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COMPARISON AND MEASUREMENT OF ENDURANCE AND STRENGTH FOR PJOK TEACHERS IN SEKADAU

Ade Rahmat[1], Ryandhika Kurniawan[2], Nuri Utami[3], Sutantio[4],Gusti Achmad Setiawan[5]

[1,2,3,4,5]IKIP PGRI Pontinak (Magister Pendidikan Jasmani, Fakultas Pendidikan Olahraga & Kesehatan, IKIP PGRI PONTIANAK), Jl. Ampera No.88, Sungai Jawi, Pontianak Kota, Kota Pontianak, Kalimantan Barat - 78116
[1] E-mail: mradde16@gmail.com

Abstrak

Pada penelitian ini tes dan pengukuran endurance dan power sangat penting untuk meningkatkan kemampuan melatih. Rumusan masalah dalam penelitian ini adalah apakah terdapat perbandingan antara tes dan pengukuran endurance dan power. Tujuan masalah dalam penelitian ini adalah untuk mengetahui hasil perbandingan antara tes dan pengukuran endurance dan power. Adapun hasil yang didapat dari tes yang diberikan. Untuk beep test yang sesuai laki-laki 0% tidak sesuai 100%, Perempuan sesuai 0% tidak sesuai 100%, untuk plank keseluruhan peserta tidak sesuai. Untuk tes medicine ball laki-laki sesuai 0% tidak sesuai 100%, Perempuan sesuai 80% tidak sesuai 20% dan untuk vertical jump laki-laki sesuai 66,67% tidak sesuai 33,33%, Perempuan sesuai 100% tidak sesuai 0%. Hasil penelitian ini diharapkan dapat meningkatkan kualitas pembelajaran PJOK, mengembangkan atlet, dan meningkatkan daya saing prestasi antar sekolah di Kabupaten Sekadau. Implementasi pengujian ini secara sistematis dan berkelanjutan dapat membawa manfaat signifikan bagi pembelajaran PJOK dan prestasi siswa. Program ini perlu dilakukan secara berkelanjutan dan memerlukan kerjasama dari berbagai pihak.

Kata kunci: Daya Tahan, kekuatan, Daya Ledak

Abstract

In this study, the assessment of endurance and power is of paramount importance in order to enhance the efficacy of training regimens. The objective of this study is to determine whether there is a comparison between tests and measurements of endurance and power. The objective of this study is to ascertain the outcomes of the comparison between tests and measurements of endurance and power. The results of the aforementioned test are as follows. In the beep test, 0% of men and 0% of women did not meet the 100% criterion. In the plank test, all participants failed to meet the criterion. In the medicine ball test, 0% of males did not fit 100%, 80% of females did not fit 20%, and in the vertical jump, 66.67% of males did not fit 33.33%, while 100% of females did not fit 0%. The results of this study are expected to enhance the quality of PJOK learning, foster the development of athletes, and elevate the competitiveness of achievements between schools in Sekadau Regency. The implementation of this test in a systematic and sustainable manner can yield significant benefits for PJOK learning and student achievement. It is imperative that this program be implemented on an ongoing basis and that cooperation be sought from a variety of parties.

Keywords*: endurance, power, Explosion power*

INSTRODUCTION

Physical Education, Sports, and Health (PJOK) plays a pivotal role in the formation of student character and health. This is in accordance with the

perspective of (Sugiyono, 2016),who asserts that "PJOK is not only related to physical activities, but also an integral part of character education and student welfare." PJOK teachers bear a significant responsibility in guiding students to achieve success in physical activities and character building (Sugiyono, 2016). In a study, Arikunto (2023) revealed that the role of the physical education teacher extends beyond that of a mere physical instructor. They also serve as guides in the development of students' character and healthy living habits. In the context of learning PJOK, the measurement of endurance and power is an important aspect, as it allows for the understanding of the physical condition of students and the determination of the most suitable training program (Arikunto, 2018). As stated by Borg and Gall, "Physical measurements provide a strong basis for designing exercise programs that suit individual needs." While endurance and power are two important components of physical fitness, a direct comparison between the two still requires further understanding. This comparison may provide valuable insights into the need for and effectiveness of exercise in learning physical education (Borg et al., 1989).

