

Volume 2, Issue 2 (December 2025)



**Journal of Physiotherapy in**  
**MENTAL HEALTH**

Journal of Physiotherapy in Mental Health, Volume 2, Issue 2, December 2025, is a biannual publication edited by Moisés Jonathan Magos Chong.

Editorial address: Hacienda el Ciervo 31A, Hacienda de las Palmas, Huixquilucan, Estado de México, Postal Code 52763, Tel. +52 (55) 5627 0210 Ext. 8875, Email: moises.magos@anahuac.mx.

Issue available at: <https://jptmh.com/index.php/jptmh/issue/view/vol2-No.2-dec25>

Responsible editor: Moisés Jonathan Magos Chong.

Exclusive Rights Registration No. 04-2023-111316510800-102 and ISSN (pending), both granted by the Mexican National Institute of Copyright (INDAUTOR).

The most recent update to this issue was made by Moisés Jonathan Magos Chong at the above-mentioned address, on December 31, 2025.

File size: 5.8 MB.

# Editorial Team

---

## General Director

Moisés Magos

## Executive Director

Michel Probst

## Administrative Director

Sharon Finkelbrand

## Chief Editors

Stavros Stathopoulos  
María Eugenia de León Pérez

## Senior Advisor

Simon Rosenbaum

## Assistant Editor

Rafael Ugarte

## Editorial Board

Carla Oda  
Paola Penagos  
Roberto Martínez Porras  
Jimena Figueroa Valero  
Aikaterini Nomidou  
Ángela Hernández

## International Experts Committee

Brendon Stubbs  
Davy Vancampfort  
Felipe Schuch

## Scientific Committee

Cristina Staub  
Olga L Montoya  
Joost van Wijchen  
Matt Erb  
Tine Van Damme  
Theodoros Chatzidamianos  
Jhon F. Santos  
Emanuel Brunner  
Alexandra Papadopoulou

## Equity, Diversity and Inclusion Committee

Axelle Mokry  
Patricia Cordeiro

# Editorial Team

---

## **Board of Physiotherapist students and early career professionals**

Jessica Beda  
Georgios Marios Kyriakatis  
Olympia Christofilea  
Carina Rico  
Georgios Papagiorgos

## **Reviewers**

Louise Danielsson  
Maria da Conceição Graça  
Leonor Santos  
Anna Quialheiro  
Farahdina Bachtiar  
Sai Kishore  
Stefanos Patsiris  
Georgia Georga  
Spyridon Zormpas  
Juliana Goulardins  
Cassandra Lyra  
Katia Nunes  
Mariana Voss  
Larissa Costa Tavares  
Cristina Yui  
Marlysa Sullivan

Joe Tatta  
Jorgelina Dellacasa  
Melina Bufarini  
Rodrigo Juárez  
Virginia Anghilante  
Carlos Alberto Pérez Gómez  
Bryan David Pinzón Porras  
Adriana del Pilar Acero  
Erika Viviana Contreras  
Cyndi Yacira Meneses  
Fabiola González Ortiz  
Sandra Milena Garay  
Liliana Maya Hijuelos  
Vanessa Soraya Ibarra Arroyo  
Laura Catalina Castañeda  
Laura Cota  
María Dolores Alfonso  
Montserrat Cruz  
Rodrigo Tepox  
Alba Jiménez  
Alba García  
Ana María Arias Pérez

## **Publishing Team**

María Eugenia de León Pérez  
Moisés Magos

Volume 2, Issue 2 (December 2025)

## **Journal of Physiotherapy in**

---



The articles' content is the authors' sole responsibility and does not reflect the point of view of the "Journal of Physiotherapy in Mental Health"©. The total or partial reproduction of the texts published here is authorized as long as the complete source and the electronic address of the publication are cited. All intellectual content in this journal is licensed to the consumer public under the figure of Creative Commons© unless the author has agreed otherwise or limited said faculty to "Journal of Physiotherapy in Mental Health" in writing and expressly. The Journal of Physiotherapy in Mental Health is distributed under a Creative Commons license Attribution-Noncommercial-No Derivatives 4.0 International.



# CONTENTS

## Editorial

Moisés Magos

07

## Review

**Neuromodulation and psychotherapy for the treatment of anxiety spectrum disorders in primary otoneurological conditions: a systematic review**

11

Carlos Henrique Gonçalves, Marianita Ozorio Neubauer, Júlia Thees Bortolotti, Mônica Andrade Rios and Katia Nunes Sá



## **Case Reports**

**Somatic symptom disorder triggered by lifetime trauma:  
a case report**

34

Ana Bárbara Siliézar-Marroquín and Ricardo López Melgar

## **Perspectives**

**Mental health physical therapy: recommendations for  
practice, policy, and payment**

45

Joe Tatta, Jeremy Fletcher, Rose M. Pignataro, Janet R. Bezner, Annette M. Willgens, Kerstin M. Palombaro, David M. Morris and Donald H. Lein





---

## Editorial

### Moisés Magos

1. General Director, Journal of Physiotherapy in Mental Health.
2. Coordinator, Professor, and Researcher, Physical Therapy and Rehabilitation, Faculty of Health Sciences, Universidad Anáhuac México

✉ Corresponding Author:  
Moisés Magos  
moises.magos@anahuac.mx

The articles' content is the authors' sole responsibility and does not reflect the point of view of the "Journal of Physiotherapy in Mental Health"©. The total or partial reproduction of the texts published here is authorized as long as the complete source and the electronic address of the publication are cited. All intellectual content in this journal is licensed to the consumer public under the figure of Creative Commons© unless the author has agreed otherwise or limited said faculty to "Journal of Physiotherapy in Mental Health" in writing and expressly. The Journal of Physiotherapy in Mental Health is distributed under a Creative Commons license Attribution-Noncommercial-No Derivatives 4.0 International.



## Editorial

### Moisés Magos

1. General Director, Journal of Physiotherapy in Mental Health.
2. Coordinator, Professor, and Researcher, Physical Therapy and Rehabilitation, Faculty of Health Sciences, Universidad Anáhuac México

---

Some time ago, a student shared an anecdote with me that caught my attention. She told me that in the house where she was staying—shared with other students from our university—there was a common practice: watching television series at twice its normal speed. In this accelerated version, the students moved from one episode to the next, devouring entire seasons. My first reaction was one of disbelief. Why would someone choose to watch something in this way, losing virtually everything that gives a narrative its meaning? What remains after this form of *binge-watching*, when settings, characters, stories, and contexts rush past the viewer?

The answer I arrive at is simple: information. Knowing what comes next, finding out what happens afterward—everything reduced to the smallest possible units of data.

After confirming that this was a common habit among several students, I could not help but reflect on the relationship between this practice and social media scrolling, where one data point follows another within a minimal window of attention. Our relationship with the world, and with the lives of others, unfolds as moments of sudden and fragmented information, leaving us with the sensation of knowing, even when our contact has been limited to superficial data.

We are already beginning to recognize the challenge this poses for society, as we train an attention span that is increasingly fractured and dispersed.

If, to this society of fleeting images, we add the fact that on social media one becomes the *product for sale*, additional dimensions of the problem emerge. Not only do I witness multiple data points from the external world, but I myself must become a series of visual fragments—multimedia designed to make my information sufficiently attractive and successful, drawing the desired likes to *what I am*.

I recall another student who shared with me that she had to close her Instagram account because she felt overwhelmed by the persistent sense of never being beautiful enough, fun enough, or successful enough,

compared with all the other women and people she observed, who always seemed to be enjoying life more than she was.

Every era has its challenges, and these are ours. How can we foster *being*, beyond merely *doing*? How do we return attention, compassionately and openly, to our embodied selves—where our history and our identity reside—beyond the abstraction we have sought to sell of ourselves? How do we recover the capacity for contemplation, rather than simply moving from one stimulus to another? How do we regain a sense of depth and transcendence in a context saturated with data alone? How do we create bonds and communities rooted in the heart, in environments where connections are severed at the speed of an *unfollow*?

There are no simple answers, and each of us must respond to these questions individually—by living them and embodying them, rather than merely knowing them as data.

Nevertheless, efforts such as those undertaken by this journal, and by each of the authors who contribute to it, represent valuable seeds. They seek to nourish this shared journey with reflections, tools, resources, and ideas.

I hope that this issue, as well as previous ones and those yet to come, can continue to contribute to the construction of guidance and direction, allowing us to address the diverse concerns we face as a society, while strengthening our collective effort to truly inhabit our lives with greater presence, compassion, and wisdom.

Moisés Magos





---

## **Neuromodulation and psychotherapy for the treatment of anxiety spectrum disorders in primary otoneurological conditions: a systematic review**

**Carlos Henrique Gonçalves <sup>1</sup>, Marianita Ozorio Neubauer <sup>1</sup>, Júlia Thees Bortolotti <sup>1</sup>, Mônica Andrade Rios <sup>2</sup>, Katia Nunes <sup>2</sup> ✉**

1. Universidade Católica de Petrópolis, Petrópolis, Rio de Janeiro, Brazil
2. Escola Bahiana de Medicina e Saúde Pública, Salvador, Brazil

✉ Corresponding Author: Katia Nunes Sá. Escola Bahiana de Medicina e Saúde Pública. Av. D. João VI, 275, Brotas, Zip Code 40285-001, Salvador, Bahia, Brazil. Email: [katia.sa@gmail.com](mailto:katia.sa@gmail.com)  
Phone: +55 24 98882-5847

The articles' content is the authors' sole responsibility and does not reflect the point of view of the "Journal of Physiotherapy in Mental Health"©. The total or partial reproduction of the texts published here is authorized as long as the complete source and the electronic address of the publication are cited. All intellectual content in this journal is licensed to the consumer public under the figure of Creative Commons© unless the author has agreed otherwise or limited said faculty to "Journal of Physiotherapy in Mental Health" in writing and expressly. The Journal of Physiotherapy in Mental Health is distributed under a Creative Commons license Attribution-Noncommercial-No Derivatives 4.0 International.



Received: May 05, 2025 | Accepted: December 16, 2025

# Neuromodulation and psychotherapy for the treatment of anxiety spectrum disorders in primary otoneurological conditions: a systematic review

Carlos Henrique Gonçalves <sup>1</sup>, Marianita Ozorio Neubauer <sup>1</sup>, Júlia Thees

Bortolotti <sup>1</sup>, Mônica Andrade Rios <sup>2</sup>, Katia Nunes <sup>2</sup> ✉

1. Universidade Católica de Petrópolis, Petrópolis, Rio de Janeiro, Brazil
2. Escola Bahiana de Medicina e Saúde Pública, Salvador, Brazil

**Abstract:** Anxiety spectrum disorders in patients with primary otoneurological conditions have been explored for treatment using psychotherapy and non-invasive brain stimulation. However, fragmented evidence complicates the identification of effective and safe clinical protocols. **Objective:** This study aimed to summarize the evidence on the efficacy of non-invasive neuromodulation and psychotherapy in managing anxiety spectrum disorders linked to otoneurological conditions. **Material and methods:** A registered PRISMA-guided systematic review (PROSPERO: CRD420250654796) analyzed clinical studies from PubMed, LILACS, SciELO, APA, and PePsic. Studies evaluating non-invasive brain stimulation and/or psychotherapy for anxiety in otoneurological conditions were included, with no restrictions on publication year or language.

Two independent researchers searched for articles using the Ryvan tool. A third researcher participated in the final decision on the inclusion of pre-selected studies. The Cochrane Risk of Bias 2 (Rob2) tool was used to analyze the methodological quality of the included studies. Data on the study population, characteristics of the interventions, and results with the respective effect sizes were extracted from the selected studies. **Results:** Of 821 screened studies, 11 met eligibility criteria: seven randomized clinical trials, three observational studies, and one case report. Six studies supported psychotherapy, particularly cognitive behavioral therapy (CBT), while five highlighted the efficacy and safety of non-invasive brain stimulation. Of these, one tested the efficacy and safety of intermittent Theta Burst Stimulation (iTBS), one of non-invasive vagus nerve stimulation (nVNS) and three evaluated transcranial Direct Current Stimulation (tDCS). However, methodological heterogeneity, small sample sizes, and varying study designs and outcomes limited the ability to make a meta-analysis and recommend these interventions as first-line treatments. **Conclusion:** Psychotherapy and non-invasive neuromodulation show promise as complementary approaches to vestibular rehabilitation for anxiety in otoneurological conditions. However, current evidence is insufficient for widespread clinical recommendation. Further high-quality, large-scale studies are needed to establish standardized protocols and confirm efficacy and safety.

## Summary Box

- To our knowledge, this is the first systematic review to synthesize clinical studies on the treatment of anxiety disorders associated with otoneurological conditions.
- The findings of this systematic review hold significant clinical relevance, offering evidence-based insights that could refine therapeutic strategies for managing anxiety disorders in patients with otoneurological conditions, ultimately improving patient outcomes and quality of life.

**Keywords:** Vertigo; Dizziness; Anxiety Disorders; Psychotherapy; Non-Invasive Brain Stimulation.

## Introduction

Dizziness, characterized by a sense of body imbalance, instability, or altered perception of the environment, and vertigo, defined as the illusion of movement of one's own body or the surroundings, are prevalent symptoms experienced by both the general population and individuals with various neurological and/or psychiatric conditions.<sup>1</sup> It is estimated that approximately 20 to 30% of adults experience dizziness or vertigo at some point in their lives.<sup>2</sup> Among the most common conditions associated with these symptoms are benign paroxysmal positional vertigo (BPPV), Menière's disease, vestibular migraine, persistent postural perceptual dizziness (PPPD), vestibular neuritis, and Débarquement syndrome.<sup>3</sup>

Certain groups are at a higher risk of developing balance-related disorders, also known as otoneurological syndromes. These include the elderly, women, and individuals with comorbidities such as heart disease, diabetes, hypertension, infections, stress, anxiety, depression, panic disorders, and sleep disturbances.<sup>4</sup> Notably, anxiety spectrum disorders are frequently linked to otoneurological dysfunctions.<sup>5</sup> The impact of these symptoms on quality of life is significant, often leading to reduced productivity, social withdrawal, and overall functional impairment.<sup>6-8</sup>

Otoneurological syndromes arise from a variety of underlying mechanisms, including sensory disintegration, reduced cerebral blood flow,<sup>9</sup> dysfunction in limbic networks — particularly those involving the hippocampus and amygdala — and abnormalities in the vestibulo-ocular reflex or ocular motility.<sup>10</sup> While first-line treatments such as vestibular rehabilitation exercises, pharmacological interventions, and labyrinthine crystal repositioning maneuvers (e.g., the Epley maneuver) have shown favorable outcomes, a subset of patients experience incomplete symptom relief.<sup>11</sup> This highlights the need for complementary therapeutic approaches to address the multifaceted nature of these conditions, particularly in cases where anxiety and balance disorders coexist.

Given the complex and multidimensional nature of otoneurological dysfunctions and anxiety spectrum disorders, interdisciplinary approaches are essential. Psychotherapy and non-invasive neuromodulation techniques, grounded in applied neuroscience, offer promising avenues for alleviating symptoms and improving quality of life. These approaches can complement traditional biopsychosocial interventions, providing a more holistic treatment framework.

Non-invasive neuromodulation techniques, such as tDCS,<sup>12</sup> rTMS,<sup>13</sup> taVNS,<sup>14</sup> and psychotherapeutic interventions like CBT,<sup>15</sup> have emerged as promising avenues. Several systematic reviews have evaluated these interventions in related, yet distinct, contexts. For instance, existing SRs have synthesized evidence on neuromodulation for *generalized anxiety disorder*<sup>16</sup> or for *tinnitus*,<sup>17</sup> and on CBT for *vertigo and dizziness* or *vestibular disorders*.<sup>18</sup> However, these reviews have either focused on psychiatric populations without a primary otoneurological diagnosis or on otoneurological populations without a specific focus on quantifying anxiety outcomes. Crucially, no systematic review to date has specifically and concurrently evaluated the effects of both neuromodulation *and* psychotherapy *targeting anxiety symptoms* in patients with *primary otoneurological syndromes*. This represents a significant gap, as the neurophysiological and cognitive mechanisms underlying conditions like PPPD or vestibular migraine suggest that combined or comparative analysis of these brain-targeting interventions is not only logical but necessary.

