

**EFFECT OF EXPLOSIVE LEG POWER, BALANCE AND FLEXIBILITY
OF THE WRIST ON LAY UP SHOOT ABILITY
IN BASKETBALL ATHLETES****Andi Mas Jaya¹, Andi Febi Irawati², Maria Herlinda Dos Santos³**Universitas Negeri Makassar^{1,2}, Universitas Muhammadiyah Bone³a.mas.jaya.am@unm.ac.id¹ andifheby28@gmail.com², mariaherlinda@unimbone.ac.id³**Abstract**

This research is a type of *Ex Post Facto* research that uses a path analysis research design. The population is all basketball athletes PERBASI Kab. Sinjai with a total sample of 30 female athletes. The sampling technique is a saturated sample or the total population. The data analysis technique used was descriptive analysis, requirements test, path analysis through the SPSS 20.00 program at a significant level of 95% or $\alpha = 0.05$. The research results show that; (1) There is a direct effect of leg explosive power on wrist flexibility in basketball athletes in PERBASI Kab. Sinjai with a beta value of 0.603 with a significant level of $0.000 < \alpha < 0.05$; (2) There is a direct effect of balance on wrist flexibility in PERBASI athletes in Kab. Sinjai with a beta value of 0.378 with a significant level of $0.019 < \alpha < 0.05$; (3) There is a direct effect of leg explosive power on the ability to lay up shoot in basketball athletes from PERBASI Kab. Sinjai with a beta value of 0.380 with a significant level of $0.002 < \alpha < 0.05$ (4) There is a direct effect of balance on lay-up shoot ability in PERBASI Kab. Sinjai with a beta value of 0.289 with a significant level of $0.005 < \alpha < 0.05$; (5) There is a direct effect of wrist flexibility on the ability to lay up shoot in basketball athletes from PERBASI Kab. Sinjai with a beta value of 0.337 with a significant level of $0.004 < \alpha < 0.05$; (6) There is no effect of leg explosive power through wrist flexibility on the lay up shoot ability of PERBASI Kab. Sinjai with a beta value of 0.203 ($0.203 < 0.380$); (7) There is no effect of balance through wrist flexibility on the lay up shoot ability of PERBASI Kab. Sinjai with a beta value of 0.127 ($0.127 < 0.289$).

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E-Mail: a.mas.jaya.am@unm.ac.idDOI <http://dx.doi.org/10.31851/hon.v6i2.12055>Jurnal Laman Olahraga Nusantara licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#)**INTRODUCTION**

Sports accomplishments have advanced quickly, particularly in recent years. Achievements that were difficult to imagine a few years ago are now possible. In several sports, some athletes can perform at their best. A sort of physical activity with incredibly intricate elements is sport, which serves as a paradigm of human creation. (Sudirman et al., 2023). It is impossible to separate

the connection between sports and human existence. Sport is motion, and human nature is motion. (H. A. Dos Santos & Hudain, 2020).

Based on observations so far, it can be stated that male basketball players in Kab. Sinjai, especially PERBASI athletes, still have numerous issues with fundamental basketball skills, which causes them to lose when competing. The basic technique that has many mistakes when competing is the basic shooting technique, especially the lay up shoot. This basic technique often makes mistakes starting from body position and also when taking steps before shooting (Pratama et al., 2022). Of course, in order to lay up shoot flawlessly, physical components like agility, balance, coordination, flexibility, responsiveness, and others must be able to support the development in lay up shoot skill. (Yusmawati, 2014). of the various physical components above, In this essay, the author seeks to explore three physical traits, namely leg explosive power, balance, and wrist flexibility, which are thought to have an impact on and contribute to the development of lay-up shooting abilities in basketball. (Santos Andi ; (Santos Andi; Sudirman, Sudirman, 2021).

Basketball players require certain physical traits, one of which is leg explosive strength. A player's jump won't be as good without explosive leg force. Because the ball will be closer to the opponent's ring when a player jumps high, it will be simpler to place the ball into the ring. However, a player who possesses strong leg explosive strength will be able to lay up shots with ease. (Harliawan et al., 2021).

