



Influence of Throw-Catch and Catch-Only Training on Table Tennis Forehand Drive Accuracy

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Keywords

Accuracy; catch-only; forehand drive; table tennis; throw-catch

Abstract

This study aims to examine the effect of to throw-catch and catch-only training on the accuracy of the forehand drive strokes in table tennis athletes, as well as to compare the effectiveness of both training methods. This research employed a quantitative approach using a quasi-experimental design in the form of a two-group pretest-posttest design. The sample consisted of 16 table tennis athletes selected through purposive sampling. The instruments used in this study included a forehand drive accuracy test, a hand-eye coordination test (throw-catch), and a reaction test (catch-only). Data analysis techniques and independent sample t-test with a significance level of 0.05. the results showed an improvement in the accuracy of forehand drive strokes after the intervention in both groups. Statistical analysis revealed a significant difference between the effects of throw-catch and catch-only training ($p < 0.05$). furthermore, throw-catch training was found to be more effective in improving forehand drive accuracy compared to catch-only training.

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INTRODUCTION

Table tennis is a sport that demands a high level of physical ability, technique, and coordination. One of the most important basic techniques in this game is the forehand drive, which serves as the primary attack for controlling the game (Zagatto et al., 2018). The accuracy of the forehand drive is an important indicator of an athlete's performance because it is related to the ability to consistently direct the ball to the desired target.

Eye-hand coordination is the main factor influencing hitting accuracy in racket sports. According to (Magill, 2007), eye-hand coordination is the ability to precisely integrate visual information with motor movements. In the context of table tennis, this ability allows athletes to accurately respond to the direction and speed of the ball, resulting in effective strokes.

Coordination exercises such as throw-catch and catch-only are widely used methods to improve these skills. Throw-catch exercises involve repeatedly throwing and catching a ball, improving movement synchronization and timing (Harsono, 2018). Meanwhile, catch-only exercises emphasize reaction speed to visual stimuli (Schmidt, R. A., & Lee, 2011). Previous research has shown that hand-eye coordination training significantly improves technical skills in table tennis (M., 2020). However, research directly comparing the effectiveness of throw-catch and catch-only training on forehand drive accuracy is limited.

Furthermore, training specificity is an important principle in sports science, suggesting that exercises that closely resemble actual game situation tend to produce better performance outcomes (Bompa & Buzzichelli, 2019). Therefore, understanding which training method provides greater transfer to real-game performance is essential for coaches in designing effective training programs.

Throw-and-catch drills are coordination exercises that involve repeated throwing and catching movements to improve the synchronization between visual perception and motor responses. This type of exercise is considered effective in improving hand-eye coordination, reaction time, and movement control, all of which are important components of table tennis performance. According to (Suisdareni & Tomoliyus, 2021), coordination-based exercises can improve athletes' responsiveness and precision in executing technical skills during matches. In table tennis, catch-and-throw exercises help athletes adapt more effectively to the direction, speed, and placement of the ball, thereby supporting the development of accuracy in the forehand drive.

Meanwhile, ball-catching drills primarily focus on reaction speed and the ability to respond quickly to visual stimuli. These drills emphasize an athlete's readiness and reflexes when receiving a moving object, which is a crucial aspect in high-speed sports such as table tennis. (Mu'ammam, 2017) explain that reaction-based drills contribute to motor learning by improving the efficiency of sensory processing and movement execution. Although catching drills alone can improve reaction ability, their movement patterns are less specific to actual stroke techniques compared to toss-and-catch drills. Therefore, differences in training characteristics can result in different impacts on forehand drive performance.

Previous research has also shown that coordination training and motor-perceptual training have a positive impact on table tennis technical skills. A study conducted by (Safari et al., 2017) explains that eye-hand coordination exercises can improve table tennis athletes' forehand drive skills. Additionally, (Rehabilitation, 2020) state that motor perception exercises can enhance stroke technique performance by improving visual responses and movement control more effectively.

