Improvements And Affection of Pilates Exercises Using the Functions of Physical Abilities and Breathing to Increasing on The Rating of Touch Speed for Fencing Players Abilities

Mohammed Salam Abdulsahib[1,2], Deena Mohammed Khalif[3]

[1]College of Engineering, Al-NahrainUniversity, Jadriya– Baghdad
[2]Faculty of Physical Education for Girls, Alexandria University, Alexandria, Egypt,
Mohammed_totti92@nahrainunvi.edu.iq
[3]College of Pharmacy - Mustansiriyah University

Abstract

The purpose of this study is to determine the influence of pilates exercises on a variety of physical abilities, particularly the motor speed, translational speed, quickness, and the strength of the leg muscles at different speeds, and flexibility. Further, the study is aimed at examining the effect of Pilates exercise on breathing functions. The sport-specific tasks taken in this study, were assessed the touch speeds rating for fencing players. Aouthers conducted on twenty fencing players. The sample was divided into two, with the experimental group comprising of 5 players subjected to the proposed training programme, which is the Pilates training, and the control group comprising of 5 players subjected to the traditional programme by the coach. Further, a sample of ten players was picked from the original fraternity and another five players outside the independent researcher's initial sample of 20 fencing players; they were not part of the sample. The researcher used the experimental design with two groups as its instrument and the pre-post score as the dependent variable. It was found that there were significant differences between the two groups, with physical abilities such as agility, speed, translational, strength, and speed of the leg muscles being superior in the experimental group based on the evaluation of the T value, which was 2.22, 2.98 4.84, 7.77, 8.27, for the experimental group and more than the T value for the control group. on the tabular value, which is (1.833), it is shown that the calculated T value is 6.24, which is accourding to the touche speeds the valued T represents a greater value that adopted. on the respiratory functions variables, it was shown that the rates of improvements were within (5. 52%-23.76%), which implied that Pilates exercise leads to a direct process of improvement. This difference is attributed to the instance of the proposed applications for that exercises programme.

Keywords: Pilates Training, Physical Abilities, Respiratory Functions.

1. Introduction

The advancement of scientific research has become a pivotal factor in the evolution of contemporary societies, with the objective of attaining the pinnacle of achievement in various

public domains, including the domain of sport. This objective is pursued by identifying and harnessing the diverse capabilities and energies of the human body, and by striving to derive the maximum benefit from the latest scientific theories and facts in the field of sport.

Problem statement:

Through the researcher's follow-up of numerous matches, it became evident that some fencers exhibited a low level of physical performance in the final rounds of matches. This may be attributed to the poor efficiency of their respiratory system. Within the limits of the researcher's knowledge, the development of physical fitness and functional efficiency of the respiratory system is an important matter that must be taken into account through specialised scientific research. This is due to the importance of Pilates exercises, as summarised by Emily Kelly (2001) in:

- Increases body flexibility - Increases and activates mental capacity - Redistributes body weight.
- Increases positive energy in the body - Increases self-confidence. Eliminates chronic pain in the body.

Furthermore, it was demonstrated that there is a close relationship between Pilates training and its fundamental principles (concentration, control, breathing, accuracy, flow) and the elements of physical fitness and the efficiency of physiological systems. This is evidenced by the fact that these principles can influence the elements of physical fitness and physiological responses.

The concept of the research was thus conceived, with the understanding that the focus on physical fitness is a crucial initial step in preparing an athlete to perform mathematical skills with optimal efficiency and minimal effort. Consequently, the researcher identified the research problem as the development of a Pilates programme to enhance certain physical fitness elements, including strength, speed, agility, flexibility, and respiratory functions. These include vital capacity (VC), short vital capacity (FVC), FEV1, inhalation capacity (IC), expiratory volume saved (ERV), and maximum flow value during exhalation. PEF This is corroborated by the findings of studies conducted by Ahmed Al-Shafei (2018) (1), Samer Al-Rifai (2017) (8), Amal Al-Sayed (2016) (4), Samah Mansour (2016) (11), Amal Abdullah (2009) (5), Salwa Moussa (2007) (10), Smith et al. (2006) (24), Blum (2002) (16) and Tom Baranowski et al. (2005) (25).

Aim of the research:

The objective of this study is to determine the effect of Pilates exercises on a number of physical abilities, including speed, leg strength, motor speed, transition speed, agility, and flexibility. Additionally, the study will investigate the impact of Pilates on respiratory functions, with the aim of improving the speed of touch for sword fencers.

The following research hypotheses were formulated:

1. The results demonstrated statistically significant differences between the pre- and post-measurements, with the post-measurements exhibiting superior performance for the physical variables under consideration (speed, power, motor speed, transition speed, agility, flexibility), respiratory functions and the rate of touch speed in the experimental group.

