

The Effect of Flexibility Exercise on Lay-up Skills in Basketball

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Abstract: This study aims to analyze the effect of flexibility exercise on the improvement of lay-up skill in basketball in Indonesia, especially in the province of Lampung. This research uses one-group pretest-posttest design. The independent variable is basketball. The data were collected in 2 months, done 24 times and analysed by using statistic test. This study involved 30 samples who took flexibility exercise. The analysis of the data found that $F_{\text{count}} = 5,010$, using $dk = 29$, and $\alpha = 0,05$ and $F_{\text{table}} = 2,756$ or $F_{\text{count}} > F_{\text{table}}$. Therefore, there is a significant effect on senior high school students' lay-up skill. Students' lay-up skill is improved 32,14% after exercising using flexibility exercise method. It can be concluded that there is a significant effect of flexibility exercise on lay-up skill in basketball game.

1 INTRODUCTION

Basketball, a sport that gets tremendous attention in a branch of sport games, is becoming popular sport played all around the world. The game is characterized by intensive body contact, frequent intermittent running and jumping, one-on-one situation, quick direction changes in combination with challenging technique, and coordination aspects like catching, throwing, passing, and dribbling (Garbenyte-Apolinskiene, Siupsinskas, Salatkaite, Gudas, and Radvila, 2018). Basketball has become a lifestyle for some young people especially high school students. Moreover, basketball can be as popular as the sport which is more popular in Indonesia, like badminton.

Basketball is a game played in teams and the victory is determined by point difference. As defined by Muhajir in his book, basketball is played by two teams, each consisting of 5 players who try to put the ball into the opponent's basket and prevent the opponents from putting the ball or scoring numbers (Yusmawati, 2014). According to Rustanto (2017) basketball is a sport in groups consisting of two teams, five players each, who compete to score points by putting the ball into the opponent's basket (hoop).

Basketball is a regular and systematic exercise which can improve physical fitness components such as: (1) cardiorespiratory endurance, (2) muscle strength and endurance, (3) flexibility, and (4) body

composition. Basketball is a program that functions as a basketball athlete development (Paiman, 2013). To be able to play basketball, you must first know and master some basic technical skills in basketball games such as passing, dribbling, and shooting (Nurrochman, et al., 2009) in (Hapsari, Dwikusworo, and Hidayah, 2013). At high school level, the basic techniques of basketball include dribbling, passing, and shooting.

Basketball promotes speed, agility, strength, endurance, power, flexibility, and motor coordination (DiFiori et al., 2018). To get effective and efficient movements in basketball, someone needs to master basketball skills, namely 1) throwing and catching techniques, 2) dribbling techniques, 3) shooting techniques 4) pivot movement techniques, 5). layup shot techniques, and 6)stealing (Nuryadi, 2016)

Lay-up is one part of the shooting technique that is often done by players to score in basketball. During basketball games, lay-up becomes one of the most commonly used method of scoring (Wang, Liu, and Moffit, 2009) in (Chua, Quek, and Kong, 2017). Lay-up is an effort to put the ball into the hoop or basket by making two steps and jump to get points; lay-up is also called gunfire. Learning how to do lay-up is difficult because it must be accompanied by a push and a high jump so that the ball becomes as close as possible to the hoop. Besides, according to (Nin, Lam, and Kong, 2016) the layup movement is part of a complex movement which consists of

run-up, take-off and landing phase. Students often find it difficult to control the flexibility of their footsteps and jumping in order to get a good coordination to do a lay-up. There are 10 physical conditions, namely: 1) strength, 2) endurance, 3) muscular power, 4) speed, 5) flexibility, 6) agility, 7) coordination, 8) balance, 9) accuracy, and 10) reaction (Wiwoho, Junaidi, and Sugiarto, 2014).

Physical conditions make a positive contribution to maximize the results of several sports. Total physical condition parameters correlate with shot accuracy in basketball (Gravitis, 2018). One element of physical condition is flexibility. Several factors that affect body shape are muscle, tendon, ligament, joint type and structure, age, sex, body temperature and muscle temperature, weight, height, and genetics.

