

DOSSIER · THERAPY

Progressive Muscle Relaxation and Autogenic Training

This page summarises the research on two established relaxation techniques: **Progressive Muscle Relaxation (PMR)** and **Autogenic Training (AT)**. The evidence base is broad, though findings are often application-focused and not always robustly causal. The most notable observation: these techniques are frequently used as supportive therapies, but their effects are highly context-dependent.

790

STUDIES IN
TOTAL

581

IN HUMANS

296

OF WHICH
CONTROLLED

5

IN ANIMALS

0

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-04

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Progressive Muscle Relaxation and Autogenic Training at a Glance

ORIGIN:
Progressive Muscle Relaxation (PMR) is a body-oriented relaxation technique developed in the 1920s by Edmund Jacobson, based on the assumption that physical tension and psychological stress are closely linked. Autogenic Training (AT) was introduced in the 1930s by Johannes Heinrich Schultz and uses autosuggestive formulas to modulate the autonomic nervous system. Both methods are learned in groups or through self-study and require regular practice.

EVIDENCE BASE:
790 evaluated studies · 296 controlled human trials · 285 observational studies · 33 review articles · 5 animal studies · 0 cell culture studies

- STRONGEST EVIDENCE:**
- **Viral Infections** A randomised controlled trial involving 51 COVID-19 patients showed that daily 30-minute sessions of PMR over five days significantly reduced anxiety levels ($P < 0.001$), though sleep quality was not fully reported. The validity is limited by the small sample size and lack of blinding.
 - **Cognition and Mental Health** A systematic review and meta-analysis of 27 studies (1997–2007) on various relaxation techniques indicated that PMR and AT may be effective for anxiety disorders, with meditation showing the largest effects. The methodological quality of the included studies was often inadequate.
 - **Musculoskeletal System** A systematic review of 15 randomised controlled trials showed that PMR had the most consistent effects in reducing pain, particularly arthritis-related pain. AT and other techniques yielded less consistent results.
 - **Oncology:** A randomised controlled trial with 104 hospice cancer patients found that the combination of PMR and guided imagery reduced pain intensity and emotional symptoms two hours post-session, providing a preliminary indication of potential benefits.
 - **Cardiovascular System** A study involving 31 hypertensive patients demonstrated a short-term reduction in blood pressure through relaxation therapy compared to non-specific therapy or medication alone, though the effects were no longer detectable after six months.

- LIMITATIONS:**
- Isolating the specific effects of PMR and AT is methodologically challenging, as both techniques are often combined with other interventions.
 - The evidence base is asymmetrical: PMR is more extensively studied, while AT is frequently addressed in older research focusing on psychovegetative disorders.
 - Many studies are small, short-term, and exhibit methodological weaknesses such as lack of blinding or active control groups.

CLASSIFICATION:
Progressive Muscle Relaxation and Autogenic Training are established relaxation techniques with demonstrated supportive efficacy in stress-related disorders, pain, and emotional distress. However, their specific effects are difficult to isolate due to methodological limitations and frequent combination with other therapies.

1. What Progressive Muscle Relaxation and Autogenic Training Are

Progressive Muscle Relaxation (PMR) is a body-oriented technique in which targeted tensing and releasing of individual muscle groups is used to achieve a state of deep relaxation. Developed in the 1920s by physician Edmund Jacobson, it is based on the premise that physical tension and psychological stress are closely connected. **Autogenic Training (AT)**, introduced by Johannes Heinrich Schultz in the 1930s, is a self-induced method that uses autosuggestive formulas (e.g., sensations of heaviness and warmth) to modulate the autonomic nervous system.

Critical to the evidence base is the **standardisation of implementation**. While PMR is often clearly structured (e.g., 16 muscle groups in a fixed sequence), AT varies in application—from short exercises to longer sessions with deeper formulas. Effects are usually measured using subjective scales (e.g., anxiety or pain scores) or physiological markers (heart rate variability, cortisol levels). Since both techniques are often combined with other interventions (e.g., cognitive behavioural therapy), **isolating their specific effects** is methodologically challenging.

2. What the Studies Show in Detail

The key human studies and major reviews—by application area, including population, duration, preparation, outcome measures, and results as reported in the original publications. Numbers are included only where the study provides them.

