

# Basketball jump shot technique design for high school athletes: Training method development

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# Basketball jump shot technique design for high school athletes: Training method development

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## ABSTRACT

This study aims to improve the results of basketball jump shot training through a study of the development of training methods. The research method used is development research. Development research that refers to the development model of Borg and Gall, namely: 1) preliminary study, 2) early development model, 3) expert evaluation, 4) small-scale trial, 5) product revision, 6) group trial, 7) refine the model, 8) define the final model. Data are collected using a questionnaire obtained from the evaluation of basketball experts and coaches, then tested with a small group of 12 athletes and a large-scale trial of 24 athletes. The data are the results of an assessment of product quality, suggestions for product improvement, and the results of filling out questionnaires by athletes. The data analysis technique used is descriptive percentage to reveal the athlete's assessment after using the product. The results of the validation of the development of training methods from basketball experts obtain an average percentage of 94.5%. While the validation of the development of training methods from basketball coaches obtain an average percentage of 96.2%. The results of the questionnaire that is filled out by 12 athletes are 21.7% who answering difficult, 46.7% answering moderately, and 31.6% answering easy. The results of the analysis of small-scale trial data from 12 athletes obtain an average percentage of 20.83% answering difficult, 50% answering moderate, and 29.16% answering easy. The results of the analysis of large-scale trial data from 24 athletes obtain an average percentage of 6.7% who answering difficult, 19.1% answering moderately, and 74.1% answering easy. From the available data, it can be concluded that the development of the basketball jump shot training method can be used for basketball athletes from SMA Negeri 1 Majalengka.

**Keyword:** method development; training; jump shot, basketball



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## INTRODUCTION

According to the National Federation of State High School Associations, approximately 7.6 million students participated in high school sports in 2009-2010. With 1.1 million students playing soccer, 570,000 students participating in athletics and basketball being ranked third with 540,000 student-athletes participating (Lueke, 2011). Basketball is a big ball game with the aim of putting as many balls into the opponent's basket and maintaining your own basket so as not to enter as much as possible (Sofyan et al., 2020). Playing basketball in principle involves a lot of explosive and strong acceleration, jumps, sprints, and influences based

on certain movements such as driving, rebounding, jumping shoots, laying-ups, closing outs, blocking shots, playing high speed, and fast attacks (Vázquez-Guerrero et al., 2019).

Basketball has the potential and ability to display a sport that develops with different training methods (Yilmaz, 2014). It was concluded that about 20% of basketball consisted of aerobics, while 80% were anaerobic; however, 80% of the total energy contribution of the aerobic energy system, including anaerobic-aerobic-anaerobic was constantly changing (Yilmaz, 2014). Basketball match analysis research has shown that the winning team performs the losing team in scoring goals in field and securing defensive rebounds (Sampaio et al., 2010). Young players are a reserve force for basketball development, as they are in a period of rapid technical development, their level of training will directly affect the development of basketball level (Zhang & Zhang, 2011).

Maximizing skills learning in training settings is a key goal for sports coaches and practitioners (Porter et al., 2019). Youth players are now interested in make long-range shots, usually with inappropriate form and technique, or dribble through several defenders before attempting a circus shot (Smith, 2017). Canlı, et al. (Kurniawan et al., 2020) state that among all the physical skills used in the game, the most difficult to develop and also the most important is the shooting ability. To get important achievements in junior basketball, it is important to examine the concept of training which must consider the selection and use of the most efficient training means taking into account all components of sports training, with a focus on the individual abilities and skills of athletes (Tănase et al., 2014). Basketball training has different aspects and is adapted to the training category. An overview of the main training methods should take into account teaching technologies, teaching strategies, and training methodologies (Daniela et al., 2013). It takes 8-12 years of training for a talented player to reach an elite level of performance and this has been described elsewhere as the 10 years or 10,000 hour rule, which means about more than 3 hours of daily training for a 10 years period (Matulaitis et al., 2019).

Athlete development studies have focused on training and skill acquisition, although a psychosocial point of view has recently been considered (Aarresola et al., 2017). High school athletes often spend 20 hours or more a week training and competing in sports (Lyons et al., 2018). Providing a specific and ongoing training stimulus to children usually leads to a more rapid increase in sports performance and peak performance in adolescence (Arede et al., 2019). In order for athletes to achieve success at the highest level, coaches must comprehensively prepare athletes to reach their potential in the physical, technical, and psychological domains (Wang, 2016). Motor skills training should be considered as a major aspect of the overall training program because motor skills development is a long and scientific process that requires the special expertise of the trainer (Wang, 2016).