Based on this background, this study aims to analyze the effect of throw-catch and catch-only training and compare the effectiveness of both on the accuracy of forehand drive strokes in table tennis athletes.

METHODS

This study used a quantitative approach with a quasi-experimental design with a two-group pretest-posttest design. This design was used to determine the effect of different treatments on improving forehand drive accuracy by comparing the results before (pretest) and after (posttest) the treatment in two groups (Fraenkel, J. R., Wallen, N. E., & Hyun, 2012). The research was conducted at the PTM Gesit Banjarnegara table tennis club in Purwanegara

District, Banjarnegara Regency. The study lasted approximately three weeks, from February 16, 2026, to March 5, 2026.

The population in this study was all 16 table tennis athletes from PTM Gesit Banjarnegara. The sampling technique used purposive sampling, which is a sampling technique based on certain considerations in accordance with the research objectives (M.Kep et al., 2024). The entire population was sampled and then divided into two groups, each consisting of 8 athletes: the throw-catch training group and the catch-only training group.

A forehand drive accuracy test developed by (Alamsyah & Tomoliyus, 2021) was used to measure athletes' forehand drive accuracy. The instrument has been used in previous studies on table tennis performance and was specifically designed to assess the accuracy of forehand drive strokes. Therefore, the instrument was considered valid in content and appropriate for evaluating forehand drive accuracy in table tennis athletes.

The throw-and-catch drill involves repeatedly throwing and catching a ball 10 times in a single set. Each repetition consists of a complete cycle of throwing and catching the ball. Meanwhile, the specialized catching drill involves catching 10 balls in a single set, during which athletes focus on reacting to and catching incoming balls as quickly and accurately as possible. Both training protocols were consistently implemented throughout the intervention period. The throw-and-catch drills consisted of 3 sets of 10 throws, while the catching-only drills consisted of 3 sets of 10 catches, with a 1-minute rest period between each set. This training program was conducted three times a week for three weeks.

A skills test developed by Tomoliyus (2012) in the study (Faris et al., 2022) was used as a research tool to measure the accuracy of the forehand drive. The athletes' accuracy in hitting a predetermined target was measured using this tool. The tool used to check how accurate forehand drive strokes are in table tennis is called the forehand and backhand drive accuracy test, which was created by (Tomoliyus et al., 2017). This tool has been checked and shows a very high level of content validity with a Content Validity Ratio (CVR) of 0.99. It also has a very high reliability score of 0.96, meaning it is dependable for measuring how accurately players perform strokes in table tennis games.

A pretest to ascertain the initial forehand drive accuracy of the complete sample was the first step in the research instrument utilized to measure the study procedure. After that, for the course of the trial, each group received various therapies. While the second group received catch-only training, the first group received throw-catch training. A posttest was given to gauge improvements in forehand drive accuracy following the completion of the whole training program.

Parametric statistical testing was the method of data analysis employed. Each group's pretest and posttest results were compared using the Paired Sample T-test, and the effects of the two training approaches were compared using the Independent Sample t-test. A significance level of 0.05 was used for testing (Ghozali, 2018).

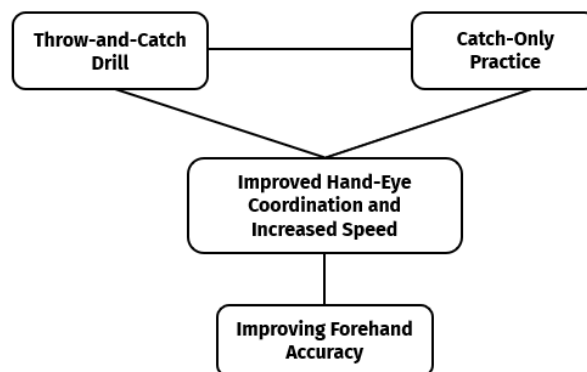


Figure 1. Framework Of Thingking

RESULTS AND DISCUSSION

The results of the study showed that there was a change in the value of forehand drive strokes in table tennis athletes after being given treatment in the form of throw-catch and catch-only training. Descriptively, most athletes experienced an increase in scores on the post-test compared to the pre-test, although there were some athletes who did not experience any changes or even experienced a decrease. This indicates that the training provided has contributed to improving abilities, especially in the aspect of eye-hand coordination which plays an important role in hitting accuracy. This finding is in line with the motor learning theory put forward by (Schmidt, R. A., & Lee, 2011), which states that motor skills can improve through practice involving repeated sensory and movement coordination.

