

15% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography

Match Groups

-  **70 Not Cited or Quoted 13%**
Matches with neither in-text citation nor quotation marks
-  **15 Missing Quotations 2%**
Matches that are still very similar to source material
-  **0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
-  **0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 0%  Internet sources
- 15%  Publications
- 0%  Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

- 70 Not Cited or Quoted 13%**
Matches with neither in-text citation nor quotation marks
- 15 Missing Quotations 2%**
Matches that are still very similar to source material
- 0 Missing Citation 0%**
Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%**
Matches with in-text citation present, but no quotation marks

Top Sources

- 0% Internet sources**
- 15% Publications**
- 0% Submitted works (Student Papers)**

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Publication	Andriansyah, Sumaryanto, Ngatman, Trisnar Adi Prabowo. "Eficacia del entrena...	2%
2	Publication	Ken Nagamine, Osamu Aoyagi. "A statistical examination into the structure of pla...	1%
3	Publication	Rosida Afriani, Anwar Anwar, Salahudin Salahudin. "The effect of traditional GOP...	<1%
4	Publication	Marcos Antonio Arlindo Soares. "Dificuldade da tarefa e nível de proficiência em ...	<1%
5	Publication	Markel Rico-González. "Physical Education in Early Childhood - Movement and De...	<1%
6	Publication	Endang Rini Sukamti, Wenti Nopriani, Ratna Budiarti, Risti Nurfadhila, Muhamma...	<1%
7	Publication	M. Auliya Akhsan Al Wahib, Endang Rini Sukamti, Tri Hadi Karyono, Trisnar Adi Pr...	<1%
8	Publication	Aziza Puspadewi Safitri, Erwin Setyo Kriswanto, Aris Fajar Pambudi, Siti Nurroch...	<1%
9	Publication	Andriansyah Andriansyah, Sumaryanto Sumaryanto, Ngatman Ngatman, Trisnar ...	<1%
10	Publication	S. M. Fernanda Iragraha. "The 4th International Conference on Physical Educatio...	<1%

11	Publication	Ari Kurniawan, Endang Rini Sukamti, Rumpis Agus Sudarko, Tomoliyus Tomoliyus...	<1%
12	Publication	Aziza Puspawati Safitri, Erwin Setyo Kriswanto, Aris Fajar Pambudi, Trisnar Adi Pr...	<1%
13	Publication	Vistor Syapri Maulana, Ahmad Nasrulloh, Sigit Nugroho, Achad Imam Ma'ruf et al...	<1%
14	Publication	Eline Coppens, Felien Laureys, Mireille Mostaert, Eva D'Hondt, Frederik J. A. Deco...	<1%
15	Publication	Kukuh Hardopo Putro, Suhajana Suhajana, Agus Susworo Dwi Marhaendro, Fau...	<1%
16	Publication	Anastasia Yakushina, Nemanja Lakicevic, Sergey Leonov, Sergey Vvedenskiy, Patr...	<1%
17	Publication	Cukup Pahawidi, Ria Lumintuarso, Ermawan Susanto, Andri Arif Kustiawan, Tris...	<1%
18	Publication	Stanley A. Herring. "Should the Athlete's State of Mind Affect Clearance Decisions...	<1%
19	Publication	"XIII National Congress SISMES", Sport Sciences for Health, 2023	<1%
20	Publication	I Dewa Made Aryananda Wijaya Kusuma, Nining Widyah Kusnanik, Ria Lumintuar...	<1%
21	Publication	Pelana, Ramdan. "Fun Learning Management for Physical Education, Sport and H...	<1%
22	Publication	Perry R. Hinton, Isabella McMurray, Charlotte Brownlow, Peter C. Terry. "SPSS Ex...	<1%
23	Publication	Ahmed Ghorbel, Med Moncef Kammoun, Mohamed Yaakoubi, Omar Trabelsi, Liw...	<1%
24	Publication	Maarten J. J. Kunst, Marja J. H. van Bon-Martens. "Examining the Link Between Do...	<1%

25	Publication	I Gusti Ngurah Putra Eka Santosa, I Putu Gede Adiatmika, Ni Made Swasti Wulany...	<1%
26	Publication	Yiran Liu, Shiao Zhao, Xuda Zhang, Xiaoyu Zhang, Taihe Liang, Ziheng Ning. "The ...	<1%
27	Publication	Debbie Hahs-Vaughn, Richard Lomax. "An Introduction to Statistical Concepts - T...	<1%
28	Publication	Indah Prasetyawati Tri Purnama Sari, Muchsin Doewes, Muhammad Furqon Hida...	<1%
29	Publication	Ricky Susiono, FX Sugiyanto, Ria Lumintuarso, Tomoliyus Tomoliyus. "Effect of Hi...	<1%
30	Publication	Bracamonte, Cassandra Lea. "Feelings of Defeat and Entrapment in Correlation w...	<1%
31	Publication	Elham Hakimirad, shirin mojaver, negin kabirmokhtar, zahra amiabadi. "The Effe...	<1%
32	Publication	Danang Endarto Putro, Ngatman, Sridadi, Catur Wahyu Priyanto, Trisnar Adi Pra...	<1%
33	Publication	Fatwa Aulia Seriannuari, Topo Yono, Ahmad Sulaiman. "Do exercise for 4 weeks u...	<1%
34	Publication	Koji Murofushi, Sho Mitomo, Yosuke Yamada, Kenji Hirohata et al. "Bodily awaren...	<1%
35	Publication	Rezki Rezki, Gusril Gusril, Arsil Arsil, Alnedra Alnedra, Bafirman HB, Anton Komai...	<1%
36	Publication	Risky Syahputra, Fx Sugiyanto Sugiyanto, Tomoliyus Tomoliyus, Syahrial Bakhtiar...	<1%
37	Publication	Siti Baitul Mukarromah, Sangheon Park, Loveleen Bala, Rikha Liemiyah. "Effects o...	<1%
38	Publication	Trisnar Adi Prabowo, Mar'atul Afifah, Asyidika Vito Indarto, Achmad Zakaria, Zak...	<1%

