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# THE EFFECT OF TUJA-SHUTTLE RUN TRAINING ON SPRINT SPEED OVER 5, 10, 15, 20, 30 METERS IN PLAYERS OF THE GOLD GENERATION FUTSAL ACADEMY

**Abdul Malik[1], Agus Himawan[2], Septyaningrum Putri Purwoto[3], Haryo Mukti Widodo[4], Heni Yuli Handayani[5]**

STKIP PGRI Bangkalan[1,2,3,4,5]

abdulmaliikban2023@gmail.com[1], agus@stkippgri-bkl.ac.id[2], septy@stkippgri-bkl.ac.id[3] , haryomukti@stkippgri-bkl.ac.id[4], heni@stkippgri-bkl.ac.id[5]

***Abstract***

*This study aims to analyze the effect of Tuja-Shuttle Run training on sprint speed ability over distances of 5, 10, 15, 20, and 30 meters in futsal players. Sprint speed is one of the essential physical components in futsal, particularly in transition situations, off-the-ball movements, and pressing. Tuja-Shuttle Run is a modified version of shuttle run training developed to simultaneously enhance acceleration, speed, and agility. This study employed a quasi-experimental method with a one-group pretest-posttest design. The subjects were 20 male futsal players aged 17–23 years. Data were collected through sprint speed tests and analyzed using a paired t-test. The results revealed a significant improvement in sprint performance across all distances after six weeks of Tuja-Shuttle Run training. It is concluded that the Tuja-Shuttle Run training is effective in improving short-distance sprint speed in futsal players.*

***Keywords***: *Tuja-Shuttle Run; Sprint Speed; Acceleration; Futsal; Physical Training*

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Correspondence Author: Abdul Malik, STKIP PGRI Bangkalan, Indonesia.
E-Mail: abdulmaliikban2023@gmail.com

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## INTRODUCION

Futsal is a team sport played in a confined space with high intensity (**Error! Reference source not found.**. Rapid directional changes, sudden movements, and transitions between positions are dominant elements in the game (Bompa, T. O., & Haff, G. G. (2009). Periodization: Theory and Methodology of Training (5th ed.). Human Kinetics

Himawan, A., Widodo, H. M., Hdanyani, H. Y., Hidayatullah, F., Anwar, K., Purwoto, S. P., Jatmiko, T., Dewa, I., Aryananda, M., Kusuma, W., Taufik, M. S., Himawan, A., Widodo, H. M., Handayani, H. Y., Hidayatullah, F., & Anwar, K. (n.d.). 2025 (febrero), Retos. 63, 280–290. https://doi.org/10.47197/retos.v63.108

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Jatmiko, T., Kusnanik, N. W., Nurhasan, N., Muhammad, H. N., & Noordia, A. (2024). Enhancing speed, agility, and anaerobic capacity via a Tuja-Shuttle Run exercise model. Middle East Journal of Rehabilitation and Health Studies, 11(1), e134693. https://doi.org/10.5812/mejrh-134693 Therefore, short-distance sprint speed is a crucial component in supporting futsal athletes' performance (**Error! Reference source not found.** Short sprints have a significant impact on improving futsal performance. Other studies also emphasize that sprint speed supports technical elements such as dribbling, (Jusran, S., & Hariadi. (2020).

Sprint speed in futsal is not only about reaching top speed but also involves the ability to accelerate and decelerate rapidly, which is vital in situations such as chasing the ball, deceiving opponents, applying pressure, and transitioning from defense to attack (Pranasto, W. H., Wiriawan, O., & Mintarto, E. (2019). Pengaruh latihan ladder drill dan shuttle run terhadap kecepatan dan kelincahan siswa ekstrakurikuler futsal SDN Rangkah IV Surabaya. Bravo's: Jurnal Program Studi Pendidikan Jasmani dan Kesehatan, 7(1), 12–18. https://doi.org/10.32682/bravos.v7i1.1053

Rahim, A. F., Rahmanto, S., Santoso, K. A. E., Fahlefi, P. M. I., & Multazam, A. (2021). Sprint tests over 5 to 30 meters are commonly used as indicators of physical capability in futsal as they reflect the actual movement demands of players during matches.

