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Effect of a Suggested Training Program of Relaxation Exercises on Psychological Fitness and Tension Degree among Fencers Based on Biorhythm Type

[1]Elsayed Moawad Elsayed, [1]Hany Mohamed Hagar and [2]Tamer Ibrahim Nabil

[1]Department of Physical Education, Faculty of Education, Al Azhar University, Egypt
[2]Department of Sport Training, Faculty of Physical Education for Boys, Helwan University, Egypt

Abstract: The research aimed to identify the impact of the relaxation exercises on the foil fencers' psychological fitness and the tension degree according to the biorhythm type. The researchers have used the experimental method as it suits the nature of the research, through using the pre-, following up and post-measurements of two experimental groups according to the biorhythm type (mornings, evening). The research sample of 21 players randomly chosen from the foil fencers of the players under 17years old from the Egyptian Fencing club within the season 2010. The total community of the research was 29 players, where 8 players excluded from the sample as they discriminated with unstable rhythm and were used for conducting the pilot study. Therefore the main research sample is 21 players divided to two groups according to their biorhythm type as 10 for the morning type and 11 for the evening type. The most important results were: there are statistically significant differences between both the pre-and post-measurements in favor of the post-measurements, moreover, there are differences between the following up and post-measurements in favor of the post-measurements for the foil fencers. There are statistical significant differences between both post-measurements of the two groups (morning and evening) in the psychological fitness and the tension degree for the foil fencers in favor of the group of the biorhythm type that commensurate with the program organize timing and the evening type on topics. The researchers recommends by the importance of using the suggested training program among the training unit's content for the foil fencers and coaches should pay attention to the importance of coordinating the synchronization between the psychological biorhythm type for the player and timing of executing the training programs to ensure increasing its effectiveness and according to competitions dates.

Key words: Psychological Fitness % Tension Degree % Fencers % Biorhythm Type

INTRODUCTION

Relaxation exercises are an effective tool of sport psychology that help reduce tension among athletes, thus giving them the ability to deal with psychological pressures and improve their muscle tone [1]. As a result, the psychological fitness of the person is enhanced.

The timing and environment of performing relaxation exercises, however, may well have an effect on the result of the actual competition. The success or failure of a player in upgrading his or her level of performance or winning the game highly relies on these two factors, especially if the gap between the time of receiving the training and the time of actual competition is too wide. This effect of the 'time cycle' is now called the effect of biorhythm, a theory increasingly applied to studies in the field of sport sciences. According to the theory, rhythmical, or cyclical changes occur in the status of the biological and physiological systems varying between 'ups' and 'downs' in a systematic manner through the times of the day. The phenomenon is common among all living things [2].

In the present study, the researchers have designed a training program of relaxation exercises, applied to a sample of two groups of foil fencers divided according to their respective type of biorhythm (i.e., a morning type and an evening type). The aim of the program was to test the validity of the major assumption of the study (there are statistically significant differences in two psychological variables (tension degree and psychological fitness) between the two groups, favoring the one whose type of biorhythm better matches the

Corresponding Auhtor: Elsaied Moawad Elsaied, Department of Physical Education, Faculty of Education, Al Azhar University, Egypt.

timing of applying the program) and, consequently, to find out whether the program is applicable to foil fencers to improve their level of performance in actual competition.

In spite of the fact that Egyptian foil fencers use almost the same tactics and styles used by international fencers, differences in performance were observed between the two groups favoring international players. A review of literature showed that Egyptian fencing coaches laid more stress on the physical, tactical and skillful aspects of the training than on the psychological components, including lifestyle and training environment. Assuming that the lower level of performance is due to the biorhythmic effect, the researchers designed a biorhythm-based training program of relaxation exercises to identify the relationship between the player's biorhythm type and his or her level of performance. The program was applied to two specific psychological variables: psychological fitness and degree of tension.