Based on the PICO strategy question “What are the effects of non-invasive neuromodulation (e.g., tDCS, rTMS, taVNS) and psychotherapy (e.g., CBT) compared to control conditions (e.g., sham stimulation, standard care, other therapies) on anxiety symptoms and otoneurological outcomes in individuals with primary otoneurological syndromes (e.g., PPPD, vestibular migraine, Menière's disease)?”, the present systematic review aimed to fill this gap by synthesizing the available evidence on the effects of non-invasive neuromodulation and psychotherapy specifically for anxiety spectrum symptoms in individuals with primary otoneurological conditions. By directly comparing and consolidating findings across these two innovative therapeutic domains, we sought to clarify their relative efficacy, identify potential synergistic mechanisms, and evaluate the safety and feasibility of their application in otoneurology. This focused approach will provide clinicians with a nuanced evidence base to guide the integration of these therapies into personalized treatment strategies, addressing the intertwined vestibular and emotional components of these disabling conditions.

## Methods

This systematic literature review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and is registered with PROSPERO under the registration number CRD420250654796.

## Data selection process

To ensure methodological transparency and compliance with PRISMA guidelines, this review included a dedicated subsection describing the data selection process. The search was conducted across five databases: Medline - via PubMed, LILACS (Latin American and Caribbean Health Sciences Literature), SciELO (Scientific Electronic Library Online), APA PsycInfo (American Psychological Association), PePsic (Periódicos Eletrônicos em Psicologia), using combined strategies of controlled vocabulary and free-text keywords related to otoneurological conditions, anxiety spectrum disorders, and therapeutic interventions. Screening was conducted by two independent reviewers using the Rayyan platform, applying predefined inclusion and exclusion criteria. Duplicates were removed, followed by title and abstract screening and full-text assessment. A third reviewer resolved any disagreements. The PRISMA flow diagram (Figure 1) illustrates the identification, screening, eligibility, and inclusion phases of the selection process.

## Inclusion criteria

The following types of clinical studies were included:

1. **Study designs:** Case reports, observational studies, case series, single-arm clinical trials, and randomized controlled trials (RCTs).
2. **Interventions:** Studies evaluating the effects of:
  - **Non-invasive neuromodulation techniques:** Transcranial electrical stimulation (tES), tDCS, TMS, taVNS, and focal ultrasound stimulation (FUS).
  - **Psychotherapy:** First-, second-, and third generation of CBT, Eye Movement Desensitization and Reprocessing (EMDR), psychoanalysis, psychodrama, and analytical therapy.
3. **Population:** Individuals with anxiety spectrum disorders (e.g., generalized anxiety disorder, panic disorder, obsessive-compulsive disorder (OCD), post-traumatic stress disorder, agoraphobia, or specific phobias) and primary otoneurological conditions, including:
  - Benign Paroxysmal Positional Vertigo (PPV)

- PPPD
  - Vestibular Migraine
  - Labyrinthitis
  - Parkinson's Disease
  - Ménière's Disease
  - Débarquement Disorder
  - Motion Sickness
  - Tinnitus
  - Vestibular Neuritis
4. **Language and publication date:** Studies published in any language and without restrictions on the year of publication were considered.
5. **Availability:** Studies must be accessible through the searched databases.

### **Exclusion criteria**

The following studies were excluded:

- Experimental studies involving animals or cell cultures
- Mechanistic studies or studies focused solely on underlying mechanisms
- Review articles, protocol studies, or pilot studies
- Observational or interventional studies focusing on otoneurological disorders secondary to other diseases (e.g., stroke, multiple sclerosis, or brain tumors)

### **Search information**

The following databases were consulted:

- Medline (via PubMed)
- LILACS
- SciELO
- APA PsycInfo
- PePsic

## Search strategies

The search strategies were tailored to each database using a combination of controlled vocabulary (e.g., MeSH terms) and free-text keywords. The following general approach was adopted:

### 1. Population terms:

- Otoneurological conditions: "Benign Paroxysmal Positional Vertigo," "Persistent Postural Perceptual Dizziness," "Vestibular Migraine," "Labyrinthitis," "Parkinson's Disease," "Ménière's Disease," "Mal de Débarquement," "Motion Sickness," "Tinnitus," "Vestibular Neuritis."
- Anxiety spectrum disorders: "Generalized Anxiety Disorder," "Panic Disorder," "Obsessive-Compulsive Disorder," "Post-Traumatic Stress Disorder," "Agoraphobia," "Specific Phobias."

### 2. Intervention terms:

- Non-invasive neuromodulation: "Transcranial Electrical Stimulation," "Transcranial Magnetic Stimulation," "Trans auricular Vagus Nerve Stimulation," "Focal Ultrasound Stimulation."
- Psychotherapy: "Cognitive Behavioral Therapy," "EMDR," "Psychoanalysis," "Psychodrama," "Analytical Therapy."

### 3. Study design terms:

- "Case Report," "Observational Study," "Case Series," "Single-Arm Clinical Trial," "Randomized Controlled Trial", "Randomized Clinical Trial."

### 4. Combination of terms:

- Boolean operators (AND, OR) were used to combine terms related to population, interventions, and study designs. For example:

- ("Benign Paroxysmal Positional Vertigo" OR "Vestibular Migraine") AND ("Transcranial Magnetic Stimulation" OR "Cognitive Behavioral Therapy") AND ("Randomized Controlled Trial" OR "Case Series").

The complete strategies applied for the screening with respective results can be consulted in Appendix 1.

**Filters:**

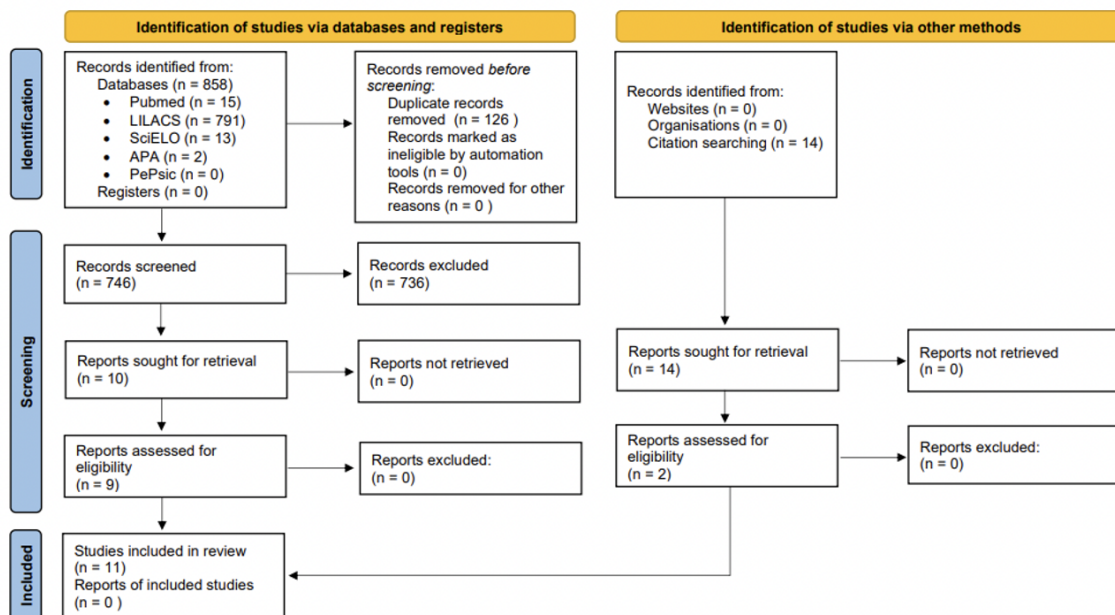
No filters were applied for language or publication date to ensure a comprehensive search.

**Results**

The initial search identified 821 articles, with 15 from PubMed, 791 from LILACS, 13 from SciELO, 2 from APA, and none from PePsic. The identified studies were entered into the Rayyan platform (available at <https://new.rayyan.ai/reviews/1282038/overview>) by two independent reviewers. The reference lists of the pre-selected studies were also consulted to expand the scope of the collection. The data collection flowchart can be seen in Figure 1.

**Study selection and characteristics**

After applying the eligibility criteria and removing duplicate articles, eleven studies were selected for data extraction and analysis. Among these, four had declared registration in clinical trial databases. The included studies comprised seven clinical trials, three observational studies, and one case report. Geographically, the studies were distributed as follows: three conducted in Germany, two in Sweden, two in Switzerland, and one each in China, Belgium, Australia, and Brazil.



**Figure 1.** Flowchart of the study selection process according to the PRISMA guideline.

*Note:* This flowchart was adapted from the PRISMA 2020 flow diagram for new systematic reviews, licensed under CC BY 4.0. Modifications were made to the table format, text size, text box filling, and removal of editorial notes.

### Otoneurological disorders and patient population

The otoneurological disorders investigated in the selected studies included: One study on Mal de Débarquement involving 20 patients, two studies on PPPD with 103 patients, three studies on general dizziness with a total of 75 patients, two studies on phobic vertigo involving 78 patients, two studies on tinnitus with 57 patients, and one case study involving 2 patients with OCD and associated dizziness symptoms. In total, this systematic review examined data from 335 patients with otoneurological disorders and anxiety symptoms.

### Therapeutic approaches evaluated

The therapeutic interventions assessed in the studies included: One study evaluating Theta Burst Magnetic Stimulation, one study investigating classical repetitive magnetic stimulation, two studies examining the

effects of tDCS, one study exploring taVNS, and six studies focusing on psychotherapy, all of which utilized a CBT approach. A summary of the characteristics of the selected studies is provided in Table 1.

**Table 1.** Characteristics of the selected studies

Study	Country	Design	Test group	Comparative group	Otoneurological condition
Browne et al., 2024 <sup>19</sup>	Australia	RCT	10	10	Mal de Debarquement
Yu et al., 2018 <sup>20</sup>	China	RCT	46	45	PPPD
Schaaf & Hesse, 2015 <sup>21</sup>	Germany	Cohort	18	5	Chronic Dizziness
Schmid et al., 2020 <sup>22</sup>	Switzerland	Retrospective cohort	20	20	PPPD
Silva et al., 2016 <sup>23</sup>	Brazil	Case report	2	N/A	OCD
Holmberg et al., 2007 <sup>24</sup>	Germany	Follow-up study of RCT	24	N/A	PPV
Holmberg et al., 2005 <sup>25</sup>	Sweden	CT	16	15	PPV
Dale et al., 2023 <sup>26</sup>	Sweden	RCT	81	78	PPPD
Eren et al., 2018 <sup>27</sup>	Germany	RCT	12	11	PPPD
Pal et al., 2015 <sup>28</sup>	Switzerland	RCT	21	21	Tinnitus
Faber et al., 2012 <sup>29</sup>	Belgium and USA	RCT	8	7	Tinnitus

**Legend:** CT = Clinical Trial without control group; N/A = not applicable; USA = United States of America; OCD = obsessive compulsive disorder; PPPD = Persistent Postural-Perceptual Dizziness; PPV - Phobic Postural Vertigo; RCT = Randomized Clinical Trial.

The therapeutic protocols (Table 2) were applied from four weeks to one year of intervention. The results obtained with the approaches examined presented effect sizes that ranged from 0.54 to 4.6 in the difference between the means in the intra- and inter-group comparison (Cohen's *d* or Hedges' *g*).

Table 2. Therapeutic protocols and results obtained.

Study	PICO Strategy	Follow-up	Parameters	Effect Size	Results (+ or -)
Browne et al., 2024 <sup>19</sup>	P = Mal de Debarquement I = tTBS + VOR vs. VOR C = Sham O = DHI, BDI, HADS-A, HADS-D, MSQ, MdDS-SQ	16 weeks	5 sessions a day 4 days 8 Coil left-DLPFC 50Hz Interval 200ms 2 trains 600 pulses/train	F (3.54) = 9.201	Both + No difference between groups
Yu et al., 2018 <sup>20</sup>	P = PPPD I = CBT + Sertraline C = Sertraline O = HARS+HDRS+DHI*	8 weeks	Sertraline daily CBT 2 sessions a week	g = 1.5	Both +, but TG > CG
Schaaf & Hesse, 2015 <sup>21</sup>	P = Chronic Dizziness I = Psychotherapy C = Not Applicable O = HADS	1 year	Neurological counseling twice, CBT individual and group Health education Exercise Tai Chi Chuan Relaxation Balance training	g = 3.1	Both + No difference between groups
Schmid et al., 2014 <sup>22</sup>	P = Persistent dizziness I = CBT + VOR + Psychoeducation C = Not applicable O = DHI* + BSI + QoL + SoH	N/R	CBT 8 sessions	HADS g = 3.9	Intra groups analysis only
Silva et al., 2016 <sup>23</sup>	P = OCD resistant I = tDCS + SSRI C = Sham + SSRI O = Y-BOCS*, BAI, BDI	4 weeks by 6 months	20 daily sessions for 30 minutes (2 h) Cathode in bilateral SMA Anode on deltoid muscle	g = 0.59 one patient with significant improvement reduction of 50% in both BDI and the BAI scores; improvement of 17% in YBOCS scores and other remained symptomatic	Both +
Holmberg et al., 2007 <sup>24</sup>	P = PPV I = CBT+VR C = Not Applicable O = DHI, VSS, VHQ, HADS	1 year	10 CBT sessions (between 8 - 12); to be stand up in situations that provoke dizziness	NR	Follow-up - limited long-term effect
Holmberg et al., 2005 <sup>25</sup>	P = PPV I = CBT C = SVR + vestibular exercises O = Reduction in dizziness handicap, vertigo symptoms (VHQ and DHI), anxiety (HAS), and depression (HDS)	8-12 sessions	10 sessions of CBT Vs. Daily exercises by 15 minutes 2 times a day	VHQ = 2.79 HAS = 2.99 HDS = 2.36	Both + TG > CG
Dale et al., 2023 <sup>26</sup>	P = Patients with functional vertigo or dizziness I = Integrative Psychotherapeutic Group C = Treatment (IPGT) O = Self-Help Group (SHG) Active control VHQ	16 weeks	One time a week 90 minutes 6-10 participants 2 therapist a group	VHQ = 2.09 (physical symptoms)	Both +
Eren et al., 2018 <sup>27</sup>	P = PPPD I = nVNS + SOC C = SOC O = Improved quality of life	Part I = 4 weeks Part II = 4 weeks	Electrical sign of low tension (synodal waves of 5kHz each during 1ms Each 40ms (25Hz) 3 stimulations for 2 minutes 5 minutes of interval 2 times a day On right neck side (on vagus nerve)	Cohen's f <sup>2</sup> = 0.853	Both + After 2 phases
Pal et al., 2015 <sup>28</sup>	P = Tinnitus I = tDCS C = Sham O = THI	5 days 1 month 3 months	5 consecutive days A on PFC 2mA 20 minutes (Test group) 1mA 90 sec (Sham group)	First month = 0.08 Third month = 0.18	Both +
Faber et al., 2011 <sup>29</sup>	P = Tinnitus I = tDCS on Left DLPFC C = Sham (n = 8) and Right DLPFC (n=7) O = HADS + VAS	2 weeks 8 weeks of washout	tDCS on left-DLPFC Cathode on right-DLPFC 1mA 20 minutes 6 sessions	Tinnitus S = - 2.06 Depression U = 8 Anxiety S = - 0.27 (p = 0.78)	Both +

**Legend:** BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; CBT = Cognitive Behavioral Therapy; CG = Control Group; NR = Not reported; PICO = Patient/Population, Intervention/Exposition, Comparison, Outcomes; tDCS = transcranial Direct Current Stimulation; DHI = Dizziness Handicap Inventory; DLPFC = Dorsolateral Prefrontal Cortex; DO = Dizziness Only; HADS = Hospital Anxiety and Depression Scale; HARS = Hamilton Anxiety Rating Scale; HDRS = Hamilton Depression Rating Scale; IPGT = Integrative Psychotherapeutic Group Treatment; MdDS-SQ = Mal de Debarquement Syndrome Symptom Questionnaire; QoL = Quality of Life; rTMS = repetitive Transcranial Magnetic Stimulation; SHG = Self help group; SoH = State of Health; SMA = Supplementary Motor Area; SSRI = Selective serotonin reuptake inhibitor; SoH = State of Health; SOC = Standard of Care; SVR = Self-Administered Vestibular Rehabilitation; taVNS = trans auricular vagus nerve stimulation; THI = Tinnitus Handicap Inventory; VHQ = Vertigo Handicap Questionnaire; TG = Test Group; VR = Vestibular rehabilitation; VOR = vestibular ocular reflex; VSS = Vancouver Symptom Score; Y-BOCS = Yellow Brown Obsessive Compulsive Scale.

