

Stimulation of Gross Motor Skills in Early Age Children through Playing Estafet and Circuit

Panggung Sutapa¹, Hadwi Prihatanta¹, Suharjana¹

¹*Sports Science Study Program, Faculty of Sports Science, Universitas Negeri Yogyakarta, Jln. Colombo No. 1, Yogyakarta, Indonesia*

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Abstract: The purpose of this study is to determine the effectiveness of stimulation through playing on a relay and playing on a circuit against gross motor skills in early childhood. Motor skills are divided into two parts, namely gross motor and fine motor skills. Gross motor skills involve large muscles and fine motor skills involve small muscles. The participants in this study were the children of kindergarten budding jasmine with a total of 68 people. All children were used as samples by using population sampling techniques. The sample was divided into two groups; group A received treatment playing on a circuit and group B received a relay treatment. The instruments used to measure gross motor skills consisted of five points, namely (1) speed - 25 meters running, (2) strength - tennis ball throw, (3) explosive strength of the legs - standing broad jump, (4) balance - walking on 4 meters long balance beam, and (5) agility - shuttle run passing the cones with 4 meter distance. Data analysis was conducted by using ANOVA with a significance level of 5%. The results showed that circuit and relay play were very influential on the gross motor skills $P < 0.05$. The relay play was very effective for increasing leg power and arm power while the circuit play was more effective in increasing speed, agility and balance $P < 0, 05$.

1 INTRODUCTION

Early childhood education which is carried out before basic education plays an important role as the basic potential development of cognitive, affective, and psychomotor skills. Thus, it can be said that early childhood is the golden age of growth and development. Children are national assets that need special attention because of their uniqueness in their growth and development. In general, every child has the same pattern of growth and development, yet the speed going through each stage is not the same. This kind of difference is often called the sensitive period, which is a condition of readiness in receiving stimulation. Such potential will disappear and will not appear again if the child is not given the opportunity to develop in the appropriate time. In this sensitive period, children need to be stimulated through playing.

Playing is a fun activity and is the best way to stimulate growth and development. A pleasant atmosphere makes children not depressed so they can enjoy the environment while playing. They are not bored to repeat the same activity, meaning that

children indirectly train their motor skills. Many benefits that can be obtained by children through playing such as establishing social interaction, training the five senses, and fostering an empathetic spirit. There are many kinds of plays that can be done by children in indoor or outdoor. An indoor play is preferred by parents because children do not get tired, overheated, and consume too much energy, while an outdoor play is beneficial for children who are experiencing body growth and development. Thus, energy usage making them hungry and more secretion of growth hormones affects the increase of growth and development. Physical activities requiring energy usage is very helpful in making the children healthier, stronger, and more cheerful. Outdoor plays could be in the forms of relays and circuits. Relay and circuit plays require speed, agility, strength, and coordination (Wang, 2009: 34). The elements of motion become the basis for responding to stimuli through movement. Kinaesthetic development in children is divided into two. They are gross motor and fine motor development. Gross motor development leads more to activities involving large muscles, while fine

motor one leads to the ability to control coordination between various types of motion into a series of motion. Most people assume that the gross motor development will automatically develop along with the increasing age of the child. In fact, slow motor development can occur because of lack of stimulation, making the child not confident in carrying out physical tasks and skills. Children with good motor skills will have well nervous system in coordinating all movements in the body so that they will be responsive, agile, and strong. Based on the background described above, the problem can be formulated as: since the differences between the effect of relay and circuit plays on gross motor skills of early childhood is not known whether which one is more effective for increasing gross motor skills of children, as well as the differences based on gender, can relay and circuit plays improve the gross motor skills of early childhood? Which is more effective to improve the gross motor skills in early childhood?