A school is an institution with a well-organized structure, where all activities are intentionally planned through a curriculum. As a place where the formal teaching and learning process takes place, schools are places where knowledge is transferred from teachers or instructors to their students. Schools have an important role in education because they have a significant influence on the development and formation of children's personalities (Cahyadi et al., 2022).

Physical education, sports, and health (Penjaskes) constitute an essential component of the overall educational curriculum. Its objective is to cultivate a range of competencies, including physical fitness, movement skills, critical thinking, social skills, reasoning, emotional stability, moral action, healthy lifestyles, and awareness of a clean environment. This is achieved through the systematic selection and planning of physical activities, sports, and health programs that align with the goals of national education (Wisma Darani, 2020).

Physical education, sports, and health (PJOK) is an essential component of education that is inextricably linked to other academic disciplines. PJOK strives to cultivate a multitude of skills, including physical fitness, movement proficiency, and student character. One of the pivotal aspects of physical fitness for students is their ability to engage in a diverse range of physical activities and sports (Novero et al., 2022).

Physical Education, Sports and Health (PJOK) is an integral component of education that is inextricably linked to other subjects. Its objective is to cultivate a multitude of attributes, including physical fitness, movement abilities, and student character. PJOK confers numerous advantages upon students, such as enhanced health, the development of motor and cognitive abilities, the formation of character, and the expansion of social interaction. Consequently, PJOK must be accorded the same level of attention and priority as other subjects (Supriyadi, 2018). Endurance and power tests and measurements play an essential role in enhancing physical abilities in each individual. Tests and measurements serve a pivotal function in evaluating the capacity of each individual in training, enabling the identification of strengths and weaknesses, thereby facilitating the development of a more targeted and effective training program. They also contribute to expediting an athlete's recovery after training or competition by monitoring progress and preventing injuries. The results of tests and measurements provide guidance for coaches in the creation of training programs that improve athlete performance. These programs focus on areas that need to be corrected or improved, and they are an important instrument in creating effective and safe training programs and improving overall athlete performance (Fenanlampir & Faruq, 2015).

Physical education is an educational discipline that aims to develop human skills through regular physical sports activities, with the objective of achieving educational goals. The incorporation of PJOK subjects is expected to facilitate the achievement of a satisfactory level of physical fitness among students.

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The term "test" is derived from the Latin "testum," which means a clay dish or jar. The term subsequently evolved to encompass the field of psychology, where tests are employed as a methodology for investigating individuals. This investigation is conducted by presenting an individual with a task or problem to be solved (Faiz et al., 2022).

Tes dan pengukuran endurance dan power penting untuk meningkatkan kemampuan melatih. Pengujian ini membantu mengevaluasi kemampuan individu, meningkatkan kapasitas latihan, mempercepat pemulihan, meningkatkan performa, dan mencegah cedera. Hasil tes bermanfaat bagi pelatih dan atlet untuk merancang program latihan yang efektif dan mencapai tujuan pelatihan. Implementasi tes dan pengukuran ini dengan tepat dapat meningkatkan kualitas pelatihan dan prestasi atlet dalam berbagai disiplin olahraga. Pengukuran adalah proses penting dalam mengumpulkan informasi yang objektif dan kuantitatif, seperti jarak, waktu, jumlah, dan ukuran. Data hasil pengukuran dapat diolah secara statistik untuk menghasilkan informasi yang lebih bermakna dan bermanfaat dalam berbagai bidang, seperti sains, teknik, ekonomi, dan ilmu sosial. Pengukuran membantu kita untuk membandingkan, mendeskripsikan, memprediksi, dan mengontrol suatu objek atau fenomena. Manfaat pengukuran antara lain meningkatkan efisiensi, kualitas, pengambilan keputusan, dan akuntabilitas (Narlan & Juniar Dicky Tri, 2020).

The physical condition and performance of athletes are commonly evaluated through the administration of fitness tests. These tests are utilized to monitor and assess the progress of athletes, provide information that can be used to inform

decisions regarding training programs, and enhance athlete motivation (Iqbal Doewes et al., 2023).

The optimal evaluation method is through the administration of tests and measurements to athletes or students. These tests and measurements can be conducted in a variety of ways and at different stages, each of which has its own benefits and objectives (Yusfi et al., 2021).

