



The Effect of Speed Trainings which use the Method of Combined Repetition and Flexibility on Developing Certain Physical Abilities and Shooting Strategies in Basketball

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Abstract:

The significance of this research is presented in identifying the importance of training, and the role of speed and its correct training method in order to support the players' skills and their required flexibility, which helps them to develop certain physical abilities. The role of science and scientific research emerges here in selecting the suitable training techniques, and by experiment this training program we even might contribute to enhancing basketball itself. The purpose of the research is designing speed training programs (using the method of combined repetition and flexibility) and identifying their effect, in order to develop certain physical abilities and shooting strategies in basketball. A significant result of this research is: "Speed trainings which use the method of combined repetition and flexibility contribute to developing the physical abilities and basketball shooting strategies of the research participants." And an important recommendation is: "These training programs should be adopted because of their contribution to the development of the player's physical abilities and shooting strategies in basketball."

1. Introduction:

A great revival of sport has been experienced worldwide because of its remarkable contribution to the enhancement of the society's well-being and its economic and political development. Accordingly, people began to foster selecting advanced equipment and constructing complete sport cities rather than stadiums, in addition to looking after the players' essential needs which enable them to grow and obtain appropriate results.

Since basketball is a well-known, enjoyable yet competitive sport, the world tended the essentials of this sport too, allowing them to improve its training methods and programs. They started with various ages (adolescences to mature adults) because each stage has its own features and particularities concerning their trainings, their physical capabilities and their technical skills and tactics.

The significance of this research is presented in identifying the importance of training, and the role of speed and its correct training method in order to support the players' skills and their required flexibility, which helps them to develop certain physical abilities. The role of science and scientific research emerges here in selecting the

suitable training techniques, and by experimenting this program we even might contribute to enhancing basketball itself.

The problem of this research is that the speed and flexibility factors are considered to be essential elements of an appropriate basketball performance, and whenever the players lack either of these two factors, we notice a slowdown of their performance and a shortcoming in their flexibility-related abilities. As is known, flexibility is an important and essential feature which enables the player of meeting other physical requirements and performing excellently.

Depending on the researchers' simple experience as former players and trainers, they noticed that the regression of development of our basketball teams in most of our local and national clubs is due to the dearth of tactics and technical drills in game, which is also caused by the players' lack of speed in their performance and/or a shortcoming in their flexibility related abilities. These features do not support a successful tactical performance. Therefore we have decided to provide the basic essentials of treating this deficiency, starting with the adolescences because they represent the basis of the advanced class which should carry out this strategic aspect. This is accomplished by using the suitable training to enhance these two features.

The purpose of this research is designing speed training programs (by means of combined repetition and flexibility) and identifying their effect in order to develop certain physical abilities and shooting strategies in basketball, as well as pointing out the differences between the results of the pretests and posttests for each of the experimental group and control group, concerning certain physical abilities and basketball shooting strategies. The hypotheses of this research are that, first, speed trainings which use the method of combined repetition and flexibility affect the development of certain physical abilities and shooting tactics in basketball, and second, there are abstract differences between the results of the pretests and posttests (in favour of the posttests) for both of the experimental group and control group, concerning certain physical abilities and shooting strategies in basketball.

2. Methodology of Research and its Field Process:

2.1 Research Method:

The researchers used the two-group experimental design (control group and experimental group) in order to solve the research's problem and to meet its purposes.

2.2 Research Population and Samples:

The population of this research is the members of Al Basrah Basketball Club, of which twelve players (a basic set of a team) were assigned as research participants. This group is divided into two samples, a control group and an experimental group, each which consists of six players. Thus, each sample represents 50% of the original research population. Each sample is compatible within the two groups and equates these groups in their variables, as is shown in Table (1).

Table 1 (Shows the compatibility of the two samples, the control one and the experimental one, and their equalization in research variables)

Research variables	Control group			Experimental Group			T Value	Significance Level
	M	SD	Variance	M	SD	Variance		
Training age (year)	5.3	0.2	3.77	5.2	0.3	5.76	0.62	No sig.
Weigh (kg)	68.5	1.2	1.75	68.4	1.3	1.9	0.12	No sig.
Height (cm)	173.3	2.3	1.32	173.4	2.4	1.38	0.06	No sig.

Resting heart rate (beat/min)	65.3	1.3	1.9	65.4	1.4	2.14	0.11	No sig.
Arm movement speed	30.2	2.4	7.94	30.5	2.2	7.21	0.2	No sig.
Leg movement speed	25.3	2.2	8.69	25.4	2.4	9.44	0.06	No sig.
Reaction speed of arm	127.3	1.1	0.86	127.2	2.3	1.8	0.08	No sig.
Muscular strength capability of arms	16.4	0.3	1.82	16.3	0.2	1.22	0.62	No sig.
Dynamic flexibility	20.3	0.4	1.97	20.2	0.3	1.48	0.45	No sig.
Scoring (sec)	6.3	0.2	3.17	6.2	0.3	4.83	0.62	No sig.
Speed Pass (sec)	14.2	0.4	2.81	14.3	0.2	1.39	0.5	No sig.
Dribbles (sec)	9.3	0.1	1.07	9.2	0.3	3.26	0.71	No sig.

