



The Philippine Journal of Physical Therapy
Official Journal of the Philippine Physical Therapy Association

VOLUME 3, ISSUE 2

August 2024



Current Practices of Physiotherapists in Implementing Psychologically Informed Physical Therapy in Chronic Pain Management: A Scoping Review

Eunice J. Garces ^{ID}*¹, John Marco L. Recio ^{ID}¹, Viviana Patricia D. Rios ^{ID}¹, Janine Patricia Sadiz ^{ID}¹, Anna Barbara N. Sanchez ^{ID}¹

¹ Far Eastern University – Dr. Nicanor Reyes Medical Foundation, Quezon City, Philippines

*Address all correspondence to Eunice J. Garces at: eunicegarces3@gmail.com

To cite this article: Garces, E.J., Recio, J.M.L., Rios, V.P.D., Sadiz, J.P., and Sanchez, A.B.N. (2024). Current Practices of Physiotherapists in Implementing Psychologically Informed Physical Therapy in Chronic Pain Management: A Scoping Review. *Philippine Journal of Physical Therapy*, 3(2), 26-73. <https://doi.org/10.46409/002.TROH9528>



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Abstract

Introduction. This study is a scoping review of the current practices in implementing Psychologically Informed Physical Therapy (PIPT) in chronic pain management. A fundamental shift of physiotherapy practice from the traditional approach of biomedical to a biopsychosocial approach has acquired recognition indicating a more comprehensive approach to addressing the complexity of the physiotherapy profession. Thus, the primary objective of this scoping review is to identify and map current data on physiotherapists' current practices in implementing PIPT in chronic pain management, and its secondary objective is to map the evidence and describe the effectiveness/efficacy, clinical utility, cost-effectiveness, and barriers of PIPT as a physiotherapy intervention.

Methods. In accordance with the set of Selection Criteria, a scoping review was undertaken to search for papers in seven databases: (1) PubMed/MEDLINE, (2) PEDro, (3) ClinicalKey, (4) Cochrane, (5) ProQuest, (6) Philippine Journal of Physical Therapy, and (7) HERDIN. A triangulation method to the search was conducted and applied for title screening, abstract screening, and full-text review to validate the articles retrieved in the databases. Thematic analysis was used to gather information and identify all themes related to PIPT as a physiotherapy intervention to make sense of the retrieved data. In addition, results were presented using descriptive synthesis to give various information and diverse integrated evidence.

Results and Discussion. Thirty-eight (38) studies out of 78,860 fulfilled the inclusion and exclusion criteria and passed the abstract and title review. After satisfying the inclusion criteria and conducting a full-text review, 15 of these articles were discarded, leaving a total of 23 studies. The data extracted from the recent studies highlight a few key findings: (1) Cognitive-behavioral therapy (CBT) is more commonly used and applied to a wide variety of situations than the other PIPT interventions identified; (2) there appears to be a difference in perceived effectiveness/efficacy between PIPT interventions and conventional PT approaches; (3) despite their apparent usability and viability, internet-based psychological programs used in conjunction with physical therapy do not show to improve outcomes beyond physical therapy alone; (4) the cost-effectiveness of PIPT interventions has not received much attention; (5) a variety of implementation obstacles have been explored; and, (6) PIPT publications are far more common in North America, particularly in the United States.

Discussion. Depending on the type of intervention utilized, current approaches for implementing PIPT may be more successful than conventional physical therapy in lowering or eradicating chronic pain. When PIPT is used in an outpatient context, it improves chronic pain management more than when it is used in an internet-based setting. Moreover, while PIPT remains a promising treatment model, more evidence is needed to justify its widespread adoption, especially given the high demand for training and barriers to implementing it.

