



Drill Training Improves Dollyo Chagi Kick Speed in Taekwondo Athletes: A One-Group Pretest-Posttest Study

Novran Saputra¹, Bayu Iswana¹, Agung Mahendra¹

¹ Physical Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Palembang, Indonesia

Corresponding Author: nopransaputra87@gmail.com

Abstract

Objectives: This study aimed to examine the effect of structured drill training on dollyo chagi kick speed among athletes of Club Taekwondo Yon Zikon 12.

Materials and Methods: This quantitative experimental study used a one-group pretest-posttest design. The participants were 12 active male taekwondo athletes selected from Club Taekwondo Yon Zikon 12. The intervention consisted of 16 structured drill-training sessions, including stance and chamber drills, target kicking, speed drills, interval drills, reaction drills, moving-target drills, and combination kicking drills. Kick speed was measured using a dollyo chagi kick-speed test with a target and timing procedure before and after the intervention. Data were analyzed using descriptive statistics, a normality test, and a paired-samples t-test at a significance level of 0.05.

Results: The mean kick-execution time decreased from 5.14 ± 0.69 seconds in the pretest to 4.60 ± 0.64 seconds in the posttest. The mean reduction was 0.53 seconds, indicating an improvement of approximately 10.39% because a lower time reflects faster kicking performance. The hypothesis test showed a significant difference between pretest and posttest scores ($p = 0.004$).

Conclusions: Structured drill training significantly improved dollyo chagi kick speed in Club Taekwondo Yon Zikon 12 athletes. The findings suggest that repetitive, progressive, and target-oriented drill activities can be used by coaches as a practical training strategy to improve kicking speed in taekwondo.

Keywords: Drill Training; Dollyo Chagi; Kick Speed; Taekwondo; Sport Training



Introduction

Taekwondo is a combat sport characterized by rapid kicking actions, quick changes of distance, and explosive lower-limb movement. In kyorugi, the ability to execute kicks quickly is an important performance component because it helps athletes reach the target before the opponent can block, evade, or counterattack. Among the commonly used techniques, the dollyo chagi or roundhouse kick is a central scoring movement because it combines hip rotation, knee extension, balance, and foot speed in a short execution time.

Previous biomechanical studies have shown that roundhouse-kick performance is influenced by execution time, target distance, impact force, lower-limb coordination, and the transfer of movement from the hip and trunk to the distal segments (Falco et al., 2009, 2009; Vagner et al., 2023). More recent evidence also emphasizes that lower-extremity biomechanical characteristics and effective scoring with electronic protectors are closely related in taekwondo kicking actions (Jia et al., 2024). Therefore, the development of kick speed should not rely only on general physical conditioning, but also on specific movement practice that reflects the technical demands of taekwondo.

Drill training is one method that can be used to improve technical consistency and movement speed. Through repeated, structured, and progressive practice, athletes can strengthen motor patterns, reduce unnecessary movement, and improve coordination between the supporting leg, hip rotation, and kicking leg. In taekwondo, drill-based training is commonly connected with speed, agility, and quickness exercises because these components support fast stepping, rapid response, and explosive kicking execution. Studies on taekwondo athletes have reported that SAQ, circuit, plyometric, and other structured training methods can improve dollyo chagi ability, kick speed, agility, and lower-limb power (Akhmad et al., 2021; Asmawi & Wiguna, 2015; M. Fajar, 2017).

Based on preliminary observation at Club Taekwondo Yon Zikon 12, several athletes still showed slow dollyo chagi execution, especially during foot transition, hip rotation, and the acceleration phase toward the target. These technical problems may reduce attacking effectiveness in kyorugi because a slow kick is easier for the opponent to anticipate. For this reason, this study was conducted to examine whether structured drill training has a significant effect on dollyo chagi kick speed among athletes of Club Taekwondo Yon Zikon 12.

