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EFFECTIVENESS OF DRYLAND TRAINING MODELS ON FREE STYLE SWIMMING FOR STRENGTH OF MUSCLE MUSCLE USING MODIFICATION OF ROWING TOOLS "FOR CHILDREN AGED 13-15 YEARS

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Abstract

This study aims to make variations of exercise or physical activity using a modification of rowing equipment. Data collection was carried out in June 2019 which took place in the Nirwana Swimming Pool in Bogor District, and the yon zikon 13 of Lenteng Agung. This research method used research and development methods (Borg and Gall), compared 40 people from Pyramid S.C. athletes. The research process is preceded by observation and interviews. Taking the test is preceded by a pre-test that is taking 50m freestyle swimming time, then athletes are given assistance doing programmed physical activity using a modified paddle device, then Post-test takes 50m freestyle swimming time. The technique of collecting data before and after doing physical activity Then completed and analyzed using SPSS. T test results showed a significant effect on increasing swimming 50 m after physical activity using the dryland rowing exercise model. Pretest-post-test results with an average value of 1.05 and a control group with an average value of 0.17, this difference is the average value of increasing the speed of test results in groups. Selection of the mean results of the different values of the experimental group and the control group or the average difference = 0.120 t-count = 1.049, df = 18, with p-value = 0.000 <0.05, it can be concluded that it is related to significant research between groups experiments and control groups, which means they have the "Effective" interpretation category. The importance of a significant difference in the dryland rowing exercise model in the freestyle before and now being given the freedom to use a modified rowing device, is undeniably the training model developed to increase the swimming speed of 50 m.

Keywords: Dryland rowing exercise model, Exercise Variations, Freestyle Swimming.

Swimming is a sport that is done in water and the sport is not the same as everyday life. This sport has four styles namely freestyle (crawl), breaststroke (breast stroke), backstroke (back stroke), freestyle (butterfly) (Soejoko, 2003: 48). Achieving high performance requires a systematic process of training that continues and must begin at an early age. If swimming training begins at an early age, then later in the golden ages can show high achievement. This all depends on the coaches, coaches, and parents as supporters. Excellent physical condition is preferred, because to achieve perfect speed will be easier, for example to practice arm movement techniques.

Strength training has the potential to develop muscle strength in dynamic conditions. Power represents the ability to move at high speed or the possibility of exerting high strength in a short time. Strength and speed are the main factors that determine a swimmer's performance. Scientists and trainers agree that the training should include ground and water training sessions. Strength and endurance training in Indonesia swimming takes place both on land and in water. (Trapper & Pearson, 2004). Exercises to increase maximum muscle strength and maximum aerobic endurance capacity are an important element in increasing competitive swimming performance. Several studies have examined the effects of maximum strength or strength-related training. (Girold, 2006).

In the sport of swimming, to be able to achieve high performance must be supported by a variety of conditions both technical and non-technical. The physical component is one of the technical conditions that is very influential in addition to other factors. Related to this M. Sajoto (2005: 8-10) outlines the physical components that must be owned and developed in order to achieve optimal performance are strength, endurance, muscle power, speed, flexibility, agility, coordination, balance, and reaction.

Soejoko (2002: 3) also revealed that there are three main groups of elements of physical condition needed to be able to do a good performance, namely strength, endurance, and flexibility. Strength can be used to increase capabilities and synchronize the shooting of their motor units (Robert U. Newton: 2002). Sajoto (2005: 117) says that in order to improve strength training in general we must pay attention to the shape and contraction of muscles. Muscle contractions are usually divided into four basic forms, namely isotonic, isometric, ecentric, and isokinetic. To support the function of body movements while swimming, it requires strength that refers to the entire muscular system. This strength is the basis for achieving maximum performance. To get the maximum swimming speed results, of course, arm strength and also from all muscle groups that support swimming. Of the many muscle groups that play a role in the most dominant swimming movement, namely the muscles of the arms, shoulders, abdomen and legs. To get a good physical fitness condition is inseparable from the systematic training methods. Factors that influence an athlete's increased achievement and skill are exercises that are carried out repeatedly, with more and more days increasing the amount of training load and intensity of training (Harsono, 2014: 100).