Distribution of **controlled human trials** by application area—the numbers are not additive, as a single study may be assigned to multiple areas:

APPLICATION AREA	CONTROLLED STUDIES
Musculoskeletal System	194
Cognition and Mental Health	171
Fatigue and Stress	170
Oncology	52
Safety and Tolerability	35
Cardiovascular System	35

APPLICATION AREA	CONTROLLED STUDIES
Immune System	13
Viral Infections	9

Viral Infections

A randomised controlled trial involving 51 isolated COVID-19 patients examined the effects of **progressive muscle relaxation** on anxiety and sleep quality. The experimental group performed 30 minutes of progressive muscle relaxation daily for five consecutive days, while the control group received routine care only. Anxiety (Spielberger State-Trait Anxiety Scale, STAI) and sleep quality (Sleep State Self-Rating Scale, SRSS) were measured before and after the intervention. Post-intervention, the experimental group showed a significant reduction in anxiety levels ($P < 0.001$), though sleep quality was not fully reported in the abstract. The study's validity is limited by its small sample size and lack of blinding.

Cognition and Mental Health

A multicentre randomised controlled trial involving 2,328 patients post-myocardial infarction examined a **rehabilitation programme** that included relaxation training and stress management¹. The intervention consisted of seven weekly outpatient group sessions for patients and relatives. After six months, no significant differences were observed between the intervention and control groups in terms of anxiety (33%) or depression (19%). However, rehabilitation patients reported a lower frequency of angina pectoris (median: three vs. four episodes per week) and reduced medication use. After twelve months, there were no differences in clinical complications or mortality. The study does not allow conclusions about the specific effects of progressive muscle relaxation or autogenic training, as these were part of a multimodal programme.

Direct comparisons with other psychological treatments showed no or slightly negative effects in the evaluated controlled human trials. Positive effects (medium effect sizes) were found for tension headaches/migraine, mild to moderate essential hypertension, coronary heart disease, bronchial asthma, somatoform pain disorders, Raynaud's syndrome, anxiety disorders, mild to moderate depression/dysthymia, and functional sleep disorders in these trials. The heterogeneity of the studies and the lack of differentiation between various relaxation techniques limit the generalisability of these findings.

A randomised controlled trial with 50 COPD patients compared **immersive virtual reality therapy (VR)** with **Schultz's autogenic training**⁹. Both groups additionally completed a pulmonary rehabilitation programme. After ten sessions, the VR group showed a significant reduction in perceived stress ($p < 0.0069$, effect size $d = 0.353$), depression ($p < 0.001$, $d = 0.836$), and anxiety ($p < 0.0009$, $d = 0.631$) as measured by self-report scales, whereas autogenic training yielded no significant effects. The study is limited by the small sample size and the lack of long-term follow-up.

A systematic review and meta-analysis of 27 studies (1997–2007) examined the efficacy of **relaxation techniques** (including progressive muscle relaxation, autogenic training, applied relaxation, and meditation) for anxiety disorders¹⁶. The review encompassed multiple techniques, with meditation showing the largest effects. Progressive muscle relaxation and autogenic training were included in the analysis, but their specific effects were not separately quantified. The methodological quality of the studies was often insufficient, and the heterogeneity of the populations limits comparability.

Musculoskeletal System

Participants performed each of the three examined techniques (progressive muscle relaxation, autogenic training, and a third method) for 20 minutes while psychological and physiological relaxation parameters (electrodermal activity, heart rate) were measured. All three techniques led to a significant increase in relaxation compared to the control group, with no differences observed between the techniques. The study is limited by the short intervention duration and the healthy population.

A systematic review of 15 randomised controlled trials examined **relaxation techniques** (including progressive muscle relaxation, autogenic training, jaw relaxation, and systematic relaxation) for pain reduction¹⁸. The review included multiple techniques, with progressive muscle relaxation showing the most consistent effects, particularly for arthritis pain. Autogenic training was also evaluated but showed no significant effects in this analysis.

HYPOTHESIS The studies suggest that progressive muscle relaxation and other body-focused relaxation techniques may be effective for musculoskeletal pain and tension. However, long-term studies with clinical populations targeting specific pain diagnoses (e.g., chronic back pain) are lacking.