Balance is also one of the physical components that can support basic shooting technique skills, especially the lay up shoot technique in basketball games. The characteristic of the lay up shoot is to put the ball into the hoop by taking three steps before putting the ball into the basketball hoop. (Harliawan et al., 2021) to be able to put the ball into the hoop, players must have perfect balance both silently and while moving (Arisman & Agun Guntara, 2021). If the balance is disturbed, it will be difficult to put the ball into the basketball hoop because an unstable body will have difficulty shooting (Taufik et al., 2021).

In addition to the two physical conditions above, wrist flexibility is one of the elements that can improve lay-up shoot skills in basketball. Flexibility is the maximum possible range of motion in one joint. Flexibility is useful for motion efficiency in carrying out motion activities and preventing possible injuries (Maretno & Arisman, 2020). This ability is needed by all players, flexibility is the ability of various joints in the body to move as widely as possible. Or it can also be interpreted that flexibility is the range of motion from one joint and it can also be interpreted that flexibility is the capacity to move in a joint's motion (Samsudin et al., 2019). The bimotor flexibility component is an important element in the context of fostering sports performance because the quality level of a person's flexibility will affect other biometer components (M. H. Dos Santos, n.d.).

With good wrist flexibility, it will be easier for players to make a lay up shoot because with maximum flexibility it will increase the thrust when shooting and it is also easy to find out the amount of energy needed when pushing a basketball. Based on the explanation above, the researcher hopes that this research will be able to improve the basic techniques of playing basketball in PERBASI Sinjai athletes, South Sulawesi.

METHOD

The type of research used in this study is Ex Post Facto. It research is a type of research in which researchers investigate problems by studying or reviewing variables (Putra et al., 2020). Related variables in research like this can be immediately observed and the main problem for future researchers is to find the causes that give rise to these effects. The selected research location is in Kab. Sinjai in the PERBASI field, Kab. Sinjai.

The research design or research design used in this research is the Path Analysis research design. (Sugiyono, 2016). The population in this study were all athletes from PERBASI Kab. Sinjai aged 13-16 years with a total population of 30 female special athletes. (Syahza & Riau, 2021) The sample is a portion of the population that is used as the object/subject of research. Meanwhile (Sugiyono, 2016) that The sample is part of the number and characteristics possessed by the

population. So it can be concluded that the sample is a portion of individuals obtained from the population, which is expected to represent the entire population.

Thus the sample used in this study were basketball athletes from PERBASI Kab. Sinjai as many as 30 athletes with the sampling technique is a saturated sample or the total population. Data collecting was done to get empirical data that could be used to assess the validity of the hypothesis. Tests of leg explosive power, balance, wrist flexibility, and layup shooting prowess were among the data gathered for this study.

RESULTS AND DISCUSSION

To get an overview of the data of a study, descriptive data analysis was used on data on leg explosive power, balance, wrist flexibility and lay up shoot ability on basketball athletes from PERBASI Kab. Sinjai. This is intended to give meaning to the results of the analysis that has been done. The results of the descriptive analysis of the data can be seen in the following table:

Table 1. The results of descriptive analysis of data on leg explosive power, balance, wrist flexibility and lay up shoot ability in PERBASI Kab. Sinjai.

Variable	N	sum	Means	stdv	variance s	Rang e	Min	mac
Leg explosive power	30	810.00	27,000 0	2.6261 3	6,897	11.0 0	21.0 0	32.0 0
Balance	30	2331.0 0	77,700 0	2.3215 6	5,390	9.00	73.0 0	82.0 0
Wrist flexibility	30	2044.0 0	68.133 3	2.5728 5	6,620	10.5 0	63.0 0	73.5 0
Lay-up shooting ability	30	209.00	6.9667	1.7711 0	3,137	7.00	3.00	10.0 0

The table above is a descriptive description of the variable leg explosive power, balance, wrist flexibility and lay up shoot ability in PERBASI Kab. Sinjai.

Test Requirements

Since the data processing in this study uses statistics using Path Analysis techniques, it is necessary to test the analysis requirements, so that the results can

be used to draw conclusions, in this study the requirements test in question includes data normality test and data linearity test.

Data normality test

One of the assumptions that must be met for the parametric test to be used in research is that the data must follow a normal distribution, so a data normality test is performed. Testing the normality of the data can be done to find out whether the data obtained in the research results are in normal distribution. Testing the normality of the data can be done with the Kolmogorov Smirnov test.

