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Analysis of Leg Strength and Power of Soccer Academy Students: A Review of Playing Positions

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Abstract

This study aims to determine the ability of arm muscle strength, abdominal muscle strength, and bond strength. The type of research used in this research is survey research with test and measurement techniques. The data analysis technique used is descriptive analysis. The research results show that; (1) the ability of the arm muscle strength of the football academy students shows an average score of 5.1 and is in the less category with a total of 13 students and a proportion value reaching 36%. which is played by 5 students with the position of the forward player and 5 students as the back player; (2) the abdominal muscle strength ability of the football academy students showed an average score of 29 and was in the good category with a total of 26 students and the proportion of scores reaching 72% which was dominated by 10 students with defender positions; (3) the carrying capacity of the football academy students shows an average score of 208.6 and is in the medium category with a total of 19 students and the proportion of scores reaching 53% which is dominated by 8 students with defender positions.

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INTRODUCTION

Soccer is a very popular sport in many countries (Tong, 2003) (Roth & Osbahr, 2018) (Syahrozi et al., 2019) (Akpinar, 2022). Football is a sport that can be used as entertainment and a game to improve body condition (Nasution & Suharjana, 2015). Football itself is a sport that is carried out in teams or teams with a total of 11 players where each player is required to have a good level of physical condition and playing skills (Yustika, 2018). The physical condition and playing skills of a soccer player based on this statement certainly have a big influence on the performance of a player, especially when competing. The game of soccer is a game that requires basic techniques or good tactics and strategies, excellent physical condition, mental competition and good and neat cooperation between lines (Nasution & Suharjana, 2015).

The physical condition that must be maintained by soccer players is part of the strategy for a player to improve techniques, tactics, or strategies in playing soccer (Limayyasya et al., 2022). Physical conditions that play an important role in soccer include muscle strength and leg power or leg muscle explosiveness (Pondaag et al., 2020) (Syarif et al., 2023). Muscle strength is the ability to exert maximum strength (DeSimone, 2016). The muscle strength needed in soccer includes arm and abdominal muscle strength (Faizin & Hariadi, 2019) (Mangindaan et al., 2023). Arm muscle strength in soccer has an influence on throwing in or throwing in soccer players (Urrahban, 2016). Meanwhile, the strength of the abdominal muscles in soccer has an influence on the player when the player is heading, where the strength of the abdominal muscles has a contribution to the heading ability of soccer players (Jufinda, 2019).

Power is the maximum ability of muscles that can be produced in a short time (Palar et al., 2015). Leg power itself in soccer is an aspect of physical condition that can affect, among others, the shooting and jump heading techniques of a player (Rosadi et al., 2021) (Risal et al., 2022) (Sapira et al., 2022). Good leg power possessed by soccer players will be able to produce hard and fast kicks, which are certainly needed by every soccer player in a soccer match, especially when players perform shooting techniques into the goal (Prasetyo et al., 2023). Based on some of the above opinions, it can be said that muscle strength and leg power are 3 aspects of physical condition that play an important role for soccer players related to the ability of basic techniques in football such as throwing in, heading, and shooting on players.

The football academy is one of the places that can provide facilities to be able to support the performance of football players on the field with routine training and special attention by the coach or football coach. One of the football academies in Indonesia is the Safin Pati Sports School (SPSS) football academy.

The results of observations made by researchers on the physical condition of Safin Pati Sports School soccer students, especially age group 16 (KU 16), were not optimal. The components of physical condition that play an important role in a soccer game such as arm muscle strength, abdominal muscle strength, and leg power still look not optimal. This can be seen from the basic techniques of the players who are still lacking when undergoing matches due to poor physical condition components. In addition, the lack of training to increase muscle strength or leg power by the coach is still not well programmed.

Every soccer player certainly has their own duties and functions in a match. Players in the soccer match itself are divided into forwards, midfielders, defenders, and goalkeepers. In this case, it certainly does not rule out the possibility that the physical condition and skills of each player are different based on their playing position. Therefore, researchers want to know the physical condition components in the form of muscle strength and leg power in soccer players based on their playing position.