The results of the normality test using Shapiro-Wilk showed that all data were normally distributed (Sig. > 0,05), so that meets the requirements of parametric statistical analysis. In addition, the homogeneity test using Levene's Test shows that the data variance between groups is homogeneous (Sig. = 0,635 > 0,05), which means that both groups have comparable characteristics for further testing.

These findings are supported by the research of (Alamsyah & Tomoliyus, 2021), which explains that hand-eye coordination and reaction speed have a significant relationship with the accuracy of table tennis strokes. Training that combines these two aspects will help athletes improve the consistency and accuracy of their strokes during gameplay.

Meanwhile, the catch-only group yielded a significance value of 0.451 (>0.05), indicating no significant improvement between pre-test and post-test scores. Although some athletes showed improvements descriptively, these changes were not statistically significant. This may be because catch-only training emphasizes reaction time without directly incorporating stroke movement patterns. Consequently, the application of training to improve forehand drive technique skills was less effective.

Based on the results of the independent samples t-test, a significance value of 0.016 (<0.05) was obtained, indicating a significant difference in effectiveness between the two training methods. The throw-catch training group proved more effective than the catch-only group in improving the accuracy of the forehand drive stroke. These results indicate that training that involves active movement coordination and simulates real game situations has a greater impact on improving athletes' technical skills.

A study (Garuda et al., 2026) explains that hand-eye coordination and reaction speed are key components of a successful table tennis stroke. The better an athlete's coordination, the higher the accuracy of their strokes. Therefore, coaches may consider using throw-catch drills as an effective alternative training method to improve basic table tennis techniques, particularly the forehand drive.

Table 1. Results of the Forehand Drive Accuracy Test

Name	Pre-Test	Post-Test	Difference (Δ)	Information
Sample 1	96	106	10	Increase
Sample 2	68	73	5	Increase
Sample 3	86	102	16	Increase
Sample 4	92	98	6	Increase
Sample 5	112	120	8	Increase
Sample 6	104	103	1	Decrease
Sample 7	100	101	1	Increase
Sample 8	81	83	2	Increase
Sample 9	80	85	5	Increase
Sample 10	104	96	8	Decrease
Sample 11	87	78	9	Decrease
Sample 12	79	81	2	Increase
Sample 13	93	88	5	Decrease
Sample 14	90	94	4	Increase
Sample 15	59	59	0	Stagnan
Sample 16	70	69	1	Decrease

Table 2. Normality Test

Variable	Group	Statistic	Sig
Pre-test	1	.987	.988
	2	.986	.986
Post-test	1	.928	.495
	2	.951	.718

Based on the results of the *Shapiro-Wilk* Normality Test, the significance value for all variables was greater than 0.05 (Sig. > 0.05). Thus, it can be concluded that the pretest and posttest data were normally distributed.

Table 3. Homogeneity Test

		Levene Statistic	Sig.
Value	Based on Mean	.230	.635
	Based on Median	.226	.638
	Based on Median and with adjusted df	.226	.638
	Based on trimmed mean	.230	.635

Based on the results of the homogeneity test using *Leven's Test*, a significant value of 0.635 > 0.05 was obtained, so it can be concluded that the data variance between the experimental group and the control group is homogeneous.