Research conducted by Yuliandra and Fahrizqi on 30 members of the basketball student activity unit at the Indonesian Technocrat University showed that the total score for the indicators of convenience, attractiveness, usefulness, and safety was 82.75%, so overall the development of the jump shot training model was feasible to use (Yuliandra & Fahrizqi, 2018). Research conducted by Kurniawan, et al., shows that the development of a shooting technique model for basketball athletes aged 16-18 years based on multiple unit offenses is effective in improving shooting skills (Kurniawan et al., 2020). Furthermore, Harun et al., in his research on the development of the jump shot training model, showed a very valid score of 89.3% (Harun et al., 2017). From several studies that have been carried out, we try to fill in the gaps from previous studies, including the samples we use are school athletes. It is hoped that from this research, we can contribute to physical education teachers, coaches, and basketball practitioners as reference material in teaching or practicing jump shots.

In this study, we tried to develop a jump shot training method for basketball games. First, we describe the significant experiences of school athletes during the development of the training methods we provide. Second, we analyze these important experiences in terms of improving jump shot skills and increasing jump shot success. The aim is to provide a new reference in the jump shot training method. The development of this training method is not designed to encourage specific shooting techniques, but rather to establish a shooting progression that will allow players to shoot more consistently, whether they are practicing long range jump shots or midrange jump shots after a dribble drive.

## METHOD

### Development Research

Scientific research is basically a method of scientific discovery, which is also known as the scientific method or scientific method (Ali, 2011). The research method used in this research is Research & Development (R&D). The Research & Development method is a research method that produces a product in a certain area of expertise, followed by certain by-products, and has the effectiveness of a product (Saputro, 2017).

### Research & Development Method Steps

The Research & Development steps go through three stages, namely: 1) preliminary study, 2) model development and design, 3) model validation (Borg & Gall, 1983). The explanation regarding the development procedure is as follows:

#### *Preliminary Study*

Needs analysis is the first step in developing training methods. In this step, the product that the researcher wants to develop is needed or not by the respondent, so that the researcher feels that the potential problems faced by school athletes in doing jump shots can be found a solution.

To obtain information related to the needs of athletes in the jump shot technique, the researcher gives a number of checklist containing related to the needs of athletes in the jump shot. The technique of collecting data through this checklist containing has been discussed with basketball experts and coaches. The results of the checklist containing are used as the basis that school athletes actually needed the development of jump shot training methods.

The initial product design is made based on references from books and videos of basketball jump shot trainings to be used as the basis for developing basketball jump shot training methods. The initial product design is in the form of pictures of jump shot trainings. In the design of this initial product, the jump shot builder components appear, such as the position of the feet, when holding the ball, when jumping, moving forward, and landing.

#### *Method Development*

Design validation is carried out before the training product developed is tested on the subject. The products made are evaluated (validated) first by basketball experts and licensed coaches. Validation is carried out by providing an initial draft of the basketball jump shot development product accompanied by evaluation sheets for basketball experts and coaches. Expert validation sheet in the form of a checklist containing aspects of quality (systematic, suitability and attractiveness) and suggestions for developing training methods developed by us.

Design revisions are made to the initial product. Then it is evaluated by basketball experts which will then be revised as an improvement of the product that will be tested. Product trials are conducted on 12 athletes (small scale). This trial is conducted to determine the initial response/response of the product being developed. Product revisions are carried out to see the shortcomings of the product which will then become the forerunner of the product to be tested on the sample. Trial use of the revised product in step 7, but with a different number of athletes. In the trial the use is carried out on 24 athletes (large scale). Product revisions that have been carried out on a large scale before

#### *Testing*

The Final Product (Development of Final Method) is a draft that will be used as an instrument in taking the final data to the sample. The results of the final product of the jump shot development method from a large-scale trial of 24 people in the form of developing training methods include: 1) Reach the target of the balloon, 2) Jump rope with two legs, 3) Walk one line on the basketball court, 4) Push up, 5) Take the cloth from the bucket then squeeze the wet cloth, and 6) BEEF (balance, eye, elbow, follow-through). For the sample, they are asked to fill out a checklist containing a number of movement sequences for the development of the basketball jump shot training method that the athlete had to answer with an alternative answer of "Easy, score 3; Medium, value 2; Difficult, score 1".