Training programs aimed at improving speed components must align with the specific characteristics of futsal. One relevant and effective training method is the shuttle run (Pranasto, W. H., Wiriawan, O., & Mintarto, E. (2019). Shuttle run involves repeated short-distance sprints and contributes to improvements in acceleration, speed, and agility (

Shahrul Reza, D., Widodo Suripto, A. (2021). Indonesian Journal for Physical Education and Sport Perbedaan Pengaruh Latihan Hollow Sprint dan Repetition Sprint Terhadap Kecepatan Lari Siswa Ekstrakulikuler Futsal SMP N 33 Semarang History Article. Keywords (Vol. 2, Issue 1). https://journal.unnes.ac.id/sju/index.php/inapes

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Surya, A. R., Yusup, U., & Sartono, H. (2021). A variation known as the Tuja-Shuttle Run has been developed to better match the demands of futsal.

The shuttle run is a commonly used training method aimed at enhancing both speed and agility (

Shahrul Reza, D., Widodo Suripto, A. (2021). Indonesian Journal for Physical Education and Sport Perbedaan Pengaruh Latihan Hollow Sprint dan Repetition Sprint Terhadap Kecepatan Lari Siswa Ekstrakulikuler Futsal SMP N 33 Semarang History Article. Keywords (Vol. 2, Issue 1). https://journal.unnes.ac.id/sju/index.php/inapes

Surya, A. R., Yusup, U., & Sartono, H. (2021). In this study, the Tuja-Shuttle Run was employed a modified variation of the traditional shuttle run that incorporates a combination of distances, zig-zag movement patterns, linear sprints, and directional changes. The Tuja-Shuttle Run training model developed by the researchers is an adaptation of High-Intensity Interval Training (HIIT) protocols, consisting of various drills that begin with short-distance runs of 4 meters involving frequent directional changes at controlled speed, followed by longer sprints of 6, 10, and 12 to 15 meters tailored to match the characteristics and intensity demands of different sports disciplines(Jatmiko, T., Kusnanik, N. W., Nurhasan, N., Muhammad, H. N., & Noordia, A. (2024). This training is designed to provide neuromuscular and metabolic stimuli that are more specifically aligned with the demands of futsal gameplay. The aim of this study is to determine the effectiveness of Tuja-Shuttle Run training in improving sprint speed over various distances (5, 10, 15, 20, and 30 meters), which serve as benchmarks for acceleration and maximum speed in futsal players.

## METHOD

This study employed a quantitative research approach using a quasi-experimental design, specifically the one-group pretest-posttest design. The population of this study consisted of all active female futsal players who were members of the Gold Generation Futsal Academy in Jombang Regency. The

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research sample was selected purposively based on the following inclusion criteria: (a) aged between 17 and 23 years; (b) actively participating in training at least three times per week; and (c) not currently experiencing any injuries or health conditions that could affect physical performance. Based on these criteria, a total of 20 futsal players were selected as research subjects. The primary instrument used in this study was a sprint speed test measured with a digital stopwatch accurate to 0.01 seconds. Measurements were conducted on a flat, hard-surfaced track consistent with futsal court standards. Distance markers (cones) were placed at 5, 10, 15, 20, and 30 meters. Each subject performed two sprints at each distance, and the best time was recorded as the final score.

The pretest and posttest data were analyzed using both descriptive and inferential statistics. A normality test was first conducted using the Shapiro-Wilk test to ensure that the data were normally distributed. Subsequently, a paired sample t-test was applied to determine whether there were significant differences between the pretest and posttest results, with the assistance of SPSS version 25 software. The level of significance (α) was set at 0.05. If the p-value was less than 0.05, it was concluded that the Tuja-Shuttle Run training had a significant effect on sprint speed at the tested distances.

**RESULT AND DISCUSSION**

The study involved 20 participants who underwent the Tuja-Shuttle Run training program for six weeks. Measurements were taken at 5, 10, 15, 20, and 30 meters. All participants demonstrated reduced sprint times across all distances post-intervention, indicating improved sprint ability.

Visual data (bar charts) showed consistent improvements across all sprint distances, reflected in reduced times from pretest to posttest

**Table.1** The Result of Sprint in Pretest dan Posttest

| No | Name | 5m_ Pre | 5m_ Post | 10m_ Pre | 10m_ Post | 15m_ Pre | 15m_ Post | 20m_ Pre | 20m_ Post | 30m_ Pre | 30m_ Post |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AH | 1.15 | 1.08 | 2.11 | 1.96 | 2.96 | 2.76 | 3.64 | 3.4 | 4.91 | 4.62 |
| 2 | AS | 1.14 | 1.06 | 2.03 | 1.9 | 2.93 | 2.7 | 3.66 | 3.38 | 4.96 | 4.7 |
| 3 | PB | 1.16 | 1.08 | 2.04 | 1.89 | 2.91 | 2.74 | 3.59 | 3.31 | 5.05 | 4.79 |