The research aimed at identifying the effect of relaxation exercises on the foil fencers' psychological fitness and their tension degree, according to the biorhythm type, through the following steps:

- Identifying the differences in the psychological fitness and tension degree between two groups of foil fencers, one with a morning biorhythm type and another with an evening biorhythm types.
- Identifying the differences in improvement rates of the psychological fitness and tension degree between pre and post measurements in the two groups according to their biorhythm type.

MATERIALS AND METHODS

The experimental method was used, being suitable for this type of research. This involved the application of pre, follow up and post - measurements to two experimental groups selected according to their type of biorhythm (the morning type and the evening type).

The research sample consisted of 21 players randomly chosen from foil fencers under 17 years old who played in the Egyptian Fencing club in the 2010 season. The total community of the research was 29 in number. 8 players were excluded from the sample for unstable biorhythm, but were used for conducting the pilot study. The remaining 21 were divided into two groups according to their biorhythm type (10 representing the morning type and 11 representing the evening type. Homogeneity of the research sample was checked for variables that might have an effect on the research results, including age, height, weight, training period, psychological fitness and tension degree. Table 1 illustrates the sample homogeneity of all variables tested.

Table 1 shows that the skewness coefficient values for the variables of age, height, weight, training age, psychological fitness and tension degree ranged between -1.158 and 0.99 and that these values are limited to ±3. This proves that the sample data is free from non-equalizing distributions in these variables and demonstrates the homogeneity of the research sample.

Data Collecting Tools

Measuring Instruments and Tests Used in the Research:

- Calibrated Medical scale for measuring body weight in kilograms.
- Restameter for measuring total body height in centimetres.

Tests Used

The Psychological Fitness Scale: The scale consists of 38 statements, which allow the player and the coach to identify the nature of the relationship between psychological fitness and sport performance level of each player. Validity and stability of the scale were proved by several studies [3, 4]. The scale was designed by Elmorsy [4].

Tension Degree Scale: This scale aims at identifying the tension levels in the muscular groups as a means to identify the optimal stimulation level related to good performance. The scale was designed by Shamoun and Ismael [5].

Ostbirg Scale for Determining the Biorhythm Type: This scale consists of 23 questions. The players select one of the answers and the questionnaire results are then evaluated according to standard degrees for each answer. The scale was translated into Arabic and standardized by Abd El-Fattah and Hassanein [6]. Validity and stability of the scale were proved in several studies [2, 7, 8].

The Pilot Study: The pilot study was conducted on a sample of 8 players during the period from 30.01.2010 to 31.01.2010 in order to find the scientific coefficients of the psychological tests (validity and reliability).

Table 1: The arithmetic mean, median, standard deviation and coefficient of skewness for psychological fitness and tension degree (N=29)

Variable	Measuring unit	Arithmetic mean	Standard deviation	Median	Coefficient of skewness
Age	Year	16.06	3.200	15.00	0.099
Height	Cm	165.06	11.110	166.00	-0.254
Weight	Kg	63.15	8.436	63.50	-0.095
Training period	Month	62.66	8.650	66.50	-1.158
Psychological fitness	Degree	42.60	3.560	42.50	0.084
Tension degree	Degree	6.04	1.064	6.00	0.113

Table 2: Coefficient correlations between the first and second applications of the psychological fitness and tension degree scales (N=8)

	First application		Second application			
Variables	Arithmetic means	Standard deviations	Arithmetic means	Standard deviations	Coefficient correlations	Self-validity
Psychological fitness	41.30	3.60	41.68	4.56	0.752 *	0.87
Tension degree	6.13	1.35	5.57	1.01	0.736 *	0.86

*The value of indexed "R" at the level 0.05= 0.706

The Scientific Coefficients (Validity and Reliability)

Reliability: To find the reliability of the scales used in the study, scales were applied and re-applied (the Test Re-test method), with the second application taken 10 days after the first. Table 2 illustrates the coefficient correlation reached between the two applications.

Table 2 illustrates the existence of a statistical significant correlation at the significant level of 0.05between the first and second applications in both psychological fitness and tension degree, indicating the reliability of the used tests in addition to the validity limits of both scales.

