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The effect of special rope training on developing agility, strength characterized by speed, and performing the counterattack skill (direct - indirect) in the sword weapon

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Abstract

The goal of the research is to prepare special training exercises in jumping ropes and in the variation and diversity of the training units and from one starting line before implementing the training units in developing agility and strength characterized by speed because it is of great importance in most sporting activities and events, most of them, especially fencing, and every fencer must possess these abilities and qualities. Because it is one of the basic characteristics of the components of physical preparation

The comprehensive and integrated preparation for this sport in accordance with the scientific method based on choosing the correct training methods and means is the success of every training work, and the principle of developing the characteristic of agility and strength distinguished by speed through training and linking them in precise performance in the implementation of any offensive skill or defensive counter-skill by both competitors has been used. The researcher, the experimental method, while the research community was represented by trained players participating in the Babylon University Private Championship, which was called (University Fencer Championship). The research community was (45) trained players in the college, from whom a number of (30) players were selected using the intentional method with the first thirty positions, and they were They were divided into two experimental groups, and after conducting homogeneity and equivalence and conducting pre-tests for them, the training was carried out for them for (8) weeks, each week two training units for (16) training units. After that, the post-test was conducted under the same conditions for them while performing the pre-test. The researcher used the statistical bag to analyze the values for the tests and they were Conclusions reached by the researcher:

1. The jumping exercises had an effective impact on the players.
2. The intensity of these jumps and movements and the type of jumps used had an impact on the level of players' performance.
3. These exercises brought about development in the agility, strength and speed of the fencing players.

Keywords: Rope ,training ,agility, strength and performing.

Introduction

Scientific progress brings new horizons. Everyone today seeks to achieve sporting achievements by keeping up with the latest training methods used to develop the level of sports performance. Through the science of sports training and harnessing this science to serve sports performance because of its established principles and rules upon which it relies and from which its material is derived. There is no doubt that sports training has general rules, as what researchers followed in developing sports performance in appropriate and correct contexts was intended to serve society.[1]

The sport of fencing requires the performance of different and fast movements that require the player to move from offensive to defensive skills with consistency, fluidity, and extreme precision of movement because they are closely related to each other, and the fact that fencing skills require players to possess the characteristic of agility and strength distinguished by speed, because it is one of the qualities that helps them in doing By performing the various skills of the game, including the Counter Repost skill, which is one of the most important and powerful offensive skills, as the attacking player performs it to respond to the defending player against the attacking move by the attacker. The response can be performed once, or a second, or a third, or even a fourth time, until the touch is achieved or the sentence ends. Attacking during the counterattack movement, and because it has a fundamental impact on the results of the matches.[2]

By focusing on developing these two qualities according to training curricula based on sound foundations and working to direct the players' attention to accuracy in performance and correct timing, they will take precedence in touch. The importance of researching jumping exercises according to specific programs, stresses, and techniques within the prepared training unit lies in the development of agility and strength characterized by speed, using different intensities limited to (85-90%).

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As for the problem of the research: The researcher, a player, coach, and teacher of that sport, found that jumping exercises had a role in developing the agility that the players needed, as well as the strength distinguished by speed, as both were observed directly by the researcher as well as through video recordings of the matches to confirm that their level was low among the participating players during the tournament, so The researcher decided to delve into this problem.

Research objectives

1. Preparing jump rope exercises to develop agility and strength characterized by speed and performing the skill of direct and indirect counterattack.
2. Identify the effect of jump rope training on developing agility and strength characterized by speed and performing the skill of direct and indirect counterattack with the sword.

Researcher hypothesis

1. There is a positive effect on the exercises related to jumping rope, the type of jumping, and the intensity used in developing agility and strength characterized by speed, and performing the skill of direct and indirect counterattack in the sword weapon.
2. There is a positive effect, in favor of the post-test, of the experimental group on agility, strength characterized by speed, and performance of the direct and indirect counterattack skill in the sword weapon.

