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THE MOTOR RANGE AND ITS RELATIONSHIP TO SOME BIOMECHANICAL VARIABLES OF THE JUMPING SKILL OF BASKETBALL PLAYERS

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Abstract

The first chapter dealt with the importance of research to determine the extent of the movement ability of the attacking players who have to get a good elevation for scoring by jumping with basketball. By jumping with basketball, while working on determining the variables that will occur there through a relationship with the movement ability of basketball players to reach through them to the desired results to contribute to the development of the game, as the research objectives were to identify the values of the movement range of basketball players for the student club, as well as finding a relationship between the motor range with some biomechanical variables for scoring by jumping with basketball, either the second chapter is the research community is the students club basketball players the research community is from the students club players consisting of (10) players while the research sample consisted of (6) players for the main experiment were excluded (2) a player due to injury and (3) a player for the exploratory experiment, where the sample represented (50%) of the original community. As for the main experiment, it was carried out on the same day as the exploratory experiment. The physical tests and the skill test for the eye were conducted in the closed hall of the students' basketball club. Filming was done from The left and right sides and perpendicular to the performance, as the height of the center of the lens is 125 cm and the distance of the two cameras from the scoring area (3). It has an effective and positive role in the highest height during jumping scoring. As for the recommendations, paying attention to the general and specific physical elements of the basketball player, especially the motor range of the trunk. Paying attention to the biomechanical aspects of the jumping scoring skill because it increases performance efficiency.

Keywords: range of motion, biomechanical variables, scoring by jumping with basketball

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Chapter one

1-1 Introduction and the importance of the research:

There is no doubt that many of the general and specific physical characteristics of basketball, including the motor range, as it is considered a basic and an important variable that contributes to increasing the performance of scoring by jumping in basketball. Being an offensive skill that has a positive return to obtain through it an increase in the team's balance of points, which leads it to victory and due to the fact that The relationship exists and is essential for the motor range of all kinds, which needs to be developed and increased in the possibility of reaching a high degree of importance in the process of implementing the skill of scoring by jumping with basketball, which requires good and correct preparation using many biomechanical variables, which start from the moment of starting the process in a successful and effective manner. It needs accuracy in mastering and possessing the players of these variables that we may not see with the naked eye, which prompted the researcher to study these variables using modern technology in videotaping, kinetic analysis, which limits things that cannot be ignored in scientific research, through the foregoing, we see that biomechanics Being a science concerned with the study of kinetic tactics and movement performance visually and causally for the success of performing the skill well, and this requires a suitable range of movement to raise the player to a level that qualifies him to implement the scoring by jumping fully and effectively. They get a good level of scoring by jumping basketball, and this is done through choices to measure this characteristic of stability so that it is similar to the playing conditions, as well as identifying many mechanical variables for the stages of scoring movement by jumping in basketball, the fruit of identifying the values that will occur through which there is a relationship with the characteristic The range of motion of the two basketball players to reach the desired results contributes to the development of the game.

1-2 Research problem:

The motor range has a role when the player performs the skill of scoring by jumping and obtaining the ability of the body to perform the skill so that he can perform the movement of scoring by jumping with a high degree of accuracy .the problem requires studying the physical and mechanical variables to impose access to finding the motor range in the performance of this offensive skill and whether this relationship between the strength of the upward movement will

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reach the degree of morality with the rest of the biomechanical variables for the stages of the skill of scoring by jumping with basketball as well as access from Through this relationship, it is necessary to know and indicate which of the mechanical values will contribute to the success of this skill.

1-3 research objectives

1- Identifying the motor range of the torso and the values of the biomechanical variables for the skill of scoring by jumping with basketball

2- Finding the relationship between the motor range of the torso with some biomechanical variables for the skill of scoring by jumping with basketball

1-4 Imposing the search:

1. There is a statistically significant relationship between the motor range of the torso and some biomechanical variables for the basketball jumping skill.

1-5 research areas:

1-5-1 Time range: for the period from (25/3/2020) to (22/1/2021)

1-5-2 The spatial field is the indoor hall of the student basketball club

1-5-3 The human field: Al-Talaba basketball club players for the 2020-2021 season

Chapter II :

2-1 Research Methodology and Procedures:

Research methodology The researcher used the descriptive method in the manner of survey studies due to its suitability to the nature of the research

2-2 The research community and its sample:

The research community is made up of students club players consisting of (10) players. The research sample consisted of (6) players for the main experiment. (2) players were excluded due to injury and (3) players for the exploratory experiment. The sample represented (50%) of the original community. .

