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# Training Model Of Coordination For Pencak Silat Athletes Aged 13-16 Years

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**Abstract**

This research was motivated by the lack of coordination of movements in pencak silat athletes aged 13-16 years. The aim of this research is to produce a product and determine the effectiveness of coordination training through a coordination training model for Pencak Silat athletes aged 13-16 years. The research and development model is the ADDIE model. The subjects of this research were pencak silat athletes aged 13-16 years at the Terate Jaya Sasana Club and Batavia Silat Padepokan Pencak Silat Indonesia. This research was conducted from March to June 2024. The results of the research findings using the paired sample t test obtained a t count of 9.277 with a p-value of 0.000 <0.05, meaning that the coordination training model can be applied. Thus, it is concluded that there is a significant difference before and after receiving treatment through the coordination training model to improve coordination for pencak silat athletes aged 13-16 years.

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## INTRODUCTION

Pencak Silat is a branch of martial arts sport which consists of sports achievements and traditions, where for sports achievements there are various kinds of martial arts teachers who are under the auspices of a national organization which is usually called the Indonesian Pencak Silat Association (IPSI). As Pencak Silat develops, it can be used as a tool for spiritual mental development and as self-defense. These elements work together as one unit, cannot be divided, and are interdependent on each other (Kholis, 2016). As a result, every aspect of Pencak Silat is based on elements of pencak silat, sport, art, and mental-spiritual discipline.

Pencak Silat is currently a popular sport and is in great demand by people from all walks of life, which can be seen from the many pencak silat competitions, both from elementary school to university level, or from regional to national level which are held by related parties. This can also be seen from the many developments in the sport of pencak silat to become one of the keys to success in producing reliable athletes in the future. Currently existing pencak silat training in Indonesia is training supported by the government, clubs or pencak silat colleges.

The achievement of high achievements by pencak silat athletes, and being able to optimize each match they participate in, is an achievement resulting from the hard work and effort of pencak silat athletes during training. Therefore, training is an indispensable requirement for every athlete to improve basic movement abilities and improve physical condition for the better. Exercise is very important to help improve your ability to do sports activities. Training also makes it possible to help improve performance, by carrying out exercises that are guided by certain training theories and principles. The training principles that must be considered to produce the best training program are: Overall physical development (multilateral), training specific to the needs of the branch activity (Specialization), developing the athlete's ability/potential/characteristics of the athlete (Individual), Overloading (Sumarno & Imawati, 2023). Apart from that, without doing regular training, it is impossible for athletes to achieve the expected achievements. The main aim and objective of training is to help athletes improve their skills and achievements as much as possible (Harsono, 2017). To achieve this, there are 4 aspects of training that athletes need to pay attention to and train carefully, namely (1) physical training, (2) technical training, (3) tactical training, (4) mental training.

In the pencak silat competition regulations issued by PB. IPSI in 2022 (PB. IPSI, 2023). Pencak Silat consists of two categories, namely the sparring category and the Kick category (Singles, Doubles, Team and Creative Solo). The sparring category is a body contact category which is divided into several classes based on the body weight of each athlete, while the single and team categories are categories that demonstrate moves that have been standardized by PB. IPSI. The only difference is that in the single category, it is shown by individuals, which includes empty hand moves and weapons, while the team category is performed by 3 people with a series of empty hand moves. The Ganda and Solo creative categories are categories of moves that require creativity in creating a series of empty hand moves and weapons and are a characteristic of each pencak silat school. However, what makes it different is that

the doubles category is played by 2 martial artists in pairs. Meanwhile, Creative Solo was performed by 1 martial artist. Pencak silat competitions also have age groupings in their implementation, namely pre-early age group (age ≤ 5 years), early age group 1 (age over 5 to 8 years), early age group 2 (age 8 to 11 years), group Pre-Adolescent age (aged 11 to 14 years), adolescent group (aged 14 to 17 years) and adult category (Kriswanto, 2015).