Research field

- Human field: Trained players at the College of Physical Education and Sports Sciences, University of Babylon.
- Time frame: period from 1/13/2020 to 3/24/2020.
- Spatial field: The closed dueling hall in the College of Physical Education, University of Babylon.

Research methodology

The researcher adopted the experimental method using the equivalent groups method because it suits the nature of the research problem.

Research community and sample

The research community was chosen intentionally, and they are fencing players in the College of Physical Education and Sports Sciences. The research community (45) students, a sample of whom was selected by a simple random method, as the number of sample members reached (30) players, representing (66%) of the research community after that. The researcher divided the members of the research sample into two experimental groups (control and experimental). The number of members of one group was (15) players. The researcher conducted homogeneity to individualize the research sample in variables (height, weight, age) and in tests of agility and strength characterized by speed, and a performance test for the counter-response for each group through Find the coefficient of variation as in Table (1).

Table 1. Show the coefficient of variation

Variables		**First group**			**Second group**		
		mean	**STDEV**	**Variance**	**mean**	**STDEV**	**Variance**
Anthropometric measurements	Length (cm)	176.18	3.43	1.946	175.16	6.35	3.62
	Weight (kg)	74.95	7.61	10.287	72.05	5.09	7.07
	Age (years)	22	1.34	5.527	22.26	1.27	5.27
Speed-tested strength tests	Arms (number of times)	9.77	1.50	15.261	9.21	1.01	11.02
	Trunk (number of times)	9.34	1.63	16.490	10.54	1.59	15.16
	The legs Right	5.82	0.81	13.910	5.24	0.58	11.04

	(meter)	Left	4.89	0.40	8.246	4.94	0.59	11.91
Skill	Counter-response test		18.40	3.14	17.115	17.65	2.84	16.10

Table 2. Shows the equivalence between the two samples, starting on one line, showing the equivalence of the two groups in the level of skill performance of the counter-response

Tests	**Control group**		**Experimental group**		**Calculated (t) value***	**Type of significance**
	mean	**STDEV**	**mean**	**STDEV**		
Testing the technical performance of the direct counterattack skill	2.98	0.704	2.97	0.998	0.040	No Sig.
Testing the technical performance of the indirect counter-response skill (with change)	2.50	0.426	2.54	0.512	0.231	No Sig.

*Tabular t value = (2.048) at significance level (0.05) and degree of freedom (28)

From Table (2) we notice that the calculated (t) value reached (0.040), which is smaller than the tabulated (t) value of (2.048) and (0.231). This indicates the presence of non-significant (random) differences between the two groups in the level of direct and indirect response skill performance, which It indicates the equality of the sample.

Training units

The exercises were applied to the experimental group under the following conditions:

1. The duration of the training is (8) weeks
2. Distribution of training units at two units per week
3. The total time of the training unit was (40) minutes. The special strength training exercises lasted for (5 minutes - 10 minutes), of which (30 - 35) minutes were allocated to the combined attack.

The implementation of the exercises began according to the college schedule in the fencing lesson two days of each week for the control group and the second experimental group on a date, and the days were Monday and Wednesday. The implementation of the research experiment was supervised by the researcher and was implemented by the second teacher of the subject. Strength training (power) is a simple follow-up to power training. These exercises improve anaerobic capacity, vertical acceleration, grip strength, and starting speed, and are among the goals of these exercises.[3]

- Increase ankle, knee and ankle strength
- Adapting the muscles of the back, shoulders and chest
- Increasing the sensory effects of the muscle fibers of the feet, knees and ankles
- Increase the strength of the leg, quadriceps femoris muscle, and leg tendons
- Developing vertical and lateral jump

To establish a single starting line for these exercises before implementing them through the basic power jumps (meaning each rotation of the rope for each jump), the technique that will be used for all exercises represents the special strength (power), and this is also considered the pre-test for agility, table (3) shows this.