Keywords: scientometric analysis, physical therapy, Philippines

Received: June 09, 2023. **Revised:** January 11, 2024. **Accepted:** April 24, 2024

Published by **University of St. Augustine for Health Sciences** on behalf of the **Philippine Physical Therapy Association**. ISSN: 2766-3086

Introduction

Chronic pain is defined as pain that lasts longer than the normal healing time, often persisting or recurring for more than three months (Schug et al., 2019). It has emerged as a global public health issue having estimates of 20% prevalence in European countries and 18% in developing countries (Villa et al., 2022). In the Philippine setting, about 10.4% prevalence of the total Filipino adult population has moderate to severe chronic pain with an annual incidence of 3.4% (Lu et al., 2011). The International Association for the Study of Pain (IASP) further classified this type of pain into two categories: chronic primary pain syndromes, in which debilitating pain can be considered a disease in and of itself, and chronic secondary pain syndromes, in which pain manifests as a symptom of another disease (Treede et al., 2019). In the absence of a more comprehensive strategy focusing on the pain itself, healthcare systems have only implemented clinical remedies for the underlying causes of chronic secondary pain syndromes. And since determining the root cause of pain is difficult, it has resulted in a landslide of serious global burdens (Mills et al., 2019) and a high prevalence of concern in both developed and developing countries (Sá et al., 2019) as it is associated with significant impacts on daily activities and quality of life (Kawai et al., 2017), productivity losses due to work absences (Adams & Salomons, 2021), drug dependence (Tetsunaga et al., 2018), a high likelihood of disability (Fujiwara et al., 2021), and staggering management costs (Smith & Hillner, 2019). As a result, multidisciplinary pain treatment programs that are both therapeutic and economical have been developed using a biopsychosocial model, a heuristic viewpoint that takes into account the physical, mental, and social environment that is fundamental to the individual. To date, chronic pain remains a prevalent condition, and clinicians concluded that an optimum treatment strategy is a biopsychosocial approach (Driscoll et al., 2021).

The complex occurrence of chronic pain is impacted by biological, psychological, and social factors. This is supported by the latest IASP definition of pain, which emphasizes the role that these components play in a person's pain experience and highlights the importance of a biopsychosocial approach. By considering each of these factors in an extensive therapeutic approach, it was suggested that healthcare professionals may provide effective and personalized care. In various research, it has been stressed how important the biopsychosocial approach is for the management of chronic pain. Hulla et al. (2019) recommend using a biopsychosocial model executed through an interdisciplinary treatment program, such as functional restoration, to treat patients with chronic pain. This approach differs from traditional biomedical treatments that only address the biological component of chronic pain with opioids and surgery. The effectiveness of this approach was credited to its comprehensiveness and emphasis on treating biological, psychological, and social factors, according to the authors.

Furthermore, a multimodal treatment strategy combining rehabilitation and maladaptive cognitions, emotions, or behavior seems to be more advantageous than conventional physical therapy alone (Monticone et al., 2017).

In addition to the advantages of a multidisciplinary approach, studies have demonstrated the importance of psychosocial factors in the treatment of chronic pain. Meints et al. (2018) argue that chronic pain is characterized by an interconnected set of biopsychosocial processes that have a wide range of psychosocial and functional implications across several domains of functioning, including cognition, emotion, and behavior, rather than merely secondary reactions to pain. Furthermore, Woods et al. (2019) emphasized the importance of family relationships in the experience of chronic pain, discovering that family strain is an important component of the chronic stress profile associated with chronic pain etiology, whereas family support is associated with a lower risk of acute pain transitioning to chronic pain over time. This suggests that focusing family ties in pain treatment techniques may be a suitable, innovative way to reduce pain onset and escalation and that healthcare systems training is necessary. The management of chronic pain must take psychological elements into consideration as well. A study by Hughes et al. (2017) discovered that acceptance-based psychological interventions successfully decreased pain interference and enhanced mental health outcomes in individuals with chronic pain. Similarly, since chronic pain is a common and persistent problem in childhood and adolescence, rehabilitation for pediatric chronic pain is typically based on learning theory and the biopsychosocial model of pain, which includes encouraging regular exercise, facilitating repeated exposure to movement in the presence of pain, and educating families about common misconceptions about anatomy, physiology, pain, exercise, and activity (Harrison et al., 2019).