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Table (1) Indicate the specifications of the research sample in terms of age, height and weight

s	Specifications / Players' names	the age (year)	length (centimeters)	Weight (kg)
1	Ali Abdel Lafta	27	182	78
2	Mohamed Hassan	26	184	80
3	Mohammed Jassim	27	186	81
4	Mohammed Jawad	28	190	87
5	Osama Hassan	29	188	84
	M	27.4	186	82
	S	3.78	4.34	7.54
	coefficient of difference	13.47	2.21	9.13

2-3 The means, tools and devices:

The following means and tools were used:

1- A medicine ball weighing (2) kg
2- Measuring tape
3- Sticky tape
4- Manual Calculator (Casio)
5- (2) Sony cameras, with a speed of (100) images / second
6- Camera holder number (2)
7- Basketball court
8- Basketballs (10)
9- DELL laptop computer (1)

2-4 Tests used:

2-4-1 Spinal flexibility test: range of motion of the torso from supine position: (189.2000.6)

This test uses a measuring tape or graduated ruler

Objective: To measure the flexibility of the muscles of the back

The test: the pitcher falls on the ground and the fingers are completely intertwined behind the neck, and the colleague assists him in fixing the hip and not allowing his entire body to move from the bottom of the penalty. The coach

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places the measuring tape or ruler in a vertical position on the ground, then the lying player raises his torso up and the maximum possible range of motion so that he is fixed in the position for three seconds. Then the height of the chin is measured from the ground in inches to give us the degree of flexibility to be measured.

2-4-2 Spinal flexibility test (motor range of the torso) from standing: (190.2000.6)

The aim of the test: to measure the flexibility of the spine on the horizontal axis

Performance method: The player stands on the seat and the feet are secured with the toes fixed while keeping the knees straight. The player bends his torso forward and down as far as possible on the ruler, provided that he is fixed at the last distance he reaches for two seconds.

Note: The scores are negative at the top of the edge of the seat and positive at the bottom of the edge of the seat.

Performance terms:

1- The knees should not be bent
2- Each player has two attempts and the best of them is recorded
3- The torso should be bent slowly
4- It must be proven at the last distance the player reaches for two seconds

2-4-3 - Jump Scoring Test: (167.2020.7)

The aim of the test: is to measure the accuracy of shooting by jumping from a standstill.

Tools needed:

- Basketball Stadium.
- Basketball goal.
- (15) basketballs.

Description of performance:

- The test takes a standing position with the ball behind the middle of the free throw line.
- Each student performs (20) attempts, provided that the throws are performed in the form of four groups, each group has (5) throws.
- After completion, the next laboratory begins, and so on until it is the turn again to perform the second set of throws, and so on until the twenty throws are performed.

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- Test instructions:
- The player can perform some corrections before starting the test as a trial.
- Each player has the right to perform (20) throws.

Test management:

- The recorder: He calls the names first and records the results of the shots second.
- Referee: stands near the player to give him the ball.

Score calculation:

- One point is calculated and recorded for the player for each successful shot (a ball that enters the basket).
- No score is awarded to the player when the ball does not enter the basket (a failed shot).
- The player's score is equal to the total points he gets in the (20) shots.
- The maximum score for the test is (20) marks.

5-2 Exploratory experience:

In order to meet the circumstances surrounding the conduct of the research, the researcher conducted an exploratory experiment on (3) players from the Student Basketball Club on the same day of filming and using a camera to shoot a video on Monday (30/3/2020) at (4) in the afternoon in the inner hall of the Club. students with basketball, and the aim of the exploratory experiment was the following:

1- The validity of imaging devices in the search
2- The extent to which the devices and tools can work during the experiment
3- The distance and height of the motion analysis cameras during the performance of the shooting skill by jumping with basketball
4- The extent to which the sample comprehends and corresponds to the tests
5- The validity of the research exercises and tests

2-6 The main experience:

The main experiment was carried out on the same day as the exploratory experiment (30/3/2020), and physical and skill tests were conducted for the sample in the inner hall of the Student Basketball Club. The test was filmed from the left and right sides of the performance, and it is perpendicular to the performance, as the height of the two cameras from the ground was (125). (cm) and the distance of the two cameras from the scoring area is (3) meters on each side.

