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EVALUATION OF THE EFFECTIVENESS OF RELAXATION IN LOWERING THE LEVEL OF ANXIETY IN YOUNG ADULTS – A PILOT STUDY

DOMINIKA WILCZYŃSKA[1], ANNA ŁYSAK-RADOMSKA[2], MAGDALENA PODCZARSKA-GŁOWACKA[2], JOLANTA ZAJT[2], MARCIN DORNOWSKI[3], and PAWEŁ SKONIECZNY[1]

Gdansk University of Physical Education and Sport, Gdańsk, Poland

[1] Social Study Department

[2] Physiotherapy Department

[3] Sport Department

Abstract

Objectives: Anxiety is a negative emotion that acts as a mediator between stress stimuli and emotional (physiological) reaction patterns. The myofascial system is particularly sensitive to stress. The aim of this study was to determine which of the 2 popular methods used to reduce psychophysical tension, i.e., soft tissue manipulation and Jacobson's progressive relaxation, is more effective. **Material and Methods:** This study was conducted at Gdansk University of Physical Education and Sports in the sports psychology laboratory and the manual therapy room. After performing specialist consultations and interviews to exclude potential participants with contraindications to any of the interventions, the final sample included 90 people who were randomly assigned to 1 of 2 treatment groups. In group I, soft tissue techniques were applied, including the techniques of post-isometric muscle relaxation, elements of myofascial relaxation of tissues, and elastic tissue deformation using the Swedish massage limited to the cervicothoracic complex. In group II, Jacobson's progressive relaxation was performed. The training consisted of tightening and relaxing specific muscle groups. The experiment was conducted under an ambulatory condition, consisting of a single physiotherapeutic session (group I) or a single progressive relaxation session using the Jacobson method (group II). The level of anxiety was assessed twice, i.e., immediately before and after the therapy. **Results:** According to a repeated-measures ANOVA, each therapeutic impact was effective in reducing the level of perceived anxiety. Furthermore, the level of perceived anxiety in group I decreased significantly more than that in group II. **Conclusions:** In conclusion, both the soft tissue manipulation and Jacobson's progressive relaxation techniques were efficient methods of minimizing the negative effects of stress. Int J Occup Med Environ Health. 2019;32(6):817–24

Key words:
trait anxiety, state anxiety, soft tissue manipulation, Jacobson's progressive relaxation, post-isometric muscle relaxation, cervicothoracic complex

INTRODUCTION

Anxiety is among the main areas of interest in modern psychology, and the concept of anxiety is a central component of psychological stress theories. According to numerous studies, anxiety is a negative emotion that acts as a mediator between stress stimuli and emotional (physiological) reaction patterns. In particular, anxiety is considered an axial stress response to emergency situations [1–6]. The myofascial system is particularly sensitive to stress, and the long-term impact of stress can lead to permanent, habitual

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Corresponding author: Dominika Wilczyńska, Gdansk University of Physical Education and Sport, Social Study Department, Górskiego 1, 80-366 Gdańsk, Poland (e-mail: dominika.wilczynska@awf.gda.pl).

tension within the skeletal muscles and, consequently, the development of pain syndromes associated with stress. Moreover, occupational stress has been identified as a risk factor for anxiety symptoms. University students are a special group of people that are enduring a critical transitory period in which they are going from adolescence to adulthood, which can be one of the most stressful times in a person's life. This high level of stress could be experienced due to remoteness, work overload, a lack of the sense of belonging and incomprehensible expectations of academic teachers, as well as due to taking up permanent work. According to the Job Square Report called "Student at work," every third student enrolled in Bachelor's studies has a regular job [6–8]. Nowadays, job demands and over-commitment are among the variables associated with higher levels of anxiety [9]. For this reason, attention should be focused on preventing exhaustion from work, with the purpose of reducing anxiety symptoms by simple and non-time-consuming methods which could be implemented in a workplace [7].

Properly and methodically selected relaxation techniques, such as Jacobson's progressive relaxation technique, visualization techniques, breathing techniques, and physiotherapeutic techniques, significantly affect the level of anxiety, reduce depressive symptoms and relieve perceived somatic pain [10–13]. Relaxation ends the vicious circle of pain, which occurs as a result of increased muscle tension, reflex spasms, disorders of circulation and increased metabolic products; however, no single relaxation technique is appropriate for everyone. Individuals must consider their needs, preferences, fitness levels and reactions to stress in choosing a relaxation technique. Hence, in the present study, the authors search for the optimal relaxation technique for lowering the level of anxiety.

