

Analysis of Abdominal Muscle Strength in Supporting Smash Movements in Volleyball

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Abstract

This study aims to analyze the role of abdominal muscle strength in supporting smash movements in volleyball. Abdominal muscle strength is believed to be an important factor in increasing jump height and maximizing smash power, which is an important aspect of the game of volleyball. The research method used was quantitative descriptive, involving 29 students from the Sports, Health, and Recreation Education Program (PJKR) class of 2022A. Data were collected using a sit-up test instrument to measure the strength of the abdominal muscles, which was carried out in a single testing session. The results showed that 5 male students were categorized as very good, 3 students were categorized as good and 3 students were categorized as moderate. Meanwhile, 2 female students were categorized as very good, 3 students were categorized as good and 3 students were categorized as moderate.

Keywords: Abdominal Muscle Strength; Smash; Volleyball; Sit-Up Test; Physical Exercise

INTRODUCTION

Nowadays sports have become a necessity for every human being to maintain fitness and physical health, many women and men really want to have an ideal body shape, in addition to maintaining fitness and health, but also make a person attractive and more confident by showing their social sites in doing their daily activities (Sahrul, 2018). Through exercise, a person can improve their physical condition, which includes flexibility, muscle strength, endurance, agility, strength, speed, and strength. In every sport, this component of physical condition is a prerequisite that must be possessed by an athlete in order to develop and achieve optimal sports achievements. Therefore, an athlete's physical condition must be continuously developed and improved according to the specific characteristics and needs of each sport. In general, exercise is a physical activity that is done repeatedly with the aim of improving or maintaining physical fitness, which can be done competitively or leisurely. Regular exercise and physical activity not only help the body stay fit, but also reduce the risk of various diseases.

Physical condition is one of the important factors that is the basis for the development of techniques, tactics, and strategies in sports. According to (Amin & Adnan, 2020) Physical condition is the most important element and is the basis for the development of techniques, tactics and strategies in sports. And obviously physical condition is one of the necessary loads for sports achievements. In an effort to improve the achievements of athletes, especially volleyball players, it is

necessary to improve physical condition elements such as power, agility, flexibility and aerobic endurance. According to (Zalsha Ayuadelia Efendi et al., 2023), some of the components of physical condition that are important for athletes include strength, speed, endurance, agility, explosiveness, reaction, balance, accuracy, and coordination of movements. In the game of volleyball, the three dominant physical components include strength, endurance, speed, explosiveness, flexibility, and agility. In addition, tactics and strategy also play a very important role in creating effective attacks against opponents.

Volleyball is a sport that involves the game of a ball that bounces off the air, across the net, with the goal of dropping the ball in the opponent's area to earn points. The game of volleyball is played by two teams, each of six people, who try to play as best as possible by attacking and defending so that the ball does not fall in their own area. In this game, the ball can be bounced with various parts of the body, from head to toe, with the right technique so that the ball does not touch the ground before it passes through the goal. Based on the opinion of several experts, volleyball is basically a ball game that prioritizes the application of basic techniques to put the ball into the opponent's area without the ball being received or falling to the ground (Rachmalia et al., 2022).

Muscle strength in volleyball is divided into various muscle groups that have an important role in aspects of the game, such as the leg muscles that are used to provide a boost when jumping, the core muscles that help maintain body stability, and the arm muscles that are needed to control and hit the ball with the right force. With structured training and a focus on muscle strength development, volleyball players can improve their performance both offensively and defensively, as well as maintain excellent physical condition during matches. According to research conducted by Oktariana & Hardiyono (2020) and Saputra et al., (2023), the strength of the abdominal muscles is very important in supporting maximum smash movements. Strong abdominal muscles allow the body to generate the necessary stability and torque in maximizing strength and speed when crushing.