Physical therapy education has traditionally focused on the biomedical model of health and illness; however, it is now widely recognized that the biopsychosocial model of health care delivery is more comprehensive and viable for addressing the multidimensional aspects of complex physical therapy and rehabilitation conditions. Main and George (2011) introduced psychologically informed physical therapy (PIPT), a subset of psychologically informed practice (PiP). PiP is a novel approach that combines physical, behavioral, and psychological interventions to reduce pain-related disability. PIPT, on the other hand, is a multimodal pain rehabilitation technique that combines traditional physiotherapy treatments (e.g., spinal manipulation or exercise) with cognitive-behavioral therapies (CBT) (e.g., pain management skills or progressive relaxation) (Ballengee et al., 2021). This integrated approach to pain treatment by a physiotherapist differs significantly from how therapy is typically delivered because it incorporates important therapeutic components known as the 5 R's: Realization, Relief, Regulation, Re-activation, and Reinforcement derived from conceptual models (e.g., Fear Avoidance Model, ACT "Hexaflex", and

cognitive-behavioral model) to be used and applied in pain clinics and rehabilitation settings (Keefe et al., 2018). Currently, the expanding body of research demonstrating the implementation of PIPT approaches for pain-related conditions is driving a surge of interest in its use. Though the benefits are promising, there are studies that also claim that PIPT has little to no effect at all, emphasizing that adding psychologically informed therapies to exercise programs is not particularly beneficial due to a lack of evidence in reducing pain intensity and that offering an internet-based CBT (iCBT) program in addition to physical treatment had no significant advantages (Petrozz et al., 2021). More supporting evidence is required before PIPT may be widely implemented. As to the researchers, the most significant drawback was the inaccessibility of the resources investigated (Cheng & Cheng, 2019) and the risk of bias owing to the small sample size (Terpstra et al., 2021). Therapeutic integration among physiotherapists is hampered by their lack of knowledge, skill, and confidence in the use of psychological techniques such as CBT (Young et al., 2019). For the time being, there appears to be a sliver of data supporting the benefits of combining physiotherapy with psychological strategies in the treatment of patients.

Although biopsychological approaches for patients with chronic secondary pain syndromes have been progressively investigated, the extent to which PIPT has been integrated into the clinical management of chronic pain is limited. Exploring the topic's scope and determining its boundaries, parameters, and gaps would aid in establishing PIPT's transformational value. Thus, the primary objective of this scoping review is to identify and map current data on physiotherapists' current practices in implementing PIPT in chronic pain management. The secondary objective is to map the evidence and describe the effectiveness/efficacy, clinical utility, cost-effectiveness, and barriers of PIPT as a physiotherapy intervention.

Methods

Research Design

The established methodology was used to conduct a scoping review, which included determining the topic and objective, developing a protocol, applying the PCC framework to concepts, conducting preliminary searches, screening of results, data extraction/charting of data, and manuscript writing, revision, and submission (Peters et al., 2021) (Figure 1). All relevant research that satisfied the inclusion/exclusion criteria was included.

Identification and Selection of Studies

An electronic and manual search of the English language literature was performed. Relevant full-text peer-reviewed articles were identified in a search of the following databases: (1) PubMed/MEDLINE, (2) PEDro, (3) ClinicalKey, (4) Cochrane, (5) Proquest, (6) Philippine Journal of Physical Therapy, and (7) HERDIN. From May until June 2022, the following combinations

of keywords were used to search: psychologically informed physical therapy, psychologically informed physiotherapy, psychologically informed practice, biopsychosocial model, CBT, physiotherapy, physiotherapist, physical therapy, physical therapist, chronic pain, pain, management, rehabilitation, rehab, treatment, and intervention. These keywords were expanded using text words and synonym searches (((("Psychologically Informed Physical Therapy" [Text Word] OR "Psychologically Informed Physiotherapy" [Text Word] OR "Psychologically Informed Practice"[Text Word]) OR "Biopsychosocial Model" [Text Word]) OR "CBT" [Text Word]) AND (((("Physiotherapy" [Text Word] OR "Physiotherapist" [Text Word]) OR "Physical Therapy" [Text Word] OR "Physical Therapist" [Text Word])) AND ("Chronic Pain" [Text Word] OR "Pain" [Text Word])) AND (((("Management"[Text Word] OR "Rehabilitation" [Text Word] OR "Rehab" [Text Word]) OR "Treatment" [Text Word]) OR "Intervention" [Text Word]) AND ("2017/03/11"[PDat] : "2022/03/09" [PDat])). Appendix B illustrates the search string that was used.