The aim of the exercise is to help athletes improve their skills, and psychological qualities to improve their performance in competition. Exercise is defined as systematic participation, in that the exercise aims to increase physical functional capacity and endurance of the exercise. Training must be guided by the correct theory and training principles, so that the expected sports performance can be achieved. (Pate, Rotella, and McLenaghan 2007: 317). Some physical components that need to be considered to be developed are, cardiovascular endurance, muscle endurance, muscle strength (strength), flexibility (speed), speed, stamina, agility (agility), power "These components are the main components that must be trained and developed by athletes in general - in fostering achievement (Harsono, 2014: 100).

In fostering swimming sports achievements there are also exercises performed on land, generally these exercises are called dryland training, psychological conditions of athletes also greatly affect the improvement of physical skills, and exercise models that are not varied can cause a sense of saturation. Therefore we need an exercise that has a variety of movements and can improve physical skills significantly. Speed is the ability to travel the distance in the shortest possible time (M.Sajoto, 2006: 54). In freestyle swimming speed is inseparable, where the speed of the alternating paddles of the arms, so the speed of the punch of both legs is a special speed that must be trained to become an absolute skill in freestyle swimming.

Good and systematic physical exercise will benefit the human organ system, including benefits in the aspect of the central nervous system, increasing conduction of nerve impulses, accelerating movement time and reaction time, increasing strength and maximum speed, increasing muscle fiber function, increasing synthesis protein for muscle development, and increasing muscle mass (Zumerchik, 2010: 593). In the world of education in large countries, training and education have left the old ways which are less efficient and less effective. With the help of technology we can start training with the help of technology which has changed the latest ways to train and be more efficient.

In swimming, speed is one of the athletes' successes reaching the least amount of time and being able to reach the distance traveled. Athletes must have plenty of time to practice continuously. In addition to water, athletes must also have ground training. Ground training is as important as training in water. To be able to have good arm strength, the trainer must provide a stimulus in the form of good arm strength training, which is most often used to train arm strength in general is push up and pull up exercises. Strength training aims to train the ability of a muscle to work with maximum load.

One of the factors that can be used as a benchmark for the achievement of success in swimming in the future is the achievement of beginner swimmers. Beginner swimmers are early age swimmers or swimmers age 13-15 years. The training of beginner swimming athletes is very important to support the career of a swimming athlete, because at that age a child's motor skills can be formed through various exercises needed in his sport branches so as to make the basic motion he has become better. To improve swimming sports achievements, intensive training is needed. The training includes physical, technical, tactic, and mental factors. During this time in the exercise given more towards technical training, physical factors are considered to have been represented at the time of training.

Physical condition training plays a very important role in terms of improving the quality and quality of athletes, especially when they are about to enter the race. The term physical condition refers to an exercise program that is carried out systematically, planned, and progressively. The goal is clear, namely to improve the functional abilities of the whole system, the body's muscle tissue, thereby increasing the athlete's performance and performance. The training program must be arranged carefully, carried out with care and discipline. Athletes who have good physical condition and prima, will significantly more quickly master the movements being trained, because some movements that are trained including techniques, tactics and psychomotor will be more capable done to the maximum. This means that even a few movement techniques that are repeated a few dozen times, they will not easily experience fatigue.

To be able to have good arm strength, the trainer must provide a stimulus in the form of good and true arm strength training, which is most often used to train arm strength in general is push up and pull up exercises. Strength training aims to train the ability of a muscle to work with maximum load. By doing this exercise it is desirable that an athlete will be able to overcome obstacles in water. To train physical athletes of children aged 13-15 years, especially the strength of freestyle arms, the model and the media used are not the same as adult athletes. Athletes aged 13-15 years should not be given an exercise that uses weights that far exceed their body weight. Media that is suitable for athletes training models aged 13-15 years can also affect the achievement of athletes in the future. Strength training methods that are deemed appropriate for exercising the freestyle arm of children aged 13-15 years namely by the method of ground training using a modification tool Rowing tool because it is in accordance with the function of muscle movement when swimming.

