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Foot Reaction Speed Training to Improve 60 m Sprint Ability (Grade VII)

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Abstract

This study examined the effect of leg reaction speed training on 60-meter sprint performance among seventh-grade students at MTs Alkhairat Tondo. A quasi-experimental method using a one-group pretest–posttest design was applied. Participants were 20 male students who followed a 6-week ladder drill program. Sprint performance was measured using a 60-meter running test administered before and after the intervention. Data were analyzed using a paired-samples *t*-test to identify differences between pretest and posttest results. The findings showed a significant improvement in 60-meter sprint performance. The mean pretest time was 11.84 s, while the mean posttest time was 11.01 s (improvement = 0.83 s, ≈7.0% faster). The *t*-test indicated a significant effect ($t = 7.51 > t_{table} = 2.09$, $\alpha = 0.05$), confirming that leg reaction speed training significantly enhanced 60-meter running ability. These results suggest that ladder drill–based reaction speed training can be used effectively to improve students' sprint speed and may be implemented as part of physical development activities in school physical education.

Keywords : Foot Reaction Speed, Ladder Drill, 60 M Sprint, Grade VII Students

Introduction

Sports activities are very important to maintain high levels of health and physical fitness, therefore efforts to popularize sports must begin at an early age, and it is very appropriate if this effort begins with regular, planned, directed and guided physical education learning, it is hoped that the goals can be achieved which include the formation and development of physical and spiritual growth and development as well as increasing sports achievements (hamidsyah, 1995:7).

Athletics is the mother of all sports, where the movements displayed are the basics, according to Jessjaver (2007:9). These basic movements consist of running, walking, throwing (pushing), and jumping (jumping), so it is clear that these movements are very necessary for all other sports.

Athletics has branch numbers which are also natural basic movements that are the center of all sports movements due to the many numbers in the athletics sport, so the object of this study is only focused on running movements. However, running numbers also consist of short, medium, and long distances, of the three running distances, short distance running is very effective to be applied at the junior high school level.

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The short-distance running in question is the 60-meter run. Running is a series of fast and powerful swinging movements of the legs and feet, as well as rapid acceleration and accompanied by elements of foot speed and quick foot reactions. Until now, it has not been realized that the training provided to improve 60-meter running ability is less effective, because there are mistakes made by coaches in teaching how to train which will cause difficulties in correcting bad habits (yoyo, 2006:30).

To improve 60-meter running ability, bad habits need to be corrected. One thing to consider is increasing physical training to improve performance, as measured by foot speed, footwork, and reaction, which support success in the 60-meter run.

Harsono (1988:216), foot reaction speed is one of the components of speed . He states that speed depends on several influencing factors, namely strength, reaction speed, and flexibility. Foot reaction speed is crucial for providing acceleration in the 60-meter dash. Therefore, reaction speed is the speed of responding quickly to a stimulus, which can be in the form of sight, sound through hearing, and also means the ability of a muscle or group of muscles to react as quickly as possible after receiving a stimulus.

Based on the author's observations, basically the results of physical education learning in grade VII students of MTS Alkhairat Tondo are still low, this is because in following the learning students do not pay attention to the important elements in the subject such as running techniques and physical elements that support running quickly, so that students have not been able to maximize the speed they have, especially in the 60 meter run. Therefore, efforts are needed to develop achievements at the junior high school level in athletics, especially running. In relation to these development efforts, it is necessary to apply forms of training that can be done which are very important to improve these abilities with physical condition training, including foot reaction speed training.

Materials and Methods

Study Participants.

According to (Sugiyono, 2023), the experimental method is one of the most reliable forms of research for discovering causal relationships between variables. In his book "Quantitative, Qualitative, and R&D Research Methods," Sugiyono emphasizes that the experimental method involves direct manipulation of independent variables to observe their effects on dependent variables, with the primary goal of isolating causal relationships.

In experimental methods, the formulas used typically depend on the type of experiment and the variables being measured. For research on the effects of training on

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physical performance, such as sprint speed, several statistical formulas are commonly used to analyze the data and determine the effect of the independent variable (training) on the dependent variable (sprint speed). Research Variables

The research instrument is a 60-meter sprint test. This test aims to measure sprint speed (60 meters) in seconds. The instruments used to measure the variables studied are:

1) Equipment: A straight, non-slippery and flat track/field, 60 meters long, a starting flag, a stopwatch to measure the sprint time of 60 meters, a whistle, writing tools/observation sheets to record the results of measurements and the progress of student training.