Playing has an important meaning for children especially to socialise as a member of the community, to recognise, and to appreciate the community, meaning that playing can foster a sense of togetherness, tolerance, and empathy. Behn et al. (2013) state that playing is a very important requirement for children that can influence positive, physical-motoric, social, and emotional aspects. It also serves as the means for socializing. According to Lynch (2015), playing is an activity that makes children happy, excited, and creating a comfortable atmosphere. Bjartveit (2017) states that playing is an activity that is able to provide pleasure, information, and to develop imagination. Thobald (2017) states that plays can be used as an educational tool to recognize rules and to get satisfaction and pleasure. For children, playing allows them to socialize with friends, understand the prevalent norms, increase creativity, and understand the world from what has not been recognised to what can be lively experienced. This is in line with the opinion of Mukherji and Louise (2014) stating that playing offers children the opportunity to develop key skills across domains including particular skills associated with each developmental domain involving social, physical, and intellectual development as well as communication/ language development. According to Madrona (2014), playing for children is a recreational activity as the key role in education especially in the early stages of development that can enable children to develop their imagination and abilities in various aspects. Playing for children provides an opportunity to manipulate, repeat, explore and practice ideas. It is their medium to find

more of their world, to obtain new knowledge, and to realise new ideas (Singer, 2006). Parsons (2013) states that playing is not only the medium of motorskill training, but also the stimuli of emotional and intellectual development. Through playing, children can jump directly into the field and become new experienced individuals that can explore the world.

The implementation of circuit plays is a combination of various kinds of activities involving elements of motions such as walking, running, throwing, kicking, leaping, and jumping. They are arranged in a circle performed by the player accomplishing the whole items that have been compiled earlier. A circuit play is divided into several posts and there are forms of activities in each post that should be accomplished in the fastest time. Faigenbaum, Bush, Mcloone et al. (2015) affirm that with qualified instruction and deliberate practice, children can improve their motor skill performance and enhance their muscle strength, which are the blocks for future participation in game, sports, and fitness activities. Wastcott (2003) mentions that a circuit is a form of activity carried out sequentially and continuously for one round involving different activities. A circuit play is a way that is seen as a very effective and efficient training with limited equipment (Kumar, 2014). The advantage of circuit plays is that it can be done without using weights but it can still stimulate physical conditions such as strength, speed, agility, and endurance depending on the content of activities played in each post.

A relay play is a continuous activity. The implementation of relay plays in this study is almost the same as circuit plays. The only difference is that there is a change of players in each post. Relay plays require the activeness of each member in a group to wait their turn after another player in the group finishes carrying out activities. This kind of relay plays is very popular among children because the activity has the elements of game and competition. A relay play is a game that connects the first player to the next player by giving a sign to the actor to continue the challenges. In playing this game, a stick is usually equipped. In this case, the game can be modified by tapping on the shoulder after the first player completes the challenge.

Motor is always associated with motion; therefore, it is difficult to distinguish motor from motion in everyday life. Motion is a muscle contraction while motor involves the function of nerves, muscles, and skeletons. Motor development includes gross motor and fine motor skills. Gross motor skills are basically all activities that involve

large muscles and are the basis for many sports (Veldman et al, 2016). On the other hand, Sher (2009) states that gross motor activities require coordination, such as various types of sports, or even tasks, such as jumping forward. Willams (Zawi, et al. 2014) determines that gross motor skills refer to the ability in using major muscles groups to perform organized joint movements like walking, running, throwing, jumping, climbing, and catching. It is in accordance to Lenner & Kline (2006) stating that gross motor skills involve large muscles, both the muscles of the arms, the body, and the muscles of the legs to perform various kinds of motion like walking, running, throwing, and jumping

Kokstejn, Musalek, Stastny et al. (2017) affirm that *Achievement of a sufficient fundamental motor skills level by the end of the preschool period is an important premise for the later participation of children in many sports activities*. While Bardid, Huyben, Deconick et al. (2016) assert that *the motoric 4-6 was designed to assess the gross and fine motor skills of preschool children(4-6 years old) and allows early detection of children with motor delay which are grouped in gross motor skills including locomotors, object-control, and balance skills*. Motor skill development affects other development as stated by Hill (2010) that *motor development and its impact on other areas of physical and mental health as well as cognitive achievement, is also the central area of focus for those working on children with neurodevelopmental disorders*. General motor skills include locomotors, non-locomotors, and manipulative movements. Locomotor motion is a movement performed by moving the body from one place to another, non-locomotor motion is carried out in a place without moving around, and manipulative motion is a movement that uses a tool requiring coordination. Furthermore, according to (Wang, 2009), the basic elements of motion shaping motor skills are strength, agility, balance, and coordination. Motor skills as the basic foundation for early childhood are divided into two, namely gross motor and fine motor. Gross motor skills are the ability in using large muscles to make physical movements of the whole body or the body parts as in running, leaping, jumping, and crawling while fine motor skills are the ability to coordinate various elements of motion into one set of motion. Johnson Holaca (2010) states that *fine motor skills are those manipulative skills that involve small movements and small muscles in parts of the body, such as picking up, feeling themselves, threading, drawing, cutting and dressing*. *Fine*