39	Publication	Novi Resmi Ningrum, Tomoliyus Tomoliyus, Fauzi Fauzi, Faidillah Kurniawan et al....	<1%
40	Publication	Nugroho Puji Santoso, Subagyo, Nurhadi Santoso, Trisnar Adi Prabowo, Wahyu D...	<1%
41	Publication	Pramod Ravi, Divya Kalimuthu, Amrutharaj MG, Gigi Jose. "Efectos del entrenami...	<1%
42	Publication	Clarke, Oxana D.. "LinguaFolio Goal Setting Intervention and Academic Achievem...	<1%
43	Publication	Katrina Volgemute, Zermena Vazne, Romualdas Malinauskas. "The benefits of gui...	<1%
44	Publication	Rasikawati, Ira. "Corpus-Based Data-Driven Learning in Reading English for Acad...	<1%



IJPESS

Indonesian Journal of Physical Education and Sport Science

p-ISSN 2775-765X | e-ISSN 2776-0200

Volume 6, No. x, October 2022 Page. x-xx

<http://journal.unucirebon.ac.id/index.php/ijpe>

ABC Running with Mental Imagery for Movement Awareness and Dynamic Coordination in Novice Sprinters

Ricky Susiono¹, Apta Mylsidayu¹, Dinan Mitsalina², Sukiri³, Trisnar Adi Prabowo⁴

¹Sports Coaching Education, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

²Sports Science, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

³Physical Education, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

⁴Physical Education of Study Program, Universitas Muhammadiyah Brebes, Indonesia

*Corresponding Author: Ricky Susiono, e-mail: ricky.susiono@unj.ac.id

Received: xx Month 2023, Approved: xx Month 2023, Published: xx Month 2023

Abstract

Study purpose. This study aims to analyze the effect of ABC Running training combined with Mental Imagery on movement awareness and dynamic coordination in novice sprinters.

Materials and methods. This study used a quasi-experimental design with a two-group pretest-posttest design approach. The study sample consisted of 24 novice sprinters from East Jakarta City aged 13-17 years, consisting of 12 male athletes and 12 female athletes. The sample was selected using purposive sampling and divided into an experimental group and a control group. The experimental group received ABC Running training combined with Mental Imagery for six weeks, with a frequency of three times a week, while the control group received regular training. Movement awareness was measured using a validated sprint movement awareness observation rubric (Aiken V = 0.851), while dynamic coordination was measured using the KTK3+ Motor Coordination Test. Data were analyzed using MANCOVA with pretest scores as covariates.

Results. The results of the multivariate test showed a significant effect of the group on the combination of movement awareness and dynamic coordination variables, with a value of $F = 118.967$; $p < 0.001$. The results of the Inter-Subject Effect Test also showed significant differences in movement awareness, $F = 145.181$; $p < 0.001$ and dynamic coordination, $F = 86.211$; $p < 0.001$.

Conclusions. ABC Running training combined with Mental Imagery has been shown to significantly improve movement awareness and dynamic coordination in novice sprinters. This program can be used as an alternative physical-mental training strategy to develop basic sprinting technique, body awareness, and motor coordination in young athletes. Further research is recommended using a

larger sample size, adding an ABC Running-only comparison group, and extending the duration of the intervention.

Keywords: ABC training, imagery training, movement awareness, dynamic coordination, novice athletes.

DOI: <https://doi.org/10.52188/ijpess.v3i1>

©2026 Authors by Universitas Nahdlatul Ulama Cirebon



Introduction

The 100-meter sprint is a sport that demands maximum speed in a short period of time, but sprinting performance isn't solely determined by physical ability. Sprinting requires the integration of speed, running technique, coordination between body parts, postural control, leg strength, stride rhythm, and movement efficiency throughout the acceleration phase and into the maximum speed phase (Permatasari et al., 2024; Pahalawidi et al., 2026). Biomechanical studies of sprinting show that variables such as stride length, stride frequency, contact time, ground reaction force, lower limb muscle activation, and body position play an important role in determining the effectiveness of sprinting technique (Rumini et al., 2024). Therefore, for novice sprinters, mastering basic technique from the outset is an essential foundation for developing efficient movement patterns, preventing repeated technical errors, and supporting long-term performance development. This aligns with the findings of a systematic review that stated that sprinting technique needs to be understood through a biomechanical approach because movement effectiveness is significantly influenced by body position, stride pattern, joint angles, and the ability to generate force appropriately during the sprint phase (Pietraszewski et al., 2025).

In novice sprinters, a common problem is not only low running speed but also unstable motor coordination patterns. Beginner athletes often experience difficulty maintaining stride rhythm, arm swings that are out of sync with leg movements, a body position that is too upright or too inclined, inefficient foot contact, and poor awareness of body movement quality while running. Recent studies on sprinting stride patterns have shown that movement pattern stability and kinematic parameter variation are related to the ability to maintain movement quality during repeated sprints (Jopek et al., 2026). In addition, research on initial sprint coordination also confirms that sprint acceleration is closely related to lower body movement coordination and strength (Donaldson et al., 2025). These problems indicate that novice sprinters need training strategies that not only develop physical speed but also improve technical control, body awareness, and coordination during sprint movement.

Movement awareness and dynamic coordination are two crucial aspects of learning sprinting technique. Movement awareness helps athletes understand body position, direction of movement, stride tempo, leg drive quality, and the relationship between arm and leg movements (Hicks et al., 2026). Meanwhile, dynamic coordination allows athletes to control body movements harmoniously when moving quickly, changing positions, and maintaining balance during acceleration (Marsico et al., 2022). In the context of sport, the ability to sense body position and movement is closely related to proprioception, neuromuscular control, coordination, and motor efficiency. Studies on proprioception training have shown that improved proprioception can support motor function, coordination, balance, and athletic performance (Yilmaz et al., 2024). In addition, awareness of voluntary actions is also considered important in motor control because it helps individuals initiate and regulate movements more accurately (Matsumiya, 2021).

