

## Relationship Between Arm Muscle Strength and Leg Muscle Explosiveness Against Smash Volleyball Athletes: A Literature Study



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**ABSTRACT:** The game of volleyball is one of the many sports that is growing rapidly among the general public, schools and clubs, this is because volleyball only uses simple equipment and can bring pleasure when playing it. This study aims to determine the relationship between arm muscle strength and leg muscle explosive power against smash volleyball athletes. This type of research uses literature studies. The database in this study with the criteria of the article comes from Sinta. In this study, 4 articles were used which became a reference for researchers to conduct a review. Characteristics of the 4 articles, 1). Issues from the last 6 years, 2). The articles reviewed are related to the focus of this research. Then the procedure for searching the articles needed in this research is based on the Google engine: 1). Google scholar and 2). Google Chrome. The analysis of this study is the relationship between arm muscle strength and leg muscle explosive power against smash volleyball athletes

**KEYWORDS:** Athletes, Arm Muscle Strength, and Leg Muscle Explosiveness, Smash Volleyball

### I. INTRODUCTION

In the current development of the world, sport has become one of the most popular, because sport is an important aspect of life (Nugroho, Yuliandra, Gumantan, & Mahfud, 2021). Sport is an activity of bodily movement that always keeps humans in a healthy state of mind and body, it is in this state that humans can develop creativity to achieve dreams and a bright future, moreover to carve out goals through sports certainly requires a healthy and strong body (Pratomo & Iqbal, 2020). In Indonesia there are many highly developed sports, one of which is volleyball and one of the most popular sports is volleyball (Nugroho et al., 2021).

William B. Morgan is the originator of the volleyball game in 1895 in Holyoke, United States. William B. Morgan himself was a physical education coach at the Young Men's Christian Association (YMCA), because of the rapid development of the volleyball game, the YMCA began holding volleyball championships nationally and then this volleyball game spread throughout the world and in 1974, the first time volleyball was contested in Poland with quite a lot of participants. In 1984 the International Volleyball Federation (IVBF) was founded, which at that time consisted of 15 countries and was based in Paris (Shaik Mannan, 2015).

Volleyball is one of the many sports that is growing rapidly among the general public, schools and clubs, this is because volleyball only uses simple equipment and can bring pleasure when playing it (Shaik Mannan, 2015). Volleyball is a sport that is played by 2 teams, each team consisting of 6 people whose aim is to drop the ball into the opponent's area. A branch of sport which is played by volleying the ball over the net, with the intent and purpose of being able to drop the ball into the opponent's field and to seek victory in playing (Srianto, 2018). The game of volleyball has basic techniques that must be mastered by the following techniques, including: overhand serve, underhand serve, overpass, underpass, block, and smash (Oktariana & Hardiyono, 2020). To achieve maximum performance in volleyball, the physical condition that is ready to do the exercises plays an important role, because every training program that is made must always cover several aspects such as: physical condition, technique, tactics and psychological factors of athletes, these are the basic factors of performance. an athlete who is interconnected with others to achieve achievements (Anggara & Alex., 2019). For good results in smashing, high achievement and high jumping ability are needed, smashes can be divided into several types, namely: Normal smash (open smash), Smash pull (quick), Smash cekis (drive smash), Smash semi, smash push (Oktariana & Hardiyono, 2020). There are three dominant physical elements that influence the results

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of high school, namely: the explosive power of the arm muscles, the explosive power of the leg muscles, and the strength of the abdominal muscles (Kustiawan, 2015).

Arm muscle strength and leg muscle explosive power are physical conditions that support good smash mastery where arm muscle strength is the ability of a person's muscles to overcome loads while working, while leg muscle explosive power is a person's ability to use maximum strength in a short time so that from smash can get points (Hermanzoni, 2020). Research conducted by (Ardiansyah Prasetiadi, 2016) found that there was a significant relationship between arm length, arm muscle strength, eye-hand coordination and leg muscle power on the smash ability of male volleyball extracurricular participants at SMA Negeri 8 Purworejo, coefficient the determination obtained is 0.600 meaning  $(0.600 \times 100\%) = 60\%$ .

### II. RESEARCH METHODS

This study uses the literature review method. Literature review is a literature review that forms the basis of the researcher's reasons decided to choose a particular theme or title that collected from several previous studies (Ridwan, Ulum, Muhammad, Indragiri, & Sulthan Thaha Saifuddin Jambi, 2021). The data collection technique in this study uses web-based internet by focusing on articles that are relevant to this research. The data used is secondary data in the sense that researchers do not go directly to the field.

It should be noted that the procedure for searching for articles relevant to this research uses the sinta database with the help of the Google Chrome and Google Scholar engines. The article search system uses keywords derived from the title of this research. As many as 50 articles were found during the article search process, but of the 50 articles found, only 4 articles were used as a reference for researchers to conduct a review. This is because 46 articles were not included or not needed in this study. The researcher also emphasized that all data used for this research was sourced from the national database or sinta with the provisions of the last 6 years so that it is still relevant today.

