

Physiological Profile of Filipino Sepak Takraw College Players

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Abstract - *This study identified the physiological profile: speed, reaction time, lower extremity power, muscular endurance, and flexibility, of Filipino Sepak Takraw college players. A descriptive and comparative design were used in investigating the physiologic profiles among the three playing positions (striker, server, and feeder) in Sepak Takraw. A total of 30 male Filipino Sepak Takraw varsity players, aged 18 to 22 years old, with at least three intercollegiate tournament playing experience, and with three to five times physical training for Sepak Takraw weekly in a year, were chosen. The 40 meter running, time ruler, sargent vertical jump, one-minute sit-up, sit and reach flexibility test were used in evaluating the physiologic profiles identified.*

No significant differences among the three Sepak Takraw playing positions were found in terms of speed, muscular endurance, and flexibility. However, significant results were found when differentiating the strikers, feeders, and servers in terms of reaction time and lower extremity power.

Strikers demonstrated to have faster reaction times and stronger lower extremity strength. The findings of the study provide crucial insights as to the physiological profile of Filipino Sepak Takraw players that could reinforce talent detection and identification, performance appraisal, and improvement metrics.

Keywords: *Sepak Takraw; Speed; Physiological profile; Reaction time; Lower extremity power; Muscular endurance; Flexibility*

INTRODUCTION

From its humble roots, Sepak Takraw has become one of the more exciting games in Asia and other countries. In fact, its popularity has spread in many western countries such as in Argentina, Brazil, Spain, Germany, and even in the United States [1]. Though similar to the gameplay of volleyball, Sepak Takraw is a complex net-barrier sport that players are allowed to

use all parts of their body except their hands or arms to hit The ball [2], [3]. "Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means "to kick ball." The choosing of the Sepak Takraw name for the sport was essentially a compromise between Malaysia and Thailand, the two powerhouse countries of the sport [4].

In the Philippines, Sepak Takraw has been closely associated to "sipa," a traditional native sport in the country. "Sipa" used to be the national sport of the country before it was replaced by "Arnis." In "sipa," the aim of the game is to kick a soft ball, made out of rattan fragments, back and forth over a net in the middle of the court much like that of Sepak Takraw. This explains why Sepak Takraw has bided well in the Philippine culture and is actually a part of the elementary and high school curriculum. In addition, like in other Southeast Asian countries, Sepak Takraw is played competitively by Filipino athletes in universities and international tournaments.

There are several forms of Sepak Takraw, but the most popular is the "Regu" format, where opposing teams of 5 players, 3 on-court with 2 substitutes, line up against each other. The on-court players comprise a Striker, a Server, and a Feeder, each having distinct tactical roles to play during a match, and therefore possessing different playing skillsets [5]. As a powerful high impact team sport, Sepak Takraw requires the player to be physically fit, strong, and masterful in technique especially of lower body parts. Sepak takraw requires the player to master a variety of performance skills like jumping, blocking, diving or spiking that are related to the needs of strength, power, agility, and speed during the duration of the game [1], [3]. Moreover, the International Sepak Takraw Federation describes the sport as astonishingly visceral and explosive and one of the toughest games in the world in the elite level [5]. Played on a rectangular court which is of similar size to a badminton court and with a net suspended in the

middle, the fundamental rules are simple, with the objective being to deliver the ball over the net into your opponents' court, and try to make it un-returnable. Players may use any part of their legs, head and torso to handle the ball, but not their arms or hands. Demanding lightning reflexes, precise control, and fearless gravity-defying leaps, Sepak Takraw delivers some of the most intense sporting action.

Given the intense nature of Sepak Takraw and despite an abundance of research in other sports, there is inadequate knowledge about talent identification and specification in Sepak Takraw. This study identified physiological characteristics that may serve as basis in determining a talent evaluation index among the player positions relative to Sepak Takraw.

OBJECTIVES OF THE STUDY

This study, in investigating the importance of physical fitness, agility, and strength in Sepak Takraw, identified the physiological profile of Filipino Sepak Takraw college players. Specifically, speed, reaction time, lower extremity power, muscular endurance, and flexibility were measured. In addition, this study also compared the physiologic profile based on the playing positions in Sepak Takraw.

