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The Development Of Training Model Of Backstroke Swimming Skills For Children Age 8-10 Years Old

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Abstract The research aims to result in the development of training model of backstroke swimming skills for children aged 8-10years. The subjects in this research and development were trainees of children aged 8-10 years in Elsa Nasution Swimming Club and Tirta Jaya Banten. The research method used was the research and development model from Borg and Gall. The data collection technique used was the result of expert validation and effectiveness test through an assessment instrument with t-test statistical data analysis. The results of research and development of Training Model of Backstroke Swimming Skills for Children Age 8-10 Years Old showed that (1) The Development of Training Model of Backstroke Swimming Skills for Children Age 8-10 Years Old Children significantly improved the backstroke swimming skills of trainees, (2) Based on data analysis the average pre-test value was 9.9 and the post-test average was 17.2, 2.233 t-value -20,679 with a significance level of 0.05, it can be said that the Development of Training Model of Backstroke Swimming Skills for Children aged 8-10 Years can improve backstroke swimming skills and effective to be applied in the process of backstroke swimming training for children age 8-10 years old.

Keywords: Training Model; Borg And Gall; Backstroke Swimming

INTRODUCTION

Swimming is an activity carried out in the water and most liked by all circles of society. Starting from children, teenagers, adults to the elderly. This activity is frequently done by all circles of society to enhance body condition, family recreation activities, up to therapy for health. This activity also benefits a child's physical growth and development. Swimming activities include games, competitions, and matters relating to safety related to nature.

Swimming can be conducted in an indoor and outdoor swimming pool as well as in open water such as lakes, rivers, or oceans (Persson & Zetaruk 2014). Swimming provides an opportunity to recognize and figure out the water environment. Through swimming, humans obtain an opportunity to move in the water freely.

Swimming is an exercise that is safe and efficient to be carried out as an exercise activity. Swimming is able to increase the cardiovascular system and reduce joint injury, along with it, the various styles/stroke which is contained in swimming can stimulate whole muscles in the body so that swimming can develop muscles evenly. Furthermore, swimming is a sport that is

the contact-free body, thus minimizing the occurrence of severe injuries such as broken bones and torn joints (Don Gambril and Alfred Bay, 1984).

Swimming is more than just a means of obtaining exercise or enjoyment, it is also a vital survival skill. Every year, thousands of people drown in swimming pools, lakes, and rivers. Most drown simply because they do not know how to swim (Don Gambril and Alfred Bay, 1984).

Swimming is a unique sport where reactions created from the bottom or walls of the pool are not used during matches/competitions, except when starting and turning, the core strength of the speed power when swimming is the propulsion created from the push of the hand stroke. Swimming performance is strongly related to technique and efficiency, low resistance, and the rate of acceleration during the propulsion phase. Swimming for matches/competitions is greatly diverse from swimming for recreation (Wayman & Pintar, 2016).

Swimming is one of the measurable sports which is included in the sports are being competed, "Many children and adolescents participate in swimming sports, both in recreation and competition. Young swimmers are

prepared by their country to participate in national or international competitions” (Persson & Zetaruk, 2014). The world’s highest multi-event events from the Olympics, Asian Games, SEA Games, and other championships at Pekan Olahraga Nasional (PON). There are 4 (four) kinds of styles in swimming sports that are contested those are Front Crawl, Back Crawl/Backstroke, Breaststroke, and Butterfly Stroke. These four styles compete at every national and international competition level. “The four main styles in swimming are crawl, backstroke, butterfly stroke, and breaststroke. Each swimmer can take one style to specialize in or follow the entire swimming style on a change style number” (Persson & Zetaruk, 2014).

Backstroke has the same motion mechanical character as crawl. Starting from the rotation and body rotation, hand rotation, and whip legs. (Gonjo et al., 2018). Nonetheless, the backstroke becomes the most attractive style because it is done with a body position that is different from other swimming styles, it faces up (supine) while the other three styles are done in facing down (covered up). The diversity of body position in backstroke certainly affects

other component differences, such as whipping directions and the process of breathing. “Backstroke is not the most natural swimming position, and swimmers usually are not attracted to this stroke in the beginning. Moving in a backward direction and not seeing clearly what is in front of you are disadvantages for beginning backstroke swimmers” (Hannula, 2001). “In backstroke swimming, swimmers perform a supine position and carry out hand rotation along with the body position doing rotation and the legs making a whipping movement” (Wayman & Pintar, 2016).

