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Effects of autogenic training on lung capacity, competitive anxiety and subjective vitality.

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Abstract

The goal of this study is to analyze the effect of regular practice of autogenic training (AT) on lung capacity, subjective vitality and competitive anxiety. We have selected a sample of size n-18. Voluntary athletes were randomly distributed in two groups: the control (n-9) and the experimental group (n-9); all of them practiced autogenic training for 6 weeks. Pre and post-intervention spirometry measurements were conducted, and the values of peak expiratory flow (PEF), forced expiratory volume at the end of the first second (FEV1) were registered; additionally, values of Subjective Vitality (SVS) and Competitive Anxiety (CSAI-2) were obtained. A significant improvement (p=0.001) of Subjective Vitality and Competitive Anxiety (self-confidence dimension) was observed; however, the rest of the variables under study were unaffected. The regular practice of autogenic training could be useful to improve some of the parameters associated with sport performance.

Keywords: Anxiety, Vitality, Lung Capacity, Body/ Mind Medicine.

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Introduction

Autogenic training (AT) is a psychological and physiological technique developed by neurologist J. H. Shultz in 1932. In addition to therapeutic uses [1–4], it has also been supported by numerous scientific studies in education, psychohygiene and sport [5–8].

The main purpose of AT is to produce a general transformation of the subject by using certain psychological and physiological exercises, leading to a relaxation state similar to suggestive statements. When the relaxation status is achieved the subject experiences feelings of tranquility, health and "eudaimonic" well-being. It produces in beneficial effects on the control of emotions and mood.

The principal idea behind this technique is the mind-body union. One idea represented with enough intensity, in a situation of absorption on its own initiative (self-hypnosis), determines an "involuntary" change in body physiology (muscle relaxation or modification of heart rate and breathing). It can somehow be, a modulator instrument on the overall health and physical performance during sports.

During a competition there are many factors involved in the athlete´s performance. The concentration and self-regulation of effort and emotions are essentials skills to assess the situation and offer the best response of the organism.

There is still much discussion on the role of anxiety in sport. Some authors point it out as a basic emotion which is triggered by the appearance of threatening stimulus. It is characterized by avoidance tendencies and is clearly distinguishable from the emotions related to challenge [9]. For others it is a complex and variable secondary emotional state that can be represented as confrontation and avoidance tendencies. [10,11]. It can appear in two ways, as state anxiety or trait anxiety. The first is characterized by a hyperactivation of the nervous system consciously perceived by the individual. The second kind of anxiety predisposes to perceive as threatening stimulus [12]. For an athlete, a period of poor performance, negative period or own inexperience may cause anxiety

states, generating psycho-physiological imbalances which worsens the performance. Studies on the perception of competitive anxiety [13] indicate that there is a relationship between mood and level of athletic success. Patterns of anxiety characterized by the appearance of fear, sadness, guilt, shyness, hostility and despair can subjectively or objectively degrade performance [14].

On the other hand, psychology is an area that has become increasingly importance in sport. It is now recognized that psychological aspects are relevant in determining athletic performance, considering this as a combination of physical and mental preparation of the body and mind respectively. Activation is understood as a physiological and psychological general reaction of the organism that varies along a continuum from deep sleep to intense excitation [15]. It is an important component when it comes to controlling the behavior of the athlete during a training session or a competition. Therefore, the regulation of emotions during critical moments of the competition is a substantial ability to maximize athletic performance [16].

The purpose of this research is to determine the effect of autogenic training on levels of competitive anxiety, and their modulation on lung capacity.

Material and Methods

Sample

18 participants, aged between 28 and 50 years; mean age 33.83 years (ST=6.13), of which 2 were women and 16 men. All regular practitioners sprint distance triathlon at the standard level. An average height of 173.17cm (SD=4.86) and the average weight of 68.33 (SD=8.3).

Instruments

Demographic questionnaire

Demographic information of the participants was obtained through a short questionnaire where they indicated: sex, age, years of experience in sport, hours of weekly training, competitive level, training status, height and weight.

Anxiety

The CSAI-2 questionnaire [12]. The version used was the original 27 items, consisting of three dimensions: cognitive anxiety (CGA) and somatic anxiety (SMA), which correlate directly; and self-confidence (SFC), which correlate negatively to the aforementioned. Each dimension consists of nine items, which are solved by Likert scale composed of four options: *none, some, quite and a lot.*

Lung capacity

For the measurement of pulmonary function airflow electronic meter (Peak Flow) PIKO-1 model was used. In addition to measuring peak expiratory flow (PEF), it also measures the forced expiratory volume in one second (FEV_1). As quality factor provides warnings and indicators for abnormal cough blows. This instrument complies with the recommendations of the American Thoracic Society (1994) in relation to the monitoring of PEF and FEV1.