Fatigue and Stress

A randomised controlled trial with chronic headache patients examined an **internet-based programme** incorporating progressive muscle relaxation, biofeedback elements, autogenic training, and stress management⁴. After a two-month follow-up, 47% of participants maintained an improvement in headache symptoms. The study is limited by the high dropout rate (38.1% during treatment, 64.8% at follow-up) and does not allow differentiation between the effects of the individual components, including progressive muscle relaxation or autogenic training.

Skin

A systematic review and meta-analysis of eight randomised controlled trials examined **psychological interventions** for atopic dermatitis, including autogenic training among other methods⁵. The average effect size for reducing eczema severity across all interventions was $r = -0.367$ (95% CI: -0.579 to -0.108). Larger effects were found for itch intensity ($r = -0.805$) and scratching behaviour ($r = -0.620$). However, study quality was heterogeneous, and the review does not allow conclusions about the specific effect of any single intervention, such as autogenic training.

Cardiovascular System

An older study with 31 hypertensive patients demonstrated a significant blood pressure reduction through **relaxation therapy (unspecified methods)** compared to non-specific therapy or medication alone¹⁷. However, the effects were no longer detectable after six months.

Oncology

Quality of life did not improve significantly. The study is limited by the lack of blinding and the short follow-up duration.

A randomised controlled trial with 104 hospice cancer patients examined the effect of **progressive muscle relaxation combined with guided imagery (PMR-GI)** on pain and symptom burden¹⁰. The combined intervention showed a significant reduction in pain intensity (difference: 1.83 points on the NRS) and emotional symptoms (anxiety, depression) two hours post-session. The study is limited by the lack of long-term follow-up, the heterogeneous patient group, and the inability to isolate the specific contribution of progressive muscle relaxation within the combined approach.

Both relaxation techniques (unspecified methods) led to significant improvements in sleep-related parameters (sleep latency, sleep duration, sleep efficiency, and sleep quality, $p < 0.001$), as well as a reduction in sleep medication use ($p < 0.05$). The study is limited by the absence of randomisation and the short intervention duration (3–4 weeks).

Overall Picture

The available studies indicate that **progressive muscle relaxation** and **autogenic training** may be effective in various clinical and non-clinical populations, particularly for anxiety, stress, sleep disorders, pain, and emotional distress. Both methods are frequently used as part of multimodal interventions, which complicates the isolation of their specific effects. While progressive muscle relaxation shows consistent effects on physiological and psychological parameters in many studies, the evidence for autogenic training is more heterogeneous and often limited to specific indications (e.g., anxiety disorders, sleep disorders).

HYPOTHESIS The data suggest that both methods are particularly effective when applied regularly and over an extended period. However, direct comparisons between the techniques are often lacking, as are studies with clearly defined clinical populations (e.g., generalised anxiety disorder, chronic pain syndromes). Additionally, long-term studies examining the sustainability of effects over months or years are rare.

Methodology of the evidence base

The duration of interventions varies between five days and twelve weeks, with shorter interventions often used in acute settings (e.g., COVID-19 isolation, postoperative pain management) and longer ones in chronic or rehabilitative contexts (e.g., oncology, COPD). Common endpoints include psychometric scales (e.g., STAI for anxiety, BFI for fatigue), physiological parameters (e.g., heart rate variability, blood pressure), and clinical outcomes (e.g., pain intensity, sleep quality). Systematic weaknesses include the lack of blinding for participants and therapists, the heterogeneity of interventions (e.g., combination with other techniques), and the often insufficient description of implementation (e.g., duration of exercises, therapist qualifications). Furthermore, follow-up measurements to assess the sustainability of effects are frequently missing.

Relaxation as therapy: Where the evidence reaches its limits

The

FREQUENT COMBINATION WITH OTHER METHODS

(e.g., mindfulness, cognitive therapy) complicates the assessment of the specific efficacy of PMR and AT. Many studies do not compare the techniques against placebo but rather against **waiting lists or standard treatment**—a design that fails to control for non-specific effects (e.g., attention, expectation bias). Additionally, **long-term data** are often lacking: most studies measure effects over only a few weeks or months, despite both methods being designed for **regular use**. The **subjectivity of measurement tools** (e.g., self-reports of anxiety or pain) carries the risk of bias, particularly when participants are already familiar with or positively disposed towards the intervention.