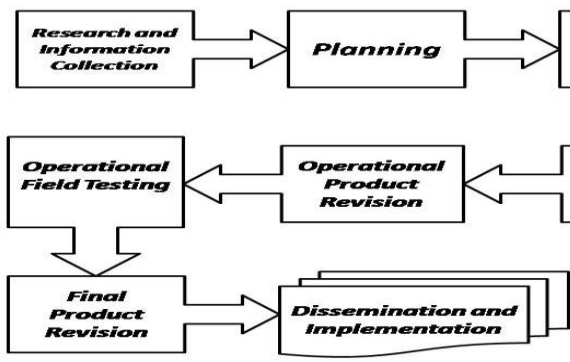
Based on the description the researchers intend to make a "Dryland exercise model in freestyle swimming for arm muscle strength using a modified Rowing tool" for children aged 13-15 years ". Based on my observations as a researcher, I see that in swimming exercises too focused with exercise in water. Because in addition to training in water, athletes must also be followed by training on land (dryland training), because training on land also has a big hand in the physicality of an athlete swimming. Early age athletes or children aged 13-15 years must have proper training, not just give any training which is the same as adult athletes, including physical training. The focus of the research problem needs to be limited to the model of ground training using modified Rowing tools for freestyle arm strength in the age of 13-15 years old swimming.

METHOD

The research model of this exercise uses the Research and Development model of Borg and Gall which consists of ten steps in research which include:

Figure 3.1 Flow Chart Development Model of Borg and Gall

Source: Borg and Gall (Sugiyono), "Educational Research Methods, Quantitative Approaches,



Qualitative, and R&D," (Bandung: Alfabeta, 2011)

The research steps that will be undertaken are the development of models developed by Borg and Gall including:

1. The first thing that is determined is an idea that will be developed, R&D can depart from the potential problems that exist in the surrounding environment, in this case the problem obtained by researchers is the lack of dryland training models in freestyle swimming training.
2. Gathering information; after the potentials and problems can be demonstrated factually, then it is necessary to gather various information that can be used as material for planning. Field surveys are a way for researchers to gather information, information that can be obtained through trainers or through athletes.
3. Product design is the result of a series of preliminary studies, which in this study is a freestyle dryland swimming exercise model.
4. Design validation is the process of assessing a training model that will be assessed by experts
5. Improved design after revision and known weaknesses
6. Limited product trials by practicing the training model on Pyramid S.C athletes
7. Revision of product returns based on limited field test results
8. Trial use under actual conditions using athletes that are different from limited product trials.
9. Revision of the product again if found deficiencies in actual conditions
10. Manufacture of mass products after repair or revision.

RESULTS

a. First Stage Results / Small Group Trials

The dryland exercise model uses a modification of the rowing tool that the researcher made after being evaluated by an expert, then underwent a revision of stage I. The data obtained was used as a basis for revising the next first stage, namely the phase II trial. The following is a summary of the first stage revisions based on evaluation and advice from experts.

Table 4 Results of Revisions from Experts on Dryland Exercise Models

No	Balance Model	Suggestions and Feedback
1	Dryland exercise model 1	It can be applied because it can be done

2	Dryland exercise model 2	It can be applied because it can be done
3	Dryland exercise model 3	It can be applied because it can be done
4	Dryland exercise model 4	It can be applied because it can be done
5	Dryland exercise model 5	It can be applied because it can be done
6	Dryland exercise model 6	It can be applied because it can be done
7	Dryland exercise model 7	It can be applied because it can be done

Based on the evaluation of small group trials conducted by researchers can be concluded as follows:

1. Exercise can be done and applied, but the training load must be adjusted so that the ability of the athlete's arm muscles can increase.
2. When practicing athletes tend not to match the movements that should be done, the trainer must provide direction so that athletes do their job correctly so that the desired movement is in accordance with the movements in the water and according to the expected results.

