
AN OVERVIEW OF JACOBSON'S PROGRESSIVE MUSCLE RELAXATION IN MANAGING ANXIETY

Julio Torales^a, Marcelo O'Higgins^a, Iván Barrios^a, Israel González^a, Marcos Almirón^{b,*}

Abstract

Anxiety is an adaptive emotional reaction to the environment that becomes pathological when it becomes more somatic and disproportionate to the stimulus and/or when it persists above the adaptive limits, leading to impairment or disability in academic, work, social, or interpersonal functioning. Currently, anxiety (as a disorder or as a symptom of another mental disorder or organic disorder) can be managed through psychotropics, psychotherapy, and, as adjuvants, physical therapy and relaxation techniques. Included among the latter is Jacobson's progressive muscle relaxation, which is effective for multiple health conditions. The aim of this review article is to provide general guidance to psychiatrists, psychologists, and physiotherapists regarding the evidence supporting the usefulness of progressive muscle relaxation on the management of anxiety.

Key words: Anxiety, Mental Disorders, Relaxation Techniques, Progressive Muscle Relaxation.

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INTRODUCTION

Jacobson's progressive muscle relaxation (PMR) has been used for multiple types of health problems, from prophylaxis of migraine episodes (Meyer, Keller, Müller, Wöhlbier, & Kropp, 2018), to treatment of tinnitus (Seydel, Haupt, Szczepek, Klapp, & Mazurek, 2010), to disorders of the temporomandibular joint (Ferendiuk, Biegańska,

Kazana, & Pihut, 2019). However, one of the most common uses since its introduction as a therapeutic strategy has been the management of anxiety disorders and the anxious symptoms that accompany various diseases and stressful situations in daily life (Burish & Tope, 1992; Conrad & Roth, 2007; Kumar, Nayak, & Kumari, 2015; Manzoni, Pagnini, Castelnuovo, & Molinari, 2008; Ramasamy, Panneerselvam, Govindharaj, Kumar, & Nayak, 2018; Redd, Montgomery, & DuHamel, 2001).

Anxiety is the most common and primitive emotional reaction that mammals have, and it is perceived as a signal that warns of a threatening danger, often unknown, which distinguishes it from fear (in which the danger is concrete and defined). Anxiety prepares physically and psychologically whoever is facing a threatening situation to face or flee danger. The basic difference between normal and pathological anxiety is that the latter is based on an unreal or distorted assessment of the threat.

^aDepartment of Psychiatry, School of Medical Sciences, National University of Asunción, San Lorenzo, Paraguay. ^bDepartment of Research Methodology (Kinesiology and Physiotherapy), School of Medical Sciences, National University of Asunción, San Lorenzo, Paraguay.

*Corresponding author: Marcos Almirón, Department of Research Methodology (Kinesiology and Physiotherapy), School of Medical Sciences, National University of Asunción, San Lorenzo, Paraguay. Email: marcosalmiron92@gmail.com

That is, anxiety is an adaptive emotional reaction to the environment that becomes pathological when it becomes more somatic and disproportionate to the stimulus and/or when it persists above the adaptive limits, leading to impairment or disability in academic, work, social, or interpersonal functioning (Torales et al., 2019).

Anxiety disorders are among the most prevalent psychiatric disorders, and in turn, anxiety as a symptom is present in multiple mental and organic disorders, although its chronic and disabling nature is often underestimated. This can frequently lead to underdiagnosis and poor treatment, which results in difficulties for patients and misuse of medical services and resources (Torales et al., 2015).

Currently, anxiety (as a disorder or as a symptom of another mental disorder or organic disorder) can be managed through psychotropics, psychotherapy, and, as adjuvants, physical therapy and relaxation techniques (Catalán Matamoros, 2009; Kaur, Masaun, & Bhatla, 2013; Ortiz et al., 2018; Torales, Barrios, Almirón, & De la Cueva, 2017). Included among the latter is Jacobson's PMR, which is effective for multiple health conditions.

The aim of this review article is to provide general guidance to psychiatrists, psychologists, and physiotherapists regarding the evidence supporting the usefulness of PMR on the management of anxiety.

PMR TECHNIQUE

PMR aims to reduce mental stress and its associated processes through the progressive inhibition of muscle tension. The technique was originally described at the beginning of the 20th century by the physiologist Edmund Jacobson (Jacobson, 1938) and has been modified in recent years to make it more effective and easier to apply (Pifarré et al., 2015).