One form of training relevant for developing basic sprinting technique is ABC running. ABC running emphasizes technical quality through the repetition of structured running patterns, helping athletes understand the key phases of sprinting. Previous research has shown that ABC

running training has a significant impact on sprinting ability compared to learning without ABC running training (Sobarna et al., 2020). Recent narrative studies have also concluded that Athletic Basic Coordination or ABC Running is beneficial for improving speed, agility, technical understanding, and body awareness in young athletes (Prasetyo et al., 2025). In addition, studies on sprint-specific training confirm that sprint-specific technique training needs to be part of a training program because it can help coaches understand how certain exercises produce the force, speed, and movement pattern demands associated with sprinting (Jusseume et al., 2025).

In addition to physical-technical training, the development of novice sprinters can also be strengthened through mental exercises oriented towards motor representation, one of which is Mental Imagery. In the context of technical training, imagination is not only visualization, but also involves kinesthetic sensations, such as feeling body position, leg thrust, arm swing, movement tempo, and stride rhythm. Recent literature explains that mental imagery or motor imagery can activate motor representation and play a role in skill learning, performance improvement, and the development of athletes' mental readiness (Duarte-Mendes et al., 2025). A recent meta-analysis suggests that imagination training can improve athletic performance (Liu et al., 2025), while studies on guided imagery show that athletes with higher levels of achievement tend to have stronger imagery abilities (Volgemute et al., 2025). Therefore, mental imagery can be a relevant complementary strategy to help novice sprinters understand and internalize running techniques more consciously.

Although sprint technique training, ABC Running, and mental imagery have been widely discussed separately, research integrating ABC Running with Mental Imagery to improve movement awareness and dynamic coordination in novice sprinters is still limited. This gap is important because novice sprinters require training models that combine physical repetition with mental rehearsal to strengthen both technical execution and internal awareness of movement. Based on this description, this study aims to analyze the effect of ABC Running training combined with Mental Imagery on movement awareness and dynamic coordination in novice sprinters. This study also aims to compare the differences in effects between the ABC Running group combined with Mental Imagery and the control group.

Materials and methods

Study participants

The population of this study consisted of all novice sprinters from East Jakarta, Indonesia. The research sample was selected using a purposive sampling technique, in which participants were selected based on predetermined criteria relevant to the objectives of the study. The inclusion criteria in this study included: 1) novice sprinters from all sprint events whose highest achievement was winning at the city or district level and who had not won at the provincial, national, or international level; 2) no injuries or illnesses during the research process; 3) not currently participating in a special training program in preparation for an upcoming competition; and 4) obtaining consent from the coach and parents or guardians. These criteria were used to ensure that participants had the characteristics of novice sprinters, were in a physical condition that allowed them to participate in the intervention, and were not currently involved in other training programs that could influence the research results.

Based on these criteria, 24 novice sprinters were selected as the study sample. Participants were aged 13–17 years and consisted of 12 male athletes and 12 female athletes. Male athletes had an average height of 168.2 ± 5.8 cm and a weight of 58.6 ± 4.9 kg, while female athletes had an average height of 164.6 ± 7.3 cm and a weight of 52.7 ± 3.5 kg. All participants were then divided into two groups: an experimental group that received ABC Running training combined with Mental Imagery and a control group that followed regular training without any structured ABC Running and Mental Imagery intervention. Because the

sample was selected using purposive sampling, the participants were not randomly selected from the population. After the pretest, participants were allocated into the experimental and control groups by considering the balance of baseline scores to ensure relatively comparable initial conditions between groups.

Study organization

This study employed a quasi-experimental study with a two-group pretest-posttest design. This design was used to analyze the effects of ABC Running training combined with Mental Imagery on movement awareness and dynamic coordination in novice sprinters. Participants were allocated into two groups based on baseline balance after the pretest, namely an experimental intervention group that received ABC Running training combined with Mental Imagery and a control group that participated in regular training activities without any special treatment, including ABC Running and Mental Imagery.

This study was conducted at the athletics stadium of Jakarta State University, Indonesia. All groups, both the intervention and control groups, conducted their training activities in the same location. This was done to maintain similar training conditions, such as track surface, training facilities, movement space, and access to training equipment. However, each group's training sessions were arranged separately to minimize interaction between groups and to prevent treatment contamination during the intervention. Prior to the intervention, all participants took a pretest to measure their initial levels of movement awareness and dynamic coordination. The pretest results were also used to allocate participants into the experimental and control groups with relatively balanced baseline characteristics. At the end of the intervention period, all participants took a posttest using the same measurement procedures as the pretest. Then, below is the research design framework in Figure 1.

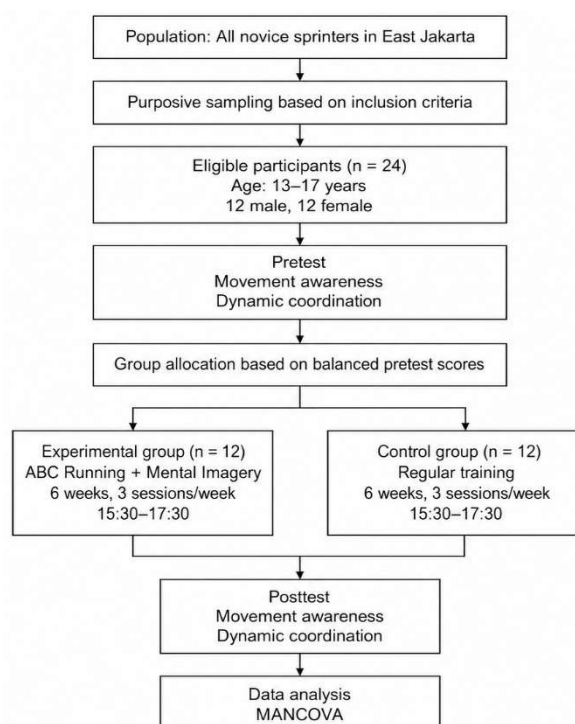


Figure 1. Research design on novice sprinters

Study Intervention

The research intervention was conducted over six weeks with a frequency of three meetings per week, resulting in a total of 18 training sessions. Each training session was held

from 15.30 – 17.30 at the Jakarta State University athletics stadium. The intervention program was designed with a progressive intensity, namely 60%–70% in the first to third weeks and 70%–80% in the fourth to sixth weeks. This intensity setting aims to allow novice sprinters to gradually adapt to the training pattern, maintain technical quality, and develop movement awareness and dynamic coordination without experiencing excessive fatigue.

