

Contribution of Leg Muscle Strength and Speed of Students Long Jump Ability

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Abstract— The purpose of this study was to determine how much contribution leg muscle strength and speed against the long jump students of the Faculty of Sport Sciences, State University of Padang. This type of research is correlational research that involved 28 male students. To obtain data, the instruments used were leg dynamometer, the test speed of 40 meters, and the long jump. Data were analyzed by multiple and straightforward product-moment to determine the contribution of used frequency determinant. Based on data analysis found that the results are magnified by leg muscle strength, had no significant relationship with the long jump, characterized by the results obtained by the $r_{count>table}$, have contributed as much as 47%. From the results obtained running speed of 40 M had no significant relationship with the long jump, characterized by the results obtained by the $r_{count>table}$, have contributed as much as 22%. There is a significant relationship between leg muscle strength and speed to run 40 M against the long jump students.

Keywords— *Strength, Speed, Long Jump.*

I. INTRODUCTION

One attempt to improve the quality of Indonesian human resources quality is through sports. This is consistent with the objectives of national sports listed in the Law on National Sports System Article 4 No. 3 of 2005 on the basis of, the function and purpose of the sport, namely:

"Maintaining and improving health and fitness, achievement, human qualities, inculcate moral values and noble character, sportsmanship, discipline, cultivate and foster national unity, strengthen national security and raised the dignity and honor of the nation".

The goals and objectives of Indonesia's sports one of which is on the development achievements, therefore the sport in Indonesia not only for physical fitness, recreation, sport but also can enhance the national unity of Indonesia through event-driven events, both at national and international levels. For Yag good achievement in sports is through a uniform coaching athletes in every region in Indonesia.

One of the sport branches is athletics. In athletics, have competed several numbers, one of which is the long jump. Basically jumping is an activity of the body is done with one leg for a jumper in order to maximize distance and altitude. That is, a jumper or athletes who strive to make the jump as far as possible or as high as possible in accordance with the rules and regulations that have been set.

In doing jumps, power is needed because it is the ability of muscles to move the body, overcoming the load

or resistance (resistance) both in the sense of the body's own load such as jumping, lifting dumbbells, and other refuse. Strength determines how much the people, lifting, jumping, resisting, and others.

In addition to power, in the long jump takes another physical condition that is very important is the speed. Speed is the ability to complete a certain distance quickly. The speed is very dependent on power because without power, speed cannot be developed. Based on this, the strength and speed plays an important role in achieving optimal outcomes leap.

According to the writer's observation field visible symptoms, college is done less than the maximum speed and power boost student repulsion is still less than optimal. The accuracy of motor coordination is done when the field is still not good, the authors suspect the problem is the low capacity of the long jump Sciences studentsof explanation on top of this important research is done in order to obtain information to determine whether leg muscle strength and speed made a significant contribution to the long jump results of students of the Faculty of Sport Sciences, State University of Padang.

1. Athletics

According to *bollesteros* in [1] Athletics is "Activity physically competitive, including some race number separated based on the movement capabilities and basic human like walking, running, jumping, and throwing." While, athletics began to be known since the holding of the modern Olympic 1 year 1896, in the city of Athens Greece In 1912 established the international athletics governing body (IAAF) International Associations Athletic Federation. It means that athletics is a sport that belong to anaerobic exercise, which at one of athletics that is the long jump an athlete should do repulsion firmly and quickly in order to maximize the distance.

Athletics is a movement that will support all activities to be carried out, both in their daily lives, as well as in the world of sport. According *Bollesteros* in [1] athletics is "a competitive physical activity, has several separate race number based on basic human movement such as walking, running, jumping, and throwing".

This is because of the movement in athletics still existing in other sports. there is no doubt that exercise is very important Athletic in improving physical fitness, ability and qualities of speed, endurance, and reaction movements, both in sports and in everyday life. Considering the sport of athletics is measured and not negotiable bargaining. In athletics there are some

numbers that to be competed, one of the numbers in the athletic field is the long jump.

2. Long jump

According [2], the principle of long jump is "activity or activities undertaken body by jumping on one leg for a jumper in order to maximize distance and altitude ". It means that a jumper or athletes who strive to make the jump as far as possible or as high as possible in accordance with the rules and regulations that have been set.