Even a gentle touch can stimulate the parasympathetic nervous system and, thus, trigger changes in the neuroendocrine system, such as lowering cortisol levels and increasing serotonin secretion [14]. Massage and other forms of soft tissue manipulation appear to cause local biochemical changes that can lead to increased neuronal activity at the level of the spinal cord and subcortical nuclei, which, in turn, could affect mood and the perception of pain. Notably, relaxation techniques can end the vicious circle of pain [15]. The bodily changes that occur under the influence of relaxation facilitate the relaxation of skeletal muscles, consequently reducing the risk of developing conditions caused by various factors, including psychogenic conditions and myofascial imbalance [16]. Manual techniques, including static contact (motionless contact between the therapist's hands and the client's body, performed with minimal force), massage and other forms of muscular energization, as well as progressive relaxation techniques, can potentially lower the level of anxiety and, thus, positively affect well-being [11].

According to the literature review performed by the authors of this study, the effectiveness of relaxation techniques in reducing anxiety levels is notable. The authors aimed to determine which of the 2 popular methods used to reduce psychophysical tension (i.e., soft tissue manipulation and Jacobson's progressive relaxation) is more effective.

MATERIAL AND METHODS

This study was conducted at Gdansk University of Physical Education and Sports in the sports psychology laboratory and the manual therapy room. After performing specialist consultations and interviews to exclude participants who might have contraindications to any of the performed interventions, the final sample included 90 people who were randomly assigned to 1 of the following 2 treatment groups: the myofascial relaxation and post-isometric relaxation techniques (group I), and Jacobson's progressive relaxation technique (group II). The studied groups did not significantly differ in the gender structure. Detailed data regarding the sizes of the groups by respondents' gender are presented in Table 1.

Table 1. Characteristics of the studied groups by participants' gender in the study conducted at Gdansk University of Physical Education and Sports

Studied group	Participants (N = 90) [years]							
	females				males			
	n	%	age		n	%	age	
			Me±QD	min.–max			Me±QD	min.–max
Group I (manual techniques) (N = 55)	32	58.2	22±1.25	21–25	23	41.8	22±0.5	20–24
Group II (Jacobson's progressive relaxation training) (N = 35)	17	48.6	21±0.5	20–24	18	51.4	22±0.5	20–25

QD – quartile deviation.

On the day of the research study, the participants in the experiment were 20–25 years old. After dividing the respondents by gender, the subgroups did not significantly differ in terms of age.

This study aimed to assess the effectiveness of the chosen relaxation methods in reducing the participants' anxiety levels and muscle tension, and in relaxing and calming the participants. This study was conducted in outpatient settings and consisted of a single physiotherapeutic session (group I) or a single Jacobson's progressive relaxation session (group II).

In group I, soft tissue techniques, including the techniques of post-isometric muscle relaxation, elements of myofascial relaxation of tissues, and elastic tissue deformation using the Swedish massage limited to the cervicothoracic complex, were used. Post-isometric relaxation (PIR) was performed on the following muscles: levator scapulae, trapezius, head and neck extensors, head and neck flexors, pectoralis major muscle, and head and neck rotators. The therapy of the abovementioned muscles was performed individually according to the methodology proposed by Rakowski [17].

Muscle PIR was performed cyclically. One cycle consisted of 3 phases. During the first phase, the muscles were stretched until the patient felt light pain or a slight stretch of the exercised group of muscles. The second phase included isometric tension of the muscles, which lasted 8–10 s and was followed by the third phase. During the third phase, the muscles were completely relaxed, and the muscle group was re-stretched. The entire cycle was repeated 3–5 times. Each treatment lasted approx. 30 min. The relaxation massage was performed using the following techniques: stroking, rubbing, kneading, vibration, and rolling [18]. The elastic deformation involved the soft tissues of the cervicothoracic complex. During the therapy session, aromatic oils and relaxation music were used to intensify the calming and relaxation effects.

In group II, Jacobson's progressive relaxation technique [19] was performed. The training consisted of tightening and relaxing specific muscle groups. During the therapy session, the respondents adopted a comfortable reclining position, which facilitated the performance of specific, deliberate movements of the hands, legs, torso, and head. The actual therapy session was preceded by 10 Jacobson's progressive relaxation training sessions. The number of sessions was based on a study by Khanna et al. who proved that progressive muscle relaxation is the most beneficial method for lowering stress after 10 days of training [20].