The intervention group received ABC Running training combined with Mental Imagery. This program was designed to integrate physical-technical training and mental-motor training. ABC Running training was used to improve basic sprint movement patterns, such as stride rhythm, arm swing, leg push, body position, and arm-leg coordination. Meanwhile, Mental Imagery was given to help athletes mentally imagine, feel, and repeat sprint movement patterns, so that athletes not only perform the movements physically but also understand the quality of the movements cognitively and kinesthetically. Details of the intervention group's training program are presented in Table 1.

Table 1. Training program for intervention group

Weeks	Intensity	Focus Training	Material on ABC Running	Program on Imagery
1	60%-70%	Adaptation of basic techniques, recognition of movement rhythm, and awareness of body position	Ankling, marching, high knee walk, A-skip, basic coordination of arm and leg swings	The athlete imagines the body position when running fast, body posture, arm swing, and slow leg push
2		Strengthens step rhythm and arm-leg coordination.	Moving ankles, A jumps, raising knees high, butt kicks, jumping with straight legs, arm-leg coordination	The athlete imagines the rhythm of the steps, the movement of the raised knees, the contact of the feet with the track, and the synchronized swing of the arms
3	70%-80%	Improved motion control, tempo, and motion awareness during acceleration.	A-skip, B-skip, high knee run, light bounding, fast leg drill, coordination of drill transition to sprint	The athlete imagines the sequence of movements from the ready position, initial push, stride rhythm, to the short acceleration phase.
4		Improved dynamic coordination quality at higher speeds	A-skip cepat, B-skip, running with high knees, jumping, running with straight legs, 20–30-meter sprint training	Athletes imagine sprinting movements at a faster tempo, but still relaxed, controlled, and efficient
5		Integration of ABC running techniques into short distance sprint patterns	Combination A-skip + sprint, high knee + sprint, bounding + sprint, fast leg drill, sprint 30-meter	Athletes visualize the transition from training to sprinting, maintaining posture, stride rhythm, and arm-leg coordination

6	Technical stabilization, dynamic coordination, and movement awareness at submaximal speeds	Drill combination: ankling–A-skip–high knee–bounding–sprint 30-meter; sequential coordination exercises	Athletes imagine a complete series of sprint movements, from preparation, acceleration, stride rhythm, to body control
---	--	---	--

The program in Table 1 shows that the intervention group received *ABC* Running training with the addition of Mental Imagery during each training session. Mental Imagery was administered before the core *ABC* Running training to provide a clear picture of the athletes' movements before engaging in physical exercise. The imagery material focused on visualization and kinesthetic sensations, such as body position, stride rhythm, leg push-off, arm swing, foot contact with the track, and the transition from *ABC* Running to sprinting. With this approach, athletes were expected to connect their mental understanding of the movements with the actual execution of the techniques on the field.

In the control group, participants continued to participate in their regular training activities according to the coach's regular program, but did not receive any special treatment in the form of structured *ABC* Running training or Mental Imagery. The control group continued to train at the Jakarta State University athletics stadium on the same schedule, from 15.30 – 17.30, to ensure a relatively similar training environment to the experimental group. However, the training material in the control group was not specifically directed at the *ABC* Running program and did not involve mental-motor training.

Outcome Measures and Measurement Procedures

Movement awareness was measured using a sprint movement awareness observation rubric developed based on the characteristics of *ABC* Running drills and sprint movements. This rubric covers six main aspects: posture awareness, arm swing awareness, knee position awareness, foot contact awareness, stride rhythm awareness, and movement transition awareness. Each aspect assesses the athlete's ability to recognize, control, and maintain movement quality during *ABC* Running and sprint training. The rubric was applied during the assessment session involving *ABC* Running drills and a short sprint task. The assessment was conducted by two observers using a 1–4 rating scale, with categories ranging from very poor to very good. Before being used in primary data collection, this rubric was validated by one expert lecturer in the field of athletics or sprint training, one expert lecturer in the field of movement learning, and one expert lecturer in the field of sports evaluation. The observation rubric is shown in Table 2.

Table 2. Rubik's observation for movement awareness variables

Aspects of Movement Awareness	Assessed Indicators
Posture awareness	The athlete is able to maintain proper body position during drills and short sprints.
Arm swing awareness	The athlete is able to recognize and control arm swings to synchronize with leg movements.
Knee position awareness	The athlete is able to lift the knees according to the <i>ABC</i> Running movement pattern.
Foot contact awareness	The athlete is able to efficiently control foot contact with the track.

Stride rhythm awareness	The athlete is able to maintain tempo and rhythm of movement.
Movement transition awareness	The athlete is able to connect ABC Running drills to short sprint movements.

Based on the validation results using Aiken V, the Rubik's scale for measuring the movement awareness variable showed a validity value of 0.851. Therefore, the Rubik's assessment of the movement awareness variable is valid because it is more than 0.7 (Susiono et al., 2024; Putro et al., 2025).

Dynamic coordination was measured using the KTK3+ Motor Coordination Test. This test is relevant because the study participants were aged 13–16 years, while the KTK3+ has been validated for children and adolescents aged 6–19 years. The KTK3+ consists of four test items: sideways jump, sideways movement, backward balancing, and an eye-hand coordination task (Coppens et al., 2021). The analysis results show that all KTK3+ items measure the same construct, namely motor competence, with inter-item correlations ranging from $r = 0.453$ – 0.799 . Construct validity is also supported by differences in performance based on age, gender, and participation in organized sports. Furthermore, KTK3+ has been used to measure body coordination in the Indonesian population (Mardiansyah et al., 2023).

Statistical analysis

Data analysis was performed using SPSS version 27 (George & Mallery, 2021). Data obtained from the pretest and posttest results on the movement awareness and dynamic coordination variables were analyzed descriptively first. Before conducting the main analysis, namely Multivariate Analysis of Covariance (MANCOVA), the data were tested to ensure that statistical assumptions had been met. The dependent variables in this analysis were the movement awareness posttest scores and the dynamic coordination posttest scores. The independent variable was the treatment group consisting of three categories. Meanwhile, the movement awareness pretest scores and the dynamic coordination pretest scores were used as covariates to control for differences in participants' initial abilities before the intervention was given. The significance level used in this study was $p < 0.05$.

