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Correlation Standing Balance, Vertical jump, Sit and reach, Agility Status with Hop test Athletes with Knee Regional Sports Injuries

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ABSTRACT

Activity This inappropriate overload will increase the risk of injury occurring in sports activities to achieve performance. This is because the body is no longer able to accept the excessive load , either because the load is excessive or because the body is too heavy to accept the load, then an injury reaction will arise from our body. To assess an athlete's ability to return to sport or return to sport (RTS), tests are needed that can predict the athlete's ability after injury. Hop test is one form of test carried out. Research Method: This quantitative research cross-sectional approach. Statistical test e d by u sing spearman correlation test for bivariate test. This study involved 5 4 patient samples at the HSF Studio clinic Results: The statistics c al test. Based on the results of the bivariate test using the sperm rho test, it shows that the results of all independent variables have no significant relationship with the dependent variable test. There is no significant relationship between standing balance, vertical jump, sit and reach test and agility standards with the hop test.

Keywords:
Standing Balance, Vertical jump, Sit and reach, Agility Hop test

INTRODUCTION

Activity *overload* that is not This precisely will increase the risk of injury that occurs in sports activities to achieve performance (Mulcahey et al., 2018). This is because the body is no longer able to accept the excessive load, either because the load is excessive or because the body is too heavy to accept the load, then an injury reaction will arise from our body (Puspitasari, 2019). Injuries that occur due to sports activities are called sports injuries (Sharma & Student, 2019).

Data in the United States shows the high incidence of sports injuries in both adults and children (Crowley et al., 2019). Sports injuries in adults reach 1.5 million per year years, and half of them are serious injuries. Sports injuries in children and adolescents are higher, 3 – 4.3 million per year. This incidence rate can be found in both men and women (Thomas & Thomas, 2019). Apart from that, the incidence of sports injuries is also found in contact sports compared to non-contact sports with a ratio of 2:1. Based on epidemiological studies in school leagues in the United States, the most common injuries to football players are the head, other injuries that often occur are the knees and ankles (Eapen, 2014)

Physiotherapist Sport responsible for providing recovery efforts to improve the athlete's performance so that he is able to return to branch the sport (Romadhoni et al., 2022). The performance in question is the ability to carry out sports activities with the components of *agility*, reaction speed and coordination and ket e movement skills that meet standards (Pardiwala et al., 2020). One of the physiotherapist's modalities for treating injury cases in athletes is to carry out exercise therapy, which is a systematic and planned performance in an effort to restore individual abilities (Nurusyaikhi et al., 2022). In this exercise therapy, individuals are retrained to be able to perform sports movements properly and correctly after experiencing an injury (Bello et al., 2020). In the treatment of sports injuries, exercise therapy is organized into one program (Nurcahyo, 2015). Athletes who suffer injuries will experience movement and function disorders and there are many factors that influence injuries related to movement ability and function (Romadhoni et al., 2022).

To assess an athlete's ability to return to sport or *return to sport* (RTS), tests are needed that can predict the athlete's ability after injury (Murray et al., 2020). *Hop test* is one form of test carried out. The one leg hop test is a functional test that has been used to identify patients are at risk for recurrent dynamic instability after ACL injury (Saha et al., 2015). There are several other

tests that can be performed to determine the results of RTS. The hop test is currently the most frequently performed test. whether the hop test is sufficient to determine an athlete's ability in RTS. Thus, the aim of this research is to see the relationship between other functional abilities and the hop test

METHOD

Study this is descriptive research with correlation study type. Correlation studies are carried out to determine the relationship between variables. Correlation study is a research method carried out to determine the relationship between 2 variables, namely vertical jump, si and reach test, single leg balance and agility status with hop test. Study started with An initial examination is carried out to determine sports injuries. The assessment is carried out with a sports injury assessment which can determine the diagnosis of a sports injury. The samples used were those who had a knee injury and had been exercising regularly and regularly for 4 months. Samples were given a test to determine the ability to return to sports (*RTS*).

Test results A correlation test was carried out between the 2 variables with variable x consisting of vertical jump value, sit and reach test value, standing leg balance value and hexagonal test with variable y hop test. In bivariate analysis, this study used the Spearman correlation test.

