6 (3) (2017) 197 - 202

Journal of Physical Education, Sport, Health and Recreations

http://journal.unnes.ac.id/sju/index.php/peshr

The Development of "Drilling" Machine For Sepak Takraw Practice

Isnaini Nurul Hidayah[1]✉, Bambang Priyono[2]

Department of Health Physical Education and Recreation, Sport Science Faculty, Universitas Negeri Semarang, Indonesia[12]

Article History

Received 15 September 2017
Accepted 26 September 2017
Published Oktober 2017

Keywords:
Pelontar; Sepak Takraw; Drilling; Development

Abstract

This study aimed at finding the effect of ladder drill training upon: (1) run speed, (2) agility, and (2) power of leg muscle. This study is an experimental research. This study utilized one group pre test-post test design. There were total people as the subject of this research. Data collection technique used 30-meter sprint test to measure run speed, Illinois agility test to measure agility, and vertical jump test to measure power of leg muscle. Data analysis technique which was used for normality test, homogeneity test/F-test, and T-test with significant level 5% by using SPSS 16.0.0. Based on the finding, there was effect of ladder drill training upon run speed with sig value=0.007, agility and power of leg muscle with sig value=0.000. Based on the data analysis, it could be concluded that there was significant effect of ladder drill training upon run speed, agility and power of leg muscle.

How to Cite

Hidayah, I. N., Priyono, B., Santosa, I., (2017). The Development of "Drilling" Machine For Sepak Takraw Practice. *Journal of Physical Education, Sport, Health and Recreation,* 6(3), 197-202.

✉ **Correspondence address :**
Dk. Kuniran, RT 06, RW 02 Jatilawang, Wonosegoro, Boyolali District, 57382 Central Java
E-mail: indahfitri195@gmail.com

p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

Sepak Takraw is a game that uses a ball from rattan. The rattan ball is kicked from foot to foot, feeding the comrades and hitting or turning off the ball on the opponent's field. So the idea of Sepak Takraw is making the ball falling down on the opponent's field and try or make sure the ball does not fall down on our field. (Darwis, 1992)

Across the country in Southeast Asia, the ball used in Sepak Takraw was originally made of hand-woven rattan, a material easily accessible in a hand-embroidered area, a highly accessible material in the region. Generally, the ball has a diameter of 5 inches and is mostly played by the villagers by the way they stand in a circle and bump each other. Historians mentioned that the use of rattan balls was first about 500 years ago. However, due to reduced rattan, new regulations were set to protect the presence of rattan. In addition, rattan balls are also more easily damaged and broken in the game nets. Then comes a synthetic ball in the same shape as a rattan ball and is still woven with a hand. (Engel, 2010)

The development of Sepak Takraw in Semarang is now increasing, this is due to the increasing number of achievements of Sepak Takraw in Semarang. The unity of Sepak Takraw is a place or means to develop the ability of an athlete of Sepak Takraw. Such as Association of Sepak Takraw "PPLOP" Central Java Province and the Student Activity Unit Sepak Takraw University of Semarang which makes it easier to improve the skills and techniques of players. To get good skills, from the beginning the athlete has been given basic engineering training, so that with the basic techniques that the player will be able to develop the next skills of Sepak Takraw.

To be able to play Sepak Takraw well, then the athlete must have the ability and good skills. A very important and very necessary ability is the basic ability in Sepak Takraw. The ability is kicked by using the legs, playing the ball with the head, playing the ball with the chest, playing the ball with the thighs, playing the ball with the shoulder. The basic competence of one another is an inseparable unity. Without mastering basic skills or basic techniques, Sepak Takraw cannot be played well. Basic techniques can be mastered well when the basic techniques are learned and trained properly and continuously. (Darwis, 1992). Effect of single leg push off exercise on the result of power of foot at the athlete of sepak takraw daughter of Central Java. This gives the idea that the single leg push off exercise can increase power, where the power in the legs at tekong measured by the speed of a tight ball obtained athletes sepak takraw daughter of Central Java while serving. Football basic technique movement takraw dominated in the form of football takraw done with one foot, then the foot of the pound should have sufficient muscle strength to maintain the balance. Of course, not just one leg is trained (

The development of techniques in sepak takraw has been widely developed in accordance with the variations of exercise. Drills practice method is a variety of exercises done by individuals or groups for the development of techniques in accordance with what is to be achieved. The importance of the drills exercises model is also presented by Harsono (1998). He stated that each exercise should contain useful drills and clear directions and objectives.