Another issue is the

LACK OF DIFFERENTIATION BETWEEN INDICATIONS

. While PMR and AT are well studied for **stress-related disorders** (e.g., generalised anxiety), there is scarcely any robust data on **somatic diseases with complex pathophysiology** (e.g., autoimmune conditions). Even in frequently investigated applications such as **chronic pain** or **hypertension**, the effects are often **moderate and not always clinically relevant**. The **overlap with placebo effects** is rarely addressed: since both methods rely on **self-efficacy and control**, observed effects may also stem from non-specific psychological mechanisms.

3. How Robust the Research Is

Research on PMR and AT focuses on **psychosomatic and stress-associated applications**. The majority of controlled studies examine effects on the **musculoskeletal system** (e.g., chronic pain), **cognitive and emotional strain** (anxiety, depression), and **fatigue syndromes**. Far fewer studies address **oncological diseases, cardiovascular conditions, or immunological parameters**. The evidence base is **asymmetrical**: while there are more studies on PMR with broader applications, AT research is dominated by older work focusing on psychovegetative disorders. Reviews frequently emphasise the **supportive role** of both methods, such as in rehabilitation or prevention.

The field is methodologically characterised by **heterogeneous study designs**. Many studies are **small and short-term**, with unclear blinding or a lack of active control groups. The **most-cited studies** (e.g., on anxiety in COVID-19 patients or post-infarction rehabilitation) show positive trends, but **generalizability** is limited: effects depend heavily on **participant compliance, quality of instruction, and combination with other therapies**. Meta-analyses also indicate **publication bias**—negative or neutral results are less frequently published. The **physiological mechanisms** (e.g., influence on the autonomic nervous system) are plausible but not consistently demonstrable.

4. What Is Often Claimed — and What the Data Show

STATEMENT	EVIDENCE
PMR and AT as standalone therapy for severe diseases	The available data are limited to supportive applications. For severe depression, acute psychosis, or advanced organic diseases, there are no controlled studies.
Long-term effects on physiological markers	Most studies measure short-term changes (e.g., cortisol levels). Whether regular use permanently modulates the autonomic nervous system remains unclear.
Use in children and adolescents	Die Forschung konzentriert sich auf Erwachsene. In children, effects are less consistent and strongly dependent on guidance.
Comparison with pharmacological therapies	Direct comparisons with medications (e.g., anxiolytics) are rare. The methods are typically studied as complementary approaches rather than alternatives.

5. The Most Robust Studies

Ranked by evidential strength, not by prominence. The full evaluation includes significantly more studies; these are the most reliable.

Controlled Human Trials

- Effects of progressive muscle relaxation on anxiety and sleep quality in patients with COVID-19 (2020)
- ¹ Psychological rehabilitation after myocardial infarction: multicentre randomised controlled trial (1996)
- ² Effectiveness of Progressive Muscle Relaxation, Deep Breathing, and Guided Imagery in Promoting Psychological and Physiological States of Relaxation (2021)
- ³ Autogenic training: a meta-analysis of clinical outcome studies (2002)
- ⁴ A randomised controlled trial of an internet-based treatment for chronic headache (2005)
- Hypnotic treatment of chronic pain (2006)
- ⁵ The effects of psychological intervention on atopic dermatitis. A systematic review and meta-analysis (2007)
- Randomised controlled trial of mindfulness-based stress reduction for prehypertension (2013)
- Sound therapy (using amplification devices and/or sound generators) for tinnitus (2018)
- ⁶ Nonpharmacologic treatment for fibromyalgia: patient education, cognitive-behavioural therapy, relaxation techniques, and complementary and alternative (2009)
- ⁷ Relaxation for depression (2008)
- ⁸ Effects of progressive muscle relaxation and mindfulness meditation on fatigue, coping styles, and quality of life in early breast cancer patients: A (2019)
- ⁹ Evaluation of the Efficacy of Immersive Virtual Reality Therapy as a Method Supporting Pulmonary Rehabilitation: A Randomised Controlled Trial (2021)
- A randomised controlled trial of Japanese patients with obsessive-compulsive disorder—effectiveness of behaviour therapy and fluvoxamine (2005)
- Preservation of immune function in cervical cancer patients during chemoradiation using a novel integrative approach (2010)
- ¹⁰ The effectiveness of progressive muscle relaxation and interactive guided imagery as a pain-reducing intervention in advanced cancer patients: A multicentre study (2019)
- ¹¹ Relaxation therapies for asthma: a systematic review (2002)
- Current treatments of bruxism (2016)
- Interventions for improving sleep quality in people with chronic kidney disease (2019)
- Effects of immersive virtual therapy as a method supporting recovery of depressive symptoms in post-stroke rehabilitation: A randomised controlled trial (2022)
- ¹² Smartphone-delivered progressive muscle relaxation for the treatment of migraine in primary care: A randomised controlled trial (2020)
- ¹³ Effectiveness of music therapy and progressive muscle relaxation in reducing stress before exams and improving academic performance in nursing students (2020)
- ¹⁴ Effect of autogenic training on general improvement in patients with irritable bowel syndrome: a randomised controlled trial (2010)
- ¹⁵ Effects of progressive muscle relaxation exercises accompanied by music on low back pain and quality of life during pregnancy (2014)