Results

Before conducting the main analysis (MANCOVA), the research data collected from the pretest and posttest were checked for normality and homogeneity. The normality test was based on the Shapiro-Wilk test ($p > 0.05$), as shown in Table 3.

Table 3. Results of normality tests on research data

		Shapiro-Wilk		
		Statistic	df	Sig.
Intervention Group	Pretest. Movement Awareness	0,903	12	0,172
	Posttest. Movement Awareness	0,950	12	0,641
	Pretest. Dynamic Coordination	0,988	12	0,599
	Posttest. Dynamic Coordination	0,948	12	0,608
Control Group	Pretest. Movement Awareness	0,884	12	0,100
	Posttest. Movement Awareness	0,906	12	0,187
	Pretest. Dynamic Coordination	0,951	12	0,648
	Posttest. Dynamic Coordination	0,864	12	0,065

Based on the results of Table 3, the significance values for the intervention and control groups for the movement awareness and dynamic coordination variables were greater than 0.05. Therefore, the research data were normally distributed (Bernadett & Csaba, 2024). Normally distributed data needs to be continued to the homogeneity test using the Levene test ($p > 0.05$) as proven in Table 4.

Table 4. Results of homogeneity test on research data

		F	df1	df2	Sig.
Intervention	Pretest. Movement Awareness	0,511	1	22	0,289
Group	Pretest. Dynamic Coordination	0,764	1	22	0,432
Control Group	Posttest. Movement Awareness	0,728	1	22	0,403
	Posttest. Dynamic Coordination	0,409	1	22	0,725

Based on the results of Table 4, the significance values for the pretest and posttest for the research variables in this population are greater than 0.05. Therefore, this research data comes from the same population. Therefore, the research data, which has demonstrated a normal and homogeneous distribution, can proceed to the main analysis using the MANCOVA test.

Before interpreting the effect of the treatment on each dependent variable, the analysis first focused on the results of the multivariate test to determine the simultaneous effect of the group on the combination of movement awareness and dynamic coordination variables (Table 5). This analysis is important because this study uses two dependent variables, so the effect of the treatment is not only visible separately but also together. The primary interpretation in this study uses Pillai's Trace values because they are more robust in a relatively small sample size.

Table 5. Results of Multivariate Tests

Effect		Value	F	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0,460	8.105	0,003	0,460
	Wilks' Lambda	0,540	8.105	0,003	0,460
	Hotelling's Trace	0,853	8.105	0,003	0,460
	Roy's Largest Root	0,853	8.105	0,003	0,460
Pretest. Movement Awareness	Pillai's Trace	0,409	4.154	0,021	0,409
	Wilks' Lambda	0,591	4.154	0,021	0,409
	Hotelling's Trace	0,692	4.154	0,021	0,409
	Roy's Largest Root	0,692	4.154	0,021	0,409
Pretest. Dynamic Coordination	Pillai's Trace	0,022	.210	0,812	0,022
	Wilks' Lambda	0,978	.210	0,812	0,022
	Hotelling's Trace	0,022	.210	0,812	0,022
	Roy's Largest Root	0,022	.210	0,812	0,022
Group	Pillai's Trace	0,926	118.967	0,000	0,826
	Wilks' Lambda	0,074	118.967	0,000	0,826
	Hotelling's Trace	12,523	118.967	0,000	0,826
	Roy's Largest Root	12,523	118.967	0,000	0,826

The multivariate test results in Table 5 show a significant multivariate effect of group on the combined movement awareness and dynamic coordination variables after controlling for pre-test scores. Based on Pillai's Trace values, the group effect was significant: Pillai's Trace =

0.926; $F = 118.967$; $p < 0.001$; partial eta squared = 0.826. These findings indicate a significant difference between the *ABC* Running training group combined with Mental Imagery and the control group on the combined movement awareness and dynamic coordination post-test results. The large partial eta squared value indicates that the group effect is in the very large category.

Furthermore, the pre-test movement awareness covariate also showed a significant multivariate effect on the combined dependent variable: Pillai's Trace = 0.409; $F = 4.154$; $p = 0.021$; partial eta squared = 0.409. This indicates that initial movement awareness abilities contributed to participants' post-test results. In contrast, the pre-test covariate dynamic coordination did not show a significant multivariate effect, with Pillai's Trace = 0.022; $F = 0.210$; $p = 0.812$; partial eta squared = 0.022. Thus, the multivariate results confirmed that differences in post-test outcomes were largely influenced by the treatment group, specifically the *ABC* Running exercise combined with Mental Imagery.

After the *multivariate test* demonstrated a simultaneous effect of group on the combination of dependent variables, the analysis continued with a test for between-subject effects (Table 6). This analysis was used to determine which variables were specifically affected by the treatment, namely movement awareness and dynamic coordination. Thus, these results help explain whether differences between groups occurred on each dependent variable after pre-test scores were controlled.

Table 6. Results from Tests of Between-Subjects Effects

Source		Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Posttest. Movement Awareness	98,935	49,280	0,000	0,881
	Posttest. Dynamic Coordination	238,806	29,027	0,000	0,813
Intercept	Posttest. Movement Awareness	132,147	16,063	0,001	0,445
	Posttest. Dynamic Coordination	0,937	0,467	0,502	0,023
Pretest. Movement Awareness	Posttest. Movement Awareness	8,051	5,060	0,036	0,202
	Posttest. Dynamic Coordination	1,240	0,151	0,702	0,007
Pretest. Dynamic Coordination	Posttest. Movement Awareness	9,709	4,836	0,040	0,195
	Posttest. Dynamic Coordination	0,553	0,067	0,798	0,003
Group	Posttest. Movement Awareness	291,468	145,181	0,000	0,779
	Posttest. Dynamic Coordination	709,254	86,211	0,000	0,712

The results of the Tests of Between-Subjects Effects in Table 6 indicate that the group factor significantly influenced both dependent variables after controlling for pretest scores. For the movement awareness variable, there was a significant difference between the experimental and control groups ($F = 145.181$; $p < 0.001$; partial eta squared = 0.779). These results indicate that *ABC* Running training combined with Mental Imagery significantly improved movement awareness in novice sprinters.

