

Contribution of Leg Muscle Strength, Leg Length and Running Speed Towards Long Jump Square in Students of Wonokromo I State Elementary School Gondang Subdistrict, Tulungagung in 2020

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DOI: <https://doi.org/10.52403/ijrr.20231028>

ABSTRACT

Sport has an important role in human life. Through sport, people can be formed who are physically and spiritually healthy and have high personality, discipline and sportsmanship so that in the end quality human beings will be formed. A reality that can be observed in the world of sports, shows a tendency for rapid increases in sporting achievements over time at both regional, national and international levels.

The aim of this research is to find out how significant the contribution of leg muscle strength, leg length, running speed, and the contribution of the independent variables together are to squatting long jump performance. The research approach used in this research is quantitative research, because in this research there are several tendencies characteristic of the correlational approach. In this kind of research, we do not need to take into account the relationship between variables. The sample in this research was 40 students. (b)

The results of the research show that the leg muscle strength variable makes a significant contribution to the long jump performance variable in the squat style with an effective contribution of 23.7%. The leg length variable makes a significant contribution to the squat style long jump achievement variable with an effective contribution of 38%. The running speed variable makes a significant contribution to the squat long jump achievement variable with an effective contribution of 13.3%. The variables of leg length, leg muscle strength, running speed, and foot length and ankle

coordination together make a significant contribution to the squatting long jump performance by 75%.

Keywords: Contribution, Long Jump and Squat Style.

INTRODUCTION

Sport has an important role in human life. Through sport, people can be formed who are physically and spiritually healthy and have high personality, discipline and sportsmanship so that in the end quality human beings will be formed. In fact, there are four basic human goals for carrying out sports activities. First, those who do sports for recreational purposes. Second, those who do sports activities for education. Third, those who do sports reach a certain level of physical fitness. Fourth, those who do sports for certain purposes to achieve optimal performance (Andi Septiono, 2006). Athletics is a sport that has been practiced since ancient times. One of the goals of athletics at that time was as a means of self-defense in facing natural challenges. Then athletics developed into a sport that was popular with the public, just like football, gymnastics and other games. The rapid development of achievements in sports, especially in athletics, cannot be separated from various factors that can support the development of achievements in sports, including improving the quality of sports

training and coaching. Improving the quality of sports training and coaching can be achieved by applying various scientific and technological disciplines related to sports training and coaching. Efforts to improve performance in sports must be through training with a scientific approach to related sciences.

According to Pate R., Clenaghan M.B. (1993:3) various sciences related to sports are sports psychology, biomechanics and exercise physiology. "Every achievement arises because of the support of various factors. In athletics, these include: (1) talent, (2) forms of movement and training, (3) level of development of performance factors and moving characteristics (power, stamina, speed, agility and skill), (4) intention and will" (Benhart Qunter. 1993: 10). According to M. Sajoto (2002: 8), says that: "Physical condition is a complete unity of components that cannot be separated, either for improvement or maintenance." "These physical conditions include: strength, endurance, muscle power, speed, flexibility, agility, balance, accuracy, reaction.

The implementation of the long jump must consider four phases of movement such as starting, pushing off, floating in the air and landing. To achieve high performance, various long jump styles were developed. The long jump style is seen while floating in the air. According to the IAAF (2000:90-92) there are several types of long jump styles, including: 1) Squatting style, 2) Hang style/sneeper, 3) Walking in the air style.

Long Jump requires complete physical condition and technical mastery to be able to achieve higher achievements. As stated by Mochamad Sajoto (1988), physical condition development in sports must be good if an athlete wants to excel. Athletes must have physical conditions such as: Strength, endurance, muscle explosive power, speed, coordination, flexibility, agility, balance, accuracy and reaction.

Based on all the components of physical condition mentioned above, their maintenance and improvement cannot be separated from each other, so that the

performance of an athlete/student in various sports can increase, the lack of attention to the components of the physical condition of an athlete/student in athletics is good. in national and international sporting events it becomes less than optimal according to what was expected, someone who wants to practice the long jump takes longer to practice the long jump. This fact proves that attention is not only focused on mastering technical skills, but the physical component also needs attention. Coaches rarely pay attention to physical factors when developing an athlete/student. Even though this is considered necessary to pay attention to when starting to train or produce an athlete so that they can achieve maximum performance. From the description above, the aim of this research is to determine the influence of leg muscle strength, leg length and running speed on long jump squatting in students at SDN I Wonokromo, Gondang Subdistrict, Tulungagung Regency.