Based on the background explanation above, the researcher raised the issue in the form of research with the title «Analysis of Muscle Strength and Leg Power of Football Academy Students: A Review Based on Playing Position». Referring to the research title, the problem that exists in this study is how the muscle strength and leg power of soccer academy students both in forwards, midfielders, defenders, and goalkeepers.

METHOD

This research is a type of descriptive research with a survey method with test and measurement techniques. The data in this study were obtained from tests and measurements made to the research sample. The sample in this study were Safin Pati Sports School KU 16 soccer students with a total sample size of 36 people. The sampling technique in this study used purposive sampling, which is a sampling technique by determining criteria - criteria (Mukhsin et al.,

2017). Physical condition ability data were obtained using the following instruments: 1) Arm muscle strength using the pull up test; 2) abdominal muscle strength using the 30 second sit up test; 3) leg power or leg explosiveness using the standing board jump.

Data collection in this study was carried out in accordance with the plan that had been designed. First, the students had to write down their height, weight, age, and playing position, then the researcher gave directions regarding the flow of research to be carried out and the division of groups to students. Second, students conduct tests according to the groups and posts that have been provided. The data obtained is then processed and analyzed using percentage descriptive statistics. Presentation of test results using norm categories, namely excellent, good, sufficient, poor, and very poor according to each instrument. The norms used are the norms of the test instrument for arm muscle strength, abdominal muscle strength, and abdominal muscle strength. (Davis, 2000), and leg power or leg explosiveness (Rahman et al., 2021). (Rahman et al., 2021).

Table 1. Assessment norms

Instrument	Category				
	Very Good	Good	Average	Poor	Very Poor
Pull up	>13	9-13	6-8	3-5	<3
Sit up 30 detik	>30	26-30	20-25	17-19	<17
Standing board jump	>254	226-253	197-225	169-196	<168

RESULTS AND DISCUSSION

This study measures three components of physical condition that have an influence on the skills of playing soccer. The results of the analysis of physical condition abilities in Safin Pati Sports School KU 16 soccer students can be described as follows:

Table 2. Descriptive statistics of muscle strength and leg power

Instrumen	N	Min	Max	Mean	Std. Deviation
Pull up	36	2	10	5,1	2,3
Sit up 30 detik	36	21	31	29	2,1
Standing board jump	36	140	240	208,6	22,2

Furthermore, descriptive statistical data on the three tests as well as the distribution of samples based on playing 5 positions are shown in the following presentation:

Table 3. Descriptive statistics of pull up test

Playing position	Statistics				
	N	Min	Max	Mean	Std. Deviation
Forwards	11	3	8	5,4	1,4
Midfielders	9	2	10	5,9	2,8
Defenders	14	2	10	4,2	2,5
Goalkeeper	2	5	7	6	1,4
Total	36				

Based on the average descriptive statistical **Table 3** of the pull up test above, it shows that the lowest average is produced by defenders with an average score of 4,2 with 14 students. While the highest average is produced by goalkeepers with an average score of 6 with an average number of players of 2 students.

Table 4. Descriptive statistics of sit up test

Playing position	Statistics				
	N	Min	Max	Mean	Std. Deviation
Forwards	11	25	31	28,5	2
Midfielders	9	21	31	28,9	3,2
Defenders	14	26	31	29,5	1,6
Goalkeeper	2	28	29	28,5	0,7
Total	36				

Based on the average descriptive statistical **Table 4** of the sit up test above, it shows that the lowest average is produced by forward players with an average score of 28,5 with an average number of players of 11 students, followed by goalkeepers with an average score of 28,5 with an average number of players of 2 students. While the highest average is produced by defender players with an average score of 29.5 with an average number of players of 14 students

Table 5. Descriptive statistics of standing board jump test

Playing position	Statistik				
	N	Min	Max	Mean	Std. Deviation
Forwards	11	140	238	198,5	26,9
Midfielders	9	165	240	214,6	23
Defenders	14	180	234	209,6	16,3
Goalkeeper	2	230	230	230	0
Total	36				

Based on the average descriptive statistical **Table 5** of the standing board jump test above, it shows that the lowest average is produced by forward players with an average score of 198,5 with

11 students. While the highest average is produced by goalkeepers with an average score of 230 with an average number of players of 2 students. The classification of each test can be seen in the following frequency distribution.

