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Research Article

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# Effects of Training Regimens and Differences Between Sexes on Forehand Drives Accuracy in Table Tennis

Ardiansyah Rica Samsu Goli<sup>1</sup>, Tomoliyus<sup>1\*</sup>, Sumarjo<sup>1</sup>, Arman Syah Goli<sup>2</sup>

<sup>1</sup>Faculty of Sport Sciences, Yogyakarta State University, Yogyakarta, Indonesia

<sup>2</sup>Department of Endocrinology and Metabolism, Faculty of Medicine, University of Tsukuba, Tsukuba, Ibaraki, Japan

\*Corresponding author: Tomoliyus, Faculty of Sport Sciences, Yogyakarta State University, Yogyakarta, Indonesia

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## Abstract

**Background:** Accuracy has become one of the prominent factors to improve the skills to counterattack the opponent in table tennis. An accurate hit possessed by an athlete is supported by the efficient training as well as stamina.

**Objective:** This study aims to evaluate the effects of training regimens and differences between sexes on forehand drive accuracy of table tennis athletes at STMY club, Yogyakarta.

**Methods:** A factorial design (2 x 3) was applied in this study to evaluate the influences of various stroke repetitions and gender on the forehand drive accuracy using multi-ball training practice. The population in this study were 30 STMY table tennis athletes who were still actively practicing table tennis. The athletes were further grouped into 6 sub-groups as assigned by the design based on the gender (male and female) and training regimens; 2-set, 3-set, and 4-set for 300, 200, and 150 strokes, respectively. Then, the forehand drive accuracy was performed.

**Results:** The training regimen of 2-set with 300 stroke repetitions significantly exhibited the highest forehand drive accuracy obtained by athletes at approximately  $88.70 \pm 5.83$  as compared to 3 and 4-set training regimens ( $p < 0.05$ ). Separately, male athletes have the tendency to possess the better accuracy than that in female athletes.

**Conclusion:** The training regimen of 2-set with 300 strokes was the recommended training program to improve the accuracy of forehand drive of the table tennis athletes at STMY club.

**Keywords:** Training regimen; Gender; Accuracy; Forehand drive

## Introduction

Table tennis is a sport that requires fundamental techniques to be learned and mastered. Each technique has a very important role in this game. Players who have good hitting skills, but are not supported by other techniques or abilities, such as forehand drive and footwork, are still considered as imperfect players [1]. Based on the observations in 5 table tennis training stations in Yogyakarta, Indonesia, beginner athletes who undertake table tennis training generally do not have good target accuracy, especially for new athletes. This can be observed from the movement of athletes

in ball striking during practice. In the game of table tennis, it is necessary to hit the target precisely to win the game. Thus, the factor of accuracy in table tennis is exclusively important in order to place a ball in a direction where is difficult for the opponent to return the stroke during the match (Wong, 2020). Even more, this is one of the factors that fails novice athletes to improve their skills in table tennis [2]. The training using the appropriate set and stroke repetitions by multi-ball method is indispensable because this might be conceivable to improve the performance of athletes to have



substantially better accuracy abilities. This is in accordance with previous research which stated that there were some significant improvements on visual abilities and counter-attack skills of junior table tennis players through the multi-ball training model [3]. Successfulness to perform the good accuracy is unavoidably affected by training and skill factors. Therefore, this training process will support the novice athletes to become outstanding athletes. As far as the present authors are concerned, there are no published works reporting the effects of training regimens and differences between sexes on the accuracy of forehand drives strokes at table tennis clubs in Yogyakarta. Therefore, this study aimed to evaluate the effects of training regimens and differences between sexes on the accuracy of forehand drive of male and female athletes at STMY Yogyakarta club.

### Participants And Methods

#### Participants and study allocation

In this study, a total of 30 beginner athletes aged 18-25 years

old was recruited from the STMY Yogyakarta club, Indonesia. The participants were 15 male and 15 female athletes that equally randomized into 6 groups based on gender and training regimen. This study was conducted from January to July 2023.

#### Study procedures

A factorial design (2 x 3) was used to select the best performance. The independent factors consisting of male (B1) and female (B2) were applied and training regimens which was divided into 3 sets, such as 2-set (A1), 3-set (A2), and 4-set (A3) were used to observe the effect of various factors towards the critical parameters during the training. A total of 6 sub-groups generated are presented in (Table 1). This study was conducted for 18 weeks with the training frequency of 3 times per week. The athletes were assigned to perform the multiball-training treatment at 300, 200, and 150 stroke repetitions for 2-set, 3-set and 4-set, respectively, with 1 minute break. The accuracy was measured using accuracy test by employing a table tennis forehand drive accuracy instrument, as displayed in Figure 1.