One jump event in athletics is long jump. According [3] "long jump is a form of movement jump lifted from my feet, the fore in an attempt to bring the point of weight as long as possible in the air that is done quickly and by doing repulsion on one leg to reach distances as far as possible".

To be able to produce a leap maxima l, the jumpers have to really master the basic techniques of jump effective and efficient, have suitable motor skills and know the factors that affect the leap away. Basic-engineering techniques long jump by [2] is related to the final settlement of the phases of the jump start of prefixes (initial phase), pedestal and posture in the air (main phase) and landing (late phase). The third element is a coherent whole, among others leap movement sequences that never dropped out, for it can be understood that the results were influenced by the speed jump run prefix, pivot leg strength, coordination of time hovering in the air and landed on a leap tub.

3. Power leg muscles

Strength is one element that is very important to support physical activity, particularly in sport; it is absolutely necessary component to achieve peak performance. In this case Bomp and Fox in [4] states that every performance in sports requiring muscle strength in addition to other elements that are also required.

According [5], the power is a component of a person's physical condition on its ability to use muscle to accept loads at work. Further according to Jonath and Krempel in [4] human power depends on several factors as follows; (1) cross-section of muscle fibers, (2) the number of muscle fibers, (3) the structure and shape of the muscles, (4) the length of muscle, (5) the speed of muscle contraction, (6) the degree of stretching, (7) of muscle tone, (8) Sense of muscle coordination, (9) inter muscular coordination, (10) motivation, (11) age and gender.

Based on the above explanation it can be ascertained that by having a good level of power can produce maximum power that can be used with a maximum contraction, this power can reflect a person's strength in generating power and motion performance. Thus it is clear that the power of a very big role in doing the long jump and in optimizing other physical abilities.

4. Speed

Speed is the ability to move with the fastest speed in terms of the motion system. Speed is the basic ability, mobility of the central nervous system and devices to prepare movements at a certain speed from a mechanical point of view.[6].

Speed is a combination of three elements namely reaction time, frequency of movements per unit of time, speed traveling a distance. Speed is a biometric ability that is important for sports activities [6] according to [7] on the basis of human movement, time is of the body or one member body and power is muscle power used by future someone in motion. Ozolin in [6], the speed is divided into two kinds, namely general and specific speed.

5. Contributions Limbs Muscle Strength And Ability To Speed Long Jump

To get the big jump, leg muscle strength and speed have a very close relationship. However all the movements cannot be separated because of the interconnections between one another. The long jump is not enough to rely on speed alone, because there are many factors that support in determining the success of the technique in the long jump, that is strength. In the long jump sports, strength is a special component of physical condition is very desirable that at the time of repulsion with a vengeance, accompanied by swing the leg and both hands towards the leap. Swing foot and both hands are needed for the longer carries the weight point it floated in the air.

II. RESEARCH METHODOLOGY

The type of this research is correlation research. The aim is to find out the relationship between leg muscle strength and speed with long jump ability. The population in this study were students of the Faculty of Sport Sciences University of Padang, amounting to 108 people by using purposive sampling technique, male students only with the number of men 110 people drawn as many as 28 people (men) or 25%, to obtain data study used leg dynamometer. The instrument of this research was test for the leg muscle strength. The data sourced from the test results of leg muscle strength, speed and jump results for the students of sport science FIK UNP who have been selected to be sample. Data were analyzed by using simple product moment, to determine the contribution of used frequency determinant.

III. RESULT

1. Correlation Analysis Between limb muscle strength against the long jump

Table 1. Correlation Analysis Between limb muscle strength against the long jump on (X1-Y)

N	r_{count}	$r_{\text{table } \alpha = 0:05}$	Conclusion
28	0.684	0.374	Ho accepted

Results of correlation analysis states there is a significant relationship between leg muscle strength in the long jump at the significant level $\alpha = 0:05$.

2. Correlation Analysis Between run Speed 40 M Against The long jump

Table 2. Correlation Analysis Between run Speed 40 M Against The long jump (X2-Y)

N	r_{count}	$r_{\text{table } \alpha = 0:05}$	Conclusion
28	0.464	0.374	Ho rejected

Results of correlation analysis stating there is a significant relationship between the running speed of 40 M with the long jump at the level of significant $\alpha = 0:05$.