Backstroke requires good motion and coordination skills because it can speed and float on surface water that requires the alignment between the movement of the legs, body, hands, and head to breathe. “when swimming, swimmers cannot move their hands as quickly as they are in the air, because when in the water there is hydrodynamic resistance created by the water so that swimmers must have bilateral coordination between the hands, both feet, as well as between hands and legs properly” (Gonjo et al., 2018).

Certainly, to do the alignment takes gradual exercises. Each style has

its difficulty level to be able to master it both in coordination and synchronization, “starting from getting the hands into the water, rotation/body rotation, the movement of catching water, the movement of pulling water, the movement of pushing water, and the movement of kicking water” (Wayman & Pintar, 2016).

In practicing backstroke skills, very extra precision is needed. Besides, the creativity of a good trainer and it is crucial to grasp the stages of learning human’s motion so that the backstroke training process runs properly and correctly, Fitts and Posner stated that 3 stages of learning must be passed by every human being, namely (1) the cognitive stage, (2) the associative stage, (3) the automation stage (Edwards, 2011). How the athletes start thinking and trying to digest a movement, feel how a movement is done properly until a movement is automatic and it does not change even though it is repeated continuously so that the athletes are able to swim using backstroke swimming effectively and efficiently. Swimming effectively and efficiently is very essential for every athlete where everyone must be able to pull a little bit of energy but be able to run optimally

and what underlies this effectiveness and efficiency is the technique by minimizing obstacles” (Lucero, 2015)

The diversities of backstroke from other styles cause this style takes a long time to learn “In swimming, the competition is usually started at the age of 8 years old and learns the four main styles, those are crawl, backstroke, butterfly stroke, and breaststroke. Each swimmer can take one style to specialize in or follow the entire swimming styles in the medley number”(Persson & Zetaruk, 2014). According to the result of the analysis in the field, there are difficulties in perfecting the backstroke especially for children aged 8-10 years because the position of the body-facing up so it is difficult to adjust a perfect and straight speed direction, it is hard to control the breath cycle which is often hit by water waves on the surface, the body position that is not parallel to the water surface “streamline”, misdirection of the wrong whip legs, the head position that is too raised since fear of being hit by water waves, and the body position that is stagnant and does not rotate. Certainly, these various problems, difficulties, confusions will be overcome if students can understand each stage of the given training and the training model that is

applied properly and correctly. Therefore, the author is very interested in researching the backstroke.

The research on swimming itself especially in the backstroke was mostly done in the motion analysis and the exercise effect without looking at the sequences and stages of movement in doing backstroke swimming. Such as research was conducted by (Fadli Surahman, 2010) entitled Motion Analysis of Backstroke Techniques for Students of the Sports Coaching Department, FIK UNP. Research from (Yogi Maulana, et al, 2018) entitled The relationship of arm power, abdominal muscle endurance, and leg power to the swimming speed of 50 meters backstroke in Subang University students. Research from (Guntur Firmansyah, 2018) entitled Development of backstroke swimming training model for Beginner KU III and KU IV at the Amarta aquatic swimming association in Malang. Then research from (Muchamad Ishak, et al, 2019) entitled the comparison of rod buoys and back floats on backstroke swimming skills. Then research from (Muchamad Ishak, et al, 2020) entitled The Relationship of Motor Ability with Backstroke Swimming Skill Results, this

study was focused on whether there is a good relationship between motor ability and backstroke swimming skills in PJKR STKIP Pasundan Cimahi students.

Previous research had shown that there had not been a comprehensive study on backstroke swimming that concerns the study criteria of developing backstroke exercise model for aged 8-10 years based on simple tools. Based on the result of observation and the observation in the field especially at Elsa Nasution Swimming Club and Tirta Jaya Banten, it is necessary to modify the training of backstroke swimming and the use of simple tools in doing backstroke swimming exercise especially at Elsa Nasution Swimming Club and Tirta Jaya Banten. Training is provided for the age of 8-10 years enters at the stage of training and strengthening the backstroke swimming. The ultimate goal in this study is to expect the athletes can grasp and master the technique of backstroke swimming by looking at the sequences and stages of movement in doing the backstroke swimming so that training process is more focused, interesting, and not boring.

Skills

Skill is simply defined as a person's ability to do a task that has a

goal to be achieved, nonetheless, skill is generally defined as motion prowess and direction of action (Cappuccio et al, 2020)

“Skill is a capacity to produce a maximum movement or final result with a minimum energy expenditure” (Sutrisna, et al, 2018). “Skill refers to a certain quality of a motion task. In that skill, there is an effectivity and efficiency element. Someone who has a high skill has those two elements certainly“(Setiawan, 2020).