The RoB 2 tool detected from low to moderate risk of bias in all studies except one study<sup>20</sup> that had presented little information about the randomization process, deviation of main outcomes and outcome measures. Two studies<sup>19,29</sup> were conducted without risk of bias (Figure 2).

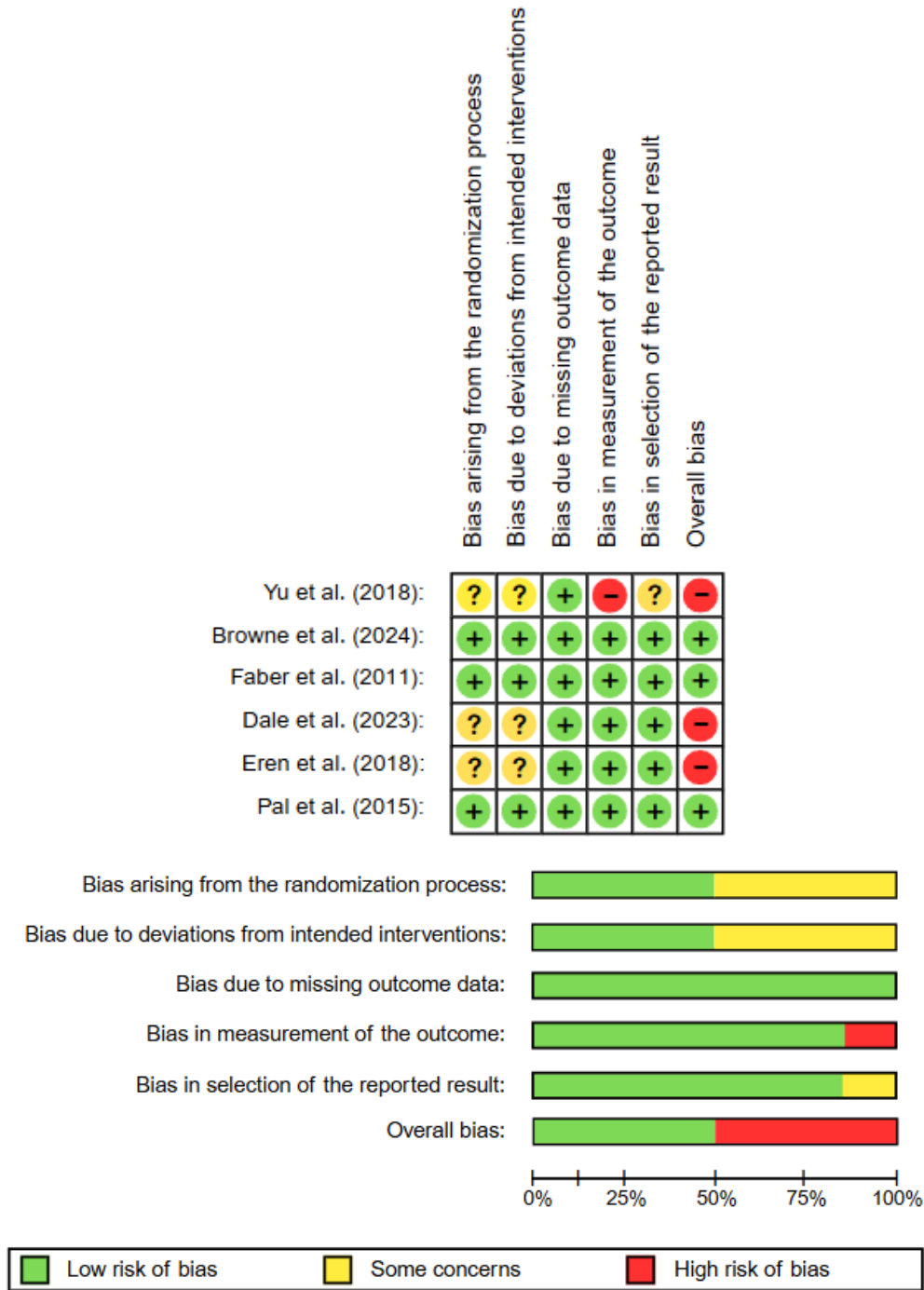


Figure 2. Risk of bias analysis according Cochrane guideline.

## Discussion

This review aimed to summarize the evidence on the efficacy and safety of psychotherapy and non-invasive neuromodulation in treating otoneurological conditions associated with anxiety. However, the number of studies meeting the predefined eligibility criteria was limited. Clinical studies were identified only for populations with nonspecific dizziness, phobic vertigo, tinnitus, and Débarquement sickness. These conditions, which primarily affect balance, are characterized by symptoms such as dizziness and vertigo. Notably, no studies were found addressing the treatment of hearing loss or other otoneurological dysfunctions using these therapeutic approaches.

First-line treatments for dizziness and vertigo include pharmacological interventions,<sup>30</sup> repositioning maneuvers for labyrinthine crystals, and vestibular rehabilitation involving adaptation, habituation, substitution exercises, biofeedback, and virtual reality.<sup>31</sup> In refractory cases, adjunctive therapies such as tympanic injections,<sup>32</sup> dry needling,<sup>33</sup> psychotherapy,<sup>34</sup> and non-invasive neuromodulation<sup>35</sup> have been explored, albeit with limited supporting evidence. This review identified six clinical studies demonstrating consistent favorable outcomes for psychotherapy as an intervention. However, these studies lacked detailed descriptions of the techniques employed, and there is insufficient comprehensive evidence, such as meta-analyses or large-scale clinical trials, to support psychotherapy as a first-line treatment. The evidence for non-invasive neuromodulation is even more limited, with only one study on rTMS, one on continuous Theta Burst Magnetic Stimulation (cTBS), two on tDCS, and one case study on taVNS. The scarcity of evidence often leads to off-label use in clinical practice or hesitancy among professionals to prescribe these therapies.

The Brazilian Consensus on Tinnitus recommends several treatments for tinnitus management,<sup>36</sup> including sound therapy, hearing aids, medications to improve ear circulation, antidepressants or anxiolytics, CBT, relaxation techniques, biofeedback, laser therapy, and treatment of temporomandibular dysfunction. The findings of this review highlight controversial results regarding the use of tDCS for tinnitus. For instance, a study<sup>28</sup> found no significant differences between active and sham groups using bifrontal tDCS targeting the dorsolateral prefrontal cortex. In contrast, other studies<sup>29</sup> reported positive outcomes for tinnitus and depression symptoms with tDCS, though no significant effects on anxiety were observed. A recent meta-analysis involving 1,031 participants<sup>17</sup> confirmed small to moderate advantageous effects of non-invasive neuromodulation, particularly with tDCS applied to the temporoparietal region or dorsolateral prefrontal

cortex for tinnitus treatment. These findings underscore the need for further large-scale clinical trials to resolve existing controversies and establish clearer guidelines for the use of tDCS in tinnitus management.

Neurological disorders are increasingly understood as maladaptive alterations within the multimodal neural system, particularly affecting vestibular spatial and temporal brain maps.<sup>8</sup> Emerging research has identified neural correlates linking the vestibular and auditory systems with fear circuits,<sup>37</sup> underscoring the critical neuropsychological roles of the vestibular and auditory systems in cognition, movement perception, spatial memory, and body image.<sup>7</sup> Furthermore, the neural network responsible for postural balance is intricately connected to cognitive, emotional, and autonomic functions.<sup>37</sup>

Clinical observations reveal that patients with panic disorders, social phobia, post-traumatic stress disorder (PTSD), OCD, and substance use disorders frequently report dizziness as a prominent symptom.<sup>38</sup> Syndromes such as PPPD often respond favorably to anxiolytic treatments,<sup>8</sup> although psychotropic medications can themselves induce dizziness as a side effect.<sup>39</sup> Fear of falling, exacerbated by dizziness or vertigo, can worsen symptoms by disrupting postural muscle activation, autonomic control, and balance, creating a self-perpetuating cycle of dysfunction.<sup>38</sup>

This neuroscientific understanding highlights the importance of exploring psychotherapy and non-invasive neuromodulation as complementary treatment approaches. Targeted interventions in the cerebral cortex, such as electrical or magnetic stimulation, can promote neurofunctional reorganization of affected neural circuits, leading to symptom relief.<sup>19</sup> Cognitive psychotherapy, on the other hand, facilitates the self-regulation of neurotransmitters within synaptic circuits, improving clinical outcomes. These approaches, when combined with pharmacological and physical therapeutic treatments, offer promising adjunctive or alternative options, particularly for patients who do not respond to first-line therapies.

Non-invasive neuromodulation, grounded in the principles of neuroplasticity, has gained significant clinical traction in recent decades.<sup>40</sup> For instance, some authors<sup>19</sup> demonstrated that cTBS significantly alleviates symptoms of Débarquement sickness syndrome, suggesting its potential integration into vestibular rehabilitation protocols. However, tDCS has shown limited efficacy compared to rTMS in treating anxiety disorders,<sup>16</sup> which may explain the lack of symptom improvement observed in psychological conditions with tDCS in other studies.<sup>17</sup>

Vagus nerve stimulation has emerged as a promising alternative, with demonstrated benefits in treating depression.<sup>41</sup> Although comprehensive evidence is still lacking, this modality holds potential for addressing postural control issues associated with anxiety in patients with PPPD,<sup>27</sup> as well as other otoneurological dysfunctions. Its low risk, cost-effectiveness, and tolerability make it an attractive option for modulating the autonomic nervous system and supporting functional recovery in otoneurological conditions.<sup>7</sup>

The integration of psychotherapy, particularly CBT, has proven to be a critical component in managing anxiety and stress, which are often associated with otoneurological symptoms. A study<sup>20</sup> demonstrated the efficacy of CBT, whether delivered individually or in group settings, in reducing the reliance on sertraline among patients with PPPD. Similarly, other authors<sup>26</sup> conducted a clinical trial involving 159 patients and found that CBT significantly alleviated vertigo, anxiety, and depression, regardless of whether it was administered individually or in groups. Notably, a study<sup>42</sup> reported that even a brief intervention of three individual CBT sessions led to measurable reductions in both physical and psychological symptoms. Furthermore, group-based CBT has shown consistent efficacy in treating refractory cases of neurotological disorders.<sup>43</sup> While CBT has demonstrated comprehensive favorable outcomes, there remains a gap in the literature regarding the effectiveness of other psychotherapeutic approaches, such as EMDR or third-generation cognitive-behavioral therapies, in this context.

Combining psychotherapy with pharmacological treatment has been shown to yield beneficial effects in managing chronic dizziness.<sup>21</sup> Similarly, the integration of psychotherapy with vestibular rehabilitation has been effective in addressing dizziness, vertigo, anxiety, depression, and somatization.<sup>34</sup> However, not all studies have reported uniformly favorable results. For instance, a study<sup>24</sup> found no significant benefits of CBT in treating phobic postural vertigo, potentially due to factors such as participant age or insufficiently detailed CBT protocols. In contrast, another study<sup>22</sup> highlighted that both CBT and vestibular rehabilitation improved clinical and functional outcomes, as well as quality of life, in patients with dizziness. These findings underscore the value of a multidimensional treatment approach, where the synergistic effects of different therapeutic modalities can enhance overall outcomes.

Patients presenting with anxiety-related dizziness, tinnitus, or vertigo require empathetic and comprehensive therapeutic reception, which should be a collaborative effort among all members of the healthcare team.<sup>44</sup> Psychoeducation plays a pivotal role in this process, as it helps patients understand the

interplay between psychological factors and otoneurological symptoms. This understanding facilitates endogenous modulation guided by cognitive functions.<sup>26</sup> CBT techniques, such as establishing clear and shared treatment goals, employing Socratic questioning, and assigning cognitive tasks for home practice, empower patients to autonomously manage their emotional and balance-related challenges. The evidence reviewed here underscores the critical role of CBT in treating neurotological disorders, with moderate to high effect sizes supporting its incorporation as a first-line therapeutic approach.

While non-invasive neuromodulation shows promise as adjunctive treatment for certain otoneurological conditions, the current evidence base is insufficient to support its widespread adoption as first-line therapies. Further research with comprehensive methodologies and larger sample sizes is essential to validate their efficacy and safety, thereby enhancing clinical confidence in their application.

This review is not without limitations. The heterogeneity of study samples and interventions, coupled with the lack of detailed descriptions of therapeutic protocols, precluded the possibility of conducting a meta-analysis. Furthermore, we were unable to find other systematic reviews, with or without meta-analyses, with which we could compare our findings. These limitations highlight the need for more standardized methodologies in future research.

A recent meta-analysis<sup>42</sup> provides high-level evidence that additional CBT, when combined with conventional treatments such as vestibular rehabilitation or Selective Serotonin Reuptake Inhibitor, significantly improves outcomes for patients with PPPD, as reflected in reductions in Dizziness Handicap Inventory, Hamilton Anxiety Scale, Generalized Anxiety Disorder Scale-7, and Patient Health Questionnaire-9 scores. In contrast, the systematic review in the main manuscript synthesizes broader interventions for anxiety associated with otoneurological conditions, highlighting CBT as a promising adjunct but emphasizing the scarcity of robust trials and methodological heterogeneity. While both studies converge on the therapeutic relevance of CBT, this study offers quantitative confirmation of its added benefit in PPPD, whereas the main review underscores the need for standardized protocols and further large-scale research to validate these findings across diverse otoneurological disorders.

## **Conclusion**

Psychotherapy, particularly CBT, and non-invasive neuromodulation represent promising adjuncts to vestibular rehabilitation and tinnitus treatment. However, the current evidence base is insufficient to warrant widespread clinical recommendation. Among the modalities examined, CBT – whether delivered individually or in groups – has consistently demonstrated favorable outcomes. Nevertheless, further well-designed controlled clinical trials are essential to strengthen the evidence base and refine the recommendations for these approaches. A multidimensional treatment framework, integrating psychotherapy with other therapeutic modalities, holds significant potential for improving outcomes in patients with anxiety associated with primary otoneurological dysfunctions.

## **Declaration of Generative Artificial Intelligence (AI) and AI-assisted Technologies in the Writing Process**

The text, originally written by the authors in Portuguese and later translated into English, was reviewed with the assistance of the Deepseek AI tool for language refinement, using the prompt: “Could you help to improve this text in an elegant English” (available at <https://chat.deepseek.com/>).

## **Conflict of Interest**

All authors declare that there are no potential conflicts of interest identified in the conduct of the research or in its reporting. No author received support, funding, goods, services or advantages for the production of this study.

## **Equity, Diversity, and Inclusion Statement**

This review was conducted with a commitment to equity, diversity, and inclusion (EDI) at multiple levels. First, our research team represents diverse academic, geographic, and professional backgrounds, fostering inclusive perspectives in study design and analysis. Second, we prioritized a comprehensive search strategy to capture global clinical studies on anxiety and otoneurological disorders, ensuring representation across populations irrespective of gender, ethnicity, or socioeconomic status. Third, methodological rigor included scrutiny of potential biases in source studies, with explicit attention to underrepresented groups in the literature. Finally, interpretation of findings was guided by awareness of clinical applicability across

diverse settings, aiming to advance equitable mental healthcare. Limitations in available data on marginalized populations are acknowledged, highlighting the need for future research to address these gaps.