The drills exercise model is a varied, patterned, systematic and continuous pattern of specialized training for skills development. Hanif (2015) submitted to improve the basic skills of the receiver of the ball, first needed drill exercise. The form of drill exercise is repetitive motion repetition, where the intensity of the athlete in moving becomes increasingly increasing, and is expected to be able to be directed to form the basic attitude of the athlete in motion. In addition, this exercise can also automate the motion of athletes, and will thoroughly improve the quality when attacking the opponent.

There are still many trainers who train athletes using drilling methods using hand throws, re-throw using tennis racquets, and re-throw using wooden rackets. To create an achievement athlete required intensive training, the success of the drilling exercise should also be supported by various factors, such as infrastructure facilities, this is because the trainer must follow the increasingly sophisticated technological developments. Therefore, the absence of machines in the exercise becomes one of the factors lack of facilities and infrastructure in drilling practice.

Observations made on March 16, 2017, at "PPLOP" Sepak Takraw of Central Java obtained the result that drilling exercises still use hand throws, punches using tennis racquets, and punches using a racket made of wood. Burhan Basyiruddin, one of the graduate students at Universitas Negeri Jakarta, tried to create a football launcher for Sepak Takraw. He has created a machine in the training process for trainers. Based on these considerations, the authors want to develop a model that provides convenience for trainers in training drilling Sepak Takraw. This machine will be developed in the form of ball launcher machi-

ne with a speed of one second per four meters and is equipped with the direction of the ball that can be adjusted in the direction of the player, the ball out automatically using the button, the price is economical and can be taken anywhere without the load is too heavy and high size.

The machines used in doing drilling exercises, currently, still use the trainer power and require more energy. According to the trainer, this machine can be a new innovation and is needed to facilitate the trainer in doing drilling exercises. This machine is also expected to streamline the practice time.

The problem is How to design Product Development of Drilling Machine In Sepak Takraw Training?. The purpose of this research is to develop the Drilling Machine In Sepak Takraw Training.

METHODS

The research design used is a research-based development model (Research and Development). According Sugiyono (2010) research and development model is the research used to produce a specific product and test the effectiveness of the product.

The test subjects classified the subjects of trials into three, among others (1) sepak takraw experts, among others, Sepak Takraw coach of Central Java who plays a role to determine whether the product of this development is appropriate material and truth. (2) electro expert.

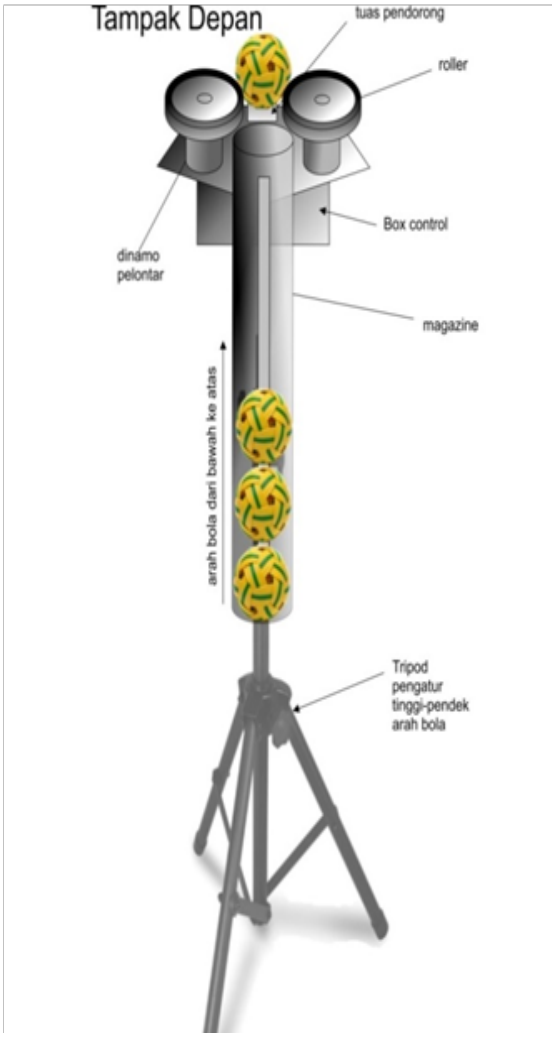
Validation is done by using a questionnaire about the design of Electro circuit machines and the effectiveness of the machine. The last one is the engine expert. Validation is done by using a questionnaire about the design of machine circuit machines and the effectiveness of the machine. In the experiment of the research, the subject product was 6 athletes of Student Activity Unit of Sepak Takraw Faculty of Sports Science, Universitas Negeri Semarang, while the trial use of this research is 15 athletes in "PPLOP" Central Java.