The criterion for stating whether the data comes from the sample used is normally distributed or not by comparing the Sig coefficients. Or a P value of 0.05 (Significant level). If the P value is greater than 0.05 (significance level), which means it is not significant, it means that the data comes from a normally distributed population. Conversely, if the P-Value is less than 0.05, which means it is significant, it means that the data comes from a population that is not normally distributed.

The results of the data normality test for the variable explosive power of the limbs, balance, wrist flexibility and the ability to lay up shoot in basketball athletes from PERBASI Kab. Sinjai can be seen from the following table:

Table 2. The results of the data normality test for the variable explosive power of the limbs, balance, wrist flexibility and lay-up shoot ability in PERBASI Kab. Sinjai.

Variable	KS-Z	P	α	Ket.
Leg explosive power	0.133	0.183	0.05	Normal
Balance	0.112	0.200	0.05	Normal
Wrist flexibility	0.113	0.200	0.05	Normal
Lay-up shooting ability	0.141	0.133	0.05	Normal

Because the research data is normally distributed, the hypothesis testing will be used parametric statistical tests.

Linearity Analysis of Data

The study's hypothesis needs to be verified and evaluated using field data collected by field tests and measurements of all the variables under investigation. The research hypothesis is tested using linearity analysis employing parametric

statistical analysis since the research data has a normal distribution. Linearity analysis aims to determine whether the two variables have a significant linear or non-linear relationship. One of the requirements of a data is said to be linear if the P_{value} is greater than 0.05 ($P_{value} > 0.05$). The results of linearity between variables in this study can be seen in the following table

Table 3. Linearity test results

	Deficiation From Linearity (F)	Sig	Conclusion
X1 with X ₃	0.570	0.818	linear
X ₂ by X ₃	1.635	0.177	linear
X ₁ with Y	0.933	0.527	linear
X ₂ with Y	2,113	0.084	linear
X ₃ with Y	0.783	0.673	linear

This study derives seven hypotheses, where the truth of the seven must be tested using inferential statistical analysis, namely by using Path Analysis.

Discussion

Based on the findings of the regression coefficient analysis of the limbs' explosive power, balance and wrist flexibility on the ability to shoot a basketball lay-up (Ihsan et al., 2022). Furthermore, hypothesis testing needs to be studied further by providing an interpretation of the results of the analysis achieved with the theory underlying the writing. This explanation is necessary in order to know the suitability of the theory with the research results achieved.

Based on the results of hypothesis testing, it was found that all of the seven hypotheses proposed were significant. In other words, there are seven accepted and significant hypotheses. To find out how the state of influence between the variables of leg explosive power, balance and wrist flexibility on the ability to lay up shoot basketball can be described as follows.

There is a direct effect of leg explosive power on wrist flexibility in basketball athletes from PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing, the significant value obtained is 0.000 because the significant value is less than 0.05 (0.000 < 0.05) so the proposed hypothesis is accepted or H_0 is rejected and H_1 is accepted. This is in line with what was stated according to Mylsidayu, Kurniawan (2015: 136) says

that: " Power can be interpreted as strength and speed that are carried out together in carrying out a motion". Meanwhile Sajoto (1955:17) says that: "Explosive power is the ability of a person to use the maximum power deployed in the shortest possible time." From the expert opinion above, it can be concluded that leg explosive power is a combination of maximum strength and speed. Therefore, in developing the explosive power of the limbs must be followed by good flexibility because in the absence of flexibility in increasing the explosive power of the limbs, the results to be achieved are not optimal. According to Widiastuti (2011: 153) that: "Modility is the joint's ability to perform movements within the joint's range of motion to the fullest." Meanwhile, according to Noer (2002: 227) says that: "Flexibility or flexibility is the possibility of motion in the area of motion of joints or groups of joints". In other words, wrist flexibility is a person's ability to flex and extend the wrist . Therefore the explosive power of the limbs is greatly supported by good wrist flexibility. Thus the explosive power of the limbs has a significant effect on the flexibility of the wrist in basketball athletes in PERBASI Kab. Sinjai.

