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Triple hop test ability performed by athletes in the regional athletic center during the competition period

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Abstract: Tests and measurements, is an integral part of various human activities, as well as in sports training activities. This study aimed to determine the level of athletes' ability in regional training camps during the periodization of competition and see the readiness of athletes to face competition. This research is a quantitative descriptive study. The population that the researchers determined was in regional training center athletes in the Special Region of Yogyakarta. Sampling techniques are carried out by purposive random sampling, namely athletes who enter the regional training center in the Special Region of Yogyakarta, so that a number of 106 athletes are obtained. The instrument used to collect the research data used the triple hop test to determine the athlete's ability level. The data in quantitative research obtained from respondents is tabulated then calculated the percentage, and then analyzed. The instrument used to collect the research data used the triple hop test to determine the athlete's ability level. The data in quantitative research obtained from respondents is tabulated then calculated the percentage, and then analyzed. The results, it can be argued that the average level of the single leg triple hop ability of regional training center athletes during the periodization of competition is in the deficient category for each category of men and women. Therefore, it is necessary to provide special evaluation and treatment.
Keyword: test, measurement, athlete, strength.

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INTRODUCTION

As one of the developing countries, Indonesia is actively carrying out development in all fields. One of the areas that is no less important is development in sports. Sports has experienced rapid progress as it has entered all aspects of life, such as industry, economy, education, and many other fields. This development is in accordance with Law No.3/2005 concerning the National Sports System, Article 4, which states that national sports aim to maintain and improve the freshness and fitness of physical, achievement, human quality, instill noble moral and moral values, sportsmanship, discipline, strengthen and foster the unity and unity of the nation, strengthen national resilience, and lift the dignity, dignity, and honor of the nation. Therefore, it can be said that sports can make life healthier and fitter, as well as can lift the honor of the nation. With today's advanced development of science and technology, many cause a shift in life values, such as social values, economic culture, politics, and the values of the sport itself. Sports, which is used only to improve physical quality, have developed into multi-functional, both for the benefit of sports themselves, the economy, and political achievements. Even today, sports have become an industry that can become a commodity with a fairly high selling value if packaged in such a way.

Sports coaching is carried out systemically, which means that coaching sports require other sub-systems directly related to the coaching system itself. One of the sub-systems with a very large role and contribution to Indonesian sports is the coaching system for talented athlete candidates. As a forum for coaching, sports clubs have resources of athletes and coaches who must get the government's full attention and the big manager of each particular sport. In Indonesia, there have been many sports clubs

as a place to channel talents. The development process is then monitored by the related government and the Indonesian National Sports Committee (KONI).

The Indonesian National Sports Committee (KONI) is an independent non-governmental organization that has the right of authority to accommodate sports coaching in all jurisdictions of the Republic of Indonesia. The organization is also authorized to coordinate and foster all sports achievements in Indonesia and is responsible for athlete achievements. The existence of KONI is strengthened by the Law of the Republic of Indonesia No. 3/2005 concerning the "National Sports System" and Government Regulation No. 16/2007 concerning "The Implementation of Sports". In carrying out its duties and functions, KONI holds a Vision "to be an independent, modern, and professional organization to build the character of the Indonesian nation, strengthen unity and lift the dignity of the nation through the development of sports achievements," and a mission "providing support to athletes to achieve goals and instill the values of the Olympic Games to be a source of inspiration for all Indonesian people. Programmed, directed, and sustainable coaching can produce optimal achievements. A professional system is needed in the organization KONI in carrying out its duties and functions following their respective goals and fields to achieve the goals of sports athletes.

Indonesia has a motto to promote sports activities, as proclaimed by the second President of the Republic of Indonesia, Mr Suharto. At the opening of the fourth national sports conference in 1981, he raised a national sports banner with the motto "*Memasyarakatkan Olahraga dan Mengolahragakan Masyarakat*" which means to familiarize sports activities to the citizens. From then on, sports activities that included citizens began to be programmed, initialized with a clear understanding that sports have become an important part and are protected by law. In its implementation, sports are divided into several parts, including mass sports carried by every citizen and sports activities that aim to provide opportunities for talented athletes to achieve their highest goals. Thus, as the highest sports organization authorized to coordinate and foster all sports achievements, KONI must participate in preparing outstanding athletes and is responsible for the achievements.