2. Statistically significant differences were observed between the pre- and post-measurements in favour of the post-measurements for the physical variables in question (speed characteristic power of the leg muscles, motor speed, transition speed, agility, flexibility), respiratory functions and the rate of touch speed in the control group.

3. The experimental group demonstrated a greater rate of improvement in the variables in question (speed characteristic force of the muscles of the legs, motor speed, transition speed, agility, flexibility), respiratory functions and the rate of speed of the touches, in comparison to the control group.

Terms and definitions:

Pilates: Pilates exercises

A series of physical movements designed to develop flexibility, endurance and balance of the body, accompanied by breathing patterns that affect not only the physical aspect but also the rehabilitation of the body in all respects.

Average speed of touches:

The number of touches a player makes in a competitive unit of time. Operational definition

Vital capacity: VC Vital capacity

The volume of the inspiratory reserve, in addition to the normal inspiratory air and the expiratory air reserve, is equal to the volume of air that can be expelled from the lungs after maximum inspiration.

Forced vital capacity (FVC)

The volume of air that can be expelled with maximum force and speed after a maximal inspiration.

FEV1: FEV1

is the volume of forced vital capacity expelled at the end of one second.

Inspiratory capacity: Inspiratory Capacity IC

It is the maximum volume of air that can be inhaled after a normal expiration and is equal to the volume of inhalation saved in addition to the volume of normal breathing.

Saved expiratory volume: Expiratory Reserve Volume ERV

The maximum volume of air that can be expelled from the lungs after a normal exhalation.

Research procedure:

To achieve the aim and hypotheses of the research, the researcher used the experimental approach with the design of two groups, one experimental and the other control.

The research sample:

The total research sample was purposively selected, consisting of (20) sword players under (17) years of age, and they were divided as follows:

Table 1: Ranking of overall research sample in percentages.

No	SAMPLE		Number	The club	Percentage
1	Top search terms	Experimental group	5	Nasr City sport	25%
		Control group	5	Nasr City sport	25%
2	Exploratory research sample		10	Tanta sport	50%
Total			20		100.00%

Survey studies:

Initial exploratory study:

In the period between 11/03/2018 and 11/08/2018, the researcher conducted a survey study with the objective of calculating the statistical coefficients required to characterise the total research sample in terms of growth rates, physical variables and the rate of touch speed on the survey research sample, as well as the number of players (12) at Tanta Sports Club.

Data Collection Methods

Hardware and Gadgets

1. Measuring tape – rubber ropes – agile ladders.

2. Fencing sword weapon – mask – glove – Feldcourt (electrical connection) – virgin).

3. The electronic device and the marker to measure the speed of the touches (designed by the researcher before) Appendix 7

4. Rustameter for measuring length in centimeters.

5. A medical scale to measure weight in kilograms.

6. A dynamometer to measure the strength of the muscles of the back and legs.

7. A dynamometer to measure grip strength.

8. Electronic Esperometer for measuring respiratory functions.

Data collection forms for the research sample:

- Data form for the total research sample, including (name – age – weight – training age). Appendix 1

- The names of the experts (7experts) whose opinions were taken in determining the research variables. Appendix 2

- The expert survey form on physical variables and respiratory functions is under research. Appendix 3

- Expert Survey Form on the proposed training program. Appendix 4

Tests: Appendix 6

- Speed strength test for the muscles of the legs (5 partridge test per leg), unit of measure (cm).
- Kinetic speed test (test run in place 15 seconds), unit of measure (number).
- Transition speed test (enemy test 30 meters from moving start), unit of measure (s).
- Agility Test (Bauer Zigzag Running Test), Unit of Measure (UOM) (D).
- Resilience test (2-second standing trunk flexion test), unit of measure (cm).
- Testing the average speed of touches (30seconds on the innovative electronic device and the person designed by the researcher before, the unit of measurement (touch/s).

Scientific parameters of physical tests, rate of speed of touches and respiratory functions in the baseline study:

In order to ascertain the specific physical tests and the rate of touch speed and breathing functions, the researcher conducted a review of the relevant scientific literature and previous studies in order to determine the physical attributes associated with the fundamental skills required for fencing, with a particular focus on those required for the fencing sword. A survey form was subsequently designed for experts (7) in order to ascertain these special physical attributes and the rate of touch speed and breathing functions in the fencing sword. The expert survey form was distributed to experts in order to determine the most important physical tests and the rate of touch speed and breathing functions in the fencing sword. The researcher presented these tests to experts and specialists in the field of fencing and selected the most appropriate ones in terms of repetition and percentages. The experts agreed unanimously on the validity of these tests to measure the physical and skill abilities under research.

Table 2: Special physical abilities, rate of speed of touches, dual respiratory functions under consideration, appropriate tests and unit of measure.