There is a direct effect of balance on wrist flexibility in PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing carried out, the significant value obtained was 0.019 because the significant value was less than 0.05 (0.019 <0.05) so the proposed hypothesis was accepted or H_0 was rejected and H_1 was accepted . According to According to Nala (2011: 20) says that: "Balance is the body's ability to react to any changes in body position, so that the body remains stable and under control". Harsono (1988:224) that: "Balance is related to self-coordination, and in some skills, also with agility ". From the expert opinions above, it can be concluded that balance is a person's ability to maintain a balanced body position both silently and moving. Therefore, in improving balance, it must be supported by perfect flexibility because flexibility is a way to keep athletes or students from being easily injured. According to Widiastuti (2011: 153) that: "Modility is the joint's ability to perform movements within the joint's range of

motion to the fullest." Meanwhile, according to Noer (2002: 227) says that: "Flexibility or flexibility is the possibility of motion in the area of motion of joints or groups of joints". If a player does not have good wrist flexibility, it will also affect his balance ability. Therefore wrist flexibility is needed in carrying out balance movements. Thus the balance has a significant influence on the flexibility of the wrist in basketball athletes PERBASI Kab. Sinjai.

There is a direct effect of the explosive power of the limbs on the ability to lay up shoot in basketball athletes from PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing, the significant value obtained is 0.002 because the significant value is less than 0.05 (0.002 <0.05) so the proposed hypothesis is accepted or H_0 is rejected and H_1 is accepted. This is in line with what was stated by Sajoto (1995: 8) that: "Muscular power is a person's ability to exert maximum strength, with effort exerted in the shortest possible time." Nala (2011: 16) argues that: "Explosive power is the ability to carry out activities suddenly and quickly by mobilizing all strength in a short time". From the opinions of the experts above, it can be concluded that if the explosive power of the legs is good, then the lay up shoot of the basketball is also very perfect. Therefore, in developing the ability to lay up shoot must be followed by the ability of physical conditions such as leg explosive power. If a player does not have good leg explosive power, then the lay up shot will not be perfect. Motion analysis in laying up shoot , that is, one has to take a step first and then make a high jump before shooting. Judging from its use where strength plays a major role in its movement. The strength and speed of muscle contraction in the limbs greatly determines the jump height in shooting. From the results of the analysis above that before shooting, players must make a jump. In order for the jump to be higher, it needs perfect leg power or explosive power. Explosive leg power is a person's ability to combine maximum strength and speed in making a jump. Therefore the explosive power of the legs is needed in doing a basketball lay up shoot. Thus the explosive power of the limbs has a significant influence on the ability to lay up shoot in PERBASI Kab. Sinjai.

There is a direct effect of balance on the lay up shoot ability of PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing conducted, the significant value obtained is 0.005 because the significant value is less than 0.05 (0.005 <0.05) then the proposed hypothesis is accepted or H_0 is rejected and H_1 is accepted . In the opinion of Nala (2011: 20) says that: "Balance is the body's ability to react to any changes in body position, so that the body remains stable and under control". Meanwhile, according to Sajoto (1988: 58) regarding the ability to master the location of the body's center of gravity known as balance that: "Balance or balance is the ability of a person to control the nervous organs of his muscles during fast movements with rapid changes in the location of the point of weight. also both in a static state and even more so in a state of dynamic motion. From the opinions of the experts above, it can be concluded that if the balance is good, the lay- up shoot of the basketball will be perfect too. Therefore, in developing the ability to lay up shoot must be followed by the ability of physical conditions such as a good balance as well. Balance is a person's ability to maintain a balanced body position. Motion analysis in laying up shoot, that is, one has to take a step first and then make a high jump before shooting. Judging from its use, balance plays a major role in the movement because if the balance is unstable, athletes or students will have difficulty shooting. So, the function of the balance in laying up shoots is to maintain balance so that it remains balanced to make it easier for athletes or students to shoot. If a player or student does not have a good balance then doing the lay up shoot will be more difficult. Therefore balance is needed in shooting movements. Thus the balance has a significant influence on the lay up shoot ability of PERBASI Kab. Sinjai.

