Volume 1, Issue 1 (November 2024)

Journal of Physiotherapy in MENTAL HEALTH

jptmh.com

Journal of Physiotherapy in Mental Health, Volume 1, Issue 1, November 2024, is a biannual publication. This edition includes editorials by experts such as Moisés Jonathan Magos Chong and Michel Probst on the body-mind connection in comprehensive care. Welcome letters from figures like Stavros Stathopoulos and Daniel Catalán-Matamoros highlight interdisciplinary collaboration. This issue features review articles, case studies, and perspectives demonstrating the crucial role of physiotherapy in physical and mental well-being. Each contribution fosters dialogue, research, and best practices in the field.

Certificate of Reservation of Rights for Exclusive Use No. 04-2023-111316510800-102, granted by the National Institute of Copyright. Responsible for the last update of this issue: Moisés Jonathan Magos Chong (Hacienda el Ciervo 31A, Colonia Hacienda de las Palmas, Huixquilucan, Estado de México, CP 52763); last modification date: November 22, 2024. File size: 9.9 MB.

Editorial Team

Editorial Team

Volume 1, Issue 1 (November 2024)

Journal of Physiotherapy in MENTAL HEALTH

Volume 1, Issue 1 (November 2024)

Journal of Physiotherapy in MENTAL HEALTH

CONTENTS

Volume 1, Issue 1 (November 2024)

Journal of Physiotherapy in MENTAL HEALTH

Review

Case Reports

EDITORIALS

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 7-9

ISSN: In process

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

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.

Many of us who have come to this area have done so through individual exploration, seeking to respond to what we see in consultation. Clinical practice undoubtedly places us face to face with the need to count on tools to treat the person as a whole and not just as a series of tissues.

In this search, it has been fascinating to corroborate how the body can be a central gateway for working with the contents we have classified as *mental*. I am convinced that the approach to mental health is seriously undermined when we marginalize corporality. Anyone who has worked with severe mental health problems will have been able to see how at the core of these problems there is an experience of *splitting*, in which connecting with one's body becomes a basic and necessary anchor on the path to integration as individuals. This applies to all of us as human beings.

Physiotherapy, by using the human body and movement as its core material, is in a privileged position to add many resources to the interdisciplinary approach to mental health. Offering concrete means responding to the needs of people who are looking for *hows*: How do I handle this moment when I feel upset, anxious, and have trouble breathing? What do I do when I start to feel absent and find it difficult to connect to the outside world?

Physiotherapy has many tools from movement, body awareness, physical activity, sensory stimulation, breathing, physical contact, relaxation exercises... that can provide *hows* to people who need it. This participation is all the more valuable because it mobilizes the person's internal resources, promoting self-management.

We are aware of the increase in mental health problems globally and the need to respond to them. Particularly in our contexts, this becomes challenging since the stigma, the lack of economic resources to cover treatments, and the lack of health personnel in the area, make this a complex public health problem that must be addressed from our areas of expertise.

The conviction that physiotherapy can contribute to the field of Mental Health and Psychiatry is the cornerstone of the creation of this journal. Through it, we seek to create a platform for the cultivation and exchange of knowledge, research, and good practices in the area. We hope that it will bring existing knowledge (and that which is in progress) closer to the rest of physiotherapists and health professionals.

The idea of maintaining a Spanish version is based on being able to give space to the valuable work that is being developed in Latin America, promoting that language is not a barrier that marginalizes a large part of the population from the possibility of generating knowledge or accessing it.

This same search also governs the fact that it is a free-access project for both authors and readers.

I am pleased to see the positive reception this project has had worldwide, with colleagues from 18 countries around the world willing to collaborate on it. The participation of prestigious universities and institutions around the world as part of this initiative encourages me about the growing recognition of this area and the need it addresses.

I hope that the Journal continues to build bridges so that we can strengthen our quests to promote well-being.

Prof. Moisés Magos

Founder and General Director

Journal of Physiotherapy in Mental Health

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 10-13

ISSN: In process

EDITORIAL

Michel Probst

1. KU Leuven, Department of Rehabilitation Sciences, Belgium.
2. Founder of the International Organization of Physiotherapy in Mental Health.

✉ Corresponding Author:
Michel Probst
michel.probst@kuleuven.be

Editorial

Michel Probst

1. KU Leuven, Department of Rehabilitation Sciences, Belgium.
2. Founder of the International Organization of Physiotherapy in Mental Health.

The publication of the first issue of the new *Journal of Physiotherapy in Mental Health* marks a significant milestone in the field of physiotherapy within mental health. It also reflects the growing recognition and importance of this domain within physiotherapy. This development can be traced back to the initial conference held in Leuven, Belgium in 2006, where the idea of bringing together physiotherapists working in mental health care and psychiatry was first discussed. Subsequently, the *International Organization of Physiotherapy in Mental Health* (IOPTMH) was established and in 2011 recognized as a subgroup by the *World Physiotherapy*. In 2018, another important event, the 1st International Congress in Psychiatry and Mental Health in the American Continent, was held in Mexico. Now, in 2024, the journal's first issue is being published.

Over the past two decades, the interest in mental health care within the domain of physiotherapy has expanded from a limited area, practiced in a few countries, to an internationally recognized sub-domain of physiotherapy. Mental health has rightfully gained high priority on the agenda of policymakers, particularly due to the experiences with the COVID-19 pandemic. However, it remains challenging to convince all healthcare professionals, of the usefulness of physiotherapy in mental health care and psychiatry. Not all physiotherapists are confident that mental health falls within their scope of practice.

The role of physiotherapists in mental health care has evolved beyond strictly somatic rehabilitation, and they have become indispensable professionals within the mental health care landscape. Their core focus in mental health is to optimize well-being and empower individuals by promoting physical activity, exercise, movement awareness, and functional movement, integrating physical and mental aspects. Physiotherapists utilize the “movement body” to enhance well-being, empowerment, and quality of life for individuals seeking help. They address both the dysfunctional aspects and the individual's healthy possibilities of the person struggling with psychological problems to influence somatic, psychological, and social functioning.

In 2019, the *International Organization of Physiotherapy in Mental Health* formulated six key elements to clarify the specific interventions within the field of physiotherapy in mental health. These elements include physical activity, exercise, and physical fitness, including motor ability and motor cognitive training; sensory, body, and movement awareness; stress and tension regulation; closeness/touch/massage; physio-education, which includes lifestyle and pain management; pediatric psychiatry-specific elements; and old age psychiatric-specific elements.

https://doi.org/10.70205/jptmh.v1i1.11231

In addition to these elements, additional key elements should be considered: psychologically informed physiotherapy (i.e. the use of psychological strategies within physiotherapy), attention to supported self-management, and rehabilitation of functional somatic disorders.

Psychologically informed physiotherapy, backed by evidence, has proven to be transformative in treating mental health problems by targeting patient beliefs, emotions, and behaviors in a structured and intentional manner. It involves embracing specific techniques such as acceptance and commitment therapy, mindfulness, trauma-informed pain care, motivational interviewing, cognitive-behavioral therapy, habituation, graded exercise therapy, adaptive pacing therapy, and more.

Physio-education by analogy to psychoeducation is very important but often neglected in physiotherapy. It aims to provide the patient (and their environment) knowledge about various facets of the illness and its treatment from a physiotherapy point of view. Pain is an example where physio-education is of great importance. There is a strong interplay between pain and mental health, creating a vicious cycle of disability. Both physical and emotional pain contribute to reduced quality of life, mobility, and social participation across the lifespan. In the context of chronic pain, physiotherapists collaborate as part of a multidisciplinary team to deliver biopsychosocial interventions, which may include psychologically informed physiotherapy, behavior change techniques, body awareness therapies, physical activity programs, and relaxation activities.

Self-management is crucial for individuals living with chronic conditions, as it enables them to manage symptoms, treatment, physical and psychological consequences, and lifestyle changes. However, in most of the cases and in the long run this is not enough. Therefore, physiotherapists play a key role in **supporting self-management** by providing support to build knowledge, skills, abilities, behaviors, and confidence in individuals with chronic conditions. Supported self-management is the key to prioritizing person-centered care.

Functional somatic disorders refer to impaired functioning of organs (or organ systems), without detectable structural abnormalities (for instance Mass Sociogenic illness (MSI), CFS (myalgia encephalomyelitis), fibromyalgia, hyperventilation syndrome, tension headache, irritable bowel syndrome, temporomandibular joint pains, post whiplash syndromes, multiple chemical or electromagnetic hypersensitivity, War syndrome, Long Covid syndrome, in some cases also the chronic low back pain, ...). Physiotherapy interventions for these disorders focus on symptom and energy management.

In our diverse and dynamic society, physiotherapists must have a deep respect for diversity. Recognizing and accepting individuals as unique and valuable on an unconditional basis can enhance their feelings of self-worth and self-respect. The field of physiotherapy in mental health needs to embrace this diversity and seek innovative and adapted methods and techniques to effectively address the needs of various populations.

The aging population, the chronically (mental) ill people, and the displaced people due to disasters and conflicts, all call for expanding our field and stepping out of our comfort zones. Physiotherapists working in mental health must become clinical chameleons, ready to adapt and tailor their approaches to the specific needs, contexts and culture of their patients.

Current expectations in healthcare include the demand for faster and better treatments, integration within interdisciplinary teams, and respect for other healthcare professionals. However, physiotherapists need to acknowledge their own limitations. Dealing with individuals with mental health problems can sometimes be challenging and even evoke feelings of powerlessness. It is essential to understand that individuals with a lack of motivation may not be receptive to help. Therefore, physiotherapists need to extend their motivational skills, inspiring and encouraging individuals to engage in the therapeutic process.

Inviting people with mental health problems to engage in physiotherapy is about initiating a dialogue rather than seeking an immediate solution. Opening up a dialogue allows an understanding of the individual's unique needs, preferences, and goals. It provides an opportunity for collaboration between the physiotherapist and the individual to develop a personalized treatment plan that aligns with their specific mental health concerns. Successful treatment should be based on the person's point of view, ensuring that their voice is heard and their treatment is tailored to their needs.

We hope that this magazine will become a source of inspiration for all physiotherapists, which are working in the field of mental health.

Prof. Emeritus Michel Probst, PT, Ph.D.
KU Leuven, Department of Rehabilitation Sciences, Belgium.
Founder of the International Organization of Physiotherapy in Mental Health

WELCOME LETTERS

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 15-16

ISSN: In process

WELCOME LETTER

Stavros Stathopoulos

1. Chief Editor, Journal of Physiotherapy in Mental Health.

✉ Corresponding Author:
Stavros Stathopoulos
stavros.stathopoulos@yahoo.gr

Welcome Letter

Stavros Stathopoulos

1. Chief Editor, Journal of Physiotherapy in Mental Health.

Dear Esteemed Readers and Contributors,

I am delighted to welcome you to the inaugural issue of the *Journal of Physiotherapy in Mental Health*, a groundbreaking endeavor that marks a significant milestone in the intersection of physical therapy and mental health.

In establishing this journal, our vision was clear — to create a platform that bridges the gap between the fields of physiotherapy and mental health, recognizing the profound impact that physical well-being can have on mental wellness. As the first-of-its-kind publication worldwide, this journal is a testament to the evolving landscape of healthcare, where interdisciplinary collaboration is not just encouraged but essential.

In this inaugural issue, you will find a collection of research articles, reviews, and insights that reflect the diverse facets of physiotherapy's role in mental health. From evidence-based practices to innovative interventions, each contribution has been carefully curated to provide a comprehensive view of the burgeoning field.

Physiotherapy is not confined to the physical; it extends its healing touch to the realms of mental and emotional well-being. Our journal is a testament to the dedication of researchers, clinicians, and academics who have tirelessly worked to unravel the complexities and potentials of this dynamic connection.

As the Chief Editor, I extend my deepest gratitude to all contributors for their invaluable insights and unwavering commitment to advancing the understanding of physiotherapy in mental health. Your work lays the foundation for future breakthroughs and contributes to the holistic approach we aspire to bring to mental healthcare.

To our readers, I invite you to immerse yourselves in the wealth of knowledge presented in these pages. Let this journal be a source of inspiration, sparking new ideas and collaborations that propel our collective understanding of the symbiotic relationship between physical and mental health.

The journey ahead is both exciting and challenging, but with your continued support and engagement, the *Journal of Physiotherapy in Mental Health* will evolve into a beacon of excellence, guiding the way for practitioners, researchers, and advocates alike.

Thank you for joining us on this pioneering venture. Together, let's unlock new frontiers in the integration of physiotherapy and mental health.

Warm regards,

Stavros Stathopoulos

Chief Editor

https://doi.org/10.70205/jptmh.v1i1.11233

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 17-18

ISSN: In process

WELCOME LETTER

Daniel Catalán-Matamoros

1. President, International Organization of Mental Health Physiotherapy.

✉ Corresponding Author:
Daniel Catalán-Matamoros
dcatalan@ual.es

Welcomen Letter

Daniel Catalán-Matamoros

1. President, International Organization of Mental Health Physiotherapy.

Dear Colleagues, Researchers, and Practitioners,

I am delighted to welcome the first issue of the Journal of Physiotherapy in Mental Health. As the President of the International Organization of Physical Therapists in Mental Health, I am honored to introduce this ground-breaking open-access journal specifically dedicated to the interplay of physical therapy and mental health. This journal will provide an exchange of knowledge, innovative research, and best practices within the area of mental health physiotherapy and a global community committed to advancing individual well-being through scientific-based approaches.

This journal is an important milestone in our field and meets an urgent need regarding comprehensive knowledge and therapies spanning the physical health-mental well-being continuum. The journal provides a publication, where all research studies and clinical innovations help to comprise the future landscape of mental health physiotherapy.

The Journal of Physiotherapy in Mental Health embraces a diverse range of topics, reflecting the multifaceted nature of our field. In the launch of this journal, not only a repository of knowledge is being created but also a vibrant, collaborative community is being fostered. The Journal of Physiotherapy in Mental Health will ensure the existence of a platform for dialogue, innovation, and collective progress to transform mental health care through physiotherapy.

On behalf of the international community of mental health physiotherapists, I would like to thank the editorial team for the development of the journal, for your support and dedication to advancing the field of mental health physiotherapy. Together, we can make a profound impact on the lives of individuals worldwide.

Warm regards,

Prof. Daniel Catalán-Matamoros, PT, PhD
President, International Organization of Mental Health Physiotherapy

 https://doi.org/10.70205/jptmh.v1i1.11235

Journal of Physiotherapy in Mental Health

PERSPECTIVE

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 20-42

ISSN: In process

ADVANCING PHYSIOTHERAPY IN MENTAL HEALTH: A FRAMEWORK FOR WHOLE-PERSON CARE

Matt Erb

1. Associate Clinical Director, The Center for Mind-Body Medicine, Washington D.C., United States
2. Physiotherapist, Simons Physical Therapy, Tucson, AZ, United States
3. Instructor, University of Arizona: Center for Integrative Medicine and Banner University Family Medicine and Psychiatry Residencies, Tucson, AZ, United States
4. Faculty, Integrative Psychiatry Institute, Boulder, Colorado, United States

✉ Corresponding Author: Matt Erb, PT. Adress: 2900 E Broadway Blvd, Ste 100, PMB 1082; Tucson, AZ 85716 United States. Email: mderb73@gmail.com. Tel.:1 202-571-7769 ext. 228

Accepted: June 4th, 2024

Vol. 1, No. 1 (November 2024) ISSN: In process
Journal of Physiotherapy in Mental Health

ADVANCING PHYSIOTHERAPY IN MENTAL HEALTH: A FRAMEWORK FOR WHOLE-PERSON CARE

Matt Erb

1. Associate Clinical Director, The Center for Mind-Body Medicine, Washington D.C., United States
2. Physiotherapist, Simons Physical Therapy, Tucson, AZ, United States
3. Instructor, University of Arizona: Center for Integrative Medicine and Banner University Family Medicine and Psychiatry Residencies, Tucson, AZ, United States
4. Faculty, Integrative Psychiatry Institute, Boulder, Colorado, United States

Abstract: The role of physiotherapy in mental health is growing. Mental health is recognized by World Physiotherapy as a specialty area, yet training standards and approaches to care vary across and even within countries. In developing whole-person treatment plans it is important to safely explore and address underlying factors rather than treating specific symptoms as isolated factors. While the biopsychosocial model of health has been around for some time and is considered important to physiotherapy in mental health, it can be understood and deployed in fragmented ways. The more recent movement to advance "psychologically informed practice" is promising and reflects the need for physiotherapy to improve how body, mind, and environment are integrated in clinical care. Physiotherapists working to advance whole-person care in support of mental health may also benefit from recent models of "integrative health". Integrative care aims to approach the biopsychosocial concept in person-centered ways that more fully embrace inseparability between physical/biological, cognitive/emotional, sociocultural, and environmental elements. None of these efforts are without challenge and physiotherapists must be versed in a broad set of whole-person concepts and strategies to safely and effectively address mental health in physiotherapy care. This Perspective presents a novel framework in support of advancing physiotherapy in mental health. The framework presented draws upon transdisciplinary considerations and aims to stimulate creative thought and action towards the shared goal of improved whole-person patient care within a larger frame of public health.

Summary Box

This perspective paper presents a synthesis of scientific, theoretical, and philosophical considerations that converge into an integrative framework for whole-person physiotherapy care in support of mental health promotion. Potential implications linked to this approach range from improvements in person-centered care, enhanced well-being in patient and physiotherapist alike, interpersonal and collectivist-minded relationship building, and advancing the role of physiotherapy in public and environmental health.

Keywords: physiotherapy, mental health, integrative, biopsychosocial, mind-body medicine, whole-person care

Corresponding Author: Matt Erb, PT. Adress: 2900 E Broadway Blvd, Ste 100, PMB 1082; Tucson, AZ 85716 United States. Email: mderb73@gmail.com. Tel.:1 202-571-7769 ext. 228

Introduction

Physiotherapy (PT) is seeing growing attention to the biopsychosocial (BPS) and integrative health (IH) models.[1,2] This movement carries potential benefits (e.g. patient satisfaction, confidence in PT care provision or job satisfaction) and is not without criticism, limitations, and challenges (e.g. access to training, discomfort in therapist and/or patient in working with psychological factors, difficulty in changing practice patterns).[1-7] Concurrently there is growing attention to the role of physiotherapy in mental health, an area of practice that typically draws upon the BPS and IH models.[8] While PT in mental health is evolving,[9-11] challenges to transforming what is generally an overly reductionist model of causality and care provision must be addressed. Enhanced approaches capable of supporting whole-person complexity without over assigning causality to any one factor, and that equally supports objectivist and subjective/qualitative lenses, are needed.

Questions around mind/body interdependence have been central to philosophic thought for generations. The biomedical model has been shaped by an arguably simplistic separation of mind (psychological, social, and spiritual dimensions) from body (all things physical/biological). This splitting is so entrenched that many physiotherapists struggle to identify and address psychosocial factors.[12-14] There is need for the development of approaches that explore body, mind, and environment as inseparable and in continuous interplay. Such efforts are challenging in noting stigma around psychological factors contributing to health states and conditions. Patients and clinicians may avoid the topic of mental health due to discomfort.[15,16] Clinicians may be reluctant to broach the subject due to lack of meaningful training/experience, or concern that patients will feel that the significance of their somatic symptoms is being dismissed with the implication that “it’s all in your head”. When practitioners become aware of the role that psychological, environmental, and/or social dynamics play in a patient’s bodily health, these challenges of moral agency (shame, stigma) must be held at the forefront so as to not inadvertently reinforce a sense of weakness or blame.[17] Clinicians can benefit from understanding clinical care that offers experiences that are equally nurturing as empowering. Said another way, addressing core human needs (feeling understood, cared for, safe, capable of navigating challenge) assists in building a “bridge of support” to psychological factors and social determinants of health (SDOH) alongside the care of the physical body. The non-dual concept of “both/and” instead of “either/or” is a frame for both the patient and therapist to successfully move ahead with whole-person care.

This paper presents a working framework for approaching physiotherapy in mental health through the lens of an IH model. The IH model is one of numerous efforts that has emerged to advance the BPS model.[18] These models aim towards more complete accounts of health/healing and do not forego biomedical care needs. Applied to PT, IH embraces a "balanced approach to the 3-legged stool conceptualization of evidence-based medicine—giving each leg (patient preference, clinician expertise, and scientific evidence) appropriate weight."[2] Important elements in applying the IH model to PT for mental health will be explored. These elements include rationale for advancing whole-person care models, the use of mind-body medicine (MBM), attention to SDOH, and a layered model of individualized support based on patient preference and need. Existing research, recommendations, challenges, limitations, and scope of practice considerations are offered in relation to advancing the role of PT in mental health using the IH approach.

Moving Towards an Integrative Framework for Whole-Person Care

The splitting of mind from body presents challenges that need attention for PT to move towards improved whole-person care. This section provides context that underscores rationale for ongoing development of the IH approach. While applicable to the whole of PT practice, such discourse is especially important for physiotherapists specializing in mental health.

"Physical" Therapy and Psychological Dynamics

The development of therapy disciplines such as physio-, psycho-, or occupational has aimed to meet specific health care needs yet has come at the expense of isolating certain aspects of whole-person experience away from other inseparable needs. For example, studies have shown that physiotherapists struggle to identify and deal with psychological factors in chronic pain,[12-14] and yet patients with chronic pain (for example) often experience comorbid anxiety and depression;[19] kinesiophobia and psychological distress are predictors of negative trajectories in patients experiencing pain.[20]

In PT, the concept of "psychologically informed practice" (PIP) has emerged as an attempt to bridge mind and body. PIP also draws upon the BPS concept and continues to be examined with some documented utility alongside challenges in training/clinical implementation.[21] Ultimately these efforts (including the IH model applied to PT in mental health presented here) reflect a collaborative

goal: improve physiotherapists' ability to safely and effectively identify and support whole-person dynamics.

An Integrative Approach to the Biopsychosocial Model

The BPS approach is often interpreted as considering discrete aspects of three separate things: biology, psychology, and sociology. PIP also carries risk to be deployed as a discrete "add-on modality" to a reduced, physically focused approach. From an early definition, the BPS model "systematically considers biological, psychological, and social factors *and their complex interactions* in understanding health, illness, and health care delivery"(emphasis added)[22]. If we consider that psychological, social, cultural, and environmental dimensions are represented in biological states/influence,[23] we begin to move towards a more integrative understanding.

IH encompasses the BPS concept and advocates that care be approached in a more unified way to allow seemingly disparate elements to combine in symbiotic, mutually reinforcing ways to profound effect. As applied to physiotherapy in mental health care, the IH promotes an approach that recognizes and explores a person's integral being by exploring and supporting the relevance of various levels of influence (body, mind, and environment) within the whole of the person's health experience.[2] In doing so, support for the biology of stress is fundamental and tied to vast body of research linking stress to adverse health outcomes.[24] While normal and healthy in context, stress can become toxic when not mitigated naturally through innate biological processes and/or through deliberate self-care efforts.[25] The science of allostatic load (the cumulative burden of chronic stress and life events) underscores the need to address cumulative stress.[26,27] Categories (physical, cognitive/emotional, social, nutritional, existential/spiritual, environmental, etc.) of stress can be explored alongside equal attention to cultivating positive/strength-based inputs that mitigate deleterious effects. The development of a mutual (clinician/patient) understanding of a "stress picture" is followed with identification and deployment of values-aligned strategies for targeted support. Clinical use of the field of mind-body medicine (MBM) can be of great assistance in this regard.

Mind-Body Medicine as Foundational

Toxic stress informs behavioral/mental health challenges equally to physical health (noting these are not mutually exclusive).[28] This section further delineates the biology of toxic stress in relation to the clinical use of MBM to assist in mitigating adverse effects of stress.