Exercises such as sit-ups are one of the effective ways to train abdominal muscle strength and increase lean muscle mass (Dondokambey et al., 2020). The abdominal muscles, including the abdominis and obliquus muscles, have an important role in maintaining body stability and facilitating the transfer of energy from the lower body to the upper body when performing punch movements. (Perdima & Ferdiansyah, 2024)

METHOD

This study is a quantitative descriptive research that aims to analyze the strength of the abdominal muscles in supporting the smash ability in volleyball. This study uses a norm category with the data collection technique used is a physical test, focusing on measuring abdominal muscle strength through a sit-up test. The subjects of this study consist of students of the Faculty of Sports and Health, PGRI Banyuwangi University, class of 2022A. Sampling was carried out using population techniques, namely by involving all students of the Faculty of Sports and Health class of 2022A totaling 29 people, consisting of male and female students. The instrument used in this study is an abdominal muscle strength test through a sit-up test, which is performed to measure endurance and

abdominal muscle strength. The collected data were analyzed using descriptive analysis techniques using abdominal muscle strength norms.

Table 1. Sit-up test norm results for male and female students

Group	Norms for Boys/Girls	
	Son	Daughter
Superior	>20	>15
Good	15-19	12-14
Keep	10-15	9-11
Less	8-11	5-8

RESULT

This study is the result of the analysis of the test and measurement of abdominal muscle strength using a sit-up test, which aims to determine the strength of the abdominal muscles of FOK students of the 2022A batch of PGRI Banyuwangi University with the results of the analysis of the sit-up test that has been carried out.

From the results of research that has been conducted by FOK students for the 2022A budget of Universitas PGRI Banyuwangi, it can be obtained that the data from this test shows that abdominal muscle strength has a relationship with the ability to destroy, with an average score of 13.6 for women. Meanwhile, the average score of boys was 21.17.

Table 2. Abdominal muscle strength test (sit-up) on students (male)

Not.	Name	Result	Information
1	Iq	20	Superior
2	Fe	19	Good
3	Hide	23	Superior
4	Free wi	24	Superior
5	Anonymous	21	Superior
6	Alo	20	Superior
7	Gh	17	Good
8	He	15	Good
9	Ag	14	Keep
10	Da	12	Keep
11	Il	18	Keep

From the data in the table above, the results of the test analysis on students (males) were obtained with percentages with poor abilities (8-11), with moderate abilities (10-15), with good abilities (15-19), with excellent abilities (>20).

Table 3. Abdominal muscle strength test (sit-up) in female students

Not.	Name	Result	Information
1	EI	15	Superior
2	Tar	16	Superior
3	Ang	13	Good
4	Ni	12	Good

5	Elr	12	Good
6	More	9	Keep
7	Baby	9	Keep
	Riz	9	Keep

From the data in the table above, the results of the test analysis on female students (female) were obtained with percentages with poor ability, namely (5-8), medium (9-11), with good ability, namely (12-14), with excellent ability (>15).

