Correlational Study of Physical Variable with Table Tennis Skill Test

Tushar Joshi[a], Sreelekha Das[a]
[a]Ph.D. Scholar, Lakshmibai National Institute Of Physical Education, Gwalior, Madhya Pradesh, 474002, India

Abstract

The present study was undertaken to help coaches find specific physical fitness variable of Table Tennis. For accomplishing the aim of the study, physical fitness variables like lower leg strength, reaction ability, coordination ability and flexibility were correlated with Pushpendra Purashwani Table Tennis skill test.To achieve this purpose, thirty male table tennis players of Lakshmibai National Institute of Physical Education and district players of Gwalior were selected through convenience sampling as subjects. The age of the subjects ranged from 18 to 25 years. In order to find out the relationship of physical fitness variable with table tennis skills the statistics used were descriptive statistics and Neyman Pearson Correlation. A significant correlation between alternate push test with reaction time and coordination, target service test with coordination, alternate counter test with reaction time and coordination, forehand drive on target test with flexibility of back and hamstring. Coordination and reaction time are the two most correlated physical fitness variable with various table tennis skills.

KEYWORDS- Table Tennis, specific fitness, lower leg strength, reaction time, coordination, flexibility and Pushpendra Purashwani Table Tennis skill test.

INTRODUCTION

Table tennis is a sport of rich history. Like many other sports, Table Tennis began as a mild social diversion. It was probably played with improvised equipment in England, during the last quarter of the 19th century. On the contrary, it is also believed that makeshift versions of the game were developed by British military officers in India around the 1860s or 1870s, who brought it back with them. A row of books stood up along the centre of the table as a net, two more books served as rackets and were used to continuously hit a golf-ball.

Now more than 10,00,000 players belong to clubs which come under the International Table Tennis Federation. Table Tennis is played on a hard smooth table, usually green or blue, nine feet long and five feet wide, standing two and a half feet above the floor. The net across the middle is slightly wider than the table and six inches high. The balls are light, hollow and made of plastic. The racket is made of the natural wood. Both the faces of the racket are covered with soft rubber. After the introduction of sandwich rubber, it has become an extremely speedy game.

Table Tennis is one of the most competitive sports in the worldas there are 226 member countries of the International Table Tennis Federation, making it one of the most played racket sports and a demanding game for improvement. Table Tennis can be played by a young and old person that's why it is Called as "LIFETIME

SPORT"[1].A coach's aim is to find the most economical way of causing a player to become a better player in the widest possible sense. This improvement may relate to the player's understanding of the game or to the development of his technique or increasing his fitness level. In present scenario, if you have to excel at apex level in sports, you have to train every performance factor weather it is psychological or physiological.

There is a close-knit relationship between skill and physical fitness. That is why, now-a-days much greater emphasis is placed on the practice of and mastery over the basic skills of a game and physical fitness right at the very beginning.

Skills of a game can be developed to a level. After that improvement in game can be done through levelling up the general fitness level and sports specific fitness level. Requirement for fitness vary from person to person like, test cricketer needs an alternate level of physical fitness. A 40-year-old mother requires an alternate physical fitness level than her girl. In this way, physical fitness changes as indicated by the conditions of a man at various circumstances in his or her life. Basically, Physical fitness is an unquestionable requirement for all.

Fitness demand for every game vary according to its game style and nature. Long duration sports like football, hockey, handball etc rely more on aerobic fitness and on the other hand short duration sports like table tennis rely more on anaerobic fitness. Specific fitness ability needed in table tennis should also be explored.

There is a lack of standardised evaluative of correlation among various physical fitness variables and table tennis skills. Variables like lower extremity strength, coordination ability, flexibility and reaction time can have a great influence on table tennis skills. If some correlation of these physical fitness variable table tennis skills can be found then it can be used to develop training programs for table tennis, identify talents in early stage and will add up to the existing knowledge. The researcher in this study attempt to find any correlation of these variables with table tennis skills by comparing them to norms from Pushpendra Purashwani table tennis skill test

MATERIALS AND METHODS
SELECTION OF SUBJECTS-

To attain the purpose of the study, 30 male table tennis players of university and district level were selected as subjects from Lakshmibai National Institute of Physical Education, Gwalior, and district academies. The age of the subjects was ranged between 18 to 25 years. All the subjects have been made familiar about the testing procedure as well as the objectives of the study before administering various tests by the researcher. Before administration of tests, the researcher made a sincere request with the subjects to extend their full cooperation for the accuracy of result