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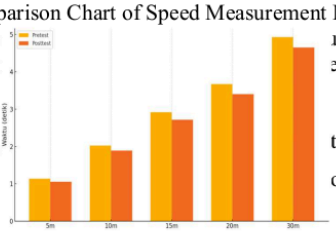
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | PBR | 1.19 | 1.12 | 1.97 | 1.84 | 2.9 | 2.7 | 3.59 | 3.35 | 4.89 | 4.6 |
| 5 | RP | 1.13 | 1.05 | 2.01 | 1.86 | 2.83 | 2.62 | 3.73 | 3.45 | 4.87 | 4.59 |
| 6 | KS | 1.13 | 1.05 | 2.05 | 1.89 | 2.88 | 2.66 | 3.76 | 3.49 | 4.89 | 4.6 |
| 7 | RZ | 1.19 | 1.09 | 1.98 | 1.85 | 2.89 | 2.71 | 3.66 | 3.38 | 5 | 4.71 |
| 8 | P | 1.16 | 1.08 | 2.06 | 1.93 | 2.98 | 2.81 | 3.74 | 3.44 | 4.96 | 4.68 |
| 9 | VK | 1.13 | 1.05 | 2.01 | 1.87 | 2.94 | 2.73 | 3.7 | 3.44 | 4.89 | 4.63 |
| 10 | WD | 1.16 | 1.08 | 2.03 | 1.9 | 2.81 | 2.6 | 3.62 | 3.38 | 4.97 | 4.72 |
| 11 | GL | 1.13 | 1.07 | 2.01 | 1.89 | 2.94 | 2.73 | 3.7 | 3.46 | 4.94 | 4.67 |
| 12 | RM | 1.13 | 1.05 | 2.13 | 1.99 | 2.9 | 2.69 | 3.78 | 3.54 | 5.01 | 4.71 |
| 13 | AM | 1.15 | 1.07 | 2.04 | 1.91 | 2.88 | 2.69 | 3.67 | 3.41 | 4.87 | 4.59 |
| 14 | SF | 1.08 | 0.98 | 1.99 | 1.85 | 2.96 | 2.76 | 3.78 | 3.51 | 4.9 | 4.64 |
| 15 | KHS | 1.09 | 1.01 | 2.08 | 1.95 | 2.98 | 2.77 | 3.49 | 3.22 | 4.9 | 4.62 |
| 16 | JJ | 1.12 | 1.04 | 1.98 | 1.82 | 2.98 | 2.79 | 3.73 | 3.45 | 4.81 | 4.52 |
| 17 | AL | 1.11 | 1.03 | 2.05 | 1.92 | 2.87 | 2.63 | 3.68 | 3.42 | 4.95 | 4.69 |
| 18 | RS | 1.15 | 1.08 | 1.94 | 1.8 | 2.9 | 2.69 | 3.65 | 3.36 | 4.95 | 4.67 |
| 19 | AR | 1.11 | 1.02 | 1.97 | 1.82 | 2.94 | 2.76 | 3.68 | 3.43 | 4.93 | 4.65 |
| 20 | RD | 1.1 | 1.01 | 2.05 | 1.92 | 2.98 | 2.77 | 3.53 | 3.22 | 4.91 | 4.65 |

Overall, all participants exhibited reduced completion times across all measured distances after undergoing the training intervention, suggesting an enhancement in sprinting speed capability. A bar graph was employed to visually depict the differences in sprint times by comparing the mean pretest and posttest values for each respective distance

**Figure 1.** Comparison Chart of Speed Measurement Results at Each Distance Interval (in M ttle Run Intervention.




Comparisc ed. Based on the chart, a decrease in sprin distances (5 m to 30 m) following the Tu tion indicates a consistent improvement in of acceleration and sprint transition.

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Descriptive analysis was conducted to determine the mean and standard deviation of sprint times at each distance. The results of the calculation are presented in the table below.

**Table 2**. Descriptive Statistics of Sprint Speed (Seconds)

| Distance | Pretest (Mean ± SD) | Posttest (Mean ± SD) |
|---|---|---|
| 5 m | 1.14 ± 0.03 second | 1.06 ± 0.03 second |
| 10 m | 2.03 ± 0.05 second | 1.89 ± 0.05 second |
| 15 m | 2.92 ± 0.05 second | 2.72 ± 0.06 second |
| 20 m | 3.67 ± 0.08 second | 3.40 ± 0.08 second |
| 30 m | 4.93 ± 0.06 second | 4.65 ± 0.06 second |