This technique involves active muscle contraction in one body segment and then muscle relaxation in that segment, focusing attention on the feelings generated focally. An interaction between physical and emotional relaxation is assumed, so that muscular relaxation helps to alleviate the phenomena associated with psychological stress (Conrad & Roth, 2007). The utility of PMR has been evidenced in various clinical conditions, such as pain syndromes (Gay, Philippot, & Luminet, 2002; Günther, Mur, Kinigadner, & Miller, 1994), headache (Schlutter, Golden, & Blume, 1980), asthma (Grover, Kumaraiah, Prasadao, & D'souza, 2002), tinnitus (Storb & Strahl, 2006); and mental disorders, such as anxiety disorders (Conrad & Roth, 2007). Its exact

physiological mechanism has not yet been fully elucidated (Pifarré et al., 2015).

PMR IN MANAGING ANXIETY

Anxiety is a negative emotion that acts as a mediator between stress stimuli and emotional (physiological) reaction patterns. It is considered a stress response to emergency situations (Killinger, Flanagan, Castine, & Howard, 2017; Wilczyńska et al., 2019).

The myofascial system is particularly sensitive to stress, and its long-term impact can lead to permanent tension of the skeletal muscles (Wilczyńska et al., 2019). PMR has been theorized to cause tense and anxious people to alleviate their symptoms by learning to reduce muscle tension, since deactivation of the muscle subsystem reduces activation of other physiological systems (central and peripheral) involved in the stress response (Gellhorn & Kiely, 1972). Other more recent explanations show that PMR generates cognitive improvements, since patients learn a greater sense of control and new ways of thinking during the relaxation procedure. In other words, when people learn to relax their muscles, they in turn manage to control thoughts, feelings, and bodily feelings of anxiety (Conrad & Roth, 2007). Here it should be pointed out, as previously mentioned, that the exact physiological mechanism of PMR is not yet fully understood.

What is already known is the efficacy of the technique in daily clinical practice (Hayes-Skelton, Roemer, Orsillo, & Borkovec, 2013). Much research has shown that PMR is beneficial in reducing the anxiety that accompanies various medical conditions and mental disorders (particularly anxiety disorders), as well as that which occurs in various situations of daily life.

Manzoni et al. carried out a systematic review and examined the level of anxiety before and after the use of relaxation training, both in clinical and non-clinical populations. Their research evidenced the existence of many studies with positive clinical results of decreased anxiety after the use of relaxation techniques (Manzoni et al., 2008).

Holland et al., in a study carried out with cancer patients, compared the efficacy of the administration of alprazolam tablets (0.5 mg, 3 times a day) with the use of PMR. The researchers determined that both interventions achieved a significant decrease in anxious and depressive symptoms, with alprazolam being only slightly superior to the relaxation technique ($n = 147$, $p < 0.001$) (Holland et al., 1991). Zullino et al. evaluated the relationships between psychophysiological and clinical measures using venlafaxine

extended release or applied relaxation and, secondarily, the impact of combined treatment in 58 patients divided into groups. The Hamilton Anxiety Scale, the Beck Depression Inventory, the Penn State Concern Questionnaire, and the Stroop Color-Word Task were applied to patients, along with electrophysiological measures. In this study, the relaxation group had less psychophysiological activity than the venlafaxine group. However, the combination of the treatment improved the response (Zullino et al., 2015).

Pifarré et al. compared the activity of PMR brain activity with the use of diazepam and found that both types of interventions reduced cortical metabolism, with a statistically significant difference between both compared to placebo ($n = 84$, $p < 0.0001$). The regions with the most marked changes were the prefrontal cortex and the anterior cingulate cortex. No significant differences were found between diazepam and PMR (Pifarré et al., 2015).

Servant et al. sought to find the short-term efficacy of relaxation in outpatients from an anxiety disorders unit. They used the Neuropsychiatric Mini-International Interview, the State-Trait Anxiety Inventory (STAI), the Penn State Worry Questionnaire, and the Beck Depression Inventory. Twenty-eight patients were included in the study. The results of this open study showed that this program significantly decreased the level of trait anxiety, depression, and worry ($n = 28$, $p < 0.05$) (Servant et al., 2014). On the other hand, in a study carried out in individuals with anxiety hospitalized in a therapeutic community, the reduction of the STAI score was tested in patients with anxiety disorders, resulting in a 60% decrease in symptoms from mild to moderate and a 40% decrease in symptoms from moderate to severe (Pucha & Vázquez, 2019).

In a study conducted on a Greek sample of people with different types of anxiety disorders, it was shown that people who had undergone PMR showed significant improvements in levels of anxiety, depression, stress, and quality of life, compared to people who received simple counseling ($n = 50$, $p < 0.001$) (Merakou et al., 2019).

Regarding the anxiety symptoms that can be seen in chronic diseases, such as cancer, a study conducted in women who underwent a mastectomy due to breast cancer reported that PMR was useful in reducing the anxiety levels, depression, and length of hospital stay after surgery. These differences were significant, compared to controls for whom the technique was not applied ($n = 170$, $p < 0.001$) (Zhou et al., 2015). Likewise, a study reported that the levels of anxiety and depression in patients affected by leprosy decreased after applying PMR (Ramasamy et al., 2018).

