a prolonged period. Background: The present research problem was to analyse the physical fitness profiling of state and national level tennis players of Manipur. The objective of the study: 1. To assess the physical fitness profiling of State and National level Tennis Players. 2. To compare the physical fitness namely speed, grip strength and flexibility of State and National level Tennis Players. Methods: Physical profiling of Manipur state and national level tennis players was done for physical profiling. A total of 15 subjects from each level were selected as the subject of the study. The subject's age ranges between 18 to 22 years. To determine Speed 50 m Yash dash run test were measured and the performance were recorded in seconds by stopwatch. To determine strength hand grip dynamometer were used to measured and the performance were recorded in pounds. To determine flexibility, Sit and Reach test was done to measured flexibility. The independent t test was used to analyze the data at a 0.05 level of significance using SPSS. Results: The results indicates that there is significant difference between state and national level players in physical fitness namely speed and grip strength where as there is no significant difference between state and national level players in physical fitness namely flexibility.

Keywords: Speed, Strength, Flexibility and Tennis.

Introduction:

Tennis is a sport that has grown drastically from the past to the present in all dimensions. Presently, tennis demands high a level of physical fitness, physiological, psychological and skill performance for the successful performance of the tennis players. Development in tennis is achieved in the surface of the playing court, racquet, ball, costume, and training patterns which has accelerated player's efficiency and also attract a greater number of spectators from around the globe.

Tennis players require a high level of physical fitness to perform well on the court. This includes cardiovascular endurance to sustain long matches, explosive strength for powerful serves and shots, agility and speed to move quickly and change direction, and flexibility to

reach for difficult shots, grip strength is a crucial for tennis players as it directly impacts their performance on the court. By profiling these fitness components, coaches and trainers can tailor training programs to enhance the players' performance and reduce the risk of injuries.

Tennis players must alternate extended stretches of low-intensity exercise or rest with brief spurts of high-intensity training. Due to this variety, tennis players need to be highly trained both aerobically to help with recovery during and after play and anaerobically for performance. There have been reports of moderate physiological reactions watching tennis matches, with various conditions influencing those reactions. (Kovacs 2007.)

Tennis is a racket sport that can be played individually against a single opponent (singles) and between two teams of two players each (doubles). Each player uses a tennis racket that is strung with the cord to strike a hollow rubber ball covered with felt over or around a net and into the opponent's court. The object of the game is to play the ball in such a way that the opponent is not able to play a valid return. The player who is unable to return the ball will not gain a point, while the opposite player will ("Tennis Rules: How to play Tennis/ Rules of Sport". www.rulesofsport.com., 2021)

Tennis is played by millions of recreational players and is also a popular worldwide spectator sport. The four Grand Slam tournaments (also referred to as the "Majors") are especially popular: The Australian Open played on hard courts, Wimbledon played on grass courts, French Open played on Clay courts and US Open played on hard courts ("Grand Slam Tournaments". ITF, 2021).

The purpose of the study is to determine "Physical Fitness Profiling of State and National Level Tennis Players of Manipur"

Objective of the study:

1. To assess the physical fitness profiling of Manipur State and National level Tennis Players.
2. To compare the physical fitness namely speed, grip strength and flexibility of State and National level Tennis Players.

Delimitations of the study:

1. The study is delimited to male tennis players of the age group 18-22 years.
2. The study is delimited to physical fitness namely speed, grip strength and flexibility.

Significance of the study:

The study gives ideas about different physical fitness tests of national and state level tennis players of Manipur. The results further help coaches, physical directors, and teaching faculty assess the player's ability to participate in different activities.

Hypothesis:

It was hypothesized that there will be no significant difference in the physical fitness namely speed, grip strength and flexibility among national and state level tennis players of Manipur.