Validity: The logical validity of the psychological fitness scale and the tension degree scale was tested by consulting 6 experts of the university faculty staff members working in the psychology field. Experts unanimously agreed on the validity of both scales to measure what they were established for and to calculate the self-validity coefficients of both scales.

The Suggested Program of Relaxation Exercises

Program Construction Steps: A review was made of the literature to determine the aims of the program which were as follows:

Aim of the Program: The aim of the program is to develop the ability to relax and reduce muscular tension among foil fencers according to the biorhythm type, through the following steps:

- Practicing alternate relaxation and developing the psychological fitness among foil fencer.
- Practicing relaxation and reducing the tension degree among foil fencing.
- Helping the fencer acquire concentration in the place and time appropriate for performance according to the biorhythm type in the fencing sport.

Content of the Program: After reviewing the scientific references and previous studies, the relaxation suggested program was prepared [1, 3, 9-11]. The program included 45 exercises of all body parts and according to the previous researches it was decided that the program time is 8 weeks as 3 training units weekly of 30 minutes each with a total of 24 units done in 720 minutes, while applying the program after finishing their training program inside the fencing hall.

As the success of the relaxation exercises depends mainly on the players' being convinced that they are able to achieve relaxation and the need for encouragement to continue the program. Therefore, both researchers conducted a session with the players before executing the experiment to illustrate the importance and value of applying the program on them from the psychological and skill point of view.

Validity of Referees for the Relaxation Program: The content of the relaxation program was given to 6 experts in both psychology and fencing to explore their opinions in the relation between the program and the psychological preparation of the players, to know how far it is inclusive of the main axes, the sufficiency of the program time, the number of sessions and any other scientific additions that they may add.

Basic Studies

Pre-Measurements: The researchers conducted the pre-measurements of the growth rates and the psychological variables on to the two (morning and

Table 3: The significance of differences between the morning and evening research groups in the pre-measurements variables (N=21)

	Morning		Evening			
Variables	Arithmetic means	Standard deviations	Arithmetic means	Standard deviations	Arithmetic means differences	"T" value
Age	16.09	2.750	16.02	2.26	0.07	0.090
Height	164.90	12.800	164.20	11.72	0.65	0.170
Weight	62.43	8.510	62.63	7.70	0.20	0.080
Training period	64.90	7.720	62.78	9.09	2.12	79.000
Psychological fitness	41.60	3.600	43.42	3.52	1.82	1.620
Tension degree	6.28	0.940	5.54	0.99	0.74	2.420

The tabular value of "T" at the level 0.05and 19 = 2.093

evening) groups of individuals in the period from 06.02.2010 to 07.02.2010. This measurement is considered as equivalence between the two groups as illustrates by Table 3.

Table 3 shows that there are no differences between the two (morning and evening) research groups in the variables of age, height, weight, training period, psychological fitness and tension degree as the calculated "T" of these variables was less than the tabular value of "T", indicating the equivalence of the two groups in these variables.

Applying the Suggested Training Program: The researchers applied the suggested training program on the groups of the morning type and the evening type in the period from 13.02.2010 to 12.04.2010, then conducted the follow - up application in the period from 13.03.2010 - 14.03.2010 in the same conditions followed in the pre-measurements.

Post-Measurements: After the end of the eighth week, the researchers conducted the post- measurements for both the morning and evening groups in the period from13.04.2010. -14.04.2010, the measurements were taken in the same conditions followed in the pre- measurements, before receiving the training loads, i.e., before the start of the training units.

Presentation and Discussion of the Results: Table 4 illustrates the existence of statistically significant differences at the level of 0.05 between the three measurements (pre, follow up and post) in favor of both morning and evening types in both psychological fitness and tension degree, indicating the existence of statistically significant differences between the three measurements. Accordingly, the researchers used the LSD test to verify the differences significance and in favor of any of the three measurements, as illustrated in Table 5.

The researchers attribute these differences between the pre and post-measurements of both types and between the follow up and post-measurements in the evening type in psychological fitness and tension degree to the effect of the relaxation exercises used in the program, as practicing these exercises leads to developing the psychological fitness and reducing the tension degree in the research sample as a result of the long period of the exercises.