This research will assist PJOK teachers in comprehending the concepts of endurance and power, as well as the methodologies for their measurement, in order to design effective training programs. The findings of this research are anticipated to be integrated into the extracurricular process at every level of education, through the training of PJOK teachers, the development of training programs, and the monitoring of student progress. The implementation of proper testing procedures can enhance the quality of PJOK learning, facilitate the development of athletes, and enhance the competitiveness of achievements between schools in Sekadau Regency. The necessity for endurance and power testing in Sekadau Regency is evident in order to improve the quality of PJOK learning. This testing enables PJOK teachers to ascertain the abilities and needs of students, improve the quality of training programs, develop the abilities of PJOK teachers, and enhance the competitiveness of achievements between schools. The systematic and sustainable implementation of this testing can bring significant benefits to PJOK learning and student achievement. Education is a complex process with the aim of producing high-quality and competitive human resources. In higher education, there are individual goals of students and the goals of educational institutions. The teaching and learning process must be able to harmonize these two goals. To produce good learning outcomes, the support of internal and external factors from students is needed (Salazar, 2015).

position in the shaping of students' character and health. Consequently, the physical fitness of PJOK teachers is of paramount importance in setting a positive example and optimizing the learning process. In this context, endurance and power are crucial elements that must be measured and developed. This review will

examine the importance of measuring endurance and power in physical education teachers in Sekadau district, as well as discuss the challenges and current concepts in developing fitness programs for physical education teachers. It will be demonstrated that PJOK teachers who have a good level of physical fitness can have a positive impact on student learning. Optimal endurance in PJOK teachers will ensure smoothness and flexibility in performing physical activities that are an integral part of the PJOK curriculum. Concurrently, sufficient power can enhance the teacher's capacity to demonstrate sports techniques in an optimal manner and provide examples that motivate students.

As indicated by (Tomporowski et al., 2008), physical education teachers who possess a high level of physical fitness are more active and more effective in managing the classroom. By enhancing their endurance and power, PE teachers can establish a learning environment that is conducive to students' physical and mental growth and development. Despite the significance of measuring endurance and power in physical education teachers, numerous challenges often arise in doing so. Some teachers may encounter time constraints or a lack of resources that impede regular measurement. Furthermore, traditional measurement methods may not fully capture the diverse circumstances and requirements of PE teachers.

Research conducted by Tomporowski indicates that the implementation of endurance and power measurements in the context of physical education teachers should consider factors such as busy work schedules and variations in initial fitness levels. Measurements that are too burdensome or less appropriate to the context of the work of PJOK teachers can reduce participation and the accuracy of results. The development of effective fitness programs for physical education teachers requires innovative approaches that are appropriate to their work context. A key focus for supporting endurance and power improvements is the development of blended learning models and training programs that can be adapted to the work schedules of physical education teachers (Tomporowski et al., 2011). According to research conducted by Theodosiou, training programs that are integrated into the daily tasks of physical education teachers can increase participation and fitness

measurement outcomes. This approach allows teachers to integrate physical exercise into their routine without placing an additional burden on their time (Theodosiou et al., 2016).

Strength is a crucial indicator of fitness and a fundamental component of athletic performance. It is essential for optimizing performance and endurance in training and competition, as well as for preventing injury. Enhancing strength can confer numerous benefits to an athlete's health and performance, including increased muscle mass, metabolism, bone health, and balance. Systematic and progressive training can facilitate the improvement of an athlete's strength (Juntara, 2019). Strength is defined as the force of muscle contraction produced in a single, maximal effort. In mechanical terms, strength is the force produced by a muscle or group of muscles in a single maximal contraction (Setiawan et al., 2021).

A series of endurance and power tests were conducted with the objective of determining the abilities and needs of PJOK teachers in Sekadau Regency. The test results were utilized to inform the design of appropriate training programs, enhance the quality of PJOK learning, and improve student achievement. This program requires the ongoing implementation and requires the cooperation of various parties. A total of 17 PJOK teachers in Sekadau District participated in endurance and power tests to ascertain their abilities and needs in teaching PJOK. The tests included the plank and beep test for endurance and the medicine ball throw and vertical jump for power. The test results will be analyzed to design appropriate training programs, improve the quality of PJOK learning, and improve student achievement in Sekadau District.