Arm Muscle Strength

Table 6. Classification of pull up tests

Interval	Frekuency	Precentag	Category
>13	0	0%	Very Good
9-13	4	11%	Good
6-8	9	25%	Average
3-5	13	36%	Poor
<3	10	28%	Very Poor
Total	36	100%	

Based on the categorization norms of the pull up test, 0 (0%) students in the very good category, 4 (11%) students in the good category, 9 (25%) students in the average category, 13 (36%) students in the poor category, and 10 (28%) students in the very poor category. The data can be seen in the following graph.

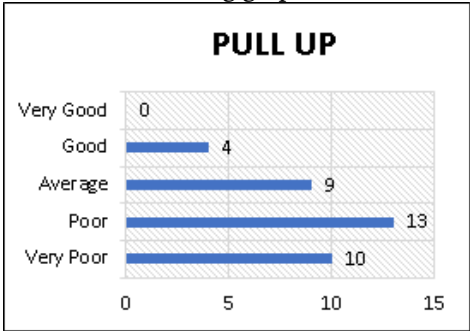

Figure 1. Graph of pull up test

Table 7. Classification of pull up tests based on playing positions

Category	Frekuency	Playing position			
		F	M	D	G
Very Good	0	0	0	0	0
Good	4	0	2	2	0
Average	9	5	3	0	1
Poor	13	5	2	5	1
Very Poor	10	1	2	7	0
Total	36	11	9	14	2

The classification **Table 7** above shows that of the 11 students who are positioned as forward players (F) consisting of, 5 students in the average category, 5 students in the poor category, and 1 student in the very poor category. Then, of the 9 students who are positioned as mielfiders (M) consisting of, 2 students in the good category, 3 students in the aevrage category, 2 students in the poor category, and 2 students in the very poor category. Furthermore, of the 14 students who play as defender (D), 2 students are in the good category, 5 students are in the poor category, and 7 students are in the very poor category. While 2 students who play as a goalkeeper (G), 1 of them is in the aevrage category, and the other 1 is in the poor category. The data can be seen in the following graph.

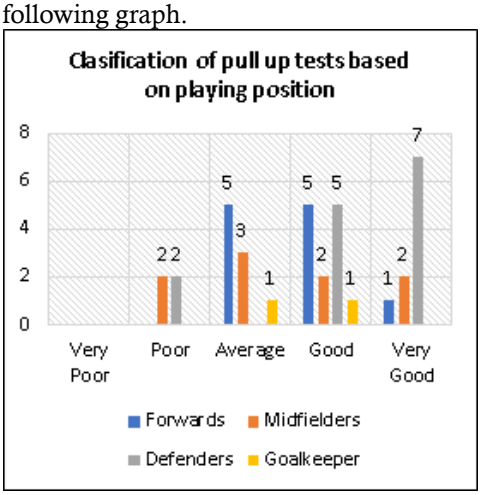

Figure 2. Classification chart of the pull up test

Abdominal Muscle Strength

Table 8. Classification of the 30-second sit-up test

Interval	Frekuency	Precentag	Category
>30	8	22%	Very Good
26-30	26	72%	Good
20-25	2	6%	Average
17-19	0	0%	Poor
<17	0	0%	Very Poor
Total	36	100%	

Based on the categorization norms of the 30-second sit up test, 8 (22%) students were obtained in the very good category, 26 (72%) students in the good category, 2 (6%) students in the average category, 0 (0%) students in the poor category, and 0 (0%) students in the very poor category. The data can be seen in the following graph

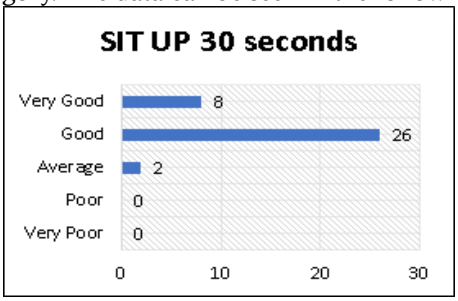

Figure 3. Graph of sit-up test

Table 9. Classification of sit-up tests based on playing position

Category	Frekuency	Playing position			
		F	M	D	G
Very Good	8	1	3	4	0
Good	26	9	5	10	2
Average	2	1	1	0	0
Poor	0	0	0	0	0
Very Poor	0	0	0	0	0
Total	36	11	9	14	2