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2-7 Biomechanical Variables:

1- The height of a body's center of gravity It is the distance measured from the ground to the imaginary point inside the body

2- The angle of the hip joint: It is the angle formed as a result of the meeting of the femur inside the pelvis with the torso.

3- The angle of the leg: it is the angle that the leg crosses between two stages

4- The angle of the arm: It is the angle that the arm crosses between two stages

5- The horizontal distance to the center of gravity of the body: It is the horizontal distance that the center of gravity of the body travels horizontally

6- Vertical distance: It is the distance measured vertically to the center of gravity of the body, which is calculated through the triangle that represents the horizontal distance and the resultant center of gravity of the body between two stages.

7- The distance between ascent and descent: in the line connecting the point of ascent (the moment of leaving the ground) and the point of landing on the ground.

8- Vertical velocity: is the division of the vertical distance by the time

9- Horizontal velocity: It is the division of the horizontal distance by the time

10- Force: Mass equals acceleration

11- Work: equals force x displacement

12- Angular velocity: equals angular distance/time

13- Propulsion: equals force x time

2-8 Programs used in kinetic analysis:

After conducting the videotaping process, the researcher inserted the videotapes into the laptop, and the leg length was chosen as the drawing scale for each player separately, and the best attempts were chosen in terms of technique and accuracy for the purpose of analysis, and the following programs were used, each according to its function.

- (Kenova) program
- Dartfish program

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2-9 Statistical means: The researcher used the following statistical bag (spss):

- Percentage
- Arithmetic mean
- standard deviation (p)
- coefficient of variation (x)
- Pearson correlation coefficient

Chapter III

3- Presentation and analysis of the results:

3-1 Presentation and discussion of the values of the biomechanical variables of the skill test and its relationship to the motor range of the torso for the basketball jumping skill.

The height of the body's center of gravity at the moment of ascent with the test of the motor range of the torso from standing showed that the calculated (r) value is greater than the tabulated (r) value at an error ratio of (0.05). The body at the moment of ascent because of the help of flexibility to extend the joints and muscles of the whole body to the top significantly, which helps to raise the center of gravity of the body at this stage, and the flexibility helps positively in the stage of approximate steps that precede the stage of ascent. The greater the flexibility of the torso, the greater the flexibility of movement as a whole. (139.2015.1)

The correlation with the variable of strength is negative with the test of the motor range of the torso from standing. It appeared to us that the value of (r) calculated is greater than the value of (r) tabular at an error of (0.05). This is attributed to the fact that the correlation is inversely strong. The increase in force leads to an increase in the muscle section, which in turn came from the increase in muscle mass, as the force was extracted through the mathematical equation (mass x acceleration), as the relationship is direct between the mass and force. On an increase in muscular size, which leads to a decrease in flexibility (116.2021.2), the correlation is negative between work from the moment of ascent to the moment of descent, as work is (force x displacement / time) in the direction of force. Increase in work means increase in force, and increase in force means increase in mass leads to This leads to an increase in muscle size, and thus to a lack of flexibility in the range of motion of the torso from standing. (158.2012.3)

The correlation with the angle of the hip is positive from the front when shooting with the motor range of the torso from standing. The greater the angle of the torso

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from standing, the greater the angle of the torso when shooting, as the increase in the motor range means the ability to extend the torso forward more before shooting, and this helps to increase the angle of the hip from the front when shooting. (159.2017.5) Because the lack of flexibility of the torso leads to stiffness of the back before scoring, and this in turn leads to the player having to bend the torso more forward when scoring, which leads to the ball not entering the scoring ring and thus the lack of correct movement. (134.2007.4)

3-2- Presentation and discussion of the values of the biomechanical variables of the skill test and its relationship to the motor range of the torso from proneness to the skill of scoring by jumping with basketball