LITERATURE REVIEW

Long jump

Jumping is a movement of lifting the body from one point to another point that is further away or higher with a fast or slow running stance with support on one leg and landing on the other leg or body part with good balance (Djumidar A. Widya, 2004: 65). Aip Syarifudin (1992: 90) is a movement that jumps forward in an effort to carry the center of body weight as long as possible in the air (floating in the air) which is done quickly and by doing. According to Eddy Purnomo (2007: 85) the types of long jump styles are Squatting Style (orthodox style), Hanging Style (hang style), Walking in the Air (hitch kick style). There are three styles used in long jump to maintain body posture in the air, namely squatting style, springing style, and hitch-kick style or walking in the air (Yoyo Basuki, et al (2000: 17). Meanwhile, according to the Department of Education and Culture, Directorate General Primary and Secondary Education (1997: 60), "when floating there are 3 different techniques that can be used;

A = Hanging Technique, B = Floating Technique, C = Air Walking Technique."

According to Aip Syarifudin (1992: 93), the squatting style of long jump is as follows: "When leaving the ground (support board), the posture of the body in the air is squatting, by rounding the body with both knees bent, both arms forward. When you are about to land, both legs are extended forward." Djumidar A. Widya (2004: 47) long jump is the skill of moving from one place to another with one foot pushed forward as far as possible. Eddy Purnomo (2011: 96) explains the squat style long jump technique as follows: "Squat style long jump, when viewed from the jump technique while in the air (floating), the swing or free leg is swung far forward and the jumper takes a step position that must be maintained as long as possible. In the first stage of floating, the upper body is considered to remain upright and the arm movements will describe a semi-circle from the top front to the bottom and back. In preparation for landing, the foot is placed forward, the knee joint of the swing leg is straightened and the body is bent forward, along with both arms being swung quickly forward when landing." So it can be concluded that the squatting long jump is a jumping movement in When the kicking foot leaves the ground (repulsion board), the posture of the body in the air is squatting like sitting, by leaning forward with both knees bent, both arms swinging forward. When landing, both legs are extended far forward, body bends forward, attention is focused on the landing place.

Physical Conditions and Physical Components

According to M. Sajoto (1995) aspects of physical condition are a unified whole of components that cannot be separated simply in improving or maintaining physical condition. Physical ability is a biomotor component that is needed in every sport. According to Harsono (2015: 155-223) the elements of physical condition include: endurance, stamina, flexibility, agility,

strength, power, muscle endurance, speed and balance.

Speed, according to Harsono (2001:36), is the ability to carry out similar movements in succession in the shortest possible time or the ability to cover a distance in a short time. Dick in Yunyun Yudianta, et al (2011:10), speed is the movement capacity of a body member or part of the body's lever system or the speed of movement of the entire body carried out in a short time. Aip Syarifuddin (1992: 90) argues, "The speed obtained from the initial results is called horizontal speed, which is very useful to help when pushing upwards forward." Djumidar (2001:40) states that: "long jump is the result of horizontal speed created from stance with vertical movement resulting from the supporting leg, the formulation of these two aspects produces a parabolic motion force from the center of gravity." Based on the opinion above, it can be concluded that speed is a determining factor in achieving optimal jump results. With maximum speed during stance, the forward thrust when floating in the air will be greater, which means the jump will be farther.

Sajoto, M (1995:11) states "One of the aspects in achieving achievement in sports is the biological aspect which includes body structure and posture, namely: (1) height and leg length, (2) body size, width and weight, (3) samatotype (body shape)". Ismaryati (2006:100) states, "Measurement of leg length is from the lower spine or can also be from the trochanter to the floor (sole of the foot)". Based on this opinion, it shows that leg length is the distance from the hips to the ankles. Sugiyatno (1998:37) states, "The influence of nutrition on physical growth is divided into 4 types of influence, namely, (1) growth speed, (2) body size after adulthood, (3) body shape and (4) body tissue composition." Hidayat (1999: 255) leg length involves the bones and muscles that form the legs, both lower and upper legs. Hadisasmita, Y & Aip Syarifuddin (1996: 73) stated, "The advantage of long legs is that it is possible

to increase the stride length." Another opinion was expressed by Sudarminto (1995: 40) that, "The longer the lever, the greater the effort used to swing". Meanwhile, reviewing the technique of floating in the air and then landing, Adang Suherman et al., (2001: 120) stated, "One of the main targets of the technique of floating in the air is to prepare the legs in a favorable position when landing, namely by extending the limp leg. forward". Based on this opinion, it can be concluded that long legs allow a longer leg swing, so this will influence the achievement of the jumping distance. With long legs, the jumper can extend both legs far forward, so that he can reach the maximum jumping distance. However, on the other hand, for jumpers with short legs, their leg reach is also short, so the jump distance is not optimal. For safety and effectiveness, landing is assisted by dropping the body forward.