PEF is dependent on effort and lung volume. Therefore, the cooperation of the participant is essential. The measurement method of the parameters is subject to the rules of the ATS and technical considerations from the SNEP (Spanish Society of Pulmonology Pediatric). The PEF must be reached as rapidly as possible, using the maximum lung volume, in order to obtain the best result. The individual must be encouraged to blow as vigorously as possible. The neck should remain in neutral position, neither flexed nor extended and the subject cannot cough. It is not necessary to block the nostrils. Once the participant reaches the point of total lung capacity they should promptly blow for about two seconds. Once all the air is expelled, they can flex the neck to relax the respiratory mechanisms. Set the tool, saliva or coughing annuls the data. Participants were advised not to take any stimulant drink, avoid large meals, not to practice vigorous exercise prior, not to wear tight clothing or accessories like belts and not to use bronchodilators in the previous six hours making [17]. Three tests were performed for each individual, taking the best result.

Subjective vitality

This concept is considered an indicator of psychological well-being, along with other measures (self-esteem and life satisfaction). It is a condition in which the subject has a sense of liveliness and possession of personal energy [18]. The parameter was measured with the Spanish version [19] of six items of the *Subjective Vitality Scale* [18]. The answers are solved using a Likert scale, consisting of seven options from 1 (not true) to 7 (true).

Periodization

CSAI-2. The questionnaire was administered in four competitions in the official calendar of the Andalusia Federation of Triathlon in 2013. These events were agreed upon by the research team and the participants. Data collection was divided into two periods: the first had 6 participants and the second with 12.

Portable spirometry

This procedure was performed on the first contact with the participants and at the end of the training process.

Subjective vitality

The questionnaire was filled out at the first contact with the participants and after 4-week program of autogenic training.

Method

Participants signed a letter which reported on the random assignment of participants in both groups (experimental and control) and commitment to the daily practice of AT at home during the intervention period. Also respecting the principles of the Declaration of Helsinki (2008 revision).

In addition, the research team and the participants met before competitions to explain the steps, methods and risks. Furthermore, the absence of any disease or disorder in any of the subjects, and the absence in the case of women, to be in menstruation periods in the competitions days was confirmed.

The sample was instructed in the technique of AT according to the period of acquisition of the originally recommended (2 weeks for each step) [20]. Before performing the exercise, participants were informed of the protocol for maximum effectiveness. Such preparation is to find a quiet room, with little light, without disturbing sounds, pleasant temperature, comfortable clothing, with or without music for relaxation. The subject should find a comfortable position, keeping his eyes closed, telling one-self "I am completely calm" and ignore all other thoughts [21].

The first exercise of the method is the weight. It consists in telling one-self the following sentence with maximum concentration and visualizing the next part of the body: "my hand (or my arm) right (left if left-handed) weighs a lot, "six times". "I am completely calm" once.

Once they learned the previous step the research team added the next sequence:

Heat: "my hand (or my arm) right (left if left-handed) is hot, "six times". "I am completely calm" once.
Heart regulation: "the heart beats calm and normal" six times.

Breathing regulation: "Breathing is quiet" six times.
Abdominal regulation: "my abdomen is hot" six times.
Cooling of the mind: "My forehead is pleasantly cool" once.

It is important to stay only about three minutes in this state of concentration. There is no need to stay longer, because unnecessary hassles and unpleasant sensations may occur. The aim of the exercise is to provide a mental state of calmness and relaxation of general voluntary muscles by visualizing and concentrating on the different sensations. Once mastered all the exercises, the relaxation time could be extended up to twenty or thirty minutes [21].

To leave the state of relaxation, participants were informed that they should flex and extend arms and legs several times, undertake several deep breaths and finally, to open their eyes.

After this, the program continued for four weeks. Halfway through the program a group session was conducted with the researcher in order to check the loyalty of program participants. They also made 15 minutes daily exercise (3-5 minutes sessions three times a day). Individuals were informed of the recommended practice of relaxation techniques [22]. To increase control over daily practice, members of the experimental group filled out a record of personal control, which they indicated whether they did AT, date, time and feelings, and a score by the following criteria:

Indifferent

1. I relax a little.
2. I relax and I feel more relaxed at the end.
3. Starting to feel the sensations of weight and I get into deep relaxation.
4. I feel I perform well technically and I noticed their daily benefits. I like to do it.

Daily communication systems with all involved were placed. The control group did not receive instruction in AT. In the fourth week, a group session was conducted with the researcher in order to check the loyalty of program participants.

The CSAI-2 questionnaire was solved by athletes 45 minutes before starting the competition. Participants were informed about how to complete the questionnaire in the pre-established place. The CSAI-2 was not completed until the research group was sure that the instructions were fully understood and the answers were based on the emotions of the participants at that time.