RESULTS

Samples were taken at the HSF studio clinic in Jakarta from athletes who had injuries to the knee region. Of the 54 samples taken, there were 41 men (76.5%) and 13 women (23.1%). 37 people (69.2%) suffered right leg injuries. The most common type of injury was anterior cruciate ligament injury, 27 people (50%), 19 meniscus injuries or (34.6%), 4 people combined ACL and LCL and 4 people with ACL and meniscus (7.7%) (Table 1)

For bivariate analysis the data obtained is in accordance with the table below. Mean data and age are 24.19 years with SD 6.06. For mean body weight 71.65 to 13.56. Mean height was 170.65 cm with SD 7.189 cm. Duration of injury with a mean of 8.04 months with up to 3,156

Tabel 1. Analysis Bivariate

Variabel	N	p	r
Single leg stance vs hop test	54	0.500	-0.094
Sit and reach test vs hop test	54	0.696	-0.054
Vertical jump vs hop test	54	0.751	0.044
Hexagonal test vs hop test	54	0.592	0.074

DISCUSSION

1. Single leg balance test
   The mean single leg balance test measurement of single leg balance is 148.6 seconds with an SD of 120.9, where the results of this test show that the single leg balance results of all samples have met the normal value.
2. Sit and reach test
   Data obtained for the sit and reach test, the mean is 18.1 cm with an SD of 5.56 cm. Like in the single leg balance test, the sit and reach test value has met the normal value, which means that the flexibility ability of the hamstrings and trunk has met the requirements for Return to sport
3. Vertical jump
   For vertical jump ability data , the mean is 47.7 cm with an SD of 12.1 cm. This vertical jump value shows that muscle power capacity has met the norm for returning to sports
4. Hop test
   The mean value of the hop test was 84.9% with SD 14.12. This figure shows that the hop test ability has not yet reached the normal value for returning to sports, even though it has reached the cut off value of 80%

5. Multivariate Analysis

Normality test results with Kolmogorov Smirnov on the independent variables shows that the sit and reach test and vertical jump test data are normally distributed ($p>0.05$) while the variables single leg stance test, single leg calf raise test, hexagon test, shuttle run test, and hop test data are distributed not normal ($p<0.05$). Therefore, the next bivariate test was carried out using the Spearman correlation test.

Based on the Sperm Rho test, the results obtained were N= 54 p= 0.5 with R = – 0.094, which shows that there is no significant relationship between the single leg stance and the hop test with a negative r value. Where the higher the single leg stance value, the smaller the hop value. Test

Based on the Sperm Rho test, the results obtained were N = 54 p = 0.696 with R = – 0.054, which shows that there is no significant relationship between sit and reach and the hop test with a negative r value. Where the higher the sit and reach value, the smaller the hop test value.

Based on the Sperm Rho test, the results obtained were N = 54 p = 0.751 with R = 0.044, which shows that there is no significant relationship between vertical jump and hop test with a positive r value. Where the higher the vertical jump value, the higher the hop test value.

Based on the Sperm Rho test, the results obtained were N = 54 p = 0.592 with R = – 0.074, which shows that there is no significant relationship between the hexagonal test and the hop test with a positive r value. Where the higher the hexagonal test value, the higher hop test value.

Based on bivariate test results using the sperm rho test shows that the results of all independent variables have no significant relationship with the dependent variable test. If discussed one by one, the single leg balance test is a measuring tool for measuring static balance and the hop test for dynamic balance. So there is no relationship between static and dynamic balance abilities. The sit and reach test, which measures hamstring and back flexibility, also had no significant relationship with dynamic balance. For the vertical jump, it shows that there is no relationship between muscle power and dynamic balance. And the hexagonal test value as a standard agility value shows the dynamic balance value.

CONCLUSION

Based on the results of the bivariate test using the sperm rho test, it shows that the results of all independent variables have no significant relationship with the dependent variable test. There is no significant relationship between standing balance, vertical jump, sit and reach test and agility standards with the hop test. Test results above show Each test must be carried out separately because each test is a hop test. So far, the hop test is a test that is often carried out to determine the ability of injured athletes to return to sport. Other tests are still being carried out to determine the capabilities resulting from each test.

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