MATERIALS & METHODS

The research approach used is a descriptive quantitative approach. Meanwhile, the type of research is correlational. The population

in this study was 40 students at Wonokromo I State Elementary School, Tulungagung Regency. In this research, the sampling technique used was saturated sampling. According to Sugiyono (2006:61), saturated sampling is a sampling technique when all members of the population are sampled. The sample in this research was 40 students. The data collection techniques used are tests and measurements. Meanwhile, the data analysis technique uses regression analysis with correlation studies.

RESULT

Research result

A normality test is run on the residuals to see if they are normally distributed or not before performing the multiple linear regression analysis. The data is stated to be normally distributed and there is no multicollinearity or heteroscedasticity because the test results for each variable have a significant value of > 0.05 . The following results were collected after testing was done using multiple linear regression analysis.

Variables	coefficient	T _{counted}	Significance of t _{counted}	Notes
Constanta	3,040			
Leg Muscle Strength	0,125	0,730	0,470	Significant
Leg Length	0,190	1,146	0,259	Significant
Running speed	0,198	0,650	0,520	Significant

The multiple linear regression test using SPSS 16 computing assistance obtained the results of the multiple regression equation, namely $\hat{Y} = 3.040 + 0.125X_1 + 0.190X_2 + 0.198X_3$

Based on the regression equation above, an interpretation can be made that $\alpha = 3.040$. A positive constant value indicates the positive influence of the independent variables (leg muscle strength, leg length and running speed). If the independent variable increases or is related within one unit, the dependent variable will increase or be fulfilled. = 0.125 Is the regression coefficient value of the leg muscle strength variable (X1) on the long jump squat style variable (Y). This means that if leg muscle strength (X1) increases by one unit, then long jump ability (Y) will

increase by 0.730 or 7.3%, the coefficient is positive. Which means that between leg muscle strength (X1) and long jump ability, squatting force (Y) has a positive relationship. An increase in leg muscle strength (X1) will result in an increase in the ability to jump long jump (Y). = 0.190. This is the regression coefficient value of the leg length variable (X2) on the squat long jump variable (Y). This means that if the leg length (X2) increases by one unit, then the long jump ability (Y) will increase by 1.146 or 11.4%, the coefficient is positive. Which means that leg length (X2) and long jump ability, squatting force (Y) have a positive relationship. An increase in leg length (X2) will result in an increase in squatting long jump ability (Y). = 0.198 This is the

regression coefficient value of the running speed variable (X3) on the long jump squat style variable (Y). This means that if running speed (X3) increases by one unit, then long jump ability (Y) will increase by 0.650 or 6.50%, the coefficient is positive. Which means that maximum running speed (X3) and long jump ability, squatting force (Y) have a positive relationship. An increase in the value of the maximum running speed (X3) will result in an increase in the squatting long jump ability (Y).

Based on the results of the hypothesis test for the leg muscle strength variable, a $T_{counted}$ value of 0.730 was obtained, whereas T_{table} it was 0.470, because $T_{counted}$ (0.730) > T_{table} (0.470) then H_0 was rejected, meaning that the leg muscle strength variable was significantly related to the squat long jump performance variable. The leg length variable obtained a $T_{counted}$ value of 1.146, while T_{table} was 0.259, because $T_{counted}$ (1.146) > T_{table} (0.259) then H_0 was rejected, meaning that the leg length variable was significantly related to the squat long jump variable. The running speed variable obtained a $T_{counted}$ value of 0.650, while T_{table} was 0.520, because $T_{counted}$ (0.650) > T_{table} (0.520) then H_0 was rejected, meaning that the running speed variable was significantly related to the squatting long jump performance variable. The results of calculating F statistics obtained a $F_{counted}$ value of 0.975, while F_{table} was 0.415, because $F_{counted}$ (0.975) > F_{table} (0.415) then H_0 was rejected, meaning that the variables leg muscle strength, leg length and running speed together (as a whole) had an effect on the variable squat style long jump performance.