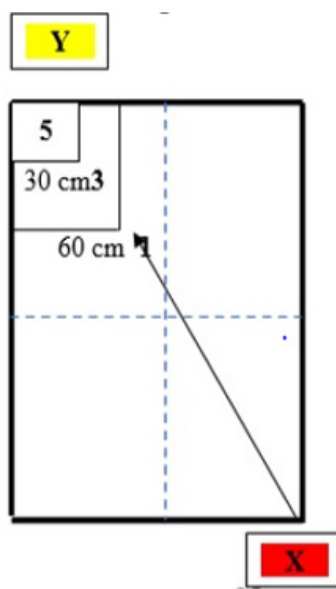


Figure 1: Image of Forehand Drive Precision Capability Instrument. X: Testimonials and Y: Feeder

Table 1: Experimental design using factorial design (2 x 3).

Gender	Training regimens		
	2-set (A1)	3-set (A2)	4-set (A3)
Male (B1)	A1B1	A2B1	A3B1
Female (B2)	A1B2	A2B2	A3B2

#### Statistical analysis

Data were expressed as mean ± standard deviation (SD). Data with more than two groups were statistically analysed using one-

way analysis of variance (ANOVA). Data with only two groups were analysed using two-tailed Student's t test. The significance level was taken at p < 0.05. Statistical analyses were performed using SPSS Statistics 26 (IBM, Armonk, NY, USA).

## Results

### Effects of training regimens on forehand drive accuracy

As presented in Figure 2 the forehand drive accuracy of combined male and female athletes ranged from 55.08 to 96.02.

The accuracy of athletes was significantly higher at 2-set (300 strokes) training regimen than that of 3-set (200 strokes) and 4-set (150 strokes) of training regimens ( $p < 0.05$ ). However, there was no significant difference of accuracy between 3-set and 4-set training regimens.

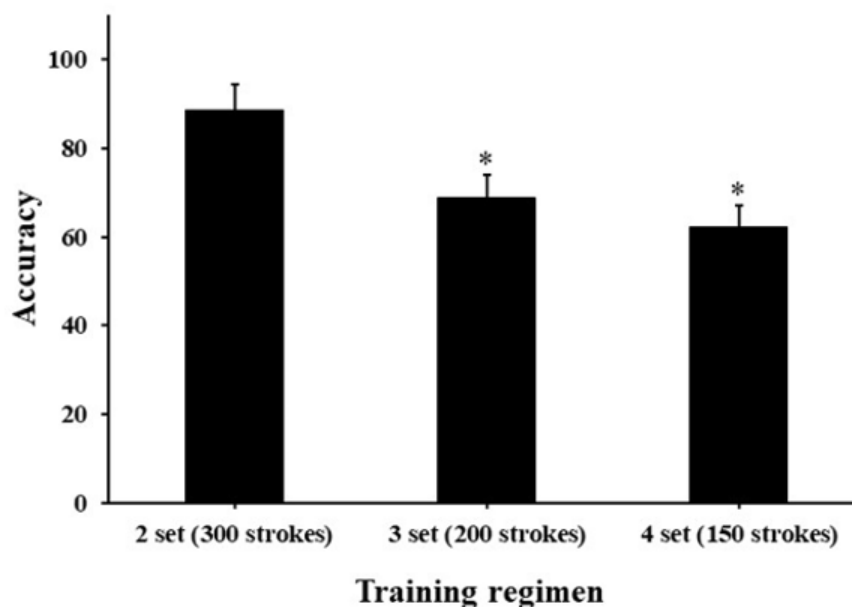


Figure 2: Effect of training regimens on forehand drive accuracy. \*:  $p < 0.05$  as compared to 2-set (300 strokes)