MATERIALS AND METHODS

Research Design and Sample

This study utilized a descriptive and comparative design in investigating the physiologic profiles of the respondents and in identifying the difference of the same among the three positions identified in Sepak Takraw. Using purposive sampling, a total of 30 male Filipino Sepak Takraw varsity players, aged 18 to 22 years old, from four Philippine colleges and universities were chosen as the respondents of the study. The inclusion criteria in selecting these players were as follows: with at least three intercollegiate tournament playing experience and with three to five times physical training and practices for Sepak Takraw every week for a span of a year prior to data collection. Equal numbers of respondents were identified based on the three player positions in Sepak Takraw: 10 strikers, 10 feeders, and 10 servers.

Measures and Data Gathering Procedure

The physiologic profile characteristics, that are deemed important in gauging the physical attributes crucial in playing Sepak Takraw, investigated in this research include: speed, reaction time, lower extremity power, muscular endurance, and flexibility.

Questionnaires were used to collect demographic information. In addition, before each test, the respondents were given prior familiarization and instructions about the test procedures.

Speed

In measuring speed, the 40 meter running test was used [2], [6]. One by one, the respondents were asked to stand in their position behind a starting line and were instructed to start running at their maximum effort once prompted with a "go" command. The times of the respondents, in completing the 40 meter dash, were recorded using a stop watch. The same watch was in used in measuring the speed of every respondent. This test was only performed once and was preceded by a two-minute stationary jogging as warm-up. The score of speed was calculated using the following formula:

$$\text{speed } (v) = \frac{x (\text{distance})}{t (\text{time})} \quad (1)$$

Where "x" is distance that participants must run and "t" is the total running time.

Reaction Time

The respondents' reaction times were measured using the time ruler test [2]. In this test, the respondents were instructed to be in a stationary standing position with the assessor standing adjacently while holding a ruler vertically in the air between a respondent's thumb and index finger without touching the ruler. When a respondent declares readiness, the assessor releases the ruler without warning the former who would catch it as fast as possible as it falls. Ten attempts were recorded in centimeters. The reaction time was calculated using the following formula:

$$\text{Reaction time } (t) = (2d (\text{average of ruler moving out of 10 attempts}) / g$$

Where "d" is distance that participants can catch and "g" is the acceleration of gravity (9.8 m/s²).

Lower Extremity Power

In evaluating lower extremity power, the sargent vertical jump test [2] were used. Standing adjacent to a marked wall, the respondents were asked to raise their nearest arm in an upward direction. The assessor then recorded the standing reach height sans any footwear. The respondents were then instructed to jump vertically as high as he could. The difference in centimeters between the standing reach height and the

jump height was the score. The respondents were afforded three attempts; the best of three were recorded.

Muscular Endurance

The ability of the muscles to sustain repeated muscle actions or muscle endurance was evaluated using a one-minute sit-up test[1]. Specifically, this test was used to measure the abdominal strength of the respondents. The test was only done once for every respondent using a standard stopwatch to time the activity. The number of reps per minute was recorded.

Flexibility

In measuring flexibility, this research specifically evaluated the flexibility of the respondents' lower back and hamstring muscles using the sit and reach flexibility test [1], [8]. The Respondents were instructed to sit on the floor with legs stretched out straight ahead sans any footwear. The soles of the feet were placed flat against a wooden box with both knees locked and pressed flat to the floor. With the palms facing downwards, and the hands on top of each other or side by side, the respondents were instructed to reach forward along a measuring line as far as possible. After three to five practice reaches, the respondents were instructed to reach forward and to hold that position for one to two seconds while the distance is recorded in centimeters.

Data Analysis

Descriptive statistics were used in evaluating the physiologic profile characteristics of the Sepak Takraw player respondents. More importantly, Analysis of Variance (ANOVA) was used in determining the differences among the three identified playing positions in Sepak Takraw: feeder, server, and striker. The level of significance was set at $p < 0.05$.

Ethical Considerations

Prior the actual activities in gathering the data, the respondents were collectively oriented with the purpose of the study. Informed consent was obtained from the respondents who voluntarily participated in the study. In addition, the respondents were informed that they had every right to refuse or withdraw so as they choose at any given point during the conduct of data gathering. The respondents were also assured that the data gathered would only be presented in group form while maintaining their personal information private.