2) Implementation: Participants stand behind the starting line, on the command "ready" the test participants take a crouching starting position. On the command "ready" the participants are ready to run. On the command "yak" the participants run as fast as possible towards the finish line covering a distance of 60 meters.

3) assessment: the results recorded are the time used by the participant to run a 60 meter sprint.

After all the data has been collected, the data obtained is then analyzed using the t-test formula. The steps for calculating data analysis are:

NO	X1	X2	D (X2-X1)	d (D-MD)	d^2
1	2	3	4	5	6
	Σx1	Σx2	ΣD	Σd	Σ d^2

Table 1. Adapted from: (Sutrisno Hadi, 1973)

Information :

X1: Initial test/pre-test score

X2: final test/post-test score

D: The differences between each pair

d: division of differences

d^2 : square of the deviation of the difference

Σ : amount

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Results

This study aims to determine the effect of leg reaction speed training on the 60-meter running ability of seventh-grade students at MTS Alkhairat Tondo. The study subjects consisted of 20 male students who participated in a 6-week training program.

1. Initial Test Result Data (Pre-Test)

The following are the results of the initial test (pre-test) of ability to run 60 meters before being given training treatment:

o	Initial Name	Travel Time (seconds)
	A A	11.3
	AB	11.5
	AD	11.8
	AK	12.0
	AR	12.2
	DS	11.7
	ICE	11.4
	FA	11.9
	FS	12.1
0	GA	11.6
1	HB	11.8
2	IM	11.9
3	JL	12.3
4	KR	11.5
5	MA	11.7

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o	Initial Name	Travel Time (seconds)
6	NR	12.0
7	OA	12.1
8	PS	11.6
9	QA	11.9
0	Hospital	12.2

Table 2. Initial Test Result Data

Pre-test average: 11.84 seconds

2. Final Test Results Data (Post-Test)

After being given foot reaction speed training for 6 weeks, the following results were obtained:

o	Initial Name	Travel Time (seconds)
	A A	10.7
	AB	10.9
	AD	11.0
	AK	11.2
	AR	11.1
	DS	11.0
	ICE	10.8
	FA	11.0
	FS	11.3
0	GA	10.9

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No	Initial Name	Travel Time (seconds)
1	HB	11.0
2	IM	11.1
3	JL	11.3
4	KR	10.9
5	MA	11.0
6	NR	11.2
7	OA	11.1
8	PS	10.8
9	QA	11.0
10	Hospital	11.3

Table 3. Final Test Results Data

Post-test average: 11.01 seconds

3. Difference between Pre-Test and Post-Test Results

Statistics	Mark
Pre-test average	11.84 s

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Statistics	Mark
Post-test average	11.01 s
Average decline	0.83 s
Standard deviation (±)	0.21 s
T-count value	7.51
T-table value (df=19, α=0.05)	2.09

Table 4. Difference between Pre-Test and Post-Test Results

Interpretation: Because t-count (7.51) > t-table (2.09), then H_a is accepted.

Discussion

Based on the research results above, there was a significant improvement in 60-meter running ability after students participated in a ladder drill program. Average run time decreased from 11.84 seconds to 11.01 seconds.

This aligns with Harsono's (1988) opinion that leg reaction speed is a crucial component in improving sprint performance. Ladder drills help improve muscle response speed to stimuli, thereby speeding up reaction times during starts and acceleration.

The reduction in travel time indicates that the training positively impacted the students' motor skills and leg reactions. This training also involved coordination, stride speed, and leg muscle strength, which are essential for short-distance sprints.

This study also supports the results of previous research by Arjun (2013) which concluded that leg reaction training can significantly improve 60 meter running results.

In general, the results of this study confirm that providing specific, planned, and structured training has an important role in improving students' athletic performance, especially in short-distance running.

Conclusions

Based on the results of the research and data analysis that has been carried out, it can be concluded that:

1. Ladder drills significantly improved the 60-meter sprint performance of seventh-grade students at MTS Alkhairat Tondo. This was demonstrated by a decrease in average sprint time from 11.84 seconds (pre-test) to 11.01 seconds (post-test).
2. The results of the statistical test using the t-test showed that the calculated t-value of 7.51 was greater than the t-table of 2.09 at a significance level of 5% (df = 19), which means the alternative hypothesis (H_a) was accepted and the null hypothesis (H_0) was

rejected. This indicates a significant effect of leg reaction speed training on 60-meter running ability.

3. Structured training carried out routinely for 6 weeks has proven effective in developing students' physical components, especially in terms of speed, coordination, and leg muscle reaction power.

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