KONI has functions, duties, and responsibilities, namely: (1) gaining outstanding sports achievements, building the character and dignity of its citizens, (2) coordinating and building every sporting activity carried out by its members to achieve goals, (3) assisting the government in setting policies and controlling the development of sports achievements, (4) publicizing sports achievements built by its members to achieve optimal achievements, (5) foster friendship and brotherhood through sports, (6) foster harmonious cooperation both vertically and horizontally with agencies in regions and provinces for the benefit of sports achievements.The sports achievements obtained are supported by many factors, one of which is the physical condition. D'Isanto (D'Isanto et al., 2019) support this statement by stating that "an athlete's ability in competition is influenced by a physical condition, technique, tactics, and mentality." Physical condition factors will also affect the athlete's achievement. Physical condition is one of the important factors because it must be supported by good physical condition to do this technique well. Furthermore, Bompa (T. O. Bompa & Carrera, 2015) explains that the elements of the physical condition include "endurance, strength, power, speed, flexibility, agility, balance, and coordination." In sports, various elements of physical condition are needed, including explosiveness, endurance, and agility, which often depend on the needs the characteristics of the sport. However, each coach provides a physical training program to their athletes but cannot know show the athletes' physical ability improves. Every coach should be able to do tests and physical strengthening of the athlete and discover the improvement for his evaluation to determine the athlete's physical ability (Fukuda, 2018).

Tests and Measurements are an inseparable part of various human activities (D'Isanto et al., 2019; Nasrulloh et al., 2021), including sports training activities. We can find out developments and shortcomings to make the right decision. Sports training is a dynamic process (Fister et al., 2019). Coaches and coaches face various problems that require solving. The more accurate the information obtained (through tests and measurements), the better the decision. In Indonesia, especially in the Yogyakarta Special Territory, measurements and evaluations of athlete performances have not been conducted often. This made the programs compiled by the coaches seemed not based on the current

conditions of the athletes. In fact, coaches need to carry out program preparations that suit the needs of athletes to develop their ability to a higher level because each athlete has varied adaptation abilities depending on the needs and training load. A training load that is too heavy and does not suit the athlete's needs can overburden the athlete, making the adaptation that is expected to be good turn into maladaptation (overtraining, injury, and so on).

Moreover, the pressure to gain achievements is getting higher every year, marked by the increase of contests number in competitive sports in Yogyakarta, prompting coaches to force the development of their athletes. In this case, athletes must complete all the training tasks the coach gives, hoping their abilities will increase. Suppose this practice is continued in the long term, it can increase the chances of athletes experiencing an injury, hinder their development and even end the careers of young athletes prematurely. Thus, the researchers believed that measuring the physical abilities of athletes in modern competitive sports is important and should have been mastered by coaches as well as is crucial to be conducted for athletes. Problems that arise as a result of this matter as much as possible resolved soon.

Measuring physical ability is very important, but most coaches still believe that power ability tests can only be done in the laboratory. Direct power test using laboratory facilities is known to be expensive. Meanwhile, on the other hand, limited funds (for small clubs) and limited facilities (the club is far from the facility) are the main reasons coaches or clubs discourage doing physical measurement tests. According to our observations, this is a common thing, especially in Indonesia. In short, these problems would prevent the performances of the athletes to the next level and cause them to be unable to achieve the desired goals. Therefore, this study aimed to determine the level of athletes' ability in regional training camps during the periodization of competition and see the readiness of athletes to face competition. This research could be utilized as an evaluation of material in constructing programs. Furthermore, it also provides an understanding of the importance of a test and performance evaluation for athletes.

METHODS

The method applied for this research was quantitative descriptive (Barada, 2013; Navarro et al., 2016; Ostrov & Hart, 2012; Spradley, 2016), which aimed to discover the ability of the triple hop test during the competition. Quantitative descriptive research is a study whose answers are still difficult to guess and aims to draw more detailed problems to be studied.

Subject

The subject of this study were regional training center athletes who had entered the periodization phase of the competition. The population was the athletes from a regional training center in the Special Region of Yogyakarta. Random sampling techniques were carried out to select 106 athletes from the regional training center in the Special Region of Yogyakarta.

Data Collection

The data of this study were obtained within a day using the single leg triple hop test research intrument and took place in the Sport Arena of Yogyakarta State University. The Sport Arena of Yogyakarta State University was selected because it is best to use an open area free from sharp objects and crowds in this test. The test activities started with a briefing on the test procedure and followed by a trial session. Each athlete was allowed to try the test three times under the applicable procedures. Afterwards, athletes were called sequentially according to the queue or number of participants. The division of small posts in carrying out this test was necessary to avoid long lines and could further shorten the data collection time. The test was carried out within a day.