Note: The T value for these groups is 2.228 with a freedom degree of (10) and an error probability of (0.05)

2.3 Applied tests:

2.3.1 Testing the speed of arm movement

(The speed of horizontal arm movements within 30 sec.)

Purpose: Measuring the individual's speed of moving the arms closer and further horizontally.

Required equipment:

1. A stopwatch
2. An instrument consisting of two wooden circles (lined with leather) with a total length of 24 inches; it is put horizontally on a table of suitable height
3. A chair

Procedure: The participant sits in front of the instrument on a distance of 8 inches. When hearing the sign, the participant touches the right circle with his fingertips, and then touches the left circle using the same hand (this is a round). This act should be repeated as many times as possible within 30 seconds.

Records: The number of rounds made by the participant within 30 sec. are counted.

2.3.2 Testing the speed of leg movement

(The speed of horizontal leg movements within 20 sec.)

Purpose: Measuring the individual's speed of moving the legs closer and further horizontally.

Required equipment:

1. A stopwatch
2. An instrument consisting of two plates of different sizes, the smaller one (with a width of 18 inches) is placed perpendicular on the middle of the main plate.
3. A chair without back support

Procedure: The participant sits in front of the instrument with his foot on the right side of it. When hearing the sign, the participant moves his foot over the middle plate

to the left side of the apparatus and moves it back to its start position (this is a round). This act should be repeated as many times as possible within 20 seconds.

Records: The number of rounds made by the participant within 20 sec. are counted.

2.3.3 Test for measuring the reaction speed of the hands

Purpose: Measuring the reaction time and speed of the hands.

Required equipment:

1. A ruler with a black line drawn between the two numbers (120 cm) and (130 cm)
2. A table of suitable height
3. A chair

Procedure: The participant sits on the chair, resting his arm on the table so that his wrist extends over the edge of the table. The assessor holds the ruler vertically in the air between the participant's thumb and index finger, but without touching it. The participant should concentrate on the black mark on the ruler. Without warning, the assessor releases the ruler, and the participant must catch it with his thumb and index finger at the black mark as quickly as possible.

Records:

1. If the participant catches the ruler at the black mark indeed by using his thumb and index finger, his reaction speed is accurate.
2. If the participant catches the ruler before the black mark, this means that his reaction speed is higher than the average speed, and the distance between the mark and the place he holds the ruler from points out the span between the participant's reaction speed and the regular speed level.
3. If the participant catches the ruler after the black mark, this means that his reaction speed is lower than the average speed, and the distance between the mark and the place he holds the ruler from points out the span between the participant's reaction speed and the regular speed level.

2.3.4 Testing the Muscular strength capability of the arms:

This factor is tested by the number of push-ups done within 10 seconds.

2.3.5 Flexibility test:

This factor is tested by the number of down- and side-touches made within 30 seconds.

2.3.6 Skill tests:

❖ Scoring test:

Purpose: Measuring the dribbling and scoring skills

Required equipment:

1. A stopwatch
2. A basketball
3. Three poles, the first one is put 6 m away from the start-line, and the poles are separated by 4.5 m each. The distance between the start-line and centre of the goal's hoop is 19.5 m.

Procedure: The participant stands at the start-line. Whenever the start sign is heard, he begins to dribble the ball between the poles from the right side first (thus the player is using his right arm). As he reaches an appropriate distance from the goal, he attempts a shoot. If he scores, he must go back to the start-line as soon as possible. But if he fails, he should try throwing the ball through the hoop until he scores, and then go back to the start-line as soon as possible in order to record the shooting time.

❖ Speed passing test:

Purpose: Measuring the participant's ability of receiving and passing the ball quickly.

Required equipment:

1. A stopwatch
2. A basketball
3. A level ground
4. An even wall

Procedure: The participant stands behind a line on a distance of 9 feet (2.7 m) away from the wall. When hearing the start sign, the participants passes the ball against the wall from any position at shoulder height, and catches it again as it bounces back, and repeats this for ten times as soon as possible.

Conditions:

- The ball may touch the wall on any height
- The participant is not allowed to ricochet the ball immediately, he should hold it before it touches the wall again.
- All attempts should be made while standing behind the line
- Whenever the ball touches the ground, the participant should pick up the ball again and continue passing, and the failed attempt will not be recorded.
- The participant is allowed to take this test twice, and the best result will be encountered.