A person's flexibility can be increased by using four methods, namely dynamic stretching method, passive and proprioceptive neuromuscular facilitation (PNF) training (Giyanto, Sutjana, & Boleng, 2013). While each technique appears to be effective to improve flexibility, the PNF techniques seem to produce the most dramatic increases in range of motion. Stretching should be included for the purpose of preparing the muscles for strenuous physical activity as well as for the prevention of injury (G, Shellack Shellack, and Prentice, 1985)

A common way to increase body's flexibility is stretching exercises. Stretching programs have generally been shown to increase muscle flexibility, most likely as a result of enhanced stretch tolerance rather than mechanical/physiological changes in the muscle that is being stretched (Chan, Hong, and Robinson, 2001; LaRoche and Connolly, 2006; Law, Harvey, Nicholas, Tonkin, De Sousa, & Finnis, 2009) in (Ayala, Sainz de Baranda, De Ste Croix, and Santonja, 2013). There are several types of stretching, including static, dynamic, passive, and contraction relaxation.



Figure 1: Knee joint flexion exercises

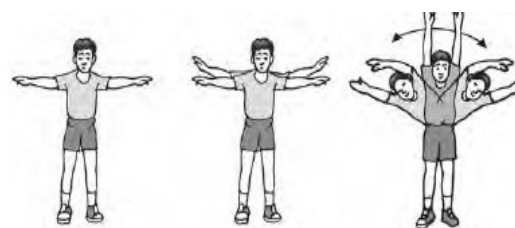


Figure 2: Joint flexibility exercises

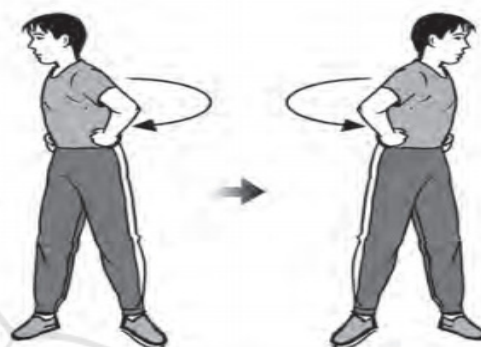


Figure 3: Waist muscles exercises

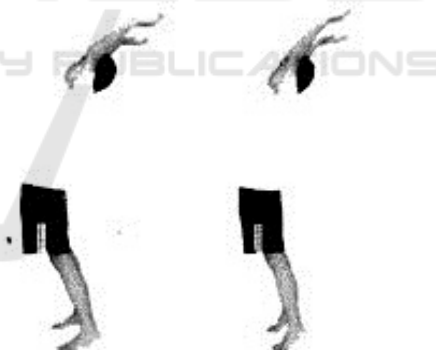


Figure 4: Hip joint flexion exercises

The above methods can improve flexibility and muscle weakness and the ability to stretch freely which result in the possibility of joints to act freely in the normal distance and the movements carried out do not cause injury. A static stretching for 30 seconds gives the greatest increase in flexibility. Increasing the stretching time to 60 seconds does not give greater short-term increase in flexibility (Bender and Education, 2015). Research shows that there were different effects between a male player of extracurricular basketball who has high flexibility

and those who has low flexibility on their power improvement and lay-up shoot result (Mertayasa, Rahayu, and Soenyoto, 2016).

Since body's flexibility is crucial, especially for children, flexibility needs to be nurtured and trained so that it will give maximum results. Determination is the range of movements that can be made by certain joints, which are limited by the arrangement of joints. It requires an appropriate training program in training flexibility (Susanto, Supriyadi, and Andiana, 2013).

Dynamic stretching exercise is a stretching exercise done by moving the body or limb rhythmically without maintaining the farthest stretch position. Curvature is the ability to move the body and its parts. A good flexibility will provide an increasing protection from injuries which provide a good motoric development for children (Putra and Muliarta, 2016). The benefit of dynamic stretching exercises is that it can increase joint motion space progressively. Based on research, (Mertayasa et al., 2016) there is a difference between the effect of high flexibility and low power of male players in extracurricular basketball on the improvement of the shoot-up results.