No	under consideration		Tests used	UOM
1	Physical Variables	Speed Characteristic Strength of Leg Muscles	Partridge test 5 partridges per man	cm
2		Kinetic speed	Test run in place 15 seconds	Number
3		Transition Speed	Testing the enemy 30 meters from a moving start	Seconds
4		Elegance.	Zigzag Running Test	Seconds
5		Resilience	Standing Torso Bending Test 2s	cm
6	Average speed of touches		30s touch rate test	touch
7	Breathing functions	Vital Capacity (VC)	Electronic Esperometer	liter
8		Fast Vital Capacity (FVC)		liter
9		Initial expiratory volume per second (FEV1)		liter
10		Inspiratory amplitude		liter
11		Saved Expiratory Volume (ERV)		liter

Second exploratory study:

In the period between 11/10/2018 and 14/11/2018, the researcher conducted a survey study with the objective of calculating the validity and stability coefficients of the physical and skill tests, as well as the tools used (the innovative and personal electronic device). The survey sample comprised ten sword players at Tanta Sports Club, all of whom were members of the research community and none of whom were part of the core sample.

Tabel 3: The present study examines the significance of the differences between two distinct and undifferentiated groups in terms of physical variables and the rate of touch speed. The exploratory sample comprises N1=N2=5.

No	Exams	UOM	Featured collection 5		Unmarked Group 5		Sweden, Communication No.	T value
			Hours	P...	Hours	P...		
1	Partridge test 5 partridges per man	cm	4.02	6.14	19.6	3.57	0.50	9.16
2	Test run in place 15 seconds	Number	4.00	0.55	4.84	0.36	0.84	3.14
3	Testing the enemy 30 meters from a moving start	w	5.74.	0.63	6.31	0.41	0.57	1.87
4	Zigzag Running Test	w	22.44	1.90	24.16	1.02	1.72	1.95
5	Standing Torso Bending Test 2s	cm	35.60	3.28	18.40	2.073	7.20	13.99
6	30s touch rate test	Females	0.98	0.04	0.89	0.08	0.09	2.36

The tabular (t) value is at a significance level of 0.05 = 1.81

Table 3 reveals statistically significant differences between the mean of the distinct group and the indistinguishable group in the physical variables and the average speed of touches (under research), indicating the validity coefficient (the validity of differentiation). This suggests that the tests are valid.

The overarching objectives of the Pilates training programme are as follows:

- Well-organized inhalation and exhalation - no pain during performance.
- Improved power characterised by speed - Improved motor and transmission speed - Improved motor flexibility.
- Improving agility - Improving the range of motion of the body joints - Raising the efficiency of the respiratory system.

The training volume of the proposed training program (Pilates trainings)

The duration of the training program was 6 weeks with 3 units per week (18 training units). The training program is divided as follows:

- 3 units for strength exercises characterized by speed and their numbers are as follows (1- 7 – 13)
- 3 units for motor speed exercises and their numbers are as follows (2- 8 – 14)
- 3 units for transitional speed exercises and their numbers are as follows (3- 9 – 15)

- 3 units for fitness exercises and their numbers are as follows (4- 10 – 16)
- 3 units for flexibility exercises and their numbers are as follows (5- 11 – 17)
- 3 units for exercises to raise the efficiency of the respiratory system and their numbers are as follows (6- 12 – 18)

Tabel 5: Load distribution

Week	First	Second	Third	Fourth	Fifth	Sixth
Severity	80 %	90%	70%	80%	90%	70%
Size	90mins	90mins	90mins	90mins	90mins	90mins
Comfort	21mins	22mins	16mins	21mins	22mins	16mins

Appendix 8

Basic study:

Pre-test:

The researcher conducted the pre-measurement of the experimental and control groups between the dates of 24/11/2018 and 28/11/2018 at the Nasr City Sports Club.

The application of the proposed training programme is as follows:

The researcher implemented the training programme (under research) for the experimental group between 1 December 2018 and 12 January 2019 at Nasr City Sports Club. This was preceded by verification of the moderation of the sample data and the administrative procedures for implementing the programme, as well as training in the correct breathing process (inhalation – exhalation).

post-test:

The researcher conducted the post-measurement of the experimental and control groups between the dates of 13/1/2019 and 16/1/2019 at Nasr City Sports Club. The conditions were identical to those of the pre-test measurement.

Statistical treatments:

The researcher employed the statistical software package SPSS (version 14) to perform the following statistical treatments:

The following statistical treatments were performed:

- Arithmetic mean – median

- Standard deviation

- Torsion coefficient

- Correlation coefficient of Pearson

- T-test to calculate the significance of differences

- Percentage to ascertain the extent of improvement
- Wilkinson test

2. View and discuss the results.

Table 6: The statistical significance of the differences between the pre- and post-measurements of the physical variables under consideration. For the experimental group, n = 5.