Endurance is the capacity to perform activities continuously over an extended period without significant fatigue. It is a crucial aspect of physical health, stamina, performance, and quality of life. Genetic predisposition, training, diet, and rest are among the factors that influence endurance. Cardiovascular training, strength training, interval training, a healthy diet, and adequate rest are effective methods for improving endurance. Maintaining optimal endurance levels can lead to enhanced performance and a higher quality of life. Endurance is the capacity to

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The plank is a fundamental exercise that effectively engages the core muscles, as well as the arms, shoulders, and thighs. The benefits of the plank include the strengthening of the core muscles, the enhancement of strength and endurance, the burning of calories, the prevention of injuries, and the improvement of sports performance. To perform the plank, maintain a straight body posture, a taut abdominal and buttock musculature, and a normal breathing pattern (Penjakora et al., 2021). The duration of the plank exercise begins at 10 seconds and gradually increases. This exercise is beneficial for both health and performance (Wicaksono, 2021). The objective of plank training is to enhance endurance through isometric exercise, which is a type of static exercise that involves muscle contraction against resistance without any changes in muscle length or joint movement (Yusfi et al., 2021).

The capacity to produce maximum force in a brief period of time is a fundamental aspect of athletic performance. This capacity is particularly crucial in sports that necessitate the execution of explosive movements, such as jumping, sprinting, and hitting a ball. The enhancement of explosive power can be achieved through the implementation of plyometric training, weightlifting, and interval training. Genetic predisposition, training regimen, dietary habits, and the quality and quantity of rest all play a role in the development of explosive power. The maintenance of this capacity is essential for individuals to achieve optimal performance in sports and other physical activities (Aji, 2019). The capacity to generate high levels of force rapidly is a crucial attribute for athletes engaged in high-intensity movements. This capacity is of particular significance in disciplines such as throwing, shot put, jumping, and others. Explosive power can be defined as the ability to produce maximal force in the shortest possible time (Aguss et al., 2021). The determining factors are muscle strength, speed of muscle contraction, and neuromuscular coordination. Athletes with high explosive power can perform faster and stronger movements. Optimal athlete development should pay attention to the development of explosive power through plyometrics, weight and speed training. This can help them achieve optimal performance and compete at the highest level (Puput et al., 2023).

The background and problem identification led to the formulation of the research question: "Is there a significant difference between the results of endurance and power measurements in PJOK teachers in Sekadau District?" This question became the main focus of the study, with the objective of identifying whether there is a significant difference between these two variables.

Tujuan utama penelitian ini adalah untuk mencapai pemahaman lebih mendalam tentang perbandingan antara pengukuran endurance dan power pada guru PJOK. Pada penelitian yang dilakukan oleh Sugiyono menekankan bahwa "tujuan penelitian harus terkait erat dengan kontribusi pengetahuan baru atau pemahaman yang lebih baik terhadap fenomena yang diteliti" (Sugiyono, 2016) This research is expected to make a significant contribution to the development of

PJOK learning, particularly in terms of elucidating the physical condition of PJOK teachers. Research conducted by Arikunto states that “research must provide clear benefits and be applicable in the context of education (Arikunto, 2018). The conceptual framework of this study is based on the view that physical measurements, especially endurance and power, have a significant impact on the level of physical fitness and health of individuals. In a study conducted by Borg and Gall, it was found that "physical measurement is an important first step in designing effective exercise programs". Furthermore, the conceptual framework links the results of the study to the concept of health, as physical fitness has a close correlation with general well-being (Borg et al., 1989). In a study conducted by Sugiono, it was found that an understanding of health encompasses not only the physical aspects but also the mental and social dimensions, which can be reflected in a person's physical condition (Sugiyono, 2016).

RESEARCH METHOD

The objective of this study was to ascertain the distinction between endurance and strength in the context of physical testing. The study involved 17 participants from Sekadau District, comprising 12 males and 5 females. It was conducted under the supervision of Physical Education, Sport and Health (PJOK) teachers. The approach adopted in this study was a quantitative descriptive approach, which permitted a comprehensive understanding of the variability in endurance and strength among participants.

The data collection process for the strength test involved testing three times for each participant. This was done to ensure that the data obtained was consistent and represented the best ability of each individual. From each trial, the highest score is taken and analyzed further. This step is important as it allows for a more accurate picture of each participant's true ability in each of the physical tests performed.