For the dynamic coordination variable, the group factor also showed a significant effect ($F = 86.211$; $p < 0.001$; partial eta squared = 0.712). These findings indicate that the group receiving *ABC* Running training combined with Mental Imagery had significantly different dynamic coordination results compared to the control group. The partial eta squared values for both variables indicate a large effect, thus the intervention can be considered to have made a strong contribution to improving movement awareness and dynamic coordination in novice sprinters.

Discussion

The results of this study indicate that ABC Running training combined with Mental Imagery has a significant effect on movement awareness and dynamic coordination in novice sprinters. Multivariate testing showed significant differences between the experimental and control groups simultaneously on the combination of both dependent variables. These findings indicate that the intervention not only impacts one aspect of motor ability, but has a comprehensive influence on athletes' ability to recognize, control, and coordinate movements. Thus, the combination of technique training through ABC Running and mental training through Mental Imagery can be understood as an effective physical-mental training strategy to build the foundation of movement in novice sprinters. This is in line with sprint biomechanical studies which confirm that sprint performance is greatly influenced by the quality of technique, stride pattern, body coordination, and movement efficiency in each phase of sprinting (Al-Saadi & Shalash, 2025; Muhsin, 2025; Jabbar, 2025).

The increase in movement awareness in the experimental group can be explained by the characteristics of ABC Running training, which requires athletes to pay attention to technical quality repeatedly. Drills such as ankling, high knees, A-skips, B-skips, bounding, and transitions to short sprints help athletes recognize body position, arm swing, knee position, foot contact, stride rhythm, and movement transitions. When these exercises are combined with Mental Imagery, athletes not only physically perform the movements but also mentally visualize and re-experience the movement patterns (Morone et al., 2022; Rumeau et al., 2023). This process can strengthen athletes' kinesthetic understanding of correct movement, thereby increasing their awareness of which body parts to control while running. These findings align with studies on proprioceptive training, which explain that the ability to sense body position and movement plays a crucial role in improving body awareness, coordination, balance, and motor control (Yilmaz et al., 2024).

The intervention's effect on dynamic coordination can also be explained by the nature of ABC running, which requires synchronous movements between the arms, legs, posture, stride rhythm, and balance during movement. In novice sprinters, dynamic coordination is not only related to the ability to move quickly but also to the ability to efficiently sequence movements at a high tempo (Al-Saadi & Shalash, 2025). Mental imagery plays a role in strengthening motor representations before physical exercise, thus improving athletes' readiness for movements requiring rhythm, body control, and movement transitions. This finding is supported by research on KTK3+, which shows that motor coordination in children and adolescents encompasses aspects of balance, locomotion, and movement control and can be influenced by involvement in organized sports activities (Coppens et al., 2021). In addition, research on coordination in sprint starts shows that motor coordination is an important component in generating leg power at the right time and duration during sprinting (Borysiuk et al., 2018).

The findings of this study also support several previous studies. Research on the ABC Run exercise shows that it contributes to the improvement of gross motor skills, as the training pattern requires repetition, rhythm, balance, and body coordination (Haetami & Triansyah, 2021). A narrative study of ABC Running in young athletes also concluded that ABC Running was beneficial in improving speed, understanding of technique, coordination, and movement fundamentals of young athletes (Prasetyo et al., 2025). From a mental imagery perspective, meta-analyses and developmental studies in athletes have shown that imagery training can improve athletic performance, including aspects of agility, strength, and sports skills (Widyastuti et al., 2024; Liu et al., 2025). Thus, the results of this study do not stand alone, but support the direction of previous findings that technical training and mental training can contribute to improving movement quality and sports performance.

While consistent with previous research, this study has unique differences and contributions. Most previous studies have primarily discussed *ABC* Running in the context of improving speed, running skills, or gross motor skills, while Mental Imagery has been more frequently studied in the context of general sports performance (Liu et al., 2025; Plakoutsis et al., 2025). This study is unique because it integrates *ABC* Running and Mental Imagery to improve two fundamental variables in novice sprinters' movement learning: movement awareness and dynamic coordination. The novelty of this study lies in its training approach, which emphasizes not only physical repetition but also the strengthening of mental and kinesthetic representations of sprinting movements. Therefore, this study contributes to the understanding that novice runner development should not only be oriented towards speed but also on the athlete's ability to understand, feel, and coordinate their body effectively while moving. These findings are also relevant to the literature on motor competence in adolescents, which emphasizes the importance of developing motor competence synergistically with physical fitness and psychosocial aspects (Burton et al., 2023).

The practical implications of this study are that athletic coaches, physical education teachers, and novice athlete trainers can use the combination of *ABC* Running and Mental Imagery as an alternative sprint technique training program. This program can be applied at the basic training stage because it emphasizes not only speed but also technical quality, body awareness, arm-leg coordination, stride rhythm, and postural control. Moderate to submaximal training intensity is also suitable for novice sprinters because it allows athletes to perfect their movements without experiencing excessive fatigue. From a movement learning perspective, Mental Imagery can be used as a simple strategy before core training to help athletes visualize and feel the movements to be performed. This aligns with the recommendations of meta-analyses of imagery practices, which indicate that structured, brief, and regular imagery training can be part of an athlete's training program (Yilmaz et al., 2024; Liu et al., 2025).

This study has several limitations that should be considered. First, the sample size was relatively small, consisting of 24 novice sprinters, so generalization of the results requires caution. Second, the study involved only novice sprinters from East Jakarta, so the results may not fully represent athletes from different regions, training levels, or training characteristics. Third, the intervention duration was only six weeks, so it cannot yet explain the long-term effects of the combination of *ABC* Running and Mental Imagery. Fourth, the study did not use an *ABC* Running group without Mental Imagery, so it is uncertain how much additional contribution Mental Imagery provides compared to *ABC* Running alone. Fifth, movement awareness was measured using an observation rubric, so the assessment results still depend on the accuracy and consistency of the observer. Therefore, further research is recommended using a larger sample size, adding an *ABC* Running-only comparison group, extending the intervention duration, and combining the observation rubric with video analysis or simple biomechanical measurements to strengthen the results.