Table 3. Show agility pre-test

Time/3 speed sets	**Repeat Jump Ability Calculate reps for each set**	**Starting Line Calculate the sum and divide it by 3**
30 seconds	40 jumps	126 jumps ÷ 3 = 42 starting lines
30 seconds	45 jumps	

30 seconds	41 jump	

Table 4. Show the training unit, the method of the jump, the technique, the alternating foot step, and the power jump, implemented in the first week and the second week

Training method	- 8 repetitions - alternating foot step - 4 successive repetitions of the power jump without interruption - 3 Repeat the method for 30 seconds - Repeat the performance 5 times
Duration	5 minutes: 2.5 minutes jumping, 2.5 minutes rest
Distress	Jumping hard: 85-90% of maximum heart rate
The goal	Maintaining the same speed from the beginning of the alternating foot step until the power jump, while reducing rest periods between sets

Table 5. Show the training unit, the technique jump method, the alternating foot step, and the power jump, are carried out in the third and fourth weeks

Training method	- 8 repetitions- (counting the right foot 4 times) - 8 successive repetitions of the power jump without interruption - Repeat the method for 60 seconds - Rest 60 seconds - Repeat the performance 3 times
Duration	6 minutes: 3 minutes jumping, 3 minutes rest
Distress	Jumping at an intensity of 85-90% of maximum heart rate
The goal	Maintaining the same speed from the beginning of the alternating foot step until the power jump, while reducing rest periods between sets

Table 6. Show The training unit, the technique jump method, the alternating foot step, and the power jump, are carried out in the fifth and sixth weeks

Training method	- Power jump 30 seconds - Rest 30 seconds - Repeat the performance 5 times
Duration	5 minutes: 2.5 minutes jumping, 2.5 minutes rest
Distress	Jumping intensely: 85-90% of maximum heart rate, or 80-120 repetitions per minute
The goal	Move forward and backward while jumping, while minimizing rest periods between sets

Table 7. Show The training unit, the technique jump method, the alternating foot step, and the power jump, are carried out in the seventh and eighth weeks

Training method	- Power jump 60 seconds - Rest 60 seconds - Repeat the performance 5 times
Training method	10 minutes: 5 minutes jumping, 5 minutes rest

Duration	Jumping intensely: 85-90% of maximum heart rate, or 80-120 repetitions per minute
Distress	Move forward and backward while jumping, while minimizing rest periods between sets

Posttests

As for the post-tests, they were carried out after the exercises were carried out on the above units, and in the same context as the pre-tests, and in the same circumstances, the post-tests were given on 3/14-17/2023.

Results and discussion

Table 8. shows the values of the means, standard deviations, and the calculated T value for the speed-discriminated strength test for the arms for the experimental and control groups

Tests	Pretest		Posttest		Calculated (t) value*	indication
	STDEV	mean	STDEV	mean		
Experimental group	9.86	1.505	14.20	1.264	8.018	Sig.
Control group	9.20	1.014	14.80	1.567	12.018	Sig.

* Tabular (t) value at degree of freedom (14) significance level (0.05) = 2.145

Table (8) and Chart (1) show the means and standard deviations for the forward leaning of the arms test for the two groups. The mean for the pre-test, respectively, was (9.86) (9.20), while the standard deviation was (1,505) (1,014), while it was (1,014). The mean of the post-test was respectively (14.20) (14.80), while the standard deviation was respectively (1.264) (1.567). To determine the significance of the differences between the two tests, the (t) test was used, as its calculated value was respectively (8.018) (12.018). When comparing it to the tabulated value of (2,145), it was found that the calculated value is greater than the tabulated value.