Instruments

In addition, the researchers utilized the ability test of the triple hop test to discover athlete skill levels (Williams et al., 2017). It was suggested using a surface and special footwear for sports/activities whenever possible. The examiner must place a tape 8 m long on the test surface on the floor. A piece of 3 m tape must then be placed perpendicular to one end of the 8 m tape to create a starting line.

Procedures

The triple hop test is performed by following the procedure: a) The athlete must start by standing on the determined test leg, with the toes at the starting line.; b) When ready, the athlete performs three maximum consecutive jumps using one leg.; c) The examiner must measure the jump distance, starting from the starting line to where the athlete's heel lands when completing the third jump.**; d)** When landing, the athlete cannot shift or turn his/her leg. The athlete must be completely still at the exact moment she/he lands so the test will be considered successful.**; e)** The athlete is allowed to perform no more than three trial jumps for each leg (to avoid fatigue) before performing the actual test.; f) After the trial test, the athlete has three chances to perform the real test. The athlete is given 30 minutes of rest between the trial and the actual test.

Data analysis

The data obtained from the respondents were tabulated, processed, and converted into percentage data. These percentage data were then categorised according to the measurement norms of the single-leg triple-hop test. Furthermore, the data analysis results were presented in a diagram to make the athlete's level of ability can be seen more clearly.

RESULTS AND DISCUSSION

The physical condition ability of the triple hop test was analyzed descriptively by percentage by categorizing the ability data into five categories, namely excellent, good, average, insufficient, and deficient. From the 42 male samples, no athlete included in the excellent and good triple hop test ability categories (0%); one athlete was in the good triple hop test ability category (2.44%); 20 athletes succeeded to reach the Insufficient category for both right leg (47.62%) and left leg (48.78%); and 22 athletes reached the Deficient category for right leg (52.38%) and left leg (48.78%). The results of data analysis for the male sample described in table 1 (See figure 1).

Table 1. Male Athlete's Triple Hop Test Ability Results

No.	Category	Triple Hop Test			
		Right leg		Left leg	
		f (N=42)	%	f (N=41)	%
1.	Excellent	0	0,00	0	0,00
2.	Good	0	0,00	0	0,00
3.	Average	0	0,00	1	2,44
4.	Insufficient	20	47,62	20	48,78
5.	Deficient	22	52,38	20	48,78

Meanwhile, out of the 61 of female samples, no athlete was in the excellent category (0%); one athlete included to the good category respectively for the left leg (1.72%) and the right leg (1.64%); there was one athlete in the average category for the left leg (1.72%) while no athlete for the right leg (0%); in the insufficient category, 21 succeeded to perform the test with the right leg (34.3%), while 12 athletes succeeded perform with the left foot (20.69%); and 39 athletes succeeded to reach deficient category using the right leg (63.93%) and 44 athletes using the left leg (75.86%). The results of data analysis for the female sample described in table 2 (see figure 1).

Table 2. Female Athlete's Triple Hop Test Ability Results

No.	Category	Triple Hop Test			
		Right leg		Left leg	
		f (N=61)	%	f (N=58)	%
1.	Excellent	0	0,00	0	0,00
2.	Good	1	1,64	1	1,72
3.	Average	0	0,00	1	1,72
4.	Insufficient	21	34,43	12	20,69
5.	Deficient	39	63,93	44	75,86