A clear reduction in average sprint time was observed across all testing distances. The relatively small standard deviations indicate a homogeneous distribution of the data. To determine whether the differences between pretest and posttest results were statistically significant, a paired sample t-test was conducted. The results of the analysis are presented below

**Table 3.** Inferensial Test (Paired Sample t-Test)

| Distance | t-Statistic | p-Value | Explanation |
|---|---|---|---|
| 5 m | 38.116 | 0.0000 | Significant ($p < 0.05$) |
| 10 m | 54.490 | 0.0000 | Significant ($p < 0.05$) |
| 15 m | 49.440 | 0.0000 | Significant ($p < 0.05$) |
| 20 m | 56.721 | 0.0000 | Significant ($p < 0.05$) |
| 30 m | 86.052 | 0.0000 | Significant ($p < 0.05$) |

The analysis results revealed a highly significant difference between the pre-training and post-training outcomes across all tested sprint distances ($p < 0.05$). This indicates that the Tuja-Shuttle Run training had a substantial effect on improving sprinting speed in futsal players.

The interpretation of the research findings indicates that the Tuja-Shuttle Run training had a significant impact on improving sprinting speed across all measured distances (5 m, 10 m, 15 m, 20 m, and 30 m). This is evidenced by a reduction in the average sprint times following the six-week training intervention, with p-values $< 0.05$ in all paired t-tests. The consistent decrease in sprint times

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demonstrates that this training effectively developed the three main components of sprint speed: a) initial acceleration (5 m and 10 m), b) transition to maximal speed (15 m and 20 m), and c) peak speed and sprint efficiency (30 m). The Tuja-Shuttle Run training, which integrates elements of rapid directional changes, progressive acceleration, and reactive stimulus response, provides a specific stimulus that closely mirrors the demands of futsal. This supports the specificity training principle, which posits that physiological adaptations are optimized when the training load closely matches the characteristics of the sport activity. (Bompa, T. O., & Haff, G. G. (2009).

This finding is in line with the research by (Trisnowiyanto, B. (2016) These findings are consistent with the research stating that agility training involving changes of direction significantly improves sprint speed and acceleration in small-ball sport athletes. Similarly, (Mawardi, A. M., & Wahyudi, H. (2021). Found that repeated training involving zig-zag patterns and changes of direction can enhance sprint performance in football players (Pratama et al., 2022). More specifically, this study reinforces evidence that integrating agility and sprint components within a single training model—such as in the Tuja-Shuttle Run yields more optimal results compared to linear sprint training alone. In the context of futsal, which demands high-intensity speed in confined spaces, these findings are highly applicable.

The Tuja-Shuttle Run training can be recommended as an integral component of futsal players' physical conditioning programs, particularly for enhancing speed across various phases of the game. Coaches may implement this training model at least three times per week, with appropriate variations and progression based on the periodization cycle. Additionally, this training does not require complex equipment, making it easily applicable in various training environments.

This study has several limitations that should be considered. First, the sample was drawn from a single futsal team, which may limit the generalizability

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of the findings to the broader population of futsal players. Second, the intervention lasted only six weeks, so it remains unclear whether the observed improvements in speed can be sustained over the long term. Third, the study did not include a control group, meaning that comparisons were made only within the same group before and after the training intervention.

The Tuja-Shuttle Run training can be utilized as an alternative physical training method to improve running speed in futsal, particularly in enhancing acceleration and movement transitions on the court. Future studies are recommended to employ experimental designs involving control groups, larger sample sizes, and longer intervention periods to strengthen the validity and generalizability of the findings. The Tuja-Shuttle Run may also be further developed and tested for its effects on other physical attributes, such as agility, endurance, or reaction time. Additionally, this training model could be modified for use with different age groups or genders.

## CONCLUSION

This study demonstrates that Tuja-Shuttle Run training has a positive effect on improving sprint speed in futsal players. After participating in a six-week training program, the players showed a significant reduction in sprint times across all tested distances 5 meters, 10 meters, 15 meters, 20 meters, and 30 meters. This decrease in sprint time reflects improvements in acceleration, transitional speed, and maximal speed, all of which are essential components in futsal performance.

The Tuja-Shuttle Run training has proven to be effective due to its combination of short sprints, directional changes, and movements that simulate real match situations. This training pattern aligns well with the physical demands of futsal, where players are required to move quickly, change direction abruptly, and react to rapidly changing situations on the court.

Based on the findings, the Tuja-Shuttle Run training can be recommended as part of a regular physical conditioning program to enhance speed performance in futsal players. This training method is also a practical option, as it is easy to

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implement, requires no specialized equipment, and provides tangible benefits in improving players' sprinting ability.

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