“Skill is characterized by physical activities that is not only involve large muscles but also small muscles in performing a movement” (Setiawan, 2020). A skill that involves delicate muscles is also called fine motor skills, “a good coordination of fine motor movements is parts of the motion system in skills and dexterity” (Muller-Lunmroth et al, 1973)

“A physical skill involving large muscles is also called rough motor skills, the more large muscles are involved, the more energy and effort are deployed” (Alawiyah, 2014)

“Skill is greatly related to success in sports” (Robertson et al, 2014). “Fitts and Posner stated that there are three steps that must be done by someone who

learns motion skills, namely: (1) the cognitive step, (2) the associative step, and (3) the automation step” (Edwards, 2011). “Learning movement skills, having diverse characteristics with cognitive and effective learning, a skill is demonstrated in appearance which is a sign of everything has been learned” (S. Suryono, 2016). A movement skill is an athlete’s foundation to conduct physical activity and sport so when the athlete has good skills then in doing physical activity and sport the athlete will undergo it as expected goal. “A basic motion skill is basic building for physical activity and sport” (Syahrial Bakhtiar, 2014, 128). If an athlete has good skills, then an athlete will perform a movement or a sport movement in training materials properly and correctly.

Backstroke Swimming

“FINA (Federation International de Notation) International Swimming Federation declared styles that there are 4 styles used in swimming competitions namely, butterfly stroke, back crawl stroke, breaststroke, and crawl” (Shandy Pieter Pelemonia, 2017, 65)

The crawl and backstroke have the same motion mechanical character “Front crawl and backstroke have similar mechanical characteristics, such as the

alternating upper and lower limbs motion and the body roll around the longitudinal axis”(Gonjo et al., 2018). “The backstroke swimming can move through the water as quickly and efficiently as possible, the body must be firm and steady. The legs should be constantly motoring to assist in propulsion and stability through the abdominal muscles. The arms provide most of the propulsion, propulsion from the arms is rather simple—push water in a straight path back (or the feet in swimming) to move forward”(Riewald & Rodeo, 2015).

Regarding the backstroke, some people find it easy and simple to master it but for some people it also find difficult to master the backstroke, this backstroke includes a unique style of lying on their back position and it is different from other styles. “It is safe to say that backstroke is the least popular stroke. There are many reasons swimmers cite for not enjoying backstroke. Most commonly, swimmers say that it makes them nervous to swim upside down without being able to see where they are going. There are a lot to bump into in a pool, swimmers don’t like water in their nose, Backstroke seems to take more effort than the other strokes do

because the power phase of the kick is done in an upward direction, against gravity”(Lucero & Bluehl-Gohlke, 2006). It can be said that the backstroke is a less popular style.

”Backstroke is not the most natural swimming position and swimmers usually are not attracted to this stroke in the beginning. Moving in a backward direction and not seeing clearly what is in front of you are disadvantages for beginning backstroke swimmers”(Hannula, 2001).

Nevertheless, there are some differences of opinion with Aryadi Rachman Journal in which stated “Backstroke is the most practical style and it can be the first style for those who will learn to swim. Backstroke uses the movement of the arms and legs interchangeably and it is not like the butterfly stroke. In the fact, the timing of the backstroke and the legs movement is the same as the crawling movement” (Aryadi Rachman, 2018, 19). As for the explanation according to Ruben Guzman: The fundamentals of the backstroke are similar to those of the freestyle except that the face is not submerged in the backstroke; therefore, head-turning mechanics are unnecessary, and it is easier to breathe.

In addition, the arm stroke is performed with the arms out to the side of the body. Both backstroke and freestyle require good hip rotation and excellent kicking. The explanation according to Dick Hanula:

“Success in backstroke technique is best achieved by observing the three r’s: rhythm, relaxation, and rotation. Rhythm facilitates power, which is the result of rotation. Rotation refers to the hip-initiated trunk rotation that generates stroking power and reduces drag. Relaxation assists in maintaining steady stroking power. Arm recovery and breathing pattern are the two main components of relaxation”(Hannula, 2001).