ADMINISTRATION OF TEST

Physical fitness variable:

The subjects have been given necessary demonstrations with regard to the markings done by the researcher for various tests. They have been made familiar with the know-how of the respective tests. Besides, every subject has been given an opportunity to learn what exactly they have to do prior to conduct the physical test. To

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[1] Encyclopedia Britannica Vol. 10 (London: Encyclopedia Britannica Ltd, 1961) p.3-4.

secure good results, the subjects have been requested to cooperate and to contribute their maximum effort. A brief account of the tests of the physical variables is as under:

1. *Lower extremity strength*

Standing Broad Jump –

Purpose: to measure the explosive power of the legs.

Equipment required: measurement tape to measure distance jumped, non-slip floor for take-offs, and soft-landing area preferred.

Procedure: The athlete stood behind a line marked on the ground with feet slightly apart. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.

Scoring: The measurement was taken in centimeters between the takeoff line and the nearest mark made by heel or any other part of the body.

2. *Reaction Time*

Ruler Drop Test –

Purpose: to measure reaction time, hand-eye quickness and attentiveness

Equipment required**:** 1 meter long ruler, calculator.

Procedure: The person tested stood near the edge of a table. The assessor hold the ruler vertically in the air between the participant's thumb and index finger, but not touching. The zero mark was aligned with the participant's fingers. The participant was asked when they are ready. Without warning, release the ruler was dropped - the subject caught it as quickly as possible as soon as they see it fall. Data was recorded in centimeters.

Scoring: The algorithm to calculate the reaction speed is $d = vt + \frac{1}{2}at^2$ where

- d = distance in metres
- v = initial velocity = 0
- a = acceleration due to gravity = 9.81m/s²
- t = time in seconds

3. *Flexibility*

Sit and Reach Test –

Purpose: To measure flexibility of the lower back and hamstring muscles.

Equipment required: Following equipment's are needed to conduct this test: pen, recording sheet, sit and reach box.

Procedure: This test involves sitting on the floor with legs out straight ahead. Feet (shoes off) are placed with the soles flat against the box, shoulder-width apart. Each subject was asked to keep both knees flat against the floor. Then with hands on top of each other and palms facing down, the subject reaches forward along the measuring line as far as possible. Three chances were given to each subject and his best

performance was recorded. Make sure there are no jerky movements and that the fingertips remain level and the legs flat.

Scoring: The distance reached by the tip of the fingers is recorded in centimeters as score.

4. Coordination

Sensamove's Coordination Test -

Purpose: To measure coordination ability of participants

Equipment required: Sensamove's "Sensbalance Mini-Board" with Baseline measurement software.

Procedure: Coordination was tested using the Sensamove's, sensebalance mini-board and baseline measurement software as shown in figure 1. The application was firstly calibrated and then the participant stood on the sensbalance mini-board and attempted a controlled and smooth movement along the FRONT-BACK axis, or the LEFT-RIGHT axis shown on the computer screen.

Scoring: The deviation from the straight line while moving FRONT-BACK axis or the LEFT-RIGHT axis was given in degrees.
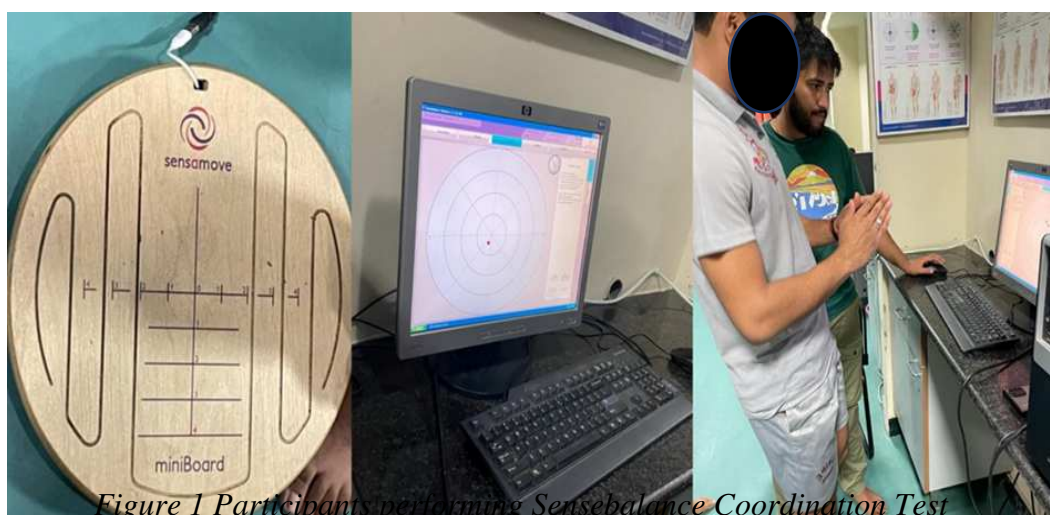