This means that the difference between the two tests is significant and in favor of the post-test. From Table (8), it appeared that there is a significant difference in the results of the two groups, which indicates that the exercises used in training the players have affected the development of the characteristic of strength characterized by speed. The researcher explains this development in the muscles of the arms and the strength of anchorage to the jump rope exercises, as it led to the stimulation of the muscle fibers.[4] Necessary, which led to the development of the characteristic of strength characterized by speed, because when the muscle is exposed to a stimulus, it is either completely affected or part of it may be affected, and this depends on the distinctive intensity of this stimulus. In addition, the training was influential and directed. (Been) states that strength improves as a result of regular training, especially If this training contains resistances appropriate to the players' abilities, with a gradual progression in these loads according to the improvement of their abilities.[5]

Table 9. shows the values of the means, standard deviations, and the value of (t) calculated for the test of strength characterized by speed for the trunk muscles for the experimental and control groups

Tests	**Pretest**		**Posttest**		**Calculated (t) value***	**indication**
	STDEV	mean	STDEV	mean		
Experimental group	9.33	1.632	11.93	1.533	4.880	Sig.
Control group	10.53	1.597	12.80	1.320	4.279	Sig.

* Tabular (t) value at degree of freedom (14) and significance level (0.05) = 2.145

Table (9) and Chart (2) show the means and standard deviations for the speed-discriminated strength test for the trunk muscles for the two groups. The mean for the pre-test was respectively (9.33) (10.53), and the standard deviation was (1.632) (1.597), while The mean for the post-test was (11.93) (12.80), while the standard deviation was (1,533) (1,320), respectively. To determine the significance of the differences between the two tests. The (T) test was used, as the calculated value respectively reached (4,880) (4,279), and when compared to the tabulated (t) value of (2,145), it was found that the calculated value was greater than the tabulated value. This means that the difference between the two tests is significant and in favor of the post-test.

It appeared that there was a significant difference between the results of the two groups, which indicates that the development that occurred in the characteristic of strength characterized by speed of the torso muscles is attributed to the development of strength and speed and their appearance in one form, as many sources mentioned that the greater the muscular strength, the easier it is to overcome resistances as the speed increases .[6] Because muscular strength has a major role in developing physical qualities such as speed and endurance, therefore, rope exercises have an impact on developing the strength of the torso muscles, which led to a rapid reduction in the test performance time, which was reflected positively in the test results. This confirms that jumping rope exercises are one of the best methods for developing the strength characteristic.[7]

- **Presentation, analysis and discussion of the results of the counter-response test**

Table 10. shows the means, standard deviations, and calculated and tabulated (t) values between the pre- and post-tests for the direct counter-response test

Tests	**Pretest**		**Posttest**		**Calculated (t) value***	**indication**
	STDEV	mean	STDEV	mean		
Experimental group	8.57	0.78	4.28	0.42	2.50	Sig.
Control group	21.51	0.63	6.92	0.51	2.54	Sig.

* Tabular (t) value at degree of freedom (14) and significance level (0.05) = 2.145

Table (10) shows the results of the direct counter-attack test for the two research groups between the pre- and post-tests. The mean for the control group in the pre-test was (2.50) and the standard deviation was (0.42), and in the post-test the mean was (4.28) and the standard deviation was (0.78). By extracting the calculated (t) value of (8.57), it turns out that it is greater than its tabulated value of (2.14) at a degree of freedom (14) and at a significance level of (0.05). This indicates that there is a significant difference between the pre- and post-tests for the control group and in favor of the post-test.

As for the experimental group, the mean of the pre-test is (2.54) and the standard deviation is (0.51), and the mean of the post-test is (6.92) and the standard deviation is (0.63), and by extracting the calculated (t) value of (21.51) it turns out that it is greater than its tabulated value of (2.14). At a degree of freedom (14) and at a significance level (0.05), this indicates that there is a significant difference between the pre- and post-tests for the experimental group and in favor of the post-test.

- **Presenting, analyzing and discussing the results of the direct counter-response skill test between the control and experimental groups in the post-test**

Table 11. shows the mean, the standard deviation, and the calculated and tabulated (t) value for the experimental and control groups in the post-test to test the direct counter-response skill

Test	**Control group**		**Experimental group**		Calculated (t) value*	**indication**
	mean	STDEV	mean	STDEV		
Direct counterattack skill	4.28	0.78	6.92	0.63	10.19	Sis.