The development and achievement of pencak silat athletes cannot be separated from mastery of basic techniques and good physical condition. Having good physical condition is the basic capital for learning and training other aspects. Besides that,. Mastering good and perfect basic techniques and having good physical condition will be able to improve the quality of the game. Supporting physical conditions in pencak silat sports include strength, agility, speed, accuracy, flexibility, balance, endurance and coordination (Saifullah et al., 2020). So these two aspects must be met or owned by an athlete in order to overcome problems that occur in the game.

One of the basic biomotor components that needs to be trained since children are 10 years old is the biomotor coordination component. Training coordination is very important for athletes to optimize their performance in the sport of Pencak Silat, both coaching and performance. This is because coordination becomes a biomotor that supports other physical components, and makes it easier to practice techniques and tactics. Because having good basic pencak silat techniques is a requirement to be able to compete in the current development of Pencak silat. Coordination itself is the ability to perform movements with various levels of difficulty quickly and precisely efficiently. Coordination is the ability to combine various movements into one or more specific movement patterns. Coordination is an important physical component for athletes in every sport, including pencak silat. Coordination is closely related to speed, strength, endurance and joint flexibility, and is a very important component for learning and developing techniques and tactics (Irawan, 2019). Pencak silat requires precise and precise movements, both in attack, defense, and in typical movements such as kicks and punches. Good coordination helps athletes to control their body movements accurately and efficiently.

In pencak silat sports, when practicing it is very important to consider age, characteristics, psychology, muscle and physical readiness. Especially in pencak silat athletes aged 13-16 years, who experience significant improvements in their motor coordination. They begin to develop better control over their body movements, but this ability still requires continuous practice to improve. For athletes who master good coordination, it will make it easier for athletes to compete. Athletes will easily carry out the training material provided by the coach, whether it is eye-hand coordination, eye-to-foot, foot-to-hand coordination. So for a coach to create a good training program, he needs to consider this, so that the training given to athletes will not cause negative effects for athletes after training.

The coordination that must be trained in the pencak silat sport in combining movements or techniques includes: (1) stance; (2) tide attitude; (3) step; (4) defense techniques; (5) attack techniques; (6) Attenuation; (7) falling technique; (8) capture technique; (9) slam technique; (10) basic resistance techniques against kickbacks (Lubis & Wardoyo, 2016b). Every pencak silat

athlete must also master these basic techniques to be able to coordinate techniques in pencak silat properly and correctly, of course this requires a training process that must be gone through. Based on the results of surveys and interviews with pencak silat trainers in several pencak silat clubs in the TMII pencak silat hermitage area, the coordination skills of athletes in supporting the sport of pencak silat are still not good. Every movement of the legs and body parts when practicing techniques such as kicking techniques, slamming techniques and attack techniques is still not in harmony, so these movements are not optimal. Another problem is the very limited variety of exercises and also the minimal use of various coordination training tools to train specific coordination in the pencak silat branch for athletes. This results in many athletes not optimizing their coordination abilities. This can be seen when athletes carry out a series of movements or when sparring with partners, they often make movement errors or fail to carry out attacks or defenses because of their own mistakes in combining movements. For example, when performing, they fall because they trip over their own feet and some even sprain them, resulting in injuries during practice.

Pencak silat has many techniques that involve coordination of the hands, feet and body as a whole. Coordination training helps athletes to develop and refine these techniques, allowing them to be more effective and competitive in competition. The role of the coach in providing training material is the key to success in creating athletes who have the basic skills of an athlete. Skills needed for performance, coaches and athletes must support each other in the training process (Purbaningrum & Wulandari, 2021). The trainer will create a training program that suits the target, while the athlete is tasked with completing each training session to the maximum. Therefore, it is important for a trainer to create a model of pencak silat coordination training. Coordination training helps improve movement efficiency, so athletes can perform techniques with less effort and wasted energy.