Conclusions

This study concluded that *ABC* Running training combined with Mental Imagery had a positive effect in improving movement awareness and dynamic coordination in novice sprinters. The results of the MANCOVA analysis showed significant differences between the experimental and control groups simultaneously in both dependent variables. Specifically, the group receiving *ABC* Running training with Mental Imagery showed better improvements than the control group, both in movement awareness and dynamic coordination. These findings suggest that integrating sprint technique training and mental imagery can help novice athletes understand, control, and coordinate movements more effectively. This program can be an alternative training program for coaches in developing novice sprinters, especially at the stage

of mastering basic techniques. However, the results of this study need to be interpreted with caution because the sample size is limited and does not include the *ABC Running* group without Mental Imagery.

Acknowledgment

The author would like to thank Universitas Negeri Jakarta for providing facilities and supporting the research up to publication.

Conflict of interest

The authors declare that they have no conflicts of interest

References

- Al-Saadi, E. S. H., & Shalash, M. J. A. (2025). Effectiveness of Training in Different Natural Environments on Some Biomechanical Variables of Sprint Runners in (100m, 200m, 400m) Events. *Indonesian Journal of Physical Education and Sport Science*, 5(1), 113–124. <https://doi.org/10.52188/ijpess.v5i1.1105>
- Bernadett, S. P., & Csaba, B. M. (2024). Examining normal distribution: which test to use? *Statistikai Szemle*, 102(1), 5–37. <https://doi.org/10.20311/stat2024.01.hu0005>
- Borysiuk, Z., Waśkiewicz, Z., Piechota, K., Pakosz, P., Konieczny, M., Blaszczyzyn, M., ... Knechtle, B. (2018). Coordination aspects of an effective sprint start. *Frontiers in Physiology*. <https://doi.org/10.3389/fphys.2018.01138>
- Burton, A. M., Cowburn, I., Thompson, F., Eisenmann, J. C., Nicholson, B., & Till, K. (2023, November 1). Associations Between Motor Competence and Physical Activity, Physical Fitness and Psychosocial Characteristics in Adolescents: A Systematic Review and Meta-analysis. *Sports Medicine*. <https://doi.org/10.1007/s40279-023-01886-1>
- Coppens, E., Laureys, F., Mostaert, M., D'Hondt, E., Deconinck, F. J. A., & Lenoir, M. (2021). Validation of a Motor Competence Assessment Tool for Children and Adolescents (KTK3+) With Normative Values for 6- to 19-Year-Olds. *Frontiers in Physiology*, 12. <https://doi.org/10.3389/fphys.2021.652952>
- Donaldson, B., Bezodis, N., & Bayne, H. (2025). Relationships between coordination, strength and performance during initial sprint acceleration. *Journal of Sports Sciences*, 43(12), 1095–1107. <https://doi.org/10.1080/02640414.2025.2482361>
- Duarte-Mendes, P., Ramalho, A., Bertollo, M., Neiva, H. P., & Marinho, D. A. (2025). To move without moving: a perspective article on motor imagery. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2025.1697086>
- George, D., & Mallery, P. (2021). *IBM SPSS Statistics 27 Step by Step*. IBM SPSS Statistics 27 Step by Step. Routledge. <https://doi.org/10.4324/9781003205333>
- Haetami, M., & Triansyah, A. (2021). Effect Of Abc Running Drill on the 50 Meter Sprint Of Students. *Jurnal Maenpo : Jurnal Pendidikan Jasmani Kesehatan Dan Rekreasi*, 11(1), 78. <https://doi.org/10.35194/jm.v11i1.1255>
- Hicks, D. S., McMillan, S., Schöllhorn, W., & van den Tillaar, R. (2026, March 1). Sprint Running Coordination: A Dynamical Systems Perspective. *Sports Medicine*. <https://doi.org/10.1007/s40279-025-02380-6>
- Jabbar, A. K. (2025). The Effect of Different Resistance Exercises on Physical Variables and Performance in 200 m Runners. *Indonesian Journal of Physical Education and Sport Science*, 5(1), 103–112. <https://doi.org/10.52188/ijpess.v5i1.1074>
- Jopek, M., Krzysztofik, M., Mroczek, D., Zajac, A., & Mackala, K. (2026). Variability of the Sprint Step Movement Pattern and Its Association with Hamstring Injury Risk. *Journal of Clinical Medicine*, 15(1). <https://doi.org/10.3390/jcm15010281>