Methodology:

In this chapter, selection of subjects, source of data, criterion measures, collection of data, procedure for administration of tests and statistical procedures employed for the study are described as follows:

Selection of subjects:

The data pertaining to the present study were collected from different clubs and association from Imphal West and Imphal East, players who have been participating on national and state level tournaments were selected as the subjects of the study. A total of 30 male tennis players i.e. 15 from national and 15 from state level players subject age group of 18 to 22 years. All the subjects, after having been informed about the objective and protocol of the study, gave

their consent and volunteered to participate in this study. The physical fitness test was used to collect the data from these subjects.

Selection of variables:

- Speed
- Grip Strength
- Flexibility (FIX)

Criterion measures:

The components of physical fitness that were selected for the present study and were measured below flow chart:

Physical Fitness	Test	Measuring units
Speed	50-yard dash	Seconds
Grip Strength	Roger's Strength Test	Kilograms / Pounds
Flexibility	Sit and Reach Test	Centimetres

Administration of the test:

The following test was administered to measure speed, grip strength and flexibility was described as follows:

50-meter Dash Run:

Purpose: To measure speed.

Equipment: Area of desired length, marked with a starting line and a finish line and two stopwatches.

Procedure: After warm-up, the subject will be asked to take position behind the starting line and wait for the signal Ready! Go! It will be ensuring that the command should be audible easily to the subject at the starts line and timers at the finish line. At the command Go! The timers started their respective stopwatches and the subject started their sprint. As soon as the subject crossed the finish line, the respective timers stop their stopwatch and recorded the time accurate up to 0.01 second. Only one correct trial was permitted. The subject will be asked to restart if he had started before the word Go! or had failed to started quickly as the command "go"

Scoring: The time elapsed from the start to the instant, subject crossed the finished line, will be the score expressed up to 100th of a second.

Grip Strength:

Purpose: The handgrip strength test is to measure the maximum isometric strength of the hand and forearm muscles. Handgrip strength is important for any sport in which the hands are used for catching, throwing or lifting.

Equipment required: Handgrip dynamometer

Procedure: The subject holds the dynamometer in the hand to be tested, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer is adjusted if required - the base should rest on the first metacarpal (heel of palm), while the handle should rest on middle of the four fingers. When ready the subject squeezes the dynamometer with maximum isometric effort, which is maintained for about 5 seconds.

Scoring: The best result from several trials is recorded.

Flexibility:

Purpose: - The purpose of the test is to measure flexibility

Equipment required: Sit and Reach box (or alternatively a ruler can be used, and a step or box).

Procedure: This test involves sitting on the floor with legs stretched out straight ahead. Shoes should be removed. The soles of the feet are placed flat against the box. Both knees should be locked and pressed flat to the floor - the tester may assist by holding them

down. With the palms facing downwards, and the hands on top of each other or side by side, the subject reaches forward along the measuring line as far as possible. Ensure that the hands remain at the same level, not one reaching further forward than the other. After some practice reaches, the subject reaches out and holds that position for at least one-two seconds while the distance is recorded.

Scoring: The score is recorded to the nearest centimetre or half inch as the distance reached by the hand.

Statistical Analysis

For the analysis of the data 30 male tennis players. 15 each from national and state level players from Manipur, descriptive analysis and independent 't' test statistical techniques were employed for finding the difference between the two group (national and state level players).

Level of Significance

To test the hypothesis, the level of significance was chosen at 0.05 level of confidence, which was considered most adequate and reliable for the purpose of this study.

Results:

The data was collected from thirty (30) male tennis players, 15 each from state and national level tennis players by administering the selected test item on speed, grip strength and flexibility. The results of data analysis of pertaining data have been presented below in the following tables:

Table 1: Shows an independent samples t-test for Speed among state and national level players.