Table (2) Statistical description of some general biomechanical variables for the skill test and its relationship to the motor range of the torso from prone to the skill of scoring by jumping with basketball

biomechanical variables	measruing unit	Skill test		The calculated correlation value	error rate	Significance of differences
		m	s			
The height of the body's center of gravity at the moment of ascent	c.m	124.3	3.57	0.783	0.11	non-moral
Power	Newton	839.12	82.34	0.79-	0.21	non-moral
work between ups and downs	Joule	1327.43	81.22	0.101-	0.02	moral
leg angle	degree	153.11	13.27	0.71	0.24	non-moral
arm angle	degree	60.01	7.18	0.34	0.82	non-moral
The angular velocity of the throwing arm	degree/sec	1863.13	249.17	0.27	0.79	non-moral
The distance between ascent and descent	c.m	59.13	9.41	0.67-	0.29	non-moral
Push to climb to reach the highest point	kg m/s	193.18	49.21	0.46-	0.58	non-moral
The angular velocity of the leg	degree/sec	271.02	64.13	0.49	0.47	non-moral
horizontal speed	meters/sec	8.11	23.41	0.21	0.27	non-moral
vertical speed	feet / minute	33.41	56.17	0.37	0.41	non-moral
hip joint angle	degree	169.15	8.93	0.04	0.121	non-moral
The horizontal distance to the center of gravity of the body	c.m	49.23	9.54	0.51-	0.19	non-moral

Significance level if the value of the error percentage d (0.05)

Inverse significant correlation between work from the moment of ascent to the moment of descent, where the value of significance was (0.01) at the level of

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significance (0.05), where work = force × displacement WFD (209.2019.9) 'Increasing work means increasing force and increasing force means increasing mass and increasing mass It means an increase in muscular size that leads to a lack of flexibility in the motor range of the trunk from prone, as it is in a stage between the point of ascent to the point of descent that needs to convert the potential energy into a kinetic state more than we need to use the resulting work of great force and distance where the force is collected from During the motor transfer by approaching steps and swinging the arms, there was no significant correlation between the rest of the variables and the motor range of the torso from supination. (176.2002.10)

The fourth chapter

4- Conclusions and recommendations

4- Conclusions:

- The motor range of the torso from standing has an effective and positive role in both the height of the body's center of gravity at the moment of ascent and the angle of the torso at the moment of shooting by jumping with basketball
- The motor range of the torso from standing has an inverse relationship with both the height of the body's center of gravity at the moment of ascent to the maximum height and work from the moment of ascent to the moment of descent.
- The range of motion from proneness has an inverse relationship with work from the moment of ascent to the moment of descent.

4-2 Recommendations:

- Paying attention to the general and specific physical elements of the basketball player, especially the motor range of the torso. Paying attention to the biomechanical aspects of the skill of scoring by jumping because it increases performance efficiency.
- Use other variants using the force platform
- Carrying out similar research, but on other skills, because it is similar to the skill of shooting by jumping
- Using different biomechanical variables, but on other skills
- The trainers in the field of training should take into account the biomechanical variables, as they work to modify and correct the training paths

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Sources

1. Raysan Khraibet Majid Najah Mahdi. Kinetic Analysis International Scientific House for Publishing, Amman, 1st Edition, 2002.
2. Sareh Abdul Karim Al-Fadhli Definition Applied Biomechanics Human Sciences Movement Sciences The Comprehensive Sports Library. 2015
3. Sareeh Abdel-Karim Al-Fadhli, Applications of Biomechanics in Sports Training and Motor Training. 2007
4. Sareh Abd al-Karim al-Fadhli Wahbi Alwan al-Bayati, Biomechanics and Mathematical Biomechanics, Beirut, Al-Ghadeer Press for Modern Art Printing. 2012
5. Essam Abdel Khalek Mostafa. Sports training, "Theories and Applications", Alexandria Knowledge Facility, second edition, 2005
6. Muhammad Hassan Allawi, Motor Performance Tests, Dar Al-Fikr Al-Arabi, Cairo, 2nd Edition, 2000.
7. Moataz Khalil, Emad Tohme, Technique and Tactics in Basketball, Dijla Publishing House, Jordan, 2020
8. Najah Mahdi Shalash, Biomechanics of Sports Performance, National Book and Documentation House for Publishing, Basra. 2010
9. Chen HB, Yang KH and Wang ZG, Biomechanics of whiplash injury,Chin J Traumatal 2021.
10. Goosey, T.V., Butterworth, D. and Morriss, C. Free Throw Shooting Technique of Male Wheelchair Basketball Players, Adapted Physical Activity Quarterly, 2018