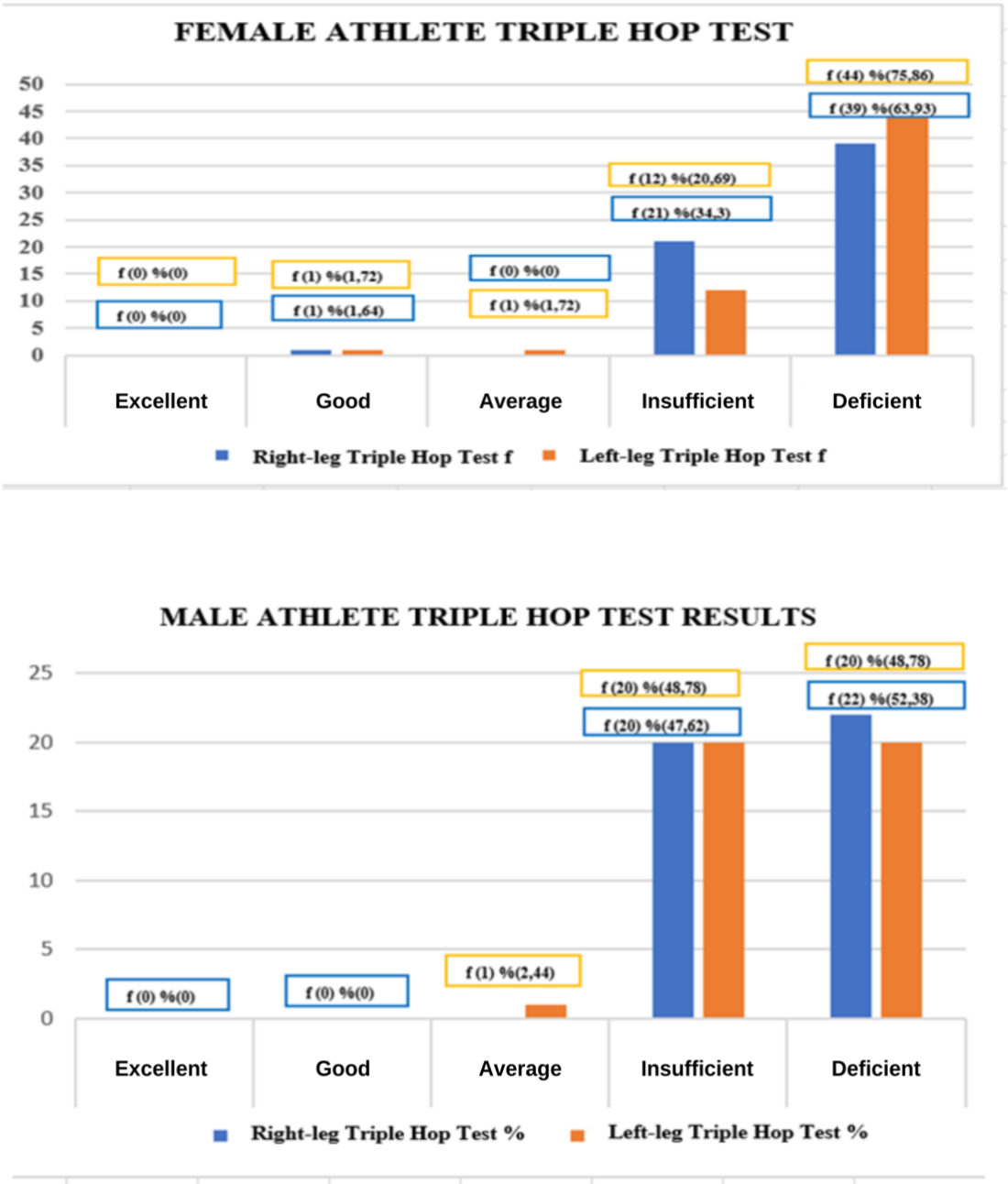

Figure 1. Triple Hop Test Ability Results

Based on the descriptive data analysis results, it can be shown that the average ability of athletes (x) was in the insufficient and deficient categories for men and women. Meanwhile, the ability of female athletes is dominant in the deficient category. This may be due to the physiological differences between male and female athletes. Meanwhile, the information on the number of research samples between the right and left feet was different because some athletes were still injured when the test was held. Apart from that, the abilities of male and female athletes were still relatively low, so it was necessary to evaluate training programs to improve athlete performance.

The term ability refers to a person's level of capacity or effort to complete a task (Sengers et al., 2020). Someone capable means that they can perform optimally in carrying out the given task. Ability in sports means an athlete who can perform the tasks assigned to him with a specific goal (Röthlin et al., 2016). Athletes who compete to achieve optimal performance must have abilities according to the specificity of each sport (Kasper, 2019). The abilities that tennis athletes must have been different from soccer athletes or volleyball athletes. However, in general, the abilities that must be prepared in sports are technical, physical, tactical, and mental (T. Bompa & Buzzichelli, 2015; T. O. Bompa, 2012; T. O. Bompa & Buzzichelli, 2019). The combination of all these abilities becomes an athlete's performance in competition. Therefore, in this study, researchers attempted to observe the triple hop test's level of ability, which focused on strength and power. The triple hop test is considered and reported in the literature as a valid predictor for measuring lower limb strength and power (Bakaraki et al., 2021; Hamilton et al., 2008; Hoog et al., 2016).