Figure 1 Participants performing Sensebalance Coordination Test

Table tennis playing ability test:

The researcher collected the data of table tennis skills by administering Pushpendra Purashwani Table Tennis Skill Test which constist of:

1. **Target Service Test**

2. **Alternate Counter Test**

3. **Fore Hand Drive on Target Test with Foot Movement after Playing Back Hand Push**
4. **Alternate Push Test**

STATISTICAL TECHNIQUE

In order to find out the relationship between physical fitness variable and table tennis skills the statistics used are descriptive statistics and Neymann Pearson Correlation.

RESULTS

Target Service Test

Table 1

Correlation of target service test with study variables

SKILL	PHYSICAL FITNESS	N	CORRELATION COEFFICIENT	P-VALUE
TARGET SERVICE TEST	Standing broad jump	30	.114	.547
	Ruler drop test	30	-.192	.310
	Coordination test front-back	30	-.512*	.004
	Coordination test left-right	30	-.447*	.013
	Sit & reach test	30	-.220	.243

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1 shows correlation of target service test a skill of table tennis with selected physical fitness variable. The Pearson correlation coefficient of target service test with standing broad jump was 0.114 with a p value of 0.547. The correlation coefficient was not found significant at 0.05 level.

The correlation coefficient of target service test with ruler drop test was -0.192 at p value of 0.310. As the score of rural drop test was recorded in seconds and the lower the time the better the score the data showed a negative correlation, but the correlation found was not significant.

Correlation coefficient of target service test with coordination test front back was -0.512 at p value of 0.004. Deviation from a straight line while moving front and back in degrees was administered as score for coordination test front back which means the smaller the degree the better the score. This led to a negative correlation between target service test and coordination test front back. The correlation was found significant at 0.05.

On the other hand, correlation coefficient of target service test with coordination test left right was -0.447 and the p value of 0.013. Here again the score was administered in degrees which lead to negative correlation. The correlation was found significant at 0.05.

Target service test and sit and reach test have a correlation coefficient of -0.220 at p value of 0.243. Over here the correlation was not found significant.

Fore hand drive on target test with foot movement after playing backhand push

Table 2

Correlation of FHDTTFM with study variables

SKILL	PHYSICAL FITNESS	N	CORRELATION COEFFICIENT	P-VALUE
FORE HAND DRIVE ON TARGET TEST WITH FOOT MOVEMENT AFTER PLAYING BACK HAND PUSH	Standing broad jump	30	-.081	.672
	Ruler drop test	30	-.078	.684
	Coordination test front-back	30	-.151	.425
	Coordination test left-right	30	-.153	.420
	Sit & reach test	30	-.437*	.016

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows correlation of fore hand drive on target test with foot movement after playing back hand push a skill of table tennis with selected physical fitness variable.. The Pearson correlation coefficient of this skill with standing broad jump was found to be -0.081 at p value of 0.672. The correlation coefficient was not found significant at 0.05 level.

The correlation coefficient of FHDTTFM with ruler drop test was -0.078 at p value of 0.684. As the score of rural drop test was recorded in seconds and the lower the time the better the score, as a result data showed a negative correlation, but the correlation found was not significant at 0.05 level.

Correlation coefficient of FHDTTFM with coordination test front back was -0.151 at p value of 0.425. Deviation from a straight line while moving front and back in degrees was administered as score for coordination test front back which means the smaller the degree the better the score. This led to a negative correlation between target service test and coordination test front back. However, the correlation was not found significant at 0.05.