PMR has also shown efficacy in the elderly population. For example, in a study of anxiety levels (measured through Beck Anxiety Inventory) in older adults, it was observed that patients' anxiety symptoms decreased significantly after the correct use of PMR (Granizo, 2019). Similar studies in other groups of older adults demonstrated that the use of this technique helped achieve a deep state of calm, reducing anxiety levels in the participants (Vera, 2019). When analyzing the efficacy of the technique in caregivers of older adults, another study reported an improvement in symptoms of the somatic area (muscular, gastrointestinal, urinary, cardiovascular, respiratory, and nervous), measured using the Hamilton Anxiety Scale. Furthermore, the continuous application of the technique improved the cognitive symptoms of the participants, such as tiredness, fatigue, and distraction. All of the above brought with it a significant improvement in job performance (Cadena, 2018).

For young adults, Hubbard investigated the impact of perceived stress and anxiety state on working memory and academic performance and whether PMR was effective. To do this, 128 health science students were selected and were divided into an experimental group and a control group. The results indicated that this technique reduced anxiety state and improved memory and academic performance of the students included in the experimental group ($n = 128$, $p < 0.001$) (Hubbard & Blyler, 2016).

An investigation carried out with psychology students from Peru reported that the PMR, used during exam periods where the students presented increases in their levels of anxiety, managed to reduce the symptoms of these students by 78%, which was also associated with an improvement in their academic performance (Toro, 2019). Another study, carried out in young music students in whom anxiety and stress levels were measured using the DASS-21 (Depression, Anxiety and Stress Scales) and the Stress Indicator Scale, and to which PMR was applied, found that anxiety levels decreased significantly in these subjects, which had an impact not only on anxiety symptoms in general but also on their professional performance in particular (Argotty, 2016).

Regarding the use of PMR in the pediatric population, a study was conducted with adolescents with high levels of anxiety. The use of the technique reduced the level of anxiety and improved the academic performance of the participants (Matamoras, 2011). In another group of adolescents, anxiety levels were measured with the STAI (state-trait anxiety inventory) and PMR was applied to subjects with higher anxiety levels. This achieved a significant

reduction in anxiety levels (Gallardo, 2014). In a trial in pediatric cancer patients in Greece and Cyprus, where PMR was used and anxiety levels were measured using the Hamilton anxiety scale, a significant reduction in anxiety levels was found in a first measurement after the introduction of the technique and that the decrease was sustained in the follow-up, comparing with the control group (Tsitsi et al., 2017).

Hashim and Zainol compared the effects of 6 and 12 PMR sessions on emotional distress, short-term memory, and sustained attention in elementary school children. One hundred and thirty-two children participated, who were assigned to groups of 6 or 12 PMR sessions. In both groups, there were improvements in emotional distress and other symptoms, although the 12-session PMR program was more effective (Hashim & Zainol, 2015).

The PMR has shown effectiveness in people of different professions. For example, when measuring the stress level in nursing personnel from different Intensive Care Units, using the STAI, NSS (Nursing Stress Scale), and NWI (Nursing Work Index) questionnaires, a marked decrease in the score was observed in these tests in those participants undergoing PMR, compared to the control group (Téllez, 2013). On the other hand, a study carried out in primary school teachers with high levels of anxiety and high work stress reported a decrease in symptoms, as well as the risk of developing burnout syndrome, after the use of PMR (Macías, 2018). In a test in participants with high anxiety levels, both PMR and connective tissue manipulation were tested, and it was found that the two methods reduced anxiety levels, without significant differences between the two ($n = 90$, $p < 0.001$) (Wilczyńska et al., 2019).

CONCLUSIONS

Despite the limitations presented by a narrative review such as this, it has fulfilled its objective of providing general guidance regarding the evidence supporting the usefulness of PMR on the management of anxiety.

PMR is useful both in adults (young and old) and in the pediatric population, as well as in clinical and non-clinical samples, and its use can be considered in the routine care of people with anxiety. In addition, it is highlighted that PMR is an easy technique to learn and practice, which requires minimally trained personnel and does not use expensive equipment (Ramasamy et al., 2018), so it can be applied in the most varied health establishments or in the patients' homes.

As recommendations for the future, more studies are needed with larger samples, examining the physiological (increase in neurotransmitters or parasympathetic activity that causes muscle relaxation) and psychological mechanisms (greater sense of control, distractibility, among others) through which the PMR exerts its action (Vancampfort et al., 2011). Another point to consider would be the number of sessions to recommend and the type of interventions (pharmacological or psychotherapeutic) with which their utility is most enhanced.

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