Materials and Methods

Study Design

This study used a quantitative experimental method with a one-group pretest-posttest design. The same athletes were measured before and after receiving the drill-training intervention. This design was selected to identify the change in dollyo chagi kick speed after the treatment period.

Study Participants

The population consisted of 46 athletes registered at Club Taekwondo Yon Zikon 12, Palembang, Indonesia. Twelve active male athletes were selected as research participants based on training activity, readiness to follow the full intervention, and basic mastery of the dollyo chagi technique. The participants were 17 to 20 years old. The research was conducted at Asrama Yonzikon 12 Kompi B Plaju, Palembang.

Study Organization

The study was organized through a structured pre-test, intervention, and post-test procedure. The main measurement instrument was a dollyo chagi kick-speed test using a pyongyo or kicking target, stopwatch or video recording, whistle, and observation



sheet. Each athlete stood at a predetermined distance from the target and performed the dollyo chagi kick according to the researcher's command. The time required to complete the kick execution was recorded in seconds. A lower score indicated faster kicking performance. Each athlete completed several attempts, and the best valid score was used as the research data.

The drill-training intervention was conducted over 16 structured meetings. Each training session consisted of three main parts: warm-up, core drill training, and cool-down. The training content was arranged progressively, beginning with basic technical control and advancing toward faster and more tactical kicking applications. In the early phase, the training focused on fighting stance, chamber position, static dollyo chagi execution, and target kicking. The middle phase emphasized repeated speed kicks, interval kicking, reactions to auditory and visual commands, and moving-target drills. The final phase focused on slip-counter dollyo chagi, ap chagi-dollyo chagi combinations, impact-pad kicking, and final performance evaluation.

This progressive training organization was designed to improve athletes' coordination, reaction ability, footwork rhythm, hip rotation, and dollyo chagi kick-execution speed.

Statistical Analysis

The data were analyzed using IBM SPSS Statistics version 23. Descriptive statistics were used to summarize the pretest and posttest scores, including mean, standard deviation, minimum, and maximum values. A normality test was conducted before hypothesis testing. The effect of drill training on kick speed was tested using a paired-samples t-test with a significance level of 0.05. The improvement percentage was calculated from the mean reduction in execution time relative to the pretest mean.

Results

The results are presented separately from the discussion to show the empirical findings without interpretive explanation. The complete pretest and posttest scores are shown in Table 1.

Table 1. Individual Pretest and Posttest Scores of Dollyo Chagi Kick Speed

Participant	Age (years)	Pretest (s)	Posttest (s)	Difference (s)
P1	17	5.65	4.15	1.50
P2	19	3.74	3.60	0.14
P3	17	5.77	4.30	1.47
P4	19	5.02	4.65	0.37
P5	20	5.29	4.80	0.49
P6	19	4.41	4.05	0.36
P7	20	5.67	5.20	0.47
P8	18	4.55	4.16	0.39
P9	18	5.60	5.28	0.32
P10	17	5.87	5.72	0.15
P11	18	5.61	5.25	0.36
P12	20	4.50	4.11	0.39

Table 1 shows that all participants recorded faster posttest scores than pretest scores. The largest individual reduction was 1.50 seconds, while the smallest reduction was 0.14 seconds.

**Table 2.** Descriptive Statistics of Dollyo Chagi Kick Speed

Test	N	Mean (s)	SD	Minimum (s)	Maximum (s)
Pretest	12	5.14	0.69	3.74	5.87
Posttest	12	4.60	0.64	3.60	5.72

As shown in Table 2, the mean kick-execution time decreased from 5.14 seconds to 4.60 seconds after the drill-training intervention. The mean reduction was 0.53 seconds, equal to an improvement of approximately 10.39% because the performance indicator was time-based.