## Research Subject

To obtain clear, quality and comprehensive information related to the questions in the formulation of research problems, one of the factors is depending on the determination of the subject. In this study, the subjects are 24 basketball athletes at SMAN 1 Majalengka who actively participate in extracurricular activities.

## Data Analysis Technique

The analysis used in this development research is to use a descriptive percentage analysis technique. While the data in the form of suggestions and reasons in choosing answers are analyzed using qualitative analysis techniques. From the percentage results obtained then classified to obtain data conclusions. See table 1 below.

Table 1. Percentage classification adaptations from Gilford.

Persentase	Category	Meaning
0 – 20%	Very Less	Thrown away
20,1% – 40%	Less	Repaired
40,1% – 70%	Moderate	Used (conditional)
70,1% – 90%	Good	Use
90,1% – 100%	Very Good	Use

(Saputro, 2017)

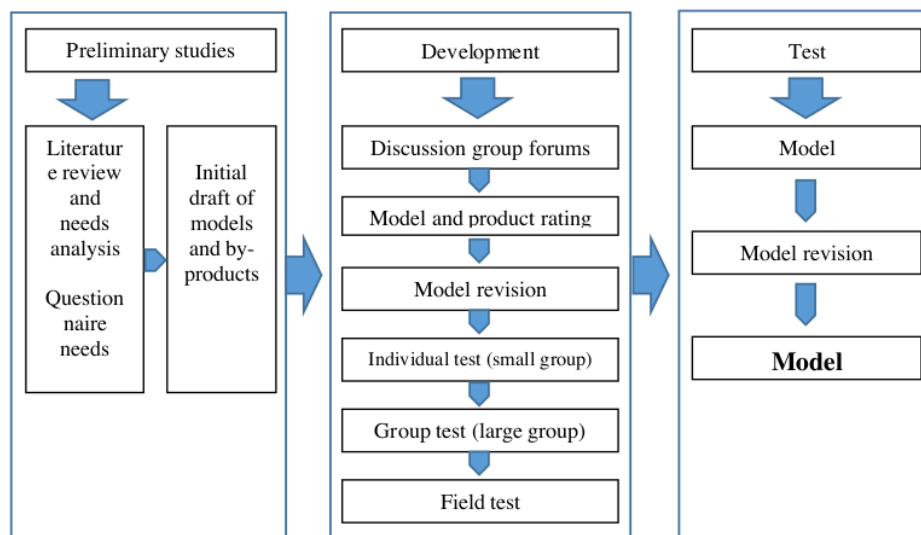


Figure 1. Model Development Procedure adaptations and modifications from Borg & Gall and Sukmaditana (Saputro, 2017)

## The Concept of Training Method Results Development

The training method developed by the researchers is the method of accuracy feat shadow person. The advantages of this developed training method can help improve the correct jump shot movement phases, improve the physical condition of supporting jump shots and to train students' accuracy in doing jump shots to the basketball hoop. The way of the training consists of several training posts. The following is an explanation of the types of jump shot technique trainings. See table 2 below.

Table 2. Type of Training

Type	Goal and Benefit
Reach the target of the balloon	Has a function to increase the power of the legs to a maximum when making a jump when doing a jump shot
Jump rope with two legs	Jumping trainings with two legs jumping over a rope mounted on a straight bar with a height of 15 cm, 20 cm, and 25 cm (height will be added according to the development of the ability of school athletes). Serve to increase the strength of leg power more maximally.
Walk one line on the basketball court	With feet on tiptoe with a distance of 5 meters. The goal is to improve the balance of the feet when doing jumps and landings in order to have good balance.
Push up	Aims to train the strength of the arm power so that the throwing results achieved in the ring can be more optimal and right on target.
Take the cloth from the bucket then squeeze the wet cloth.	Aims to train the flexibility of the wrist so that it can be flexible in the fingers and joints in the hands so that they can have the ball swing towards the ring maximally and have maximum accuracy.
BEEF (balance, eye, elbow, follow trough)	Coordination training