No	Variables	Exams	Pre-Test		Post-Test		Sweden, Communication No.	T value
			Mean	SD	Mean	SD		
1	Speed Characteristic Strength of Leg Muscles	Partridge test 5 partridges per man/cm	4.60	0.41	5.10	0.29	0.50	2.92
2	Kinetic speed	Test run in place 15 s/no	4.42	0.50	4.94	0.31	0.52	2.98
3	Transition Speed	Testing the enemy 30 meters from a moving start/s	6.33	0.41	6.12	0.39	0.21	2.27
4	Elegance.	Zigzag Running Test/s	24.96	1.11	23.90	1.75	1.06	4.22
5	Resilience	Standing torso flexion test for 2 s/cm	3.26	0.39	6.60	1.59	3.34	4.847

The tabular (t) value is at a significance level of 0.05 = 1.833

Table 6 reveals statistically significant differences at the 0.05 level between the pre- and post-measurements of the physical variables under study in the experimental group, with the post-measurement values exhibiting a greater degree of variation.

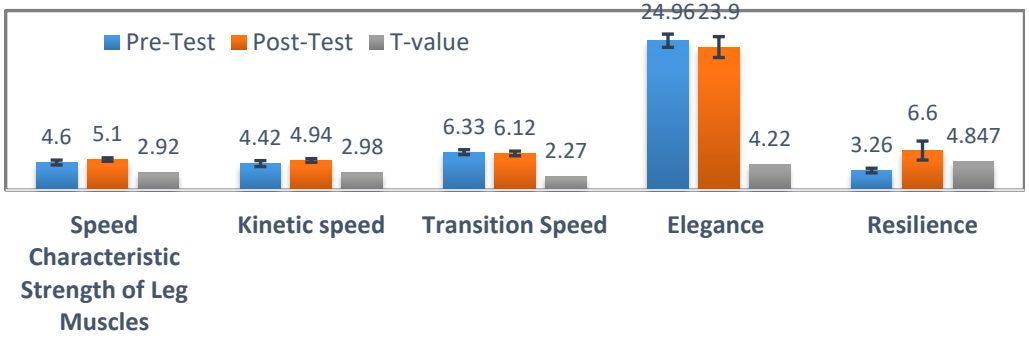

Figure (1) The statistical differences between the pre- and post-measurements of the physical variables under investigation for the experimental group are of significance.

Tabe 7: The statistical differences between the pre- and post-measurements of the average speed of the touches in question for the experimental group are of significance. For the experimental group, n = 5.

No	Variables	Exams	Pre-Test		Post-Test		Sweden, Communication No.	T value
			Mean	SD	Mean	SD		
1	Average speed of touches	30s touch rate test	1.12	0.10	0.95	0.05	0.17	6.24

The tabular (t) value is at a significance level of 0.05 = 1.833

Table 7 reveals a statistically significant difference at the 0.05 level between the pre- and post-measurements of the rate of touch speed in the experimental group, with the post-measurement exhibiting a higher value.

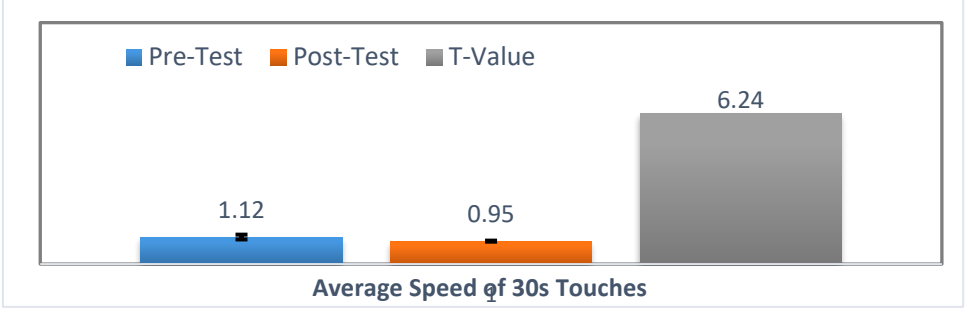

Figure (2) The statistical significance of the differences between the pre- and post-measurements of the average speed of touches under investigation for the experimental group.

Table 8: The statistical significance of the differences between the pre- and post-measurements of the variables under investigation in the experimental group. For the experimental group, n = 5.

No	Variables of respiratory functions	UOM	Pre-test	post-test	Difference between the two averages	Positive Ranks	Negative Ranks	z<v O >> ZO
1	Vital Capacity (VC)	liter	5.2	5.49	0.29	5	-	2.023*
2	Fast Vital Capacity (FVC)	liter	5.252	5.542	0.29	5	-	2.023*
3	Initial expiratory volume per second (FEV1)	liter	4.808	5.088	0.28	5	-	2.023*
4	Inspiratory amplitude	liter	2.816	3.32	0.504	5	-	2.023*
5	Saved Expiratory Volume (ERV)	liter	1.33	1.646	0.316	5	-	2.023*

Tabular Z value at 0.05 = ±1.96

Table 8 reveals that there are statistically significant differences between the pre- and post-measurements of the variables under study in the experimental group, with the post-measurements exhibiting a greater degree of respiratory function than the pre-measurements. These differences are statistically significant at the 0.05 level.