## References

1. Lempert T, Bronstein A. Management of common central vestibular disorders. *Curr Opin Otolaryngol Head Neck Surg.* 2010 Oct;18(5):436–440. <https://doi.org/10.1097/MOO.obo13e32833dbd69>
2. Murphy C, Reinhardt C, Linehan D, et al. A review of primary care referrals for patients with dizziness and vertigo: prevalence and demographics. *Ir J Med Sci.* 2022 Feb;191(1):385–389. <https://doi.org/10.1007/s11845-021-02575-6>
3. Bhattacharyya N, Gubbels SP, Schwartz SR, et al. Clinical practice guideline: benign paroxysmal positional vertigo (update). *Otolaryngol Head Neck Surg.* 2017 Mar;156(3 Suppl):S1–S47. <https://doi.org/10.1177/0194599816689667>
4. Agrawal Y, Carey JP, Della Santina CC, et al. Disorders of balance and vestibular function in US adults. *Arch Intern Med.* 2009 May 25;169(10):938–944. <https://doi.org/10.1001/archinternmed.2009.66>
5. Staab JP. Chronic dizziness: the interface between psychiatry and neurootology. *Curr Opin Neurol.* 2006 Feb;19(1):41–48. <https://doi.org/10.1097/01.wco.0000198102.95294>
6. Bisdorff A, Bosser G, Gueguen R, et al. The epidemiology of vertigo, dizziness, and unsteadiness and its links to co-morbidities. *Front Neurol.* 2013;4:29. <https://doi.org/10.3389/fneur.2013.00029>
7. Beh SC. The neuropsychology of dizziness and related disorders. *Otolaryngol Clin North Am.* 2021 Oct;54(5):989–997. <https://doi.org/10.1016/j.otc.2021.05.016>
8. Breinbauer HA, Arévalo-Romero C, Villarroel K, et al. Functional dizziness as a spatial cognitive dysfunction. *Brain Sci.* 2024 Jan;14(1):16. <https://doi.org/10.3390/brainsci14010016>
9. Brandt T, Dieterich M. The vestibular cortex: its locations, functions, and disorders. *Ann N Y Acad Sci.* 1999 May;871(1):293–312. <https://doi.org/10.1111/j.1749-6632.1999.tb09193.x>
10. Smith PF. The vestibular system and cognition. *Curr Opin Neurol.* 2017 Feb;30(1):84–89. <https://doi.org/10.1097/WCO.0000000000000403>
11. McDonnell MN, Hillier SL. Vestibular rehabilitation for unilateral peripheral vestibular dysfunction. *Cochrane Database Syst Rev.* 2015 Jan 13;(1):CD005397. <https://doi.org/10.1002/14651858.CD005397.pub4>
12. Brunoni AR, Nitsche MA, Bolognini N, et al. Clinical research with transcranial direct current stimulation (tDCS): challenges and future directions. *Brain Stimul.* 2012 Jul;5(3):175–195. <https://doi.org/10.1016/j.brs.2011.03.002>
13. Lefaucheur JP, Aleman A, Baeken C, et al. Corrigendum to “Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation (rTMS): an update (2014–2018)”. *Clin Neurophysiol.* 2020 May;131(5):1168–1169. <https://doi.org/10.1016/j.clinph.2020.02.003>
14. Frangos E, Ellrich J, Komisaruk BR. Non-invasive access to the vagus nerve central projections via electrical stimulation of the external ear: fMRI evidence in humans. *Brain Stimul.* 2015 May;8(3):624–636. <https://doi.org/10.1016/j.brs.2014.11.018>
15. Cima RFF, Andersson G, Schmidt CJ, et al. Cognitive-behavioral treatments for tinnitus: a review of the literature. *J Am Acad Audiol.* 2014 Jan;25(1):29–61. <https://doi.org/10.3766/jaaa.25.1.4>
16. Sá KN, Baptista RF, Shirahige L, et al. Evidence-based umbrella review of non-invasive brain stimulation in anxiety disorders. *Eur J Psychiatry.* 2023 Jul;37(3):167–181. <https://doi.org/10.1016/j.ejpsy.2023.01.001>

17. Martins ML, Souza DS, Cavalcante MEOB, et al. Effect of transcranial direct current stimulation for tinnitus treatment: a systematic review and meta-analysis. *Neurophysiol Clin.* 2022 Feb;52(1):1–16. <https://doi.org/10.1016/j.neucli.2021.12.005>
18. Zang J, Zheng M, Chu H, et al. Additional cognitive behavior therapy for persistent postural-perceptual dizziness: a meta-analysis. *Braz J Otorhinolaryngol.* 2024 May–Jun;90(3):101393. <https://doi.org/10.1016/j.bjorl.2024.101393>
19. Browne CJ, Sheeba SR, Astill T, et al. Assessing the synergistic effectiveness of intermittent theta burst stimulation and the vestibular ocular reflex rehabilitation protocol in the treatment of mal de débarquement syndrome: a randomized controlled trial. *J Neurol.* 2024 May;271(5):2615–2630. <https://doi.org/10.1007/s00415-024-12215-5>
20. Yu YC, Xue H, Zhang YX, et al. Cognitive behavior therapy as augmentation for sertraline in treating patients with persistent postural-perceptual dizziness. *Biomed Res Int.* 2018;2018:8518631. <https://doi.org/10.1155/2018/8518631>
21. Schaaf H, Hesse G. Patients with long-lasting dizziness: a follow-up after neurotological and psychotherapeutic inpatient treatment. *Eur Arch Otorhinolaryngol.* 2015 Jun;272(6):1529–1535. <https://doi.org/10.1007/s00405-014-3447-y>
22. Schmid DA, Allum JHJ, Sleptsova M, et al. Relation of anxiety and other psychometric measures, balance deficits, impaired quality of life, and perceived state of health to dizziness handicap inventory scores. *Health Qual Life Outcomes.* 2020;18:204. <https://doi.org/10.1186/s12955-020-01445-6>
23. Silva RM, Brunoni AR, Miguel EC, et al. Transcranial direct current stimulation for treatment-resistant obsessive-compulsive disorder: report on two cases and proposal for a randomized, sham-controlled trial. *Sao Paulo Med J.* 2016 Sep–Oct;134(5):446–450. <https://doi.org/10.1590/1516-3180.2016.0155010716>
24. Holmberg J, Karlberg M, Harlacher U, et al. One-year follow-up of cognitive behavioral therapy for phobic postural vertigo. *J Neurol.* 2007 Sep;254(9):1189–1192. <https://doi.org/10.1007/s00415-007-0499-6>
25. Holmberg J, Karlberg M, Harlacher U, et al. Experience of handicap and anxiety in phobic postural vertigo. *Acta Otolaryngol.* 2005;125(3):270–275. <https://doi.org/10.1080/00016480410023001>
26. Dale R, Limburg K, Schmid-Mühlbauer G, et al. Somatic symptom distress and gender moderate the effect of integrative group psychotherapy for functional vertigo on vertigo handicap. *J Psychosom Res.* 2023 Apr;167:111175. <https://doi.org/10.1016/j.jpsychores.2023.111175>
27. Eren OE, Filippopoulos F, Sönmez K, et al. Noninvasive vagus nerve stimulation significantly improves quality of life in patients with persistent postural-perceptual dizziness. *J Neurol.* 2018 Oct;265(Suppl 1):63–69. <https://doi.org/10.1007/s00415-018-8894-8>
28. Pal N, Maire R, Stephan MA, et al. Transcranial direct current stimulation for the treatment of chronic tinnitus: a randomized controlled study. *Brain Stimul.* 2015 Nov;8(6):1101–1107. <https://doi.org/10.1016/j.brs.2015.06.014>
29. Faber M, Vanneste S, Fregni F, et al. Top-down prefrontal affective modulation of tinnitus with multiple sessions of tDCS of dorsolateral prefrontal cortex. *Brain Stimul.* 2012 Oct;5(4):492–498. <https://doi.org/10.1016/j.brs.2011.09.003>
30. Renner V, Geißler K, Boeger D, et al. Inpatient treatment of patients admitted for dizziness: a population-based healthcare research study. *Otol Neurotol.* 2017 Dec;38(10):e460–e469. <https://doi.org/10.1097/MAO.0000000000001568>

31. Hall CD, Herdman SJ, Whitney SL, et al. Vestibular rehabilitation for peripheral vestibular hypofunction: an updated clinical practice guideline. *J Neurol Phys Ther.* 2022 Apr;46(2):118–177. <https://doi.org/10.1097/NPT.0000000000000382>
32. Wang Y, Zhao J, Wu J, et al. Comparison of side effects of different steroids used in intratympanic injections. *Am J Otolaryngol.* 2024 May;45(3):104258. <https://doi.org/10.1016/j.amjoto.2024.104258>
33. Rosenblum O, Yehoshua I, Adler L, et al. Procedural skills workshops for primary care physicians in Israel: a comprehensive analysis. *BMC Med Educ.* 2024 Apr 10;24:381. <https://doi.org/10.1186/s12909-024-05381-7>
34. Radziej K, Schmid-Mühlbauer G, Limburg K, et al. Psychotherapie bei Schwindelerkrankungen: eine störungsorientierte Gruppenbehandlung. *Psychother Psychosom Med Psychol.* 2017 Jun;67(6):245–251. <https://doi.org/10.1055/s-0043-104768>
35. Chen Y, Cha YH, Gleghorn D, et al. Brain network effects by continuous theta burst stimulation in mal de débarquement syndrome. *J Neural Eng.* 2021 Dec;18(6):066025. <https://doi.org/10.1088/1741-2552/ac314b>
36. Onishi ET, Coelho CC, Oiticica J, et al. Tinnitus and sound intolerance: evidence and experience of a Brazilian group. *Braz J Otorhinolaryngol.* 2018;84:135–149. <https://doi.org/10.1016/j.bjorl.2017.12.002>
37. Neumann N, Fullana MA, Radua J, et al. Common neural correlates of vestibular stimulation and fear learning: an fMRI meta-analysis. *J Neurol.* 2023 Apr;270(4):1843–1856. <https://doi.org/10.1007/s00415-023-11568-7>
38. Staab JP. Psychiatric considerations in the management of dizzy patients. In: *Adv Otorhinolaryngol.* Basel: S Karger AG; 2019. p. 170–179. <https://doi.org/10.1159/000490286>
39. Pimentel BN, Rosa RR, Filha VAVS. Impacto da cefaleia no equilíbrio postural e na percepção da tontura em mulheres. *Res Soc Dev.* 2020 Jan;9(2):e165922161. <https://doi.org/10.33448/rsd-v9i2.2161>
40. Moreno-Duarte I, Morse LR, Alam M, et al. Targeted therapies using electrical and magnetic neural stimulation for the treatment of chronic pain in spinal cord injury. *Neuroimage.* 2014 Jan;85:1003–1013. <https://doi.org/10.1016/j.neuroimage.2013.05.097>
41. Tan C, Qiao M, Ma Y, et al. The efficacy and safety of transcutaneous auricular vagus nerve stimulation in depressive disorder. *J Affect Disord.* 2023 Sep 15;337:37–49. <https://doi.org/10.1016/j.jad.2023.05.048>
42. Edelman S, Mahoney AEJ, Cremer PD. Cognitive behavior therapy for chronic subjective dizziness: a randomized controlled trial. *Am J Otolaryngol.* 2012 Jul;33(4):395–401. <https://doi.org/10.1016/j.amjoto.2011.10.009>
43. de Barros ACS, Furlan AER, Marques LHN, et al. Effects of a psychotherapeutic group intervention in patients with refractory mesial temporal lobe epilepsy and comorbid psychogenic nonepileptic seizures. *Seizure.* 2018 May;58:22–28. <https://doi.org/10.1016/j.seizure.2018.03.023>
44. Walker A, Kantaris X, Chambers M. Understanding therapeutic approaches to anxiety in vestibular rehabilitation: a qualitative study of specialist physiotherapists in the UK. *Disabil Rehabil.* 2018 Apr;40(7):829–835. <https://doi.org/10.1080/09638288.2016.1277393>

**APPENDICES****Supplementary Material**

Supplemental material associated with this article will be made available [here](#).

- Appendix 1 - Complete search strategies and screening results



# CASE REPORTS



---

## **Somatic symptom disorder triggered by lifetime trauma: a case report**

**Ana Bárbara Siliézar-Marroquín <sup>1,2</sup>✉ and Ricardo López-Melgar <sup>2,3</sup>**

1. Universidad de San Carlos de Guatemala
2. Mental Health Center TMS Guatemala
3. Universidad de San Pablo de Guatemala

✉ Corresponding Author: Ana Bárbara Siliézar-Marroquín. Sexta avenida 4-01, Clínica 403, Edificio Medika 10, zona 10, Ciudad de Guatemala, Guatemala, C.P. 01010.  
Email: 3008057480101@medicina.usac.edu.gt  
Phone: +502 4738 6197.

The articles' content is the authors' sole responsibility and does not reflect the point of view of the "Journal of Physiotherapy in Mental Health"©. The total or partial reproduction of the texts published here is authorized as long as the complete source and the electronic address of the publication are cited. All intellectual content in this journal is licensed to the consumer public under the figure of Creative Commons© unless the author has agreed otherwise or limited said faculty to "Journal of Physiotherapy in Mental Health" in writing and expressly. The Journal of Physiotherapy in Mental Health is distributed under a Creative Commons license Attribution-Noncommercial-No Derivatives 4.0 International.



Received: July 02, 2025 | Accepted: December 09, 2025

## Somatic symptom disorder triggered by lifetime trauma: a case report

Ana Bárbara Siliézar-Marroquín <sup>1</sup>✉ and Ricardo López-Melgar <sup>2</sup>

1. Universidad de San Carlos de Guatemala
2. Mental Health Center TMS Guatemala
3. Universidad de San Pablo de Guatemala

**Abstract:** Somatic Symptom Disorder (SSD) is characterized by persistent and distressing physical symptoms that cannot be fully explained by a medical condition. Cumulative lifetime trauma is a well established risk factor for SSD, often overlooked in traditional biomedical evaluations. **Objective:** To describe a complex case of SSD triggered by long standing psychological trauma and to highlight the diagnostic and therapeutic value of a trauma-informed, interdisciplinary approach. **Materials and methods:** A case of a 40-year-old Guatemalan woman with incapacitating chronic low back pain and multiple negative findings on structural and neurophysiological testing is presented. Her history revealed childhood physical abuse, a rape-related pregnancy, and prolonged intimate partner violence. Despite neurosurgical management, she reported a pain intensity of 9/10 on the Numeric Rating Scale (NRS), significant functional impairment, and depressive symptoms. A comprehensive psychiatric evaluation supported a diagnosis of SSD per DSM-5-TR criteria. She received psychoeducation, trauma-focused cognitive behavioral therapy, and graded physical rehabilitation. The rehabilitation program was designed and supervised by a licensed physiotherapist, focusing on progressive mobilization, core strength, and recovery of daily function. **Results:** After eight weeks of interdisciplinary treatment, the patient's pain level decreased to 5/10 on the NRS, PHQ-9 scores dropped from 18 (moderately severe) to 8 (mild), and she experienced a marked improvement in mobility and daily functioning. **Conclusions:** This case underscores the importance of identifying trauma as a central component in chronic pain syndromes. SSD remains underdiagnosed in trauma exposed populations, particularly in low resource settings. Early psychiatric referral and integrated care can prevent unnecessary interventions and improve long term outcomes.

### Summary Box

- This case highlights the clinical overlap between trauma related psychopathology and somatic symptom disorders.
- It illustrates how under-recognized trauma histories can delay diagnosis in chronic pain settings.
- The integration of psychiatry, physiotherapy, and pain medicine enabled functional recovery.
- Trauma-informed care reduced symptom severity and improved quality of life.
- This case underscores the need for interdisciplinary approaches in medically unexplained syndromes, especially in low resource settings.