Table 4. Paired Sample T-test (Group 1)

		t	Sig. (2-tailed)
Pair 1	Throw-Catch Catch-Only	-3.028	.019

Based on the results of the Paired Sample T-test in group 1, a significance value of 0.019 (<0.05) was obtained, thus concluding that there was a significant difference between the pretest and posttest scores. The average score indicated an increase in results after treatment, thus indicating that the training provided significantly improved the athletes' abilities.

Table 5. Paired Sample T-test (Group 2)

		t	Sig. (2-tailed)
Pair 1	Throw-Catch Catch-Only	-.798	.451

Based on the results of the Paired Sample T-test in group 2, a significance value of 0.451 (>0.05) was obtained, so it can be concluded that there is No. significant difference between the pretest and posttest scores. Thus, the treatment given did not have a significant effect on increasing the results.

Table 6. Independent t-test

		Leven's Test for Equality of Variances	t	Sig. (2-tailed)
gain	Equal Variances assumed		2.729	.016
	Equal variances not assumed		2.729	.016

Based on the results of the independent sample t-test, a significance value of 0.016 (<0.05) was obtained, so it can be concluded that there is a significant difference between the two groups. Thus, the treatment given to the two groups had different levels of effectiveness, where one training method proved to be more effective than the other method.

The findings of this study suggest that throw-catch training can be used as an effective complementary exercise for improving forehand drive accuracy in table tennis athletes. Given its significant effect on performance improvement ($p = 0.019$; $p < 0.05$), coaches are encouraged to systematically incorporate toss-and-catch drills into their weekly training programs. This exercise can be performed during warm-ups or the coordination training phase for approximately 10–15

minutes per session, two to three times a week. Athletes can perform 3–4 sets of 10 catch-and-throw repetitions before proceeding to forehand drive stroke technique drills. This approach is supported by motor learning theory, which states that skill mastery improves when training integrates perceptual information with the execution of coordinated movements (Schmidt & Lee, 2011). Additionally, the principle of training specificity states that exercises closely resembling actual sports movements yield greater transfer effects on performance (Bompa & Buzzichelli, 2019).

The throw-and-catch training group showed a more significant improvement compared to the group that performed only catching exercises. A paired t-test on Group 1 yielded a p-value of 0.019 ($p < 0.05$), indicating that throw-and-catch training significantly improved forehand drive accuracy. These results can be explained by the characteristics of the exercise itself, which simultaneously combines visual tracking, hand-eye coordination, timing, and active ball control. These movements closely resemble the actual execution of a forehand drive in a table tennis match. Based on the principle of training specificity proposed by (Bompa & Buzzichelli, 2019), training programs that simulate actual game situations tend to provide a greater transfer effect on athletic performance. Therefore, catch-and-throw drills allow athletes to adapt more effectively to the direction, speed, and placement of the ball during play.

In addition, catch-and-throw drills also stimulate neuromuscular coordination and improve sensorimotor integration. Athletes are not only required to react to visual stimuli but also to coordinate upper-body movements accurately and continuously. These findings align with research conducted by (Susetyorini, J. T., Rahayu, T., & Rahayu, 2019), who reported that eye-hand coordination exercises significantly improved forehand drive skills in table tennis athletes. Similarly, (Rehabilitation, 2020) stated that perceptual-motor exercises enhance stroke performance by improving movement control and the efficiency of visual responses.

Overall, the findings demonstrate that training specificity and movement integration play important roles in enhancing technical skills in table tennis. Exercises involving active coordination and realistic movement patterns provide greater performance benefits compared to drills focusing solely on reaction ability. Therefore, the implementation of throw-catch training may contribute significantly to improving athlete performance and technical effectiveness during competitive play.

CONCLUSION

This study aimed to determine the effect of throw-catch and catch-only training methods on the accuracy of forehand drive strokes in table tennis athletes and to compare the effectiveness of both methods. Based on the results of the analysis, it can be concluded that both training methods contributed to changes in forehand drive accuracy; however, their effects differed in significance. The paired sample t-test showed that the throw-catch training method had a significant effect on improving forehand drive accuracy, as indicated by a significance value of 0.019 ($p < 0.05$). In contrast, the catch-only training method did not show a significant effect, with a significance value of 0.451 ($p > 0.05$).