motor skills develop slightly later than gross motor skills and need patience and practice to develop. According to Payne & Larry (2012), fine movements are also integral to motor development in general to other areas of human development, like academics and social development. Fine motor skills like printing or writing legibly, for example, are important for transmitting written ideas. Rebecca et al. (2014) state that gross motor function has a very important role in maintaining the health of a child with which the child is able to carry out daily activities without interference so that they can improve their quality of life. Furthermore, Yusof, et al. (2013) state that mastery of motor skills leads to improved proficiencies in complex skills, which in turn enhances participation of children in physical activities.

2 METHODS

This was an experimental study involving two groups with different treatments, namely the group of relay plays and the group of circuit plays. The number of samples in this study was 68 children aged 5-6 years tested subsequently and then ranked and paired to be divided into two groups. Group A performed all the items (five posts) and then replaced by other players (circuit plays) and Group B performed every activity in each item then moved to the new item in relays. The instruments used to measure gross motor skills consisted of five points, namely (1) speed– 25meters run, (2) strength – tennis ball throw, (3) explosive strength of the legs – standing broad jump, (4) balance – walking on 4 meters long balance beam, and (5) agility – shuttle run passing the cones with 4 meter distance.

Table 1: Achievement.

No	Time of 20 m run (second)	Ball throw (meter)	Explosive strength (meter)	Time of walking on 4 meters long balance beam (second)	Time of shuttle run (second)	Score
1	>3.59	< 5.9	< 1.53	> 5.11	> 4.0	5
2	3.60-4.02	4.8 – 5.8	1.22 – 1.52	5.12 - 6.76	4.01 – 4.53	4
3	4.03-4.45	3.7 - 4.7	0.91 – 1.21	6.77 - 8.41	4.54 – 5.06	3
4	4.46-4.88	2.6 - 3.6	0.60 – 0.90	8.42 - 10.06	5.07 – 5.59	2
5	< 4.89	> 2.5	> 0.5	< 10.07	< 6.00	1

The data analysis technique used in this study was the ANACOVA test at a significance level of 5% with a test on the prerequisite of data normality and homogeneity. The hypothesis in this study was as follows: relay and circuit plays could improve the gross motor skills of early childhood. Circuit plays were more effective than relay plays in improving the gross motor skills of early childhood.

3 RESULTS

The preliminary test results that must be obtained were the normality and homogeneity tests. The results of the normality test show that the distribution of the data was normal, indicated by the results of the statistical test of $P < 0.05$, while the results of the homogeneity test indicated that the

data were homogeneous, indicated by the results of the statistical test of $P < 0.05$. The results of the first hypothesis test stating that relay and circuit plays could improve the gross motor skills of early childhood was proven with $P < 0.05$ and the results of the second hypothesis test stating that circuit plays were more effective than relay plays in terms of improving gross motor skill in early age of children was proven with $P < 0.05$.

The table 2 below explains that both circuit-based and relay-based play treatments show a significant effect on gross motor improvement in early childhood with $P < 0.05$.

Based on the table 3 below, it can be determined that the treatment of circuit plays is very influential whether on running speed, the ability to throw the ball, standing broad jump, balance, and agility and all of them were proven to be significant with $P < 0.05$.

Table 2: Circuit and relay treatment test results.

No.	Score	F	Sig	t	df	Sig.(2) tailed
1	Equal Variances	3.564	.063	6.537	66	.000 assumed
2	Equal variances not		6.537	62.674		.000 assumed

Table 3: Test results before and after treatment of circuit plays.