Overview of the Science of Mind-Body Medicine

The broad field of MBM is fundamental within IH. MBM explores how "connections and interactions between the brain, mind, body, and behavior can activate psychophysiological changes and a health-promoting potential in the individual—paths towards better health."[29] MBM is informed by growing evidence in psychoneuroimmunology (PNI). PNI has established a scientific foundation for normalizing attention to individual and collective body-mind-environment interactions.[30,31] For example, research demonstrates that our psychology,[32] our previous life experiences of adversity,[33,34] and of interpersonal relationships[35-36] each carry biological correlates. Further, health is deeply informed by the nature and quality of the environments in which we live, work, and play.[37]

MBM research includes close attention to physiological regulation of the central-autonomic nervous system and supports the understanding that overall neurophysiological state/function impacts all other systems in complex, interdependent ways (Figure 1). MBM supports viewing whole-person physiology from the lens that this integrated psychophysiological network functions in interdependence with the environments (natural, built, social, etc.) each person is "bathed" in.[30,36,38,39] At the individual level, if a MBM skill shown to improve self-regulation processes is trained, any resultant positive shift in autonomic function carries potential for other positive system-wide changes (e.g. neuroendocrine function, inflammation, immune system).[40,41] External impacts may include positive influence on behavior, motivation, and social/relational engagement.[36,42] The sum of MBM research suggests potential for enhanced stress resiliency, pain reduction or improved pain management, decreased inflammation, and improved cardiovascular, mental, gastrointestinal, immune, and endocrine functions.[30,40,43,44]

Understanding and supporting these interconnections (through simple, positively framed psychoeducation and the use of MBM within the care plan) assists in normalizing the ways in which cognitive, emotional, social, and ecological factors directly influence health. While the tendency to over-assign causality to any one agent will always be a challenge for clinicians and patients alike, the failure to address these coexisting and causal connections is a longstanding barrier to effective healthcare and overall healing.

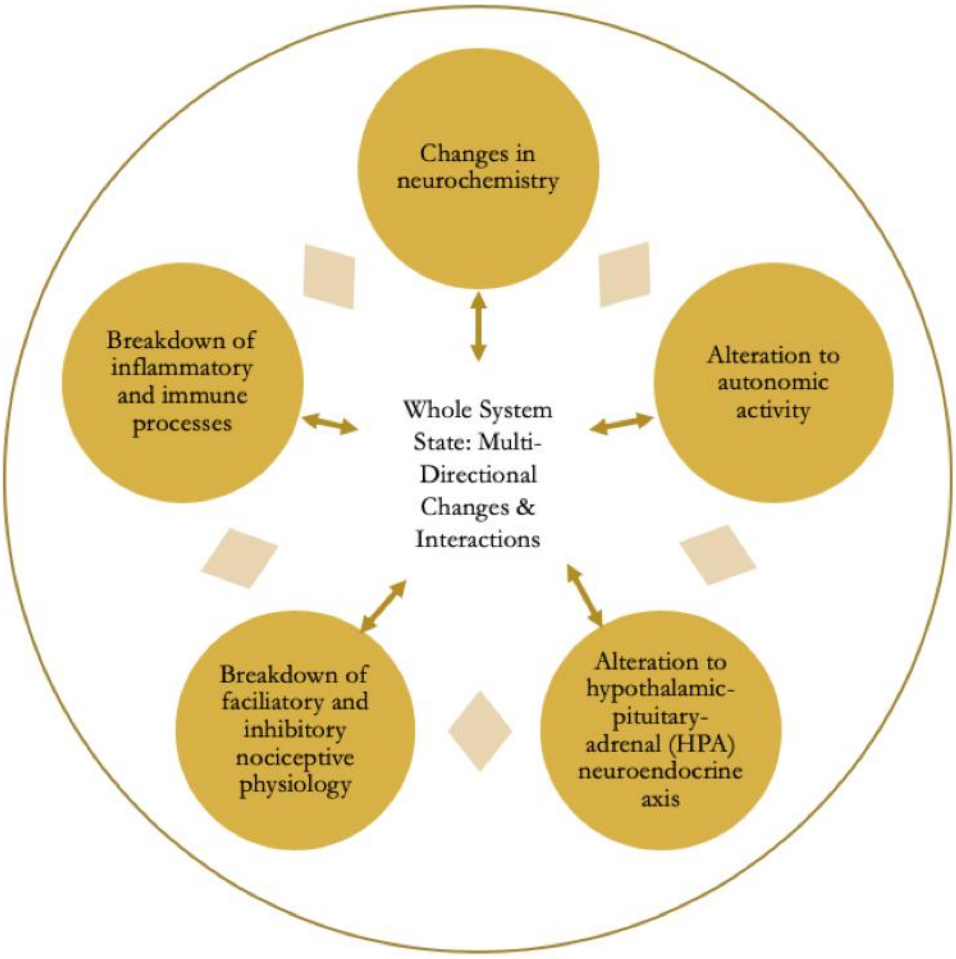


Figure 1: Integral Physiology

Description: All physiological systems are interdependent. Facilitating a shift in one system, such as improving autonomic regulation using mind-body medicine skills training, carries potential for positive shifts across all systems.

A toolkit

MBM includes an array of evidence-supported approaches that carry potential to explore and support the uniqueness of each person's lived experience and life process across time and in relationship to layers of environment. Such exploration must be strength-based by balancing the tendency for negativity bias through acknowledgement of innate wholeness, innate resilience/capacity, and inner/outer resources. MBM provides a "toolkit" that can promote healing processes and/or greater well-being. Table 1 lists example evidence-informed topics that fall under MBM and that can be utilized in clinical care to support whole-person well-being. While outside the scope of this paper to teach clinical delivery or review each subtopic's evidence for specific conditions, reviews of the general mechanisms, benefits, limitations, and risks are growing.[30,45,46]

Mental Imagery	Meditation/Mindfulness	Biofeedback
Body Awareness	Expressive Drawing	Expressive Writing
Creative Arts	Contemplative Movement	Nutrition, Mindful Eating
Body Language, Posture	Cognitive-Behavioral Skills	Family History/Ecomaps
Breath Awareness/Regulation	Personal Spirituality/Meaning	Placebo/Nocebo
Group/Mutual Support	Emotion Awareness/Expression	Touch, Manual Therapies
Self- and Co-regulation Skills	Nature/Ecotherapy	Communication, Prosocial Skills

Table 1: Mind-Body Medicine Topics and Modalities

Description: These topics and clinical tools frequently overlap. For example, body awareness is intricately linked to emotional awareness. If a patient is in a distressed state, a combination of biofeedback, breath regulation, various avenues for self-expression (e.g. verbal expression, writing, drawing), and/or touch-based therapies can support developing greater capacity to feel, regulate, and move through the experience.

Social Determinants of Health and Mind-Body Self-Care in Context

Introduced earlier, it is vital to address collectivist considerations within individualized IH care. SDOH are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes.[47] SDOH includes topics such as the influence of the natural/ecological, social, or built environment (living conditions); racialization/systemic racism; minoritization; ableism and discrimination; economic stability; food access, quality, and security; access to educational, health care, and other resources; and the broader cultural context that informs each person's overall life experience.[38,48] Do we know what our patient's living conditions, work environments, and/or natural/ecological environment and exposures are like? Their socioeconomic status? Their life histories and the impact of their cultural background? The impact of inter-generational/historical patterns of stress?

At first glance, self-care (a core tenet of MBM) can be interpreted as individualistic. In collectivist cultures, self-care may be perceived as egoic, self-indulgent, or unimportant to the whole of the family/community unit.[49-51] Further, if promoted unmindfully, self-care can fail to address the profound relevance of SDOH. In contrast, clinically-oriented MBM navigates self-care in ways that support the deepening of resiliency and positive coping with the discomfort, demand, stress, challenge, or trauma that comes with life and living. In the collectivist frame, these "self" constructs extend into supporting relationships with others (co-regulation, communication, behavior), the outer world (including nature), and virtually any aspect of one's experience.

Coming from the understanding that one's individual sense of health/well-being informs how that person relates not only to oneself, but to their interpersonal relationships and sense of belonging in community, the individualistic and collectivist views align in support of each other. In other words, there is a both/and approach to the topic of self-care. Undoubtedly, personal responsibility plays a role in overall health.[52] However, when health policy, social constructs, and/or clinical care becomes excessively focused on individual actions rather than systemic issues, negative outcomes can be reinforced.[53,54] The study of SDOH in context to personalized mind-body self-care or lifestyle medicine reminds us that the choices people make are 1) often bound by the choices actually available to them and 2) reflect complex internalized dynamics that arise out of individual historical and/or sociocultural determinants that need understanding and

support to increase the possibility of change. While science has validated that personal history contributes to patterns of toxic stress that contribute to ill health,[55] these dynamics were/are not wholly subject to individual choice. Figure 2 expresses how societal conditions (including ecological/environmental factors such as loss of green space or climate change) carry significant influence on threat appraisal processes, and thus the whole of individual and collectivist views of allostatic load.

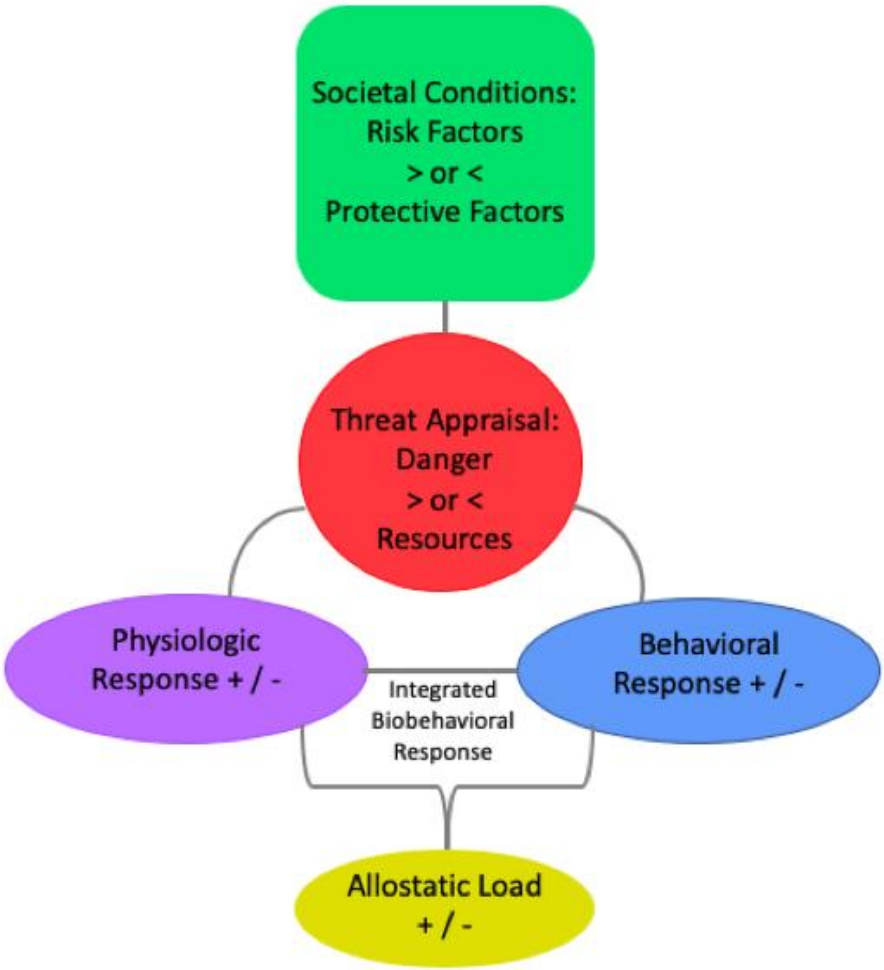


Figure 2: Socioecological Influences on Allostatic Load

Description: Societal and ecological conditions can either diminish or support health by impacting threat appraisal physiology, behavioral patterns, and allostatic load management.

Carefully/safely assessing the sum interactions of individual and systemic limiting vs. protective factors, in collaboration with each patient, yields a care design that can mitigate toxic stress. Putting in place both internal and external resources creates potential for shifts in life course/health trajectory away from a crisis mode of functioning and towards greater well-being.[56,57]

A Layered Framework of Whole-Person Support

Building from the preceding rationale, a layered approach to care is presented. Framed as potentially useful for PT in general, the IH framework described here considers inter-related ingredients that can be addressed to support whole-person PT care:

1. **Strength-based self-referential processes**. This ingredient involves support for building self-awareness across interacting domains (physical/somatic/sensory, cognitive, emotional, social/relational, etc.) over time.[58,59] A critical example is training to better recognize one's overall physiological state. Often persons experiencing distress oscillate between states of hyper/hypoarousal and maladaptive defense ("fight, flight, freeze").[60] Self-awareness is also intimately intertwined with principles of subjectivity and self-expression in health and healing. The concept of a *phenomenological heuristic* implies a stance that explores and supports the embodied, lived experience of each patient in a way that enables people to come to know themselves better and to arrive at their own questions and solutions. This effort requires active listening and space/time for sharing. Excessive focus on objective details (e.g. range of motion, bodily asymmetry) and/or attempts to "fix-it" through procedural modalities may fall out of balance to the importance of subjectivity, narrative medicine, and support for psychosocial factors, especially in context to mental health care.
2. **Functional shifting of physiological state**. This ingredient offers mind-body skills training (e.g. biofeedback, breath regulation, body awareness training, meditation, movement, etc.) that combines with self-awareness (preceding category) to enhance physiological/behavioral self-regulation towards more optimal states.[60] It is useful to consider that the application/development of these first two ingredients (self-awareness and self-regulation) applies equally to *the practitioner*. Experiential learning and self-application carry potential to deepen the therapist's skill and capacity to share and support others, thereby deepening the container of relational attunement. There is

growing inquiry into the connections between behavior, emotion, and physiological state regulation within relationship.[61-63]

3. **Capacity to be present to and learn from discomfort**. Often, unpleasant states are met with reactivity and urgency to fix the state. While MBM promotes improved access to the "relaxation response"[64], the ability to examine patterns of experiential avoidance and their impact on well-being is also highly relevant as part of enhancing awareness promoted in MBM.[65] All states cannot be "fixed", at least not imminently. Thus, this clinical framework includes an ingredient that aims towards the development of enhanced resilience through the concept of "comfort with discomfort."
4. **Principles of salutogenesis and eudaimonia**. The concept of salutogenesis approaches health by recognizing innate wholeness that can be revealed/realized through the application of skills and concepts that are strength-based.[66] Similarly, eudaimonia represents a state or sense of flourishing or well-being that is non-transitory and connected to principles of intentioned living and self-realization.[67] This ingredient includes capacity for exploring the individualized relevance of wisdom-based understandings of human life/experience that are found in all cultures across generations. The concept of personalized psychospiritual integration within IH care does not aim to debate the existence of metaphysical realities, rather aims to advance the pragmatic goal of safely leveraging the possibility of positive interactions between recorded general life wisdom and individual experience, purpose, and meaning. Going further, this category aims towards the mitigation of suffering and/or reduced identification with the nature of suffering.
5. **Tending to the SDOH**. As presented, there is a tendency for health care professionals to focus on personal responsibility with insufficient acknowledgment of SDOH. Patients frequently report a lack of understanding from health care professionals, often feeling blame, stigma, or shame.[68,69] In acknowledging that ill-health states are informed by systemic factors, there is a helpful redistribution of one's sense of causality. In conjunction with a strong therapeutic relationship, this validation supports one's sense of agency. Further, considering a balance of more passive care experiences (e.g. touch and relaxation-based therapies) with more active care components (e.g. exercise/movement, biofeedback) may support this ingredient. David Nicholls suggests that today's more recent interest in personal responsibility, self-care, and active rather than passive therapies diverts attention away from the social determinants that are known to give rise to disease in the first place.[70] In essence, a balance between nurturance and empowerment is the way forward.

Beyond education and validation in patient care, SDOH must be addressed within practice management and community involvement. Resource seeking for patient needs (e.g. support to identify additional services or referrals, community-based programs, etc.) can combine with pro bono work, sliding fee scales, and public health/policy advocacy work.[71,72] Proactively addressing SDOH serves health equity and social justice within PT practice.

The preceding concepts are consistent with and supportive of principles of trauma-informed care (TIC)[73,74], cultural humility,[75-77] and process-based therapy (PBT).[78] These approaches recognize individual complexity and acknowledge that transformation takes time and looks different for each person. These synergistic approaches aim to support the underlying processes that drive psychophysiological challenges and aim to offer a more unifying approach with capacity to bridge different therapy models into customized care for each patient's unique presentation and life context. These efforts require letting go of predictability as well as the ongoing cultivation of capacity to navigate complexity and uncertainty.[79]

Barriers to Implementing Physiotherapy in Mental Health Care

To begin moving beyond recognition of complex factors in our patients' symptoms and outcomes and toward responsible professional embodiment and action, we must recognize barriers to doing so. Keefe, Main, and George[80] suggest systemic change is needed at three levels: professional education, clinical practice and care pathways, and policy. Erb & Ranjbar[81] additionally propose that in relation to narrative medicine (a component of MBM and the IH model), the preceding systemic barriers interact with challenges at the level of the *individual therapist*. These include:

- limited personal/professional **time**
- overcoming **habit/convenience** in one's work
- navigating personal **discomfort** that may arise when one's professional identity or paradigm shifts, and how this relates to the need for **self-application** of mind-body concepts to better deliver the same for others
- **cost/finances**
- holding onto potentially faulty **belief systems**
- accessing quality academic and clinical **training, and**
- receiving adequate professional mentoring/clinical supervision.

Each of the preceding can be approached as interacting barriers that interfere with creating the circumstances requisite to a more comprehensive and relationally focused approach to care.

Scope of Practice

The presence of psychosocial factors are not distinct from does not imply the presence of a mental health condition.[23] Further, there is a general movement in mental health care to look closely at the harm of diagnostically labeling life experience (PTM).[82] When a diagnosed mental health disorder is present, non-stigmatizing support for this aspect of the person's experience is an important part of whole-person PT care.[23]

While subject to geographic locale/legal jurisdiction, sociocultural dynamics/needs, public health considerations, the extent of individualized professional training/mentoring, practice setting, etc., the following working guidelines can be useful when addressing mental health in physiotherapy:

1) Approaching the use of MBM tools/skills (which engage psychological content) through invitation reflects an intersection with TIC principles.[74] Given that physiological correlates to safety such as subduing/mitigating threat appraisal)[83] can be positively influenced through ways of relating/responding when strong emotions or traumatic memories surface, our first aim must be to remain present/caring to where a patient is at in their process, and from an accepting (non-fixing) stance.
2) Physiotherapists typically receive training in mental health conditions and are skilled in describing behaviors that reflect mental health and psychiatric diagnoses. However, the ability of a physiotherapist to independently diagnose a mental health condition is based on practice setting, licensure, practice acts, and other concerns of jurisdiction rather than knowledge and training. Regardless of each practitioner's specific scope, physiotherapists carry substantial potential to recognize, screen, and directly support persons experiencing a wide range of psychosocial factors and states of somatic/mental health comorbidity. It is imperative that physiotherapists have baseline whole-person care competency since psychosocial factors are inseparable from bodily states/physiology.[23]
3) It is important to refrain from analyzing psychological experience/content. Analysis is subject to error and the dynamics of psychological projection; regardless, it can come across as patriarchal,

judgmental, pathologizing, and/or stigmatizing. Providing a safe relational space where psychosocial factors can be gently explored in support of each patient arriving at their own answers/solutions, is encouraged.

4) Steering away from offering specific personal life advice such as, "I think you should leave your spouse" is encouraged as part of PBT. Supportive exploration around psychosocial-oriented resources/options, lifestyle considerations, etc. when sought out by the patient or through invitation, is distinguished from targeted and potentially problematic interference with the individual's own decision-making process around their lived experience.
5) When historical content such as traumatic memories and/or strong emotions arise, it can be helpful to assist patients to avoid regressive states such as may more purposely be created or worked with in psychotherapy settings. This goal is supported by projecting a caring and non-fixing presence, combined with cues to stay connected with the present moment (e.g., "Would it help to sit, notice the body, and breathe together to allow the emotions to move through you?") Supportive refocusing strategies can include allowing adequate time for expression, cues to increase internal or external sensory attention, centering on physical activity/movement, and/or the identification of other immediate needs (e.g., "What would feel supportive right now?")

If the complexity of the presentation is outside one's skill/training/comfort level, this must be confidently recognized and gently disclosed as part of a mutual exploration of whether additional resources are important to include. In this process, and consistent with TIC principles, it is an important consideration to understand that suggesting to someone that they need psychotherapeutic services carries high potential to stigmatize and reinforce shame/blame dynamics, and thus compromise the person's sense of safety. Therefore, if deemed appropriate, a suggested best practice (with due attention to timing and context) would be asking the person whether they feel they could benefit from additional support and if so, to let them know that you are able and willing to help them identify possible resources. By eliciting and supporting individual choice, this approach provides an experience of agency/empowerment.

Conclusion

There is growing need for the PT profession to proactively contribute to the growing worldwide mental health crisis and its intersection with a shortage of services. Designing and advancing training models for physiotherapists to effectively support mental health is an ambitious goal. While no single clinician can meet all needs that present in the clinic, PT can grow in its approach to serving the mental health of all PT patients. The transdisciplinary concepts described in this Perspective reflect working concepts and tools aimed to support this broad goal. Examining PT's role in mental health from public health and stepped care lenses will require ongoing debate, critical studies, mutual learning, research, advocacy, and policy work.

Advancing the IH model as an approach to PT in mental health as presented here aims to be a flexible perspective to contemplate, work with, and improve upon. Persons working in this area are encouraged to share, collaborate, and co-create new avenues in support of quality, person-centered care. It falls upon academia and practicing clinicians alike to study outcomes and refine whole-person and transdisciplinary approaches such as the one described. While advocating for baseline capacity in all physiotherapists to safely integrate and support the psychological, social, cultural, and spiritual domains within the IH model of care, growth in pathways for physiotherapists supporting mental health is critically needed to move ahead into rapidly changing and uncertain times.

Equity, Diversity, and Inclusion Statement

The topics and principles of justice, equity, diversity, and belonging are held in the forefront of the concepts and principles advocated for in this piece. Examples of relevance include repeated acknowledgment of sociocultural and environmental factors on health; including in relation to individual moral agency, and stigmatization. Attention to the broader set of social determinants, including minoritization, racialization, and systemic racism, are named as factors needing careful consideration when working with physiotherapy and mental health. The conceptual framework for care that is described has arisen out of extensive, ongoing work in marginalized, underserved, and collectivist-oriented communities; with direct consideration of principles of cultural humility and strategies to serve social justice.

Conflict of Interest Statements

•Author has not presented any promotional talks to any pharmaceutical companies within the past 12 months.

•Author does not discuss off-label or investigational drug use.

•Author is sole proprietor of a professional consulting business and may receive income from teaching, consulting, and/or professional writing in integrative health/wellness.

•Author is an Independent Scholar: may receive royalties from an academic, peer-reviewed textbook. However, all such royalties are utilized for pro bono and/or sliding fee scale teaching and mentoring in the field of physiotherapy with a focus on addressing mental health, justice, equity, diversity, and inclusion.

References

1. Smart KM. The biopsychosocial model of pain in physiotherapy: past, present and future. Phys Ther Rev [Internet]. 2023 Mar 4;28(2):61–70. Available from: https://doi.org/10.1080/10833196.2023.2177792

2. Justice C, Sullivan MB, Van Demark CB, Davis CM, Erb M. Guiding Principles for the Practice of Integrative Physical Therapy. Phys Ther [Internet]. 2023 Oct 10 [cited 2023 Dec 1];pzad138. Available from: https://academic.oup.com/ptj/advance-article/doi/10.1093/ptj/pzad138/7304129

3. Holopainen R, Simpson P, Piirainen A, Karppinen J, Schütze R, Smith A, et al. Physiotherapists' perceptions of learning and implementing a biopsychosocial intervention to treat musculoskeletal pain conditions: a systematic review and metasynthesis of qualitative studies. PAIN [Internet]. 2020;161(6). Available from: https://journals.lww.com/pain/Fulltext/2020/06000/Physiotherapists__perceptions_of_learning_and.5.aspx

4. van Dijk H, Köke AJA, Elbers S, Mollema J, Smeets RJEM, Wittink H. Physiotherapists Using the Biopsychosocial Model for Chronic Pain: Barriers and Facilitators—A Scoping Review. Int J Environ Res Public Health. 2023;20(2).