Second stage results / large group trial

After the results of the product development of the dryland exercise model have been tested on a small scale and have been revised, the next step is to conduct a large group trial. Based on the results of limited trials (small group trials) that have been evaluated by experts, the researchers then revised the initial product and obtained 7 models of freestyle Dryland swimming for athletes aged 13-15 years to be used in large group trials. The next step after the model underwent a phase II revision from the experts then proceed with testing the product trial to a large group using 30 research subjects. Assessment data from 30 participants on the effectiveness of the Dryland exercise model are shown in the following table:

Table 5 Results of the experimental group swimming levels (Pre Test) - (Post Test)

Name	**Pre Test**	**Post Test**
X1	**35,05**	**34,08**
X2	**35,25**	**34,28**
X3	**35,83**	**34,86**
X4	**35,55**	**34,58**
X5	**35,02**	**34,05**
X6	**35,84**	**34,87**
X7	**35,55**	**34,58**
X8	**36,02**	**35,05**
X9	**35,90**	**34,93**
X10	**35,57**	**34,60**
X11	**35,38**	**34,41**
X12	**36,11**	**35,14**
X13	**34,20**	**33,23**
X14	**36,26**	**35,29**
X15	**36,43**	**35,46**
X16	**37,03**	**36,06**
X17	**35,60**	**34,63**
X18	**35,78**	**34,81**

X19	**35,94**	**34,97**
X20	**36,28**	**35,31**
X21	**37,44**	**36,47**
X22	**36,55**	**35,58**
X23	**34,22**	**33,25**
X24	**36,88**	**35,91**
X25	**35,77**	**34,80**
X26	**36,88**	**35,91**
X27	**36,43**	**35,46**
X28	**36,21**	**35,24**
X29	**35,66**	**34,69**
X30	**34,65**	**33,68**
JUMLAH **Rata-rata**	**1075,28** **35,84**	**1046,18** **34,87**

Based on the description of the table above there is a difference between the Pre Test results and the Post Test results obtained by large group trials that were previously carried out Pre Test or initial tests and Post Tests conducted on athletes aged 13-15 years, before the application of the freestyle dryland swimming exercise model for athletes aged 13-15 years applied to athletes, researchers conducted a Pre Test or initial test to determine the level of 50 meter freestyle swimming ability by the subject to be studied, from the pre test results obtained the number of 50 meters freestyle swimming ability was 1075, 28 After that the treatment is given to athletes by using the dryland training model using a modified rowing device. After the treatment is given, the subject is tested again with the same test as the 50 meter freestyle swimming ability test, this test is called the Post Test which is used to find out whether there is an increase in the ability to swim athletes after the treatment in the form of a dryland exercise model using a modified rowing tool. a figure of 1046.18. Based on this information it can be said that the freestyle dryland swimming model for athletes aged 13-15 years is developed effectively and can improve the ability to swim athletes. Here is a comparison of the results of the 50 meter freestyle swimming athletes before giving treatment and after giving treatment using a modified rowing tool with a bar chart:

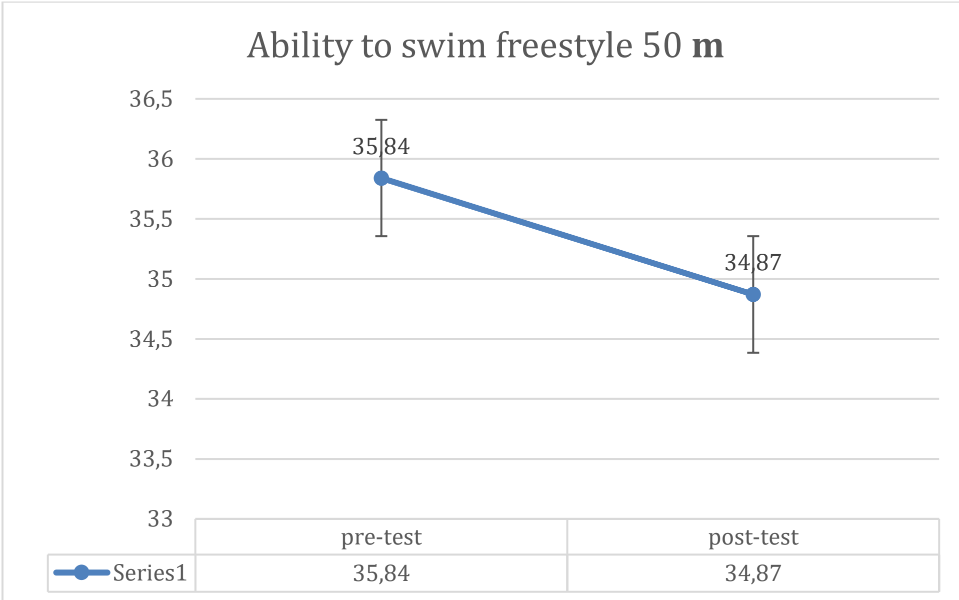


Figure 4.6 Bar diagram (Experimental Group Trial)

The results of small group trials and large group trials can be concluded that the Dryland swimming freestyle exercise model for athletes aged 13-15 years can be used in the process of increasing arm muscle strength for athletes 13-15 years old as well as feasible and effective for increasing the swimming abilities of athletes.

Table 6 Results of Frequencies Test for swimming ability 50 meters

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	@pretest	34.37	60	1.262	.163
	@postest	1.50	60	.504	.065

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	@pretest & @postest	60	-.799	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	Upper			
Pair 1	@pretest - @postest	32.867	1.692	.218	32.430	33.304	150.453	59	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	Upper			
Pair 1	Data_Prestest - Data_Posttest	.03900	.06060	.01355	.01064	.06736	2.878	19	.010

In a significant test the difference with SPSS 16 can be t-test = 2,878, df = 19 and p-value = 0.00 <0.05 which means that there are significant differences in the dryland training model before and after being given the dryland exercise model using a modified rowing tool. Based on this information it can be said that the dryland exercise model developed is effective and can improve swimming abilities.

Table 7 Results of control group swimming levels (Pre Test) - (Post Test)

Name	**Pre Test**	**Post Test**
X1	35,05	**34,90**
X2	35,25	**35,10**
X3	35,83	**35,68**
X4	35,55	**35,40**
X5	35,02	**34,87**
X6	35,84	**35,69**
X7	35,55	**35,40**
X8	36,02	**35,87**
X9	35,90	**35,75**
X10	35,57	**35,42**
X11	35,38	**35,23**
X12	36,11	**35,96**
X13	34,20	**34,05**
X14	36,26	**36,11**
X15	36,43	**36,28**
X16	37,03	**36,88**
X17	35,60	**35,45**
X18	35,78	**35,63**
X19	35,94	**35,79**

X20	36,28	**36,13**
X21	37,44	**37,29**
X22	36,55	**36,40**
X23	34,22	**34,07**
X24	36,88	**36,73**
X25	35,77	**35,62**
X26	36,88	**36,73**
X27	36,43	**36,28**
X28	36,21	**36,06**
X29	35,66	**35,51**
X30	34,65	**34,50**
JUMLAH	**1075,28**	**1070,78**
Rata-rata	**35,84**	**35,69**