The instrument utilized in this study was based on test data obtained from the administration of various tests to 17 participants. The data analysis technique employed in this study was descriptive analysis, which entailed the calculation of

averages and percentages. The provisions of the target rules utilized in the performance of the physical condition test will be presented in tabel 1 below.

Tabel 1. Test Component Rules

Type Test	Test Item	Gender	Target
Endurance	Beep Tes	M	Min 13
		F	Min 12
	Plank	M	Min 128.5 per second
		F	Min 121 per second
Power	Medicine Ball	M	Min 600 per cm
		F	Min 400 per cm
	Vertical Jump	M	Min 73 cm
		F	Min 50 cm

Data collection for the beep test in the endurance section was conducted on a single occasion due to concerns regarding fatigue among the individuals participating in the test. The beep test, which is a test that measures cardiorespiratory endurance, requires a high level of energy from participants and can cause fatigue rapidly. In the context of this study, performing the beep test more than once in a single testing session could result in a significant decrease in performance.

In the context of this study, performing the beep test more than once during a single testing session could result in a significant decline in performance. Limiting the data collection for the beep test to a single instance was essential to

ensure that the values obtained reflected the individual's maximum performance at that particular moment. This is crucial to minimize any bias that may arise due to performance decrements caused by fatigue. Consequently, the outcomes will more accurately reflect the cardiorespiratory endurance capabilities of each participant in the study group.

The objective of this study is to gain insight into the role of endurance and strength in producing physical test results. The findings may provide a deeper understanding of the differences between endurance and strength, as well as their practical implications for the development of more effective training programs. Therefore, this study has the potential to make a significant contribution to our understanding of the relationship between endurance and strength in the context of physical testing.

RESULT

The results of the data analysis, as determined by the researchers, will be presented in tabular form.

Tabel 2. Endurance Test Result

Type Test	Test Item	Gender	Competent	%	Incompetent	%
Endurance	Beep Tes	M	0	0	12	100
		F	0	0	5	100
	Plank	M	0	0	12	100
		F	0	0	5	100

The results of the analysis indicate that the test participants did not achieve the expected standards, particularly in the power and endurance tests. This suggests the need for increased participation and more satisfactory test results in the future. To address this, potential remedial measures include re-evaluating the

physical training program provided to participants with a focus on improving strength and endurance, increasing health promotion and physical activities, developing a more suitable test schedule, providing motivation and support to participants, reviewing test criteria and standards, involving fitness experts in the programming and evaluation of participants, and considering the use of alternative measurement methods where necessary. It is hoped that implementing these measures will result in increased participation and performance in future power and endurance tests.

Plank testing is an essential component of evaluating core strength, with a particular focus on the strength of the arm, abdominal, and upper back muscles. However, an analysis of the results indicates that none of the participants met the stipulated requirements of the plank test. This suggests a deficiency in the participants' physical preparation, particularly in exercises that strengthen the arm muscles.

A lack of specific training for the arm muscles may be a significant contributing factor to low performance in the plank test. The arm muscles play an essential role in maintaining a stable plank position, so a lack of focus on exercises that engage the arm muscles directly impacts participants' ability to maintain a good plank position. Therefore, greater efforts are needed to integrate more varied and comprehensive exercises, including exercises that strengthen the arm muscles, to improve participants' performance in the plank test in the future.

Tabel 3. Strength Test Results

Type Test	Test Item	Gender	Competent	%	Incompetent	%
Power	Medicine Ball	M	0	0	12	100
		F	4	80	1	20
	Vertical	M	8	66.67	4	33.33

	Jump	F	5	100	0	0

The results presented in Table 1 indicate that the tests conducted were designed to evaluate the endurance and physical strength capabilities of the participants, with a specific focus on endurance and power tests. However, an analysis of the data in the table reveals that none of the male participants met the criteria for the test, while only four out of five female participants did so. This observation suggests a notable discrepancy in the performance of male and female participants in these tests. One potential explanation for this discrepancy is the absence of training programs designed to enhance hand muscle strength.

The hand muscles play a crucial role in the execution of various physical activities, including endurance and power tests. Hand muscle strength is essential for supporting the body and generating the thrust required in various movements. The lack of training that specifically targets the hand muscles may contribute to the suboptimal performance of participants in these tests. Consequently, it is imperative to implement modifications to the physical training program for participants, incorporating exercises that fortify hand muscles to enhance their performance in endurance and power tests in the future.