*Tabular (t) value = (2.048) at a significance level (0.05) and at a degree of freedom (28)

Table (11) shows that the mean of the control group in the post-test is (4.28) and the standard deviation is (0.78). As for the experimental group, its mean is (6.92) and the standard deviation is (0.63). By extracting the calculated (t) value of (10.19), it turns out that it is greater From its tabular value of (2.048) with a degree of freedom (28) and a significance level of (0.05), this indicates that there is a significant difference between the two groups in the post-test and in favor of the experimental group.

- **Presenting, analyzing and discussing the results of the indirect counter-response skill test regarding the change between the control and experimental groups in the post-test**

Presentation, analysis and discussion of the results of the technical performance test for the indirect counter-response to change

Table 12. shows the means, standard deviations, and calculated and tabulated (t) values between the pre- and post-tests for the technical performance test, the indirect counter-response with change

Tests	Pretest		Posttest		Calculated (t) value*	indication
	STDEV	mean	STDEV	mean		
Experimental group	5.58	0.58	4.41	0.70	2.97	Sig.
Control group	10.006	0.81	5.76	0.99	2.98	Sig.

*Tabular t value = (1.76) at significance level (0.05) and degree of freedom (14)

It is clear from Table (12) that there are differences in the values of the means between the pre- and post-tests, as the mean for the control group in the pre-test was (2.97) and the standard deviation (0.70), and in the post-test the mean was (4.41) and the standard deviation (0.58). To find out the true differences between the pre- and post-measurements, the researcher used the (t) test, from which the results indicated that the differences are significant because the calculated value of (t) is greater than the tabulated value of (1.76) at a degree of freedom (14) and a significance level of (0.05), and this indicates There was a significant difference between the pre- and post-tests for the control group, in favor of the post-test.

As for the experimental group, the mean of the pre-test is (2.98) and the standard deviation is (0.99), and the mean of the post-test is (5.76) and the standard deviation is (0.81). To find out the true differences between the pre- and post-measurements, the researcher used the (t) test, from which the results indicated that the differences Significant because the calculated value of (t) is greater than the tabular value of (1.76) at a degree of freedom (14) and a significance level of (0.05). This indicates that there is a significant difference between the pre- and post-tests for the control group and in favor of the post-test. It is noted from the values of the previous table (5) that the experimental and control groups achieved statistically significant differences between the pre- and post-tests, in favor of the post-test. The researcher attributes this to the training exercises for each of the two groups, which had a positive impact in developing the level of technical performance of the numerical attack.[8]

Table 13. shows the mean, the standard deviation, and the calculated and tabulated (t) value for the experimental and control groups in the post-test of the technical performance test, the indirect counter-response of change

Test	Control group		Experimental group		Calculated (t) value*	indication
	mean	STDEV	mean	STDEV		
The skill of counter-response is indirect by change	4.41	0.59	5.77	0.82	5.16	Sis.

Table (13) shows that the mean of the control group in the post-test is (4.41) and the standard deviation is (0.59). As for the experimental group, its mean is (5.77) and the standard deviation is (0.82). By extracting the calculated (t) value of (5.16), it turns out that it is greater From its tabular value of (1.701) at a degree of freedom (28) and at a significance level (0.05), this indicates that there is a significant difference between the two groups in the post-test and in favor of the experimental group.

It is noted from the values of the previous table (13) that the experimental group achieved statistically significant differences between the pre- and post-tests and in favor of the post-test. The researcher attributes this to the fact that the rope jumping exercises, the training units, the intensity, the training volume, and the intensity of the rated load had a major role in developing performance through... Developing speed and agility in movement performance and in fencing, especially the counterattack. The trained athlete needs agility and speed in performance, and all of this has a positive impact in developing the level of skill performance.[9]

Table 14. Shows the means, standard deviations, and the calculated (t) value and type the difference between the two groups during the post-test: the strength and speed of the arms

Groups	mean	STDEV	df	Significance level	(t) value		Type of difference
					The calculate	Tabulation	

					d one		
Control	14.2	1.26	38	0.05	4.51	2.02	Sig.
Experimental	14.8	1.56					

To find out the truth about the differences between the means, the value of (t) was calculated for the uncorrelated samples, which reached (4.51), which is greater than the value of the tabular (t) which amounts to (2.02) at a degree of freedom (38) and an error rate of (0.05). This indicates the presence of statistical differences. Significant between the two groups and in favor of the experimental group.