The non-existence of differences between the pre- and the follow up measurements for both types, may be due to the short period of practicing relaxation exercises that has no effect on the differences between pre- and follow up measurements for both (morning and evening) types.

These results agree with the results reached by prior studies [3, 12] as they indicated that sport training, relaxation exercises and motor education programs have positive impact on developing the skill aspects and the motor, physical and health abilities. Moreover, they have a positive impact on the motor and psychological efficiency and help in modify the behavioral problems. They also agree with results reached by Abd El-Fattah and Naser El-Din [13] who noted that stretching exercises lead to the muscular relaxation which causes the individual to feel comfortable and reduce the tension degree. This result agrees with results reached by Gaber [14] indicating the importance of using mental training programs for directing the tension degree and developing the fencers performance level.

Table 6 illustrates the existence of statistically significant differences between both the post-measurements of the two groups (morning and evening) in the psychological fitness and the tension degree for the foil fencers in favor of the group of the evening biorhythm type consistent with the time of executing the program. The arithmetic mean of the evening type in the psychological fitness was 62.35 which is higher than the morning type group and arithmetic mean of the evening

Table 4: Analysis of variation between the three measurements (pre, follow up and post) of the research two groups (morning and evening) in the variables of the research (N=21)

Variables	Biorhythm type	Variation rate	Squares sums	Freedom degrees	Squares average	"F" value and significance
Psychological fitness	Morning N=10	Between groups	1427.772	2	713.633	43.33*
		Within groups	444.690	27	16.470	
		Sum	1898.970	29	-	
	Evening N=11	Between groups	2612.050	2	1306.030	17.69*
		Within groups	2215.570	30	73.840	
		Sum	4872.620	32	-	
Tension degree	Morning N=10	Between groups	86.070	2	43.033	11.671*
		Within groups	99.850	27	0.739	
		Sum	107.470	29	-	
	Evening N=11	Between groups	145.860	2	72.930	76.77*
		Within groups	28.640	30	0.950	
		Sum	174.500	32	-	

*The tabular value of "F" 27.2, at the level 0.05= 3.35

*The tabular value of "F" 30.2, at the level 0.05= 3.32

Table 5: Significance of differences between the three measurements of the research two groups (the morning and the evening) by using the LSD test (N=21)

Variables	Biorhythm type	Measurement	Arithmetic mean	Post	Following up	Pre	LSD
Psychological fitness	Morning	Post	41.60	-	-3.30	16.0*	3.72
		Following up	44.90	-	-	12.70	
		Pre	57.60	-	-	-	
	Evening	Post	43.42	-	3.50	18.93*	3.55
		Following up	46.92	-	-	15.43*	
		Pre	62.35	-	-	-	
Tension degree	Morning	Post	6.28	-	1.28	3.38*	2.25
		Following up	5.0	-	-	2.10*	
		Pre	2.90	-	-	-	
	Evening	Post	5.54	-	1.26	3.62*	2.14
		Following up	4.28	-	-	2.36*	
		Pre	1.92	-	-	-	

Table 6: Significance of differences between the two groups (morning and evening) in the post-measurements of the psychological fitness and tension degree

Variables	Biorhythm type	Number	Arithmetic mean	Standard deviation	Arithmetic mean differences	"T" value
Psychological fitness	Morning	10	57.60	4.971	4.75	2.93*
	Evening	11	62.35	5.271		
Tension degree	Morning	10	2.90	0.737	0.98	4.22*
	Evening	11	1.92	0.730		

*The value of indexed "T" at the level 0.05= 2.93

Table 7: Changing rates (improvement rate) of the psychological fitness scale and tension degree of the research morning and evening type groups (N=21)

Variables	Biorhythm type	Measurement	Arithmetic mean	Standard deviation	Changing rate
Psychological fitness	Morning N=10	Pre-	41.60	3.62	27.8%
		Post-	57.60	4.97	
	Evening N=11	Pre-	43.42	3.52	30.4%
		Post-	62.35	5.27	
Tension degree	Morning N=10	Pre-	6.28	0.94	53.8%
		Post-	2.90	0.73	
	Evening N=11	Pre-	5.54	0.99	65.3%
		Post-	1.92	0.73	

*The value of indexed "T" at the level 9and 0.05= 2.262 and at the level 10, 0.05= 2.228

type group in the tension degree was 1.92 which is lower than the morning type. As long as tension decrease, it moves to the positive direction.

