



The effect of muscle stretching exercises on the peripheral speed of the throwing arm and achievement in discus throw for people with disabilities, category F34.

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Abstract. Flexibility exercises (muscle stretching) are physical exercises that aim to improve and develop some motor skills. Given the importance of muscle strength in the skill performance of discus throwing for people with disabilities, the longer the muscle, the greater the force it gives, which is directly proportional to the distance achieved by the thrower. The ability of the muscle to stretch, which reaches half the length of the muscle, gives greater strength and speed to the arms when performing. This comes through some exercises for the thrower's arm that contribute positively to this aspect. The aim of the study was to identify the effect of muscle stretching exercises on the peripheral speed of the throwing arm and achievement in discus throwing for people with disabilities in the F34 category sitting. The hypothesis of the research was that there were statistically significant differences between the pre- and post-tests in the peripheral speed of the throwing arm and achievement in discus throwing for people with disabilities in the F34 category sitting, in favor of the post-test. The researcher used the experimental method using the single-group method, and muscle stretching exercises were used for the throwing arm to increase its ability to develop peripheral speed as well as achievement. The exercises continued for (6) weeks with (3) training units per week. After conducting the post-tests, the researcher concluded:

1. INTRODUCTION

Muscle stretching is an important physical characteristic in many sports events. Many researchers and specialists have addressed the characteristic of flexibility to develop and improve some motor abilities in most sports events, especially in the discus throwing event. The more muscle tension increases, the more power it gives to the thrower's arm. Extending the radius of the discus thrower's arm increases the peripheral speed. Extending the arm to the farthest point gives the disc a greater circular speed before the tool is launched, which contributes positively to achieving high achievement and winning the competition. There has been a noticeable turnout by people with disabilities to practice sports, and the world has become sympathetic to them and has taken their role in the sports community through their insistence on practicing events. Therefore, the sport of the disabled is no less important than the sport of the healthy. Just as the sport of the healthy had goals, in contrast, there is something similar in the sport of the disabled, as the practice of sports for the disabled is of utmost importance that may exceed its importance for the healthy, such as being therapeutic,

physical, social or rehabilitative for the disabled" (2: 21-22) Therefore, this sport has become its primary goal, integrating these categories of disabled sports with normal sports and achieving sports achievements in various sports events, "since the primary goal of disabled sports is to reconnect with disabled individuals and help them integrate into society in a way that develops and improves their psychological tendencies and mental and physical abilities" (4:40). Athletics had a major role in organizing their tendencies and abilities according to the type of disability and classifying it according to the laws and medical foundations of sports. Muscular strength has great importance in achieving accomplishment in many sports events, especially discus throwing events for people with disabilities (F34). Since the researcher is a former discus thrower and follows many local and international championships and is aware of the importance of this event, and through some procedures and tests, the researcher noticed that there is weakness in the muscle strength and peripheral speed of the thrower's arm. He attributes this weakness to the extension, as some players do not fully extend the throwing arm when performing, and thus do not achieve the distance that leads them to win the competition. Therefore, the researcher decided to delve into this study. Therefore, the importance of the research lies in providing muscle stretching exercises because of their importance in increasing the radius of rotation, which is reflected positively on the throwing distance. The aim of the study:

To identify the effect of muscle stretching exercises on the peripheral speed of the throwing arm and achievement in throwing the discus for people of determination, category F34

2. METHOD AND PROCEDURES

The experimental method was used in the homogeneous single-group method to suit the problem of the experimental design of the research. As for the research sample, the research sample was chosen randomly, and they are discus throwers from category F34 sitting in Qadisiyah Governorate, numbering (6) players out of a community of (19) players representing the Middle Euphrates region (Babil, Muthanna, Najaf and Diwaniyah) with a percentage of (31.5%) of the research community

Table (1) shows the homogeneity of the research sample in age, training age and weight.

Indicators	Unit of measurement	Arithmetic mean	Standard deviation	Difference	Coefficient of skewness
Arm Length	cm	77.833	4.215	5.415	-1.576
Chronological Age	year	32.000	3.098	9.682	-1.510
Training Age	year	5.167	0.753	14.570	1.828
Peripheral Velocity	meter/second	11.333	2.160	19.061	-0.414
Achievement	meter	23.667	2.733	11.546	-1.608

3. MEASUREMENTS USED IN THE RESEARCH

- Measuring peripheral speed:

Kinematic analysis is an effective tool in extracting mechanical variables, as "analysis in the sports field is one of the important sciences that depend on other sciences such as anatomy, mechanics, physics and mathematics, so it is not possible to conduct an analysis of sports movements without completing all the elements affecting performance" (3: 139), and thus the peripheral speed of the arm was extracted through video recording, where a Japanese-made (SONY) video camera was used at a speed of 100 frames per second to extract the variable of peripheral speed of the throwing arm by placing a camera from above at a height of (3.10) m, and the kinetic analysis program (KINOVEA) was used to extract the value of peripheral speed

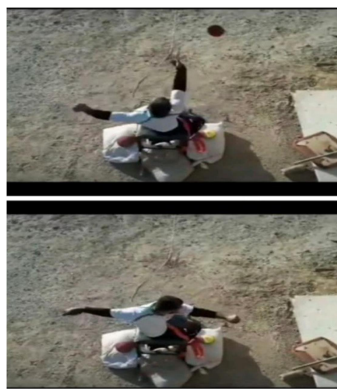


Figure (1) shows the discus throw analysis.

- Discus throw measurement (1) kg:

- Purpose of the test: Measure the achievement of discus throw
- Tools used: Disc weighing (1) kg, number (2), measuring tape.

- Test specifications: The player sits on the throwing chair and holds the disc (1) kg and the player throws.
- Test conditions: The player is given three attempts, the best attempt is recorded.
- Recording: Calculating the distance and choosing the best attempt from the three.

Main experiment:

After (7) days of conducting the exploratory experiment to identify difficulties and obstacles, the main experiment was conducted by conducting pre-tests on Friday, 6/9/2024, at the Diwanayah Sports Club stadium, and the variable of the peripheral speed of the throwing arm was extracted, as well as the achievement distance. Two days later, muscle stretching exercises were performed on 9/9/2024 until 19/10/2024.

The exercise vocabulary included muscle stretching for the working muscles and opposing muscles participating in the performance using the fixed and moving stretching method on the experimental research sample during the special preparation period. The components of the training load were taken into account in developing muscle stretching and were applied at the beginning of the main section with gradual giving of intensity and difficulty of the exercise. The training took two months with three training units per week on (Monday, Wednesday and Saturday) and the number of units reached (16) training units. After the end of the training period, the post-test was conducted on the Diwanayah Club field on Monday 10/21/2024 and the values of the variables were extracted: peripheral speed and achievement in throwing the discus.

Results:

Table (2)

shows the statistical means in the pre- and post-test and the value of (t) for the tests used in the research

Tests	Unit of measure	Pre-test		Post-test		Calculated value of (t)	sig
		s	a	s	a		
Peripheral Velocity	meter/second	11.333	2.160	15.833	1.472	7.04	0.00
Disc Throw Achievement	meter	23.667	2.733	32.000	2.000	12.27	0.00

4. DISCUSSION OF THE RESULTS

Through Table (3), significant differences appeared in the post-test for the variables of peripheral speed and achievement in throwing the discus for the experimental research group. The researcher attributes this to the fixed and moving muscle stretching exercises because of their great importance in extending the throwing arm, which increases the radii of the arm and thus increases the peripheral speed according to the biomechanical laws. This development occurred as a result of applying the exercises according to the working and opposing muscles participating in the performance, which included fixed and moving stretching exercises at high speeds for the throwing arm through exercises prepared specifically for it, which led to an increase in the speed of the throwing arm to some extent. In addition to that, the body parts worked towards the motor duty of the skill in order for the discus to acquire the maximum possible speed, as it was proven that "in order for the tool to acquire the maximum speed, the body levers must work on the movement and in the correct direction, because the rapid movement carried out by the body levers enables us to obtain the maximum force that serves the player in achieving the goal of the movement, which is represented by the high speed of the tool" (5: 54). The moral development in the variable of achievement in throwing the discus for this category of people with special needs is the result of the development in peripheral speed because it is one of the important factors that gave better results, which increased the morale of achievement for the research group, as well as the role of the players in commitment and continuity in training throughout the training period. The experiment helped in this matter, and this was confirmed by (Abu Al-Ala and Ahmed), quoting (Wilmore and Castel), "that most of the changes resulting from training occur during the first period of the program within 6-8 weeks" (1: 206)

5. CONCLUSIONS

- 1- Fixed and moving muscle stretching exercises have a positive effect in increasing the radii of the throwing arm, which increased the peripheral speed of the throwing arm in throwing the discus for people with disabilities, category F34
- 2- Developing peripheral speed using fixed and moving muscle stretching exercises contributed significantly to developing achievement in throwing the discus for people with disabilities, category F34

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