5. Frazier LD. The past, present, and future of the biopsychosocial model: A review of The Biopsychosocial Model of Health and Disease: New philosophical and scientific developments by Derek Bolton and Grant Gillett. New Ideas Psychol [Internet]. 2020 Apr 1;57:100755. Available from: https://www.sciencedirect.com/science/article/pii/S0732118X19301448

6. Williams GC, Frankel RM, Campbell TL, Deci EL. Research on relationship-centered care and healthcare outcomes from the Rochester biopsychosocial program: A self-determination theory integration. Fam Syst Health [Internet]. 2000 [cited 2024 May 31];18(1):79–90. Available from: https://doi.apa.org/doi/10.1037/h0091854

7. van Erp RMA, Huijnen IPJ, Jakobs MLG, Kleijnen J, Smeets RJEM. Effectiveness of Primary Care Interventions Using a Biopsychosocial Approach in Chronic Low Back Pain: A Systematic Review. Pain Pract [Internet]. 2019 Feb 1 [cited 2024 May 31];19(2):224–41. Available from: https://doi.org/10.1111/papr.12735

8. Probst M. Physiotherapy and Mental Health. Rev Colomb Rehabil. 2019 Jun 5;18:208–14.

9. Probst M, Skjaerven LH, editors. Physiotherapy in mental health and psychiatry: a scientific and clinical based approach. Edinburgh: Elsevier; 2018. 338 p. (Physiotherapy essentials).

10. Erb M, Ranjbar N. Integrative Rehabilitation Practice and Mental Health. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon Publishers; 2021. p. 410–24.

11. Heywood SE, Connaughton J, Kinsella R, Black S, Bicchi N, Setchell J. Physical Therapy and Mental Health: Scoping Review. Phys Ther [Internet]. 2022 Aug 4 [cited 2022 Aug 12];pzac102. Available from: https://doi.org/10.1093/ptj/pzac102

12. Brunner E, Dankaerts W, Meichtry A, O'Sullivan K, Probst M. Physical Therapists' Ability to Identify Psychological Factors and Their Self-Reported Competence to Manage Chronic Low Back Pain. Phys Ther. 2018 Jun 1;98(6):471–9.

13. Synnott A, O'Keeffe M, Bunzli S, Dankaerts W, O'Sullivan P, O'Sullivan K. Physiotherapists may stigmatise or feel unprepared to treat people with low back pain and psychosocial factors that influence recovery: a systematic review. J Physiother [Internet]. 2015 Apr 1;61(2):68–76. Available from: http://www.sciencedirect.com/science/article/pii/S183695531500017X

14. Zangoni G, Thomson OP. "I need to do another course" - Italian physiotherapists' knowledge and beliefs when assessing psychosocial factors in patients presenting with chronic low back pain. Musculoskelet Sci Pract. 2017;27:71–7.

15. Reichman M, Bakhshaie J, Grunberg VA, Doorley JD, Vranceanu AM. What Are Orthopaedic Healthcare Professionals' Attitudes Toward Addressing Patient Psychosocial Factors? A Mixed-Methods Investigation. Clin Orthop. 2022 Feb 1;480(2):248–62.

16. Viverito KM, Mittal D, Han X, Messias E, Chekuri L, Sullivan G. Attitudes regarding seeking help for mental health problems and beliefs about treatment effectiveness: A comparison between providers and the general public. Stigma Health. 2018;3(1):35–41.

17. Kirmayer L, Gomez-Carrillo A. Agency, embodiment and enactment in psychosomatic theory and practice. Med Humanit. 2019 Jun 1;45:1–14.

18. Bell IR, Caspi O, Schwartz GER, Grant KL, Gaudet TW, Rychener D, et al. Integrative medicine and systemic outcomes research: issues in the emergence of a new model for primary health care. Arch Intern Med. 2002 Jan 28;162(2):133–40.

19. Gerhardt A, Hartmann M, Schuller-Roma B, Blumenstiel K, Bieber C, Eich W, et al. The prevalence and type of Axis-I and Axis-II mental disorders in subjects with non-specific chronic back pain: results from a population-based study. Pain Med Malden Mass. 2011 Aug;12(8):1231–40.

20. Melloh M, Elfering A, Egli Presland C, Röder C, Hendrick P, Darlow B, et al. Predicting the transition from acute to persistent low back pain. Occup Med Oxf Engl. 2011 Mar;61(2):127–31.

21. Main C, Simon C, Beneciuk J, Greco C, George S, Ballengee L. The Psychologically Informed Practice (PiP) Consultation Roadmap: A Clinical Implementation Strategy. Phys Ther. 2023 May 9;103.

22. University of Rochester. The Biopsychosocial Approach [Internet]. n.d. [cited 2022 Apr 3]. Available from: https://www.urmc.rochester.edu/medialibraries/urmcmedia/education/md/documents/biopsychosocial-model-approach.pdf

23. O'Keeffe M, George SZ, O'Sullivan PB, O'Sullivan K. Psychosocial factors in low back pain: letting go of our misconceptions can help management. Br J Sports Med [Internet]. 2018 Aug 28;(53):793–4. Available from: http://bjsm.bmj.com/content/early/2018/08/28/bjsports-2018-099816.abstract

24. O'Connor DB, Thayer JF, Vedhara K. Stress and Health: A Review of Psychobiological Processes [Internet]. Vol. 72, Annual Review of Psychology. Annual Reviews; 2021. p. 663–88. Available from: https://www.annualreviews.org/content/journals/10.1146/annurev-psych-062520-122331

25. Kautz MM. Applications of psychoneuroimmunology models of toxic stress in prevention and intervention efforts across early development. Brain Behav Immun - Health [Internet]. 2021 Oct 1;16:100322. Available from: https://www.sciencedirect.com/science/article/pii/S2666354621001253

26. Juster RP, Russell JJ, Almeida D, Picard M. Allostatic load and comorbidities: A mitochondrial, epigenetic, and evolutionary perspective. Dev Psychopathol. 2016;28(4pt1):1117–46.

27. Guidi J, Lucente M, Sonino N, Fava GA. Allostatic Load and Its Impact on Health: A Systematic Review. Psychother Psychosom. 2021;90(1):11–27.

28. Shern DL, Blanch AK, Steverman SM. Toxic stress, behavioral health, and the next major era in public health. Am J Orthopsychiatry [Internet]. 2016 [cited 2024 May 23];86(2):109–23. Available from: https://doi.apa.org/doi/10.1037/ort0000120

29. Esch T, Stefano GB. The BERN Framework of Mind-Body Medicine: Integrating Self-Care, Health Promotion, Resilience, and Applied Neuroscience. Front Integr Neurosci [Internet]. 2022;16. Available from: https://www.frontiersin.org/articles/10.3389/fnint.2022.913573

30. Taylor AG, Goehler LE, Galper DI, Innes KE, Bourguignon C. Top-Down and Bottom-Up Mechanisms in Mind-Body Medicine: Development of an Integrative Framework for Psychophysiological Research. Explore N Y N [Internet]. 2010 Jan;6(1):29. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2818254/

31. Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R. Psychoneuroimmunology: psychological influences on immune function and health. J Consult Clin Psychol. 2002 Jun;70(3):537–47.

32. Cacioppo JT, Tassinary LG, Berntson GG. Handbook of psychophysiology [Internet]. New York, NY: Cambridge University Press; 2017 [cited 2020 May 16]. Available from: https://doi.org/10.1017/9781107415782

33. Fagundes CP, Glaser R, Kiecolt-Glaser JK. Stressful early life experiences and immune dysregulation across the lifespan. Brain Behav Immun [Internet]. 2013 Jan 1;27:8–12. Available from: http://www.sciencedirect.com/science/article/pii/S0889159112001821

34. Felitti VJ. Adverse childhood experiences and adult health. Acad Pediatr. 2009 Jun;9(3):131–2.

35. Eisenberger NI. An empirical review of the neural underpinnings of receiving and giving social support: implications for health. Psychosom Med [Internet]. 2013;75(6):545–56. Available from: https://www.ncbi.nlm.nih.gov/pubmed/23804014

36. Eisenberger NI, Moieni M, Inagaki TK, Muscatell KA, Irwin MR. In Sickness and in Health: The Co-Regulation of Inflammation and Social Behavior. Neuropsychopharmacology [Internet]. 2017 Jan 1;42(1):242–53. Available from: https://doi.org/10.1038/npp.2016.141

37. Vineis P, Robinson O, Chadeau-Hyam M, Dehghan A, Mudway I, Dagnino S. What is new in the exposome? Environ Int [Internet]. 2020 Oct 1;143:105887. Available from: https://www.sciencedirect.com/science/article/pii/S0160412020318420

38. Braveman P, Egerter S, Williams DR. The social determinants of health: coming of age. Annu Rev Public Health [Internet]. 2010/11/26 ed. 2011;32:381–98. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21091195

39. Ward-Caviness CK, Pu S, Martin CL, Galea S, Uddin M, Wildman DE, et al. Epigenetic predictors of all-cause mortality are associated with objective measures of neighborhood disadvantage in an urban population. Clin Epigenetics. 2020 Mar 11;12(1):44.

40. Moraes LJ, Miranda MB, Loures LF, Mainieri AG, Mármora CHC. A systematic review of psychoneuroimmunology-based interventions. Psychol Health Med. 2018;23(6):635–52.

41. Kenney MJ, Ganta CK. Autonomic Nervous System and Immune System Interactions. In: Terjung R, editor. Comprehensive Physiology [Internet]. 1st ed. Wiley; 2014 [cited 2024 May 28]. p. 1177–200. Available from: https://onlinelibrary.wiley.com/doi/10.1002/cphy.c130051

42. Berridge KC. Motivation concepts in behavioral neuroscience. Rev Ingestive Sci [Internet]. 2004 Apr 1;81(2):179–209. Available from: https://www.sciencedirect.com/science/article/pii/S0031938404000435

43. Garland EL, Brintz CE, Hanley AW, Roseen EJ, Atchley RM, Gaylord SA, et al. Mind-Body Therapies for Opioid-Treated Pain: A Systematic Review and Meta-analysis. JAMA Intern Med [Internet]. 2019 Nov 4 [cited 2019 Dec 6]; Available from: https://doi.org/10.1001/jamainternmed.2019.4917

44. Muehsam D, Lutgendorf S, Mills PJ, Rickhi B, Chevalier G, Bat N, et al. The embodied mind: A review on functional genomic and neurological correlates of mind-body therapies. Neurosci Biobehav Rev. 2017;73:165–81.

45. Vancampfort D, Stubbs B, Van Damme T, Smith L, Hallgren M, Schuch F, et al. The efficacy of meditation-based mind-body interventions for mental disorders: A meta-review of 17 meta-analyses of randomized controlled trials. J Psychiatr Res [Internet]. 2021 Feb 1;134:181–91. Available from: https://www.sciencedirect.com/science/article/pii/S0022395620311560

46. Van Dam NT, van Vugt MK, Vago DR, Schmalzl L, Saron CD, Olendzki A, et al. Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation. Perspect Psychol Sci J Assoc Psychol Sci [Internet]. 2018 Jan;13(1):36–61. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29016274

47. U.S. Department of Health and Human Services. Healthy People 2030, Social Determinants of Health [Internet]. [cited 2024 May 24]. Available from: https://health.gov/healthypeople/priority-areas/social-determinants-health

48. Maric F, Nicholls DA. Environmental physiotherapy and the case for multispecies justice in planetary health. Physiother Theory Pract [Internet]. 2022 Nov 18;38(13):2295–306. Available from: https://doi.org/10.1080/09593985.2021.1964659

49. Osokpo O, Riegel B. Cultural factors influencing self-care by persons with cardiovascular disease: An integrative review. Self-Care Long Term Cond [Internet]. 2021 Apr 1;116:103383. Available from: https://www.sciencedirect.com/science/article/pii/S0020748919301737

50. Dudgeon P, Carlin E, Bray A. Rethinking self-care through an Indigenous lens-the importance of community. BMJ. 2023 Nov 13;383:2494.

51. Wyatt JP, Ampadu GG. Reclaiming Self-care: Self-care as a Social Justice Tool for Black Wellness. Community Ment Health J [Internet]. 2022 Feb 1;58(2):213–21. Available from: https://doi.org/10.1007/s10597-021-00884-9

52. Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benrimoj SI. Helping patients help themselves: A systematic review of self-management support strategies in primary health care practice. PLOS ONE [Internet]. 2019 Aug 1;14(8):e0220116. Available from: https://doi.org/10.1371/journal.pone.0220116

53. Friesen P. Personal responsibility within health policy: unethical and ineffective. J Med Ethics [Internet]. 2018 Jan 1;44(1):53. Available from: http://jme.bmj.com/content/44/1/53.abstract

54. Wikler D. Personal and Social Responsibility for Health. Ethics Int Aff [Internet]. 2002;16(2):47–55. Available from: https://www.cambridge.org/core/article/personal-and-social-responsibility-for-health/257DFEC4C74A4DB3049AD02D1F3A6E75

55. Felitti VJ, Anda RF. The lifelong effects of adverse childhood experiences. In: R Alexander & D Esernio-Jenssen (Ed), Chadwick's Child Maltreatment: Sexual Abuse & Psychological Maltreatment, Encyclopedic. 4th ed. STM Learning, Inc.; 2014.

56. Erb M, Winkle D. Defining the Need. In: In: Erb M, Schmid A A (Eds) Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon, Jessica Kingsley; 2021. p. 57–73.

57. Low M. A novel clinical framework: The use of dispositions in clinical practice. A person centred approach. J Eval Clin Pract. 2017 Oct;23(5):1062–70.

58. Finlayson-Short L, Davey CG, Harrison BJ. Neural correlates of integrated self and social processing. Soc Cogn Affect Neurosci [Internet]. 2020 Nov 5 [cited 2024 May 24];15(9):941–9. Available from: https://doi.org/10.1093/scan/nsaa121

59. Yoon HJ, Seo EH, Kim JJ, Choo IH. Neural Correlates of Self-referential Processing and Their Clinical Implications in Social Anxiety Disorder. Clin Psychopharmacol Neurosci Off Sci J Korean Coll Neuropsychopharmacol. 2019 Feb 28;17(1):12–24.

60. Corrigan F, Fisher J, Nutt D. Autonomic dysregulation and the Window of Tolerance model of the effects of complex emotional trauma. J Psychopharmacol (Oxf) [Internet]. 2010 Jan 21 [cited 2019 Jan 27];25(1):17–25. Available from: https://doi.org/10.1177/0269881109354930

61. Deits-Lebehn C, Smith TW, Williams PG, Uchino BN. Heart rate variability during social interaction: Effects of valence and emotion regulation. Int J Psychophysiol [Internet]. 2023 Aug 1;190:20–9. Available from: https://www.sciencedirect.com/science/article/pii/S0167876023004531

62. Coutinho J, Pereira A, Oliveira-Silva P, Meier D, Lourenço V, Tschacher W. When our hearts beat together: Cardiac synchrony as an entry point to understand dyadic co-regulation in couples. Psychophysiology [Internet]. 2021 Mar 1 [cited 2024 May 21];58(3):e13739. Available from: https://doi.org/10.1111/psyp.13739

63. Hilpert P, Brick TR, Flückiger C, Vowels MJ, Ceulemans E, Kuppens P, et al. What can be learned from couple research: Examining emotional co-regulation processes in face-to-face interactions. J Couns Psychol [Internet]. 2020 Jul [cited 2024 May 24];67(4):475–87. Available from: https://doi.apa.org/doi/10.1037/cou0000416

64. Benson H, Greenwood MM, Klemchuk H. The Relaxation Response: Psychophysiologic Aspects and Clinical Applications. Int J Psychiatry Med [Internet]. 1975 Mar 1 [cited 2019 Jul 7];6(1–2):87–98. Available from: https://doi.org/10.2190/376W-E4MT-QM6Q-H0UM

65. Chawla N, Ostafin B. Experiential avoidance as a functional dimensional approach to psychopathology: An empirical review. J Clin Psychol [Internet]. 2007 Sep 1 [cited 2024 May 24];63(9):871–90. Available from: https://doi.org/10.1002/jclp.20400

66. García-Moya I, Morgan A. The utility of salutogenesis for guiding health promotion: the case for young people's well-being. Health Promot Int [Internet]. 2016 Feb 18 [cited 2019 Sep 5];32(4):723–33. Available from: https://doi.org/10.1093/heapro/daw008

67. Sullivan MB, Erb M, Schmalzl L, Moonaz S, Noggle Taylor J, Porges SW. Yoga Therapy and Polyvagal Theory: The Convergence of Traditional Wisdom and Contemporary Neuroscience for Self-Regulation and Resilience. Front Hum Neurosci. 2018;12:67.

68. Dolezal L, Lyons B. Health-related shame: an affective determinant of health? Med Humanit [Internet]. 2017 Dec 1;43(4):257. Available from: http://mh.bmj.com/content/43/4/257.abstract

69. Mensinger JL, Tylka TL, Calamari ME. Mechanisms underlying weight status and healthcare avoidance in women: A study of weight stigma, body-related shame and guilt, and healthcare stress. Body Image [Internet]. 2018 Jun 1;25:139–47. Available from: https://www.sciencedirect.com/science/article/pii/S1740144517303790

70. Nicholls D, Gibson BE. Physiotherapy otherwise. 2022.

71. DeVoght A, Davenport TE. Upstream Influences. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals Eds Erb, M & Schmid A. Singing Dragon, Jessica Kingsley; 2021. p. 57–73.

72. Davenport TE. Supporting Our Hike Upstream: Special Issue and Recurring Feature on Social Determinants of Health in Physical Therapy. Cardiopulm Phys Ther J. 2020;31(1):2–4.

73. Reeves E. A Synthesis of the Literature on Trauma-Informed Care. Issues Ment Health Nurs [Internet]. 2015 Sep 2;36(9):698–709. Available from: https://doi.org/10.3109/01612840.2015.1025319

74. Ranjbar N, Erb M. Adverse Childhood Experiences and Trauma-Informed Care in Rehabilitation Clinical Practice. Arch Rehabil Res Clin Transl [Internet]. 2019 Mar 21;100003. Available from: http://www.sciencedirect.com/science/article/pii/S2590109519300023

75. Tervalon M, Murray-García J. Cultural Humility Versus Cultural Competence: A Critical Distinction in Defining Physician Training Outcomes in Multicultural Education. J Health Care Poor Underserved [Internet]. 1998 May [cited 2024 Feb 18];9(2):117–25. Available from: https://muse.jhu.edu/article/268076

76. Foronda C, Baptiste DL, Reinholdt MM, Ousman K. Cultural Humility: A Concept Analysis. J Transcult Nurs [Internet]. 2015 Jun 28 [cited 2020 Feb 4];27(3):210–7. Available from: https://doi.org/10.1177/1043659615592677

77. Ranjbar N, Erb M, Mohammad O, Moreno FA. Trauma-Informed Care and Cultural Humility in the Mental Health Care of People From Minoritized Communities. FOCUS [Internet]. 2020 Jan 1 [cited 2020 Jan 26];18(1):8–15. Available from: https://doi.org/10.1176/appi.focus.20190027

78. Hofmann SG, Hayes SC. The Future of Intervention Science: Process-Based Therapy. Clin Psychol Sci [Internet]. 2019 Jan [cited 2024 May 24];7(1):37–50. Available from: http://journals.sagepub.com/doi/10.1177/2167702618772296

79. Peterson SR, Erb M, Davenport TE. From Idea Cults to Clinical Chameleons: Moving Physical Therapists' Professional Identity Beyond Interventions. J Orthop Sports Phys Ther. 2022 Apr;52(4):170–4.

80. Keefe FJ, Main CJ, George SZ. Advancing Psychologically Informed Practice for Patients With Persistent Musculoskeletal Pain: Promise, Pitfalls, and Solutions. Phys Ther. 2018 May 1;98(5):398–407.

81. Erb M, Ranjbar N. Deepening the Narrative. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon Publishers; 2021. p. 164–77.

82. Johnstone L, Boyle M. The power threat meaning framework: An alternative nondiagnostic conceptual system. J Humanist Psychol. 2018;0022167818793289.

83. Porges SW. Neuroception: a subconscious system for detecting threats and safety. Zero Three. 2004;24:19–24.

REVIEW

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 44-53

ISSN: In process

EXERCISE IN SEASONAL AFFECTIVE DISORDER - A BRIEF REVIEW

Georgios Marios Kyriakatis[1]✉, Prokopia Mirka Lykou[1], Stavros Stathopoulos[2]

1. Bachelor of Science in Physiotherapy, University of Thessaly, Lamia, Greece.
2. Professor, "G Marconi" University, Rome, Italy, Teaching staff, Medical school, Athens & Thessaloniki University, Greece, PT specialized in rehabilitation of neurological & neuropsychological diseases.

✉ Corresponding Author: Georgios Marios Kyriakatis. University of Thessaly. Address: 3rd km Old National Road Lamia-Athens, 35132, Lamia. Tel.: (+30) 6973475522. Email: georgemarioskiriakatis2000@gmail.com

Accepted: June 4th, 2024

Vol. 1, No. 1 (November 2024) ISSN: In process
Journal of Physiotherapy in Mental Health

REVIEW

EXERCISE IN SEASONAL AFFECTIVE DISORDER - A BRIEF REVIEW

Georgios Marios Kyriakatis[1], Prokopia Mirka Lykou[1], Stavros Stathopoulos[2]

1. Bachelor of Science in Physiotherapy, University of Thessaly, Lamia, Greece.
2. Professor, "G Marconi" University, Rome, Italy, Teaching staff, Medical school, Athens & Thessaloniki University, Greece, PT specialized in rehabilitation of neurological & neuropsychological diseases.

Abstract: Seasonal affective disorder (SAD) or seasonal depression is a mental disorder that occurs mainly in the winter months with symptoms that differ from the well-known depression. Several forms of treatment have been explored, with exercise being promising. Objectives: The purpose of this study is to review all available studies related to exercise and physical activity in SAD, both therapeutically and on a more general clinical and research level. Material and Methods: The literature search was conducted in Pubmed, Scopus, APA Psychinfo and SPORTDiscus databases. The following keywords were used: seasonal depression, seasonal affective disorder, exercise, therapeutic exercise, physiotherapy, physical therapy and physical activity. The final studies were selected using specific inclusion and exclusion criteria. Results: Of the 169 studies initially identified, the researchers concluded on 3 studies. The symptoms of SAD can be reduced with a personalized program that includes aerobic exercise, combining perhaps the appropriate time of day, but also the presence or absence of natural or artificial light. Also, it has not been proven whether or not exercise is a predictor of SAD. Conclusion: Aerobic exercise is possibly the key for the reduction and elimination of symptoms of SAD in the winter months. However, further study in this field seems extremely necessary to find safe and reliable forms of exercise that improve the symptoms of these patients.

Summary Box

This study provides a comprehensive perspective on the treatment of SAD through exercise and beyond, informing both its benefits and its possible combined intervention. The significance of the study highlights exercise as a very important treatment modality as it can be performed without equipment and is not cost prohibitive. Also, the study having provided several years of data is considered informative for physiotherapists, both in terms of early understanding of symptoms and in the treatment options available to them.