On the other hand, correlation coefficient of FHDTTFM with coordination test left right was -0.153 and the p value of 0.420. Here again the score was administered in degrees which lead to negative correlation. The correlation was not found significant at 0.05.

FHDTTFM and sit and reach test have a correlation coefficient of -0.437 at p value of 0.016. Over here the correlation was found significant at 0.05 level.

Alternate push test

Table 3

Correlation of alternate push test with study variables

SKILL	PHYSICAL FITNESS	N	CORRELATION COEFFICIENT	P-VALUE
ALTERNATE PUSH TEST	Standing broad jump	30	.034	.856
	Ruler drop test	30	-.596*	.001
	Coordination test front-back	30	-.770*	.000
	Coordination test left-right	30	-.582*	.001
	Sit & reach test	30	-.095	.617

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3 shows correlation of alternate push test of table tennis with selected physical fitness variable. The Pearson correlation coefficient of this skill with standing broad jump was found to be 0.034 at p value of 0.856. The correlation coefficient was not found significant at 0.05 level.

The correlation coefficient of alternate push test with ruler drop test was -0.596 at p value of 0.001. As the score of rural drop test was recorded in seconds and the lower the time the better the score, as a result data showed a negative correlation. The correlation was found significant.

Correlation coefficient of alternate push test with coordination test front back was -0.770 at p value of 0.000. Deviation from a straight line while moving front and back in degrees was administered as score for coordination test front back which means the smaller the degree the better the score. This led to a negative correlation between target service test and coordination test front back. The correlation was found significant at 0.05.

On the other hand, correlation coefficient of alternate push test with coordination test left right was -0.582 and the p value of 0.001. Here again the score was administered in degrees which lead to negative correlation. The correlation was found to be significant at 0.05.

Alternate push test and sit and reach test have a correlation coefficient of -0.095 at p value of 0.617. Over here the correlation was not found significant at 0.05 level.

Alternate counter test

Table 4

Correlation of alternate counter test with study variables

SKILL	PHYSICAL FITNESS	N	CORRELATION COEFFICIENT	P-VALUE
ALTERNATE COUNTER TEST	Standing broad jump	30	.024	.901
	Ruler drop test	30	-.462*	.010
	Coordination test front-back	30	-.543*	.002
	Coordination test left-right	30	-.288	.123
	Sit & reach test	30	-.103	.587

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows correlation of alternate counter test of table tennis with selected physical fitness variable. The total number of participants were 30. The Pearson correlation coefficient of this skill with standing broad jump was found to be 0.024 at p value of 0.901. The correlation coefficient was not found significant at 0.05 level.

The correlation coefficient of alternate counter test with ruler drop test was -0.462 at p value of 0.010. As the score of rural drop test was recorded in seconds and the lower the time the better the score, as a result data showed a negative correlation. The correlation was found significant.

Correlation coefficient of alternate counter test with coordination test front back was -0.543 at p value of 0.002. Deviation from a straight line while moving front and back in degrees was administered as score for coordination test front back which means the smaller the degree the better the score. This led to a negative correlation between target service test and coordination test front back. The correlation was found significant at 0.05.

On the other hand, correlation coefficient of alternate counter test with coordination test left right was -0.288 and the p value of 0.123. Here again the score was administered in degrees which lead to negative correlation. The correlation was found not significant at 0.05.

Alternate counter test and sit and reach test have a correlation coefficient of -0.103 at p value of 0.587. Over here the correlation was not found significant at 0.05 level

DISCUSSION
The result of the study at significant value of 0.05 indicates that there is significant negative correlation between alternate push test with reaction (r = -0.596) and coordination abilities (r = -0.770 & r = -0.582) as seen in table 3 and 4. Also, alternate counter test showed significant negative correlation between reaction ability (r = -0.462) and coordination ability (r = -0.543). This indicates that correlation between reaction ability and coordination ability of table tennis players are significant. Training program of table tennis should include these fitness variables. Coordination ability correlates the most compared to other physical fitness variables with table tennis skills. On the other hand, lower leg strength and flexibility showed low correlation with table tennis skills. Though table 2 showed a relationship between

FHDTTFM with flexibility. Sample number are small to generalize this statement and a study with large sample size should be conducted.

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