Biomotor coordination ability is a basic thing that is very necessary in helping to perfect other physical biomotor components, even coordination is a basic component to support training techniques and tactics in Pencak silat. Coordination can also help improve basic Pencak Silat techniques, because currently it requires athletes to have good basic techniques. Coaches also have an important role in helping develop and improve the coordination abilities of the athletes being trained. Based on the problems above, the researcher saw the importance of variations in coordination training in pencak silat skills in athlete development, so the researcher decided to create a Coordination Training Model for Pencak Silat Athletes aged 13-16 years..

The focus of the problem is on the coordination training model for Pencak Silat Athletes aged 13-16 years. So the goals are: 1) Produce a product in the form of a coordination training model for pencak silat athletes aged 13-16 years; and also 2) Testing the effectiveness of implementing the product developed in the form of a coordination training model.

## METHODS

The research approach and method for this coordination training model uses a research and development model with the ADDIE model.

### Participants

The participants in this research were Pencak Silat athletes, members of

the Sasana Terate Jaya Sports Club and members of the Batavia Silat Performance Club, aged 13-16 years, totaling 30 people.

**Sampling Procedures**

The sampling procedure uses Purposive Sampling technique. According to Sugiyono, (2018), purposive sampling is a technique for determining samples with careful consideration to obtain representative results. To get specific results, researchers limited participants by criteria, namely age (13-16 years).

**Materials and Apparatus**

Data collection in research was carried out using research instruments, namely coordination exercises with test instruments. This instrument has been validated by Pencak Silat experts and practitioners as well as Pencak Silat lecturers and has been declared valid so that it can then be applied in the field

**Procedures**

The research and development stage uses the design model that will be used in this research using the ADDIE model This model is one that is used in developing a training model that takes into account the basic stages of research design, which consists of five phases, namely; (a) Analysis, (b) Design, (c) Development, (d) Implementation, (e) Evaluation (Cahyadi, 2019).

**Design or Data Analysis**

The data analysis technique for measuring effectiveness uses the Paired Sample test (Sugiyono, 2017). To determine the effectiveness of the results of coordination training after being given a variety of Pencak Silat coordination training models for Pencak Silat athletes aged 13-16 years

## RESULT

Overall, the purpose of this needs analysis is to determine the level of need for developing a coordination training model for pencak silat athletes aged 13-16 years, and the obstacles and challenges that will be faced in developing this model. Researchers conducted a preliminary study using observation instruments and interviews with coaches and pencak silat athletes aged 13-16 years about training models that have been used or applied during the training process to improve coordination in athletes. Based on the results of the needs analysis, it can be seen that a variety of training models are needed that can be used to improve coordination in athletes, adjusted to the athlete's characteristics, type of training and supporting infrastructure support in the training process. The next step after the needs analysis stage is designing the training model. At this stage the researcher created or designed an initial product of 25 draft variations of coordination training in the form of a series of training model developments which will later be used as a guide, guideline or reference that can be used by coaches and athletes to improve the quality and variety of coordination training.

The next stage after the coordination exercise draft design stage is the development stage. At this stage, we will start to validate the initial draft which will be given to three experts according to their fields, both those who work as pencak silat traning lecturers, and also work as international pencak silat trainers and national licensed physical trainers. Based on the results of expert validation, of the 25 variations of the training model, 20 variations of the model are suitable for implementation, but there are still 5 variations of the model that are worth revising. Because, basically variations of

this model can be done, but there are some changes that need to be made, such as for kicks, right and left variations are made and for attacks, right and left variations are also made. Therefore, the validation results of the three experts in Pencak Silat training totaled 25 variations suitable for use, but with several revisions. From the development stage, the next stage in the ADDIE model is the implementation stage. At this stage, implementation is carried out in two groups, namely a small group for expert validation and a large group for effectiveness testing.