## RESULTS AND DISCUSSION

### Results

Table 3. Small-Scale Expert Validation Results

No	Model Items	Basketball Expert			Total	Basketball Coach			Total
		Systematics	Suitability	Attractive ness		Systematics	Suitability	Attractive ness	
1	I	3	3	3	9	3	2	3	8
2	II	3	3	3	9	3	3	3	9
3	III	3	3	3	9	3	3	3	9
4	IV	2	2	2	6	3	3	2	8
5	V	2	2	2	6	3	2	3	8
6	VI	2	2	3	7	3	2	2	7
Total		15	15	16	46	18	15	16	49

Based on table 3, it can be seen that on the assessment of basketball experts, the score on systematics and the suitability of the value 15 is the formula  $15/18 \times 100\% = 83.3\%$  in the good category and while attractiveness has a value of 16 with the formula  $16/18 \times 100\% = 88.9\%$  in good category. For the overall assessment by experts/expert lecturers on a small-scale trial it reaches a value of 46. By using a descriptive formula, the percentage is  $46/54 \times 100\% = 85.1\%$  in the good category.

The basketball coach assessment obtains a value in the systematic value of 18 with the formula  $18/18 \times 100\% = 100\%$  in the very good category, the value of conformity with the value 15 formula  $15/18 \times 100\% = 83.3\%$  in the good category and attractiveness has the value of 16 with the formula  $16/18 \times 100\% = 88.9\%$  in the good category. For the overall assessment by the basketball coach on a small-scale trial it reached a value of 49. By using the descriptive formula the percentage was  $49/54 \times 100\% = 90.7\%$  in the very good category.

Table 4. Large-Scale Expert Validation Results

No	Model Items	Basketball Expert			Total	Basketball Coach			Total
		Systematics	Suitability	Attractiveness		Systematics	Suitability	Attractiveness	
1	I	2	2	2	6	3	3	3	9
2	II	2	3	3	8	3	3	3	9
3	III	2	2	2	6	3	3	3	9
4	IV	2	3	3	7	3	3	3	9
5	V	2	2	2	6	3	3	3	9
6	VI	3	2	2	8	3	2	2	7
Total		13	14	14	41	18	17	17	52

Based on table 4, on the assessment of basketball experts, it can be seen that the assessment on systematics has the same value 13 with the formula  $13/18 \times 100\% = 72.2\%$  in the good category and for the assessment of suitability and attractiveness it has a value of 14 with the formula  $14/18 \times 100\% = 77.8\%$  in good category. For the overall assessment of the assessment of expert lecturers on large-scale trials it reaches  $41/54 \times 100\% = 76\%$  in the good category.

The basketball coach assessment obtains a value in the systematic value of 18 with the formula  $18/18 \times 100\% = 100\%$  in the very good category, the value of suitability and attractiveness have the same value as the value of 17 formula  $17/18 \times 100\% = 94.5\%$  in very good category. For the overall assessment by basketball coaches on a large-scale trial it reaches a value of 52. By using a descriptive formula, the percentage is  $52/54 \times 100\% = 96.2\%$  in the very good category.

9

**Table 5. Results of Individual Test (Small Group)**

No	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Total
001	2	3	1	2	3	1	12
002	2	3	1	2	3	1	12
003	2	2	2	3	2	1	12
004	2	2	2	3	2	1	12
005	2	2	3	3	2	1	13
006	3	2	3	2	3	3	16
007	2	3	1	2	3	3	14
008	1	2	3	3	2	1	12
009	2	3	2	1	2	1	11
010	2	2	2	3	2	1	12
011	2	2	2	3	2	1	12
012	2	2	2	3	2	1	12
Total							150

Based on Table 5 regarding the results of individual tests (small groups), that overall the scores obtains from the 12 athletes are  $150/216 \times 100\% = 69.4\%$  in the good category. Based on the data above, athletes give a good assessment of the basketball jump shot training method. Judging from the way of training, the simple names, the use of modified training tools, all of which make the atmosphere of basketball practice fun, so that athletes can understand the basketball jump shot exercise and make students active during practice.