Record: The time of this test will be recorded from the moment the ball touches the wall for the first time until it touches the wall again for the tenth successful pass. It is measured in seconds and Deci seconds. In case the participants takes this test twice, the attempt with the least recorded time will be encountered.

❖ Dribbling Test:

Purpose: Testing the participant's dribbling speed between a couple of poles

Required equipment:

1. Six poles, placed as is shown in figure 11. Important to note is the location of the start-line (which is 5 feet/1.5 m away from the first pole) and the end-line. The distance between the other poles is 8 feet/2.4m each.
2. A stopwatch
3. A basketball

Procedure: The participant stands behind the start-line with the ball in his hands. Whenever the start sign is heard, he takes a zig-zag path between the poles while dribbling continuously. He should dribble all the way to the end-line and back again to the start-line. The time which will be recorded is the time spent while dribbling to the end-line and back until he crosses the start-line again. (Thus: start – end – start)

Conditions:

- The participant is allowed to practice this parkour before taking the test.
- The participant should dribble in a legal manner.
- The participant is allowed to dribble with either his left hand or right hand.
- The participant is allowed to attempt this test only twice, and the best result will be recorded.

Records:

- The recorded time will be from the start sign until the moment the participant crosses the start-line again with the ball.
- The time of both attempts will be recorded.
- The results of the better attempt will be encountered.

2.4 Pretests:

The pretests took place on 8-9/7/2015.

2.5 The applied training:

Because of the speed trainings which use the method of combined repetition and flexibility, we had to select exercises which fit the conditions of the trainings mentioned previously. The training volume is controlled by increasing the repetition and recording the time of speed-related exercises and skills that allow the participant of reaching the required speed. Concerning the flexibility exercises, we had to use both the dynamic and static flexibility at the same time (which are referred to earlier). Accordingly, one of the conditions of applying intensity in trainings (in line with the speed factor and its different types) is adding the muscular strength capability to the measuring, because it's a combination of both speed and force. This feature is considered to be an essential trait in order to succeed in a basketball game, too. Therefore, the applied intensity is between 80-90% by using high intensity interval training (HIIC).

The resting level, however, is indicated by the heart rate which reached about 120-130 beat/min between the repetitions and about 110-120 beat/min between the groups.

This training lasted for two months (eight weeks with three training units each), thus with a total of 24 training units. Each unit consists of 2 flexibility exercises, 3 speed exercises, either with or without the use of a ball. The main part of the training unit was occupied by the trainer and the experimental group only, and the rest of the training was for all participants with the supervision of a trainer. The researchers supervised the practice of these exercises only, according to the training method which is applied on these exercises by the trainer. These trainings took place during the period between 11/7/2015 and 6/9/2015.

2.6 Posttests:

The posttests took place on 7-8/9/2015.

3. Results and Discussion:

3.1 Discussion and analysis of the results of the physical tests:

Table 2 (Shows the results of the physical pretests and posttests for each of the control group and experimental group)

Physical research variables	Control group				Experimental group			
	M pre	M Post	Standard Error	T value	M Pre	Mpost	Standard Error	T value
Speed of arm movement	30.2	32.1	0.2	9.5	30.5	34.5	0.5	8
Speed of leg movement	25.3	27.3	0.3	6.6	25.4	30.2	0.7	6.8
Reaction speed	127.3	126.1	0.3	4	127.2	124.1	0.4	7.75
Muscular strength capability	16.4	18.6	0.3	7.3	16.3	20.2	0.7	5.57
Dynamic flexibility	20.3	22.3	0.4	5	20.2	25.4	1.1	4.72

Note: The T value for these groups is 2.571 with a freedom degree of (5) and an error probability of (0.05)

Table 3 (Shows the results of the physical posttests for each of the control group and experimental group)

Physical research variables	Control group		Experimental group		T value	Significance Level
	M post	SD	M Post	SD		
Speed of arm movement	32.1	0.3	34.5	0.4	10.9	Significant
Speed of leg movement	27.3	1.1	30.2	1.3	3.8	Significant
Reaction speed of arms	126.1	1.2	124.1	1.3	2.53	Significant
Muscular strength capability	18.6	0.4	20.2	0.3	7.27	Significant
Dynamic flexibility	22.3	0.5	25.4	0.6	9.11	Significant

Note: The T value for these groups is 2.228 with a freedom degree of (10) and an error probability of (0.05)

By observing the tables (1) and (2) we notice a development in the physical aspects and research variables of the control group and experimental group, particularly the experimental group. According to the researchers, the development of the control group is due to their commitment to their daily training and their regular practice of exercises. This proves that physical training contributes to their development indeed, as is confirmed by Mohammed Hussain Alawi (1986) and Nadir Abdul Salaam Al Awamiry (1983): "Physical training contributes to the enhancement of physical aspects and the level of tactical performance."