After completing the process of developing several coordination training models for pencak silat athletes, starting from needs analysis, creating model products, a series of expert tests, development, to implementation, the next stage is an effectiveness test to find out whether this model is effective. to be implemented or not. The results of this effectiveness test provide conclusions and answers for researchers whether the model developed is suitable for production and use by pencak silat athletes aged 13-16 years.To measure the effectiveness of the model developed, the researcher used The research design used is one group pre test-post test design. One group pretest-posttest design is a research activity that provides an initial test (pretest) before being given treatment, after being given treatment then giving a final test (posttest) (Sugiyono, 2018). The sample for this study was 30 pencak silat athletes from the Sasana Terate Jaya and Batavia Silat Association from the Indonesian Pencak Silat Padepokan.

Next, for the effectiveness test, it begins with the calculation process with the N-Gain score. From the calculation results, the average value of the N-Gain score is 72.21, which is included in the Effective category. With a minimum N-Gain score (%) of 5.21 and a maximum of 220. Thus, it means that after being given treatment using the Coordination Training model, it is effective in improving the coordination of pencak silat athletes aged 13-16 years. Then, the results of the difference test with the Paired samples t-test obtained the t-score = 9.277, sig. value. (2 tailed) = 0.000 <0.05. This means that there is a significant difference before and after receiving treatment through the coordination training model. Therefore, it can be seen that the coordination training model is effective in improving the coordination of pencak silat athletes aged 13-16 years. Based on these results, it can be concluded that through the coordination training model developed by researchers, it can improve the coordination abilities of pencak silat athletes aged 13-16 years, meaning that the training model developed has significant effectiveness.

## DISCUSSION

Researchers developed a variety of coordination training model products for pencak silat athletes aged 13-16 years with the aim of training athletes' coordination, both hand-eye and ankle-foot coordination. As stated by Bompa, exercise is a systematic sporting activity over a long period of time, increased progressively and individually which leads to the characteristics of human physiological and psychological functions to achieve predetermined targets (T. O. Bompa & Buzzichelli, 2019).

In the training process there is multilateral physical development which is the basic training for success in all sports including badminton. Another explanation is that Matthews dan Foster (2020) state that, training is a systematic and training process that is carried out repeatedly by increasing the amount of

training load and the intensity of the training. Players who develop a strong training base will be able to tolerate sport-specific training activities better and ultimately have greater potential for sports development.

Training is a process of perfecting sports skills that contains theoretical and practical material, using methods and implementation rules with a scientific approach, using planned and organized educational principles, so that training goals can be achieved on time (Ramadhani et al., 2020). Seyfarth, Friedrichs dan Wank (2019) said that the training model is a medium that can clarify an activity concept and has the aim of improving a desired condition, be it physical condition or achievement. so, this training model must be designed well according to the training program you want to achieve.

Developing one's abilities can be interpreted as balanced training between multilateral and specialization (Palma, 2017). The form of an exercise can be carried out if it includes four training classifications, namely 1) learning, 2) repetition, 3) skill perfection, and 4) assessment (T. Bompa & Haff, 2018). Good training is training that is designed systematically by following the characteristics of the athlete's branch, time availability, and the athlete who will be trained (Mariyono et al., 2017). The objectives of training planning are: 1) to stimulate maximum physiological adaptation at specified times during the main competition period; 2) preparing athletes at a complex level of readiness in building skills, biomotor abilities, psychological characteristics, and managing fatigue levels (Lubis & Wardoyo, 2016b). he biomotor component of coordination is needed in almost all competitive sports and competitions, because the basic elements of movement technique in sports involve the synchronization of several abilities. In sports, coordination is needed by a person to combine several movements into one effective and efficient movement pattern. Coordination is the ability to perform movements at various levels of difficulty quickly and precisely efficiently. Almost all sports require coordination" (Abrar & Syahara, 2019). Sukadiyanto, (2016) said "coordination is the ability of muscles to control movement appropriately in order to achieve a specific physical task. Coordination states the harmonious relationship of various factors that occur in a movement.". So, coordination is the ability to carry out movements or work precisely and efficiently.