Keywords: seasonal depression, winter depression, SAD, aerobic exercise, physiotherapy

Corresponding Author: Georgios Marios Kyriakatis. University of Thessaly. Address: 3rd km Old National Road Lamia-Athens, 35132, Lamia. Tel.: (+30) 6973475522.
Email: georgemarioskiriakatis2000@gmail.com

Introduction

Depression is a mental disorder in which we observe symptoms such as loss of interest, loss of pleasure and low levels of good mood in daily activities for long periods of time.[1,2] Depression occurs more often in adult European women and affects daily life, as well as personal relationships with family, friends, work and school.[2] Depression can be expressed by various physical symptoms, most notably feelings of tiredness or low energy, reduced appetite and weight loss, difficulty in sleeping, feelings of excessive guilt and poor concentration.[1] According to the World Health Organization, there are many different types of depressive disorders, one of which is seasonal affective disorder (SAD) or seasonal depression.[2]

The underlying meaning of depression and SAD may look the same but they differ in both symptoms and time of onset.[3-5] According to the International Classification of Diseases - 11, SAD is defined as the presentation of symptoms and course of mood episodes in mood disorders with a seasonal pattern.[6] It is necessary to mention that the term SAD should not be confused with the term winter blues, since the second condition does not require a medical diagnosis and refers mainly to a temporary form of sadness, where the person may feel depressed because of the shorter and darker days or the inability to go out because of the ice and cold, but their physical and mental health remains unaffected. Risk factors that can precipitate the onset of SAD are heredity, female gender, geographical distribution mainly in northern countries where there is not enough sunlight or the day lasts much less than the night and finally, the age at which it occurs, which is mainly between 18 and 30 years old.[7]

More specifically, SAD usually occurs in the autumn and winter months, particularly in January and February when we observe that there is less sunlight due to weather conditions.[5] In contrast, symptoms of SAD decrease in spring and summer.[7] Patients suffering from depression may experience seasonal worsening of their symptoms but this differs from patients suffering from SAD.[4] More specifically, the symptoms of SAD are irritability, increased fatigue, drowsiness, increased appetite levels, decreased social interest and changes in eating habits. Patients want to consume more carbohydrates and as a result their body weight increases without being able to control it.[3,4] About 20% of people suffering from SAD are diagnosed with type 1 and type 2 bipolar disorder.[5]

SAD is essentially an emotional interaction in which social, psychological and biological factors are involved, which have an overwhelming influence on the emotions and actions of individuals and this results in self-destructive effects. For this reason, prevention and treatment programs should be created to deal with it

properly. Several studies suggest that physical inactivity may be the reason for the onset of SAD, as well as less exposure to sunlight.[8] It has been reported that physical exercise, and aerobic exercise in particular, reduces by 50% the symptoms of SAD, with patients being more productive and cheerful.[9,10]

Furthermore, another form of treatment suggested for these patients is light therapy, which means continuous exposure to sunlight and/or artificial light of a specific intensity.[11] People with SAD after the end of treatment have positive emotions such as self-control, self-confidence and self-esteem, emotions that are absent in these patients during the onset.[11,12] The above forms of treatment are not expensive and anyone can access them at any time of the day. Additional forms of treatment, mentioned by the World Health Organization, include medication, which may be costly but accelerates the reduction of symptoms and makes patients feel better in combination with exercise.[2,5]

Thus, the purpose of this brief review is to examine all available studies related to exercise and physical activity in SAD, both therapeutically and on a more general clinical and research level.

Material and methods

To conduct this review, specific databases were searched with strictly selected keywords and with specific inclusion and exclusion criteria. In addition, authors declare that this study has not been registered in any international online protocol database.

The literature search was performed in Pubmed, Scopus, APA Psychinfo and SPORTDiscus databases on December 4, 2023. The following keywords were used: "seasonal depression", "seasonal affective disorder", "exercise", "therapeutic exercise", "physiotherapy", "physical therapy" and "physical activity". No time restriction was used when displaying the initial records in any of the aforementioned databases and the search strategy was captured as follows: ((("seasonal depression") OR ("seasonal affective disorder") AND (((((exercise) OR ("therapeutic exercise")) OR (physiotherapy)) OR ("physical therapy")) OR ("physical activity"))).

The inclusion criteria were studies: a) in English, b) with a sample of participants over 18 years of age, c) with a sample diagnosed with SAD using a valid and reliable measurement tool or based on a psychiatric diagnosis and d) where at least one intervention group was exclusively related to exercise or therapeutic exercise or physical activity or physiotherapy or generally as a study was related to the extraction of robust scientific results on the subject. In contrast, the exclusion criteria were for studies: a) where the sample was

healthy participants and b) where the group intervention was combined with another form of treatment (e.g. light therapy).

The eligibility of the studies was assessed separately by 2 reviewers, as well as the titles, abstracts and, finally, the full text of the studies. The same reviewers also separately performed data extraction from the finally selected studies.

Results

A search of the 4 databases resulted in 169 initial records. After removing duplicate studies, 118 articles remained and after removing 96 studies due to title, 22 remained to read the abstracts. After reading the abstracts, 10 studies were removed and 12 remained. After reviewing the full text based on inclusion and exclusion criteria, 9 studies were removed. Thus, a total of 3 studies are included in this review. The selection process of the studies is also shown graphically in Figure 1.

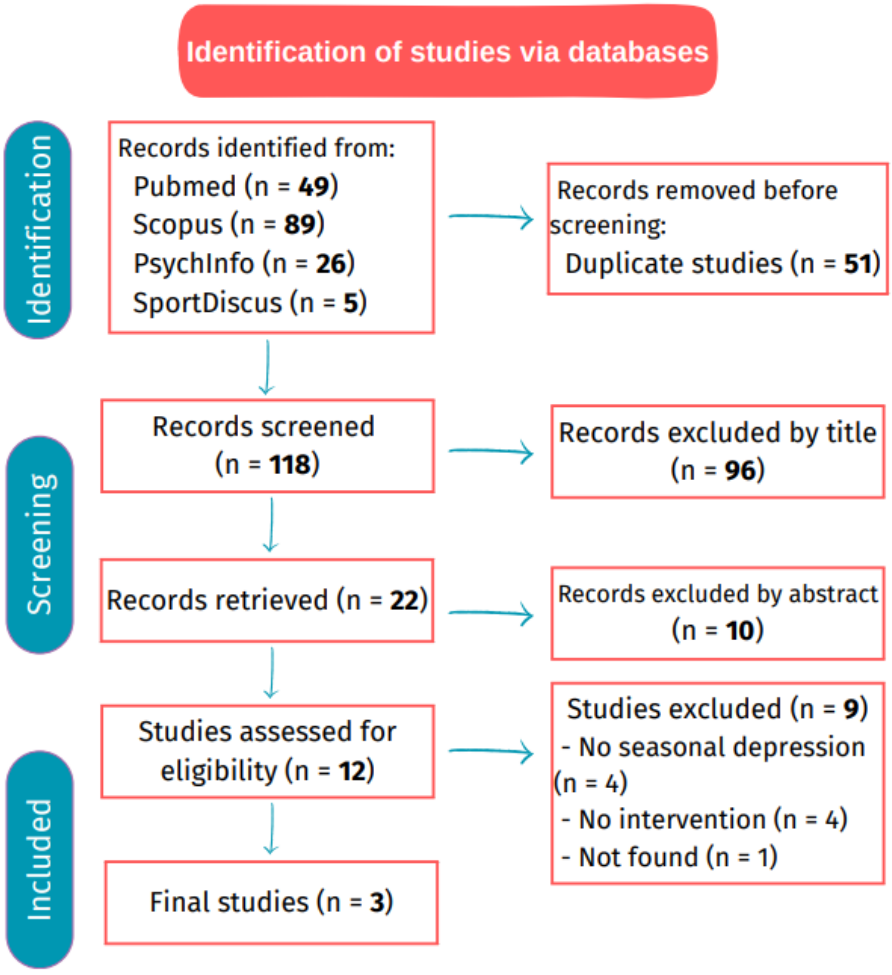


Figure 1. Graphical representation of the selection process of the final studies in the review.

Of the 3 included studies, 2 are clinical trials conducted in Russia and 1 is a survey that took place in the United States of America. All studies were conducted during at least one winter month and used individualized aerobic exercise, but also interventions with a more general concept of physical exercise and activity. The duration of the interventions was mainly one week and the assessment tools used for depressive symptoms were the Hamilton Depression Rating Scale in 2 studies and the Seasonal Pattern Assessment Questionnaire in 1 study.

Further details of each of the studies are shown in Table 1. The data reported in the table are only for intervention groups that were rigorously screened and diagnosed with SAD and are always exercise-related. Any groups other than the control groups that were screened for comparison of outcomes and outside the scope of this review were not considered by the researchers.

Regarding the effectiveness of the study interventions, Pinchasov et al., 2000 conclude that an individualized aerobic exercise program significantly reduces the symptoms of SAD (initial mean HDRS score: 17.4, final mean HDRS score: 5.7) by increasing oxygen consumption in the body, but with no statistical difference with the non-SAD group. This study is the only one we have so far showing the verified effectiveness of exercise in SAD with statistically significant results. Also, the study by Putilov et al., 2005 informs us that aerobic exercise in the midday hours is highly effective (initial mean HDRS score: 17.3, final mean HDRS score: 5.7), but concluded that it is no more favorable than exercise in the morning hours and that the treatment time may not substantially affect patients' chronobiology. This study also showed positive results regarding combined exercise and bright light therapy.

Finally, Drew et al, 2021, conducted a study in which participants were assessed with SPAQ, a self-reported scale about seasonal variations, which assessed sleep length, engagement in social activities, mood (overall feeling of well-being), weight, appetite, and energy level. Regarding their physical activity level, participants had to rate their general level of physical activity for a typical week, how often they visit their workout facility, and how social they are and feel there. The conclusion report that physical activity level is not a predictor of SAD, however it is worth noting that no conclusions have been drawn specifically for the group found diagnosed with SAD.

Study	Design	Region / Country	Intervention group	Assessment	Method	Results
Pinchasov et al., 2000[13]	CT	Novosibirsk, Russia	Physical exercise therapy-SAD group (n = 9) [only ♀, approximate MA = 34.8]	HDRS At baseline and 1 week after the intervention.	1-week training on stationary bicycle [12:00 – 13:00 h]. 1-hour daily of two 27-min pedaling sessions with 5 min rest. (every session: 5 min warm-up, 12 min of basic pedaling with at least a 10-min period of an exercise intensity at approximately 75% of a subject's maximal level)	Reduction of depressive symptoms (p = 0.000), but with no statistical significant differences compared with non-SAD group.
Putilov et al., 2005[8]	CT	Novosibirsk, Russia	Physical exercise group with SAD (n = 9 ♀)	HDRS At baseline and 1 week after the intervention.	1-week physical exercise on stationary bicycle [13:00 – 14:00].	Midday physical exercise was an effective treatment for SAD (p = 0.000).
Drew et al., 2021[14]	Survey	Fairbanks, Alaska, USA	Winter-pattern SAD group (n = 17) [♀ > ♂, the highest percentage - moderately physical active]	SPAQ, Survey questions about physical activity level.	Survey questions focused on participants' experiences at the gym (physical activity level in a "typical week" (work and leisure), frequency, gym sociality).	Physical activity level did not significantly associated with the occurrence or not of SAD.

Table 1. Sample, assessment, intervention and outcome characteristics of the studies. (CT = Clinical Trial, n = sample number, MA = Mean Age, SAD = Seasonal Affective Disorder, HDRS = Hamilton Depression Rating Scale, USA = United States of America, SPAQ = Seasonal Pattern Assessment Questionnaire).

Discussion

The objective of this brief review was to collect all available data on the effectiveness, and the association, of exercise interventions on symptoms of SAD. The results showed that a cyclometer-based aerobic exercise program significantly improves SAD. It was also found that an individual's level of physical activity is probably not a factor in the development of SAD.

Only one other review has been conducted over the years on the effects of exercise on SAD, although this one accepted studies from conference proceedings with healthy participants, reporting that there were barriers to drawing conclusions about physical activity and SAD.[15] The present review is certainly more up-to-date and more rigorous in its study inclusion criteria.

Similar studies investigating the effectiveness of aerobic exercise have been conducted in Finland. First of all, the study by Patronen et al., 1998, investigated an exercise program both in combination with bright light therapy and in normal light. The physical fitness program followed by the participants involved vigorous aerobic exercise using special equipment for systematic training of the main muscle groups for 1 hour, 2-3 times a week for 8 weeks. The study concluded that supervised physical activity combined with exposure to bright light appears to be an effective intervention for improving mood and some aspects of health-related quality of life in winter. In addition, Leppämäki et al., 2002 and Leppämäki et al., 2004, followed the exact same program as the previous study but this time followed a randomized sample with the results again reporting that aerobic exercise combined with exposure to bright light works positively on SAD. At this point it is very important to mention that in all of the above studies, compared to those included in this review, it seems to be concluded that aerobic exercise definitely works, but the sample in these studies is a healthy population or depressed patients without a diagnosed SAD. So, the above results are good to consider for future research and possible treatment in these patients, but with great consideration.[8,9,11-13]

Moreover, people with SAD experience a decrease in both the frequency of physical activity and the pleasure they get from it during the winter months and secondly report that activity patterns may have an impact on behavioral activation treatments for depression.[16] In addition, it has been found that those who perform high-intensity physical activity have a lower rate of seasonal sensitivity (due to changes in the duration of natural light) and those with high seasonal sensitivity have lower psychological well-being.[10]

The clinical importance of the results of this review lies in the fact that there is now scientific information available for interested clinical and academic health professionals - and especially for physiotherapists - which has been retrieved under strict criteria, in order to provide a more definitive conclusion on the topic as far as possible. More specifically, it is worth observing that in two of the three included studies, a 1-week exercise program led to remarkable results in terms of SAD symptoms, which can perhaps be explained by the short "seasonal" duration of the condition, and therefore its more immediate treatment compared to other mental disorders.

The present study certainly has some limitations, the primary one being the very small number of both studies and sample. Also, through the finally selected studies the long-term effects of each intervention were not known. Finally, even the quality of the studies can be considered questionable. For all the above reasons, we suggest that future studies on this topic should be carried out with randomization of the sample, with a properly and rigorously structured clinical intervention, with a larger sample, extracting long-term results, always focusing on the patient and improving the quality of life. Also, a very good consideration for future research is how green exercise, which by definition may include aerobic exercise combined with exposure to sunlight in nature, may affect the symptoms of SAD.

In combination with the high level of evidence for exercise, and especially for individualized aerobic exercise, in depression in general, it is safe to conclude that this type of exercise can really help patients with SAD. It should not be forgotten that our bodies are made for moving and the effects of physical inactivity bring about negative changes in people, and therefore in their psychology and mental health. So patients will be able to control every symptom that occurs during the winter months with the ultimate focus of being more productive and in a better mood during the day.

Equity, Diversity, and Inclusion Statement

The authors declare responsibly that they have respected the principles of equity, diversity and inclusion in their study.

Conflict of interests

The authors declare that there is not conflict of interests.

References

1. Kyriakatis GM, Besios T, Lykou PM. The effect of therapeutic exercise on depressive symptoms in people with multiple sclerosis - A systematic review. Mult Scler Relat Disord. 2022 Dec; 68:104407. doi: 10.1016/j.msard.2022.104407.

2. World Health Organization. Depressive disorder (depression). [Online]. Available at the following link: https://www.who.int/news-room/fact-sheets/detail/depression [accessed: 17 December 2023]

3. Roecklein KA, Rohan KJ. Seasonal affective disorder: an overview and update. Psychiatry (Edgmont). 2005 Jan;2(1):20-6.

4. Howland RH. An overview of seasonal affective disorder and its treatment options. Phys Sportsmed. 2009 Dec;37(4):104-15. doi: 10.3810/psm.2009.12.1748.

5. American Psychiatric Association. Seasonal Affective Disorder (SAD). [Online], Available at following link: https://www.psychiatry.org/patients-families/seasonal-affective-disorder [accessed: 17 December 2023].

6. International Classification of Diseases – 11. Seasonal pattern of mood episode onset. [Online], Available at following link: https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f822487798 [accessed: 06 January 2024].

7. Galima SV, Vogel SR, Kowalski AW. Seasonal Affective Disorder: Common Questions and Answers. Am Fam Physician. 2020 Dec 1;102(11):668-672.

8. Putilov AA, Danilenko KV. Antidepressant effects of light therapy and “natural” treatments for winter depression. Biological Rhythm Research. 2005;36 (5), 423-437. doi: 10.1080/09291010500218506

9. Leppämäki S, Haukka J, Lönnqvist J, Partonen T. Drop-out and mood improvement: a randomised controlled trial with light exposure and physical exercise. BMC Psychiatry.2004; 4:22. https://doi.org/10.1186/1471-244X-4-22

10. Alvarado C, Castillo-Aguilar M, Villegas V, Estrada Goic C, Harris K, Barria P, Moraes MM, Mendes TT, Arantes RME, Valdés-Badilla P, Núñez-Espinosa C. Physical Activity, Seasonal Sensitivity and Psychological Well-Being of People of Different Age Groups Living in Extreme Environments. Int J Environ Res Public Health. 2023 Jan 17;20(3):1719. doi: 10.3390/ijerph20031719.

11. Leppämäki S, Partonen T, Lönnqvist J. Bright-light exposure combined with physical exercise elevates mood. J Affect Disord. 2002 Nov;72(2):139-44. doi: 10.1016/s0165-0327(01)00417-7.

12. Partonen T, Leppämäki S, Hurme J, Lönnqvist J. Randomized trial of physical exercise alone or combined with bright light on mood and health-related quality of life. Psychol Med. 1998 Nov;28(6):1359-64. doi: 10.1017/s0033291798007491.

13. Pinchasov BB, Shurgaja AM, Grischin OV, Putilov AA. Mood and energy regulation in seasonal and non-seasonal depression before and after midday treatment with physical exercise or bright light. Psychiatry Res. 2000 Apr 24;94(1):29-42. doi: 10.1016/s0165-1781(00)00138-4.

14. Drew EM, Hanson BL, Huo K. Seasonal affective disorder and engagement in physical activities among adults in Alaska. Int J Circumpolar Health. 2021 Dec;80(1):1906058. doi: 10.1080/22423982.2021.1906058.

15. Peiser B. Seasonal affective disorder and exercise treatment: a review, Biological Rhythm Research, 2009;40:1, 85-97, doi: 10.1080/09291010802067171

16. Sigmon ST, Schartel JG, Boulard, NE, & Thorpe GL. Activity Level, Activity Enjoyment, and Weather as Mediators of Physical Health Risks in Seasonal and Nonseasonal Depression. Journal of Rational-Emotive & Cognitive-Behavior Therapy. 2010; 28(1), 42–56. doi:10.1007/s10942-010-0106-0

CASE REPORTS

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 55-79

ISSN: In process

INTERNET-DELIVERED PAIN RESILIENCE THERAPY (PRT): A MULTI-SUBJECT CASE SERIES

Joe Tatta[1,2]✉, Rose M. Pignataro[3], Janet R. Bezner[4], Carey E. Rothschild[5]

1. Integrative Pain Science Institute, New York, New York, USA.
2. Department of Physical Therapy, Arcadia University, Glenside, Pennsylvania, USA.
3. Emory and Henry College, Program in Physical Therapy, Marion, Virginia, USA.
4. Texas State University, Department of Physical Therapy, Round Rock, Texas, USA.
5. University of Central Florida, Program in Physical Therapy, Orlando, Florida, USA.

✉ Corresponding Author: Joe Tatta. Integrative Pain Science Institute. 300 West 23rd Street New York, NY 10011. 646-498-8986. joe@integrativepainscienceinstitute.com

Accepted: June 4th, 2024

Vol. 1, No. 1 (November 2024) ISSN: In process
Journal of Physiotherapy in Mental Health

CASE REPORT

INTERNET-DELIVERED PAIN RESILIENCE THERAPY (PRT): A MULTI-SUBJECT CASE SERIES

Joe Tatta[1,2]✉, Rose M. Pignataro[3], Janet R. Bezner[4], Carey E. Rothschild[5]

1. Integrative Pain Science Institute, New York, New York, USA.
2. Department of Physical Therapy, Arcadia University, Glenside, Pennsylvania, USA.
3. Emory and Henry College, Program in Physical Therapy, Marion, Virginia, USA.
4. Texas State University, Department of Physical Therapy, Round Rock, Texas, USA.
5. University of Central Florida, Program in Physical Therapy, Orlando, Florida, USA.

Abstract: Objective: Pain is a multifaceted phenomenon; therefore, innovative, multisystem approaches are recommended as a path to pain recovery. Pain Resilience Therapy (PRT) was developed as a novel, resilience-focused approach to pain management using intermediate to advanced physical therapist knowledge and skills. Methods: Three people with chronic pain received tele-physical therapy using PRT. The primary aim of PRT was to facilitate the development of pain resilience. Addressing vulnerability was a secondary aim. Treatment results were assessed using validated self-report measures for pain intensity, resilience, vulnerability, interference, patient outcome expectations, expectancies, and perspectives. Results: All patients demonstrated a significant reduction in pain intensity and increased pain resilience (cognitive-affective positivity or behavioral perseverance) measured by the Pain Resilience Scale (PRS), Pain Self-Efficacy Questionnaire (PSEQ), Chronic Pain Acceptance Questionnaire (CPAQ), and Self-Efficacy for Rehabilitation (SER). Pain interference improved (PROMIS®) with associated improvements in activity, sleep, mood, and stress measured by the Defense and Veterans Pain Rating Scale (DVPRS 2.0). Certain measures related to vulnerability (negative mood, fear avoidance, pain catastrophizing, kinesiophobia, depression, anxiety) also improved. The PRT intervention was safely delivered and patients reported their health as very much improved measured by the Patient Global Impression of Change (PGIC) survey. Conclusion: PRT's resilience-focused approach reduced pain and increased pain resilience while improving physical and psychological well-being. Although research is needed to elucidate change mechanisms, assisting patients in accessing resources that facilitate resilience is a valid pathway to pain recovery. This case series is a step toward integrating an understanding of resilience within the broader context of pain and disability.

Summary Box

• This is the first study to report the effectiveness of Pain Resilience Therapy. Initial outcomes indicate that Pain Resilience Therapy can significantly decrease pain intensity, improve physical and psychological factors associated with chronic pain, and enhance patients' self-reported health status.

• The importance of this study lies in its potential to inform physical therapist practice by offering an alternative telehealth intervention for chronic pain that could be accessible to those who cannot attend in-person therapy. It also emphasizes the role of resilience in pain management and could shift the focus from pain vulnerability to resilience-building, which may lead to better long-term outcomes for patients with chronic pain.