**Table 6. Results of Individual Test (Small Group) Recapitulation**

No	Model Items	Athlete	Hard	Athlete	Medium	Athlete	Easy	Total Athelte
1	I	1	8,33 %	10	83,33 %	1	8,33%	12
2	II	0	0 %	8	66,67 %	4	33,33%	12
3	III	3	25%	6	50%	3	25%	12
4	IV	1	8,33%	4	33,33%	7	58,33%	12
5	V	0	0%	8	66,67%	4	3,33%	12
6	VI	10	83,33%	0	0%	2	16,67%	12
Total			20,83%		50%		29,16%	

Based on Table 6 above, it can be illustrated that in the process of skills training using the development of training methods, there are 20.83% who answering difficult, 50% answering moderately, and 29.16% answering easy. So, it can be concluded that overall students respond well to the development of the basketball jump shot training model.

26

**Table 7. Recapitulation of group test (large group)**

No	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Total
001	3	3	3	2	3	3	17
002	3	3	3	3	3	3	18
003	3	3	2	2	3	3	16
004	3	3	3	2	3	3	17

No	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Total
005	3	3	3	2	3	3	17
006	3	3	3	3	3	3	18
007	3	3	2	2	3	3	16
008	3	3	3	2	3	2	16
009	3	3	3	2	3	2	16
010	3	3	3	3	3	1	16
011	3	3	2	2	3	3	16
012	3	3	3	2	3	3	17
013	3	2	3	1	3	3	15
014	3	3	1	2	1	3	13
015	3	3	1	2	2	3	14
016	3	3	3	3	1	3	16
017	3	2	3	3	3	3	17
018	3	3	1	2	2	3	14
019	3	3	3	3	2	3	17
020	3	2	3	1	3	3	16
021	3	2	3	3	3	3	17
022	3	3	1	2	2	3	14
023	3	3	3	3	2	3	17
024	3	2	3	1	3	3	16
Total							390

Based on Table 7 regarding the results of individual tests (small groups), the overall score obtained from the 24 athletes is  $390/432 \times 100\% = 90.2\%$  in the good category. Based on the data above, athletes give a good assessment of the basketball jump shot training method. Judging from the way of training, simple names, the use of modified training tools, all of them make the atmosphere of basketball practice fun, so athletes can understand basketball jump shot exercises and make students active during practice.

Table 8. Recapitulation of Group Test (Large Group)

Model Items	Hard	Medium	Easy
I	0	0 %	24
II	0	0 %	17
III	3	15 %	14
IV	2	10 %	6
V	2	10 %	15
VI	1	5 %	17
Total	8	6,7 %	89

Based on Table 8 above, it can be illustrated that in the skills training process using the development training method, there are 6.7% who answering difficult, 19.1% answering moderately, and 74.1% answering easy. So, it can be concluded that overall students give a good response to the development of the basketball hopping exercise model. From the results of the large group recapitulation, it can be concluded:

Table 9. Results of Items Development of Jump shot Training Method

No	Training Method Development	Conclusion
1	Training jump shot method 1	Proper to use
2	Training jump shot method 2	Proper to use
3	Training jump shot method 3	Proper to use
4	Training jump shot method 4	Proper to use
5	Training jump shot method 5	Proper to use
6	Training jump shot method 6	Proper to use

Based on the observation of the new model exercise with several post practice items in the field, it shows that the jump shot training method contributes to the jump shot technique. This is indicated by the effectiveness of the six items of the jump shot exercise development method. The six items of the training



development method can increase and improve the ability of the jump shot technique and the physical abilities that support it, so that the accuracy when doing jump shots increases. Based on tabel 9, the researcher can conclude that training using exercise items can improve the systematics of motion and advanced abilities of athletes. Thus, the development of the jump shot training method can be feasible to use for basketball athletes at SMAN 1 Majalengka.

## Discussion

School athletes still have difficulty in entering the ball into the basketball hoop properly due to the lack of understanding of motion in the phases of jump shot skills and not optimal aspects of the physical condition supporting the jump shot movement such as leg, body, arm, and vertical jump movements. So, the shot still doesn't hit the target and the resulting shot is still weak or not optimal. When novice basketball players first attempt jump shots using previously learned techniques for set shots, they may find that the ball does not reach the hoop and has too little backspin (Okubo & Hubbard, 2018).

Even though it cannot be denied that one of the determining factors for a team's victory is the ability to shoot. Shooting in particular is very important for the offensive and greatly affects the outcome of a basketball game (Boddington et al., 2019). Players who are able to score successful shots from various distances are advantageous in basketball (Nakano et al., 2020). The ratio of points scored and the total number of attempts during a match or training session fail to provide adequate feedback on the shooter's improvement process, especially for more inexperienced players (França et al., 2021). The reason it must be developed is that the training method is more detailed and also trains the components of the physical condition supporting the jump shot such as the movement of the limbs, body, arms, and vertical jump so that the jump shooting results have optimal accuracy.