Based on the information in the table above, there is a difference between the Pre Test results and the Post Test results obtained by large group trials that were previously carried out Pre Test or initial tests and Post Tests conducted on athletes aged 13-15 years, these groups were not given a dryland swimming exercise model freestyle modification using rowing tools for athletes aged 13-15 years applied to athletes, researchers conducted a Pre Test or preliminary test to determine the level of 50 meter freestyle swimming ability by the subject to be studied, from the pre test results obtained the number of results of the ability to swim style free 50 meters in the amount of 1075.28. This group was not given a freestyle dryland swimming exercise model using a modified rowing device after that, so the subjects were tested again with the same test as the 50 meter freestyle swimming ability test, this test called the Post Test which was used to find out whether there was an increase in ability swimming athletes when not given a dryland exercise model using a modified rowing tool, then a figure of 1070.78 is obtained. Based on these information it can be said that athletes not given the freestyle dryland swimming model using rowing modification tools for athletes ages 13-15 cannot significantly improve the athlete's swimming abilities. Here is a comparison of the results of the 50 meter freestyle swimming athletes before giving treatment and after giving treatment using a modified rowing tool with a bar chart:

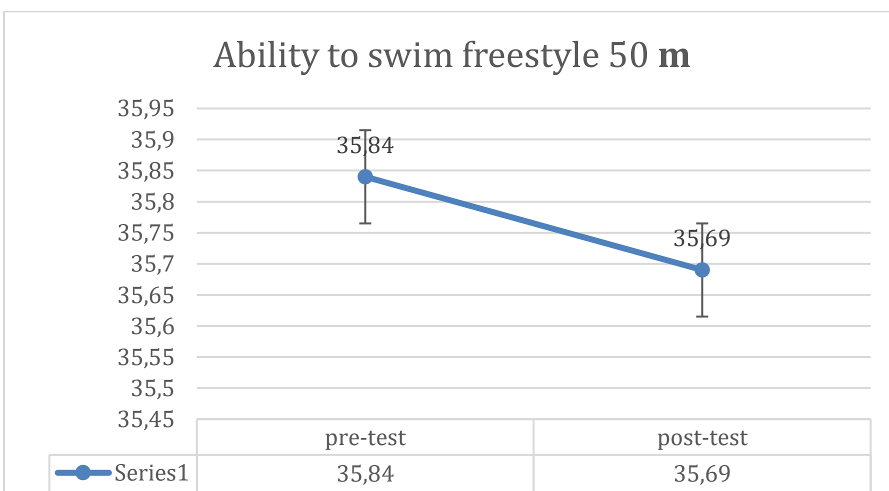


Figure 8 Bar diagram (Control Group Trial)

The results of small group trials and large group trials can be concluded that not given a Dryland swimming freestyle training model using a rowing tool modification for athletes ages 13-15 could not significantly improve the swimming abilities of athletes.

Table 9 Results Frequencies Tests for the ability to swim 50 meters control group

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre_test	35.36	60	.901	.116
	post_test	1.5000	60	.50422	.06509

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	pre_test & post_test	60	-.543	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	pre_test - post_test	3.3857E1	1.24870	.16121	33.53509	34.18024	210.027	59	.000

In a significant test the difference with SPSS 16 can be t-test = 210,027, df = 59 and p-value = 0.00 <0.05, which means there is no significant difference. Based on this information it can be said that no dryland training model is given using a rowing tool modification cannot significantly improve swimming abilit

able 10 Results of differences in the ability to swim the experimental group and the 50 meter swimming control group.

Group Statistics

	post_test	N	Mean	Std. Deviation	Std. Error Mean
pre_test	experiment	30	34.87	.763	.139
	control	30	35.69	.763	.139

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
pre_test	Equal variances assumed	.000	1.000	-4.161	58	.000	-.820	.197	-1.214	-.426
	Equal variances not assumed			-4.161	58.000	.000	-.820	.197	-1.214	-.426

Because the data variance is homoen, the equal variances assumed column will be chosen, and in the t-test for equality means row the price of t = 4.161, db = 48 and sig is obtained. (2 tailed) or p-value = 0.000 <0.05 or Ho is rejected. Thus, the hypothesis proposed was tested by the data, so it was concluded that the swimming speed of athletes who were given treatments were faster than athletes who were not given dryland training treatments using modified rowing tools.