The data collection techniques in this study were Observation, Interview, Documentation, and Expert Validation. Data analysis used qualitative approach and model development method.

The product developed is a drilling machine in Sepak Takraw practice in the form of a ball throwing machine. This drilling machine aims to simplify the role of trainers in drilling exercises as a substitute for the ball throwers that have been done manually by the coach, either using a racket or hand throw. This ball launcher machine can also facilitate and ease the trainer in drilling drills.

This ball-throwing machine uses a dynamo to launch the ball, it also consists of a ball storage container that can be filled with 6 balls and can be set the speed, the direction, and the launcher also connect to electricity. This ball-throwing machine is also equipped with the frequency control of the number of balls that come out from the machine in every second and can adjust the ball to the desired player.

This drilling machine is a ball thrower machine that is made to simplify and help the trainer to train drilling in Sepak Takraw. During this time, coaches still use hand throws, throws using tennis racquets, and throws using specially designed wooden rackets. The design of products made are as follows **picture 1**:



Picture 1. Machine Design

The development of this ball-launcher machine is the development of science and technology conducted in the field of sports to facilitate

the trainer during drilling exercise for athletes. Drilling exercises generally use tennis rackets and hand throws. This time the researchers made the development of the ball launcher machine that automatically works if pressed the button will release the ball with an average speed of 4 MPs.

The development of this thrower machine is equipped with switches and red and yellow LED lights as the setting out the ball automatically. If the switch is touched by an iron ring associated with the chain, then the ball automatically comes out one by one.

The product developed is a ball launcher for sepak takraw. The machine designed specifically to launch the ball automatically by pressing the button installed in the pipe.

RESULT AND DISSCUSION

This small-scale trial was conducted at Student Activity Unit Sepak Takraw Faculty of Sports Science, Universitas Negeri Semarang with respondents 6 athletes and aims to identify and identify various problems such as weakness, deficiency, or product effectiveness when used for measurement. Data obtained from these trials are used as a basis for revising the product before it is used in field trials. The data obtained from the questionnaires by experts is a preliminary data to indicate whether the development product can be used for drilling practice on sepak takraw. Data obtained from the interviews conducted by the researcher to the respondent or the trial subjects were used to evaluate the product before it was used in a large-scale trial. **The table 1** details of the results of a small-scale test interview on athletes are as follows:

Table 1. Rincian hasil wawancara

Content	Interview Results					
	1	2	3	4	5	6
Safety	V	V	V	V	V	V
Comfortability	V	V	V	V	V	V
Speed	V	V	V	V	V	V
Drilling Practice	V	V	V	V	V	V
Usefulness to play	V	V	V	V	V	V
Usefulness to practice	V	V	V	V	V	V

The results obtained by researchers in small-scale trials 1 are as follows. A total of 6 athletes stated:

1. The product is not safe to use for beginner player training
2. Uncomfortable product used for beginner player training
3. The product does not fit the needs of athletes related to the speed of bursting the ball
4. The product can not be used as drilling practice
5. The product can not be used for training
6. The product can not be used for further training

Small-scale trials II were conducted with the same respondents and the same number of 6 athletes.

The results obtained by researchers in small-scale trials II are as follows. A total of 6 athletes stated:

1. The product is safe to use for beginner player training
2. The product is comfortable to use for beginner player training
3. The product is in accordance with the needs of athletes related to the speed of the ball
4. Products can be used as drilling exercises
5. The product can be used for exercise
6. The product can be used for further practice.