### Effects of gender on forehand drive accuracy

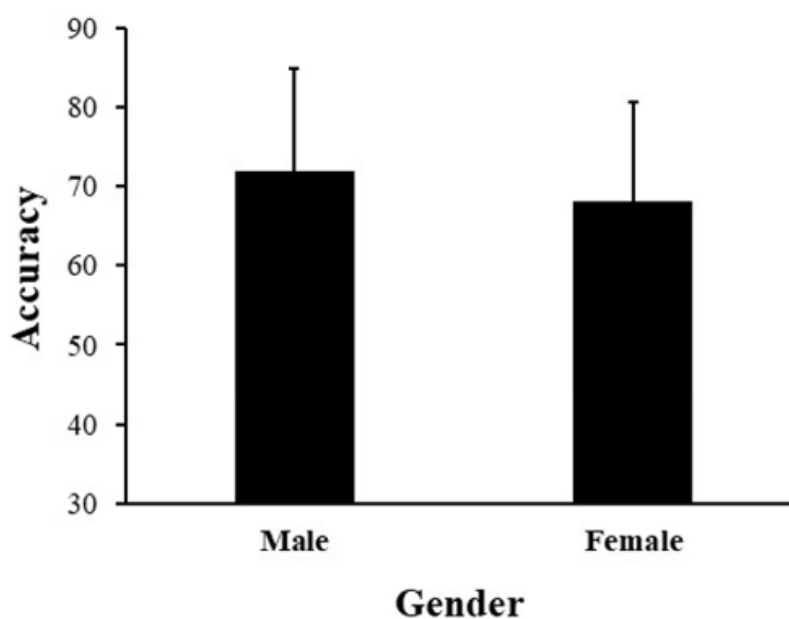


Figure 3: Effect of gender on forehand drive accuracy

Figure 3 represents the results of forehand drive accuracy between male and female athletes. The result exhibited that the forehand drive accuracy of the combined training regimens was not statistically difference between male and female after 18 weeks training. However, there was a clear tendency showing that the forehand drive accuracy of male athletes was higher than that of woman athletes.

## Discussion

The table tennis athletes at STMY Yogyakarta club require a variety of types of training to improve the strokes accuracy. One of the goals of performing a variety of exercises is to improve the muscular and stamina endurance of athletes during the match [4,5]. There are several training methods in table tennis, according to [6] training methods in table tennis include practicing with other players, practicing with a coach, individual practice, using machines as well as multi-ball. From the various methods in table tennis, one of the training methods used to improve the accuracy of the forehand drive strokes is the multiball training method [7-9]. This training method emphasizes the number of sets and strokes, thus enabling athletes to familiarize hitting the ball at the expected target precisely. The multiball method can be executed using machines or manuals provided by trainers [10]. However, STMY table tennis in Yogyakarta does not have an automatic machine, so, the manual multiball method is more convenient and accessible to improve the accuracy of athletes' forehand drives. The high frequency of practicing the forehand drive accuracy by hitting the ball as much as possible is expected to create the accustomed athletes on perfectly generating the precise strokes on target [11-13]. Accordingly, exercise using multiball is selected by the coach in this study. One of the goals of multi-ball training is to improve the athlete's forehand drive accuracy. As shown in the results, there was a significant influence of training regimens on forehand drive accuracy of athletes at the STMY table tennis club. Interestingly, the group with 2-set (300 strokes) training regimen obtained the highest accuracy with an average of  $88.70 \pm 5.83$  among all groups. These results were corroborated by [14] confirming that, in particular, there was an increase in forehand drive accuracy of 9.80, with a percentage increase of 21.30% in 2-set frequency (unpublished). Accuracy in sport can be reflected as the ability of players to direct a stroke to the interested target. Accuracy is an indispensable factor for table tennis player to achieve the precise target [15,16] Several studies have proven that there was a positive correlation between frequency of stroke repetitions and accuracy in sports which means that the higher the frequency of training, the higher the accuracy will be obtained by the players [17,18] In our study, the training regimen of 2-set is defined as the multiball training that consist of 300 strokes repetition and categorized as the highest repetition than other set of training regimens. Thus, this might be the potential reason explaining that the training regimen of 2-set with 300 strokes could significantly improve the forehand drive accuracy among the table tennis athletes in this study.

Furthermore, the tendency of higher accuracy was obtained by male athletes at the STMY table tennis club. Based on the results of the analysis, the forehand drive strokes accuracy of male group

with an average of  $72.00 \pm 12.78$  was better than that of female group with an average of  $68.00 \pm 12.61$ . Physiologically, table tennis is facilitated by sexual dimorphism. According to some studies, male athletes are prone to faster in lateral displacement, with considerably lower body strength in its impulsive and elastic-impulsive manifestations, and higher values of isometric strength in the upper limbs. Furthermore, male table tennis players have a better dynamic posture control, greater height, and wingspan compared to female table tennis players. Therefore, all these factors might be associated with our results exhibiting the parallel relationship of more powerful strokes as the result of higher speed and accuracy of male than female athletes.

Nowadays, table tennis is a sport in which control and mastery of technique are crucial. The need for precise and accurate hits has become the imperative effort to defeat the opponent in this game. Based on the results of this study, we passionately expanded the evaluation on improving the forehand drive accuracy of table tennis players by selecting the training regimen of 2-set with 300 stroke repetitions as the optimal multiball training regimen in order to achieve the maximal accuracy. This finding is also associated with the differences between sexes showing that, under this selected circumstance, male athletes were prone to obtain more accuracy than female athletes. Thus, these results can be used as a reference and consideration for trainers, players, or coaches of the current table tennis sport to design or create an exercise program that aims to train and improve table tennis forehand drive accuracy of novice athletes. This study is the first to unveil the influence of training regimen and gender on accuracy to improve the ability and skills of athletes in STMY table tennis club. However, our study has several limitations such as sample size and the stress generated during the training that may affect the results. Future research are suggested to perform more profound evaluations and parameters to improve the stamina, skills, and tactics of table tennis players.