**Keywords:** Somatic Symptom Disorder; Trauma; Chronic Pain; Psychosomatic; Functional Syndromes

## Introduction

Somatic Symptom Disorder (SSD), as delineated in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)<sup>1</sup> is characterized by one or more persistent somatic symptoms that result in clinically significant distress or functional impairment and are accompanied by excessive health-related thoughts, emotions, or behaviors.<sup>2</sup> The annual prevalence of SSD in primary care settings is estimated at 4–6 %.<sup>2</sup> Meta-analytic evidence indicates that exposure to traumatic experiences substantially increases the risk of chronic pain and functional somatic syndromes.<sup>3-4</sup> Proposed mechanisms include central sensitisation and dysregulation of neuroendocrine immune axes.<sup>5</sup> This case report illustrates how lifelong cumulative trauma can manifest as refractory chronic somatic complaints and situates the ensuing discussion within the contemporary literature. The next section details the patient's presentation and diagnostic work-up.

## Case Presentation

A 40-year-old Guatemalan woman was admitted to a multidisciplinary pain clinic with a 12 year history of incapacitating low back pain. Her past medical history included two L4–L5 discectomies (2013 and 2017), a right hip fracture due to a motorcycle accident at age 22, and chronic sleep disruption. Despite appropriate neurosurgical care and pharmacological management, the patient reported persistent pain rated at 9/10 on the Numeric Rating Scale (NRS),<sup>6-7</sup> which significantly interfered with her mobility, occupational function, and quality of life.

The patient also disclosed a background of childhood physical abuse, intimate partner violence during adulthood, and a rape-related pregnancy at age 22. Repeated diagnostic evaluations, including magnetic resonance imaging (MRI), electromyography (EMG), and inflammatory markers, revealed no evidence of ongoing neuropathic or structural pathology. The discordance between the subjective severity of symptoms and the absence of objective findings prompted a referral to psychiatric services.

Psychiatric assessment revealed elevated health-related anxiety, catastrophic pain beliefs, and behavioral avoidance. These features, combined with the chronicity of symptoms, met the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) criteria for Somatic Symptom

Disorder (SSD). Additional screening tools showed a Patient Health Questionnaire-9 (PHQ-9)<sup>8-9</sup> score of 18, consistent with moderately severe depressive symptoms.

The case illustrates the clinical relevance of trauma-informed screening in patients with medically unexplained symptoms. The profound functional impairment in the presence of extensive negative workups underscores the diagnostic value of early psychiatric referral in complex chronic pain syndromes.

### **Diagnostic Evaluation**

The diagnostic process combined biomedical exclusion, standardized psychiatric screening, and clinical observation. Structural causes for the patient's pain were ruled out through serial magnetic resonance imaging (MRI) and electromyography (EMG), which showed no progressive discopathy, nerve compression, or signs of radiculopathy. Laboratory evaluations, including complete blood count, inflammatory markers (CRP, ESR), vitamin D, and thyroid function, were within normal ranges.

The patient described her pain as constant, burning, and disabling, with a baseline intensity of 9/10 on the Numeric Rating Scale (NRS). Despite pharmacologic therapy, she avoided physical activity due to fear of exacerbation and perceived spinal deterioration. These maladaptive behaviors contributed to a progressive reduction in mobility and increased healthcare utilization.

Psychiatric evaluation was performed using the DSM-5-TR criteria, supported by validated instruments. The Patient Health Questionnaire-9 (PHQ-9) yielded a score of 18, indicative of moderately severe depressive symptoms. While the Somatic Symptom Scale-8 (SSS-8)<sup>10-11</sup> was not available in her setting, the clinician's assessment and symptom report were consistent with high somatic symptom burden and significant psychosocial impairment.

Her presentation met all three core criteria for Somatic Symptom Disorder (SSD): (A) one or more distressing somatic symptoms, (B) excessive thoughts, feelings, or behaviors related to those symptoms, and (C) a chronic course lasting more than 12 months. These findings were documented and later summarized in a DSM-5-TR criteria table (see Table 1).

The integration of objective exclusion and subjective criteria facilitated a clear diagnostic formulation and prevented unnecessary repeat interventions.

**Table 1.** DSM-5-TR diagnostic criteria for somatic symptom disorder and clinical application

DSM-5-TR Criteria	Operational definition	Evidence in the patient
Somatic symptoms One or more somatic symptoms that are distressing or cause significant disruption of daily life	Chronic musculoskeletal pain that interferes with work, sleep, and activities of daily living for >10 years	Persistent low-back pain reported as “incapacitating,” leading to occupational disability and fragmented sleep
B. Excessive thoughts, feelings, or behaviors related to the somatic symptoms (at least one of): <ul style="list-style-type: none"> <li>• Disproportionate and persistent thoughts about symptom seriousness</li> <li>• Persistently high level of health-related anxiety</li> <li>• Excessive time and energy devoted to symptoms</li> </ul>	Any one sub-criterion is sufficient; manifestations may fluctuate over time	Repeated consultations with multiple specialists despite unremarkable findings; pervasive worry about spinal “deterioration”; daily rumination and avoidance of feared activities
C. Chronicity The symptomatic state persists (typically >6 months)	Duration criterion differentiates SSD from transient somatic reactions	Pain has persisted for 12 years, with subjective worsening during the past year

*Specifier:* With predominant pain, persistent, severe applicable given the intensity, chronicity, and substantial functional impact of the pain complaint.

### Therapeutic Intervention

The patient was enrolled in a multimodal treatment program designed to address both physical disability and trauma related psychopathology. Management was coordinated between psychiatry, physiotherapy, and pain medicine services. Treatment was delivered in an outpatient setting and followed a trauma-informed, stepped-care model.

Psychoeducation sessions conducted by a licensed psychiatrist focused on the biopsychosocial nature of pain and the influence of trauma on somatic perception. These sessions aimed to reduce catastrophic beliefs and promote adaptive coping strategies.

Trauma-focused cognitive behavioral therapy (TF-CBT) was initiated to address maladaptive cognitions and behavioral avoidance. Weekly sessions (60 minutes each) were conducted by a trained clinical psychologist.

Specific techniques included cognitive restructuring, graded exposure to avoided movements, and development of personalized relapse prevention strategies.

In parallel, the patient underwent graded physical rehabilitation, beginning with supervised low-impact aerobic activity (15–20 minutes of walking and core strengthening exercises, 3 times per week). Sessions gradually progressed in intensity and complexity over eight weeks, targeting functional goals such as stair climbing and domestic activity tolerance. The rehabilitation program was designed and supervised by a licensed physiotherapist, focusing on progressive mobilization, core strength, and recovery of daily function.

Pharmacologic therapy remained unchanged during this period, consisting of acetaminophen and low dose duloxetine (30 mg/day), prescribed previously for neuropathic pain and mood symptoms.

The patient was monitored weekly by the multidisciplinary team. Adherence was high, and no adverse events or exacerbation of symptoms were reported throughout the intervention.

This integrative approach prioritized functional restoration, psychological resilience, and trauma processing, aligning with current evidence supporting interdisciplinary care for somatic symptom disorders.

## **Results**

At the conclusion of the eight-week intervention period, the patient exhibited clinically meaningful improvements across multiple domains. Pain intensity, initially rated at 9/10 on the Numeric Rating Scale (NRS), decreased to 5/10. This reduction was associated with improved tolerance to movement, reduced reliance on assistive devices, and gradual resumption of basic household activities.

The Patient Health Questionnaire-9 (PHQ-9) score declined from 18 (moderately severe depressive symptoms) to 8 (mild), indicating significant reduction in mood-related impairment. The patient reported fewer ruminative thoughts about her pain and a greater sense of control over symptom fluctuations.

Functional capacity improved, as evidenced by her ability to engage in low-intensity physical exercise without anticipatory fear or symptom exacerbation. Attendance at therapy sessions was consistent, and adherence to home exercise prescriptions was confirmed by both the physiotherapist and the patient.

There were no reported adverse events, medication changes, or pain flares requiring emergency visits or hospital admission during this time.

These outcomes suggest that the trauma-informed, interdisciplinary strategy contributed to both symptomatic relief and functional recovery.

## **Discussion**

This case illustrates how cumulative psychological trauma can shape the clinical presentation, persistence, and severity of somatic symptomatology. The patient's history of early life adversity, sexual trauma, and intimate partner violence constituted a high-risk background for the development of SSD, in accordance with existing meta-analytic evidence linking trauma exposure to increased vulnerability for functional somatic syndromes.<sup>3,12</sup> From a pathophysiological perspective, chronic trauma alters the development and regulation of corticolimbic circuits, sensitizes descending pain modulation pathways, and disrupts the hypothalamic–pituitary–adrenal (HPA) axis.<sup>13-14</sup> These neurobiological changes lower the threshold for nociceptive perception and amplify bodily vigilance, thereby perpetuating somatic distress in the absence of identifiable pathology.

The diagnostic process in this case underscored the importance of structured psychiatric evaluation when faced with disproportionate pain reports and extensive negative findings. DSM-5-TR criteria<sup>1</sup> for SSD were met with clarity, and clinical scales such as the NRS and PHQ-9 provided objective benchmarks for symptom monitoring and response to treatment.

Therapeutically, the interdisciplinary model combining psychiatry, physiotherapy, and psychotherapy yielded substantial improvements in both functional outcomes and mood symptoms. This is consistent with stepped-care interventions shown to be effective in SSD.<sup>15</sup> The case also highlights the limitations of purely biomedical approaches and the potential harm of diagnostic delay or overmedicalization. Recent literature further supports this approach, highlighting the cost-effectiveness and clinical efficacy of interdisciplinary models in somatic symptom disorders.

Given the context of a low-resource setting, this case underscores the feasibility and impact of trauma-informed, collaborative care in the treatment of SSD. Table 1 summarizes the DSM-5-TR criteria and how they applied to the patient, offering a transparent framework for future replication and training.

## **Conclusion**

Somatic Symptom Disorder remains under-recognized among trauma exposed patients, leading to diagnostic delay and potentially iatrogenic interventions. Routine, structured screening for lifetime trauma, including childhood adversity and intimate partner violence during chronic pain evaluations can uncover psychosocial drivers that purely biomedical assessments overlook. Early identification should trigger timely referral to mental health services and facilitate shared decision-making.

Interdisciplinary, trauma-informed care combining psychiatry, pain medicine, physiotherapy, and evidence-based psychotherapy has demonstrated superior diagnostic accuracy, functional recovery, and patient satisfaction compared with siloed, procedure focused approaches.<sup>15</sup> Implementing such integrated pathways is especially pertinent in resource-limited settings, where inefficiencies and repeat surgeries exacerbate patient burden.

Future research should prioritise pragmatic trials that evaluate stepped-care models and culturally adapted screening tools for SSD in low and middle income countries.

## **Informed Consent and Ethical Considerations**

All identifying information has been anonymized to protect confidentiality. The report adheres to the CARE (CAse REport) guidelines and complies with institutional ethical standards for the publication of medical case studies.

## **Patient Perspective**

The patient expressed that, for the first time in her care journey, she felt “listened beyond the pain.” She highlighted that understanding the psychological basis of her symptoms helped her reframe her suffering and regain a sense of control. She noted that psychoeducation and therapy sessions allowed her to release long standing feelings of shame and helplessness. She emphasized that having a multidisciplinary team validate her trauma history without judgment was a critical turning point in her recovery.

## **Equity, Diversity, and Inclusion Statement**

This study considered gender informed approaches and trauma sensitive practices throughout the patient’s evaluation and care. The research team reflects a multidisciplinary and inclusive composition. Cultural

factors relevant to the Guatemalan context were integrated into treatment decisions, communication style, and follow up planning. The patient's socioeconomic background and limited access to mental health resources were taken into account when designing a feasible outpatient care pathway.

**Conflict of interests**

There are no financial, professional, or personal conflicts of interest related to the content or publication of this case report.

## References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Text rev. Washington (DC): American Psychiatric Association; 2022.
2. Creed F, Henningsen P. Somatic symptom disorder: a state-of-the-art review. *J Psychosom Res.* 2018;111:94–101.
3. Afari N, Ahumada SM, Wright LJ, et al. Psychological trauma and functional somatic syndromes: a systematic review and meta-analysis. *Psychosom Med.* 2014;76(1):2–11.
4. Liao Y, Xie X, Wang Z, et al. Childhood trauma and risk of chronic pain in adulthood: a meta-analysis. *Pain.* 2022;163(5):851–864. doi:10.1097/j.pain.0000000000002405.
5. Fillingim RB, Loeser JD, Baron R, et al. Assessment of chronic pain: domains, methods, and mechanisms. *Lancet Neurol.* 2021;20(10):769–784.
6. Krebs EE, Carey TS, Weinberger M. Accuracy of the Numeric Rating Scale for pain intensity in clinical practice. *Pain Med.* 2020;21(2):289–294.
7. García-Pérez S, Pérez-Martínez C, López-García A, et al. Assessment of chronic pain in Spanish patients using the Numeric Rating Scale. *Rev Esp Anesthesiol Reanim.* 2021;68(4):197–204.
8. Picardi A, Lega I, Tarsitani L, et al. The Patient Health Questionnaire-9 (PHQ-9): a review of its psychometric properties in clinical populations. *Front Psychiatry.* 2021;12:713087. doi:10.3389/fpsy.2021.713087.
9. Muñoz-Navarro R, Cano-Vindel A, Moriana JA, et al. The PHQ-9: reliability, validity and factorial structure in a Spanish clinical sample. *J Affect Disord.* 2017;208:68–75.
10. Gierk B, Kohlmann S, Kroenke K, et al. The somatic symptom scale-8 (SSS-8): a brief measure of somatic symptom burden. *JAMA Intern Med.* 2014;174(3):399–407. doi:10.1001/jamainternmed.2013.12179.
11. López-Martínez AE, Ramírez-Maestre C, Esteve R, et al. Psychometric properties of the Spanish version of the Somatic Symptom Scale-8 (SSS-8). *J Psychosom Res.* 2020;134:110120.
12. McLean CP, Asnaani A, Litz BT, et al. The relationship between trauma exposure and somatic symptom severity across development. *J Trauma Stress.* 2020;33(1):1–11.
13. Heim C, Nemeroff CB. The role of childhood trauma in the neurobiology of mood and anxiety disorders: preclinical and clinical studies. *Biol Psychiatry.* 2001;49(12):1023–1039.
14. Tracey I, Bushnell MC. How neuroimaging studies have challenged us to rethink: is chronic pain a disease? *J Pain.* 2009;10(11):1113–1120. doi:10.1016/j.jpain.2009.09.001.
15. Kroenke K, Joo J, Wu J, et al. Stepped care for somatic symptom disorders: a randomized clinical trial. *JAMA Psychiatry.* 2019;76(11):1193–1201.





---

## Mental health physical therapy: recommendations for practice, policy, and payment

**Joe Tatta <sup>1</sup>, Jeremy Fletcher <sup>2</sup>, Rose M. Pignataro <sup>3</sup>, Janet R. Bezner <sup>4</sup>,  
Annette M. Willgens <sup>5</sup> ✉, Kerstin M. Palombaro <sup>6</sup>, David M. Morris <sup>7</sup>,  
Donald H. Lein <sup>7</sup>**

1. Integrative Pain Science Institute, New York, New York, USA
2. U.S. Department of Veterans Affairs, Mobile, Alabama, USA
3. Program in Physical Therapy, Marion, Emory & Henry University, Emory, Virginia, USA
4. Department of Physical Therapy, Texas State University, Round Rock, Texas, USA
5. Department of Physical Therapy, Nova Southeastern University, Tampa, Florida, USA
6. Department of Physical Therapy, Widener University, Chester, Pennsylvania, USA
7. Department of Physical Therapy, University of Alabama at Birmingham, Birmingham, Alabama, USA

✉ Corresponding Author: Annette M. Willgens. Address:  
Nova Southeastern University, 3400 Gulf-to-Bay Blvd  
Clearwater, FL, 33759 United States. Email:  
aw1451@nova.edu. Phone: +1 585 261 3703

The articles' content is the authors' sole responsibility and does not reflect the point of view of the "Journal of Physiotherapy in Mental Health"©. The total or partial reproduction of the texts published here is authorized as long as the complete source and the electronic address of the publication are cited. All intellectual content in this journal is licensed to the consumer public under the figure of Creative Commons© unless the author has agreed otherwise or limited said faculty to "Journal of Physiotherapy in Mental Health" in writing and expressly. The Journal of Physiotherapy in Mental Health is distributed under a Creative Commons license Attribution-Noncommercial-No Derivatives 4.0 International.