To achieve success in backstroke swimming needed to heed three indicators those are rhythm, relaxation, and rotation. A good rhythm will help channel the energy that is expended to maximize rotation so that will produce powerful strokes and reduce obstacles. Relaxation helps in maintaining the consistency of energy that is in each stroke. Whereas Ruben Guzman stated a good backstroker is: The best backstrokers are maintain excellent body position with their hips and torso up high; have a smooth, relaxed stroke recovery with their arms entering directly in line with their shoulders; have excellent head control

and keep the head steady; have good hip rotation, torso rolling, and shoulder lift; have flawless kicking; and pull through the water efficiently and with great power.

Backstroke swimming movement phases: (1) the body position in backstroke swimming must be done well. The proper body position is in a horizontal position as a field of water resistance. The position can reduce the body’s resistance to water. (2) The movement of the limbs in doing backstroke swimming serves as maintaining or keeping the body position’s balance and the balance of the swimmer’s arms movement. Likewise, the elastic movement of the legs joints can be used as leg propulsion. (3) The proper movement of the arms and limbs is also sustainably carried out can maintain the balance of a swimmer’s body.

Mechanism fundamentals which affect backstroke swimming are same as applicable fundamentals to other styles. The basic techniques of backstroke swimming are as follows: (1) Body position, (2) Kicking, (3) Arms, (4) Stroke tempo (coordination) (Montgomery & Chambers, 2009)

The next opinion, according to Blythe Lucero stated in his book that the backstroke is broken down into five parts namely: (1) Body Position, (2) Arm Stroke, (3) Kick, (4) Breathing, (5) Coordination (Lucero & Blyehl-Gohlke, 2006). Agree with Scott Riewald's statement in his book that the backstroke is detailed into five parts namely: (1) Body Position, (2) Arm Stroke, (3) Kick, (4) Head Position (Breathing), (5) Coordination (Riewald & Rodeo, 2015)

Good backstroke swimmers afford to keep a proper body position with the position of the hips and chest are aligned with the surface of the water, performing a relaxed stroke recovery with the position of the hands and shoulders rhythmically when entering the water, they have excellent head control and keep the head steady, they have good hip rotation, they can shrug during recovery, they have an excellent kick form and they can pull water efficiently. Some explanations about the backstroke above explain that the simple backstroke or practical style of supine body position is easy to breathe with the face is facing up, at the same time mouth and nose on the surface water

Characteristic of children age 8-10 years old

Child's development is the gradual formation of biologically determined characteristics and traits that arise when a child learns from experience (Ulfa Kesuma, Khikmatul Istiqoma, 2019). These school-age children have different characteristics from younger children. Students love to play, move, work in groups, and love to feel or do something in person. Trainers should enlarge a training that contains fun elements, apply simple tools that are easy to understand and provide opportunities to repeat moves to perfect them during training. "The characteristic of elementary school-age children related to physical activities that are generally children love to play, move, work in groups and practice directly (Abdul Alim, 2009 in Erick Burhaeni, 2017)

Students are happy and active in learning also able to develop their potency if their teacher can plan and teach students as the characteristic of student's development. The developments among them are physical, motor, and perceptual development "Characteristics of elementary school-age 10-12 years are an individual who has active movement in activities, doing physical activity in every break and

leisure time (Yuni Sunarni, Eka Santi, Kurnia Rachmawati, 2019).

Physical development is the most crucial thing for elementary school-age children because it will influence their daily behavior, include in learning. A child's physical development will affect the opinion of him and others. It means children who have an ideal physique will be more confident in themselves than less ideal. Physical development that appears in the period of children aged 6-12 years, besides that there is a power that also dominates called flexibility and balance.

In this period of elementary school-age children, their physical development is slower than the age before and after them. This does not mean that the child's physical development stops, but it can be said that the child's physical development at this age is slower or consistent compared to early childhood and puberty. Physical development of the aged 6-12 years is relatively slower and more consistent. This rate of development lasts until major changes occur at the beginning of puberty (Tri Murti, 2018)

At this time, physical growth gives the ability for children to participate in various new activities.

Motor abilities for elementary school children along with their physical growth, they have been able to control themselves to perform more coordinated motor abilities. A child's physical and motor development should be considered in a certain context. "The transition stage (7-10years) in this stage, individual begins to combine and use his basic ability in sports. For instance, walking a straight line, jumping ropes, playing a ball, etc. Skills at this stage are more complex and specific (Ulfa Kesuma, Khikmatul Istiqoma, 2019)

Motor development is the development of physical movement through coordinated activities of the nerve center, nerves, and muscle. Motor development is the development of elements of maturity and control of body movements that is closely related to the development of motor centers in the brain. Motor skills children at the age 7-10 years reach the specialized skills stage where the child is more mastered motor skills and reaches the peak of motor development (Patterson, 1996) in (Siswiyanti, STh. Susilowati, Sri Surini Pudjiastuti, 2013).

