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The Effect of Plyometric Depth Jump on Students' Jumping Smash Ability in Badminton

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Abstract. This study aimed to determine the effect of plyometric depth jump training on students' jumping smash performance in badminton. The research employed a *static-group pretest–posttest design* with a sample of 32 students from MTs Darul Kholili, selected randomly from a total population of 86 students. The vertical jump test was used to measure the students' jump height, which served as an indicator of their jumping smash ability. The data were analyzed using a *t*-test to examine differences between the experimental and control groups. The results revealed a significant difference in smash jump height between the two groups (t = 4.935 > $t_{taβle}$ = 2.042), indicating that plyometric depth jump training significantly improved explosive leg power and jump height. These improvements directly contributed to better performance in executing jumping smashes in badminton. The findings highlight that systematic plyometric programs, particularly depth jump exercises, are effective for developing lower-limb strength, neuromuscular coordination, and overall skill execution. Therefore, this type of training can be recommended as an integral component of badminton conditioning programs in school-based physical education and athlete development settings.

Keywords: badminton; plyometric training; depth jump; jumping smash; explosive power students

INTRODUCTION

The history of badminton is both a cultural celebration and a form of recreation. Some say that badminton was played in India, Egypt, and China 2,000 years ago. Badminton is one of the most popular sports in the world, attracting interest from a wide range of age groups and skill levels (Ghazali 2018). Badminton sport very potential to develop on age school base until carry on age. For students, sports gives lots of benefits for growth and development as well as emotional and social challenges (Lestari 2024). There is Lots version from origin start existence game hair parry, in a number of stories many say If game hair parry started from the era of ancient Egypt, there is also said game This originates from China And No Few say If game This originates from India (Viera 2019). Fur parry is a sport that is familiar among society, including in it is world-class achievements so that it makes lots of public especially children follow play hair parry although No play directly in the field And No follow the rules that have been set. Hair parry Alone can become a means of positive liaison among the public (Wahyudin 2019). In Indonesia itself known Lots one type of sport such as football, basketball, badminton. Badminton game is branch lots of sports popular by communities throughout the world including in Indonesia (Muttaqin 2025).

National sports own a significant influence in strengthening the existence of a nation. Character insight and competitiveness are the most important bases for strengthening energy in synergy. Sports development is an integral part of the national development process, especially in efforts to improve the quality of human resources that lead to: (1) improving the physical health of the community, (2) the mental and spiritual quality of the community, (3) the formation of national character and personality, (4) discipline and sportsmanship, and (5) increasing achievements that can arouse a sense of national pride (Agustina 2019).

Badminton in Indonesia has positioned itself as a very popular sport among the people, due to the achievements it has achieved and its ability to compete with other countries in the world (Ricky 2024). Badminton is a sport that is loved by all ages, from children to adults (Hasanah 2020). One of the sports that is loved by the people in Indonesia is badminton. The World Badminton Federation, around 500 million people play badminton worldwide. Badminton games can be found in the home environment, schools, and badminton clubs. Indonesia itself always includes badminton clubs in

championship events held both domestically and internationally, with the aim that badminton games in Indonesia can compete with other nations. Badminton is a sport that is the mainstay of the Indonesian nation in the world sports arena Badminton is a sport that is the mainstay of the Indonesian nation in the world sports arena (Tafaqur 2015). Indonesia's badminton achievements in international badminton championships have reached the champion, even though they are champions, there are still clearly visible weaknesses, especially in the service, smash, and block sections, because they are still often readable and less than optimal in anticipating the smash made by the opponent. From the problem identification carried out by the researcher, training is needed as an effort to improve student quality.

Sport is defined as any physical activity undertaken systematically to encourage, foster, and develop physical, spiritual, and social potential (Rohmah 2022). A badminton player is considered skilled if they can execute basic playing techniques well and correctly without excessive movement (Sholeh 2018). can play badminton required technical, physical, mental and intellectual maturity (Bagas 2023) . Physical condition is a crucial element for achieving success. One of the essential elements every athlete must possess to develop and optimally improve their sporting performance is physical fitness. The physical fitness that must be developed and improved must be tailored to the needs and characteristics of each sport (Kartiko 2021).

The 10 biomotor components that need to be improved in sports include increasing explosive leg muscle power. Explosive leg muscle power is a person's ability to exert maximum force in the shortest possible time. In this case, the movement in question is jumping as high as possible vertically (Raka 2017). In badminton sport need high jump To do a smash, then muscle power required good legs (Priambada 2019) Components The most significant and primary biomotor components in athletics are speed and agility, which are crucial factors in determining an athlete's success. Therefore, efforts are needed to encourage the improvement of these two biomotor components in the athlete. Speed can be determined as the time achieved in a short duration, which is influenced by agility and speed of movement. Meanwhile, agility is defined as the coordination of the whole body that is greatly influenced by several motor abilities, such as strength, speed, balance, and various anthropometric factors.