Furthermore, the independent sample t-test revealed a significant difference between the two training methods ($p = 0.016 < 0.05$), indicating that the level of effectiveness between the groups was not the same. The results demonstrate that the throw-catch training method is more effective than the catch-only method in improving the accuracy of forehand drive strokes. In conclusion, training programs that involve coordinated movement patterns and active ball control, such as throw-catch exercises, are more beneficial in enhancing forehand drive accuracy. Therefore, coaches are recommended to incorporate throw-catch training into practice sessions to optimize athletes' performance in table tennis.

REFERENCES

- Agustina, A. T., & Priambodo, A. (2017). Hubungan antara tingkat konsentrasi terhadap hasil ketepatan shooting olahraga petanque pada peserta Unesa Petanque Club. *Jurnal Pendidikan Olahraga dan Kesehatan*, 5(3), 391–395.
- Akbar, R. (2020). Model latihan keterampilan ayunan putt untuk atlet pemula cabang olahraga golf. *Jurnal Ilmu Keolahragaan*, 19(2), 134–142. <https://doi.org/10.24114/jik.v19i2.21819>
- Alfindana, D., & Putro, D. E. (2023). Hubungan antara konsentrasi, koordinasi mata tangan terhadap pukulan gate-in pada cabang olahraga woodball di Club Semangat Pagi Pacitan. *Jurnal Ilmiah Pendidikan Jasmani*, 4(2), 112–120.