Received: July 16, 2025 | Accepted: December 01, 2025

## Mental health physical therapy: recommendations for practice, policy, and payment

Joe Tatta <sup>1</sup>, Jeremy Fletcher <sup>2</sup>, Rose M. Pignataro <sup>3</sup>, Janet R. Bezner <sup>4</sup>,  
Annette M. Willgens <sup>5</sup> ✉, Kerstin M. Palombaro <sup>6</sup>, David M. Morris <sup>7</sup>,  
Donald H. Lein <sup>7</sup>

1. Integrative Pain Science Institute, New York, New York, USA
2. U.S. Department of Veterans Affairs, Mobile, Alabama, USA
3. Program in Physical Therapy, Marion, Emory & Henry University, Emory, Virginia, USA
4. Department of Physical Therapy, Texas State University, Round Rock, Texas, USA
5. Department of Physical Therapy, Nova Southeastern University, Tampa, Florida, USA
6. Department of Physical Therapy, Widener University, Chester, Pennsylvania, USA
7. Department of Physical Therapy, University of Alabama at Birmingham, Birmingham, Alabama, USA

**Abstract:** Four out of 5 individuals with mental and/or behavioral health challenges have a comorbid physical condition, and PTs frequently encounter patients with MBH needs. Depression is the leading cause of disability, with a global prevalence of 280 million. Individuals with depression also experience an elevated risk of cardiovascular disease, cancer, respiratory disease, musculoskeletal pain, obesity, metabolic disease, and diabetes. The public deserves accessible, affordable, integrated mental and physical healthcare, and PTs are uniquely positioned to play a critical role in prevention,

early detection and intervention. **Objectives:** This perspective paper has 3 objectives: 1) to provide practical, evidence-based, actionable strategies for physical therapists to manage these conditions; 2) to enlist academic and clinical stakeholders to update curricula and provide contemporary clinical training for today's students; and 3) to advocate for legislative and payment reform reflecting the effectiveness of physical therapy in addressing MBH. This paper contains three sections. Section 1 includes the need for MBH PT, the role of the PT as an integrative primary care provider, and MBH models to guide PT care. Section 2 addresses 3 objectives: (1) screening and differential diagnosis, best practices, and research; (2) education and clinical interventions for PTs working in MBH; and (3) legislative and payment recommendations and system-level reforms to support PTs in MBH. Section 3 includes recommendations and future directions for PTs to advance and elevate the profession in support of the people we serve.

### Summary Box

*This perspective paper highlights methods, models, screening, intervention, and systems reforms for physical therapists to improve the lives of individuals with mental and behavioral healthcare needs. It provides focused recommendations for clinicians as primary care practitioners, and it highlights the urgent need to shift PT education toward a whole-person approach.*

**Keywords:** physical therapy; mental health; behavioral health; practice; policy; payment

**Section 1: The imperative for mental health integration in physical therapy**

The American Physical Therapy Association (APTA) and physical therapy professionals globally are actively expanding their role to address mental and behavioral health (MBH) within individuals and communities.<sup>1</sup> Contemporary physical therapist (PT) practice recognizes the strong connection between physical and mental health. The APTA's official position is that "*physical therapist services include the prevention and management of behavioral and mental health conditions, addressing the interconnected physical, psychological, and social health domains to ensure whole-person care*".<sup>1</sup> This perspective discusses how physical therapists (PTs) can expand or work at the top of their scope of practice, the role that PTs play in MBH, and evidence-based models that guide clinical decision making for the PT addressing MBH.

PTs frequently encounter patients with mental health conditions. Notably, 4/5 individuals with MBH conditions have a comorbid physical condition.<sup>2</sup> According to one survey, 41% of PTs in general practice reported daily encounters with patients who had comorbid MBH conditions, while 76% reported weekly encounters.<sup>3</sup> Of all MBH conditions, depression is the leading cause of disability, with a global prevalence of 280 million.<sup>4</sup> Evidence indicates close associations and shared risk factors between depression and cardiovascular disease, cancer, and respiratory disease.<sup>4</sup> People with depression also experience higher rates of somatic symptoms, musculoskeletal pain, sedentary behaviors, obesity, hyperglycemia, metabolic syndrome, diabetes, and disability.<sup>5</sup> Bidirectional associations exist between depression, anxiety, and physical illness, as well as shared etiological, environmental, psychological, and biological factors that contribute to mental and physical health.<sup>6-7</sup>

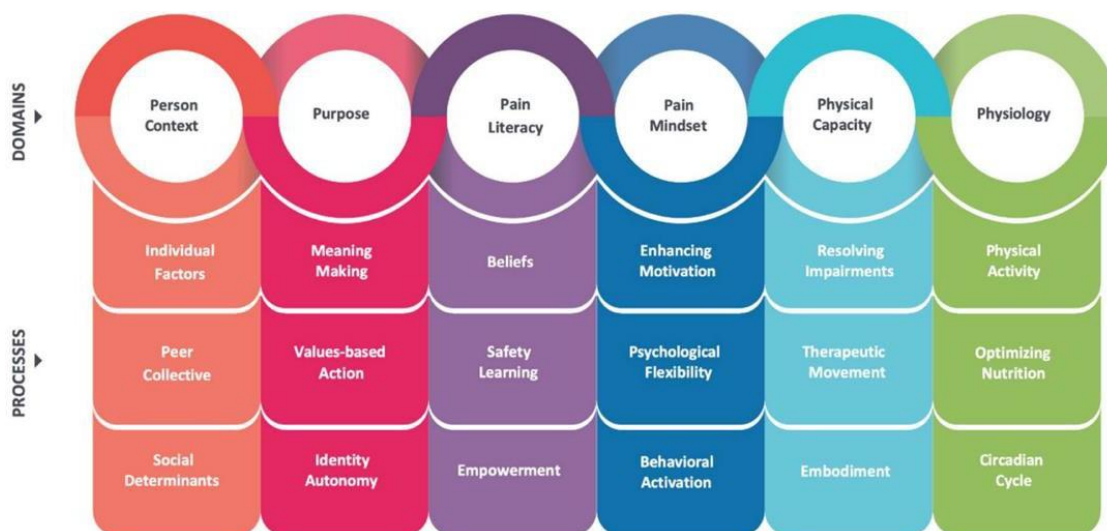
One hundred and twenty-two million Americans (49%) live in a designated mental health provider shortage area.<sup>8</sup> In addition, the United States is projected to face a shortage of 17,800 to 48,000 primary care physicians by 2034.<sup>8</sup> Physician and MBH provider shortages, along with the burden of MBH and noncommunicable diseases, have caused growing demand for primary care services. People with physical and functional impairments are particularly affected. PTs are well-suited to meet these needs by working alongside other primary health care team members, with increasing credibility and influence.<sup>8</sup> Given provider shortages and increasing primary care burdens within the US, including PT as primary care team members can improve access, optimize care navigation, and reduce overall costs for people with physical and functional needs, particularly among people experiencing depression and anxiety, the two most

common MBH conditions.<sup>8</sup> Overall, PTs can positively influence MBH through patient engagement, motivation, and evidence-based interventions.<sup>9</sup>

While some PTs may be apprehensive about managing psychosocial aspects, the impact of whole-person care and therapeutic alliance improves physical therapy outcomes.<sup>10</sup> The growing burden of MBH conditions, often accompanied by physical health issues, demonstrates a clear need for PTs to address psychological and social determinants of health.<sup>11</sup> These realities underscore the urgent need to integrate MBH into PT practice, not only to improve outcomes but also to redefine the PT's role as a frontline provider in addressing physical, mental, and behavioral health.

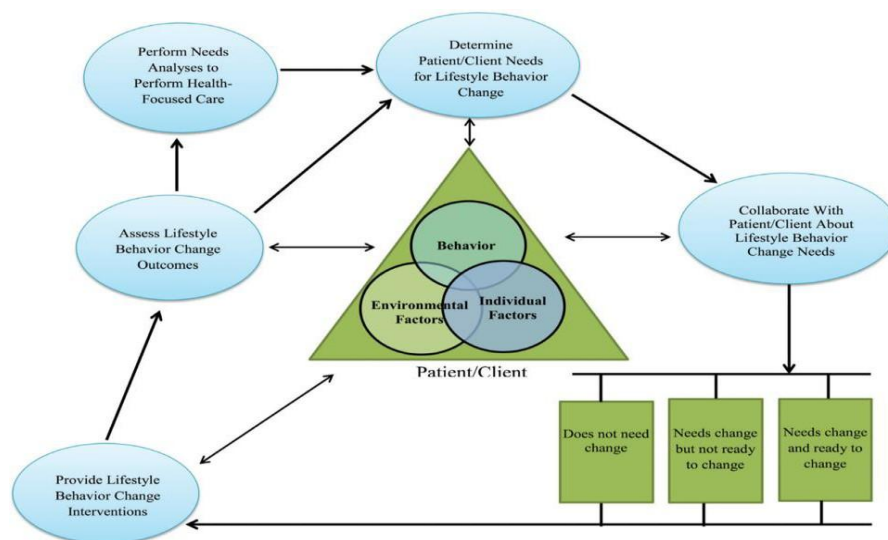
Two models guide the PT in a transdiagnostic approach to MBH care. The first, developed by Tatta et al. in 2023, is the Pain Recovery and Integrative Systems Model (PRISM).<sup>12</sup> PRISM supports PTs working at the intersection of pain management and MBH. PRISM is an integrative, salutogenic, and cognitive-behavioral approach that addresses the multidimensional nature of pain.<sup>12</sup> As a resilience-based approach, PRISM aligns with global, psychosocial MBH strategies and positions PTs as key providers in whole-person care. PRISM's processes are based on Level I and II evidence, offering PTs a practical framework that transforms traditional pain and MBH care toward facilitating resilience.<sup>12</sup> It includes 6 domains: (1) *Person Context* acknowledges how pain intersects with social and life circumstances; (2) *Purpose* recognizes that pain disrupts life's meaning and restores values-based action, identity, and autonomy; (3) *Pain Literacy* develops empowered beliefs and safety learning; (4) *Pain Mindset* cultivates a psychologically flexible and behaviorally adaptive response to pain; (5) *Physical Capacity* improves function by resolving impairments with therapeutic movement and embodiment; and finally, (6) *Physiology*, emphasizes physical activity, nutrition, and circadian rhythms. Preliminary operationalization and feasibility testing were undertaken.<sup>13</sup> See Figure 1 for details of the PRISM Model.

The Second model is the Health-Focused Behavior Change Model (HFPTM) developed by Lein et al. in 2017.<sup>14</sup> This validated model provides a framework for PTs to screen for and address health behaviors known to improve physical, mental, and behavioral well-being.<sup>14</sup> HFPTM is patient/client-centered and considers individual, behavioral, and environmental factors (Figure 2). The HFPTM has five constructs and related care activities. Step 1 is a needs analysis which prepares PTs to examine the prevalence of MBH needs in the clinic, learn about MBH PT, consider screening tools and resources to provide MBH interventions, create a consultancy network with MBH providers, and establish ongoing program evaluation.



**Figure 1.** (PRISM) Pain Recovery and Integrative Systems Model<sup>12</sup>

Step 2 determines each patient/client’s need for lifestyle behavior change by using valid and reliable measures to screen for MBH challenges. Step 3 involves collaboration with the patient/client about lifestyle and behavior change, and Step 4 involves behavioral interventions such as stress and pain relief, nutrition, physical activity, low-intensity cognitive-behavioral techniques, and/or referring to a mental health provider for co-management.<sup>15</sup> Step 5 requires the PT to assess outcomes, such as treatment concordance for PT MBH interventions and patient satisfaction with PT MBH services. See Figure 2 for details on the MFPTM.



**Figure 2.** Health Focused Physical Therapy Model<sup>14</sup>

**Section 2: Strategies for practice, education, and policy transformation**

The *first objective* for this section is to highlight screening, diagnosis, differential diagnosis, best practices, and research for MBH PT. While MBH concerns can surface during the patient interview, the use of publicly available patient-reported outcome measures (PROMs) can help screen for stress, anxiety, depression, PTSD, and substance use. Identification of these conditions aids the diagnostic process, which is the evaluation of information obtained from the patient's history and physical examination and other available information.<sup>16</sup> Diagnosis is within the professional scope of physical therapist practice in the United States of America (USA).<sup>17</sup> Many PTs serve as entry point providers, and in certain states and jurisdictions are legally recognized as primary care providers.<sup>17</sup>

Since stress is associated with MBH conditions, PTs may ask patients to complete a stress survey first, such as the Perceived Stress Scale (PSS). The PSS is a reliable and valid 10-item tool: scores ranging from 0 to 13 suggest low stress, while scores from 14 to 26 are considered moderate stress. High perceived stress is a score between 27 and 40. Moderate to high scores should prompt the PT to administer either the General Anxiety Scale-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9), or both based on symptoms detected during the initial examination.<sup>18-20</sup> The GAD-7 is a reliable and valid tool; scores from 0 – 4 are interpreted as minimal anxiety; 5 – 9 = mild anxiety; 10 – 14 = moderate anxiety; 15 – 21 = severe anxiety.<sup>18-19</sup> A score of 8 or higher suggests generalized anxiety disorder and warrants referral to a mental health provider.<sup>20</sup> The 9-item PHQ-9 is a reliable and valid scale to assess depression. PTs should interpret the total score as follows: 0-4 = no depression; 5-9 = mild depression; 10-14 = moderate depression; 15-19 = moderately severe depression; and 20 or greater severe depression.<sup>21</sup> If the PHQ-9 score indicates mild depression, PTs should consider repeating the test and initiating a stress management program, but should consider referring to and co-managing with a mental health provider if the PHQ score is 10 or greater.<sup>21</sup> The PHQ-9 also has a question that screens for suicide risk. If a patient's response is 1 or higher on this question, further testing by a trained professional is critical.

*The second objective* for this section is to outline education and clinical interventions for the MBH PT. Although people with MBH conditions have lower levels of physical activity, evidence demonstrates the effectiveness of exercise in improving MBH outcomes.<sup>5</sup> Regular exercise modulates the functioning of the hypothalamus-pituitary-adrenal (HPA) axis.<sup>22</sup> Additional benefits include secretion of endogenous opioids and endocannabinoids, which are associated with pleasure, reduced anxiety, decreased pain sensitivity, and

lower systemic inflammation.<sup>22</sup> Exercise can also help mitigate some of the physical side effects associated with antipsychotic medication, such as weight gain, hyperlipidemia, and metabolic syndrome.<sup>22</sup> The psychological benefits of exercise, such as reduced depression and anxiety and improved self-efficacy, likely arise from the dynamic interplay between neurophysiological, behavioral, and social mechanisms.