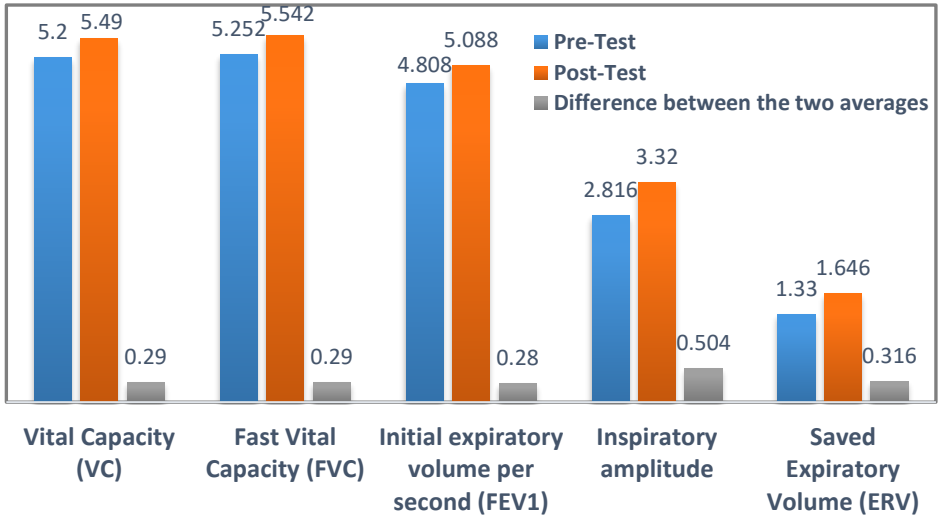

Figure (3) The statistical significance of the differences between the pre- and post-measurements of the variables under investigation in the experimental group.

Table (9) presents the differences between the average pre-post measurement of the experimental group and the rates of improvement in the variables of respiratory functions, with a sample size of n = 5.

No	Variables		UOM	Pre-Test	Post-Test	Differences between the two means	Improvement Percentages (%)
1	Breathing functions	Vital Capacity (VC)	liter	5.2	5.49	0.29	5.58%
2		Fast Vital Capacity (FVC)	liter	5.25	5.542	0.29	5.52%
3		Initial expiratory volume per second (FEV1)	liter	4.808	5.088	0.28	5.82%
4		Inspiratory amplitude	liter	2.816	3.32	0.504	17.90%
5		Saved Expiratory	liter	1.33	1.646	0.316	23.76%

		Volume (ERV)					

Table 9 illustrates the discrepancies in the improvement rates (in percentage terms) between the pre- and post-measurement of the variables and respiratory functions under study in the experimental group. It is evident that the improvement rates for the variables under study were 58.58% higher in the post-measurement.

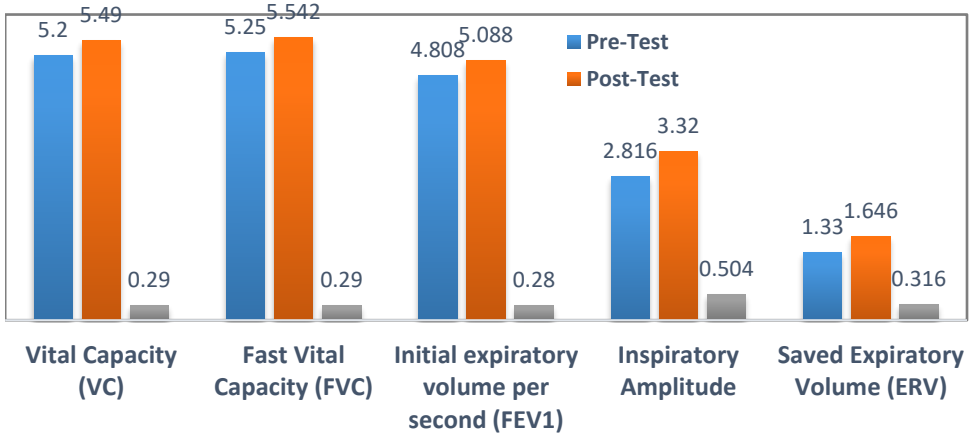

Figure (4) presents the differences between the average pre-post measurement of the experimental group and the rates of improvement in the respiratory function variables in question.

Table (10) presents the statistical significance of the differences between the pre- and post-measurements of the physical variables under consideration for the control group (n = 5).