Coordination is an activity that consists of two or more abilities and movement patterns, such as eye-hand and foot-eye coordination (Rihatno, 2017). By using coordination abilities, a series of movements can be carried out in harmony, synchrony and simultaneously, so that the movements performed appear flexible and supple (Lutfi A. et al., 2021). Thus, coordination is an important movement in learning skill elements, due to the very complete and perfect coordination of biomotor elements which in their implementation consist of several elements that interact with each other.

The higher a person's level of coordination, the easier it will be to learn new and complex techniques and tactics. Bompa said that "Coordination is a complex motor skill necessary for high performance" (Sugawara & Nikaido, 2014). Coordination is an element of physical conditions that is relatively difficult to define precisely because its function is closely related to other elements of physical conditions and is determined by the system's capabilities. The higher a person's level of coordination, the easier it will be to learn new and complex techniques and tactics.

Pencak silat is the result of Indonesian human culture to defend or maintain its existence (independence) and integrity (unity) towards the environment or natural surroundings to achieve harmony in life in order to increase faith and devotion to God Almighty (Wilujeng & Hartoto, 2013). Indonesian pencak silat is a reference for Southeast Asian countries and even the world, but currently Indonesia's achievements in the field of pencak silat are experiencing a decline (Kuswanto, 2016). Pencak Silat does have deep roots in the Indonesian archipelago. As a traditional martial art, Pencak Silat has become an integral part of Malay tribal culture in a broad sense. The residents of the coastal areas of Sumatra Island and the Malacca Peninsula developed distinctive and traditional variations of Pencak Silat.

Pencak Silat is not only a form of physical martial arts, but also reflects the rich cultural aspects of Malay society. In practice, Pencak Silat not only teaches self-defense techniques, but also values such as discipline, respect for tradition, and togetherness in community. Pencak silat is a unity with four forms of single chess as reflected in the trusula weapon on the IPSI symbol, the three ends of which symbolize art, martial arts and sport, and the handle represents mental-spiritual elements (Widiastuti & Fhitriani, 2017). Pencak silat is a means that is able to develop mentally and spiritually, especially to realize noble character and strengthen the soul as a treasure of Indonesian culture which has been proven in aspects of sports and martial arts.

Then, the success of this product becomes a form of effort to improve coordination and of course also supports improving skills. As stated by Lubis and Wardoyo, the requirement that every athlete must have is mastery of pencak silat skills, so that the athlete can perform well. The pencak silat skills are stance, stance, step patterns, defense, dodge, hand attack, foot attack, sweep, knee, cut and catch (Lubis & Wardoyo, 2016a).

This research also shows the results that there is an increase in coordination for pencak silat athletes aged 13-16 years after implementing the coordination training model for pencak silat athletes developed by researchers. This is supported by the statement Widiastuti, (2014) that movement skills are the ability to carry out movements efficiently as well as a manifestation of the quality of coordination and control over the parts of the body involved in the movement. In line with the opinion of Ruzaman, (2018), movement skills are a manifestation the quality of coordination and control over the parts of the body involved in movement. Movement skills are acquired through a learning process, namely by understanding movements and doing them repeatedly.

The results of previous research also show that the training model is an approach that is designed in a structured manner and implemented in stages, so that the delivery of knowledge or knowledge becomes effective and efficient (Mirawati & Royani, 2019). In accordance with the training model developed by researchers, the aim is to help pencak silat athletes aged 13-16 years carry out coordination movements that support improving basic Pencak Silat technical skills, by carrying out coordination exercises effectively and efficiently.

After carrying out expert validation and testing the effectiveness of the model, from these results it can be seen that the coordination training model for pencak silat athletes developed in this research can be effectively used in Pencak Silat training. The results of the product that researchers have created, namely a coordination training model for

pencak silat athletes for pencak silat athletes aged 13-16 years, have several advantages and disadvantages in this product.

## CONCLUSION

Based on the results of the analysis, it can be concluded that the Pencak Silat coordination training model can be applied and is feasible to be used effectively. Thus, Pencak Silat athletes aged 13-16 years who have poor coordination can apply Pencak Silat coordination exercises to improve the athlete's coordination.

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