Keywords: chronic pain, resilience, PRISM, musculoskeletal pain, salutogenesis

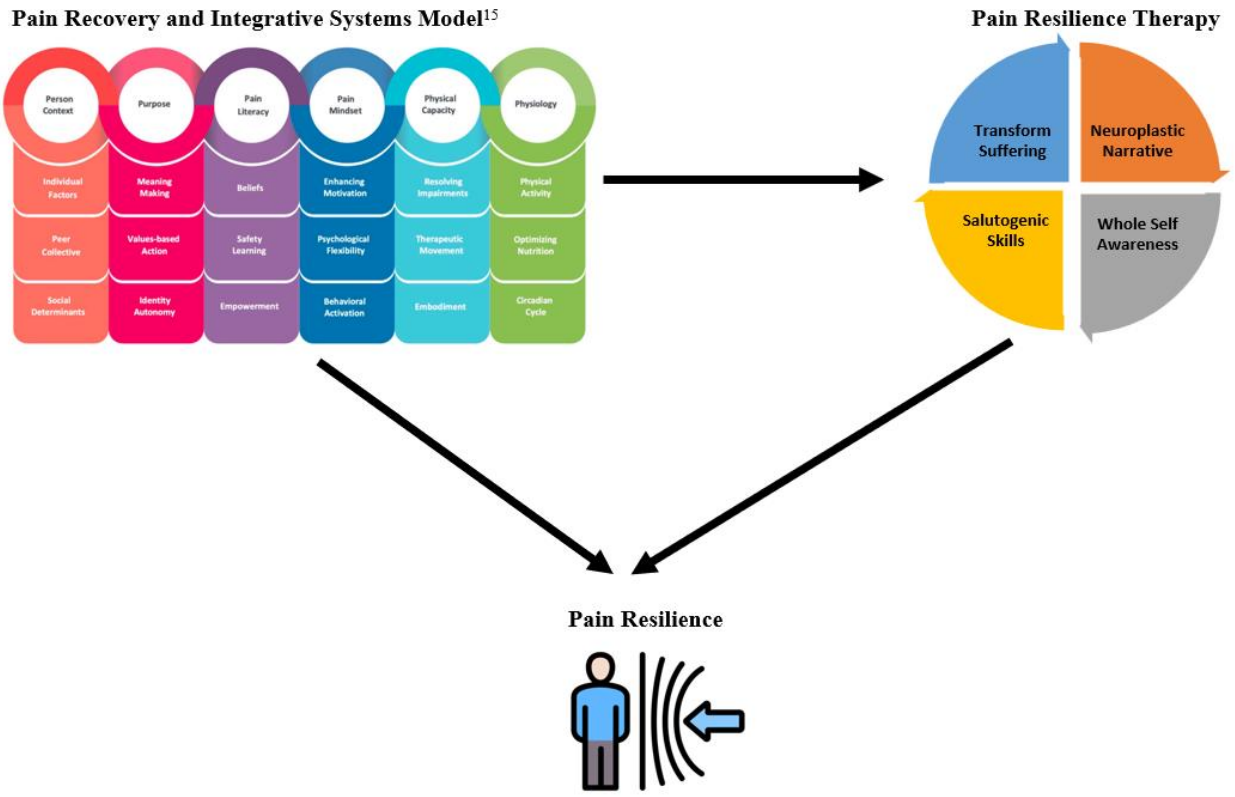
Corresponding Author: Joe Tatta. Integrative Pain Science Institute. 300 West 23rd Street New York, NY 10011. 646-498-8986. joe@integrativepainscienceinstitute.com

Introduction

Pain is an emergent experience arising from sensory, motor, and cognitive-emotional processing in the brain. Through learning and memory, pain is encoded and can persist.[1] Sensory alterations[2] (hyperalgesia, allodynia) cause an attentional bias resulting in cognitive-emotional distress (pain catastrophizing, kinesiophobia).[3] Poor motor performance (fatigue, reduced control, impairment) also contributes to disability.[4] Increased vigilance to bodily sensations and instability of body schema lead to disconnection, detachment, or dissociation.[5] As part of this multifaceted experience, one's sense of coherence (perceiving pain as comprehensible, manageable, and meaningful)[6] and self-efficacy may be diminished.[7] Avoidance behaviors are the embodiment of the pain experience.[8] Learning about and adapting to pain is a complex, dynamic process incorporating cognitive, affective, and physiological states.[9]

Decades of research have been devoted to factors that generate vulnerability to chronic pain, yet few studies have explored the characteristics that facilitate enhanced adaptation.[10,11] New evidence suggests a salient role of resilience in adapting to pain and achieving successful function (in human terms, well-being).[12,13] Resilience first emerged as a construct from positive psychology, shifting the emphasis away from negative psychological factors and toward positive aims, promotive and protective factors, and adaptive capacities.[14] Recently, the Pain Recovery and Integrative Systems Model (PRISM) introduced a broader, multi-process and multisystem construct of pain-specific resilience in physical therapy. This new model centers on learning healthy behaviors that promote relatively stable levels of physical, physiological, and psychosocial functioning.[15] These positive, asset-based processes are contingent upon individualized behavior change and are person context-dependent (Figure 1). Personal contextual factors may include beliefs, safety learning, embodiment, therapeutic movement, and psychological flexibility.[15] Health-promoting behaviors (physical activity, sleep, nutrition, avoidance of risky substances) also build resilience and adaptive plasticity.[15,16] Resilience may act as a protective factor in the face of pain symptomatology, disability, and psychosocial distress to promote beneficial outcomes and/or buffer vulnerability toward negative outcomes.[17] Assessing and addressing the resilience gap may strengthen outcomes in people facing the adversity of chronic pain.[18] While many physical therapists are familiar with resilience as a factor in pain management, we were unable to identify previous investigations concerning a specific, multi-system approach toward enhancing

Figure 1: Clinical Decision-Making Process



resilience and chronic pain recovery. Likewise, we were unable to locate research that detailed changes in pain-specific resilience as a process outcome across an episode of physical therapy care.

The purpose of this case series is to describe the initial development of a novel intervention called Pain Resilience Therapy (PRT) and demonstrate its effects in three individuals experiencing chronic pain. Innovative aspects of PRT include a resilience-focused approach to reduce pain, improve pain interference, and enhance quality of life. We hypothesized that PRT would be safely tolerated, facilitate pain recovery, enhance physical and psychological resilience, and significantly improve patients' self-perceived health.

Case Presentation

Case 1

A 44-year-old male (white, college educated, married, employed, no current opioid use) with an 8-year history of chronic low back pain (CLBP) was referred by his physical therapist due to a noticeable plateau in progress and difficulty coping with pain. He previously received 8 years of intermittent impairment-based

physical therapy that centered on lumbar stabilization exercises, spinal mobility, and manual therapy. He also received 8 months of psychodynamic psychotherapy and 8 weeks of Pain Reprocessing Therapy[19] with no relief. His pain was localized to the base of the spine and above the right posterior superior iliac spine. The patient reported no leg pain, numbness, or paresthesia. His primary complaint was pain exacerbated by work-related stress, sitting for prolonged periods, and a loss of recreational activities such as running and skiing. He was motivated to return to running and believed a body-mind approach to treatment would be beneficial.

Case 2

A 66-year-old female (white, college-educated, married, lightly employed, no current opioid use) presented with an 8-month history of left-sided neck pain and bilateral shoulder pain. She reported an adverse incident during a massage therapy session where the practitioner suddenly and forcefully distracted and pulled both upper extremities at 180 degrees of flexion without her consent or warning. This incident was described as traumatic and reminiscent of an acceleration–deceleration injury. Approximately 24 hours after the incident, the patient reported feeling 'numb all over my body' and then progressively developed pain. She reported diffuse paresthesia in both upper extremities that did not follow a dermatomal pattern. Throughout 8 months, the patient consulted and/or received treatment from one neurologist, three chiropractors, two physical therapists, three orthopedists, a physiatrist, and an acupuncturist. She underwent three imaging studies indicating cervicalgia and mild rotator cuff tendinosis but no rotator cuff tear. The patient was motivated to resume activities such as returning to the gym and Pilates classes; however, she was very concerned about movements that would exacerbate pain and described confusion regarding the cause of and unpredictability of her symptoms. The patient reported that these symptoms resulted in significant disruption to her daily life.

Case 3

A 74-year-old female (white, college-educated, unmarried, retired, no current opioid use) presented with a history of childhood trauma, Hashimoto's thyroiditis, and previous CLBP with a new episode that began 6 months earlier. Her primary care physician prescribed a gabapentinoid (300mg/4x/day) to manage her pain. Three months into the medication regime, the patient began to experience drug-related side effects that included rebound pain between doses, intense dermatomal itching in her trunk and arms, anxiety, and

difficulty sleeping. Her primary care physician provided education on tapering down the gabapentinoid and recommended physical therapy for pain management. The patient reported localized pain at the base of the lumbar spine and at various points throughout the thoracic spine. She reported no leg pain, numbness, or paresthesia. The patient believed conservative treatment would support the medication taper and help manage her pain. However, she was uncertain and fearful about tapering the medication due to its potential analgesic effects. The patient was having difficulty completing her daily routine.

Diagnostic Evaluation

For each of the three patients featured in this case series, the treating physical therapist employed a diagnostic evaluation process based on the biopsychosocial model of pain. Physical examination followed consensus-based multispecialty guidelines and best practices in telemedicine for orthopedic and neurologic pain.[20] This included visual observation, verbally guided self-palpation, lumbar and hip active range of motion (ROM), functional strength testing, gait assessment, and special clinical tests. Physical examination findings for each patient are provided in Table 1. The treating physical therapist used the 10-item Optimal Screening for Prediction of Referral and Outcome-Yellow Flag (OSPRO-YF)[21] to evaluate pain-related psychosocial factors shown in Table 2. The OSPRO-YF is a valid and reliable multidimensional psychological measure for individuals with chronic pain.21 Functioning and disability reflect a complex interaction among individual health conditions, as well as contextual environmental and personal factors. Therefore, the treating therapist used the International Association for the Study of Pain (IASP)[22] and the World Health Organization's International Classification of Functioning, Disability, and Health (ICF-11)[23] new classifications for chronic pain to formulate a diagnosis. This reflects the International Classification of Diseases (ICD) 11th Revision (ICD-11) which regards chronic pain as a biopsychosocial phenomenon and includes the diagnosis of chronic primary pain and six types of chronic secondary pain.[23] Empirical studies have demonstrated the integrity of these diagnostic categories, reliability, clinical utility, international applicability, and superiority over the previous 10th edition (ICD-10).[23] For reliability and diagnosis, a classification algorithm and coding tool for the ICD-11 are available for clinician use.[23]

Table 1: Evaluation Findings

	Case 1	Case 2	Case 3
ICD-11 Diagnosis	• MG30.02 Chronic primary low back pain • XS7G Psychosocial factors present • XS2E Severe pain intensity • XS7N Severe distress • XT5T Continuous with additional flare-ups	• NA6Z Injury to neck/neck trauma • XS7G Psychosocial factors present • XS2E Severe pain intensity • XS7C Moderate distress • XT5T Continuous with additional flare-ups	• MG30.02 Chronic primary musculoskeletal pain • PL13.2 Drug-related injury or harm in the context of correct administration or dosage • XS7G Psychosocial factors present • XS2E Severe pain intensity • XS7C Moderate distress • XT5T Continuous with additional flare-ups
Key Examination Findings	• Posture revealed no scoliosis, abnormal kyphosis, or lordosis. • Lumbar range of motion (ROM) assessed while standing. The patient was instructed to move to end range of flexion, extension, lateral flexion, and rotation. Although lumbar ROM was within normal limits, pain was noted at the end ranges of forward flexion and left rotation. • Lower extremity muscle strength was WNL as assessed by the following functional movement patterns; a *double leg squat and rise* to test L3 and L4 quadriceps and lower extremity strength, heel-toe walking for L5 and S1 radiculopathy–related weakness, and repetitive toe raises for S1-related related weakness. • Faber's test was negative for sacroiliac joint dysfunction. • Seated straight leg raise and slump test were negative for neural tension/L4 to L5 or L5 to S1 disc herniation. • Prone stork test was negative for posterior facet pain. • Gait pattern was normal, the patient was able to heel walk, toe walk, and, tandem walk.	• Posture revealed no cervical lordosis, forward head posture, or abnormal head tilt. • Cervical ROM assessment included flexion, extension, lateral flexion, and rotation. Left lateral flexion and right rotation were painful and limited by 10 degrees. • Bilateral shoulder flexion and abduction ROM was WNL yet pain was noted in a diffuse pattern throughout the upper quarter at the end range. • The Spurling Maneuver was negative for cervical radiculopathy. • Roos Stress Test was negative for Thoracic outlet syndrome. • Empty can test was negative for shoulder impingement.	• Posture revealed no scoliosis, abnormal kyphosis, or lordosis. • Lumbar ROM was assessed while standing. The patient was instructed to move to end range of flexion, extension, lateral flexion, and rotation. Lumbar ROM was limited in all directions by about 20 degrees due to reports of pain and/or tension. • Lower extremity muscle strength was WNL as assessed by the following functional movement patterns; a *double leg squat and rise* to test L3 and L4 quadriceps and lower extremity strength, heel-toe walking for L5 and S1 radiculopathy–related weakness, and repetitive toe raises for S1-related related weakness. • Faber's test was negative for sacroiliac joint dysfunction. • Seated straight leg raise and slump test were negative for neural tension/L4 to L5 or L5 to S1 disc herniation. • Prone stork test was negative for posterior facet pain. • Gait pattern was normal, the patient was able to heel walk, toe walk, and, tandem walk.

Outcomes

Each patient completed five standardized outcome measures to assess psychosocial factors and patient status before treatment and at 90 days post-treatment (Table 2).

Table 2: Outcome Measures

	Case 1		Case 2		Case 3	
	Pretreatment	**90-Days Posttreatment**	**Pretreatment**	**90-Days Posttreatment**	**Pretreatment**	**90-Days Posttreatment**
OSPRO-Yellow Flag **+Yellow Flag** **- Yellow Flag**	**Resilience** +PSEQ 22.591 +SER 89.952 +CPAQ 37.943 **Vulnerability** +FABQ-W 23.293 +FABQ-PA 21.01 +TSK-11 28.293 +PCS 30.742 +STAI 50.682 +STAXI 21.119 +PHQ-9 10.123 +PASS-20 51.118	**Resilience** -PSEQ 45.242 -SER 111.986 -CPAQ 75.547 **Vulnerability** -FABQ-W 7.111 -FABQ- PA 14.031 -TSK 19.246 -PCS 16.086 +STAI 36.382 +STAIX 18.92 -PHQ-9 3.43 -PASS-20 23.675	**Resilience** +PSEQ 30.822 +CPAQ 48.889 **Vulnerability** +FABQ-W 27.876 +FABQ- PA 21.107 +TSK-11 31.545 +STAIX 14.323 +PCS 29.968 +PASS-20 52.635	**Resilience** -PSEQ 42.906 -CPAQ 71.406 **Vulnerability** -FABQ-W 6.159 -FABQ- PA 13.919 -TSK-11 18.691 -STAIX 34.422 -PCS 9.743 -PASS-20 17.37	**Resilience** +PSEQ 38.627 +CPAQ 61.05 **Vulnerability** +FABQ-W 22.758 +TSK-11 29.037 +PCS 29.791 +PASS-20 47.354	**Resilience** -PSEQ 38.627 -CPAQ 61.05 **Vulnerability** +FABQ-W 26.82 +TSK-11 28.2 +PCS 21.261 +PASS-20 38.023
Pain Resilience Scale	Behavioral Perseverance = 15 Cognitive/Affective Positivity = 9 Total Score = 24	Behavioral Perseverance = 15 Cognitive/Affective Positivity = 21 Total Score = 36	Behavioral Perseverance = 15 Cognitive/Affective Positivity = 13 Total Score = 28	Behavioral Perseverance = 18 Cognitive/Affective Positivity = 28 Total Score = 46	Behavioral Perseverance = 16 Cognitive/Affective Positivity = 16 Total Score = 32	Behavioral Perseverance = 16 Cognitive/Affective Positivity = 22 Total Score = 38
Pain Intensity	5/10: Interrupts some activities	1/10; Hardly notice pain	7/10: Focus of attention prevents doing daily activities	2/10; notice pain, doesn't interfere with activity	5/10; interrupts some activities	2/10; notice pain, doesn't interfere with activity
DVPRS Pain Interference	Activity 8/10 Sleep 7/10 Mood 9/10 Stress 9/10	Activity 0/10 Sleep 0/10 Mood 0/10 Stress 1/10	Activity 8/10 Sleep 8/10 Mood 9/10 Stress 9/10	Activity 2 /10 Sleep 2/10 Mood 0/10 Stress 0/10	Activity 7/10 Sleep 5/10 Mood 6/10 Stress 6/10	Activity 2/10 Sleep 3/10 Mood 3/10 Stress 3/10
PROMIS® Pain Interference	Raw Score 26 T Score 69.6	Raw Score 6 T Score 41	Raw Score 28 T Score 72.4	Raw Score 7 T Score 48	Raw Score 13 T Score 57.1	Raw Score 10 T Score 53.8
Patient Global Impression of Change		7- Very Much Improved		7- Very Much Improved		6- Much Improved

Abbreviations: OSPRO-YF, Optimal Screening for Prediction of Referral Outcomes-Yellow Flag, DVPRS, Defense and Veterans Pain Rating Scale, PROMIS®, Patient-Reported Outcomes Measurement Information System; **Vulnerability Measures:** FABQ-W, Fear-Avoidance Beliefs Questionnaire work subscale, FABQ-PA, Fear-Avoidance Beliefs Questionnaire physical activity subscale, TSK-11, Tampa Scale of Kinesiophobia, PCS, Pain Catastrophizing Scale, STAI, State-Trait Anxiety Inventory, STAXI, State-Trait Anger Expression Inventory, Patient Health Questionnaire-9, PHQ-9, PASS-20, Pain Anxiety Symptoms Scale. **Resilience Measures:** PSEQ, Pain Self-Efficacy Questionnaire, SER, Self-Efficacy for Rehabilitation, CPAQ, Chronic Pain Acceptance Questionnaire.

The Pain Resilience Scale (PRS) was used to measure pain resilience.[24] The PRS was developed as a pain-specific measure of resilience, and its validity within the chronic pain population is superior to general resilience scales. It has high internal consistency (*Cronbach's* α = .94) and high *test*-retest reliability (r = .79). The PRS provides a total score, along with two distinct subscales for cognitive/affective positivity and behavioral perseverance.[24] Higher scores indicate greater pain resilience.

The 10-item OSPRO-YF tool was used to measure pain resilience and pain vulnerability. The OSPRO-YF is a valid and reliable multidimensional psychological measure for individuals with chronic pain and accurately estimates scores of 10 full-length psychological questionnaires (FABQ, TSK-11, PCS, STAI, STAXI, PHQ-9, PASS-20, PSEQ, SER, CPAQ) found in Table 2.[21] It includes 1 domain related to resilience (positive affect/coping) and 2 domains related to vulnerability (negative mood and fear avoidance). The Cronbach's α for the 2 domains ranges from 0.88 to 0.94. The presence of a positive yellow flag indicates

pain-associated psychological distress. The absence of a yellow flag after treatment indicates a statistically significant improvement in pain-associated psychological distress.[21]

The Defense and Veterans Pain Rating Scale (DVPRS 2.0) was used to measure pain intensity and pain interference with activity, sleep, mood, and stress.[25] The DVPRS is a reliable (Cronbach's α = 0.871) and valid instrument that provides standard language and metrics to communicate pain and related outcomes.[25] Lower scores indicate less pain intensity and pain interference.

Patient-Reported Outcomes Measurement Information System (PROMIS)® Pain Interference Short Form 6b was also used to measure pain interference.[26] The PROMIS® is a reliable (Cronbach's α = 0.88 to 0.97) self-report measure of the consequences of pain on relevant aspects of a person's life and how pain hinders social, cognitive, emotional, physical, and recreational engagement. The minimally important difference (MID) is 3.0 T-score points for pain samples.[26] Lower scores indicate less pain interference.

Patient Global Impression of Change (PGIC) is a valid measure[27] regarding a patient's perspective on the efficacy of treatment. Patients rate their change on a 7-point scale of: "7- very much improved," "6- much improved," "5- minimally improved," "4- no change," "3- minimally worse," "2- much worse," or "1- very much worse." Higher scores are associated with greater improvements in pain.

Therapeutic Intervention

In all three cases, one physical therapist who developed PRT provided treatment for chronic pain. PRT is a health behavior change approach developed from the recently published PRISM for physical therapist practice.[15] The physical therapist and patient collaborated to create each individualized treatment plan using evidence-informed methods for shared decision-making. The PRISM framework (Figure 1) served as a patient decision aid to enhance shared knowledge about treatment options and adherence.[28] PRISM processes are supported by Level I or II evidence.[15] Second, the physical therapist considered objective data from the OSPRO-YF (Table 2), which is a validated guide for psychologically informed practice.[21] A description of each treatment intervention is found in Table 3. The primary aim of treatment was to facilitate pain resilience. A secondary aim was to address pain vulnerability. It should be noted that many of the processes involved in PRT exceed entry-level physical therapist education and represent intermediate to advanced clinical skills. PRT's approach to resilience can be summarized in four ways:

1. The Transformation of Suffering:[29] The core emotional experience of chronic pain is one of anxiety,[21] fear without solution,[30] guilt,[31] and shame.[32] These states cause emotional dysregulation and pain persistence. Therefore, the initiation of PRT is based upon individual factors and relational processes to support empathic attunement that validates, reassures, and provides a corrective pain experience that opens the person to new possibilities.
2. A Neuroplastic Narrative: Pain education and comprehending how the brain works helps the patient to develop a non-pathologizing understanding that the body is not damaged. In this way, patients can develop insights about the ways the brain produces pain, how neural networks can adapt, and how the brain can change the way it perceives and responds to pain, reducing its intensity and impact on daily life. Clinically, a pathoanatomic cause of pain is reconstructed for a new neuroplastic narrative.[33]
3. Whole Self Awareness: In conjunction with a neuroplastic narrative, patients can build awareness of the integration of sensory, motor, and emotional aspects that influence pain and the understanding that managing pain extends beyond the brain. Embodied experiential exercises are used to address interactions among the brain, mind, body, and behavior.[34]
4. Salutogenic Skills: Building skills for better health and the role of health-promoting behaviors, including physical activity, sleep hygiene, and nutrition, enhance physiological systems that drive plasticity and support well-being.[35]

PRT helps the patient understand how the brain works, and how to use it to modulate pain, and build resilience. Improving pain literacy and the capacity to use it effectively, promotes patients' motivation for behavior change.[36] Behavior change processes and techniques support pain self-management. To achieve these objectives, a HIPPA-compliant Zoom for Healthcare was used to deliver a 60-minute tele-physical therapy session once per week.[37] Case #1 received 8 weeks of care, Case #2 received 10 weeks of care, and Case #3 received 12 weeks of care (Table 3).