No	Physical Variables	Exams	Pre-Test		Post-Test		Sweden, Communication No.	T value
			Mean	SD	Mean	SD		
1	Speed Characteristic Strength of Leg Muscles	Partridge test 5 partridges per man/cm	4.6	0.41	5.06	0.22	0.46	5.66
2	Kinetic speed	Test run in place 15 s/no	4.94	0.31	4.49	0.56	0.45	2.98
3	Transition Speed	Testing the enemy 30 meters from a moving start/s	6.08	0.23	6.37	0.25	0.29	9.61
4	Elegance	Zigzag Running Test/s	24.28	1	25.46	1.29	1.18	5.96
5	Resilience	Standing Stem Bending Test 2 sec/s	4.28	1.89	3.66	1.03	0.62	2.032

The tabular (t) value is at a significance level of 0.05 = 1.833

Table 10 reveals statistically significant differences at the 0.05 level between the pre- and post-measurements of the physical variables under study in the control group, with the post-measurement exhibiting a more favourable outcome.

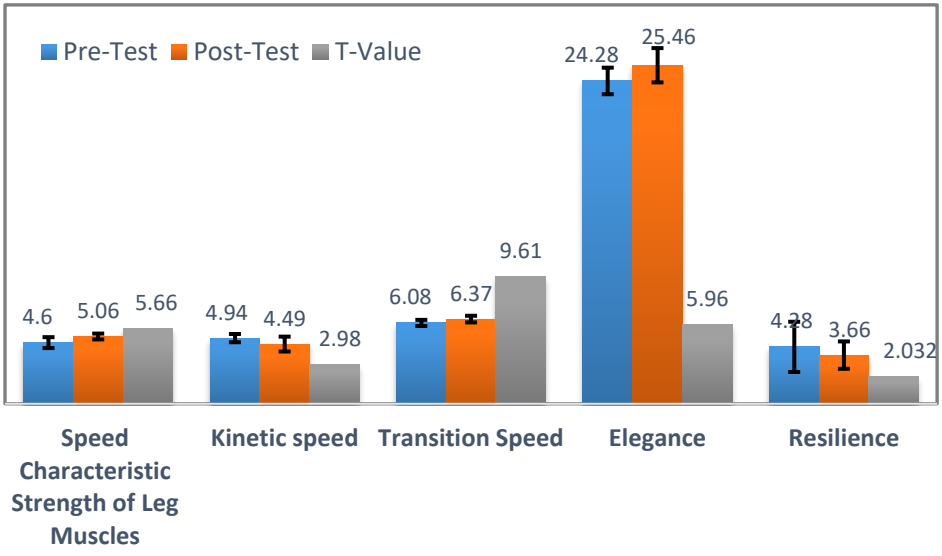

Figure (5) presents the statistical significance of the differences observed between the pre- and post-measurements of the physical variables under consideration for the control group.

Table (11) The statistical significance of the differences between the pre- and post-measurements of the average speed of the touches in question for the control group (N = 5).

No	Variables	Exams	Pre-Test		Post-Test		Sweden, Communication No.	T value
			Mean	SD	Mean	SD		
1	Average speed of touches	30s touch rate test	1.15	0.08	0.97	0.07	0.08	5.52

The tabular (t) value is at a significance level of 0.05 = 1.833

Table 11 reveals statistically significant differences at the 0.05 significance level between the pre- and post-measurements of the average speed of touches in the control group. These differences are in favour of the post-measurement.

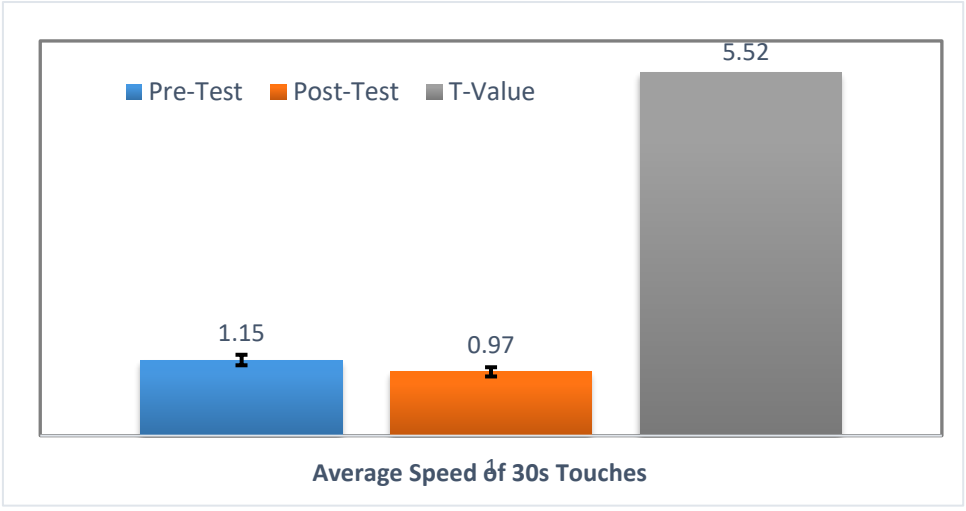

Figure (6) Illustrates the statistical significance of the differences observed between the pre- and post-measurements of the average speed of the touches in question for the control group.