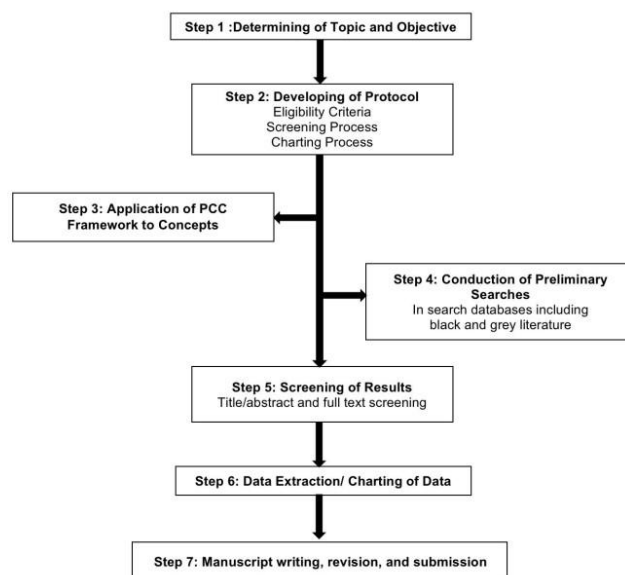


Figure 1. Scoping Review Process

Study Selection

Studies that were included consisted of full-text, peer-reviewed research on psychologically informed physical therapy written in English. At least one out of several contents was reported in the selected studies: effectiveness/efficacy, clinical utility, cost-effectiveness, and barriers to PIPT as a physiotherapy intervention. To guarantee that only current literature is presented, the publication years of the study were restricted from 2017 to 2022. Furthermore, studies that focus only on psychologically informed practice without a physiotherapist were excluded. Types of studies included were: RCT, Systematic Review, Qualitative Study, Case Series, Pre-Post Study Design, Review articles, Discussion paper, Perspective paper, and Editorial.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Publication years 2017 – 2022	Grey literature
Peer-reviewed publication	Focused only on psychologically informed practice (without a physical therapist or physiotherapist)
English language	
At least one of the following should be reported in the selected studies on PIPT as a physiotherapy intervention: effectiveness/efficacy, clinical utility, cost-effectiveness, or barriers.	

Titles and abstracts of articles were independently reviewed by two authors in order to apply the inclusion/exclusion criteria. Additionally, we used EndNote X9 to implement Bramer and colleagues' (2016) deduplication method. Before final inclusion in the study, the full texts of potentially relevant papers were retrieved and evaluated for consensus by two authors (M.R.) and (V.R.). A third author was consulted in the event of a dispute (E.G.). Any studies that met any of the exclusion criteria were rejected. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist was followed for this review, and a flow diagram (Figure 2) of the included studies was provided. Furthermore, because evaluating the methodological rigor of research, design suitability, and study relevance helps ensure practitioners engage in evidence-based practice (Tod & Van Raalte, 2020), critical appraisal of the studies in this scoping review was carried out after the articles had been screened. This entails (a) identifying the study type(s) of the individual paper(s), (b) identifying appropriate criteria and checklist(s), (c) selecting an appropriate set of criteria and checklist, (d) performing the appraisal, and (e) summarizing and using the results (Tod et al., 2021). Each study was assessed for quality and bias using the JBI-Sumari appraisal tool and interpreted the results using an article, in which studies with a JBI score greater than 70% were classified as high quality, those with a score between 50% and 70% as medium quality, and those with a score less than 50% as low quality (Pimsen et al., 2022).

Charting the Data

This review comprised a total of 23 articles (Figure 2). A data extraction sheet tailored to the research was created. The contents of the articles included in the study were then extracted and arranged in tabular format based on the following: (1) authors, (2) year of publication, (3) quality of evidence, (4) research methods, (5) study population and sample size (if applicable), and (6) aims/purpose (Table 9). This procedure was double-checked by another researcher. A distinct table was made to examine the data and provide a summary of the PIPT interventions used in each

study. The following information was included: (1) author/s, (2) country of origin, (3) PIPT intervention, (4) conventional PT intervention, (5) duration of the intervention, (6) setting, (7) outcomes, and (8) key findings relevant to the scoping review (Table 10).