Table 3: Description of Pain Resilience Therapy

Case 1		
Session	**Process**	**Description of the Intervention**
1	• Individual factors • Relational processes	A Corrective Pain Experience: The initiation of care is based upon individual factors and relational processes to support empathic attunement that validates, reassures, and provides a corrective pain experience that opens the person to new possibilities. The therapist invites the patient to tell their story of pain, of searching for a solution, and potentially being misunderstood and/or mismanaged by the medicolegal system. The therapist explicitly demonstrates a deep understanding and empathy towards the person's experiences of pain and associated emotional distress. Allowing the person's experience to be heard and seen is foundational for safety and trust. Affirming the person's pain and emotional experiences as real and significant helps counteract feelings of shame or disbelief they may have encountered in their healing journey. This experience is important for moving through vulnerable emotional states (suffering) that maintain pain (fear, shame, guilt, frustration, sadness, etc.) and as a precursor to discussing the sensitive topic of the brain as the cause of pain.
2	• Beliefs	The Brain and Pain: the cause of chronic pain is reconceptualized from bodily damage to a central brain-generated false alarm. Pain education is provided on the role of the brain in the generation and maintenance of pain. Pain was explained so that the patient understands that pain is generated by the brain and that pain can be triggered by either physical damage/injury, anticipated injury, or by difficult emotions/distress. It was emphasized that all pain is real and not due to the patient's imagination, and that no blame or stigma should be associated with having centralized chronic pain. Neural pathways in the brain generate all pain, and centralized pain is driven by a cycle of pain leading to a focus on pain, which leads to increased pain. Understanding pain lowers fear-avoidance behaviors so that people can move again.
3	• Resolving impairments	Therapeutic Exercise was prescribed to normalize spinal ROM deficits. This includes movement prescribed to correct impairments, restore muscular and skeletal function, and/or maintain a state of well-being.
4	• Therapeutic movement	Graded Exercise Therapy: a program was developed to improve physical function and increase physical activity levels so that the person could return to running 2-miles twice a week.
5	• Psychological flexibility • Physical activity	Noticing Thoughts with Movement: this is a foundational psychological flexibility technique and skill. This skill and perspective help people gain some distance from thoughts and the impact they are having on pain and function. The exercise helps people to step back from thoughts so that people can relate differently toward thoughts about pain. (e.g. I'm noticing that I'm having the thought that…) It may include and be combined with education on how to apply this skill to increasing levels of potentially threatening movement where negative thoughts or emotions may naturally arise.
6	• Safety learning	Window of Tolerance: safety learning is important for people who live with chronic pain, toxic stress, or have a trauma history. Ongoing pain and stress can narrow the window of tolerance (the zone in which a person is able to function most effectively) making it difficult for people to remain in a state of optimal arousal. They may more easily slip into states of hyperarousal or hypoarousal in response to stressors or pain. Education here helps to build resilience by learning to identify and cultivate a sense of safety, where individuals can better manage their reactions to potential triggers, staying within their window of tolerance.
7	• Embodiment	Interoceptive Awareness: embodiment exercises help people consciously identify a variety of bodily sensations. This is achieved via interoception exercises that promote body awareness. This technique increases awareness of heart and breathing rate, body temperature, muscle tension/tightness, pain, feelings of emotion moving through the body and the 5 senses. Body awareness encompasses the sensitivity to bodily signals and the ability to recognize subtle body cues and the sense of bodily self.
8	• Embodiment	Shifting States: embodiment exercises help people consciously control the transition from sympathetic to the parasympathetic mediated states. This is achieved by various relaxation and breathing techniques and exposure to pleasant, unpleasant and neutral bodily sensations. These techniques can stimulate the parasympathetic nervous system and thus prevent stress mechanisms from developing harmful effects on physical and mental health.
Case 2		
Session	**Process**	**Description of the Intervention**
1	• Individual factors • Relational processes	A Corrective Pain Experience: The initiation of care is based upon individual factors and relational processes to support empathic attunement that validates, reassures, and provides a corrective pain experience that opens the person to new possibilities. The therapist invites the patient to tell their story of pain, of searching for a solution, and potentially being misunderstood and/or mismanaged by the medicolegal system. The therapist explicitly demonstrates a deep understanding and

		empathy towards the person's experiences of pain and associated emotional distress. Allowing the person's experience to be heard and seen is foundational for safety and trust. Affirming the person's pain and emotional experiences as real and significant helps counteract feelings of shame or disbelief they may have encountered in their healing journey. This experience is important for moving through vulnerable emotional states (suffering) that maintain pain (fear, shame, guilt, frustration, sadness, etc.) and as a precursor to discussing the sensitive topic of the brain as the cause of pain.
2	• Beliefs	The Brain and Pain: the cause of chronic pain is reconceptualized from bodily damage to a central brain-generated false alarm. Pain education is provided on the role of the brain in the generation and maintenance of pain. Pain was explained so that the patient understands that pain is generated by the brain and that pain can be triggered by either physical damage/injury, anticipated injury, or by difficult emotions/distress. It was emphasized that all pain is real and not due to the patient's imagination, and that no blame or stigma should be associated with having centralized chronic pain. Neural pathways in the brain generate all pain, and centralized pain is driven by a cycle of pain leading to a focus on pain, which leads to increased pain. Understanding pain lowers fear-avoidance behaviors so that people can move again.
3	• Psychological flexibility	Noticing Thoughts: this is a foundational psychological flexibility technique and skill. This skill and perspective help people gain some distance from thoughts and the impact they are having on pain and function. The exercise helps people to step back from thoughts so that people can relate differently toward thoughts about pain. (e.g. I'm noticing that I'm having the thought that…)
4	• Psychological flexibility	Naming The Mind: when beliefs about pain don't readily change psychological flexibility skills can help people manage thoughts and emotions. The "Naming the Mind" exercise is a psychological technique that helps individuals create a healthier distance between their sense of self and their thoughts, thereby reducing the impact of negative or unhelpful thinking patterns. This practice is grounded in mindfulness principles emphasizing the observation of thoughts without immediate identification or judgment. The person assigns a name to their mind or to specific thought patterns. This is conceptualized as a protector within that has become overprotective due to the persistence of pain.
5	• Resolving impairments • Therapeutic movement	Therapeutic Exercise was provided to normalize spinal ROM deficits. This includes movement prescribed to correct impairments and restore muscular and skeletal function.
6	• Resolving impairments • Therapeutic movement	Therapeutic Exercise was prescribed to normalize spinal ROM deficits. This includes movement prescribed to correct impairments, restore muscular and skeletal function., and/or maintain a state of well-being.
7	• Resolving impairments • Therapeutic movement	Therapeutic Exercise was prescribed to normalize spinal ROM deficits. This includes movement prescribed to correct impairments, restore muscular and skeletal function., and/or maintain a state of well-being.
8	• Circadian Cycle	Sleep Hygiene Behaviors: lifestyle factors impact nervous system function, pain modulation, as well as mental and physical health. Education as delivered with information about sleep in general and/or sleep hygiene behaviors.
9	• Physical activity	Graded Walking Program: was created with education on a structured plan to gradually increases the duration, distance, and intensity of walking sessions over time. This approach is beneficial for individuals looking to improve their fitness, manage chronic pain, or simply increase their physical activity in a safe and sustainable manner. Education was provided about the safe return to Pilates class twice a week.
10	Values-based action	Trying On a Value: A life lived according to values is described as rewarding, meaningful, and active. It can also feel liberating, joyous and free. People are provided with a list of values-based words. They choose a value they are willing to try for one week. Common values people find important are fun, spontaneity, reliability, risk, compassion, connection, and vitality. This list is by no means exhaustive.
Case 3		
Session	**Process**	**Description of the Intervention**
1	• Individual factors • Relational processes	A Corrective Pain Experience: The initiation of care is based upon individual factors and relational processes to support empathic attunement that validates, reassures, and provides a corrective pain experience that opens the person to new possibilities. The therapist invites the patient to tell their story of pain, of searching for a solution, and potentially being misunderstood and/or mismanaged by the medicolegal system. The therapist explicitly demonstrates a deep understanding and

		empathy towards the person's experiences of pain and associated emotional distress. Allowing the person's experience to be heard and seen is foundational for safety and trust. Affirming the person's pain and emotional experiences as real and significant helps counteract feelings of shame or disbelief they may have encountered in their healing journey. This experience is important for moving through vulnerable emotional states (suffering) that maintain pain (fear, shame, guilt, frustration, sadness, etc.) and as a precursor to discussing the sensitive topic of the brain as the cause of pain.
	• Beliefs	The Brain and Pain: the cause of chronic pain is reconceptualized from bodily damage to a central brain-generated false alarm. Pain education is provided on the role of the brain in the generation and maintenance of pain. Pain was explained so that the patient understands that pain is generated by the brain and that pain can be triggered by either physical damage/injury, anticipated injury, or by difficult emotions/distress. It was emphasized that all pain is real and not due to the patient's imagination, and that no blame or stigma should be associated with having centralized chronic pain. Neural pathways in the brain generate all pain, and centralized pain is driven by a cycle of pain leading to a focus on pain, which leads to increased pain. Understanding pain lowers fear-avoidance behaviors so that people can move again.
2	• Beliefs • Meaning making	Medication-Related Beliefs: some patients may believe that medication is the only way to control pain. Addressing beliefs and exploring broader meaning-making was utilized to develop a more holistic narrative to pain management. Medication-related beliefs were reconstructed. Medication, in the right dose, was reframed as one potential modifier of neuroplasticity (e.g. 'it helps the nervous system change and adapt in a good way') alongside lifestyle interventions. A change in belief shifts the meaning about the relative importance of medication as just one part of an overall pain management program and how it improves movement.
3	• Motivational enhancement	Decisional Balance: the patient was ambivalent about tapering down the medication. Decisional balance was explored with regard to tapering. Support to weigh the pros and cons of continuing versus tapering off the medication was discussed. The patient was prompted to make arguments for change themselves. (e.g. 'What benefits do you think you might find if you were to reduce the medication?' 'What do you stand to gain and what concerns do you have about reducing the medication?')
4	• Therapeutic movement	Six Movements of the Spine: this exercise was taught as a daily sequence to improve spinal joint mobility through the fundamental movements of flexion, extension, lateral flexion, and rotation. The movements engage and relax the supporting muscles of the spine. Combined with deep diaphragmatic breathing it supports the activation of the parasympathetic nervous system and relaxes spinal muscles.
5	• Circadian cycle	Sleep Hygiene Behaviors: lifestyle factors impact nervous system function, pain modulation, as well as mental and physical health. Education was delivered with information about sleep in general and/or sleep hygiene behaviors.
6	• Circadian cycle	Sleep Hygiene Behaviors: lifestyle factors impact nervous system function, pain modulation, as well as mental and physical health. Education as delivered with information about adding progressive muscle relaxation to the patient's nightly bedtime routine.
7	• Optimizing nutrition	Ultra-Processed Foods: the role of nutrition was discussed with regard to inflammation, autoimmunity (Hashimoto's), pain, and body function. The adoption of healthy eating habits was encouraged. The distinction between highly processed foods versus whole foods was explored and discussed.
8	• Optimizing nutrition	Food Triggers: nutrition education was provided regarding nutritional triggers and pain. This centered on reading food labels and identifying added sugar, refined carbohydrates, food additives (MSG, Aspartame) and saturated or trans fats.
9	• Psychological flexibility	Noticing Thoughts: this is a foundational psychological flexibility technique and skill. This skill and perspective help people gain some distance from thoughts and the impact they are having on pain and function. The exercise helps people to step back from thoughts so that people can relate differently toward thoughts about pain. (e.g. I'm noticing that I'm having the thought that…)
10	• Behavioral activation	Activity Scheduling: helping patients return to and schedule activities that are likely to be enjoyable or provide a sense of accomplishment. These activities are chosen based on their potential to disrupt the cycle of depressive symptoms. The scheduling is gradual, starting with simpler tasks and progressively incorporating more complex or challenging activities.
11	• Values-based Action	Trying On a Value: A life lived according to values is described as rewarding, meaningful, and active. It can also feel liberating, joyous and free. People are provided with a list of values-based words. They choose a value they are willing to try for one week. Common values people find important are fun, spontaneity, reliability, compassion, connection, vitality. This list is by no means exhaustive.

12	• Values-based Action	Taking Action: people can learn how to make room for painful sensations in service of the way they want to live. This exercise explores values-based activities in which they are committed to engage and the unpleasant thoughts, emotions, or sensations they are willing to make room for while completing this activity. (e.g. 'I'm willing to make room for some back pain and feeling sweaty when I exercise. I also notice that I'm having thoughts that too much exercise will damage my back and I'm going to have to use medication for the rest of my life. I'm willing to move with these thoughts because I value my health and I see the contribution of physical activity to health.')

Results

This case series describes the effect of PRT, a novel resilience-focused approach used in the treatment of 3 people with chronic pain (Table 2).

Case 1 pain score decreased by 4 points from 5/10 to 1/10 by the end of 8 sessions. The patient experienced a significant improvement in all pain-specific resilience factors as demonstrated by increased cognitive-affective positivity (PRS), pain self-efficacy, pain acceptance, and self-efficacy in rehabilitation (OSPRO-YF). Vulnerability factors of fear avoidance, kinesiophobia, pain catastrophizing, pain-related anxiety, and depression also significantly improved (OSPRO-YF). The patient's depressive symptoms indicated by the PHQ-9 decreased from moderate (10.12) to none-minimal (3.43) by the end of the treatment. Vulnerability factors of state-trait anxiety and state-trait anger improved but did not reach significance. Positive changes were reflected in pain interference (DVRPS). Pain no longer interfered with activity, sleep, or mood (0/10), and was hardly noticed with stress (1/10). The change in pain interference surpassed the minimally important difference (MID) of 3.0 T-score points for pain samples (PROMIS)®.[26] The patient no longer had pain with lumbar ROM. He was able to sit for prolonged periods and returned to the recreational activity of running twice a week for 2 miles. By the end of the care, he was skiing intermediate slopes with his family on the weekends. The patient self-reported his condition as very much improved as measured by the PGIC.

Case 2 pain score decreased 5 points from 7/10 to 2/10 which did not interfere with activity by the end of 10 sessions. The patient experienced a significant improvement in all pain-specific resilience factors as demonstrated by improvements in cognitive-affective positivity and behavioral perseverance (PRS), pain self-efficacy and pain acceptance (OSPRO-YF). This patient also experienced a significant improvement in all vulnerability factors of fear avoidance, kinesiophobia, state-trait anxiety, pain catastrophizing, and pain-related anxiety (OSPRO-YF). Positive changes were reflected in pain interference (DVRPS). Pain did not

interfere with mood or stress (0/10), and was minimal with activity and sleep (2/10). The change in pain interference surpassed the minimally important difference (MID) of 3.0 T-score points for pain samples (PROMIS)®.[26] The patient no longer had cervical ROM limitations. She was able to return to all daily activities pain-free. By the end of care, she returned to the gym and Pilates classes, reporting minimal 2/10 pain. The patient self-reported her condition as very much improved as measured by the PGIC.

Case 3 pain score decreased 3 points from 5/10 to 2/10 which did not interfere with activity by the end of 12 sessions. All pain-specific resilience factors improved as demonstrated by cognitive-affective positivity (PRS) and pain self-efficacy and pain acceptance (OSPRO-YF). Vulnerability factors of fear avoidance, kinesiophobia, pain catastrophizing, and pain-related anxiety improved but did not reach significance (OSPRO-YF). Positive changes were reflected in pain interference with activity (2/10) and sleep, mood, and stress (3/10) (DVRPS). The change in pain interference surpassed the minimally important difference (MID) of 3.0 T-score points for pain samples (PROMIS)®. [26] Lumbar ROM was within normal limits. By the end of care, she was able to return to all daily activities. The patient self-reported her condition as much improved as measured by the PGIC.

Discussion

This case series describes the initial development and use of a new intervention called Pain Resilience Therapy (PRT). All participants reported substantial reductions in pain intensity and improvements in pain-specific resilience post-treatment. There were also significant improvements in pain interference with enhanced social, cognitive, emotional, physical, and recreational activities. Self-perceived health was very much improved.

All three cases also demonstrated improvement in vulnerability factors. Case 1 and Case 2 reached statistically significant improvements in certain vulnerability factors, but Case 3 did not. This may be because PRT does not target vulnerability. It may be that the initial development of PRT focused on psychological flexibility as a resilience factor.[38] Participants may benefit from positive psychology interventions that cultivate optimism, joy, hope, gratitude, or self-compassion.[10] It may be that psychosocial factors such as state and trait anxiety and anger are less impacted by pain resilience-focused approaches. The role of perceived injustice should also be considered as higher levels of injustice are associated with less

optimal pain outcomes.[39] Feelings of injustice and associated anxiety and anger may arise when a patient receives unsatisfactory treatment and/or pain relief. All participants reported challenges negotiating the healthcare system and consulting multiple healthcare providers throughout their pain management journey with unsatisfactory outcomes. The assessment of injustice alongside resilience is warranted. Also, Case 3 was still tapering down from a gabapentinoid, which may have contributed to an increased level of anxiety, a known symptom of dependence and withdrawal that impacts reward centers in the brain.[40] This phenomenon is similar to other drugs (opioids) affecting neuroplasticity and the ability of the nervous system to downregulate.[41] Specific to this case gabapentinoid use is associated with a high risk for adverse events.[40]

Researchers have suggested the valuable contribution of both resilience and vulnerability factors in chronic pain and physical disability, with the additional caveat that resilience factors uniquely impact specific aspects of the pain experience.[42] In a sample of 188 patients with chronic pain and disability both resilience and vulnerability factors impacted pain outcomes, yet the resilience factors uniquely impacted psychosocially focused outcomes – above and beyond vulnerability factors.[42] In a survey of 249 women with chronic pain, those with higher resilience exhibited more participation in moderate-vigorous activity.[43] In a study of 220 adults with chronic pain, pain resilience mediated the relationship between pain intensity and activity patterns.[44] In sixty adults with low back pain, resilience moderated the influence of negative pain beliefs on movement-evoked pain.[45] Resilience-focused treatments also share common elements used in integrative approaches. A recent single-arm trial (n=16) of integrated cognitive behavioral therapy for chronic pain reported significant reductions in pain catastrophizing but not pain intensity.[46] The intervention was not resilience-focused but rather focused on shifting attention, working on memory, and mental practice alongside video feedback.

Pain resilience and pain catastrophizing combine to predict functional outcomes and quality of life.[11] The three participants who received PRT in this case series experienced a significant reduction in pain catastrophizing and pain intensity. Indeed, resilience can act as a protective factor in the face of pain symptomatology, disability, and psychological sequelae.[17] Multisystem resiliency approaches such as PRT have been identified as a predictor of improved physical and psychological functioning.[47] Such an approach may help physical therapists understand how the whole human body, embedded in a context, shapes the

brain and behavior. Broadening the scope of resilience in chronic pain has been recommended by pain researchers and clinicians.[10] Finally, randomized controlled trials suggest that internet-delivered care can be as effective as in-person care in pain management, and in the cases presented in this paper, internet-delivered care was effective in improving patient outcomes in meaningful ways.[48] The use of tele-physical therapy is a valuable intervention that may enhance access to pain management.

The primary limitation of PRT is the need for empirical support (efficacy/effectiveness) for its application. There was no control group, and due to the small sample size and individualized nature of chronic pain, external validity is limited. In addition, case series may be subject to various biases, including selection bias. To gain insight into what leads to resilience, it is important to explore the potential causal factors and mechanisms in further detail. For example, all participants in this study were white, college-educated, and did not report recent exposure to social determinants known to negatively impact pain. Resilience is a multidimensional construct that impacts the brain and behavior differently based on sociodemographics.[49] Future research should consider the combined and independent contributions of pain resilience and vulnerability.[50] This case series provides a structure for generating new knowledge and testing through cohort studies and randomized-controlled trials.

Conclusion

PRT is a novel, resilience-focused approach to pain management. Pain-specific resilience improved in all patients along with reductions in pain intensity. Improvements in pain interference enhanced social, cognitive, emotional, physical, and recreational activities. Participants' self-perceived health was very much improved suggesting PRT's use can advance pain management. Research supporting innovations like PRT is needed to reduce pain and negative sequelae that limit activity and restrict participation.[51] Further operationalization of PRT is required for efficient and effective delivery.

Informed Consent and Ethical Considerations

We invited three patients with chronic pain to participate in the study. We informed each participant of the study's purpose, procedures, potential benefits, and risks. Patients were advised that their participation was voluntary and that they could withdraw at any time without penalty or loss of benefit. The treating physical therapist reviewed each patient's rights to privacy. Patients who chose to participate signed written consent that included permission for publication of identifying material in a case report. Each patient also signed a

HIPAA (Health Insurance, Portability, and Accountability Act) acknowledgment. There were no adverse events reported during the study. Patients did not receive compensation for participation.

Patient Perspective

The PGIC (Table 2) allowed patients to objectively rate their perceived health 90 days post-intervention. Case 1 and 3 rated their overall health as "very much improved and case 3 "much improved. Improvements in PGIC correlate with pain, disability, and quality-of-life measures, and the multifaceted nature of the questions allows patients to contemplate several factors that they may consider important in their clinical situation.[27]

Equity, Diversity, and Inclusion Statement

In the design and execution of this research, we have actively embraced the principles of equity, diversity, and inclusion. The research team was constructed with a commitment to these values, ensuring a range of perspectives by including members from different backgrounds, genders, ethnicities, sexual orientations, and stages of their scientific careers.

We actively worked to mitigate bias in our recruitment and selection processes within the confines of a three-person case series. Our study population was chosen with a deliberate effort to reflect diverse demographics, ensuring that our research is relevant and accessible to a wide spectrum of people living with pain. In our research methodology, we specifically utilized self-report measures that identify various factors of mental distress, an often-overlooked contributor to the pain experience. These measures have been validated across diverse populations to ensure the reliability and validity of our results across different demographics.

The analysis and interpretation of our results were undertaken with a conscious effort to recognize and highlight diversity. We considered how the outcomes might differ by demographic factors and discussed the implications of these differences concerning EDI. In cases where disparities were evident, we engaged in a thorough exploration of potential contributing factors and their broader societal implications.

We believe that incorporating EDI principles into our research enriches the scientific process and enhances the societal impact of our findings. We are committed to continuous learning and improvement in

implementing EDI principles in our work and as we further develop Pain Resilience Therapy and test it in cohort and randomized controlled trails.

Conflict of interests

The authors report no conflicts.

References

1. Smart KM. The biopsychosocial model of pain in physiotherapy: past, present and future. Phys Ther Rev [Internet]. 2023 Mar 4;28(2):61–70. Available from: https://doi.org/10.1080/10833196.2023.2177792

2. Justice C, Sullivan MB, Van Demark CB, Davis CM, Erb M. Guiding Principles for the Practice of Integrative Physical Therapy. Phys Ther [Internet]. 2023 Oct 10 [cited 2023 Dec 1];pzad138. Available from: https://academic.oup.com/ptj/advance-article/doi/10.1093/ptj/pzad138/7304129

3. Holopainen R, Simpson P, Piirainen A, Karppinen J, Schütze R, Smith A, et al. Physiotherapists' perceptions of learning and implementing a biopsychosocial intervention to treat musculoskeletal pain conditions: a systematic review and metasynthesis of qualitative studies. PAIN [Internet]. 2020;161(6). Available from: https://journals.lww.com/pain/Fulltext/2020/06000/Physiotherapists__perceptions_of_learning_and.5.aspx

4. van Dijk H, Köke AJA, Elbers S, Mollema J, Smeets RJEM, Wittink H. Physiotherapists Using the Biopsychosocial Model for Chronic Pain: Barriers and Facilitators—A Scoping Review. Int J Environ Res Public Health. 2023;20(2).

5. Frazier LD. The past, present, and future of the biopsychosocial model: A review of The Biopsychosocial Model of Health and Disease: New philosophical and scientific developments by Derek Bolton and Grant Gillett. New Ideas Psychol [Internet]. 2020 Apr 1;57:100755. Available from: https://www.sciencedirect.com/science/article/pii/S0732118X19301448

6. Williams GC, Frankel RM, Campbell TL, Deci EL. Research on relationship-centered care and healthcare outcomes from the Rochester biopsychosocial program: A self-determination theory integration. Fam Syst Health [Internet]. 2000 [cited 2024 May 31];18(1):79–90. Available from: https://doi.apa.org/doi/10.1037/h0091854

7. van Erp RMA, Huijnen IPJ, Jakobs MLG, Kleijnen J, Smeets RJEM. Effectiveness of Primary Care Interventions Using a Biopsychosocial Approach in Chronic Low Back Pain: A Systematic Review. Pain Pract [Internet]. 2019 Feb 1 [cited 2024 May 31];19(2):224–41. Available from: https://doi.org/10.1111/papr.12735

8. Probst M. Physiotherapy and Mental Health. Rev Colomb Rehabil. 2019 Jun 5;18:208–14.

9. Probst M, Skjaerven LH, editors. Physiotherapy in mental health and psychiatry: a scientific and clinical based approach. Edinburgh: Elsevier; 2018. 338 p. (Physiotherapy essentials).

10. Erb M, Ranjbar N. Integrative Rehabilitation Practice and Mental Health. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon Publishers; 2021. p. 410–24.

11. Heywood SE, Connaughton J, Kinsella R, Black S, Bicchi N, Setchell J. Physical Therapy and Mental Health: Scoping Review. Phys Ther [Internet]. 2022 Aug 4 [cited 2022 Aug 12];pzac102. Available from: https://doi.org/10.1093/ptj/pzac102

12. Brunner E, Dankaerts W, Meichtry A, O'Sullivan K, Probst M. Physical Therapists' Ability to Identify Psychological Factors and Their Self-Reported Competence to Manage Chronic Low Back Pain. Phys Ther. 2018 Jun 1;98(6):471–9.

13. Synnott A, O'Keeffe M, Bunzli S, Dankaerts W, O'Sullivan P, O'Sullivan K. Physiotherapists may stigmatise or feel unprepared to treat people with low back pain and psychosocial factors that influence recovery: a systematic review. J Physiother [Internet]. 2015 Apr 1;61(2):68–76. Available from: http://www.sciencedirect.com/science/article/pii/S183695531500017X

14. Zangoni G, Thomson OP. "I need to do another course" - Italian physiotherapists' knowledge and beliefs when assessing psychosocial factors in patients presenting with chronic low back pain. Musculoskelet Sci Pract. 2017;27:71–7.