The International Organization of Physiotherapy in Mental Health (IOPTMH) and the Centers for Disease Control and Prevention (CDC) generally recommend at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity per week, along with muscle-strengthening activities twice a week, for adults to improve both physical and mental health. This can be achieved in bouts of 10 minutes spread across the day. Adherence to guidelines for physical activity is strongly associated with both the prevention and improvement of MBH conditions, and exercise is recognized by physicians and MBH providers as an evidence-based option for treating mental health conditions.<sup>23</sup> Despite this recognition, a relatively small proportion of primary care physicians recommend physical activity consistent with national guidelines or refer patients to a PT as an intervention for MBH.<sup>24</sup>

Recent systematic reviews and meta-analyses indicate that exercise and PT intervention successfully address MBH conditions.<sup>25-26</sup> Across people with depression, anxiety, PTSD, schizophrenia, and eating disorders, aerobic and strength training, body awareness, and mind-body techniques improve psychological symptoms, physical health, and overall quality of life. In 2024, the BMJ published a landmark systematic review and meta-analysis of 218 randomized controlled trials, including over 14,000 participants with major depressive disorder, indicating that exercise works well in these patients.<sup>25</sup> Additionally, a substantial body of research has now emerged to explore the mechanisms of mindful movement practices such as yoga, Pilates, Tai Chi, and Qigong. Yoga<sup>27</sup> and Pilates<sup>28</sup> optimize the interaction between neurophysiological regulation, psychological processes, and behavioral change,<sup>29</sup> and offer a viable complementary approach to managing symptoms of stress, anxiety, depression, and PTSD.<sup>30</sup> Several high-quality clinical trials and reviews underscore the therapeutic potential of yoga across a range of mental health symptoms without adverse events.<sup>31</sup> Table 1 illustrates MBH conditions and the corresponding evidence.

**Table 1.** Research findings in support of exercise for common MBH conditions<sup>25</sup>

Exercise Concept	Evidence
General	<ul style="list-style-type: none"> <li>• Walking or Jogging: <i>moderate reductions in depressive symptoms</i> <ul style="list-style-type: none"> <li>○ (Hedges' <math>g = -0.62</math>; 95% credible interval [CrI]: -0.80 to -0.45)</li> </ul> </li> <li>• Yoga: <i>moderate symptom reduction</i> <ul style="list-style-type: none"> <li>○ (<math>g = -0.55</math>; 95% CrI: -0.73 to -0.36)</li> </ul> </li> <li>• Strength training: <i>moderate symptom reduction</i> <ul style="list-style-type: none"> <li>○ (<math>g = -0.49</math>; 95% CrI: -0.69 to -0.29)</li> </ul> </li> <li>• Mixed Aerobic Exercise: <i>moderate effectiveness</i> <ul style="list-style-type: none"> <li>○ (<math>g = -0.43</math>; 95% CrI: - 0.61 to -0.24).</li> </ul> </li> <li>• Tai Chi or Qigong: <i>moderate symptom reduction</i> <ul style="list-style-type: none"> <li>○ (<math>g = -0.42</math>; 95% CrI: - 0.65 to -0.21).</li> </ul> </li> </ul>
Dose-Response Relationship	Antidepressant effects of exercise were found to be proportional to the intensity prescribed. Vigorous activities yielded more significant benefits.
Acceptability & Adherence	Strength training and yoga are the most acceptable modalities, with lower dropout rates compared to other forms of exercise
Comparative Effectiveness	Exercise interventions showed moderate, clinically meaningful reductions in depressive symptoms in comparison to active controls. Exercise in combination with selective serotonin reuptake inhibitors (SSRIs) or psychotherapy provides additional benefits
Gender Differences	Strength training is more effective for women Yoga or qigong has greater efficacy for men
Age Differences	Yoga is beneficial for older adults Strength training has better outcomes in younger individuals.
Comorbidities & Baseline Depression Levels	Exercise is <i>equally effective</i> for individuals with and without comorbidities and across varying baseline levels of depression
Clinical Implications	Exercise, particularly walking or jogging, yoga, & strength training, should be core components in the treatment of depression.

Despite decades of research linking physical inactivity to chronic disease, its impact on MBH is only now being fully recognized. A 2025 umbrella review in the Journal of Psychiatric Research systematically evaluated whether aerobic exercise could serve as a *transdiagnostic* intervention across a range of MBH conditions.<sup>26</sup> Researchers assessed 99 randomized controlled trials (RCTs), which included over 5,600 participants, using the TRANSD criteria for rigor and generalizability of cross-diagnostic treatment effects.

Findings indicated that consistent moderate-to-vigorous aerobic exercise, implemented at the frequency of the American College of Sports Medicine (ACSM) guidelines,<sup>32</sup> is an effective intervention for 11 mental disorders spanning four diagnostic spectra: depression, anxiety, psychotic, and neurodevelopmental conditions.

The benefits of aerobic exercise result in moderate improvements in core psychiatric symptoms, including PTSD,<sup>33</sup> depression,<sup>34</sup> anxiety,<sup>35</sup> schizophrenia,<sup>36</sup> eating disorders,<sup>37-39</sup> and inattention and hyperactivity.<sup>35</sup> Importantly, aerobic exercise improved symptoms of anxiety and depression, where pharmacological treatments often fall short.<sup>40</sup> While more data are needed for quality of resistance-training effects, the existing evidence strongly supports the use of aerobic exercise as a broad-spectrum, low-cost, and low-risk intervention.<sup>26</sup> The underlying mechanisms are multifaceted—ranging from reductions in inflammation and oxidative stress, to influences on the gut-brain axis, the immune system, and increased levels of brain-derived neurotrophic factor.<sup>41</sup>

Evidence also supports lifestyle interventions, including tobacco and nicotine cessation,<sup>23</sup> nutrition,<sup>42</sup> sleep hygiene,<sup>43</sup> and mindful stress management,<sup>44</sup> which can be prescribed by PTs to manage MBH conditions and chronic disease. Additionally, the APTA and World Health Organization (WHO) recommend *low-intensity psychological interventions (LIPs)*, which are brief, accessible, transdiagnostic treatments focused on self-management skills for lifestyle and behavior change.<sup>45-47</sup>

LIPs are delivered by non-specialized health care providers and include strategies such as motivational interviewing,<sup>48</sup> shared decision making,<sup>49</sup> cognitive behavioral PT,<sup>50</sup> mindfulness and acceptance-based approaches<sup>43-44</sup>, pain neuroscience education,<sup>51</sup> cognitive functional therapy,<sup>52</sup> and pain resilience therapy.<sup>43</sup> The evidence indicates that PTs can effectively and appropriately deliver LIP as part of a stepped care approach,<sup>53</sup> serving as a first line of treatment, then allowing the patient to “step up” to a mental health provider to address specific diagnostic or treatment needs. Stepped care provides lower intensity and less costly approaches as a first-line treatment, which has shown both efficacy and cost-effectiveness.<sup>16</sup>

*The third objective for this section* highlights legislative, payment, and system reforms. Several policies and position statements give credibility to the MBH PT movement. These are led by the APTA, whose mission and vision statements connect mental health to physical health.<sup>1</sup> See Table 2 for a description of the organizations and their policies that influence MBH in physical therapy.

**Table 2.** Organizations and policies influencing MBH in physical therapy

Domain	Directive	Specific Language for MBH Physical Therapy
APTA House of Delegates policy on the role of the PT in behavioral & mental Health <sup>1</sup>	HOD P07-25-49-19	Physical therapist services include the prevention and management of behavioral and mental health conditions, addressing the interconnected physical, psychological, and social health domains to ensure whole-person care.
APTA House of Delegates on physical therapists' services in primary care <sup>8</sup>	HOD P07-24-05-07	Physical therapists possess clinical expertise in the prevention and management of common health conditions seen in primary care settings. Physical therapists practicing in primary care improve the health of society.
Commission on the Accreditation of Physical Therapy Education (CAPTE) <sup>54</sup>	Required elements to support the PTs role in mental health care across the lifespan: 7A, 7D	7A: Curricular Requirements for diagnosis, differential diagnosis, neuroscience, pharmacology, behavioral science, and psychosocial aspects of health/disability 7D: Screening and Exam for psychosocial and mental health aspects of patient care.
Jurisdictional Physical Therapist Scope of Practice <sup>55</sup>	HOD P06-17-09-16 HOD P06-17-08-07	Defined by state licensure laws and typically includes evaluation and management of the physical, behavioral, and psychosocial factors influencing pain, functioning, disability, health, and well-being. State practice acts that specifically mention MBH as of May 2025 are AL, CT, CA, DC, FL, IL, MI, MN, MS, MO, SC, VA.
APTA Guide to Physical Therapist Practice 4.0 <sup>17</sup>	1. Diagnosis 2. Tests & Measures 3. Interventions	<ul style="list-style-type: none"> <li>• “...to organize and interpret all relevant information collected.”</li> <li>• cognitive and mental functions tests to address mental and other psychiatric diagnoses as well as illness or injury influencing mental functions.</li> <li>• Educational &amp; procedural interventions including MI, CBT, mindfulness, pain modulation, and lifestyle health behavior change.</li> </ul>
APTA Code of Ethics <sup>56</sup>	HOD S06-20-28-254 Principles 5, 6, 7, 8	The principles obligate us to address MBH through prevention, screening, assessment, and intervention.
APTA Federal Section	Primary Care Special Interest Group	Promotes PTs as universally recognized front-line providers in the primary care arena.
American Council of Academic Physical Therapy (ACAPT) <sup>57</sup>	Dealing with the MBH crisis in higher education includes over 300 PT programs and over 39,000 students.	Address and train students in trauma-informed crisis management, training to recognize and respond to MBH conditions in students, discuss MBH regularly, create safe spaces for MBH, provide mindfulness resources.

There is a need to extend beyond pain neuroscience education and more clearly address MBH conditions using evidence-based curricular design.<sup>2,51</sup> Options for including MBH content into PT curricula include

adding certificate programs in MBH to the DPT degree, adding complex MBH concepts to discussions, patient simulations, and practical exams, and teaching students evidence-based educational interventions such as interoception awareness,<sup>58</sup> meditation,<sup>59</sup> reframing,<sup>60</sup> breathing,<sup>61</sup> and links between alexithymia, alexisomia,<sup>62-63</sup> and wellness.

Similarly, payment models can facilitate or diminish access for individuals with MBH needs. To provide high-quality, reimbursable care, PTs must remain informed about the various payment structures and how they influence service delivery and documentation across settings.<sup>64</sup> The general payer information in Table 3 describes how the common payer types, such as the Centers for Medicare and Medicaid Services (CMS) and private insurers, may reimburse PT services.

**Table 3.** Payers' systems that may reimburse for MBH Physical Therapy

Payer Type	Description
Medicare Part A	PT for hospital stay, skilled nursing facility, inpatient rehabilitation, hospice, or home health care. <i>PTs can elevate patient outcomes and expedite discharge by using MBH interventions.</i>
Medicare Part B	Pays for medically necessary outpatient PT when a physician, nurse practitioner, or physician assistant certifies it as medically necessary. Coding must be accurate based on documentation of personal factors and body functions, including mental functions. Codes include low (97161), moderate (97162), and high (97163) complexity, and psychological distress or behavior barriers may require additional time, care coordination, or modification to the plan of care.
CMS Integrative Behavioral Health Model	Developed to improve behavioral and physical health outcomes for adults enrolled in Medicaid and Medicare with moderate to severe mental health conditions or substance use disorder (SUD). PT is not covered under this model, but many PTs use alternative diagnoses, like chronic pain, to address underlying MBH factors. While this strategy enables patients to access needed services, it poses the risk of diagnostic overshadowing, a situation where the physical diagnosis (e.g., pain) eclipses the recognition and treatment of co-occurring mental or behavioral health conditions. This practice can negatively affect both patient outcomes and a PTs ability to deliver whole-person care.
Medicare Advantage (Part C)	A privately managed alternative to Medicare. Includes PT with varying coverages.
Medicaid	The US public health insurance program for eligible low-income individuals. Coverage varies by state and includes eligibility standards, payment rates, and PT is often at risk of being cut or limited.
Private Insurance	Wide variability and coverage, limits, and requirements. PTs should verify coverage and billing practices with individual insurance companies.
Cash-Based Services	Patient pays the PT directly, bypassing insurance billing. PTs can establish their fee schedules, including setting a flat rate per session, creating a service-specific fee schedule, or offering packages that provide a discount for multiple visits. Patients may choose to submit receipts to their health savings accounts (HSAs) or flexible spending accounts (FSAs), or even to their private insurers for possible reimbursement after paying out-of-pocket. Therefore, PTs should provide clear documentation of services rendered, including appropriate ICD-11 codes and, when applicable, CPT® codes, particularly if patients intend to seek reimbursement independently.

The successful implementation of the physical therapy management plan relies on system-level support. Health systems should foster interprofessional coordination and collaboration through shared documentation platforms, value-based payment models, and interdisciplinary care. Additionally, policy should support licensure, scope expansion, and payment that enable PTs to participate fully in MBH care delivery. In instances where payment for PTs to participate fully in MBH is lacking, strategic action should be taken by the APTA components and state associations to secure payment in a coordinated effort with other stakeholders. This may be in the form of a "charge" in the context of the APTA House of Delegates. This directs the APTA Board of Directors to allocate resources and act on access to and payment for PTs to participate fully in MBH care delivery.

### Section 3: Recommendations and future directions for the profession

While some PTs may be apprehensive about shifting their practice, whole-person care improves outcomes.<sup>2</sup> The trust and rapport cultivated during clinical encounters enhance the likelihood of patient disclosure, so PTs must become trained to recognize signs of psychological distress. Tables 4 and 5 include the clinician and the educator recommendations, with action items to advance the profession on behalf of the patient.

**Table 4.** Recommendations for clinician stakeholders

Recommendations	Action Items
Use the Health Focused PT Model (HFPT) and/or the Pain Recovery and Integrative Systems Model (PRISM) to guide patient-centered care.	- Routinely assess MBH using validated tools (e.g., PHQ-9, GAD-7, PSS, equanimity scale, tolerance for uncertainty scale, and others)
Enhance Screening & Differential Diagnosis	- Screen for stress, anxiety, depression, post-traumatic stress, suicidality, and ACE scores using validated scales - Use clinical reasoning to determine when to refer to another health service provider
Utilize psychologically informed interventions	- Incorporate cognitive-behavioral principles and techniques such as values-based goal setting, reframing, meditation, and breathing techniques to stabilize the autonomic nervous system
Prescribe exercise and physical activity as part of "first-line" MBH care.	- Provide tailored, evidence-based exercise prescription for depression, anxiety, post-traumatic stress, and other conditions as part of collaborative, team-based care
Incorporate Mindful Movement Practices	- Introduce Yoga, Tai Chi, Pilates, Qi Gong to promote emotional regulation and reduce distress
Facilitate lifestyle interventions for whole-person care	- Address smoking cessation, nutrition, sleep hygiene, & social connectedness
Collaborate and refer appropriately	- Engage in co-management, consultation, and referral pathways with other providers to improve MBH outcomes - Build community partnerships to address social determinants of health and ACE scores.

**Table 5.** Recommendations for educator stakeholders

Recommendations	Action Items
Support scope and payment for MBH	- National and jurisdictional policy should support licensure, scope expansion, and payment that enable PTs to participate fully in MBH care delivery.
Embed MBH into physical therapist/physiotherapist/DPT curricula	- Include coursework on MBH screening, psychologically informed care, HFPTM, and PRISM frameworks; add MBH interventions, difficult conversations, and MBH diagnoses in simulations, role play, and practical exams for all courses.
Train faculty and students to learn psychologically informed care skills	- Include training for students in motivational interviewing, shared decision making, strengths-based communication, and trauma-informed care.
Foster competence in low-intensity psychotherapeutic interventions (LIPs)	- Prepare students to deliver interventions aligned with WHO guidelines as non-specialized healthcare providers for MBH education and behavior change.
Expand interprofessional education	- Include interprofessional case studies with an MBH focus
Promote cultural humility	- Encourage students to have conversations and role play MBH care, including Adverse Childhood Experiences (ACE) scores and social determinants of health
Support advanced competencies in MBH	- Offer certifications and continuing education focused on MBH

The emergence of the MBH PT reflects an evolution informed by decades of research, advances in PT education, and clinical innovation. Today's PT must move beyond somatic reductionism and the traditional mind-body divide by promoting a whole-person approach to patient care. This aligns with the APTA House of Delegates position, stating that "*Physical therapist services include the prevention and management of behavioral and mental health conditions, addressing the interconnected physical, psychological, and social health domains to ensure whole-person care.*"<sup>1</sup> Committing to 1 training in mind-body interventions each year can alter the fabric of PT for all patients and advance our work to new levels of value and longevity.