There is a direct effect of wrist flexibility on lay-up shoot ability in PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing carried out, the significant value obtained was 0.004 because the significant value was less than 0.05 (0.004 <0.05) so the proposed hypothesis was accepted or H_0 was rejected and H_1 was accepted. In the opinion of Ramli (2015: 102) says that: "flexibility is a person's

ability to be able to make movements with the widest possible range of motion in the joints". According to Darwis (1989) in Ismaryati (2006: 101) says that:"A person's flexibility is influenced by: joint type, muscle resting length, ligament and joint capsule resting length, body shape, muscle temperature, gender, age, skin resistance, and body shape. bone". From the opinions of the experts above, it can be concluded that if the flexibility of the wrist is good, then the lay-up shoot movement in basketball will also be good. Analysis of lay-up shoot motion in a basketball game, that is, a person must take a step first and then make a high jump before shooting . From the results of this analysis, players must have good wrist flexibility because if the wrist flexibility is not perfect then the shot taken is not directed towards the basketball hoop . Therefore, in developing the ability to lay up shoot , it must be followed by good wrist flexibility so that it will develop the ability to lay up shoot well. If a player does not have good wrist flexibility, it will be difficult for the player to develop lay-up shooting skills . So, wrist flexibility is a person's ability to flex and extend the wrist . Therefore wrist flexibility is needed in developing lay-up shoot skills in basketball games. Thus wrist flexibility has a significant contribution to the lay up shoot ability of PERBASI Kab. Sinjai.

There is no effect of leg explosive power through wrist flexibility on the lay up shoot ability of PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing conducted, the beta coefficient value obtained is 0.203. because the value of the beta coefficient obtained is smaller when compared to the beta coefficient of the direct effect of leg explosive power on the ability to lay up shoot, namely 0.380 ($0.203 < 0.380$) then the hypothesis proposed is rejected or H_0 is accepted and H_1 is rejected. This means that the ability to lay up shoot in basketball which is affected by leg explosive power will not increase if it is also affected by wrist flexibility. If connected based on the third hypothesis where there is a direct effect of leg explosive power on the ability to lay up shoot in basketball games. Where if it is also influenced by wrist flexibility, then with the influence of wrist flexibility it can be said that it has no potential to improve lay-up shoot skills in basketball. As

Leg explosive power, which is the capacity to combine the greatest amount of strength and speed when completing a jump, is well-known. Therefore, there is no impact on PERBASI Kab. Sinjai's ability to shoot layups through wrist flexibility.

There is no effect of balance through wrist flexibility on the lay-up shoot ability of PERBASI Kab. Sinjai.

Based on the results of the hypothesis testing conducted, the beta coefficient value obtained is 0.127. because the value of the beta coefficient obtained is smaller when compared to the beta coefficient of the direct effect of balance on lay-up shoot ability, namely 0.289 ($0.127 < 0.289$) then the hypothesis proposed is rejected or H_0 is accepted and H_1 is rejected. This means that the ability to lay up shoot in basketball which is affected by balance will not increase if it is also affected by wrist flexibility. Based on the fourth hypothesis where there is a significant direct effect of balance on lay-up shoot ability in basketball games, wrist flexibility can be said to have no potential to increase lay-up shoot ability in basketball games. As is known, balance is a person's ability to maintain a body position in order to remain balanced both moving and still. Thus, there is no effect of balance through wrist flexibility on the lay up shoot ability of PERBASI Kab. Sinjai.

CONCLUSION

From the results of testing the hypothesis and discussing the results of the research, the following conclusions can be drawn:

1. There is a significant direct effect of leg explosive power on wrist flexibility in basketball athletes from PERBASI Kab. Sinjai.
2. There is a direct effect of balance on wrist flexibility in PERBASI Kab. Sinjai.
3. There is a direct effect of wrist flexibility on lay-up shoot ability in PERBASI Kab. Sinjai.
4. there is a significant effect of power explode legs on the ability of Lay Up Shoot in athletes basketball PERBASI Kab. sinjai.

5. There is a direct effect of balance on ability Lay Up Shoot on basketball athletes PERBASI Kab. Sinjai.
6. There is no effect of leg explosive power through wrist flexibility on the ability to lay up shoot in PERBASI District basketball athletes. Sinjai.
7. There is no effect of balance through wrist flexibility on the lay-up shoot ability of PERBASI Kab. Sinjai.

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