The duration of the therapy was similar between the 2 groups, i.e., approx. 20–30 min. The level of state

anxiety was assessed using the *State-Trait Anxiety Inventory (X1) questionnaire* (STAI-X1) before and after the therapy.

The STAI-X1 is a part of the tool designed to study anxiety as a transient, situationally conditioned state of an individual. It was developed by Charles D. Spielberg, Richard L. Gorsuch and Robert E. Lushene in 1970. The STAI-X1 is composed of a 20-question scale which measures anxiety as a state and is considered by the authors of the current study. The respondents were tasked with indicating the extent to which each questionnaire statement applied to them. After reading the information card, the respondents provided informed consent to participate in the experiment [21].

Ethics

The procedures of the following study were in accordance with the Declaration of Helsinki. Bioethics Committee document No. KB-25/17.

Statistics

The collected results were subjected to a statistical analysis, which aimed to verify the effectiveness of both treatments in reducing the perceived level of anxiety immediately after the treatment. An analysis of variance (ANOVA) for repeated measures (the effect of the repeated measures was designated Therapeutic intervention) was performed. To compare the test results of both groups, planned comparisons were performed using the contrast method. The assumptions were verified by performing Cochran's C, Hartley's, and Bartlett's tests.

RESULTS

The collected results were subjected to a statistical analysis aimed to verify the effectiveness of both treatments in reducing the perceived level of anxiety immediately after the treatment.

Table 2. Participants' levels of state anxiety before and after treatment in the study conducted at Gdansk University of Physical Education and Sports

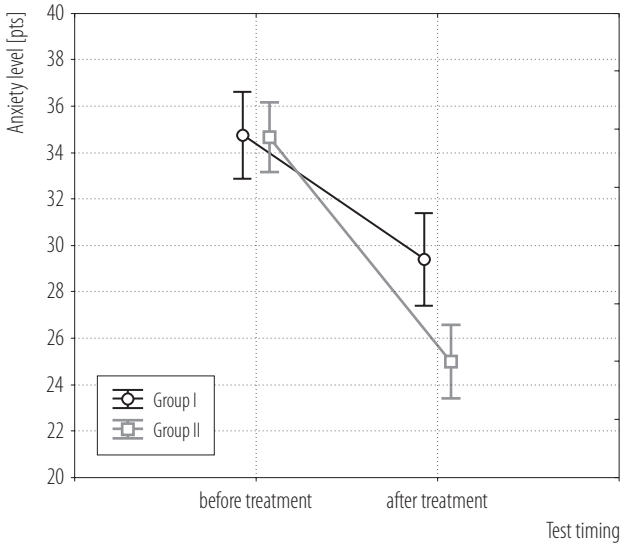
Test time	State of anxiety [pts] (M±SD)		p[a]
	group I (manual techniques)	group II (Jacobson's progressive relaxation)	
Before treatment	34.7±5.4	34.7 ± 5.7	0.942
After treatment	25.0±5.1	29.4 ± 7.0	< 0.001

[a] Group I vs. group II.
Significance of the difference (in a given group), a comparison of the state before and after the treatment: $p < 0.001$ in both groups.

Because gender and its interactions with the other factors were not statistically significant, an ANOVA was conducted to analyze the qualitative factor, i.e., Analyzed group, and the repeated-measures factor, i.e., Therapeutic intervention. Table 2 presents the basic numerical characteristics of the anxiety level of the respondents, as measured before and after the treatment.

In this study, the individuals assigned to the manual techniques group (group I) or the Jacobson's progressive relaxation group (group II) did not significantly differ in the level of anxiety before the treatment was performed. Each therapeutic impact was effective in reducing the level of perceived anxiety. In the participants who were subjected to the manual techniques, i.e., post-isometric relaxation of tissues and elastic tissue deformation techniques, the average level of anxiety decreased from < 35 pts to 25 pts, while in the participants who underwent Jacobson's relaxation, the average level of anxiety decreased from < 35 pts to 29.4 pts. The level of perceived anxiety after the treatment was significantly different in the examined groups ($p = 0.0008$). Figure 1 illustrates the results of the analysis.

The interaction effect of Analyzed group * Therapeutic intervention ($p < 0.001$) was also statistically significant, confirming that massage reduced the anxiety in the re-



Vertical bars – 95% CI.
Group I – manual techniques; group II – Jacobson's progressive relaxation.

Figure 1. Anxiety level in the analyzed groups before and after treatment in the study conducted at Gdansk University of Physical Education and Sports

spondents more effectively than Jacobson's progressive relaxation.