The classification **Table 9** above shows that of the 11 students who play as forward players (F), 1 of them is in the very good category, 9 in the good category, and 1 student is in the average category. Then, of the 9 students who play as midfileders (M), 3 of them are in the very good category, 5 students in the good category, and 1 student in the average category. Furthermore, out of 14 students who play as defenders (D), 4 of them are in the very good category and 10 other students are in the good category. Meanwhile, 2 students who play as goalkeepers (G) are in the good category. The data can be seen in the following graph

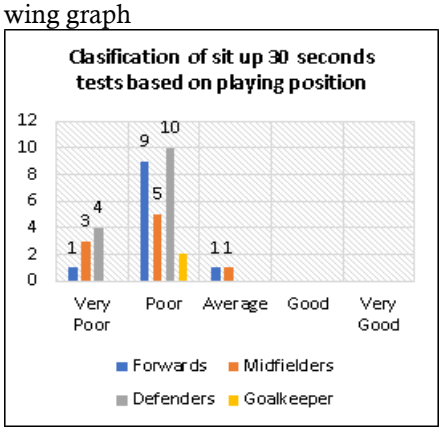

Figure 4. Classification chart of the sit up test

Leg Power

Table 10. Classification of standing board jump tests

Interval	Frekuency	Precentag	Category
>254	0	0%	Very Good
226-253	9	25%	Good
197-225	19	53%	Average
169-196	6	17%	Poor
<168	2	6%	Very Poor
Total	36	100%	

Based on the categorization norms of the standing board jump test, 0 (0%) students in the Very good category, 9 (25%) students in the good category, 19 (53%) students in the average category, 6 (17%) students in the poor category, and 2 (6%) students in the very poor category. The data can be seen in the following graph.

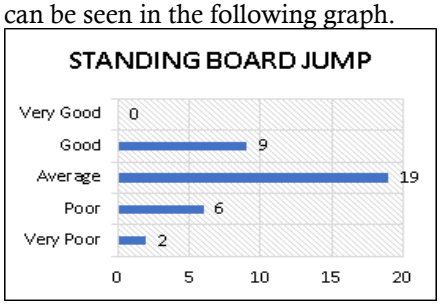

Figure 5. Graph of standing board jump test

Table 11. Classification of standing board jump tests based on playing position

Category	Frekuency	Playing position			
		F	M	D	G
Very Good	0	0	0	0	0
Good	9	1	3	3	2
Average	19	6	5	8	0
Poor	6	3	0	3	0
Very Poor	2	1	1	0	0
Total	36	11	9	14	2

The **Table 11** above shows that of the 11 students who play as forward players (F), 1 student is in the good category, 6 students in the average category, and 3 students in the poor category. Then, out of 9 students who are positioned as midfielders (M), 3 students are in the good category, 5 students are in the average category, and 1 student is in the very poor category. Furthermore, of the 14 students who play as defenders (D), 3 students are in the good category, 8 students in the average category, and 3 students in the poor category. Meanwhile, 2 students who play as goalkeepers (G) are each in the good category. The data can be seen in the following graph

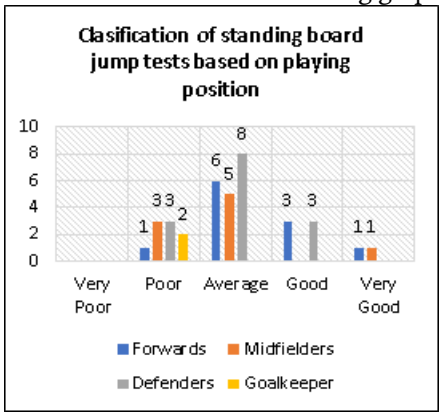

Figure 6. Classification chart of the standing board jump test.

CONCLUSION

The students' arm muscle ability is in the less category with an average score of 5.1 and a percentage value reaching 36% which is dominated by 5 front players and 5 back players.

The abdominal muscle ability of the students is in the good category with an average score of 29 and a percentage value reaching 72% which is dominated by 10 back players.

The power tunkau ability of the students is in the medium category with an average score of 208.6 and a percentage value of 53% and is dominated by 8 defenders.

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