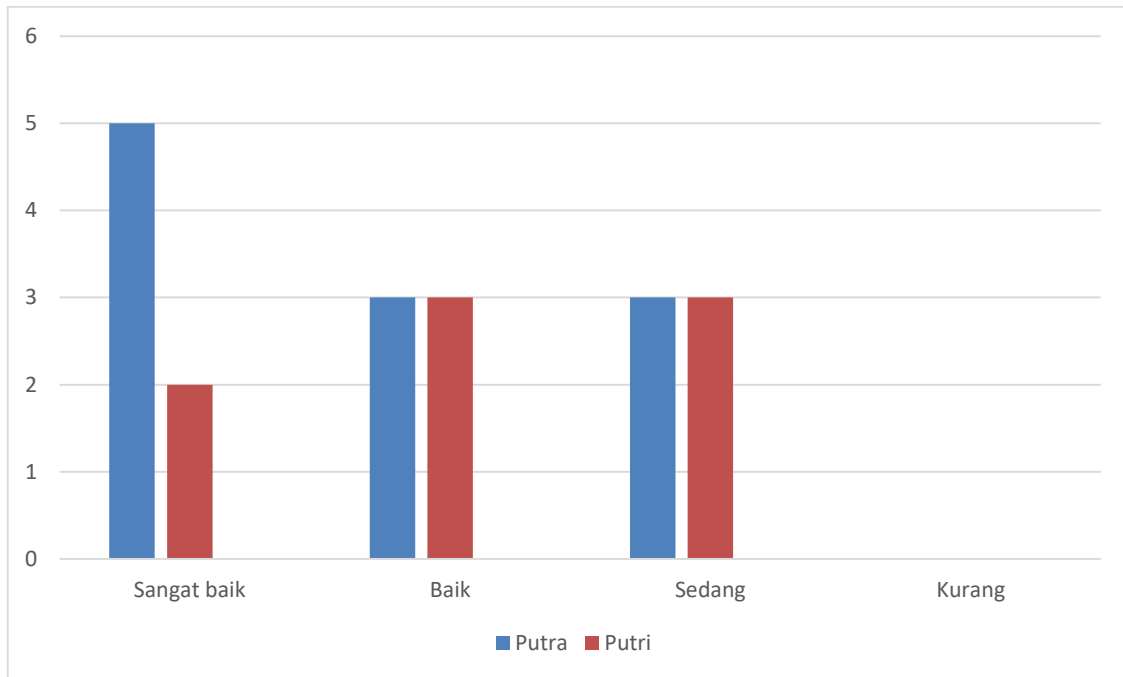


Figure 1. Bar diagram of abdominal muscle strength test for students of class 22 A

Based on the results of the above analysis, it can be concluded that the average abdominal muscle strength ability of male students of PGRI Banyuwangi FOK class of 2022A has muscle strength ability with a superior category, namely with an average score (21.17). On the other hand, most of the abdominal muscle strength abilities in students of PGRI Banyuwangi University, FOK study program, class of 2022A, have abdominal muscle strength abilities in a good category, namely with an average score (13.6).

DISCUSSION

Nowadays sports have become a necessity for every human being to maintain fitness and physical health, many women and men really want to have an ideal body shape, in addition to maintaining fitness and health, but also make a person attractive and more confident by showing their social sites in doing their daily activities (Sahrul, 2018). Physical fitness is one of the main assets that must be owned by humans, because by having a good level of physical fitness, humans will find it easier to do their activities or work, on the other hand, with a low level of physical fitness, humans will find it difficult to do all daily activities because physical fitness has a very important role in human life. Therefore, in

order to have good physical fitness, it is necessary to train and maintain physical fitness continuously. (Darmawan, 2017).

Physical ability is one of the most important factors in playing volleyball. This physical ability is mainly emphasized on the part of the body that plays a special important role in performing smashes, so one of the components of physical ability, in this case sitting exercises and reserve training. The role of Sit up gymnastics and Back up gymnastics in increasing muscle strength, especially when smashing balls, is first the position of the body, especially the upper body, including the head is tilted back as the initial movement, then move forward quickly to do the smash. Such situations are very demanding for Sit up and Back up gymnastics, where Sit Up gymnastics is done by starting with a supine lying posture with both knees bent, both hands crossed in front of the chest to the upper part of the body pulled up then back to the original posture, this movement is repeated and Back up gymnastics is done starting with a posture lying on the stomach with both hands hugging each other and placed behind the head then the body is pulled back then Returning to the original attitude of this movement is done repeatedly, both forms of exercise aim to support an increase in muscle strength, one of which is the abdominal muscles, in other words the stronger the abdominal muscles, the stronger the strength in doing a smash on volleyball, in this case it can certainly result in an increase in the ability to smash (Saputra et al., 2023).