In addition, Table 11 was made to highlight the clinical utility, cost-effectiveness, effectiveness/efficacy, and/or barriers of PIPT as a physiotherapy intervention by classifying PIPT interventions according to the primary psychological strategy: (1) graded activity or graded exposure; (2) cognitive-behavioral-based physical therapy; (3) acceptance and commitment-based physical therapy; and (4) internet-based psychological programs. The table includes the following information: (1) author, (2) title of the study, (3) PIPT intervention, (4) conventional PT intervention, (5) study outcomes, (6) summary of the study, (7) limitations of the study, and (8) remarks. Based on the outcomes of summarizing, the charts were updated and modified iteratively.

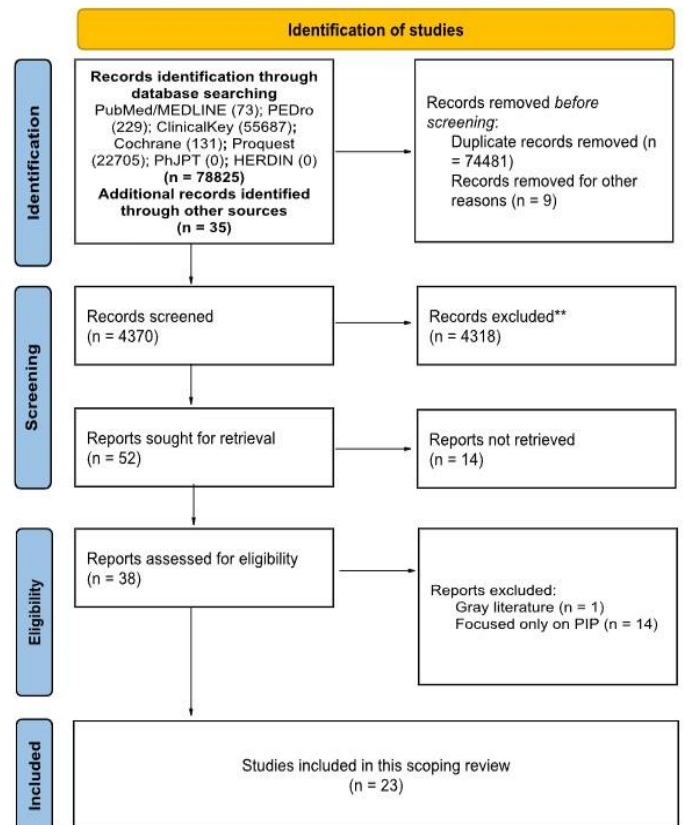


Figure 2. PRISMA flow chart of the selection of the studies for inclusion in the review

Collating, Summarizing, and Reporting the Results

In accordance with the scoping review methodology, the extent and nature of the available evidence was described. The results were presented using descriptive synthesis to give various information and diverse integrated evidence. The findings were based on the PIPT intervention's effectiveness/efficacy, clinical

utility, cost-effectiveness, and barriers to its use as a physiotherapy intervention. To make sense of the retrieved data, thematic analysis was used to gather information and identify all topics related to PIPT as a physiotherapy intervention. Colaizzi's (1978) method of data analysis technique was used to (1) read and re-read the transcript, (2) identify significant statements and phrases, (3) aggregate the formulated meanings, (4) integrate all the resulting ideas into themes, (5) reduce the exhaustive description, (6) generate a report detailing the topic's basic structure, and (7) validate the exhaustive description and its fundamental structure (Han et al., 2021). Coding was done by two of the reviewers (M.R. and V.R.) and was verified by a third reviewer if there was a dispute (E.G.). A map was included to visually present the findings in a broader context in order to advance clinical practice, research, and policy.