2 LITERATURE REVIEW

Basketball games have several basic techniques of shooting, one of which is layup. This kind of shot is done in the basketball hoop after dribbling the ball. To do a high jump in the layup movement, speed is needed in the last three or four steps. It is important to keep the head upright while shooting. The ball must be thrown using the wrist and fingers. It should touch the board first before entering the hoop (Pridani, Insanistyo, and Arwin, 2017).

Olifer (2007) in (Nuryadi, 2016) mentions in his book "Basics of Basketball" that there are 2 (two) types of shooting techniques, namely 1) outer shot which consists of jump shoot, free throw, and set shoot, and 2) deep shot, which is also called the layup shot. Layup technique must be continuously trained so that you get maximum results.

Layup in basketball is defined as an effort to put the ball into the hoop or basket by making two steps and jump in order to gain points. Layup is also called flying shot. Layup is often done by cutting or pushing (cut or drive). Layup shoot is one of moves usually used to score points in a basketball game when performing lightning strikes (Mertayasa et al., 2016).

The layup movement must be done by making a high jump and pushing the ball to make the ball as close as possible to the hoop, increasing the chance of getting points. Layup can be done by using right or left hand. (Prusak, 2007) mentions the steps to do right hand layup as follows. Firstly, jump with the support of the left leg, then lift the right knee and right hand, after that shoot the ball high and slowly to the upper right corner of the shooter's square. To do left hand layup, jump with the support of the right foot, lift your left knee and left hand, then shoot the ball up high and slowly to the upper right corner of the shooter's square.

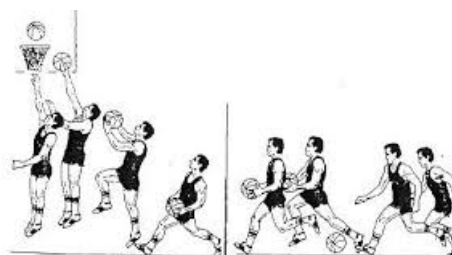


Figure 5: The layup movement technique

Human exercise aims to improve physical fitness. Physical fitness needs to be trained and maintained by training the physical condition of the human elements. Improving flexibility through stretching is another important preparatory activity suggested to enhance physical performance (G et al., 1985). One element is the physical condition of flexibility. Several factors which affect the body's flexibility include muscle, tendon, ligament, and joint structure type, age, sex, body temperature and muscle temperature, body weight and height and genetics. Flexibility can be enhanced by using one of four methods namely dynamic stretching method, static method, passive method and Neuromuscular Proprioceptive Facilitation method (Giyanto et al., 2013)

Flexibility is a prerequisite for performing a skill that requires extensive joint space which makes it easy to make fast movements. Likewise, determination is important for all people of all ages, especially children and adolescents who sit in school. As people get older, their joints, ligaments, and tendons become stiffer, reducing their flexibility. The flexibility is one component of physical condition that has an important role. The flexibility that someone has usually reflects the agility of a person in his or her movements.

Even for athletes that are dominant in their element of flexibility, if they have good flexibility,

they will have better performance compared to athletes who have lower level of flexibility (Juditya and Suwandar, 2016). Thus, coaches will generally insist that stretching exercises be included as a part of the preparatory period following a sufficient warm-up prior to engaging in strenuous activity. We have already mentioned why warm-up should be performed before stretching in order to achieve the best results (G et al., 1985)

3 RESEARCH METHODS

This study uses quantitative research and the method in this study is true experiment. The true experiment is a real experiment, which can control all variables which can influence the way of experiment (Sugiyono, 2009).

The treatment in this research was done by carrying out layup exercise and flexibility exercise, done by the students of a senior high school in Metro city, Indonesia. The total population is 120 students, and the samples of this study are 30 students. The sample were taken by using random sampling method without paying attention to the strata of the population.

The research design used is pre-experimental design with One-group Pretest-Posttest design. In this design, there is no control group and the subjects are placed randomly. Pretest of layup was given to find out the first sample result. After that, treatment (flexibility) was given. Finally, final test (layup) was administered. By doing so, the real result of consequence of contradicted treatment that was given can be seen (Maksum, 2012).

The instrument was used to measure the skill level of layup shoot, using scoring of picture value of layup (Sodikun, 1992). Layup tests were done 8 times. The highest score was considered as the first score (pretest) and the final test (posttest).