One of the easiest and most frequently performed forms of exercise is the Sit-up movement. Sit-ups are a simple type of physical exercise that can train muscle strength and make muscles firmer. In addition, Sit-ups also have many other benefits such as: improving body balance, increasing muscle mass, improving posture, beautifying abdominal muscles, and burning more calories. Sit-ups can be done by positioning your body on your back, then your knees bent, then your body is lifted until you reach a sitting position with your hands clenched in your head. Parts of the body that can benefit from doing sit-ups regularly include the rectus abdominis, transverse abdomen, obliques in addition to hip flexors, chest, and neck. There are several factors that affect sit-ups on muscle mass, namely the correct sit-up procedure, the variety of movements, and the exact duration of the sit-up according to the ability (Pratama et al., 2023). Applying the right sit-ups can be very helpful to be able to maximize the exercise of the body's muscles, but of the many benefits mentioned, it is always important to know the possibility of injury from physical exercise.

Sports can be used as a tool to achieve educational goals, one of which is volleyball (Setiawan, 2022). Volleyball is a team sport that is widely loved by the Indonesian people because volleyball is quite fun and suitable for use as a recreational sport and achievements can also be used as a means of improving health. Volleyball is also one of the sports that are popular, this is evidenced by the large number of sports actors or people who play volleyball in the community. Many volleyball courts were built and every afternoon were used by the community to play. Based on the opinion of several experts, volleyball is basically a ball game that prioritizes the application of basic techniques to put the ball into the opponent's area without the ball being received or falling to the ground (Rachmalia et al., 2022).

The smash technique is something that must be mastered in the game of volleyball. Smash is an important skill, the easiest way to win points. A good smash technique in volleyball is something that a volleyball player must have in order to produce a good and deadly smash. Volleyball players must have certain requirements as capital in each smash. Therefore, one of the components of physical ability, in this case is Sit up training and Back-up training. The role of Sit up gymnastics and Back up gymnastics in increasing muscle strength, especially when smashing balls, is first the position of the body, especially the upper body, including the head is tilted back as the initial movement, then move forward quickly to do the smash. This situation is very demanding for Sit up and Back up gymnastics, where Sit Up gymnastics is done by starting with a supine lying posture with both knees bent, both hands crossed in front of the chest to the upper body pulled up then back to the original posture, this movement is repeated and back up gymnastics is done (Saputra et al., 2023).

The strength of the abdominal muscles can be increased by using one of the exercises, namely the sit-up by using several physical exercise programs to increase the strength of the abdominal muscles using the right sit-up with the correct sit-up procedure, movement variation, and the right duration of the sit-up according to the body's ability, applying the right sit-up method can be very helpful to be able to maximize the exercise on the body muscles, However, of the many benefits mentioned, it is always important to know the possibility of injury due to physical exercise.

Based on the results obtained in this study, the abdominal muscle strength of students of Universitas PGRI Banyuwangi FOK Batch 22A, boys are included in the very good category, namely with an average of males (21.7) and an average of females (13.6) in the good category. Thus it can be said that the strength of the abdominal muscles also plays a role in the smash ability of volleyball players, although in this study the effect was not significant. This can be caused by various influences such as the fitness condition of the players, the condition of the field and so on. This can be seen from the results of the sit up test which shows that most of the objects have quite good abdominal muscle strength and above the minimum limit, although at the time of the smash test many of them are not optimal when doing it (Oktariana & Hardiyono, 2020). So it can be said that good sit-up test results must be balanced with stable physical condition and physical fitness so that they can still be maximized, it is hoped that the results of the sit-up test that have been carried out by PGRI students of Banyuwangi University FOK Class of 2022A can continue to be maximized with good results, and help them maintain a stable physical condition.

CONCLUSION

Based on the explanation above, it can be concluded that the average muscle strength ability of students (male) is (21.7) and female students (13.6) of PGRI University Banyuwangi are included in the very good category, while for PGRI students of Banyuwangi University FOK Batch 22A is included in the good category. However, it is necessary to continue to train the strength of the abdominal muscles in order to still get optimal ability in maximizing their ability in volleyball. This shows that the strength of the abdominal muscles is very important to support the smash ability in volleyball.

CONFESSION

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