RESULTS AND DISCUSSION

Table 1. Physiological Profile in terms of Speed of Filipino Sepak Takraw College Player Respondents and the Differences based on Playing Positions

Playing Position	N	Mean	p-value (post-hoc p-value)	VI
Feeder	10	7.10	(0.16) with striker	NS
Server	10	6.73	(0.57) with feeder	NS
Striker	10	6.92	(0.50) with server	NS
Overall	30	6.92	0.48	NS

NS-Not Significant; Level of significance $p < 0.05$: *Significant difference obtained by LSD Post-hoc Test; **Significant difference obtained by ANOVA

Table 2
Physiological Profile in terms of Reaction Time of Filipino Sepak Takraw College Player Respondents and the Differences based on Playing Positions

Playing Position	Mean	p-value	VI
Feeder (N=10)	1.87	*(0.04) with striker	S
Server(N=10)	1.91	(0.27) with feeder	NS
Striker(N=10)	1.85	*(0.04) with server	S
Overall (N=30)	6.92	**0.04	S

Level of significance $p < 0.05$: *Significant (S) difference obtained by LSD Post-hoc Test; **Significant difference obtained by ANOVA

Table 3. Physiological Profile in terms of Lower Extremity Power of Filipino Sepak Takraw College Player Respondents and the Differences based on Playing Positions

Playing Position	Mean	p-value	VI
Feeder (N=10)	47.60	*(0.03) with striker	S
Server(N=10)	48.90	(0.07) with feeder	NS
Striker(N=10)	57.70	*(0.03) with server	S
Overall (N=30)	51.40	**0.04	S

Level of significance $p < 0.05$: *Significant (S) difference obtained by LSD Post-hoc Test; **Significant difference obtained by ANOVA

Table 4. Physiological Profile in terms of Muscular Endurance of Filipino Sepak Takraw College Player Respondents and the Differences based on Playing Positions

Playing Position	Mean	p-value	VI
Feeder (N=10)	48.60	(0.07) with striker	NS
Server(N=10)	44.25	(0.09) with feeder	NS
Striker(N=10)	50.75	(0.15) with server	NS
Overall (N=30)	47.87	0.12	NS

Level of significance $p < 0.05$: *Significant difference obtained by LSD Post-hoc Test; **Significant difference obtained by ANOVA

Table 5. Physiological Profile in terms of Flexibility of Filipino Sepak Takraw College Player Respondents and the Differences based on Playing Positions

Playing Position	Mean	p-value	VI
Feeder (N=10)	35.75	(0.18) with striker	NS
Server (N=10)	34.50	(0.20) with feeder	NS
Striker (N=10)	38.25	(0.17) with server	NS
Overall (N=30)	47.87	0.23	NS

Level of significance $p < 0.05$: *Significant difference obtained by LSD Post-hoc Test; **Significant difference obtained by ANOVA

The results of the descriptive and inferential statistics, specifically the results of ANOVA and LSD post-hoc test of the physiological profile characteristics of Filipino Sepak Takraw college players are presented in tables 1 to 5 in terms of speed, reaction time, lower extremity power, muscular endurance, and flexibility, respectively. No significant differences among the three Sepak Takraw playing positions were found in terms of speed (Table 1), muscular endurance (Table 4), and flexibility (Table 5). However, significant results were found when differentiating the strikers, feeders, and servers in terms of reaction time (Table 2) and lower extremity power (Table 3).

The physical demands needed by athletes in Sepak Takraw were closely related to other sports like badminton and volleyball that inherently demands efficiency in many fitness components [2], [9]. In addition, in order to play professionally against opponent and to win matches in a physical game like Sepak Takraw, an athlete constantly needs to improve his level of basic physical qualities, such as strength, power, muscular endurance, flexibility, and agility. In volleyball, in fact, players require well-developed muscular strength, power and endurance, speed, agility, and flexibility; players need to have a high level of jumping ability, fast reaction time, and swift movements [2]. Much like the sport of Sepak Takraw, the same physical demands are needed in order to play competitively. These demands could be attributed and evaluated to the biochemical parameters or physiological profile of athletes.