Table 15. Shows the means, standard deviations, calculated (t) value and type The difference between the two groups during the post-test: the characteristic strength of the back muscles

Groups	**mean**	**STDEV**	**df**	**Significance level**	**(t) value**		**Type of difference**
					The calculated one	Tabulation	
Control	12.8	1.53	38	0.05	4.78	2.02	Sig.
Experimental	11.93	1.32					

Table 16. shows the pre- and post-tests of the agility test for both the experimental and control samples

Groups	**Test**					Significance level	(t) value	Type of difference
	Pretest			**Posttest**				
Experimental	**Units**	mean	STDEV	mean	STDEV	0.00	10.277	Sig.
	number of jumps	41.66	1.112	46	1.113			
Control	number of jumps	40.933	0.961	42.266	0.961	0.001	-4.183	Sig.

When observing Table (16) and the values in it, it becomes clear to us in the agility test that there is a difference between the pre-test and the post-test, as the mean for the experimental group was (41.66) jump and deviation (1.112). This was in the pre-test, which was adopted as a single starting line for both groups, as detailed in Table for the pre-test. When looking at the mean and deviation for the post-test, which was (46) and deviation (1.113), as for the control, its means were (40.933) and (42.266) and deviation (0.961) for both pre- and post-test. It is clear from all of this that there is a difference in the number of jumps in favor of both groups.

Table 17. shows the post-measurement of the jumping agility test for the control and experimental groups

Test	**Control**		**Experimental**		**(t) value**	**Type of difference**
	mean	STDEV	mean	STDEV		
Agility skill	42.266	0.961	46	1.133	9.727	Sig.

* Sig value (0.00) at error level (0.05) for sample 30

When looking at the values after conducting the measurement and statistical analysis, it became clear that there was a clear difference in the post-test and in favor of the experimental group that was trained according to a program prepared and codified by the researcher, as this program affected the training, intensity, diversity in jumps, and increased training volumes, with the stability of the training for the type of exercise beyond mastery and stability. The performance of the

trained players.[10] The repetitions carried out and the rest periods were appropriate for the research sample. This is what requires sports training when training any sporting event in order to reach the best level for the players, whether in fencing or any other game or event. The training exercises were in accordance with the prepared program. Their training targeted the strength and speed of the arms. And also to the torso muscles and the agility of movement of the legs in rapid, alternating, and opposite jumps, and this is all that a fencing player requires,[11] in terms of agility of movement with constant speed, changing the positions of the body and legs with constant speed, which contributed to the development of performance in the direct and indirect counter-response by changing, because the counter-response in the sport of fencing is needed by the player. On the speed of movement in the arm and the agility of the leg in attack as well as defense, and that the counter-response is carried out by the players, whether a defender or an attacker. All of this must be trained in these situations in different ways and methods, including jumping rope with a variety of movements while maintaining the level of performance, a good fencer is a good trainee.[12]

Conclusions

1. The jumping exercises had an effective impact on the players.
2. The exercises within the training sessions were influential on the performance of the trained players in developing agility and strength characterized by speed for the research sample.
3. The training intensity for those jumps and movements and the type of jumps used were appropriate and had an impact on the level of players' performance in the counterattack skill (direct and indirect by changing).
4. These exercises brought about development in the agility and strength of the fencing players, especially the training group.

Recommendations

1. It is recommended to combine these jump rope exercises with other sporting events.
2. It is recommended to perform exercises on all other physical and motor abilities because they are effective in developing them.
3. The use of jump ropes and this program is recommended for players, whether in fencing or other sports, because of its impact on many physical, motor and skill abilities.

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