## Conclusion

Our study thereby deduced that the training regimen and gender have influences on table tennis forehand drive accuracy of athletes in the STMY club. The regimen of 2 sets was chosen as the best training frequency on both male and female athletes to improve the forehand drive accuracy in table tennis sport. Furthermore, male athletes could gain the maximal accuracy with 2 sets of training regimen.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Human ethics

The protocol was approved by the Ethics Committee of Faculty of Sport Sciences, Yogyakarta State University (permission number: 461/UN34.16/PT.01.04/2023).

## Data availability

Data will be made available on request.

## Acknowledgements

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## Conflicts of interest

The authors declare that they have no conflicts of interest.

## References

- Belli T, Misuta MS, de Moura PPR, Tavares TS, Ribeiro RA (2019) Reproducibility and validity of a stroke effectiveness test in table tennis based on the temporal game structure. *Front Psychol* 10(427): 1-9.
- Castellar C, Pradas F, Carrasco L, De La Torre A, González-Jurado JA (2019) Analysis of reaction time and lateral displacements in national level table tennis players: Are they predictive of sport performance? *Int J Perform Anal Sport* 19: 467-477.
- Gu Y, Yu C, Shao S, Baker JS (2019) Effects of table tennis multi-ball training on dynamic posture control. *PeerJ* 6: 1-19.
- Ivanovic J, Dopsaj M (2012) Functional dimorphism and characteristics of maximal hand grip force in top level female athletes. *Coll Antropo*, 36: 1231-1240.
- Kondrič M, Zagatto AM, Sekulić D (2013) The physiological demands of table tennis: a review. *J Sports Sci Med* 12: 362-370.
- Kong S, Li J (2023) Training to improve the physical fitness of table tennis players. *Rev Bras Med Esporte* 29 1-4.
- Marchese F, Lanzoni IM, Steca P (2022) Personality traits and motives in table tennis players. *Int J Environ Res Public Health* 19(17): 1-10.
- Piras A, Lanzoni IM, Raffi M, Persiani M, Squatrito S (2016) The within-task criterion to determine successful and unsuccessful table tennis players. *Int J Sports Sci Coach* 11(4): 523-531.
- Pradas de la Fuente F, Ortega-Zayas MÁ, Toro-Román V, Moreno-Azze A (2023) Analysis of technical-tactical actions in high-level table tennis players: differences between sexes. *Sports* 11: (225).
- Pradas F, Toro-Román V, de la Torre A, Moreno-Azze A, Gutiérrez-Betancur JF, et al (2022) Analysis of specific physical fitness in high-level table tennis players-sex differences. *Int J Environ Res Public Health* 19: 5119.
- Ralston GW, Kilgore L, Wyatt FB, Buchan D, Baker JS (2018) Weekly training frequency effects on strength gain: A meta-analysis. *Sports Med Open* 4(36): 1-24.
- Rong Z (2024) Optimization of table tennis target detection algorithm guided by multi-scale feature fusion of deep learning. *Sci Rep* 14(1401): 1-16.
- Saleh SF (2015) Effects of training with multi-balls on some visual abilities and counter-attack skills for junior table tennis players. *JASS* 5(2): 170-180.
- Suisdareni, Tomoliyus (2021) The effect of drill exercise and reaction speed on the drive accuracy of beginner table tennis athletes. *Jurnal Keolahragaan* 9(2): 231-237.
- Syaeful (2014) Pengaruh latihan multiball terhadap kemampuan ketepatan forehand drive tenis meja pada mahasiswa UKM tenis meja universitas negeri yogyakarta. Universitas Negeri Yogyakarta, Yogyakarta.
- Syamsulrizal, Iqbal M (2022) The relationship between training concentration with the accuracy of passing futsal club bomber (FA) Jakarta. *INSPIREE* 3(3): 207-221.
- Wong D, Lam WK, (2020) Biomechanics of table tennis: a systematic scoping review of playing levels and maneuvers. *Appl Sci* 10(5203): 1-21.
- Zagatto AM, Papoti M, Gobatto CA (2008) Validity of critical frequency test for measuring table tennis aerobic endurance through specific protocol. *J Sports Sci Med* 7: 461-466.