6. Summary

The available studies demonstrate that progressive muscle relaxation (PMR) and autogenic training (AT) can exert supportive effects in various clinical and non-clinical populations, particularly in cases of anxiety, stress, sleep disorders, pain, and emotional distress. PMR shows more consistent results, especially in pain reduction and stress-associated disorders, whereas AT presents more heterogeneous findings and is often limited to specific indications such as anxiety or sleep disorders. Both techniques are frequently used as part of multimodal interventions, which complicates the assessment of their specific efficacy. The effects are highly context-dependent and influenced by factors such as compliance, quality of instruction, and combination with other therapies. The methodological quality of the studies varies widely, with common limitations including small sample sizes, lack of blinding, and insufficient long-term follow-up.

It is plausible that PMR, due to its body-oriented structure, is especially effective for musculoskeletal pain and tension, while AT, through its autosuggestive elements, may have a stronger impact on psychovegetative disorders. However, direct comparisons between the techniques and studies with clearly defined clinical populations—such as those with generalised anxiety disorder or chronic pain syndromes—are lacking. Additionally, the observed effects may partly stem from non-specific mechanisms such as placebo, expectation bias, or self-efficacy. The assumption that both techniques sustainably modulate the autonomic nervous system remains speculative, as long-term data on physiological markers are absent.

To improve the evidence base, studies with the following characteristics would be necessary: 1) Direct comparisons between PMR and AT in clearly defined clinical populations to identify specific indications and mechanisms of action. 2) Long-term studies with follow-up measurements over months or years to assess the sustainability of effects and capture physiological markers such as heart rate variability or cortisol levels. 3) Methodologically robust designs with active control groups, blinding, and adequate sample sizes to control for non-specific effects. 4) Investigations into their application in children and adolescents, as well as in severe conditions such as depression or autoimmune diseases, to test the generalisability of the findings. 5) Studies systematically analysing the combination with other therapies to understand synergistic effects or interactions.

7. Unresolved Questions

- **Dose-response relationship:** Is there an optimal frequency or duration of application that extends beyond subjective effects?
- **Neurobiological mechanisms:** Which specific brain regions or networks are influenced long-term by PMR/AT?
- **Cost-benefit analysis:** Are these techniques economically viable for routine care (e.g., rehabilitation, prevention)?

Frequently Asked Questions

Are PMR and AT equally effective for all patients?

Effectiveness depends strongly on **individual factors**. Patients with high **self-efficacy expectations** or **motivation** tend to benefit more. For severe mental health conditions (e.g., psychoses) or cognitive impairments, these techniques are less well-studied and may be less suitable. **Physical limitations** (e.g., for PMR) can complicate implementation. **Therapist competence** plays a central role—poorly guided exercises may even be counterproductive.

Can these techniques be harmful?

Controlled studies report **rarely severe adverse effects**. However, improper use may lead to **short-term symptoms** such as dizziness, muscle cramps, or increased anxiety. In **trauma patients**, relaxation exercises may trigger memories of loss of control. **Epilepsy patients** should practise PMR only under supervision, as deep relaxation may precipitate seizures. Autogenic Training is **contraindicated in psychotic disorders**, as it may exacerbate dissociative states.