DISCUSSION

1. Product Improvement

Based on the acquisition of the figures in the table above it can be concluded that the dryland training model using a modified rowing tool can and is feasible to be used in exercises to increase arm muscle strength and effectively to improve swimming ability. There is a comparison of numbers that show that the results of the initial and final tests have progressed, from the initial tests totaling 1075.28 then given treatment in the form of a dryland training model that has been developed then only a final test or post test is carried out to determine the effectiveness of the developed and obtained models. the data amounted to 1046.18, so the dryland exercise model uses a modification of effective rowing tools to increase muscle strength and swimming ability.

Seeing the strengths and weaknesses of the product made there are inputs that researchers will convey in order to achieve this product improvement, while the input is as follows in this model it is necessary to adjust the training load. Characteristics and understanding of athletes, requires the trainer to provide direct practice for athletes to learn new movements that are felt to be done. The dryland exercise model made by researchers is a product that has never been done, aims to help trainers in applying variations of dryland exercises, improve swimming skills, and as a reference for training materials. This dryland training model is made based on the level of children's needs in physical activity, especially in swimming. This product after reviewing some of the weaknesses that need improvement, it can be conveyed some of the advantages of this product include: Increasing muscle strength and also improve swimming ability. This model can make a variety of exercises, and enthusiastic in physical exercise. Athletes can feel the comfort and security in the dryland training process using a modified rowing tool. The dryland model is more effective and efficient. Can help the trainer in training the physical athlete. A contribution to science, especially for swimming.

This research development has been maximally pursued in accordance with the abilities of the researchers, but in this study there are still some limitations that must be recognized and put forward as a material consideration in generalizing the results of the research achieved. The limitations include the following: Field trials of this research will be even better if carried out on a broader scope. The product used is far from perfect. Facilities and infrastructure used are still limited.

CONCLUSION

Based on the data obtained, from the results of field trials and discussion of research results it can be concluded that the dryland training model using modified rowing tools can increase muscle strength effectively and efficiently with the Dryland Exercise Model that researchers have developed, for athletes aged 13-15 years can improve swimming ability 50 meters.

REFERENCES

Bompa and Gregory. 2009. Periodization Theory And Methodolgy of Training. United States: Human Kinetics.

Bompa, T. O., & Buzzichelli, C. (2015). *Periodization Training For Sports* (Third Edition). Champaign: Human Kinetics.

Bompa, T. O., & Calcina, O. (1994). *Theory And Methodology Of Training: The Key To Athletic Performance* (3rd Ed). Dubuque, Iowa: Kendall/Hunt Pub. Co.

Bompa, Tudor O dan Haff, G. Gregory. *Periodization: Theory and Methodology of Training.* Champaign: 1999.

Bompa, Tudor O. Periodization: *Training for Sport (Programs for Peak Strength in 35 Sport)*. Champaign: 1999

Brian Mackenzie, & Glen Cordoza. (2012). *Power Speed Endurance: A Skill Based Approach To Endurance Training*. Victory Belt.

Faizal Chan. (2012).*Strength Training* - Jurnal Media Ilmu Keolahragaan Indonesia,Cerdas Sifa,

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). Educational Research (Seventh edition). *Educational Research: An introduction*.

Harsono. (2011). *Kepelatihan Olahraga, Teori dan Metodologi*. Jakarta: Rosda.

Johansyah, L., Dewi, S. (2017). Cooling vest wool fibre for recovery activity. *Journal of Science and Engineering Investigations,* 35-38. doi:10.2991/ichlas-17.2017.35

Soejoko, 2005. *Pembahasan Kekuatan Lengan Dalam Olahraga* Jakarta,Indonesia

Tudor Hale. (2015). *Exercise Physiology*. University College Chichester, UK.