METHOD

This research aims to result in the development of training model of backstroke swimming skills for children aged 8-10years that will be arranged into a training implementation guidebook that will be used as a guide by trainer/teacher in training backstroke swimming.

The approach used in this research was the research and development model from Borg and Gall which consists of ten steps, among others: 1) Research and Information Collecting, 2) Planning, 3) Develop preliminary form of product, 4) Preliminary field testing, 5) Main product revision, 6) Main field testing, 7) Operational product revision, 8) Operational field testing, 9) Final product revision, and 10) Dissemination and implementation.

A total of 18 training models will be tested at two swimming clubs Elsa Nasution Swimming Club and Tirta Jaya Banten. The subjects of the research are athletes aged 8-10years. Minor trials were conducted at Tirta Jaya Banteng swimming club, whereas major trials and effectiveness tests were conducted at Elsa Nasution Swimming Club with a total of 40 subjects.

To find out whether there is or there is not a significant influence of

using the model, the formula to process the overall data of test subjects using t-test procedure and SPSS 16 application.

RESULTS AND DISCUSSIONS

Small group trials

At this stage, the model that had been tested by an expert then also tested in small group trials with 15 subjects of children aged 8-10 years. Here is a summary of the results of small group trials were conducted by the researcher:

1. Basically, all variations can be applied but there were some points must be simplified, clarified, adapted to the children's capability in capturing the information received.
2. There needs to be a simple explanation and explained in parts so that it is easy for trainees to understand what the researcher means

Big group trials

After collecting the result of small group trials, then the researcher analyzed some discoveries in the field related to the model developed. Based on those discoveries, the researcher did revisions for the consummation of the development backstroke swimming training model for children aged 8-10 years that resulted 18 training models of backstroke swimming that can be

applied for improving backstroke swimming skills at the age 8-10 years.

Big group trials were conducted by the researcher using research subjects as many as 40 students at the age of 8-10 years. The following is the summary of the result of big group trials were conducted by the researcher:

- 1) Basically, all variations can be applied but there were some points that must be simplified, clarified, adapted to the children's capability in capturing the information received.
- 2) There needs to be a simple explanation and explained in parts so that it is easy for trainees to understand what the researcher means
- 3) The trainees were happy with the new training atmosphere in the varied training process and the unusual tools that the trainees used. So that the trainees were easy to absorb the material.
- 4) The trainer was greatly helped by the backstroke swimming training model.

Model Effectiveness Tests

The effectiveness of this model was carried out at Elsa Nasution

Swimming Club with a total of 40 research subjects.

At this stage, the researcher had done initial tests before and after giving the backstroke swimming training model as many as 18 models using instruments of final test of backstroke swimming skills.

The following is the result of statistical calculations on the effectiveness of training model of backstroke swimming for children age 8-10 years old.

Table 1.
Paired Samples Test

Paired Samples Test								
	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre_Test - Post_Test	-7.300	2.233	.353	-8.014	-6.586	20.679	39	.000

Based on data analysis in the table 1 were obtained the average pre-test value was 9.9 and post-test average was 17.2, the standard deviation pre-test was 2.048 and the post-test was 2.090. The average of pre-test and post-test was -7.300 and the standard deviation was

2.233 t-value -20,679 with a significance level of 0.05 because H_0 was rejected. Based on the explanation, it can be said that the Development of Training Model of Backstroke Swimming Skills for Children Age 8-10 Years Old can improve backstroke swimming skills and effective to be applied in the process of backstroke swimming training skills for children aged 8-10 years.

tests of the product made can also be used as a basis that this model can be used for backstroke swimming skills training programs for children aged 8-10 years.

CONCLUSION

Based on the process of development were conducted by the researcher for the first stage to the product creation in the form of the development of training model of backstroke swimming with expert testing, small group trials, big group trials as well as effectiveness tests of The Development of Training Model of Backstroke Swimming Skills for Children Aged 8-10 years can be concluded that:

- 1) The development of training model of backstroke swimming skills can be implemented in the process of backstroke swimming training for children aged 8-10 years.
- 2) The development of training model of backstroke swimming skills for children aged 8-10 years through several stages and effectiveness

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