How long does it take for effects to manifest?

Most studies show initial effects after **a few weeks** of regular practice. However, **longer-term training** (several months) is necessary to achieve stable changes. The **learning curve** varies: while some patients progress quickly, others require **several months** to internalise the techniques. **Combination therapies** (e.g., with cognitive behavioural therapy) may accelerate the onset of effects but are not always required.

Sources

- 1 Psychological rehabilitation after myocardial infarction: multicentre randomised controlled trial
Jones DA, West RR · 1996
- 2 Effectiveness of Progressive Muscle Relaxation, Deep Breathing, and Guided Imagery in Promoting Psychological and Physiological States of Relaxation
Toussaint L, Nguyen QA, Roettger C, Dixon K, Offenbächer M, Kohls N et al. · 2021
- 3 Autogenic training: a meta-analysis of clinical outcome studies
Stetter F, Kupper S · 2002
- 4 A randomized controlled trial of an internet-based treatment for chronic headache
Devineni T, Blanchard EB · 2005
- 5 The effects of psychological intervention on atopic dermatitis. A systematic review and meta-analysis
Chida Y, Steptoe A, Hirakawa N, Sudo N, Kubo C · 2007
- 6 Nonpharmacologic treatment for fibromyalgia: patient education, cognitive-behavioral therapy, relaxation techniques, and complementary and alternative medicine
Hassett AL, Gevirtz RN · 2009
- 7 Relaxation for depression
Jorm AF, Morgan AJ, Hetrick SE · 2008
- 8 Effects of progressive muscle relaxation and mindfulness meditation on fatigue, coping styles, and quality of life in early breast cancer patients: An assessor blinded, three-arm, randomized controlled trial
Gok Metin Z, Karadas C, Izgu N, Ozdemir L, Demirci U · 2019
- 9 Evaluation of the Efficacy of Immersive Virtual Reality Therapy as a Method Supporting Pulmonary Rehabilitation: A Randomized Controlled Trial
Rutkowski S, Szczegieliński J, Szczepańska-Gieracha J · 2021
- 10 The effectiveness of progressive muscle relaxation and interactive guided imagery as a pain-reducing intervention in advanced cancer patients: A multicentre randomised controlled non-pharmacological trial
De Paolis G, Naccarato A, Cibelli F, D'Alele A, Mastroianni C, Surdo L et al. · 2019
- 11 Relaxation therapies for asthma: a systematic review
Huntley A, White AR, Ernst E · 2002
- 12 Smartphone-Delivered Progressive Muscle Relaxation for the Treatment of Migraine in Primary Care: A Randomized Controlled Trial
Minen MT, Adhikari S, Padikkala J, Tasneem S, Bagheri A, Goldberg E et al. · 2020
- 13 Effectiveness of music therapy and progressive muscle relaxation in reducing stress before exams and improving academic performance in Nursing students: A randomized trial
Gallego-Gómez JI, Balanza S, Leal-Llopis J, García-Méndez JA, Oliva-Pérez J, Doménech-Tortosa J et al. · 2020
- 14 Effect of autogenic training on general improvement in patients with irritable bowel syndrome: a randomized controlled trial
Shinozaki M, Kanazawa M, Kano M, Endo Y, Nakaya N, Hongo M et al. · 2010
- 15 Effects of Progressive Muscle Relaxation Exercises Accompanied by Music on Low Back Pain and Quality of Life During Pregnancy
Akmeşe ZB, Oran NT · 2014
- 16 Relaxation training for anxiety: a ten-years systematic review with meta-analysis
Manzoni GM, Pagnini F, Castelnuovo G, Molinari E · 2008
- 17 Relaxation therapy and high blood pressure
Taylor CB, Farquhar JW, Nelson E, Agras S · 1977
- 18 Systematic review of relaxation interventions for pain
Kwekkeboom KL, Gretarsdottir E · 2006

International Health Research

Research, put in context. Every statement leads to the original paper; the decision in the individual case rests with the treating professional.
ih-research.com/en/knowledge/progressive-muskelentspannung/ · Last updated 2026-10-04