Statistical analysis

The effects of AT on the dependent variables: peak expiratory flow (PEF), forced expiratory volume in one second (FEV_1), somatic anxiety (SMA), cognitive anxiety (CGA), self-confidence (SFC) and subjective vitality (SV) were calculated by nonparametric statistical test of Mann-Whitney U. SPSS v.19 was used.

Results

In table 1, the data obtained from the demographic questionnaire is displayed. In table 2, the results of

statistical analysis are shown. Significant differences were found between the experimental and control groups in self-confidence and subjective vitality.

Mean subjective vitality in the experimental group showed higher scores, 5.72 than in the control group, 4.76 (p=0.004). Similar behavior in self-confidence variable was observed. Mean scores were higher in the experimental group, 20.67 than in control group, 26.89 (p=0.001). No significant differences were found in other variables.

Table 1. *Frequencies and percentages of demographic variables.*

Weekly training hours

Values	**<6**	**6-10**	**10-15**	**<15**
Sample	0	15	3	0
%	0	83.3	16.7	0

Training condition

Values	**Sometimes alone/ Sometimes in group**	**Alone**	**Always in group**	**Total**
n	16	2	0	18
%	88,9	11,1	0	100

Years of experience

Valores	**<1**	**1-3**	**>4**	**Total**
n	2	13	3	18
%	11,1	72,2	16,7	100

Table 2. *Statistical results of the variables under study.*

	Control group				**Experimental group**				
	Mean	**Variance**	**Median**	**MR**	**Mean**	**Variance**	**Median**	**MR**	**U**
PEF	450,78	8525,44	420	9,44	450,44	2681,02	465	9,56	40
FEV1	3,82	,156	3,9	9,89	3,81	,049	3,7	9,11	37
SMA	14,44	5,02	14	10,61	12,89	10,11	14	8,39	6,5
CGA	13,67	15,25	13	10,5	12,22	3,69	12	8,5	30,5
SFC	20,67	21	23	6	26,89	11,86	28	13	31,5**
SV	4,76	,2	5	5,72	5,72	,272	6	13,28	9**

(PEF=peak expiratory flow; FEV1= forced expiratory volume in one second; SMA= somatic anxiety; CGA= cognitive anxiety; SFC= self-confidence; SV= subjective vitality)

Discussion

The results showed that most participants had low scores on cognitive and somatic anxiety for both groups (control and experimental). Also self-confidence scores were high in both. This data is consistent with those obtained in another study [23].

Regarding lung capacity as the variable analyzed, the data have shown no differences between the means obtained for the control and experimental group. It contrasts with the result obtained in another study [24] where the data did show significant differences between the group that practiced yoga and AT with the control group which only practiced AT. The difference of disciplines in both cases is remarkable. One of the main aspects of yoga is breathing, regulating mental state, emotions and anxiety levels. This allows us to hypothesize about the idea that the AT coupled with the discipline of yoga and practitioners experience could be a sufficiently effective tool to increase the levels of lung capacity in the parameters studied. This could explain the results obtained in our study.

Regarding the effect of AT on competitive anxiety, no significant differences between the means in CGA and SMA were observed. This data contrast with the findings in another study [25] which found significant differences were found in the state of anxiety with the same measuring instrument (CSAI-2). They also differ with results from other studies, which the regular practice of other relaxation techniques has been shown to balance and maintain the ideal state of activation (arousal) in competitive situations [26], reducing the risk of SMA

caused by continued high stress response in the body. The results obtained with this tool may be due to sport competitive level of the sample. This may be one reason why there were no significant results in both parameters, since they only have a personal commitment to participate in the different competitions, with results not being the main objective.

Self-confidence is one of the parameters that has shown sensitivity to intervention, obtaining significant differences between groups. These results could suggest a practical involvement in sport psychological preparation, helping self-regulation of emotions, both factors listed as determinants of performance [16], and contribute to improved psychological health.

In connection with this concept, we also obtained significant differences in the variable of subjective vitality. This parameter is part of the dimensions of psychological well-being, which we also find self-esteem. No wonder then, that as differences between means in self-confidence variable were found, it was also found in subjective vitality. Regular practice of AT would be positively associated with psychological well-being, producing improvements in health status and increasing personal vitality.

Conclusion

AT technique could be a useful tool to positively modulate the pre-competitive levels of self-confidence and subjective vitality. However, we must be cautious with the results obtained in this study. The mechanisms that regulate sports performance are very complex and besides the psychological variables, we must consider the physiological components.

Similarly, we are aware of the sampling limitation. They face competition differently than a high-level athlete, who is oriented to win or get a great place. Therefore, it would be interesting to investigate our results using an elite athletes sample, applying a longer AT training in presence of the researcher.

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