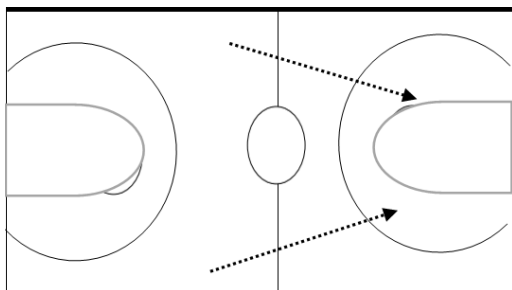


Figure 6: The implementation of layup test. (Source: Imam Sodikun, 1992)

To find out the result of the effect of flexibility exercise on the layup result in layup technique, this research uses simple regression linear formula:

$$Y = a + Bx$$

Description:

X : flexibility exercise

Y : layup technique result

a : constant value of Y if X = 0

b : Direction value as a determinant which indicates the increase (+) or decrease (-) of variable Y

After collected, the data were then processed by using above statistic formula. After that, test -F was done. If $F_{count} > F_{table}$, it means that flexibility exercise gives an effect on the layup technique.

4 RESULTS AND DISCUSSION

Table 1: The result of pretest and posttest on layup shooting

Group	Mean	Percentage
Pre test	13,37	32,14 %
Post test	16,6	

The results of the research involving 30 samples who took flexibility exercise show that $F_{count} = 5,010$ and with using $dk = 29$, then $\alpha = 0,05$, it was given $F_{table} = 2,756$. Therefore, it can be seen that $F_{count} > F_{table}$, meaning that flexibility exercise contributes to the result of layup technique in basketball game. Besides, the result of the author's calculation shows that regression similarity $Y = 0,975 + 0,676 (X)$. The study reveals that there is simple regression similarity on flexibility exercise toward layup technic result as variable Y. The regression similarity predicts the future condition and some increase, if X changed. Therefore, simple linear regression Y above X has a significant effect.

Layup skill is a basic technique in basketball which is important and must be done by students who join extracurricular basketball. One of types of shooting which has the highest chance of making points is layup, which is done by a striker whose position is 1 meter away from the hoop. Player who has the closest position to the hoop commonly has higher shooting accuracy compared to those who are in other positions; the success rate is between 55 to 60 percent.

Some basic steps in doing layup is dribbling or catching the ball passed by teammate. After that, by having some jump steps, effort to put the ball into the hoop is made. Layup movement is a complex

movement. In doing the actions in layup movement such as jumping, hovering and landing, ankle flexion is very crucial. Basketball players who have powerful leg muscle and flexible hand motion will be better in doing layup in a basketball game. The power of leg and flexibility in hand pivot are significant factors which play roles in the layup. The more powerful the leg power, the more effect it gives in the layup. Use the ankle flexion when jumping. Participants who have high flexibility and low flexibility affect the result of leg muscle power. On the other hand, flexibility of pivot hand also can be influenced, because the distance between ring of hand and the hoop is closer thus makes it easy for the player to do the layup.

The data which analyzed using F Test shows that $F_{\text{count}} = 5,010 > F_{\text{table}} = 2,576$. It means that increasing effect of result layup in basketball game is significant or very significant.

Flexibility exercise is exercise that uses for doing to all of way with big movement amplitude and wide, as function of pivots which was used for movement. Doing flexibility exercise is very crucial to pay attention intensity and weight that was given with controlling the way of exercise such as paying attention to movement technique that was given for exercising. Flexibility movements will produce energy-efficient movements with differences determined by basketball players depending on the results of lay-up shots on basketball extracurricular players (Mertayasa et al., 2016).

5 CONCLUSION

Based on the research, it is concluded that flexibility exercise is proven to improve the layup skills of student of SMA N 1 Metro city, Indonesia. It is proved by the statistical analysis result that shows the increase of the score, from the pretest (13,37) to the posttest (16,6) with the difference of -3.23. Furthermore, the results show that $F_{\text{count}} = 5,010 > F_{\text{table}} = 2,756$. This research can be a reference if a teacher or a coach is about to increase the layup skill of their students using flexibility exercise in the basketball extracurricular program.

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