Variable	Level of participation	N	Mean	Std.Deviation	Std Error Mean	't'	Sig.
Speed	National	15	6.5380	.26219	.06770	3.057	.005
	State	15	7.0007	.52432	.13538		

*Significant level at 0.05

Table 1 shows that the mean test score on speed for the national level group was $6.53 \pm .262$. Mean score on speed for state level group was $7.00 \pm .524$ respectively. The standard errors of Speed were also found as .06770 and .13538 respectively. Significance difference as p value ($0.05 > 0.005$). The calculated t- value is (3.057) and the tabulated t- value is (1.701). Hence calculated is greater than tabulated value state has higher score than the national level players. But the less score in sec means the greater performance.

Table 2: Shows an independent samples t-test for Grip Strength among state and national level players.

Variable	Level of participation	N	Mean	Std.Deviation	Std Error Mean	't'	Sig.
Grip Strength	National	15	50.8300	2.47548	.63917	3.382	.002
	State	15	46.5200	4.27086	1.10273		

*Significant level at 0.05

Table 2 shows that the mean test score on grip strength for the national level group was 50.8 ± 2.47 . Mean score on grip strength for state level group was 46.5 ± 4.27 respectively. The standard errors of grip strength were also found as .63917 and 1.10273 respectively. There is significance difference as p value ($0.002 < 0.05$). The calculated t- value is (3.382) and the

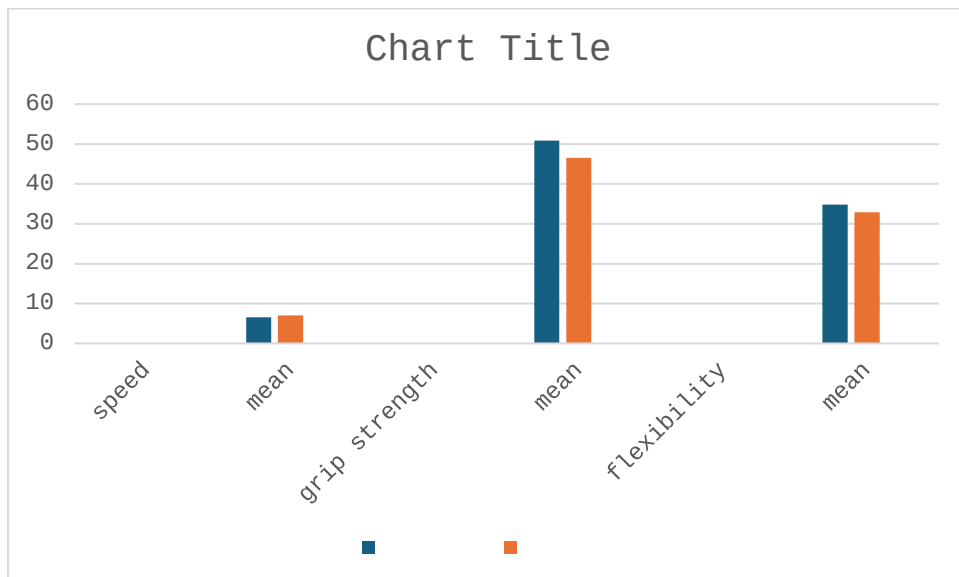
tabulated t- value is (1.701). Hence calculated is greater than tabulated value, national has higher score than the state level players.

Table 3: Shows an independent samples t-test for Flexibility among state and national level players.

Variable	Level of participation	N	Mean	Std.Deviation	Std Error Mean	't'	Sig.
Flexibility	National	15	34.8267	5.37381	1.38751	.982	.335
	State	15	32.9067	5.33566	1.37766		

*Significant level at 0.05

Table 3 shows that the mean test score on flexibility for the national level group was 34.8 ± 5.37 . Mean score on flexibility for state level group was 32.9 ± 5.33 respectively. The standard errors of flexibility were also found as 1.38751 and 1.37766 respectively. There is no significance difference as p value ($.335 > 0.05$). The calculated t- value is (.982) and the tabulated t- value is (1.701).



Graphical representation of Speed, Grip Strength and Flexibility for national level and state level players

Discussion of Finding:

The purpose of the study was to develop physical fitness profile of national and state level tennis players of Manipur. The results showed some of the tennis players' physical fitness profiles. The physical ability and level of fitness of the player are factors that can influence the outcome of a tennis match. (Smekal et. al. 2001).