- Anggraeni Ratono Putri, G. (2025). *Pengembangan terapi okupasi dengan metode koordinasi mata dan tangan menggunakan kotak konsentrasi pada anak berkebutuhan khusus*. Repository Universitas PGRI Adi Buana.
- Azetra, A., Bahtiar, S., Umar, U., Putra, A. N., & Ifdil, I. (2024). Pengaruh daya ledak otot tungkai, koordinasi mata kaki, dan konsentrasi terhadap kemampuan shooting bola pada pemain sekolah sepak bola (SSB). *Jurnal Counseling dan Pendidikan*, 12(4), 458–466.
- Bayani, S. N., Komarudin, K., Saputra, M. Y., & Novian, G. (2024). Meningkatkan percaya diri atlet intelektual rendah pada cabang olahraga open-skill melalui latihan kognisi. *Jambura Journal of Sports Coaching*, 6(2), 84–97. <https://doi.org/10.37311/jisc.v6i2.24739>
- Citra, P., Dewi, P., & Sukadiyanto, S. (2015). Pengembangan tes keterampilan olahraga woodball untuk pemula. *Jurnal Keolahragaan*, 3(2), 228–240.
- Dewi, P. C. P. (2015). Identifikasi keterampilan pukulan olahraga woodball. *Jurnal Pendidikan Kesehatan Rekreasi*, 2(2), 166–172.
- Dewi, P. C. P. (2016). Analisis komponen biomotorik pada olahraga permainan woodball. *Jurnal Pendidikan Kesehatan Rekreasi*, 1(1), 81–87.
- Fahima, D. F., Razali, R., Amiruddin, A., Syamsulrizal, S., Zulfikar, Z., & Abdurrahman, A. (2025). Analysis of concentration levels, anxiety and gating strokes in Aceh-North Sumatra PON athletes in Aceh Province woodball sports in 2024. *Path of Science*, 11(1), 9001–9010. <https://doi.org/10.22178/pos.113-31>
- Fayogi, N. U., Sukanti, E. R., Hartanto, A., Teofa, B., Wibafiet, P., & Yachsie, B. (2022). Study of the correlation between arm muscle power, arm length, hand-eye coordination, and concentration on gate-in results in woodball. *International Journal of Multidisciplinary Research and Analysis*, 5(3), 606–615. <https://doi.org/10.47191/ijmra/v5-i3-04>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2022). *How to design and evaluate research in education* (11th ed.). McGraw Hill LLC.
- Julianti, K., Widnyana, M., Vittala, G., & Saraswati, N. L. P. G. K. (2025). Hubungan antara koordinasi mata tangan dengan kualitas pukulan pada atlet woodball Provinsi Bali. *OBAT: Jurnal Riset Ilmu Farmasi dan Kesehatan*, 3(4), 288–294. <https://doi.org/10.61132/obat.v3i4.1560>
- Komarudin, K., Saputra, M. Y., Awwaludin, P. N., Febrianty, M. F., & Novian, G. (2024). *Model latihan kognisi dalam olahraga*. Indonesia Emas Groups.
- Kriswanto, K., & Lumbanraja, E. S. (2016). Pengaruh jenis pegangan terhadap hasil akurasi gasing pada woodball. *Journal of Sport Coaching and Physical Education*, 1(1), 1–7.
- Maulinda, R., & Kriswanto, K. (2019). Hubungan motor ability dengan hasil akurasi pukulan ke arah gate pada atlet putra UKM woodball UNNES tahun 2018. *Journal of Sport Coaching and Physical Education*, 4(1), 48–54.
- Mulyadi, A., Komarudin, K., Sartono, H., & Novian, G. (2021). Meningkatkan konsentrasi atlet sepak bola melalui metode latihan life kinetik. *Jurnal Patriot*, 3(4), 387–396. <https://doi.org/10.24036/patriot.v3i4.801>
- Murdaningsih, D. A., & S. R. (2022). Sumbangan koordinasi mata tangan dan konsentrasi terhadap akurasi pukulan jarak pendek woodball. *Journal of Sport Sciences and Fitness*, 8(1), 15–22.
- Novian, G., Komarudin, K., Rismayadi, A., Febrianty, M. F., & Syahid, A. M. (2025). A study of endurance training methods and their effects on archery athletes. *Journal of Physical Education and Sport*, 25(1), 62–66.
- Nurhasanah, R., Pranoto, N. W., Fajri, H. P., & Nelson, S. (2025). Hubungan tingkat konsentrasi terhadap hasil pukulan atlet woodball Sumatera Barat. *Jurnal Ilmu Keolahragaan*, 3(2), 281–286.
- Sin, T. H. (2016). Persiapan mental training atlet dalam menghadapi pertandingan. *Jurnal Performa Olahraga*, 1(1), 61–73.
- Suhaimi, M. S., Salleh, M. H., & Rifin, M. R. A. (2024). Enhancing woodball performance: Assessing the effectiveness of the ball placement jig for beginners. *Politeknik & Kolej Komuniti Journal of Engineering and Technology*, 9(2), 98–107.
- Syafutra, W., & Remora, H. (2024). Pengaruh mental training terhadap hasil pukulan jarak dekat atlet Silampari Woodball Academy. *Jurnal Muara Pendidikan*, 9(2), 409–416. <https://doi.org/10.52060/mp.v9i2.2412>
- Taheri Akhbar, M., Alamin, D., Supriyanto, B., Andreas, J., Dlis, F., Sukur, A., & Wasan, A. (2023). The analysis of woodball game on long-distance shot athletes IWBA Palembang. *Journal of Indonesian Physical Education and Sport*, 9(1), 34–42.
- Wisata, I. K., Danardani, W., Semarayasa, I. K., & Lesmana, K. Y. P. (2025). Peran psikologi olahraga dalam meningkatkan performa, kesehatan mental, dan kesejahteraan. *Jurnal Studi Multidisipliner Berkelanjutan*, 9(12), 23–32.
- Yazid, S., Kusmaedi, N., & Paramitha, S. T. (2016). Hubungan konsentrasi dengan hasil pukulan jarak jauh (long stroke) pada cabang olahraga woodball. *Jurnal Terapan Ilmu Keolahragaan*, 1(1), 50–58. <https://doi.org/10.17509/itikor.v1i1.3903>