15. Reichman M, Bakhshaie J, Grunberg VA, Doorley JD, Vranceanu AM. What Are Orthopaedic Healthcare Professionals' Attitudes Toward Addressing Patient Psychosocial Factors? A Mixed-Methods Investigation. Clin Orthop. 2022 Feb 1;480(2):248–62.

16. Viverito KM, Mittal D, Han X, Messias E, Chekuri L, Sullivan G. Attitudes regarding seeking help for mental health problems and beliefs about treatment effectiveness: A comparison between providers and the general public. Stigma Health. 2018;3(1):35–41.

17. Kirmayer L, Gomez-Carrillo A. Agency, embodiment and enactment in psychosomatic theory and practice. Med Humanit. 2019 Jun 1;45:1–14.

18. Bell IR, Caspi O, Schwartz GER, Grant KL, Gaudet TW, Rychener D, et al. Integrative medicine and systemic outcomes research: issues in the emergence of a new model for primary health care. Arch Intern Med. 2002 Jan 28;162(2):133–40.

19. Gerhardt A, Hartmann M, Schuller-Roma B, Blumenstiel K, Bieber C, Eich W, et al. The prevalence and type of Axis-I and Axis-II mental disorders in subjects with non-specific chronic back pain: results from a population-based study. Pain Med Malden Mass. 2011 Aug;12(8):1231–40.

20. Melloh M, Elfering A, Egli Presland C, Röder C, Hendrick P, Darlow B, et al. Predicting the transition from acute to persistent low back pain. Occup Med Oxf Engl. 2011 Mar;61(2):127–31.

21. Main C, Simon C, Beneciuk J, Greco C, George S, Ballengee L. The Psychologically Informed Practice (PiP) Consultation Roadmap: A Clinical Implementation Strategy. Phys Ther. 2023 May 9;103.

22. University of Rochester. The Biopsychosocial Approach [Internet]. n.d. [cited 2022 Apr 3]. Available from: https://www.urmc.rochester.edu/medialibraries/urmcmedia/education/md/documents/biopsychosocial-model-approach.pdf

23. O'Keeffe M, George SZ, O'Sullivan PB, O'Sullivan K. Psychosocial factors in low back pain: letting go of our misconceptions can help management. Br J Sports Med [Internet]. 2018 Aug 28;(53):793–4. Available from: http://bjsm.bmj.com/content/early/2018/08/28/bjsports-2018-099816.abstract

24. O'Connor DB, Thayer JF, Vedhara K. Stress and Health: A Review of Psychobiological Processes [Internet]. Vol. 72, Annual Review of Psychology. Annual Reviews; 2021. p. 663–88. Available from: https://www.annualreviews.org/content/journals/10.1146/annurev-psych-062520-122331

25. Kautz MM. Applications of psychoneuroimmunology models of toxic stress in prevention and intervention efforts across early development. Brain Behav Immun - Health [Internet]. 2021 Oct 1;16:100322. Available from: https://www.sciencedirect.com/science/article/pii/S2666354621001253

26. Juster RP, Russell JJ, Almeida D, Picard M. Allostatic load and comorbidities: A mitochondrial, epigenetic, and evolutionary perspective. Dev Psychopathol. 2016;28(4pt1):1117–46.

27. Guidi J, Lucente M, Sonino N, Fava GA. Allostatic Load and Its Impact on Health: A Systematic Review. Psychother Psychosom. 2021;90(1):11–27.

28. Shern DL, Blanch AK, Steverman SM. Toxic stress, behavioral health, and the next major era in public health. Am J Orthopsychiatry [Internet]. 2016 [cited 2024 May 23];86(2):109–23. Available from: https://doi.apa.org/doi/10.1037/ort0000120

29. Esch T, Stefano GB. The BERN Framework of Mind-Body Medicine: Integrating Self-Care, Health Promotion, Resilience, and Applied Neuroscience. Front Integr Neurosci [Internet]. 2022;16. Available from: https://www.frontiersin.org/articles/10.3389/fnint.2022.913573

30. Taylor AG, Goehler LE, Galper DI, Innes KE, Bourguignon C. Top-Down and Bottom-Up Mechanisms in Mind-Body Medicine: Development of an Integrative Framework for Psychophysiological Research. Explore N Y N [Internet]. 2010 Jan;6(1):29. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2818254/

31. Kiecolt-Glaser JK, McGuire L, Robles TF, Glaser R. Psychoneuroimmunology: psychological influences on immune function and health. J Consult Clin Psychol. 2002 Jun;70(3):537–47.

32. Cacioppo JT, Tassinary LG, Berntson GG. Handbook of psychophysiology [Internet]. New York, NY: Cambridge University Press; 2017 [cited 2020 May 16]. Available from: https://doi.org/10.1017/9781107415782

33. Fagundes CP, Glaser R, Kiecolt-Glaser JK. Stressful early life experiences and immune dysregulation across the lifespan. Brain Behav Immun [Internet]. 2013 Jan 1;27:8–12. Available from: http://www.sciencedirect.com/science/article/pii/S0889159112001821

34. Felitti VJ. Adverse childhood experiences and adult health. Acad Pediatr. 2009 Jun;9(3):131–2.

35. Eisenberger NI. An empirical review of the neural underpinnings of receiving and giving social support: implications for health. Psychosom Med [Internet]. 2013;75(6):545–56. Available from: https://www.ncbi.nlm.nih.gov/pubmed/23804014

36. Eisenberger NI, Moieni M, Inagaki TK, Muscatell KA, Irwin MR. In Sickness and in Health: The Co-Regulation of Inflammation and Social Behavior. Neuropsychopharmacology [Internet]. 2017 Jan 1;42(1):242–53. Available from: https://doi.org/10.1038/npp.2016.141

37. Vineis P, Robinson O, Chadeau-Hyam M, Dehghan A, Mudway I, Dagnino S. What is new in the exposome? Environ Int [Internet]. 2020 Oct 1;143:105887. Available from: https://www.sciencedirect.com/science/article/pii/S0160412020318420

38. Braveman P, Egerter S, Williams DR. The social determinants of health: coming of age. Annu Rev Public Health [Internet]. 2010/11/26 ed. 2011;32:381–98. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21091195

39. Ward-Caviness CK, Pu S, Martin CL, Galea S, Uddin M, Wildman DE, et al. Epigenetic predictors of all-cause mortality are associated with objective measures of neighborhood disadvantage in an urban population. Clin Epigenetics. 2020 Mar 11;12(1):44.

40. Moraes LJ, Miranda MB, Loures LF, Mainieri AG, Mármora CHC. A systematic review of psychoneuroimmunology-based interventions. Psychol Health Med. 2018;23(6):635–52.

41. Kenney MJ, Ganta CK. Autonomic Nervous System and Immune System Interactions. In: Terjung R, editor. Comprehensive Physiology [Internet]. 1st ed. Wiley; 2014 [cited 2024 May 28]. p. 1177–200. Available from: https://onlinelibrary.wiley.com/doi/10.1002/cphy.c130051

42. Berridge KC. Motivation concepts in behavioral neuroscience. Rev Ingestive Sci [Internet]. 2004 Apr 1;81(2):179–209. Available from: https://www.sciencedirect.com/science/article/pii/S0031938404000435

43. Garland EL, Brintz CE, Hanley AW, Roseen EJ, Atchley RM, Gaylord SA, et al. Mind-Body Therapies for Opioid-Treated Pain: A Systematic Review and Meta-analysis. JAMA Intern Med [Internet]. 2019 Nov 4 [cited 2019 Dec 6]; Available from: https://doi.org/10.1001/jamainternmed.2019.4917

44. Muehsam D, Lutgendorf S, Mills PJ, Rickhi B, Chevalier G, Bat N, et al. The embodied mind: A review on functional genomic and neurological correlates of mind-body therapies. Neurosci Biobehav Rev. 2017;73:165–81.

45. Vancampfort D, Stubbs B, Van Damme T, Smith L, Hallgren M, Schuch F, et al. The efficacy of meditation-based mind-body interventions for mental disorders: A meta-review of 17 meta-analyses of randomized controlled trials. J Psychiatr Res [Internet]. 2021 Feb 1;134:181–91. Available from: https://www.sciencedirect.com/science/article/pii/S0022395620311560

46. Van Dam NT, van Vugt MK, Vago DR, Schmalzl L, Saron CD, Olendzki A, et al. Mind the Hype: A Critical Evaluation and Prescriptive Agenda for Research on Mindfulness and Meditation. Perspect Psychol Sci J Assoc Psychol Sci [Internet]. 2018 Jan;13(1):36–61. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29016274

47. U.S. Department of Health and Human Services. Healthy People 2030, Social Determinants of Health [Internet]. [cited 2024 May 24]. Available from: https://health.gov/healthypeople/priority-areas/social-determinants-health

48. Maric F, Nicholls DA. Environmental physiotherapy and the case for multispecies justice in planetary health. Physiother Theory Pract [Internet]. 2022 Nov 18;38(13):2295–306. Available from: https://doi.org/10.1080/09593985.2021.1964659

49. Osokpo O, Riegel B. Cultural factors influencing self-care by persons with cardiovascular disease: An integrative review. Self-Care Long Term Cond [Internet]. 2021 Apr 1;116:103383. Available from: https://www.sciencedirect.com/science/article/pii/S0020748919301737

50. Dudgeon P, Carlin E, Bray A. Rethinking self-care through an Indigenous lens-the importance of community. BMJ. 2023 Nov 13;383:2494.

51. Wyatt JP, Ampadu GG. Reclaiming Self-care: Self-care as a Social Justice Tool for Black Wellness. Community Ment Health J [Internet]. 2022 Feb 1;58(2):213–21. Available from: https://doi.org/10.1007/s10597-021-00884-9

52. Dineen-Griffin S, Garcia-Cardenas V, Williams K, Benrimoj SI. Helping patients help themselves: A systematic review of self-management support strategies in primary health care practice. PLOS ONE [Internet]. 2019 Aug 1;14(8):e0220116. Available from: https://doi.org/10.1371/journal.pone.0220116

53. Friesen P. Personal responsibility within health policy: unethical and ineffective. J Med Ethics [Internet]. 2018 Jan 1;44(1):53. Available from: http://jme.bmj.com/content/44/1/53.abstract

54. Wikler D. Personal and Social Responsibility for Health. Ethics Int Aff [Internet]. 2002;16(2):47–55. Available from: https://www.cambridge.org/core/article/personal-and-social-responsibility-for-health/257DFEC4C74A4DB3049AD02D1F3A6E75

55. Felitti VJ, Anda RF. The lifelong effects of adverse childhood experiences. In: R Alexander & D Esernio-Jenssen (Ed), Chadwick's Child Maltreatment: Sexual Abuse & Psychological Maltreatment, Encyclopedic. 4th ed. STM Learning, Inc.; 2014.

56. Erb M, Winkle D. Defining the Need. In: In: Erb M, Schmid A A (Eds) Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon, Jessica Kingsley; 2021. p. 57–73.

57. Low M. A novel clinical framework: The use of dispositions in clinical practice. A person centred approach. J Eval Clin Pract. 2017 Oct;23(5):1062–70.

58. Finlayson-Short L, Davey CG, Harrison BJ. Neural correlates of integrated self and social processing. Soc Cogn Affect Neurosci [Internet]. 2020 Nov 5 [cited 2024 May 24];15(9):941–9. Available from: https://doi.org/10.1093/scan/nsaa121

59. Yoon HJ, Seo EH, Kim JJ, Choo IH. Neural Correlates of Self-referential Processing and Their Clinical Implications in Social Anxiety Disorder. Clin Psychopharmacol Neurosci Off Sci J Korean Coll Neuropsychopharmacol. 2019 Feb 28;17(1):12–24.

60. Corrigan F, Fisher J, Nutt D. Autonomic dysregulation and the Window of Tolerance model of the effects of complex emotional trauma. J Psychopharmacol (Oxf) [Internet]. 2010 Jan 21 [cited 2019 Jan 27];25(1):17–25. Available from: https://doi.org/10.1177/0269881109354930

61. Deits-Lebehn C, Smith TW, Williams PG, Uchino BN. Heart rate variability during social interaction: Effects of valence and emotion regulation. Int J Psychophysiol [Internet]. 2023 Aug 1;190:20–9. Available from: https://www.sciencedirect.com/science/article/pii/S0167876023004531

62. Coutinho J, Pereira A, Oliveira-Silva P, Meier D, Lourenço V, Tschacher W. When our hearts beat together: Cardiac synchrony as an entry point to understand dyadic co-regulation in couples. Psychophysiology [Internet]. 2021 Mar 1 [cited 2024 May 21];58(3):e13739. Available from: https://doi.org/10.1111/psyp.13739

63. Hilpert P, Brick TR, Flückiger C, Vowels MJ, Ceulemans E, Kuppens P, et al. What can be learned from couple research: Examining emotional co-regulation processes in face-to-face interactions. J Couns Psychol [Internet]. 2020 Jul [cited 2024 May 24];67(4):475–87. Available from: https://doi.apa.org/doi/10.1037/cou0000416

64. Benson H, Greenwood MM, Klemchuk H. The Relaxation Response: Psychophysiologic Aspects and Clinical Applications. Int J Psychiatry Med [Internet]. 1975 Mar 1 [cited 2019 Jul 7];6(1–2):87–98. Available from: https://doi.org/10.2190/376W-E4MT-QM6Q-H0UM

65. Chawla N, Ostafin B. Experiential avoidance as a functional dimensional approach to psychopathology: An empirical review. J Clin Psychol [Internet]. 2007 Sep 1 [cited 2024 May 24];63(9):871–90. Available from: https://doi.org/10.1002/jclp.20400

66. García-Moya I, Morgan A. The utility of salutogenesis for guiding health promotion: the case for young people's well-being. Health Promot Int [Internet]. 2016 Feb 18 [cited 2019 Sep 5];32(4):723–33. Available from: https://doi.org/10.1093/heapro/daw008

67. Sullivan MB, Erb M, Schmalzl L, Moonaz S, Noggle Taylor J, Porges SW. Yoga Therapy and Polyvagal Theory: The Convergence of Traditional Wisdom and Contemporary Neuroscience for Self-Regulation and Resilience. Front Hum Neurosci. 2018;12:67.

68. Dolezal L, Lyons B. Health-related shame: an affective determinant of health? Med Humanit [Internet]. 2017 Dec 1;43(4):257. Available from: http://mh.bmj.com/content/43/4/257.abstract

69. Mensinger JL, Tylka TL, Calamari ME. Mechanisms underlying weight status and healthcare avoidance in women: A study of weight stigma, body-related shame and guilt, and healthcare stress. Body Image [Internet]. 2018 Jun 1;25:139–47. Available from: https://www.sciencedirect.com/science/article/pii/S1740144517303790

70. Nicholls D, Gibson BE. Physiotherapy otherwise. 2022.

71. DeVoght A, Davenport TE. Upstream Influences. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals Eds Erb, M & Schmid A. Singing Dragon, Jessica Kingsley; 2021. p. 57–73.

72. Davenport TE. Supporting Our Hike Upstream: Special Issue and Recurring Feature on Social Determinants of Health in Physical Therapy. Cardiopulm Phys Ther J. 2020;31(1):2–4.

73. Reeves E. A Synthesis of the Literature on Trauma-Informed Care. Issues Ment Health Nurs [Internet]. 2015 Sep 2;36(9):698–709. Available from: https://doi.org/10.3109/01612840.2015.1025319

74. Ranjbar N, Erb M. Adverse Childhood Experiences and Trauma-Informed Care in Rehabilitation Clinical Practice. Arch Rehabil Res Clin Transl [Internet]. 2019 Mar 21;100003. Available from: http://www.sciencedirect.com/science/article/pii/S2590109519300023

75. Tervalon M, Murray-García J. Cultural Humility Versus Cultural Competence: A Critical Distinction in Defining Physician Training Outcomes in Multicultural Education. J Health Care Poor Underserved [Internet]. 1998 May [cited 2024 Feb 18];9(2):117–25. Available from: https://muse.jhu.edu/article/268076

76. Foronda C, Baptiste DL, Reinholdt MM, Ousman K. Cultural Humility: A Concept Analysis. J Transcult Nurs [Internet]. 2015 Jun 28 [cited 2020 Feb 4];27(3):210–7. Available from: https://doi.org/10.1177/1043659615592677

77. Ranjbar N, Erb M, Mohammad O, Moreno FA. Trauma-Informed Care and Cultural Humility in the Mental Health Care of People From Minoritized Communities. FOCUS [Internet]. 2020 Jan 1 [cited 2020 Jan 26];18(1):8–15. Available from: https://doi.org/10.1176/appi.focus.20190027

78. Hofmann SG, Hayes SC. The Future of Intervention Science: Process-Based Therapy. Clin Psychol Sci [Internet]. 2019 Jan [cited 2024 May 24];7(1):37–50. Available from: http://journals.sagepub.com/doi/10.1177/2167702618772296

79. Peterson SR, Erb M, Davenport TE. From Idea Cults to Clinical Chameleons: Moving Physical Therapists' Professional Identity Beyond Interventions. J Orthop Sports Phys Ther. 2022 Apr;52(4):170–4.

80. Keefe FJ, Main CJ, George SZ. Advancing Psychologically Informed Practice for Patients With Persistent Musculoskeletal Pain: Promise, Pitfalls, and Solutions. Phys Ther. 2018 May 1;98(5):398–407.

81. Erb M, Ranjbar N. Deepening the Narrative. In: Integrative Rehabilitation Practice: The Foundations of Whole-Person Care for Health Professionals. London, United Kingdom: Singing Dragon Publishers; 2021. p. 164–77.

82. Johnstone L, Boyle M. The power threat meaning framework: An alternative nondiagnostic conceptual system. J Humanist Psychol. 2018;0022167818793289.

83. Porges SW. Neuroception: a subconscious system for detecting threats and safety. Zero Three. 2004;24:19–24.

JPTMH Journal of Physiotherapy in Mental Health

Volume 1, Issue 1 (November 2024)

PP: 80-94

ISSN: In process

"I HAVE A BODY NOW" : A BODY IMAGE MULTIMODAL APPROACH TO A PATIENT WHO FACES BODY IMAGE DISTURBANCE- A CASE REPORT

Isis Ferracini Gebara [1]✉, Eliane Florencio Gama[2]

1. Physical Therapist at Isis Gebara Physiotherapy, Ibiúna, São Paulo, Brazil.
2. PhD, Adjunct Professor- Anatomy Descriptive and Topographical, Department of Morphology and Genetics and Post- Graduate Program in Structural and Functional Biology of the Paulista School of Medicine/ Federal University of São Paulo, São Paulo, Brazil.

✉ Corresponding Author: Isis Gebara, Isis Gebara Fisioterapia. Address: Rua Francisco de Barros,346, Ibiúna, São Paulo, Brasil - CEP: 18150-000. Phone: +55 11 963811744. E- mail: isis.gebara@gmail.com.

Accepted: June 4th, 2024

Vol. 1, No. 1 (November 2024) ISSN: In process
Journal of Physiotherapy in Mental Health

CASE REPORT

"I HAVE A BODY NOW" : A BODY IMAGE MULTIMODAL APPROACH TO A PATIENT WHO FACES BODY IMAGE DISTURBANCE- A CASE REPORT

Isis Ferracini Gebara [1]✉, Eliane Florencio Gama[2]

1. Physical Therapist at Isis Gebara Physiotherapy, Ibiúna, São Paulo, Brazil.
2. PhD, Adjunct Professor- Anatomy Descriptive and Topographical, Department of Morphology and Genetics and Post- Graduate Program in Structural and Functional Biology of the Paulista School of Medicine/ Federal University of São Paulo, São Paulo, Brazil.

Abstract: Body image (BI) is the representation of the body in mind. Body image disturbance (BID) is the misperception of body image. The present work is a case report of a physical therapy (PT) treatment elaborated for a woman who was diagnosed with BID. **Objective**: to analyze the effects of physical therapy in BID**. Methods:** Image Marking Procedure Test, Body Perception Index Calculation were used. After anamnesis, three months of PT were taken, where body perception was stimulated, by using proprioception, interoception, exteroception. interoception, exteroception. and instructions of body anatomy. **Results:** The patient was diagnosed with paraschematia and hiposchematia at the beginning of PT. After three months of therapy, her paraschematia was healed but hiposchematia remained. **Conclusion:** PT in BID affected positively body image. Nonetheless, since it is a case report, we cannot generalize the results.

Summary Box

• ***What knowledge does this study add:*** *The present study adds the knowledge of the importance of the presence of a physiotherapist in BID in the bariatric care multidisciplinary team. Furthermore, it also adds the knowledge of physical therapy treatment in BID, regardless of its etiology.*

• ***Why this is important:*** *This research demonstrates the importance of physiotherapy in mental health disorders, such as body image disorders.*

Keywords: body image, physical therapy, body image disturbance, bariatric surgery, eating disorders.

Corresponding Author: Isis Gebara, Isis Gebara Fisioterapia. Address: Rua Francisco de Barros,346, Ibiúna, São Paulo, Brasil - CEP: 18150-000. Phone: +55 11 963811744. E- mail: isis.gebara@gmail.com.

Introduction

Several Physiotherapy specialties are recognized and implemented in multidisciplinary treatment programs, however, when taking into account disorders related to mental health, the role of the physiotherapist may be underestimated. Psychiatric Physiotherapy has been a common practice, for over 50 years, in countries such as Belgium and Scandinavia, however, the use of the body itself (its movements, its relationship with the environment) as a physiotherapeutic strategy in psychopathological conditions is not yet significant.[1]

One of the conditions in which Psychiatric Physiotherapy can be useful is in cases of body image distortions, as this disorder can have negative consequences on movement quality, daily function, habits and health.[2, 3]

Body Image (BI) is the body representation in mind.[4] According to Corno and her colleagues[5] it's the key component of personal identity and self-consciousness. BI is constructed by multiple aspects, which are interdependent, but currently, the definition of BI has expanded, respecting its multidimensional mode. Banfield and Maccabe[4] and Allen and her colleagues[3] have shown in their studies complementary BI definitions, which highlights a new viewing for this theme. There are: functional BI, that relates to the body functionality;[6] cognitive aspect, which relates to beliefs and thought about BI; the affective aspect of body image, that is related of feelings about body; the behavioural component, that is the result of the previous aspects of body image, giving light to how the person behave about their body; the perceptual one, that is linked with the body size estimation.[4] It is important to mention that the perceptual component of body image is unconscious, as its role in guiding the body through space is well known[7]. The conscious assessment of BI can also be called as its attitudinal component.[8,9]

The perceptual aspect of body image is constructed by a series of multisensorial information that is provided by inputs of the nervous system, originated by visual, tactile, vestibular, auditory, and exteroceptive stimuli. It's constructed by the perception of the own person's body and also by the surrounding space, giving the primordial information of body orientation into different environments. It's self-modifying, once there's always new bodily experiences from daily life that must be monitored constantly by the brain.[8,9]

Unconscious and conscious aspects of BI link itselves by an interdependent network from a complex neuro anatomical pathway. The perceptual construction is located into supramarginal and angular gyri of inferior parietal lobe and it's correlated with motor areas of the brain, while the conscious aspect of BI is connected to the limbic system.[9]

According to Hosseini and Padhy,[8] body image disturbance (BID) is the misperception of body image and it can be entailed by family bad behavior and comments about body, social-media unattainable beauty standard, low self-esteem, media, social pressures, body mass index and other factors, such as sexual abuse. Depending on self-conceptions in front of these scenarios, the subject can develop BID, which, in turn, can trigger body dissatisfaction.