The jump shot is one of the most frequently used shooting techniques in modern basketball (Bazanov et al., 2015). A jump shot is a shot that can be taken in transition or one-on-one while dribbling in any situation (Çetin & Muratlı, 2014). At the early peak performance age, sport should devote all their training time to a structured form of training regardless of the potential physical and psychosocial consequences associated (De Bosscher & De Rycke, 2017). In more dynamic long-range tasks such as jumping basketball shots, evidence suggests that perceptual-action coupling relies on late detection of visual information (Klostermann et al., 2018).

The findings obtained in the study show that shooting accuracy of young basketball players is negatively affected by fatigue (Mulazimoglu et al., 2017). To maximize the width of the hoop, the ball must be released at a greater angle of release (i.e. perpendicular to the hoop) (Okazaki et al., 2015). The "dip" is defined as the movement of lowering the ball under the player's shooting pocket, the area of the body when all parts of the shooter's arm are in a vertical plane in front of the shoulder holding the ball (Penner, 2021). Efficiency in shooting is identified with the ability to perform well in basketball and therefore is training extensively (Rojas et al., 2000). The main finding of our study is that when shooting from the furthest distance (6.75 m) with respect to medium and short distances, differences in the angles of the shoulder and hip rotation axes occur early in the shooting action and that this difference is maintained until the jump shot is completed and the player has landed (Štirn et al., 2019). The average value shows that when making jump shots, basketball players have increased takeoff time and peak strength and overall average strength in the take-off phase and relative average strength (Struzik et al., 2014).

The results of the validation of experts/lecturers and basketball coaches show that each training item developed by the researcher has a good assessment of systematics, suitability, and attractiveness, so that the development of this training model, based on lecturer validation can be used in research. Thus, it can be concluded that based on validation data from basketball experts/lecturers who provide an assessment of the development of the basketball jump shot training model that the researchers developed is feasible and good to use. When considering how to educate children for tomorrow's society, it is important for students to acquire skills that enable them to work well together to solve problems that arise (Ito, 2019). Strategic planning has become very popular over the last few years to maximize the performance of individual players (Calleja-González et al., 2016). The main feature of the intervention is regular exposure to increased stress during daily

exercise (Kegelaers et al., 2021). Monitoring the training load makes it possible to optimize periodization and offers trainers a better understanding of individual targets for training (Vázquez-Garcera et al., 2020). Trainers' beliefs about the training process are one of the lines of research that provide information about the design of training sessions (Cañadas et al., 2015).

Judging from the assessments of basketball experts and basketball coaches, overall the development of training methods is categorized as very good from several systematic, precise, and interesting factors in the very good category. So it can be concluded that the overall development method of basketball jumping practice is in the category feasible to be given or tested on the sample. Athletes give a good assessment of the basketball jump shot training method. Judging from the method of training, the names of the trainings are simple, the use of modified training tools, makes the atmosphere of basketball training fun, so that students can understand basketball jump shot trainings. Based on the large group trial data above, with the addition of the number of athletes, they still give a good assessment of the basketball jump shot training method because the training method that the researchers developed is interesting and fun so that it makes athletes give a good assessment during the training process athletes are active in following the development of the basketball jump shot training method.

## CONCLUSION

Based on data processing and analysis, it can be concluded that the six training models developed include: 1) reach the target of the balloon, 2) jump rope with two legs, 3) walk one line on the basketball court, 4) push up, 5) take the cloth from the bucket then squeeze the wet cloth, 6) BEEF (balance, eye, elbow, follow trough), suitable for high school athletes. The limitation of this study is that the sample used already has a basic jump shot technique although it is not perfect, it would be better if the sample used is a sample that is really a beginner so that it is able to control and see the development and impact of the development of the exercise model. Further research can be conducted by testing the effectiveness of the development of the jump shot training method in order to obtain the accuracy of the athlete's jump shot ability and other variables that may have an impact on improving the jump shot technique, so that it can be used as a training method that ensures the quality of basketball jump shots in the future.

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## CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors

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