The development of the experimental group, on the other hand, is due to the used training program, whose advance in physical aspects has already been proved. Practicing speed trainings by means of repetition had an effect on the performance in terms of speed-related requirements, like the speed of movement, the reaction speed and the muscular strength. Combined flexibility equally influences these physical aspects in case it is applied coupled with the previous training, and it provides the essentials of an appropriate performance.

3.2 Discussion and Analysis of the results of skill-related tests:

Table 4 (Shows the results of the skill-related pretests and posttests for each of the control group and experimental group)

Skill-related Research variables	Control group				Experimental group			
	M Pre	M post	Standard Error	T value	M pre	M post	Standard Error	T value
Scoring (sec)	6.3	5.9	0.1	4	6.2	5.2	0.3	3.33
Speed Pass (sec)	14.2	13.8	0.1	4	14.3	13.1	0.4	3
Dribbles (sec)	9.3	8.9	0.14	2.85	9.2	8.6	0.22	2.72

Note: The T value for these groups is 2.571 with a freedom degree of (5) and an error probability of (0.05)

Table 5 (Shows the results of the skill-related posttests for each of the control group and experimental group)

Skill-related variables	Control group		Experimental group		T value	Significance Level
	M post	SD	M post	SD		
Scoring (sec)	5.9	0.2	5.2	0.3	4.37	Significant
Speed Pass (sec)	13.8	0.4	13.1	0.2	3.5	Significant
Dribbles (sec)	8.9	0.11	8.6	0.21	2.83	Significant

Note: The T value for these groups is 2.228 with a freedom degree of (10) and an error probability of (0.05)

After presenting the skill-related aspects in table (4) and (5), we notice that there is a development in the shooting skills of both the control group and experimental group, and the latter presented noticeably better in the posttests. As is mentioned earlier, the development of the control group is due to practicing suitable and effective trainings, as is stated by Bestuisi Ahmed and Abbas Al Sameraey: "Trainings are regular and deliberate actions which result in the progress of certain dynamic and skill-related aspects of sport and life in general."

The experimental group, on the other hand, developed due to the practiced trainings and their role in accomplishing physical enhancement, which influenced the development of the tactical aspects. In other words, lacking certain physical features which are necessary for an appropriate performance will prevent the participant from improving the required precision and speed in order to practice the basic skills on the court.

Therefore, the researchers applied two effective training methods in order to develop both the physical aspects and its associated expertise, as is confirmed by Amrullah Ahmed Al Busati (1998): "Athletes of different disciplines are not able to practice the basic skills that distinguish each activity if they lack certain physical features which are essential for an appropriate performance, and therefore we notice an interwoven connection between the tactical skill level and the specific physical requirements for each activity." Likewise, Singer (1990) pointed out that: "No skill is accomplished without the presence of particular physical capabilities."

Certain specific physical exercises are applied in order to increase the tactical level and to enhance the performance's effectiveness, as is mention by Richard Schmidt: "Speed and force play an essential role in the enhancement of the performance's effectiveness."

Besides, increasing the precision of the performance in addition to the speed factor requires increasing the training volume, thus, increasing the repetition of the training units. This is confirmed by WajeihMahboob (2000): "Repetition and training result in a higher precision of expertise and a more competitive and brilliant motion." Consequently, the training which uses the method of repetition is considered to be an effective technique to enhance basketball.

4. Conclusions:

1. The speed trainings which use the method of repetition and flexibility had an effect on the development of physical abilities and basketball shooting strategies of the research participants.
2. Training the physical aspects all together resulted in a better development of each aspect individually, rather than working on each aspect apart.

3. Trainings which use the method of repetition and flexibility affected the tactical performance and enhanced it, for they increase the training volume and prepare the active joints.

Sample of a training unit:

- Week: One
- Training unit: 1
- Intensity: 80%
- Total time: 53-55 min
- Target: Developing the player's speed and flexibility

Part	Time	Exercises	Volume	Resting	
				Between Repetitions	Between Groups
Main	45 sec	Standing on a table and trying to push up while bending over for 5 sec, then twisting the torso while moving for 10 sec	3x15 sec	Heart rate at 120-130 beat/sec About (2-2.5) min	Heart rate at 110-120 beat/sec About (2.5-3) min
	60 sec	Holding a stick and placing it on the shoulders, and twisting the torso 10 times, then doing push-ups.	3x20 sec		
	180 sec	Sprinting all over the court within 15 sec	3x4 times		
	300 sec	Sprinting from the end of the court towards the middle of it (where a few balls are placed), and picking one of them up. Then he returns while dribbling to score and to return again to the middle of the court to pick up the next ball etc. This exercise is repeated within 20 sec.	3x5 times		
	180 sec	Passing the ball once to a player, and dribbling straight forwards to the end of the court to score. Then he returns to the player to pass him the ball again, and this exercise is repeated within 15 seconds	3x4 times		