DISCUSSION

Relationship between Leg Muscle Strength and Long Jump Performance Variables in Squat Style

Based on the research results, it shows that the leg muscle strength variable has a regression coefficient value of 0.125 with positive parameters. The research results show that the leg muscle strength variable

provides an effective contribution of 23.7%. This explains that leg muscle strength has an important role in achieving long jump performance. The results of the hypothesis test show that the leg muscle strength variable is significantly related to the long jump performance variable in the squat style. This proves that leg muscle strength plays an important role in producing a push as high and as far as possible. Leg muscle strength plays a role in movement when supporting for maximum resistance.

The Relationship between Leg Length and Long Jump Performance in Squat Style

According to the study's findings, the leg length variable's regression coefficient is 0.190 with favorable parameters. This variable has a 38% effective contribution capacity. When performing a move, the proper technique must be used. Biomechanics suggests that long legs have a long reach. This demonstrates that using the full length of the athlete's legs will increase the jump's distance.

The research hypothesis shows that the leg length variable is significantly related to the long jump achievement variable in the squatting style of students at SDN Wonokromo I. This proves that the leg length variable has a positive correlation with increasing the ability to jump far or not. The longer the lever, the greater the effort used to swing. Long legs allow you to have a longer leg swing, so this will affect the distance you can jump. With long legs, the jumper can extend both legs far forward, so that he can reach the maximum jumping distance. However, on the other hand, for jumpers with short legs, their leg reach is also short, so the jump distance is not optimal.

The Relationship between Running Speed and Long Jump Performance in Squat Style

Based on the research results, it shows that the running speed variable has a regression coefficient of 0.19 with negative

parameters. This means that the shorter the running time (the faster the time required), the squatting long jump performance will increase. The effective contribution of the running speed variable to the long jump achievement variable is 13.3%. This proves that running speed is an important component related to long jump performance. The faster you run, the more you can produce maximum jumps.

The results of the hypothesis test show that the running speed variable is significantly related to the squatting long jump performance variable. In the long jump, the initial stage is useful for gaining maximum speed before reaching the support board. The start is done by running closer to maximum speed, but still under control to push off. So the speed from the start will produce a maximum forward thrust.

The initial running speed and the magnitude of the repulsion angle are the elements that determine the achievement of the jumping distance. The initial run in the long jump is a run with acceleration from a standing start. The frequency and length of strides increase over time until preparations are made for a push. The running start must cover sufficient distance and allow the runner to achieve proper preparation for the final action, a bad/slow start will only result in poor performance.

Joint Contribution of Leg Muscle Strength, Leg Length, and Running Speed to Long Jump Performance in Squat Style

The results of the study showed that the combination of independent variables (Leg Muscle Strength, Leg Length, and Running Speed) contributed 75%. The results of this research show that the combination of anthropometric factors and physical condition ability factors can make a big contribution to long jump ability.

The results of the hypothesis test show that leg muscle strength, leg length and running speed together (as a whole) affect squatting long jump performance. This proves that in theory the combination of anthropometric

factors and physical condition ability factors is proven to be true.

The results of the research show that the maximum running speed and leg muscle strength variables are the factors most related to long jump performance. The leg length variable is the most effective in increasing long jump ability, followed by the leg muscle strength variable. The combination of independent variables is able to contribute to long jump ability by 75%.

CONCLUSION

Based on the results of research and the results of data analysis that has been carried out, it can be concluded that leg muscle strength makes a significant contribution to long jump performance in the squat style with an effective contribution of 23.7% for students at Wonokromo I State Elementary School, Gondang Subdistrict, Tulungagung Regency. Leg length makes a significant contribution to squatting long jump performance with an effective contribution of 38% among students at Wonokromo I State Elementary School Gondang Subdistrict, Tulungagung Regency. Running speed makes a significant contribution to squatting long jump achievement with an effective contribution of 13.3% among students of Wonokromo I State Elementary School, Gondang Subdistrict, Tulungagung Regency. Leg length, leg muscle strength, running speed, foot length and ankle coordination together make a significant contribution to the squatting style long jump achievement of 75% of students at Wonokromo I State Elementary School, Gondang Subdistrict, Tulungagung Regency.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Suyono, Zainal Afandi, Wasis Himawanto. Contribution of leg muscle strength, leg length and running speed towards long jump square in students of Wonokromo I state elementary school Gondang subdistrict, Tulungagung in 2020. *International Journal of Research and Review*. 2023; 10(10): 215-221. DOI: <https://doi.org/10.52403/ijrr.20231028>