DISCUSSION

Previous studies have emphasized the importance of relaxation techniques in reducing the level of anxiety and, thus, improving well-being [13]. Numerous scholars have performed studies to identify appropriate and personalized relaxation training [22]. No studies investigating the effectiveness of relaxation in lowering the level of anxiety in young adults, using manual therapy techniques and Jacobson's progressive relaxation, have been performed. However, the authors have attempted to indirectly compare and discuss the results of the above studies with papers describing the effect of relaxation techniques on the level of anxiety. The analyzed study results confirmed the impact of a single manual soft tissue manipulation and Jacobson's progressive relaxation on the anxiety level of the respondents.

The effectiveness of introducing relaxation techniques has also been confirmed by other authors, including Manzoni et al [23], who performed a meta-analysis demonstrating the consistent and significant effectiveness of relaxation training in reducing anxiety levels. These authors analyzed 19 studies involving interventions, such as Jacobson's progressive relaxation, autogenic training, visualization, meditation, stretch release relaxation, Benson's, and behavioral relaxation techniques, and most studies (14 studies) used the STAI questionnaire. Young people were found to benefit more from the use of relaxation techniques, and relaxation exercises performed at home have been shown to have a greater effect than therapy sessions alone. Preyde [24] found that, compared to the effectiveness of massage therapy, soft tissue manipulation was more efficient in reducing the level of anxiety (the State Anxiety Index) and pain. These observations are consistent with results reported by other authors [25].

In addition, a meta-analysis published in 2004 [15] showed that manual soft tissue manipulation significantly reduced anxiety by providing an effect similar to that achieved with psychotherapy. This study indicated that the application of manual techniques, i.e., post-isometric relaxation of tissues and elastic deformation of tissues, reduced anxiety in the respondents more effectively than Jacobson's progressive relaxation.

Previous studies are consistent with these results, showing that different massage techniques significantly reduce the state of anxiety [26–29]. Ernst [30] noted that the use of massage can induce many psychological and somatic benefits, i.e., reduction in muscle tension, mood improvement, and increase in pain threshold, and it is often used to relieve symptoms of fatigue, stress, depression, and anger. However, he suggested that randomized studies did not provide definitive answers to questions about the effectiveness of the use of massage, and concluded that further, high-quality scientific studies should be performed.

According to the holistic approach to health perspective, the human body and psyche are one. Both the human body and psyche are constantly bombarded with negative factors that are suppressed or combated by the body. Over time, the possibilities of self-regulation are exhausted, leading to disturbances in the proper functioning of the body. The pattern of the development of disorders is usually the same: an increase in muscle tension; the loss of the ability of relaxation; the development of joint contractures; the deterioration of blood circulation; the appearance of coldness, tingling, shortness of breath, faster fatigability and sluggishness; the slowing of thought processes; and even the development of psychosomatic diseases. To maintain good health, restoring the static and dynamic balance is necessary for introducing relaxation as an element of daily psychosomatic renewal. Additionally, the efficiency of lowering the level of anxiety in the course of a single treatment using soft tissue manipulation and Jacobson's progressive relaxation was confirmed in the present study, suggesting that both methods are effective in minimizing the negative effects of a changing lifestyle.

Limitations

The experiment included a one-time measurement of the level of state anxiety after the therapy session. If the study had also determined the duration of the treatment effect of anxiety reduction (on the same day, after a series of relaxation sessions using elements of myofascial relaxation of tissues or progressive relaxation), the results could have possibly revealed some more longitudinal influence of the therapy. The study was a pilot one and the analyses were based on a group of students. Nonetheless, the therapy methods (post-isometric muscle relaxation, elements of myofascial relaxation of tissues) applied in the study, due to the current need for effective, inexpensive and non-time-consuming relaxation methods, could be extended to other groups with different work characteristics. It is worth emphasizing that, although progressive muscle relaxation is a kind of technique which is easy to apply and has a low cost profile, there is a number of doubts about the methodology and theoretical assumptions. There is a consideration about the length of the session, which could be justified by automation, which is a time-consuming and very individual matter, and which is the aim of the progressive technique.

CONCLUSIONS

This study confirmed the effectiveness of progressive relaxation and myofascial relaxation of tissues in reducing the level of anxiety. The techniques selected for the study could be used in everyday psychosomatic rehabilitation. The occurrence of anxiety and the increasing number of affective disorders set the direction for future research on coping strategies to decrease the level of emotional tension at home, at school, as well as in the work environment.

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