Speed

Speed is a very important physiologic factor in Sepak Takraw as it significantly influences the ability of the players to perform. Speed is needed for moving to and from the Sepak Takraw ball and to cover short distances in the shortest possible time [9]. In support, argued that due to the nature of the game it is important for the Sepak Takraw players to reach their

maximum speed as fast as possible; the ability of covering the court in the shortest possible time is vital [2]. Speed also affects other factors such as the serve speed. A study in Australia proved that foot speed positively influences and increases the serve speed which is significantly advantageous for a player [10]. In this study, no significant difference was found among the three player positions because speed is a characteristic to which all Sepak Takraw players should possess in order to excel and play at a high level. Since the study respondents are elite Sepak Takraw players, speed as physical attribute is expected of them. Players of this sport are required to have the ability to move rapidly in different directions through the court in order to reach the ball.

Reaction Time

Sepak Takraw involves being able to deliver the ball back to the other side of the court and over the net; thus, reaction time is crucial in this sport. In this study, strikers have been found to have a faster reaction time compared to servers and feeders. This is mainly due to the striker's main objective to execute volleys into the opponent's court which requires exceptional reaction time [5]. As the feeder sets the ball, it is the responsibility of the striker to time the feed and smash the ball towards the opponent's court. This is why strikers are also called killers. When not in possession of the ball, the striker is responsible for blocking any incoming spikes which also requires perfect timing and response.

Lower Extremity Power

Jumping ability, reflected in an athlete's physiological parameter pertaining to lower extremity power, is an important fundamental ability for Sepak Takraw players, especially for strikers [1]. Spikers as well as feeders are required to jump high during games in order to execute their role of either spiking or blocking spikes; these actions require lower limbs movements that are both powerful and explosive [8]. A study in the United States concluded that Sepak Takraw players have excellent lower limb jumping ability in comparison with many other intermittent sports athletes [7]. Sepak Takraw players, especially strikers, include in their training and practice regimen jumping activities that strengthen their extremities rendering them the physical tools needed to jump higher to block or strike the ball. This specific role of strikers elucidates as to why this study found them to have more powerful lower extremities compared to feeders and servers. Their main responsibility is to

jump and spike; it is all but fitting that they have more powerful legs compared to those in other playing positions.

Muscular Endurance and Flexibility

Muscular strength is the main component required in sepak takraw, especially in kicking, jumping, and blocking [2]. It also very important in avoiding injury as stronger and firmer muscles are less susceptible to tear. In this study, muscle endurance was mainly attributed to core strength as such is needed in order to execute the different physical activities and demands required in Sepak Takraw [8]. Another important factor and fundamental parameter in order to maintain and improve the performance of athletes in this sport is flexibility. Flexibility is closely related to range of motion as the former strengthens the latter allowing the players to perform their actions at a higher level [11]. The requirement of both muscle endurance and flexibility among Sepak Takraw players, regardless of position, is argued to be related with the result of the study. No significant difference was found among the playing positions in terms of muscle endurance and flexibility as all Sepak Takraw players fundamentally trains and demonstrates such physical traits.

CONCLUSION

The findings of the study showed the physiological profiles of Filipino college Sepak Takraw players and confirmed the difference of the same in terms of reaction time and lower extremity power. While no significant differences were found among the three playing positions in terms of speed, muscular endurance, and flexibility as these attributes are established to be fundamental requirements for Sepak Takraw players, strikers, understandably demonstrated to have faster reaction times and lower extremity strength due to the nature of their role and responsibilities in a Sepak Takraw game. These findings provide significant insights as to how talent and physical attributes among aspiring and current Sepak Takraw players could be identified and evaluated. In turn, contributing to building a roster that would best compete against elite teams. In addition, such findings could help develop certain training regimen and programs that would enhance the skills of Sepak Takraw players relative to player positions.

RECOMMENDATION

In due course, the findings of the study provide crucial insights as to the physiological profile of

Filipino Sepak Takraw college players that could reinforce in improving talent detection, talent identification, performance appraisal, and improvement metrics. Finally, the findings of this study must be received with caution because of the limitation of the convenience sample that may not be representative of the general player population; thus, a more comprehensive study involving a larger sample is recommended. In addition, this study could be further improved through the inclusion of biochemical parameters that could identify and impact player characteristics thus producing a more scientific evidence on the physiologic attributes of Sepak Takraw athletes.

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