Table 3. Normality and Hypothesis Testing

Analysis	Statistic/Value	Decision Rule	Interpretation
Normality test	Asymp. Sig. = 0.200	$p > 0.05$	Data were normally distributed
Paired-samples t-test	Sig. = 0.004	$p < 0.05$	Significant pretest-posttest difference

Table 3 indicates that the data fulfilled the normality assumption and that the paired-samples t-test showed a statistically significant improvement after the intervention. Therefore, the research hypothesis was accepted: drill training had a significant effect on dollyo chagi kick speed among Club Taekwondo Yon Zikon 12 athletes.

Discussion

The discussion should interpret the findings of the study and relate them to previous studies and relevant theories. Authors should explain the significance of the findings, possible reasons for the results, practical implications, and recommendations for future studies.

The findings show that structured drill training significantly improved dollyo chagi kick speed. The decrease in mean execution time from 5.14 to 4.60 seconds indicates that the athletes were able to execute the technique more quickly after 16 drill-training sessions. This finding is consistent with previous taekwondo studies reporting that structured speed, agility, quickness, circuit, and plyometric training can improve kick speed, dollyo chagi ability, and lower-limb performance (Akhmad et al., 2021; Asmawi & Wiguna, 2015; M. K. Fajar et al., 2023).

The improvement can be explained by the nature of drill training. Repeated practice helps athletes perform the same technical pattern with better rhythm, shorter preparation time, and fewer unnecessary movements. In dollyo chagi, speed is not determined by leg movement alone; it also depends on the coordination of the supporting leg, hip rotation, trunk control, knee extension, and foot trajectory. Biomechanical studies of taekwondo roundhouse kicks have shown that execution time, distance, target height, impact force, and segmental coordination influence the quality of kick performance (Falco et al., 2009, 2013; Vagner et al., 2023).

static technique control to faster and more tactical movement conditions. The use of chamber drills, target kicking, repeated speed kicks, reaction drills, and moving targets may have improved the athletes' readiness to initiate the kick and accelerate the kicking leg toward the target. This explanation is supported by studies showing that agility training, repeated high-intensity technique training, and sport-specific conditioning can improve physical and combat-related performance in taekwondo athletes (Ouergui et al., 2020; Singh et al., 2024).

The results also align with neuromuscular and biomechanical evidence showing that elite or more effective roundhouse kicks are associated with better muscle activation timing, faster response characteristics, and more efficient kinetic and kinematic patterns ((Jianjun



et al., 2025; Lu & Liu, 2015; Thibordee & Prasartwuth, 2014). In practical terms, when athletes repeat the dollyo chagi pattern under controlled speed and target conditions, they are more likely to develop a stable movement sequence and reduce execution time.

Despite these positive results, the study has several limitations. First, the sample size was small and involved only 12 athletes from one club, so generalization should be made carefully. Second, this study used a one-group design without a control group, meaning that improvements cannot be separated completely from other training or maturation effects. Third, the researcher could not fully control the athletes' physical activities outside the intervention sessions. Fourth, the study did not measure additional variables such as leg power, hip flexibility, reaction time, or kick accuracy, although these factors may contribute to dollyo chagi performance. Future research should use a control group, larger sample, more precise digital timing devices, and additional biomechanical or physical-performance measurements.

Practical Implications Coaches may use drill training as a practical method to improve dollyo chagi speed, especially when the program is delivered progressively and consistently. The early phase should emphasize technical accuracy and body position, the middle phase should emphasize speed and reaction, and the final phase should integrate drills into tactical situations such as counterattacks and kick combinations. Coaches should also ensure adequate warm-up, appropriate recovery, and continuous correction of technique so that speed improvement does not reduce kicking accuracy or increase injury risk.

Conclusions

Structured drill training significantly improved dollyo chagi kick speed among athletes of Club Taekwondo Yon Zikon 12. The mean execution time decreased from 5.14 ± 0.69 seconds to 4.60 ± 0.64 seconds, with a mean reduction of 0.53 seconds and a significance value of 0.004. These results indicate that repetitive, progressive, and target-oriented drill training can be used as an effective training strategy to support faster dollyo chagi execution in taekwondo.

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Conflict of Interest

The author declares no conflict of interest related to this article.

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