Besides most of the studies on BID are related to eating disorders patients, it seems to be common to find body image disturbance and dissatisfaction among postoperative bariatric surgery patients, since they experience rapid body shape change in a short period of time, which may compromise the patient's body perception[10,11]. Alegría and Larsen observed in their qualitative study that, in post weight loss surgery conditions, participants presented confusing references about their recent body.[12] A particular patient, in the same study reported that she knew she was thinner, but she still perceived her body as a fat one. Based on these data, the authors suggest the necessity to inform health professionals, who manage this kind of patients, about possible body image disturbance in post bariatric surgery. So that they can be prepared to explain this possible condition and elaborate therapeutic strategies to help them.

The Basic Body Awareness Therapy, the Norwegian Psychomotor physiotherapy, the "tailored physiotherapy programme" are described in the literature as body therapeutic strategies for various mental disorders and also used specifically for the distortion of body image in cases of patients with eating disorders.[13-15] When it comes to obese patients, the body strategies most cited in the literature are dance therapy to improve body image and physiotherapy to help with weight loss. [16,17] As far as we know, there is no description in the literature of a physiotherapeutic approach focusing on Body Image for patients undergoing bariatric surgery, although Souza et al.[11], in their recent article on body image changes in post-bariatric patients, suggest the need for a perceptual body approach for these patients.

The aim of the present work is to report a physical therapy strategy in body image disturbance of a post bariatric, young woman.

Case Presentation

A 27 years old brazilian woman, came to physical therapy with the complaint that she doesn't know her body dimensions. She passed through bariatric surgery and hasn't had any skin repair surgery. Using the IMP test and BPI, she was diagnosed as paraschematia with a hyposchematia, because her body segments had presented disoriented and she underestimated her body dimensions. The physical therapy was performed once a week, by face to face mode, in the physiotherapist's office, located in the city of Ibiúna, SP.

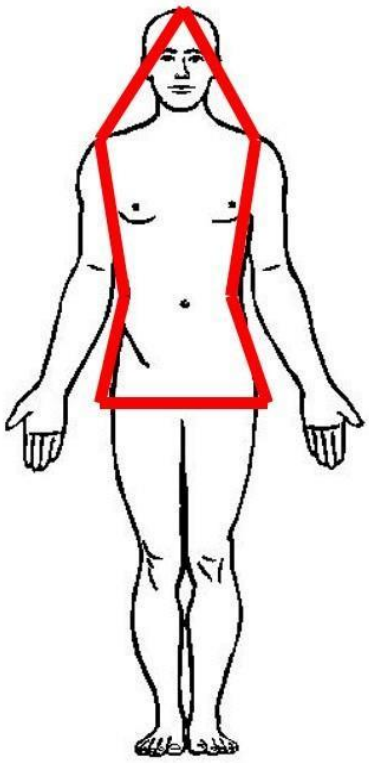
Diagnostic Evaluation

The beginning and the completion of treatment were performed by the Image Marking Procedure (IMP) test.[18- 20] IMP test is widely used to assess body size estimation.[21-27]

The Image Marking Procedure is a projective test and the subjects are asked to imagine themselves as they were standing before a mirror. The test consists in the patient staying at a distance from their outstretched arms in front of a wall, blindfolded, and they are asked to point in the wall where their body parts are found under touching at the same point in their body by the examiner. The body parts that are pointed compose the body silhouette and are top of the head, both acromion, waist - just below the last rib, and trochanters (figure 1). The test is repeated three times, for more accurate results. After the wall marking, the patient is carefully positioned as close as possible to the wall, where the real body dimensions are compared with a square.[18-20] The used tools for this test were: 30 mm yellow, green, blue and red chroma labels; eyes suits; square.

From IMP, the Body Perception Index (BPI) was calculated, aiming to diagnose the patient's body image. According to the formula: BPI [(Perceived size 1 + Perceived size 2 + Perceived size 3)/3]/Real size X 100. A total BPI value for the whole body is also calculated (mean value of the BPI values at the different body regions).[28] Following Bonnier's nomination of BI distortions, the results from BPI can be called schematia- when there's no distortion of BI; aschematia- when there's a lack of perception of the body, being called as

Figure 1: Schematic view of Image Marking Procedure and its body segments correlation.



a anaesthesia of the body sensation and topography; hyposchematia- when there's an underestimation of the body size; hyperschematia- when there's an overestimation of body size, and paraschematia- the disorientation of body segments.[29] Body Perception Index ≥ 99,4% and ≤ 112,3% is considered to have adequate body perception, as schematia; Body Perception Index below 99,4% was classified as hyposchematia, and above 112,3% as hyperschematia according classification proposed by Segheto and his colleagues.[30] The table 1 shows a schema of the body image diagnoses.

Table 1: Scheme of the body image diagnoses

Body Perception Index	Results of BPI – Body Image Classification
≥ 99,4% and ≤ 112,3%	Schematia
Above 112,3%	Hyperschematia
Below 99,4	Hyposchematia

Therapeutic Intervention

The used tools were: a ball of 25 cm of diameter; twine; mat for covering the floor; dyna-disk. The exercises varied between perceptual stimulation exercises and strength exercises with free resistance.

In the final of every exercise, the patient was invited to make a body scanner[31] exercise, which consists of supine position, closed eyes, deep breathing and attention to the stimulated body parts and bodily sensations.

The first meeting was destined for anamnesis. Perceptual BID was diagnosed by IMP test. The second meeting started by a touch exercise that was made by passing a ball through the patient's body delimitations. She was lying on a mat covered floor, in the supine position, with closed eyes. After this, the patient kept her eyes closed and was asked to roll on the floor, from left to right and from right to left, with outstretched arms and shoulders, aiming to perceive her body dimensions.

The third session was oriented to give her perceptual information of the patient's inferior members. First, in supine position, the physiotherapist used different textures tools, such as dyna-disc, leading the patient to take attention to her legs. Following that, measuring exercise was used, which consists of the physiotherapists asking the patient to draw the perceived circumference of a specific part of her body with a twine, starting with her thighs. After the first drawing, the real measurement was made by the physical therapist, and both were compared. The same exercise was used in other body parts, such as the waist, chest and arms.

The fourth session was oriented for the patient to perceive her body in a functional way. Strength exercises were used, by using strength added to the attention to the stimulated muscles before, during and after the exercise, using the scanner exercise.[31] It was used for abdomen, abdominal plank and abdominal crunch exercise; for legs, squat exercise and for arms, push up exercise.

At the fifth meeting, sensorial exercise was made, which was developed by the patient standing against the wall, holding a ball by her waist and spinning her body in 360º without letting the ball fall. Another exercise was made, consisting of the patient lying on the floor in the supine position with closed eyes, while the PT passed the ball to the waist region.

Subsequently, the physiotherapy on the same session was conducted by strength exercise, such as abdominal ones. Touch exercises in the abdomen area were performed, by using a ball passing through her waist, side to side, making a circumference, with the aim of accurating her waistline afference.

The ensuing sessions maintained the same pattern as the previous ones, aiming to maintain the progress of BI rehabilitation. Table 2 shows a summary of the sessions.

Table 2: Summary of the sessions

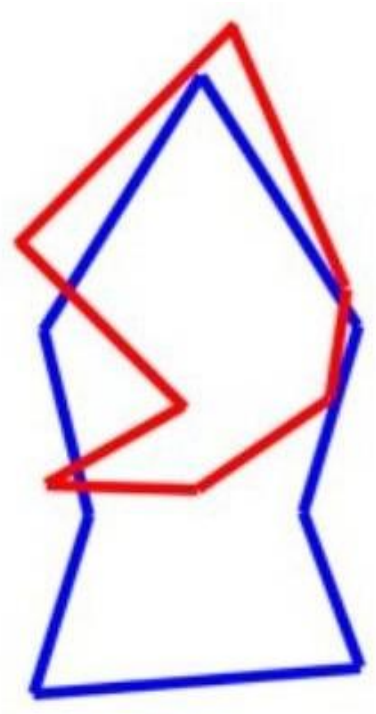
First meeting	IMP Test.
Second meeting	Passing a ball through the patient's body delimitations; roll on the floor; body scanner exercise.
Third meeting	Using different texture tools to take attemption to the patient's legs; measuring exercise for the legs and other body areas with a twine; body scanner exercise.
Fourth meeting	Stretching exercises for abdomen and legs; body scanner exercise.
Fifth meeting	Spinning a ball against the wall; lying on the floor in supine position while the PT passed the ball to the waist region; abdominal exercise; making a circumference with a ball on the patient's waist, while she's lying on the floor; body scanner exercise.
Ensuring sessions	Same as the previous ones.

Results

By IMP test, paraschematia with hyposchematia (total BPI=74,4%) was diagnosed at the first meeting (figure 2). The perception of a healthier BI was created session by session. With each new session, the patient came referring to advances and difficulties in daily life that guided the direction of treatment along with the

physiotherapist's plan. By observing the difference in what was perceived in the BID and recognizing that the body was no longer part of it, the patient began to understand her real body. Some sessions were more remarkable than others, from the point of view of triggering a new body concept. Second and fifth meetings were this case.

Figure 2: Result of the drawings acquired through the IMP first patient´s test. The red drawing represents the perceived body dimension and the blue drawing represents the real dimension of the body. Observe that low body segments are perceived in a confused way.

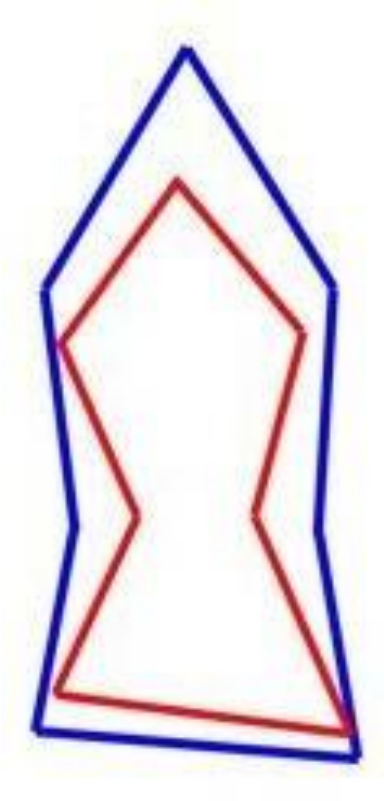


At the second meeting, the patient started to note she had a different body than she thought. On the occasion, she reported to perceive her body thinner than she thought it was, once she was still perceiving her body just like before the bariatric surgery. It was triggered by the perception of the frontal bulge of the 9 and 10 vertebrochondral ribs.

At the fifth session, the patient reported she couldn't make a whole clay body, since she didn't have any precise sense of her waist and abdomen. This was clear from the clay body, divided in superior and inferior quadrants. Then, the PT oriented the therapy to the patient to perceive the waist region and to understand the quadrants' communication by that.

After three months, IMP test and BPI were remade. Paraschematia were healed, but hyposchematia (BPI=79,1%) were kept. The aim of the present treatment was to make the patient perceive her body segments, in a real way, which was achieved, even though she still underestimated her body dimensions. The result of the IMP test can be checked in the figure 3.

Figure 3: Result of the drawings acquired through the IMP last patient´s test. The red drawing represents the perceived body dimension and the blue drawing represents the real dimension of the body. Observe that body segments are well perceived, although its dimensions are underestimated.



Discussion

A three-month treatment for BID followed, with the aim of returning the precision of body perception to a woman who had parachematia and hyposchematia. We analyzed the BI using the IMP test. As her diagnosis showed BID in different ways, it was worth working in an integrated way, using strength and sensory exercises, thus bringing schematic reorganization through different afferent stimuli.

This treatment was developed by three main components: proprioception, exteroception and interoception, guided by attention to each stimulus[31, 32] introducing to the patient ways of experiencing her body in order to perceive its limits, size and dimensions. The scanner exercise [31] was an attempt to guide this, as it was a voluntary way of paying attention to this perception, thus making the perception of the body closer to reality.

The three previously mentioned components were explored through tactile, visual afferent pathways and also through muscular action, explored, respectively, in the second, third, fourth and fifth meeting. Although all meetings explored tactile afferent pathways, it is important to highlight that proprioception originated from muscular activity was also present, as well as sensory reorganization through visual comparison between perceived and real size, presented in the third meeting.

Although the underestimation of her body remained, the imprecision of the perception of her body segments was reestablished. In the literature, no similar physiotherapeutic treatment was found that specifically worked on paraschematia, through the BI approach, although ways of diagnosing it were found.[33]

The literature establishes that body image disorders can accompany different psychiatric situations, such as epilepsy,[33] and eating disorders, as well as obesity and anorexia nervosa.[8] However, emerging knowledge also points to the growth of IHD in women who are exposed to media,[34] in addition to people who have undergone bariatric surgery.[11]

Therefore, the need for a real and healthy reconnection with one's own body is present in several clinical situations. Physiotherapy can be a non-drug treatment alternative for mental disorders that present symptoms such as BID.

Given the results of this study, it opens up a reflection to consider physiotherapeutic treatment for people who undergo bariatric surgery, as part of their rehabilitation process.

Informed Consent and ethical considerations

The present case report was conducted in accordance with ethical standards and the CARE guidelines for case reports. The patient provided written informed consent for the publication of their medical information and any accompanying images.

Equity, Diversity and Inclusion Statement

The authors are committed to promoting equity, diversity, and inclusion throughout the entire clinical intervention process. These principles were applied at every stage of care, from assessment and treatment planning to follow-up.

Patient Perspective

At the end of the study, the patient reported an improvement in her daily quality of life and started to do physical activity, aiming to keep creating body experiences. She said she recognized herself, and highlighted the fact that she had a body, which was reported by her own words: "I have a body now".

Conclusions

The present study reinforces that physiotherapy can be efficient in the treatment of mental health, particularly it can help patients who face body image disorders. However, the results cannot be expanded to the general population, as the sample in this study is small.

Conflicts of Interest

The authors declare that there's no conflict of interest.

References

1. ROBST, Michel. Physiotherapy and mental health. Clinical physical therapy, v. 230, p. 59-68, 2017.

2. Mehling W, Wrubel J, Daubenmier J, Price C, Kerr C, Silow T, Gopisetty V, Stewart, A. Body Awareness: a phenomenological inquiry into the common ground of mind-body therapies. Philos Ethics Humanit Med. 2011; 6:6. doi: 10.1186/1747-5341-6-6

3. LONGO, Matthew R. Distortion of mental body representations. Trends in Cognitive Sciences, v. 26, n. 3, p. 241-254, 2022.

4. Banfield SS, McCabe MP. An evaluation of the construct of body image. Adolescence. 2002 Summer;37(146):373-93. PMID: 12144166.

5. Corno G, Serino S, Cipresso P, Baños RM, Riva G. Assessing the Relationship Between Attitudinal and Perceptual Component of Body Image Disturbance Using Virtual Reality. Cyberpsychol Behav Soc Netw. 2018 Nov;21(11):679-686. doi: 10.1089/cyber.2018.0340. PMID: 30421995.

6. Allen CP, Telford RM, Telford RD, Olive LS. Sport, physical activity and physical education experiences: Associations with functional body image in children. Psychology of Sport and Exercise. 2019 Nov;45:1-7. 101572. doi: 10.1016/j.psychsport.2019.101572

7. Medina J, Coslett HB. From maps to form to space: touch and the body schema. Neuropsychologia. 2010 Feb;48(3):645-54. doi: 10.1016/j.neuropsychologia.2009.08.017. Epub 2009 Aug 20. PMID: 19699214; PMCID: PMC2813960.

8. Hosseini SA, Padhy RK. Body Image Distortion. 2023 Feb 12. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 31536191.

9. Thurm BE, Pereira ES, Fonseca CC, Cagno MJS, Gama EF. Neuroanatomical aspects of the body awareness. Journal of Morphological Sciences: Functional Anatomy and Cell Biology. 2011;28(4):296-299.

10. Perdue TO, Schreier A, Neil J, Carels R, Swanson M. A Concept Analysis of Disturbed Body Image in Bariatric Surgery Patients. International Journal of Nursing Knowledge.2020;31(1):74-81.https://doi.org/10.1111/2047-3095.12220

11. Souza, A. L. L., de Souza, P. M., Mota, B. E. F., Xavier, C. L. F., Santiago, F. G., Oliveira, J. S., Borges, S. A., Bearzoti, E., Gama, E. F., & Souza, G. G. L. (2023). Ghost Fat: Altered Female Body Perception After Bariatric Surgery. Perceptual and Motor Skills, 130(1), 301–316. https://doi.org/10.1177/00315125221133868

12. Alegría, Christine Aramburu PhD, APRN, FNP-BC1,a; Larsen, Barbara MA2,b. "That's who I am: A fat person in a thin body": Weight loss, negative self-evaluation, and mitigating strategies following weight loss surgery. Journal of the American Association of Nurse Practitioners 27(3):p 137-144, March 2015. | DOI: 10.1002/2327-6924.12158

13. Catalan-Matamoros D, Helvik-Skjaerven L, Labajos-Manzanares MT, Martínez-de- Salazar-Arboleas A, Sánchez-Guerrero E. A pilot study on the effect of Basic Body Awareness Therapy in

patients with eating disorders: a randomized controlled trial. Clin Rehabil. 2011 Jul;25(7):617-26. doi: 10.1177/0269215510394223. Epub 2011 Mar 14. PMID: 21402650.

14. WALLIN, Ulf; KRONOVALL, Per; MAJEWSKI, Marie-Louise. Body awareness therapy in teenage anorexia nervosa: outcome after 2 years. European Eating Disorders Review: The Professional Journal of the Eating Disorders Association, v. 8, n. 1, p. 19-30, 2000.

15. Albertsen MN, Natvik E, Råheim M. Patients' experiences from basic body awareness therapy in the treatment of binge eating disorder -movement toward health: a phenomenological study. J Eat Disord. 2019 Oct 21;7:36. doi: 10.1186/s40337-019-0264-0. PMID: 31641506; PMCID: PMC6802330.

16. Muller-Pinget S, Carrard I, Ybarra J, Golay A. Dance therapy improves self-body image among obese patients. Patient Educ Couns. 2012 Dec;89(3):525-8. doi: 10.1016/j.pec.2012.07.008. Epub 2012 Sep 30. PMID: 23031613.

17. Haire-Joshu D, Hill-Briggs F. Treating Obesity—Moving From Recommendation to Implementation. JAMA Intern Med. 2018;178(11):1447–1449. doi:10.1001/jamainternmed.2018.5259

18. Muller-Pinget S, Carrard I, Ybarra J, Golay A. Dance therapy improves self-body image among obese patients. Patient Educ Couns. 2012 Dec;89(3):525-8. doi: 10.1016/j.pec.2012.07.008. Epub 2012 Sep 30. PMID: 23031613.

19. Thurm BE. Perfil da percepção corporal e a insatisfação corporal em mulheres com transtornos alimentares: uma proposta de intervenção corporal. São Paulo: São Judas University;2012. Doctorate Degree.

20. Finn Askevold; Measuring Body Image: Preliminary Report on a New Method. Psychother Psychosom 1 February 1975; 26 (2): 71–77. https://doi.org/10.1159/000286913

21. Thurm BE, Miranda ML de J, Salzano FT, Cangelli Filho R, Cordás TA, Gama EF. Revisão dos métodos empregados na avaliação da dimensão corporal em pacientes com transtornos alimentares. J Bras Psiquiatr 2011;60:331–6. https://doi.org/10.1590/S0047-20852011000400015.

22. RICA, Roberta L. et al. Body-image and-size perception after a single session of HIIT body work in healthy adult men. Motricidade, v. 14, n. 4, p. 66-73, 2018.
23. Formaggio, E., Bertuccelli, M., Rubega, M., Di Marco, R., Cantele, F., Gottardello, F., ... & Masiero, S. (2022). Brain oscillatory activity in adolescent idiopathic scoliosis. Scientific Reports, 12(1), 1726

24. THULO, Lesawana Eliza. An investigation of the relationship between body image and westernisation: a comparison of black rural and urban women. 2017. Tese de Doutorado.

25. PICADO, S.; ALMEIDA, G.; PEREIRA, C. Perception of Body Image and Body Scheme in post-Stroke patient. European Journal of Public Health, v. 29, n. Supplement_1, p. ckz034. 047, 2019.

26. Pivotto, L. R., Schmit, E. F., Candotti, C. T., Rodrigues, A. P., Neto, E. S., Souza, C., & Loss, J. F. (2022). Effect of 30 pilates sessions on body posture, perception and dynamic balance in healthy women. Brazilian Journal of Motor Behavior, 16(1), 36-46.

27. Schmit, E. F. D., Rodrigues, A. P., Souza, C., Candotti, C. T., & Loss, J. F. (2017). Repeatability and intra-rater reproducibility of a digitalized test of body image perception. Revista Brasileira de Cineantropometria & Desempenho Humano, 19(2), 214-223.

28. Slade PD, Russell GFM. Awareness of body dimensions in anorexia nervosa: cross- sectional and longitudinal studies. Psychological Medicine. Cambridge University Press; 1973;3(2): 188–199. DOI:10.1017/S0033291700048510

29. Vallar G, Rode G. Commentary on Bonnier P. L'aschématie. Rev Neurol (Paris) 1905; 13: 605–9. Epilepsy & Behavior. 2009;16(3):397-400. https://doi.org/10.1016/j.yebeh.2009.09.001.

30. Segheto W, Segheto KJ, Gama EF, Silva CB. Esquema corporal e nível de atividade física em adultos jovens universitários. Revista Brasileira de Ciência & Movimento. 2011;19(3):29-36. https://doi.org/10.18511/rbcm.v19i3.2828

31. Marchesini, Simone. (2022). Intervenção baseada em atenção plena e imagem corporal em pacientes submetidos à cirurgia bariátrica. Revista Científica Multidisciplinar Núcleo do Conhecimento. 17-39. 10.32749/nucleodoconhecimento.com.br/psicologia/pacientes.

32. Hölzel BK, Lazar SW, Gard T, Schuman-Olivier Z, Vago DR, Ott U. How Does Mindfulness Meditation Work? Proposing Mechanisms of Action From a Conceptual and Neural Perspective. Perspect Psychol Sci. 2011 Nov;6(6):537-59. doi: 10.1177/1745691611419671. PMID: 26168376.

33. Mehta UM, Thippeswamy H, Bharath RD, Satishcandra P. Paraşemazinin Fenomenolojik ve Tanısal Kapsamı: Bir Olgu Sunumu [Phenomenological and Diagnostic Implications of Paraschemazia: A Case Report]. Turk Psikiyatri Derg. 2015 Summer;26(2):138-41. Turkish. PMID: 26111290.

34. TREMBLAY, Simon C.; ESSAFI TREMBLAY, Safae; POIRIER, Pierre. From filters to fillers: an active inference approach to body image distortion in the selfie era. AI & society, v. 36, p. 33-48, 2021.

Allied Institutions

ENalMH
EUROPEAN NETWORK OF
ACTIVE LIVING FOR MENTAL HEALTH

ASOCIACIÓN DE FISIOTERAPEUTAS EN SALUD MENTAL GUATEMALA

INSTITUTO NACIONAL DE
NEUROLOGÍA Y NEUROCIRUGÍA
MANUEL VELASCO SUÁREZ

FEMEFI A.C.
Federación Mexicana de
Fisioterapia, Terapia Física,
kinesiología y Rehabilitación

Universidad
del Gran Rosario

ESS+
Escola Superior de Saúde Norte
CRUZ VERMELHA PORTUGUESA

Western Norway
University of
Applied Sciences

ECR
ESCUELA COLOMBIANA DE REHABILITACIÓN

Facultad de Medicina
UNAM

UNIFESP
UNIVERSIDADE FEDERAL DE SÃO PAULO
1933

Sponsors

DIPLOMADO

FISIOTERAPIA EN

SALUD MENTAL

FISIOTERAPIA

EN SALUD

MENTAL

Salud en Movimiento

Journal of Physiotherapy in MENTAL HEALTH

November 2024