A large-scale trial was conducted at PPLOP sepak takraw Central Java with a total of 15 athletes, along with details of interviews on large-scale trials. A total of 15 athletes stated:

1. The product is safe to use for beginner player training
2. The product is comfortable to use for beginner player training
3. The product is in accordance with the needs of athletes related to the speed of the ball
4. Products can be used as drilling exercises
5. The product can be used for exercise
6. The product can be used for further practice.

Research development is done by sharing the stages. The research started from the initial product validation of product trial that is a small-scale test and big scale so that mass-produced product where the product can be used its usefulness, the researcher involves three validators with their respective expertise ie electro expert, engineer, and sepak takraw expert. Small-scale trials were conducted at Student Activity Unit sepak takraw FIK UNNES (Universitas Negeri Semarang) and large-scale test conducted at PPLOP sepak takraw Central Java. Validation of the product is

done by using questionnaire instrument to know how far this tool is said to be worthy to be tested. Questionnaires used in the research process as product validation data and effectiveness test. At the same time, other checks such as documentation, interviews, and discussion of more than one source, in the same way, are observed and expert experts. For assessment using the appraisal that has been developed the deputy of Implementation of Science and Technology Science, Ministry of Youth and Sports of the Republic of Indonesia in 2011. Expert assessment results sepak takraw with a score of 78, experts electro with a score of 77, engineers with a score of 91, each expert obtained a score above 77 that enter the good and appropriate criteria.

The results of the study based on the analysis of data description of trials conducted in Semarang. For the effectiveness of the tool then the tool is tested its effectiveness by using observation, interview, documentation, and discussion. Researchers create a new innovation in the form of the development of ball throwing tool. In the initial design, the researchers focused on the criteria that have been used by the Ministry of Youth and Sports in the selection and research for the participants of innovative sports technology competition in 2017. Before being tested on a small scale, the development of drilling tools in sepak takraw practice first need to be validated by expert experts in accordance with this field of research. To validate the resulting product, the researcher involves the experts consisting of 1 coach of sepak takraw Central Java, namely Bambang Edy, M.Pd., Engineer, Drs. Supraptono, and Electrical experts, namely Tatyantoro Andrasto, S.T., M.T

Validation is done by the expert team by observing drilling tool development product in sepak takraw practice when doing drilling along with evaluation sheet along with suggestion and input sheet. The evaluation sheet is a questionnaire that contains aspects of product quality. The suggestion sheet is used as a revision as well as input is given to the researcher regarding the developed tool

The evaluation result is the value of product quality aspect of the development of drilling tool in sepak takraw practice using the scoring range of 100 (1-10 scale). Questionnaire evaluation sheet for drilling tool development in sepak takraw practice

The data obtained from the evaluation sheet or questionnaire by the experts is the determination of the next step in developing the drilling tool in the sepak takraw practice in order to be used for small-scale trials and field trials (large-scale trials). The following is the result of filling out evaluation sheets from sepak takraw experts, engineers, and electro-experts.

Revise the initial draft of the product, based on the advice of an expert on the development of the athlete's endurance sensor when kicking, the product revision is made with the following details:

1. The machine can be used, but RPM must be added to get the ball out faster;
2. Added ball charge

The effectiveness of this product is based on the results of large-scale trials. The effectiveness of the product includes the effectiveness for the measurement and effectiveness of automatic production.

At the time of discussion to implement the development of drilling tools in sepak takraw that have been considered final, the researchers present the experts. This activity aims to convey the development outcomes (the process of procedure and production) to the users and professionals through discussion to know the extent to which research success is achieved.

Based on the steps of research and development to produce a product that has been done, then obtained the final product in the form of a ball-launcher machine for sepak takraw. This development product can be used for drilling practice on sepak takraw.

The indicator of the success of this product was in the form of analysis from observation result, interview, documentation, and discussion with the expert team that is sepak takraw expert, engineer, and electro. According to product trial that has been done got the result that product development of drilling tool in sepak takraw can and effective use for exercise. The results of large-scale trials showed that the product is working properly, athletes and trainers can also see the results of measurements made.

This research was a research of the development of drilling tool in sepak takraw which was structured according to the stages that have been determined.

CONCLUSION

Based on the results of the analysis and discussion, the conclusion that can be drawn from this research is to produce a ball-launcher machine for sepak takraw that can be used for training. Seeing the limitations of this product, it can be further developed for the athlete's endu-

rance gauge product when kicking to fit as.

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