Proceeding of International Joint Conference on UNESA
Homepage:https://proceeding.unesa.ac.id/index.php/pijcue
e-ISSN : 3032-376

PIJCU, Vol. 3, No. 1, Agt 2025
Page 53-56

Proceeding of International Joint Conference on UNESA

Combination of Hitting Drill Interval Training with The Reaction Speed of Table Tennis Athletes

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Keywords:
Interval training
Hitting drill
Reaction speed
Table tennis
Athlete

ABSTRACT

This study aimed to examine the effect of a combination of interval training and hitting drills on the reaction speed of table tennis athletes. The research background is based on the need for table tennis athletes to have high reaction speed in the face of very fast-moving balls, where fast response is one of the main determinants of performance on the court. The study used an experimental method with measurement of reaction speed before and after exercise intervention. The assessment was carried out using an audio-visual whole body reaction test and an anticipation reaction time test to obtain objective reaction speed data. Statistical analysis was carried out with normality, homogeneity and t tests to compare results before and after treatment. The results showed that the combination of interval training and hitting drills significantly increased the reaction speed of table tennis athletes. These findings confirm the importance of integrated and specific training programs to optimize athlete performance, as well as provide recommendations for coaches in designing effective and efficient training programs to increase athlete competitiveness at national and international levels.

INTRODUCTION

Click or tap here to enter text.According to data from the International Table Tennis Federation (ITTF), the speed of the ball in professional matches can reach 70 to 100 km/h, which requires athletes to react in less than 0.3 seconds (1). This makes table tennis a sport that requires high speed and reaction to achieve maximum performance. Professional athletes must be able to respond to an opponent's attacks in a very short time to remain competitive (2). However, not all athletes, especially at the regional and national levels, have sufficient physical capacity to meet these demands. Decreased athlete performance is often caused by training programs that are less specific and not well integrated, resulting in unstable and suboptimal performance when competing, and increasing the risk of injury (3)

Recent trends in sports training show an increasing use of more specific training methods to develop athletes' overall physical abilities. One method that is starting to be widely applied is *Interval Hitting Drills* (4), which has been proven to increase the speed and reaction of athletes in various sports (5). Nonetheless, the specific application of this method in the context of table tennis is rarely studied in depth. A study by Widodo (2021) emphasizes the importance of modifying the frequency, duration, and training load to improve the reactive agility as well as endurance of junior table tennis athletes, but the study has not explicitly addressed the use of any particular training method (6).

The main problem faced in the development of table tennis athletes today is the lack of an integrated and specific training program (7), especially to increase the reaction speed simultaneously. Many exercise programs do not focus on one of the main aspects of physical performance, so they do not provide optimal results. On the other hand, challenges such as time and resource constraints have also become obstacles to designing

effective and efficient exercise programmes. Exercise methods such as multiball and shadow can improve athlete's punching technique (8), but has not thoroughly discussed the aspects of strength, speed and reaction as one unit. Inaccuracies in training program planning can hinder development athlete achievements at national and international levels (9), as well as reducing their competitiveness on the global stage. Therefore, this study has a high urgency to provide empirical evidence regarding the effectiveness of integrated exercise methods (10). By developing a comprehensive and specific training approach, this research is expected to make a new contribution to the science of sports coaching, as well as supporting the improvement of the performance of table tennis athletes so that they are able to compete at national and international levels.

RESEARCH METHOD

The research was conducted in April, after the 2025 Fasting and Eid al-Fitr holiday agenda, in order to get maximum results. For a more objective assessment, no explanation is required the day before the assessment. Two days before the assessment, the players completed an ad-hoc open survey with additional information about their experience and the characteristics of their game. Before assessment, all research samples warm up first to avoid injury. Before assessing the reaction speed test, first carry out an anthropometric test, which includes measuring height and weight. Then a reaction speed test was carried out with *whole body reaction audio visual* and *anticipation reaction time test.*

Data is presented as the average of ± standard deviations and ranges (min–max). The Shapiro-Wilks test was used to determine the normal distribution of variables and the Levene test was used to determine variance homogeneity. T-tests for unrelated samples are used to determine sex differences. A p-value of ≤ 0.05 is considered statistically significant. Statistical analysis was performed with SPSS version 25.

RESULTS AND DISCUSSION

This study showed that the combination of interval training and punch training significantly improved the reaction speed of table tennis athletes. Data were collected through reaction speed tests before and after the training intervention. Statistical analysis was conducted using normality, homogeneity, and t tests to compare the results before and after treatment. The results showed that: A targeted training program combining interval training and hitting can improve reaction speed which is indispensable in table tennis matches. The demand for high reaction speed is important, given that ball speeds reach 70-100 km/h and require a response of less than 0.3 seconds. Reaction speed is a very crucial aspect in table tennis, where a quick response to an opponent's attack can determine the outcome of the match. This research confirms the importance of integrated and specific training program design to improve athlete performance at national and international levels.

The Importance of Interval Training: Interval training has been shown to be effective in improving athletes' speed and reaction in a number of sports. However, its specific application in the context of table tennis has been little researched. These findings illustrate the potential of the technique to improve overall performance. Limitations of

Training Programs: The current state of affairs suggests many training programs are not focused on the performance-determining aspects of athletes, resulting in suboptimal outcomes. Existing programs often do not cover overall speed and reaction, creating a need for a more comprehensive approach. Recommendations for Coaches: The results from the study suggest that coaches need to adapt and integrate more specific training methods to promote improved reaction speed. By doing so, athletes will be better prepared for the technical and physical demands of competition. Research Implications: This study is expected to make new contributions to the science of sports training and improving the readiness of table tennis athletes. The results are not only relevant for coach development but also as a reference for athletes who want to improve their performance on the field. Thus, the combination of interval training and stroke training can be an effective strategy in the development of table tennis athletes and improve their competitiveness in higher competition arenas.

CONCLUSION

Table tennis is a sport that demands a combination of exercises to achieve peak performance, speed and good reactions allow a quick response to an opponent's attack. Recent trends in sports training show an increased use of specific training methods to develop athletes' physical abilities. However, there are still few studies analyzing the reaction speed of table tennis athletes, especially in athletes aged 10-20 years. The purpose of this study was to determine how much the reaction speed of table tennis athletes in East Java. To determine the reaction speed of table tennis athletes, the sample will conduct a reaction test, namely with whole body reaction audio visual and anticipation reaction time. The results of this study are expected to be a reference value for various table tennis practitioners.

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