Table 12 presents indicators regarding the change in the number of migrants with tertiary education in countries belonging to the Organisation for Economic Co-operation and Development (OECD). 1990-2000

The statistical importance of the post-test differences relative to the pre-test of the variables of respiratory functions in question for the control group (n = 5) was determined to be statistically significant.

Table (12) reveals statistically significant differences at the 0.05 level between the pre- and post-measurements of the variables under study in the control group, with the post-measurement values exhibiting a greater degree of respiratory function.

No	Variables of respiratory functions	UOM	Pre-Test	Post-Test	Difference between the two averages	Positive Ranks	Negative Ranks	z<v O >> ZO
1	Vital Capacity (VC)	liter	5.25	5.3	0.05	4	1	1.214
2	Rapid Vital Capacity (FVC)	liter	5.138	5.346	0.028	4	1	1.084
3	Initial expiratory volume per second (FEV1)	liter	4.856	4.908	0.052	4	1	1.355
4	Inspiratory amplitude	liter	2.836	2.958	0.122	4	1	1.753
5	Saved Expiratory Volume (ERV)	liter	1.35	1.444	0.094	4	1	1.753

(Z) tabular value at 0.05 = ±1.96

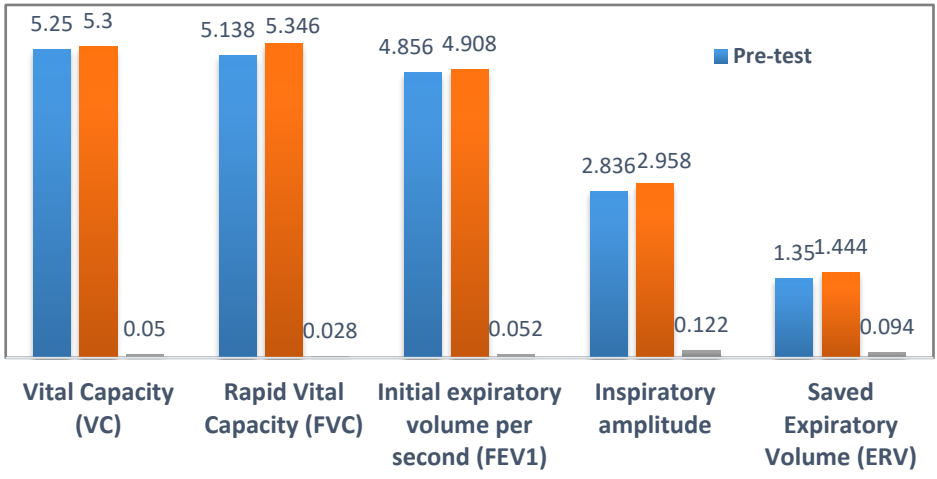

Figure (7) The statistical significance of the differences observed between the pre- and post-measurements of the variables of respiratory function in question for the control group.

Table (13) presents the differences between the control group's averages of pre-post measurement and percentages of improvement in respiratory function variables. The data set comprises n = 5.

No	Variables		UOM	Pre-Test	Post-Test	Differences between the two means	Improvement Percentages (%)
1	Breathing functions	Vital Capacity (VC)	liter	5.25	5.30	0.05	0.95%
2		Fast Vital Capacity (FVC)	liter	5.318	5.346	0.028	0.53%
3		Initial expiratory volume per second (FEV1)	liter	4.856	4.908	0.052	1.07%
4		Inspiratory amplitude	liter	2.836	2.958	0.122	4.30%
5		Saved Expiratory Volume (ERV)	liter	1.350	1.444	0.904	6.96%

Table 13 clearly demonstrates that the improvement rates for the variables and respiratory functions in question in the control group differed significantly between the pre- and post-measurement periods. The improvement rates for the variables in question were 13.81% higher in the post-measurement period.

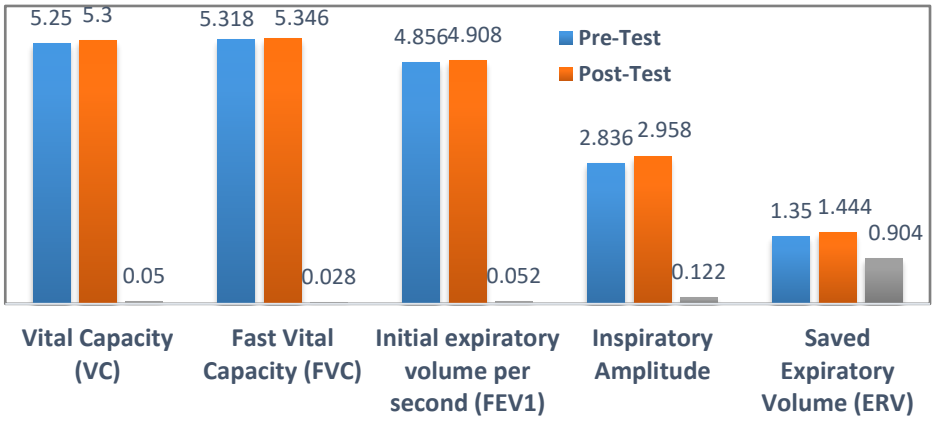

Figure (8) presents the differences between the control group's averages of pre-post measurement and percentages of improvement in respiratory function variables under consideration.