3. Analysis of the correlation between leg muscle strength and running speed of 40 M to jump far above.

Table 3. Analysis of the correlation between leg muscle strength and running speed of 40 M to jump far above (X1, X2-Y)

N	r_{count}	$r_{\text{table } \alpha = 0:05}$	Conclusion
28	0.745	0.374	Ho rejected

Results of correlation analysis states there is a significant relationship between leg muscle strength and running speed of 40 M to jump far above the significant level $\alpha = 0.05$.

IV. DISCUSSION

1. Leg muscle strength

According to [8] strength is quality provides tension to build a muscular contraction maximum. [4] defines strength as one's ability to deal with pressures that come from both the outside or from within.

Muscle strength as explained above, deep relation to the performance of motor skills has a role which is crucial for achieving maximum achievement. Muscle strength has a certain influence in motor performance someone, because with one's ability to exert strength the quantity of motor performance can be determined, whereas balance, agility, coordination are motor abilities affect the quality of motion.

From the results of the analysis that has been obtained, the conclusion is drawn that the results obtained there is no significant relationship between leg muscle strength with the long jump of the Faculty of Science students of Sports at Padang State University. Level of leg muscle strength possessed by students would certainly be better if it did not ignore factors that can influence the long jump. Contributions are given leg muscle strength was only 47, while 53 were influenced by another factor.

2. Hand eye coordination

In the long jump there are factors that affect the results of the jump achieved by the jumper. One of them is speed when running. Speed according to [9] is "for perform similar movements in a row in time the shortest". Meanwhile according to [10] "speed is a sign that states an object is moving".

Running speed in the long jump is required to

obtain high speed, which will bring the body in the horizontal direction obtain optimal results. According to [11] "the prefix run must reach enough distance and allow runners to reach proper preparation for the final action, bad start or run slow will only produce a bad jump." For three until the last five steps the jumper prepares to switch horizontal speed to vertical speed, at that moment speed is not reduced, horizontal speed is that speed caused by the prefix while the vertical speed is speed arising from the power of refusing. Horizontal travel speed determined by dividing the distance traveled by the time taken the facer is used while the acceleration tells us some things the speed changed. Acceleration runs until it reaches maximum speed or optimal speed and then it will decrease according to the ability of the jumper.

Speed is influenced by various factors including stride length and step frequency. In the step length there are three activities namely distance when stepping, when flying, and when landing. While flying to get a good jump, pay attention speed when released and pay attention to air resistance when flying.

From the results of the analysis that has been obtained, the conclusion is drawn that there is a significant relationship between running speed of 40 M with a long jump students of Sports Science Faculty Universitas Negeri Padang. The level of running speed of 40 M that an athlete has will certainly be it's better if you don't ignore the factors that can affect the development of the long jump above. Contributions are given by the speed of the long jump result which is 22%, while 78% is influenced by other factors.

3. Contribution of leg muscle strength and running speed to 40 m the results of the long jump over.

To get the result of a long jump, muscle strength Limbs and speed have a very close relationship. Therefore all these movements cannot be separated because of interconnectedness between one and the other. From the description above, then the long jump is not enough rely on speed alone, because there are still many factors that are support in determining the success of a technique in jumping far away, is power. In the long jump sport, strength is a component of special physical condition which is very necessary, i.e. at the time of repulsion with all their might accompanied by swings your legs and hands towards the jump. Swing legs and second hands are needed because they will carry more and more weight the body floated in the air.

Thus it can be interpreted that there is a connection or the relationship between the variables of leg muscle strength, speed of 40 M and make a significant contribution to the long jump in branches athletic sports. Then it can be concluded that the leg muscle strength and 40 M running speed are two important factors that can be affect long jump in the athletic branch, specifically students Faculty of Sport Science, Padang State University.

V. CONCLUSION

Based on the results obtained, it can be concluded as follows:

1. From the results obtained do not leg muscle strength had no significant relationship with the long jump, characterized by the results obtained by the r count > r table, has a contribution of 47%.
2. From the results obtained running speed 40 has a significant relationship with the long jump, characterized by the results obtained by the r count > r table, has a contribution of 22%.
3. There is a significant relationship between leg muscle strength and speed to run 40 M against the long jump students of the Faculty of Sport Sciences, State University of Padang, characterized by the results obtained r arithmetic > r table, having approximately 56%.

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