### **Equity, Diversity, and Inclusion Statement**

The authors affirm their commitment to diversity, equity, and inclusion in all aspects of research. In preparing this manuscript, we prioritized inclusive research practices by considering the needs and perspectives of diverse populations, particularly those underrepresented in clinical research and healthcare systems. Efforts were made to ensure that this work promotes accessibility and respect for individuals across dimensions of race, ethnicity, gender identity, sexual orientation, age, ability, socioeconomic status, and lived experience.

### **Conflict of Interests**

All authors declare that there are no conflicts of interest.

## References

1. American Physical Therapy Association. Role of the Physical Therapist and APTA in Behavioral and Mental Health [Internet]. 2025 Dec [cited 2025 Dec 23]. Available from: <https://www.apta.org/siteassets/pdfs/policies/role-pt-apta-behavioral-mental-health.pdf>
2. Heywood SE, Connaughton J, Kinsella R, et al. Physical Therapy and Mental Health: A Scoping Review. *Phys Ther*. 2022 Nov 6;102(11).
3. Connaughton J, Gibson W. Do Physiotherapists Have the Skill to Engage in the “Psychological” in the Bio-Psychosocial Approach? *Physiother Can*. 2016 Nov;68(4):377–82.
4. World Health Organization. Constitution [Internet]. 2025 Apr [cited 2025 Apr 2]. Available from: <https://www.who.int/about/governance/constitution>
5. Firth J, Rosenbaum S, Stubbs B, et al. Motivating factors and barriers towards exercise in severe mental illness: a systematic review and meta-analysis. *Psychol Med*. 2016 Oct;46(14):2869–81.
6. Bekhuis E, Boschloo L, Rosmalen JGM. Differential associations of specific depressive and anxiety disorders with somatic symptoms. *J Psychosom Res*. 2015 Feb;78(2):116–22.
7. National Center for Health Workforce Analysis. HRSA State of the Behavioral Health Workforce, 2024 [Internet]. 2025 Mar [cited 2025 Mar 31]. Available from: <https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/state-of-the-behavioral-health-workforce-report-2024.pdf>
8. O’Bright K, Peterson S. Physical Therapists in Primary Care in the United States: An Overview of Current Practice Models and Implementation Strategies. *Phys Ther*. 2024 Dec 6;104(12):pzae123.
9. Alvarez E, Garvin A, Germaine N, et al. Use of Mental Health Interventions by Physiotherapists to Treat Individuals with Chronic Conditions: A Systematic Scoping Review. *Physiother Can*. 2022 Jan 1;74(1):35–43.
10. Kinney M, Seider J, Beaty AF, et al. The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: A systematic review of the literature. *Physiother Theory Pract*. 2020 Aug 2;36(8):886–98.
11. Daré LO, Bruand PE, Gérard D, et al. Co-morbidities of mental disorders and chronic physical diseases in developing and emerging countries: a meta-analysis. *BMC Public Health*. 2019 Dec;19(1):304.
12. Tatta J, Pignataro RM, Bezner JR, et al. PRISM—Pain Recovery and Integrative Systems Model: A Process-Based Cognitive-Behavioral Approach for Physical Therapy. *Phys Ther*. 2023 Oct 3;103(10):pzado77.
13. Tatta J, Pignataro R, Bezner J, et al. Internet-Delivered Pain Resilience Therapy: A Multi-Subject Case Series. *JPTMH*. 2024 Nov 22;1(1):55–79.
14. Lein DH, Clark D, Graham C, et al. A Model to Integrate Health Promotion and Wellness in Physical Therapist Practice: Development and Validation. *Phys Ther*. 2017 Dec 1;97(12):1169–81.
15. Mareya S, Watts MC, Zhao L, et al. Exploring the Stepped Care Model in Delivering Primary Mental Health Services—A Scoping Review. *Int J Ment Health Nurs*. 2024 Dec;33(6):2026–42.
16. Jeitani A, Fahey PP, Gascoigne M, et al. Effectiveness of stepped care for mental health disorders: An umbrella review of meta-analyses. *Pers Med Psychiatry*. 2024 Nov 1;47–48:100140.
17. American Physical Therapy Association. Guide to Physical Therapist Practice 4.0 [Internet]. 2025 Mar [cited 2025 Mar 31]. Available from: <https://guide.apta.org>

18. Johnson SU, Ulvenes PG, Øktedalen T, et al. Psychometric Properties of the General Anxiety Disorder 7-Item (GAD-7) Scale in a Heterogeneous Psychiatric Sample. *Front Psychol.* 2019;10:1713. doi:10.3389/fpsyg.2019.01713
19. Beard C, Björgvinsson T. Beyond generalized anxiety disorder: psychometric properties of the GAD-7 in a heterogeneous psychiatric sample. *J Anxiety Disord.* 2014;28(6):547–52.
20. Plummer F, Manea L, Trepel D, et al. Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *Gen Hosp Psychiatry.* 2016 Mar;39:24–31.
21. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med.* 2001;16(9):606–13.
22. Mahindru A, Patil P, Agrawal V. Role of Physical Activity on Mental Health and Well-Being: A Review. *Cureus.* 2023 Jan 7;15:e33475. doi:10.7759/cureus.33475
23. Firth J, Solmi M, Wootton RE, et al. A meta-review of “lifestyle psychiatry”: the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry.* 2020 Oct;19(3):360–80.
24. Escobar-Roldan ID, Babyak MA, Blumenthal JA. Exercise Prescription Practices to Improve Mental Health. *J Psychiatr Pract.* 2021 Jul;27(4):273–82.
25. Noetel M, Sanders T, Gallardo-Gómez D, et al. Effect of exercise for depression: systematic review and network meta-analysis of randomised controlled trials. *BMJ.* 2024 Feb 14;e075847.
26. Solmi M, Basadonne I, Bodini L, et al. Exercise as a transdiagnostic intervention for improving mental health: An umbrella review. *J Psychiatr Res.* 2025 Apr;184:91–101.
27. Thayabaranathan T, Immink MA, Stevens P, et al. Understanding the potential for yoga and Tai Chi interventions to moderate risk factors for stroke: a scoping review. *Future Neurol.* 2018;13(4):239–52.
28. Fleming KM, Herring MP. The effects of pilates on mental health outcomes: A meta-analysis of controlled trials. *Complement Ther Med.* 2018 Apr;37:80–95.
29. Schuman-Olivier Z, Trombka M, Lovas DA, et al. Mindfulness and Behavior Change. *Harv Rev Psychiatry.* 2020 Nov;28(6):371–94.
30. Nejadghaderi SA, Mousavi SE, Fazlollahi A, et al. Efficacy of yoga for posttraumatic stress disorder: A systematic review and meta-analysis of randomized controlled trials. *Psychiatry Res.* 2024 Oct;340:116098.
31. Wu Y, Yan D, Yang J. Effectiveness of yoga for major depressive disorder: A systematic review and meta-analysis. *Front Psychiatry.* 2023;14:1138205. doi:10.3389/fpsyg.2023.1138205
32. American College of Sports Medicine. *ACSM’s Guidelines for Exercise Testing and Prescription.* 12th ed. Philadelphia (PA): Lippincott Williams & Wilkins; 2025.
33. Björkman F, Ekblom Ö. Physical Exercise as Treatment for PTSD: A Systematic Review and Meta-Analysis. *Mil Med.* 2022 Aug 25;187(9–10):e1103–13.
34. Jemni M, Zaman R, Carrick FR, et al. Exercise improves depression through positive modulation of brain-derived neurotrophic factor (BDNF). *Front Physiol.* 2023;14:1102526. doi:10.3389/fphys.2023.1102526
35. Wanjau MN, Möller H, Haigh F, et al. Physical Activity and Depression and Anxiety Disorders: A Systematic Review of Reviews and Assessment of Causality. *AJPM Focus.* 2023 Jun;2(2):100074.

36. Rovira-García A, Da Cuña-Carrera I. Efectos de la fisioterapia mediante ejercicio terapéutico en pacientes con esquizofrenia. Una revisión sistemática. *Rev Esp Salud Publica*. 2022;96:e202201002.
37. Beccia AL, Dunlap C, Hanes DA, et al. Mindfulness-based eating disorder prevention programs: A systematic review and meta-analysis. *Ment Health Prev*. 2018 Mar 1;9:1–12.
38. Cherpak CE. Mindful eating: a review of how the stress–digestion–mindfulness triad may modulate and improve gastrointestinal and digestive function. *Integr Med (Encinitas)*. 2019;18(4):48–53.
39. Hanson P, Shuttlesworth E, Halder L, et al. Application of Mindfulness in a Tier 3 Obesity Service Improves Eating Behavior and Facilitates Successful Weight Loss. *J Clin Endocrinol Metab*. 2019 Mar 1;104(3):793–800.
40. DeBoer LB, Powers MB, Utschig AC, et al. Exploring exercise as an avenue for the treatment of anxiety disorders. *Expert Rev Neurother*. 2012;12(8):1011–22.
41. Vancampfort D, Firth J, Stubbs B, et al. The efficacy, mechanisms and implementation of physical activity as an adjunctive treatment in mental disorders: a meta-review of outcomes, neurobiology and key determinants. *World Psychiatry*. 2025 Jun;24(2):227–39.
42. Watts AW, Rydell SA, Eisenberg ME, et al. Yoga's potential for promoting healthy eating and physical activity behaviors among young adults: a mixed-methods study. *Int J Behav Nutr Phys Act*. 2018;15(1):42.
43. Tatta J, Willgens AM, Palombaro KM. Mindfulness and Acceptance–Based Interventions in Physical Therapist Practice: The Time Is Now. *Phys Ther*. 2022 Mar 1;102(3):pzab293.
44. Tatta J, Willgens AM, Palombaro KM. The ACT trained physical therapist: Psychologically flexible, resilient, and armed with evidence-based tools. *J Context Behav Sci*. 2022;26:253–60.
45. Gili M, Castro A, García-Palacios A, et al. Efficacy of Three Low-Intensity, Internet-Based Psychological Interventions for the Treatment of Depression in Primary Care: Randomized Controlled Trial. *J Med Internet Res*. 2020 Jun 5;22(6):e15845.
46. Heppner WL, Shirk SD. Mindful moments: a review of brief, low-intensity mindfulness meditation and induced mindful states. *Soc Personal Psychol Compass*. 2018;12(12):e12424.
47. Morris L, Lovell K, McEvoy P, et al. A brief transdiagnostic group compared to individual low-intensity CBT for depression and anxiety: a randomized non-inferiority trial. *Cogn Behav Ther*. 2023 May 4;52(3):176–97.
48. Kruger E, Granzow R. Motivational Interviewing Education and Utilization in US Physical Therapy. *J Phys Ther Educ*. 2023 Mar;37(1):31–7.
49. Hoffmann T, Bakhit M, Michaleff Z. Shared decision making and physical therapy: What, when, how, and why? *Braz J Phys Ther*. 2022 Jan;26(1):100382.
50. Sanaeifar F, Pourranjbar S, Pourranjbar M, et al. Beneficial effects of physical exercise on cognitive-behavioral impairments and brain-derived neurotrophic factor alteration in the limbic system induced by neurodegeneration. *Exp Gerontol*. 2024 Oct 1;195:112539.
51. Martinez-Calderon J, Ho EKY, Ferreira PH, et al. A Call for Improving Research on Pain Neuroscience Education and Chronic Pain: An Overview of Systematic Reviews. *J Orthop Sports Phys Ther*. 2023 Jun;53(6):353–68.
52. Devonshire JJ, Wewege MA, Hansford HJ, et al. Effectiveness of Cognitive Functional Therapy for Reducing Pain and Disability in Chronic Low Back Pain: A Systematic Review and Meta-analysis. *J Orthop Sports Phys Ther*. 2023 May;53(5):244–85.

53. Singla DR, Lemberg-Pelly S, Lawson A, et al. Implementing Psychological Interventions Through Nonspecialist Providers and Telemedicine in High-Income Countries: Qualitative Study from a Multistakeholder Perspective. *JMIR Ment Health*. 2020 Aug 27;7(8):e19271.
54. Commission on Accreditation in Physical Therapy Education. Standards and Required Elements for Accreditation of Physical Therapist Education Programs [Internet]. 2023 Jan [cited 2023 Jan 23]. Available from: [http://www.capteonline.org/uploadedFiles/CAPTEorg/About\\_CAPTE/Resources/Accreditation\\_Handbook/CAPTE\\_PTStandardsEvidence.pdf](http://www.capteonline.org/uploadedFiles/CAPTEorg/About_CAPTE/Resources/Accreditation_Handbook/CAPTE_PTStandardsEvidence.pdf)
55. American Physical Therapy Association. Physical Therapist's Scope of Practice [Internet]. 2017 [cited 2025 May 7]. Available from: <https://www.apta.org/contentassets/a400d547ca63438db1349c4a69bf7ead/position-pt-scope-practice.pdf>
56. American Physical Therapy Association. Code of Ethics for the Physical Therapist [Internet]. 2020 [cited 2025 May 7]. Available from: <https://www.apta.org/siteassets/pdfs/policies/codeofethicshods06-20-28-25.pdf>
57. American Council of Academic Physical Therapy. Dealing with the mental health crisis in higher ed [Internet]. 2022 [cited 2025 May 7]. Available from: <https://acapt.org/news/news-detail/2022/02/16/dealing-with-the-mental-health-crisis-in-higher-ed>
58. Price CJ, Hooven C. Interoceptive awareness skills for emotion regulation: theory and approach of mindful awareness in body-oriented therapy (MABT). *Front Psychol*. 2018;9:798. doi:10.3389/fpsyg.2018.00798
59. Basso JC, McHale A, Ende V, et al. Brief, daily meditation enhances attention, memory, mood, and emotional regulation in non-experienced meditators. *Behav Brain Res*. 2019 Jan;356:208–20.
60. Bernstein A, Hadash Y, Lichtash Y, et al. Decentering and related constructs: a critical review and metacognitive processes model. *Perspect Psychol Sci*. 2015;10(5):599–617.
61. Zaccaro A, Piarulli A, Laurino M, et al. How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing. *Front Hum Neurosci*. 2018 Sep 7;12:353.
62. Edwards E, Shivaji S, Wupperman P. The emotion mapping activity: preliminary evaluation of a mindfulness-informed exercise to improve emotion labeling in alexithymic persons. *Scand J Psychol*. 2018;59(3):319–27.
63. Kano M, Endo Y, Fukudo S. Association Between Alexithymia and Functional Gastrointestinal Disorders. *Front Psychol*. 2018;9:599. doi:10.3389/fpsyg.2018.00599
64. Lentz TA, Goode AP, Thigpen CA, et al. Value-based care for musculoskeletal pain: are physical therapists ready to deliver? *Phys Ther*. 2020;100(4):621–32.

# Allied Institutions



INSTITUTO NACIONAL DE  
NEUROLOGÍA Y NEUROCIROLOGÍA  
MANUEL VELASCO SUÁREZ



Universidad  
del Gran Rosario



Escola Superior de Saúde **Norte**  
CRUZ VERMELHA PORTUGUESA



Western Norway  
University of  
Applied Sciences



ESCUELA COLOMBIANA DE REHABILITACIÓN

Facultad de Medicina



UNIVERSIDADE FEDERAL DE SÃO PAULO

1933

# Sponsors

---



**DIPLOMADO**  
**FISIOTERAPIA EN**  
**SALUD MENTAL**



**FISIOTERAPIA**  
**EN SALUD**  
**MENTAL**

*Salud en Movimientos*



**Journal of Physiotherapy in**  
**MENTAL HEALTH**

December 2025