3. Discussion of Results:

The results of the statistical analysis of the research data were discussed in accordance with the research objectives and assumptions, with the aim of reaching the main objective of the research. This was achieved by referencing scientific references and previous studies.

Discuss the results of the first hypothesis:

The experimental group showed significant and noticeable improvements in physical characteristics such as leg muscular strength, motor speed, transition speed, agility, flexibility, respiratory functions, and touch speed, as evidenced by unambiguous and statistically significant changes between the pre- and post-measurements. The findings from Table 6 and Figure 1 demonstrate statistically significant disparities at a significance level of 0.05. The computed values (2.22, 2.98, 4.84, 7.77, 8.27) exceeded the tabulated value (1.833), suggesting enhanced performance in agility, kinetic speed, flexibility, leg muscular strength, and transition speed among the fencers.

Table 7 and Figure 2 indicate that there are significant differences at a significance level of 0.05 between the measurements taken before and after the experiment in the experimental group. The computed value of 6.24 is higher than the tabular value of 1.833, indicating a significant increase in the average speed of touches for fencing players.

The study credits the Pilates training programme for these enhancements. This conclusion is consistent with multiple reference studies (e.g., studies 1, 3, 4, 5, 7, 8, 10, 11) that have demonstrated the beneficial effects of Pilates exercises on agility, motor speed, flexibility, leg muscular strength, transition speed, and touch speed in fencing.

Furthermore, the findings from Tables 8 and 9, as well as Figures 3 and 4, demonstrate noteworthy enhancements in respiratory functions with a statistical significance level of 0.05. The improvement rates varied between 5.52% and 23.76%, suggesting that Pilates exercises had a positive impact on cardiovascular and pulmonary efficiency. This leads to enhanced energy supply, improved transport of oxygen to muscles, and a reduction in residual weariness.

The researcher attributes the improvement rates to the experimental group in the post-measurement of the Pilates training programme, which has the ability to improve respiratory functions and give the player a greater ability to concentrate. This is due to the nature of these exercises, where the greatest possible energy can be extracted from the body, and this is in line with what was indicated by the results of the studies of both (15) and (20), in that the process of deep breathing works to transfer a greater amount of pure oxygen to all the cells of the body and get rid of the combustion products that cause fatigue, and these exercises also helped to increase muscle strength, which increases the amount of muscular endurance.

Thus, the validity of the first hypothesis was achieved, which states (there are statistically significant differences between the pre- and post-measurements in favour of the post-measurement in the physical variables in question (speed, characteristic strength of the leg muscles, motor speed, transition speed, agility, flexibility) and in the respiratory functions and the rate of touch speed in the experimental group).

Discussion of the results of the second hypothesis:

Which states? Statistically significant differences were observed between the pre- and post-measurements, favouring the post-measurements, in various physical variables including speed, muscle force in the legs, motor speed, transition speed, agility, flexibility, as well as respiratory functions and touch speed rate in the control group.

Following table 10 and figure 5 resulted and indicate that differences of some levels at 0.05 of significance between the post-measurements of the control group, and these post-measurements have a favourable, as calculated this value 2.03, 2.98, 5.66, 5.96, 9.61 were greater than the tabular value 1.833. These differences relate to the level of performance in certain physical abilities (agility, motor speed, flexibility, strength, and leg muscle speed) for fencing players using the sword weapon.

The findings from Table (11) and Figure (6) reveal significant differences at a 0.05 significance level between the control group's pre- and post-measurements. Specifically, the post-measurement displayed a higher average speed of touches for players using the sword fencing weapon. This conclusion is reinforced by the calculated value of 5.52, which surpasses the tabular value of 1.833, indicating statistical significance.

Authers finding in previous research on pilates training, as following studies (1), (3), (4), (5), (7), (8), (10), and (11), they contributed these attributes for difference sets control adherence to the trainer's instructions during the training process.

The analysis of tables (13), (13), and figures (7) and (8) reveals that there are no statistically significant changes, at the 0.05 level, between the pre/post-measurements of the group controls.

However, the post-measurements show a slight improvement in the respiratory function variables evaluated.

This means that the first hypothesis, which states that the physical variables (the rate of touch speed in the control group, the speed characteristic force of the muscles of both legs, motor speed, transition speed, agility, and flexibility) differed significantly between the pre- and post-measurements, is correct. However, the respiratory functions part of the hypothesis is not.

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