The vertical jump test yielded significant differences in the results obtained by the participants. This can be attributed to the fact that the average participant is employed as a sports teacher, a profession that necessitates frequent physical exertion. Consequently, the participants exhibited a high degree of familiarity with movements and activities involving leg muscles, such as running, jumping, or performing leg strength training, in their capacity as sports teachers.

Although the vertical jump test directly measures leg muscle strength and power, the physical conditions and regular activities that the participants had in their jobs indirectly contributed to the maintenance and improvement of leg muscle strength. This suggests that a work environment that supports regular physical activity can contribute to better health and physical performance for individuals, even without exercises specifically aimed at strengthening leg

muscles. Therefore, it should be recognized that the job as a PE teacher has significantly benefited the participants' physical performance in the vertical jump test.

The results of this study demonstrated a significant difference in the responses of male and female participants to the medicine ball test. Of the 12 male participants who took the test, none achieved satisfactory results. In contrast, four of the five female participants who took the test achieved satisfactory results, while the other one did not. This discrepancy can be interpreted as an indication that there were factors that influenced the participants' response to the test, including possible differences in strength development, test execution technique, or other variables. One aspect that may play a role is training habits or previous experience in performing the movements associated with the medicine ball test. The women who achieved satisfactory results may have had better previous experience or practice in this regard; however, the one unsuccessful participant suggests that other factors may also influence the results.

The results of this study highlight the importance of considering individual factors and variability in the design and interpretation of test results. They also emphasize the need for more comprehensive evaluations to understand the differences in response to physical exercise between male and female participants. Thus, appropriate steps can be taken in designing an exercise program that suits individual needs and characteristics to achieve optimal results. The results of the vertical jump test showed that the majority of participants managed to achieve appropriate results, indicating a fairly good quality of the overall sample tested. Of the total 17 participants who took the test, 12 were male participants. Of these 12 male participants, 8 achieved the expected score, while 4 did not. In contrast, there were 5 female participants who took the test, and the results showed that all the female participants managed to achieve a score that matched the set criteria. This difference draws attention to the different responses of male and female participants to the vertical jump test. Although a small percentage of male

participants did not achieve the expected results, the overall success rate of the vertical jump test was quite high, particularly among female participants.

The results indicate that the vertical jump test may be more suitable or easier for female participants to achieve than male participants in the given sample. However, further analysis may be required to understand the factors underlying this difference, including aspects such as previous training experience, test execution technique, or physical differences between male and female participants. With these results in mind, appropriate measures can be taken to optimize the execution and interpretation of vertical jump test results in the future.

DISCUSSION

The results of the research indicate that the majority of participants who took the test did not meet the established targets. One of the primary contributing factors is the lack of training in endurance and power among the participants. This lack of training may result in a reduced physical ability to perform well on the tests.

It is important to note that tests requiring endurance and power require adequate preparation and consistent training. A lack of training that focuses on improving physical strength and endurance may result in a participant being unable to cope with such tests. For instance, a lack of strength training may result in decreased performance in power tests such as the vertical jump, while a lack of endurance training may affect results in endurance tests such as the beep test.

In response to this, it is necessary to implement measures that will encourage increased participation and the improvement of the quality of exercise undertaken by participants. This will require the development of more effective and targeted training programs, the promotion of health, and the encouragement of more active physical activity. In addition, it is important to provide support and motivation to participants in order to improve training consistency. By taking these steps, it is expected that participants will be better prepared and able to achieve the targets set in future endurance and power tests.

CONCLUSION

The findings of the research indicate that, despite the completion of the test, the participants remain classified as less. This is due to the participants' lack of engagement in exercises targeting the muscles of the hands and feet. The absence of targeted exercises may compromise the participants' ability to perform activities related to the test, resulting in suboptimal outcomes. Based on the aforementioned research results and conclusions, the following suggestions can be utilized as evaluation material for future improvement:

1. It is expected that instructors will create training programs that include exercises specifically designed to strengthen hand and leg muscles, as well as more diverse and comprehensive exercises designed to improve overall strength and endurance.
2. Regular evaluations of participants' progress during the implementation of the training program are suggested. This provides constructive feedback that helps coaches and teachers improve their performance.

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