The training method to improve speed and agility is through the use of exercises. jump depth plyometrics . Plyometrics are various training models For reducing saturation in the training program with adding something burden exercise And intensity exercise on moment experiment done in a way over and over again For increase explosive strength Power explosion muscle legs in a way maximum (Instituto 2021). Flexibility is a component of physical fitness that makes our movements effective and efficient, appearing less stiff, and making it easier for us to perform daily activities. The better an athlete's flexibility, the more efficient the body's energy expenditure for movement (Soenyoto 2023). Improving badminton player performance is crucial. Throughout the game, these movements are performed frequently and for extended periods. Athletes who perform these movements are at risk of fatigue, which impacts how well their heart, lungs, circulatory system, respiration, muscles, and joints function (Rasyid 2022).

One of the skills players must possess to improve their badminton performance is mastery of jumping techniques, which is a crucial factor. This can be seen when players smash towards their opponent or when blocking the ball to defend against an opponent's attack, where the apparent jump height is often less than optimal. Therefore, researchers will conduct research on Plyometric Depth Jump Training Strategies for MTs Darul Kholili Students in Performing Jumping Smashes in Badminton. Plyometric training is training to develop speed and strength (power) by using your own body weight. (Aisyiyah 2019) . The purpose of this study was to examine the effect of plyometric depth jump training on the jumping smash ability of students at MTs Darul Kholili in badminton.

METHOD

This research was conducted at MTs Darul Kholili. This research was conducted in the odd semester of the 2024/2025 academic year. The pretest and posttest were conducted at 07.00 – 09.00 WIB. The treatment was carried out in 12 meetings, with a frequency of 4 times a week, namely on Monday, Wednesday, Friday and Saturday from 07.00 – 09.00. The method used in this study was a quasi-experimental design with a "Non-Equivalent Pretest-Posttest Control Group Design".

This study has a population of 86 students of MTs Darul Kholili in the Odd Semester of the 2024/2025 Academic Year. The research sample consisted of 32 people taken using a simple random sampling technique. The researcher conducted a lottery to determine the experimental group and the control group by creating lottery numbers 1

and 2. The sample that got lottery number 1 entered the experimental group and the sample that got lottery number 2 entered the control group. The instrument used to collect data in this study was a vertical jump test, namely by reaching the highest point with the fingertips. Data analysis used inferential statistics using the unpaired sample t-test independent sample t-test.

RESULTS AND DISCUSSION

Based on the results of the data analysis obtained from the initial test and final test of the experimental group and control group, the data obtained are in the table below.

Table.1. Average Pre-test and Post-test

Group	Pre-test	Post-test
Experiment	28.30	34.85
Control	29.15	32.30

The results of the calculation with the t test obtained the result that t count = 4.935 > t table = 2.042 at a significance level of 0.05. Indicating that there is a significant difference in the height of the smash jump between the experimental group and the control group. It was concluded that plyometric depth jump training affects the ability to do jumping smashes in badminton games. Judging from the average pre-test and post-test with the conclusion that the jumping smash ability of the experimental group trained using the plyometric depth jump method is better than the control group. It can be concluded that plyometric depth jump training affects the explosive power of the leg muscles to increase the height of the jump in doing jumping smashes in MTs Darul Kholili students.

Research shows that plyometric depth jump training can improve jumping smash ability in badminton. Mastering badminton hitting skills/techniques also requires physical conditioning. Physical condition is a unified whole consisting of several inseparable components. The physical strengths referred to include strength, endurance, muscular endurance, speed, flexibility, agility, balance, accuracy, and reaction (Lamusu 2022). To support jumping smash skills, the component of physical condition that influences it is leg muscle power. Leg muscle power is a combination of leg muscle strength and speed, allowing power to produce maximum force in a short and rapid time (Haryanto 2021).

The ability to smash in badminton is a must for every student because smashing is an attack shot into the opponent's area to score points. Jumping is closely related to leg muscle power, and one exercise that can be done to improve this jumping ability is plyometric depth jump training. Plyometric training is an exercise that can build leg muscles and increase leg muscle power (Syamsudar 2020). Depth jump training is an exercise that uses a box with a soft surface, where the exercise is done by jumping from a bench onto a soft surface and then jumping as high as possible (Zainuddin 2022). Depth jumps can train the muscles of the legs, thighs, hips, and lower back. Because it trains the lower body and is done explosively, plyometric depth jump training can increase leg muscle power (Pembayun 2018). Several studies have shown the effectiveness of plyometric depth jump training. Depth jump training is very effective in increasing leg muscle strength and power. Depth jump training can increase jump height in volleyball players. In addition, the depth jump training method carried out for 18 sessions with a training frequency of 3 times a week can shorten the travel time for speed and agility (Adib 2023).

CONCLUSION

The results of the research that has been conducted on the effect of plyometric depth jump training on the ability to perform jumping smashes in badminton games in MTs Darul Kholili students. Based on the research results and conclusions mentioned above, several suggestions have emerged from the researcher. From the results of this study, it is hoped that PENJAS teachers of Badminton games in schools can use plyometric depth jump training to increase the explosive power of leg muscles. Students are also expected to be able to implement the learning materials that have been created so that they do not deviate from the results targeted by the PENJAS teachers.

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