Physical Fitness namely speed, grip strength and flexibility were measured by 50 m dash run, roger's strength test and sit and reach test between national and state level tennis players of Manipur. Speed and grip strength found significance difference between national and state level tennis players of Manipur when applying an independent sample t-test as p value of speed is .005 and for grip strength is .002 which is less than 0.05 level of significance. The calculated t- value is (3.057) and the tabulated t- value is (1.701). Hence calculated is greater than tabulated value state has higher score than the national level players. But the less score in sec

means the greater performance. For grip strength, the calculated t- value is (3.382) and the tabulated t- value is (1.701). Hence calculated is greater than tabulated value, national level players have higher score in grip strength than the state level players.

Flexibility as measured by sit and reach test found no significance difference between national and state level tennis players of Manipur when applying an independent sample t-test as p value is .335 which is greater than 0.05 level of significance. The calculated t- value is (.982) and the tabulated t- value is (1.701). It is concluded that no difference was noticed between national and state level tennis players.

Conclusions:

Researcher analysed the gathered information according to the reason of the study. Few studies have been done with the intention of identifying physical fitness profiles or developing guidelines and standards for the physical fitness component of tennis and more especially for tennis specific games. The collected data was analysed by the researcher in accordance with the study's purpose. Factual analysis of physical fitness factors revealed the limits for instance, speed, grip strength, and flexibility were important differences between Manipur's state and national tennis players.

However, the results of the physical fitness profile of national and state level tennis players concluded that speed and grip strength found significance difference between national and state level tennis players and there is no significance difference between national and state level tennis players on flexibility. The results of this study describe the physical fitness profiles of national and state level tennis players. Coaches might use them to find and select new athletes or tennis players.

References:

Carl Maresh, Michael F. Bergeron, William J Kraemer (1991). Tennis: A physiological Profile during Match Play. *International Journal of Sports Medicine* 12(5): 474-9 DOI: 10. 1055/s-2007-1024716.

Fernandez-Fernandez, Jaime PhD¹; Sanz-Rivas, David PhD^{1,2}; Mendez-Villanueva, Alberto PhD³ (2009). A Review of the Activity Profile and Physiological Demands of Tennis Match Play. *Strength and Conditioning Journal* 31(4): p 15-26, August 2009. | DOI: 10.1519/SSC.0b013e3181ada1cb

Hakkinen K. Changes in physical fitness profile in female volleyball players during the competitive season. *J Sports Med Phys Fitness*. 1993; 33:323-332.

Kovacs, M.S., 2006. Applied physiological of tennis and performance. *British Journal of Sport Medicine*.

Ming-Kai Chin, Kurt Steininger, * Raymond C H So, Christopher R Clarkt and Alison S K Wong (1995). Physiological profiles and sport specific fitness of Asian elite squash players. *Br J Sports Med*. 1995 Sep;29 (3): 158-164. Doi: 10.1136/bjism.29.3.158

Picabea JM, Cámara J, Yanci J. Physical fitness profiling of national category table tennis players: implications for health and performance. *Int J Environ Res Public Health*. 2021;18(17):9362

Shalini Menon, Mamta Kumari and Ajay Kumar Pandey (2024) An assessment of physical fitness profiling of university-ranked badminton players. *International Journal of Physical Education, Sports and Health* 2024; 11(6): 196-199

Smekal, G., S.P. Von Duvillard, C. Rihacek, R. Pokan, P. Hofmann, R. Baron, H. Tschan and N.A. Bachl, 2001. Physiological profile of tennis match play. *Med (pp: 462)*. Washington DC: National Academies Sci Sports Exercsi, 33(6): 999-1005

Tennis Rules. Pro Tennis Tips. 15 March 2015. Retrieved 25 November 2021.