- Jusseume, J., Fornasier-Santos, C., Morin, J. B., Millot, B., Guilhem, G., & Slawinski, J. (2025). Kinematic and Kinetic Comparison of Sprint-Specific Exercises: Impact on Maximal Sprint Acceleration Training. *Journal of Human Kinetics*, 99, 191–205. <https://doi.org/10.5114/jhk/211899>
- Liu, Y., Zhao, S., Zhang, X., Zhang, X., Liang, T., & Ning, Z. (2025, May 1). The Effects of Imagery Practice on Athletes' Performance: A Multilevel Meta-Analysis with Systematic Review. *Behavioral Sciences*. <https://doi.org/10.3390/bs15050685>
- Mardiansyah, A., Syafruddin, & Bakhtiar, S. (2023). Assessment of motor competence in Indonesian elementary school children using the Körperkoordinationstest Für Kinder (KTK3+) (Body coordination test for children). *Journal of Physical Education and Sport*, 23(10), 2632–2641. <https://doi.org/10.7752/jpes.2023.10301>
- Marsico, P., Meier, L., van der Linden, M. L., Mercer, T. H., & van Hedel, H. J. A. (2022). Psychometric Properties of Lower Limb Somatosensory Function and Body Awareness Outcome Measures in Children with Upper Motor Neuron Lesions: A Systematic Review. *Developmental Neurorehabilitation*, 25(5), 314–327. <https://doi.org/10.1080/17518423.2021.2011976>
- Matsumiya, K. (2021). Awareness of voluntary action, rather than body ownership, improves motor control. *Scientific Reports*, 11(1). <https://doi.org/10.1038/s41598-020-79910-x>
- Morone, G., Ghanbari Ghoshchy, S., Pulcini, C., Spangu, E., Zoccolotti, P., Martelli, M., ... Iosa, M. (2022, October 1). Motor Imagery and Sport Performance: A Systematic Review on the PETTLEP Model. *Applied Sciences (Switzerland)*. <https://doi.org/10.3390/app12199753>
- Muhsin, Z. Q. A. (2025). The Impact of Training with Varying Intensities on the Specific Strength and Speed of the Anchor Runner in the 100-Meter Relay for Female Students. *Indonesian Journal of Physical Education and Sport Science*, 5(2), 191–201. <https://doi.org/10.52188/ijpess.v5i2.1175>
- Pahalawidi, C., Lumintuarso, R., Susanto, E., Kustiawan, A. A., & Prabowo, T. A. (2026). Determining 100-Meter Sprint Performance : Interaction of Anthropometry , Muscle Endurance , and Lower-Limb Power as a Mediator in Novice Student-Athletes. *International Journal of Kinesiology and Sports Science*, 14(2), 23–33. <https://doi.org/10.7575/aiac.ijkss.v.14n.2p.23>
- Permatasari, D., Tomoliyus, T., Hariono, A., & Prabowo, T. A. (2024). Effect of Weight Training on Increasing 100 Meter Running Speed in Sprinter Athletes Based on Gender. *Journal of Advances in Sports and Physical Education*, 7(01), 1-6. <https://doi.org/10.36348/jaspe.2024.v07i01.001>
- Pietraszewski, P., Maszczyk, A., Zajac, A., & Gołasz, A. (2025, May 1). Muscle Activity and Biomechanics of Sprinting: A Meta-Analysis Review. *Applied Sciences (Switzerland)*. <https://doi.org/10.3390/app15094959>
- Plakoutsis, G., Paraskevopoulos, E., Krekoukias, G., Christakou, A., & Papandreou, M. (2025). Motor Imagery Ability and Motor Imagery Perspective Among Professional Football Players. *Healthcare (Switzerland)*, 13(23). <https://doi.org/10.3390/healthcare13233045>
- Prasetyo, B., Sukamti, E. R., & Prabowo, T. A. (2025). A narrative review: How does ABC running affect speed improvement in young athletes. *J Adv Sports Phys Edu*, 8(1), 14-18. <https://doi.org/10.36348/jaspe.2025.v08i01.003>
- Putro, K. H., Suharjana, S., Marhaendro, A. S. D., Hariono, A., Siswantoyo, S., Fauzi, F., ... Prabowo, T. A. (2025). Evaluating Validity and Test-retest Reliability on Indonesian Basketball Talent Scouting Model for Athletes Aged 10 to 14. *Physical Education Theory and Methodology*, 25(3), 540–547. <https://doi.org/10.17309/tmfv.2025.3.09>
- Rumeau, V., Grospretre, S., & Babault, N. (2023). Post-Activation Performance Enhancement and Motor Imagery Are Efficient to Emphasize the Effects of a Standardized Warm-Up

- on Sprint-Running Performances. *Sports*, 11(5).
<https://doi.org/10.3390/sports11050108>
- Rumini, Adi, S., & Kusuma, D. W. Y. (2024, December 10). The Mechanics of Speed: A Systematic Literature Review on Athletic Sprint Technique. *Physical Education Theory and Methodology*. <https://doi.org/10.17309/tmfv.2024.6.17>
- Sobarna, A., Hambali, S., Sutiswo, S., & Sunarsi, D. (2020). The influence learning used ABC run exercise on the sprint capabilities. *Jurnal Konseling Dan Pendidikan*, 8(2), 67–71.
<https://doi.org/10.29210/142100>
- Susiono, R., Sugiyanto, F. X., Lumintuarso, R., Tomoliyus, T., Sukamti, E. R., Fauzi, F., ... & Prabowo, T. A. (2024). Agility Test Innovation on Special Badminton Athletes for the Junior Category (U17): Validity and Reliability. *Retos*, 53, 547-553.
<https://doi.org/10.47197/retos.v53.103282>
- Volgemute, K., Vazne, Z., & Malinauskas, R. (2025). The benefits of guided imagery on athletic performance: a mixed-methods approach. *Frontiers in Psychology*, 16.
<https://doi.org/10.3389/fpsyg.2025.1500194>
- Widyastuti, C., Hidayatullah, F., Purnama, S. K., Ekawati, F. F., Hidayat, M., Rochmani, K. W., ... & Yulianto, W. D. (2024). Developing PETTLEP imagery model to improve self-efficacy of karate athletes. *Retos*, 55, 938-945.
<https://doi.org/10.47197/retos.v55.106128>
- Yılmaz, O., Soylu, Y., Erkmén, N., Kaplan, T., & Batalik, L. (2024). Effects of proprioceptive training on sports performance: a systematic review. *BMC Sports Science*, 16(1).
<https://doi.org/10.1186/s13102-024-00936-z>

Information about the authors:

Dr. Ricky Susiono, M.Pd: ricky.susiono@unj.ac.id; <https://orcid.org/0009-0009-1182-3970>, Sports Coaching Education, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

Apta Mylsidayu: apta.mylsidayu@gmail.com; <https://orcid.org/0000-0003-1022-131X>, Sports Coaching Education, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

Dinan Mitsalina: dinanmitsalina@unj.ac.id; <https://orcid.org/0009-0002-9449-4082>, Sports Science, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

Prof. Dr. Sukiri, M.Pd: sukiri@unj.ac.id; <https://orcid.org/0000-0003-3748-3889>, Physical Education, Faculty of Sports and Health Sciences, Universitas Negeri Jakarta, Indonesia

Dr. Trisnar Adi Prabowo, M.Pd: trisnar.prabowo@umbs.ac.id, <https://orcid.org/0000-0001-6977-0503>; Physical Education of Study Program, Universitas Muhammadiyah Brebes, Indonesia

Cite this article as: Susiono, R. *et al.* (2026). ABC Running with Mental Imagery for Movement Awareness and Dynamic Coordination in Novice Sprinters. *Indonesian Journal of Physical Education and Sport Science (IJPESS)*, 6(3), xx-xx. Doi