These results agree with results reached in the study of Ahmed [7] in the distinctiveness of the first group where there is agreement between the time of executing the training program, the time and type of biorhythm favoring the group in the vital variables and the skillful performance. This also agrees with the views of previous studies [2, 15], that persons with the evening biorhythm type are characterized by effective activity and the ability to tolerate the exhaustion in the second half of the day. Therefore, the coach is required to make the training time commensurate with the competitions time to benefit from the biorhythm principle.

This was also confirmed by Stephenson *et al.* [16] concerning the impact of the circulatory rhythm of some hormonal activities variables during the performance of the sport exercises. The variables most responsive were identified according to the training programs timing.

Table 7 shows the existence of statistically significant differences between both the pre and post-measurements of the psychological fitness scale in favor of the post-measurements, where the changing rate (improvement rate) of the psychological fitness in the morning type was 27.8%, while the evening type reached 30.4%. Moreover, it illustrates the existence of statistically significant differences between both the pre and post-measurements of the tension degree in favor of the post measurements as the changing rate (improvement rate) of the morning type reached 53.8%, while the changing rate of the evening type reached 65.32%.

The researchers attribute the changing rate to the positive impact of the relaxation exercises used in developing the psychological fitness and lowering the tension degree of the foil fencers. This result agrees with what was mentioned by Nidffer [17] that relaxation may be an indicator in decreasing the tension level and promoting the concentration level and competency in all physical and psychological aspects. This agrees with what Rateb stated [18] that the relaxation exercises leads to the acquisition of the skill of getting rid of tension and a feeling of free movement in the different parts of the body. The skill of breathing easily leads to acquiring the relaxation skill for sportsmen. He also noted that the mental training contributes positively to developing the physical performance thus developing the sports performance, which in turn helps to smoothly perform the skills and providing mental responses in the right manner. Shamoun [1] confirms that the relaxation exercises assist in eliminating fatigue and exhaustion, indicating that the body needs the muscular and mental relaxation, the harmonized psychological preparation, concentrating on the motor performance and the mental visualization. In addition to the voluntary control in the breathing muscles that contributes to reaching the optimal tension degree, this helps achieve efficient performance in different sports.

CONCLUSION

In the light of the research procedures, the limits of the main sample, the method used and the statistical analysis, the researchers reached the following conclusions:

- There are statistical significant differences between both the pre-and post-measurements in favor of the post-measurements, moreover, there are differences between the following up and post-measurements in favor of the post-measurements for the foil fencers.
- There are statistical significant differences between both post-measurements of the two groups (morning and evening) in the psychological fitness and the tension degree for the foil fencers in favor of the group of the biorhythm type that is commensurate with the program timing and the evening type.
- The relaxation exercises positively affected the psychological fitness in a changing rate of the morning group with 27.8% and a changing rate of the evening group with 30.4%.
- The relaxation exercises positively affected the tension degree with a changing rate of the morning type group with a percentage of 53.8% and a changing rate of the evening type group with a percentage of 69.3%.

Recommendation: According to the results of the research and the conclusions, the researchers recommend the following:

- The importance of using the suggested training program between the training unit's content for the foil fencers.
- Coaches should pay attention to the importance of coordinating the synchronization between the psychological biorhythm type for the player and timing of executing the training programs to ensure increasing its effectiveness and according to competitions dates.

- The importance of paying attention to the relaxation exercises for its positive effect in raising the psychological biorhythm type and decreasing the tension degree of fencing players according to their biorhythm type.
- Conducting similar researches on different samples of the three weapons for male and female players.
- Conducting similar researches in different sports activities.

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