### III. RESULT

Table 1 below is the four articles which are the main references or sources for the authors in completing this research. Because the research database is sourced from the articles listed in the table below. These four have several components that need to be listed in the table below, namely 1). Author's name, 2). Article title, 3). Journal name, 4). Research results which include, a. the variable being measured, b. number of samples and c. The following statistical test is used in detail 4 articles that are relevant to this research as follows.

**Table 1. List of Articles That Become References**

No	Writer's name And Year Rise	Title	Journal Name	Research result
1	(Yulifri, Sepriadi, & Wahyuri, 2018)	Connection Explosion power Leg Muscles And Muscles Arm With Accuracy Smash Athlete Volleyball Uproar Regency West Passage	Journal Mensana	The results showed that the explosive power of the leg muscles had a significant relationship with smash accuracy, because $r_{count}$ was $0.455 > r_{table}$ $0.396$ . The explosive power of the arm muscles has a significant relationship with smash accuracy, because $r_{count}$ is $0.406 > r_{table}$ is $0.396$ . the explosive power of the leg muscles and arm muscles together has a significant relationship with the accuracy of the Gepar volleyball smash in West Pasaman Regency, because $R_{count} = 0.523 > R_{table}$ $0.396$ and the truth is accepted empirically.
2	(Maifa, 2018)	Connection Between Muscle Strength Dan's arm Explosion power Leg Muscles With Ability Smash In Game Volleyball for Students	CENDEKIA: Educational Scientific Journal	The results of this study can simply be broken down as follows: (1) Yes there is a significant relationship between arm muscle strength and smash ability in volleyball for Physical Education students class of 2017/2018 STKIP Paris Barantai Kotabaru. (2) There is a significant relationship between the explosive power of the leg muscles and the ability to smash in

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		Force Penjaskesrek 2017/2018 Stkip Paris Chain New city		the volleyball sport of Physical Education students class of 2017/2018 STKIP Paris Barantai Kotabaru. (3) There is a significant relationship between the strength of the arm muscles and the explosive power of the leg muscles on the ability to smash in volleyball for Physical Education students class of 2017/2018 STKIP Paris Barantai Kotabaru
3	(Asnaldi, 2020)	Connection flexibility and Power Muscle Blast Arm To Accuracy Smash Volleyball	Physical Activity Journal	The results of research from data analysis can be obtained results: (1) Flexibility has a significant contribution to the accuracy of the smash students of SMKN 1 South Solok by 29.70%. (2) The explosive power of the arm muscles has a significant contribution to the smash accuracy of students at SMKN 1 Solok-Selatan by 41.22%. (3) Flexibility and explosive power of the arm muscles have a significant contribution together to the smash accuracy of students at SMKN 1 Solok South of 60.99%.
4	(Isabella & Bakti, 2021)	Connection Explosion power Leg Muscles And Arm Muscle Strength To Accuracy Smash Volleyball	Journal Health Sport	The results of the study can be concluded that the strength of the arm muscles and the explosive power of the leg muscles are components of the physical condition that greatly influence the accuracy of the smash. Good mastery of basic techniques can also improve an athlete's ability to smash volleyball.

### IV. DISCUSSION

In addition to the preparation of physical conditions, an athlete is required to be skilled in mastering volleyball game techniques such as passing, service, smash and block, all of which are basic technical movements that have goals, different movement functions and in different implementations which physical conditions are needed ( Yulifri et al., 2018). Mastery of the basic techniques of playing volleyball is one of the elements that can determine the win or loss of a team in a volleyball game and when smashing, the players make jumps to hit, block and serve. This clearly shows that volleyball players need greater explosive power in the extremities to perform jumps and punches at greater speeds (Shaik Mannan, 2015).

In addition to the element of explosive power, arm muscle strength, good eye and hand coordination are also beneficial for being able to direct the ball with the desired hand reach in smashing (Ardyansyah Prasetiadi, 2016). Leg muscle explosive power is also known as explosive power, which is very necessary in various sports. In line with the description above, the research conducted (Maifa, 2018) found a relationship between arm muscle strength and leg muscle explosive power with the ability to smash in volleyball games for Physical Education and Health Education students class of 2017/2018, Paris chain, Kotabaru. Smash is the most important part in the game of volleyball, because smash is one of the most widely used forms of attack for attacks to get points or points (Srianto, 2018). The ability to smash is done by changing the distance of the jump height by maximizing the explosive power of the leg muscles, one form of exercise that can be applied in maximizing the jump height is plyometric training, because plyometric training aims to maximize the explosive power of the leg muscles so that they will be able to make jumps smash well, a volleyball player will easily do a smash if having a maximum jump height and good leg muscle explosive power, with the application of this form of plyometric training it is hoped that athletes will be even better at smashing (Anggara & Alex., 2019). The characteristics of volleyball games really need biomotor components such as strength (power), speed (speed), agility (agility), and durability (endurance). Related to the explosive power of the leg muscles, what is very influential in its development is the leg muscles and is very influential for smashes in volleyball games (Isabella & Bakti, 2021)

### V. CONCLUSIONS

From the results of the discussion and review of the articles carried out that there is a relationship between the strength of the arm muscles and the explosive power of the leg muscles on the smashes of volleyball athletes

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