A physical component is related to the motion suitability of each sport's characteristics (Siedentop & Van der Mars, 2022). The physical component referred to in this case is leg strength. Leg strength is an important component of improving overall physical condition because muscle strength is the driving force for every physical activity, protecting athletes from possible injuries (Page & Ellenbecker, 2019). Zatsiorsky and Tiggemann (Tiggemann et al., 2016; Zatsiorsky et al., 2020) add that strength is a person's ability to use his muscles to accept loads while working. Leg strength in sports that use legs is very important because only with strong legs can players perform good movements. The observation of this ability is aimed at athletes at the regional training centre in Yogyakarta Province.

The Single Leg Triple Hop Test is a test instrument that requires the ability of muscle strength, neuromuscular coordination, and lower extremity joint stability (Barber et al., 1990; Kalytczak et al., 2016; Williams et al., 2017). This research shows that the level of Triple Hop Test ability for athletes in the training camp in Yogyakarta Province is, on average, in the deficient category for both female and male athletes, even though the training camp has reached the competition period stage. This competition period is the final and peak stage to winning the championship before entering a transition period. Several aspects can cause these results: lower extremity injuries, muscle fatigue, training fatigue that does not produce good training compensation, the lack of specific training programs undertaken, and individual factors themselves. Hamilton suggested (Hamilton et al., 2008) that it is better to be in a fit state, not in a state of fatigue, in carrying out this test, especially in the lower extremities.

This result is considered very dangerous for athletes when competing because athletes have less low extremity strength, which will cause athletes to get injured during body contact or long-duration matches easily (Hietamo et al., 2021; Suchomel et al., 2016). Many studies have shown extrinsic and intrinsic factors for lower extremity injury in body contact competitions caused by weak lower extremity strength (Grassi et al., 2018; Hagen et al., 2016; Lee et al., 2017; McKay et al., 2001; Miguel Ângelo de Castro & João, 2019). This research also proves that tests and measurements are very much needed in practising and training and can be used to make the right decisions. This research can be utilized as an evaluation material in constructing programs. It also provides an understanding on the importances of a test and performance evaluation for athletes. Based on the test results obtained from this study, the researchers hope that coaches can regularly test and evaluate physical abilities, especially strength and power. The power measurement test is not limited to laboratory tests only, but it can be done with a triple hop jump test or other relatively inexpensive tests. Selection of such a test provides an opportunity for trainers to carry out tests and evaluations on an ongoing basis without thinking too much about costs or the availability of laboratory measurement facilities.

We suggest that follow-up is needed to increase the strength of the athlete's lower limbs because the measurement results were still low for all athletes, and some athletes were injured before the data collection process. The athlete's lower limb strengthening program needs to be carried out next to improve performance and reduce the risk of injury to athletes. Thus, prevention of injury may be possible and athletes can achieve the desired level of performance.

The single-leg-triple hop test is a suitable research instrument to determine an athlete's ability because this test does not take a long time and is ideal for testing research samples at the population

level. Furthermore, although this test is not a direct power measurement instrument, it is relatively inexpensive. This is different from the direct power test procedure, which uses laboratory equipment. Based on these advantages, this test is suitable for coaches in Indonesia, especially in Yogyakarta, considering the limitations of physical measurement laboratory equipment or facilities in each region.

Nevertheless, the researcher realized that the results of this study have several drawbacks. First, the low measurement results might be caused by the awkwardness of carrying out the measurement technique or the athlete's unfamiliarity with doing the single-leg-triple hop. Meanwhile, several athletes who took the test were injured, so some could not take it to their full potential. Second, the use of appropriate ability measurement instruments for each sport may be needed in further research. This is because *power* can be generated through several body parts (legs, arms, back and others). On the other hand, this power requirement varies depending on the motion performed in certain sports.

Given the many variations in the sports participating in this study, various power measurement tests are needed to find optimal power measurement results, and even better if they are adapted to each sport. However, we recommend using a combination of multiple measurement instruments to measure power athletes, as this can interpret the condition of the power athlete more broadly. Third, considering that the purpose of our study was only to determine the level of leg power of athletes in the Regional Athletic Center during the competition period, an explanation regarding the ideal level of power in the competition period to prevent injury could not be explained further. Thus, research on the relationship between the level of leg muscle power and the incidence of injury needs to be carried out.

CONCLUSION

It can be stated that the average level of triple hop ability of regional training centre athletes during the competition period is in the insufficient category for both men and women. Therefore, it is necessary to provide proper and programmed evaluation and training to increase athletes' ability in training camps in Yogyakarta Province.

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