No	Indicators		F	Sig	t	df	Sig.(2tailed)
1	Run	Equal variances assumed	0,13	.911	3.748	66	.000
		Equal variances not assumed			3.748	65.961	.000
2	Ball throw	Equal variances assumed	3.556	.064	-7.638	66	.000
		Equal variances not assumed				57.413	.000
3	Broad jump	Equal variances assumed	2.295	.135	-11.875	66	.000
		Equal variances not assumed				-11.875	64.803
4	Balance	Equal variances assumed	0.14	.096	8.535	66	.000
		Equal variances not assumed				8.535	65.985
5	Agility	Equal variances assumed	5	.785	8.634	66	.000
		Equal variances not assumed				8.634	65.979

Table 4: Test results of before and after the treatment of relay plays.

No	Indicators		F	Sig	t	df	Sig.(2tailed)
1	Run	Equal variances assumed	3.93	.533	4.767	66	.000
		Equal variances not assumed			4.767	60.317	.000
2	Ball throw	Equal variances assumed	.48	.827	-12.468	66	.000
		Equal variances not assumed			-12.468	65.770	.000
3	Broad Jump	Equal variances assumed	12.523	.001	-11.394	66	.000
		Equal variances not assumed			-11.394	57.311	.000
4	Balance	Equal variances assumed	.483	.489	9.932	66	.000
		Equal variances not assumed			9.932	65.999	.000
5	Agility	Equal variances assumed	26.554	.000	10.180	66	.000
		Equal variances not assumed			10.180	44.703	.000

Based on the above table, it could be determined that the treatment of relay plays was very influential on running speed, the ability to throw the ball, standing broad jump, balance, and agility and all of them were indicated significant with $P < 0.05$.

Table 5: Time decrease.

No	Indicator	Relay	Circuit
1	Run	4.3685	3.3391
2	Balance	6.9574	6.0403
3	Agility	3.9291	3.3506

Time decrease after performing circuit-based and relay-based physical activities of the motor running element, balance and agility is depicted in table 5. The time decrease indicated the effectiveness of circuit-based and relay-based physical activity. The treatment of circuit plays showed more effectiveness when compared to relay plays in running, balance, and agility with the decreasing time of 1.03 seconds, 0.92 seconds, and 0.58 seconds, respectively.

Table 6: Increased power of arm and lower limbs.

No	Indicators	Circuit	Relay
1	Power of Arms	4.1909	4.9135
2	Power of Lower Limbs	1.0941	1.1571

The increased power of the arm and lower limbs after relay and circuit plays is shown in table 6. This increased power indicated the effectiveness of the treatment of relay and circuit plays. The treatment of relay plays showed more effectiveness compared to circuit plays in arm power and lower limb power. The differences of increased power were 0.72 meter for arm power and 0.06 meter of lower limb power.

4 DISCUSSION

Playing is a physical-motoric need for children and it turns out to be a means for socialising. Playing is an activity that makes a person happy, excited, and able to create a comfortable atmosphere, provides information, and develops imagination. Playing can be used as an educational tool to recognise rules and to get satisfaction. Playing with physical activity for children allows socialising with friends, understanding the prevalent norms, increasing creativity, improving fitness with which the elements of physical ability such as strength, agility, power, and speed will also increase. Playing for children provides an opportunity for children to manipulate, repeat, explore and try their ideas and knowledge to be applied in the field.

The results of the research show that circuit plays were very effective and efficient ways to improve children's abilities such as speed, balance, and agility which increased significantly, whereas the arm power and lower limb power increased greater through relay plays. The discovery of physiological theory related to the theory of neurons states that new neurons will interlock into a circuit if along with given motor stimulation, so that the separated neurons will be integrated each other creating a link between the right brain and the left-brain nerves. Learning in the form of circuit plays was done by conducting a series of activities in one unit of activity. These activities include walking, running, throwing, leaping, and jumping. Through the practice of direct motor skills, children will get to know their world in a concrete manner and physical activity leads to increased sensory sensitivity causing increased space and time awareness. At this rate, this kind of increased abilities causes other functions to increase.

5 CONCLUSIONS

Relay and circuit plays could improve the gross motor skills of early childhood with $P < 0.05$.

Circuit plays were more effective than relay plays in improving the gross motor skills of early childhood with $P < 0.05$.

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