Results

Search Results

Among the 78,860 studies identified by the search strategy, 38 studies met the inclusion and exclusion criteria and passed the abstract and title review. During the full-text review, 15 studies were excluded due to the following reasons: (1) gray literature and (2) focused only on PIP, leaving 23 studies in total. Included records are referenced using the superscript provided, and are numbered alphabetically (Table 9 & Table 10).

Conceptualization and Themes

Table 9 shows the study characteristics of the 23 papers that composed this review whereas Table 10 presents an overview of the PIPT interventions involved in the study. A majority of these papers were qualitative studies (n = 8) while the rest of the papers were randomized controlled trials (n = 6), reviews (n = 4), discussion papers (n = 2), an editorial (n = 1), a perspective paper (n = 1), and a pre-post study design (n = 1). The research framework is depicted in Figure 3.

The use of PIPT in physiotherapy practices was covered in 18 papers. Most of these used cognitive-behavioral physical therapies, five of which discussed graded activity or graded exposure, five of which focused on acceptance and commitment-based physical therapy, four of which discussed internet-based psychological programs, two of which were categorized under "others", and one for which the classification was deemed to be inapplicable (Figure 4).

The effectiveness/efficacy, clinical utility, cost-effectiveness, and barriers of PIPT as a physiotherapy intervention were covered in 23 studies; fourteen of them concentrated on effectiveness/efficacy, eleven on clinical utility, six on barriers, and two on cost-effectiveness (Figure 5).



Figure 3. Research Framework

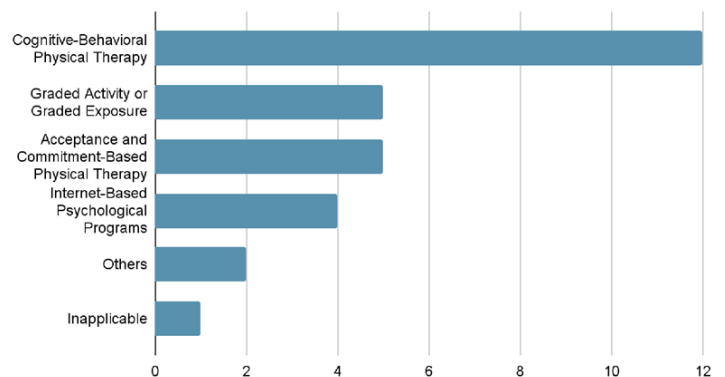


Figure 4. Frequency of the use of PIPT in PT practices

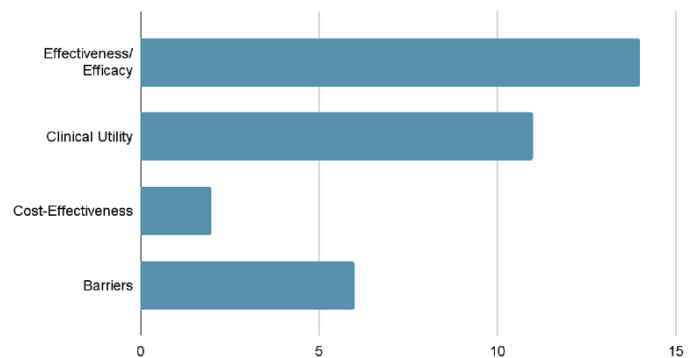


Figure 5. Frequency of discussing effectiveness, clinical utility, cost-effectiveness, or barriers of PIPT as a PT intervention

Many biopsychosocial approaches have been proposed in physical therapy practice to manage chronic pain. Although research encompasses a wide range of such techniques, this review focused on PIPT and six key themes that recur regularly across the studied literature. Themes derived from the scoping review included (1) current physiotherapists' practices in implementing PIPT, (2) the effectiveness/efficacy of PIPT in eliminating or reducing chronic pain, (3) the clinical utility of PIPT's application in a variety of settings, (4) the cost-effectiveness of PIPT as a treatment alternative in economic terms, (5) the barriers to PIPT practice, and (6) the country of origin for the PIPT intervention. Although similar elements are seen in various contexts in the literature, the focus of this study was on PIPT's application to chronic pain management.

Theme 1. Current Physiotherapy Practices in Implementing PIPT

In this scoping review, several applications of a psychologically informed practice in physiotherapy were identified. Based on the principal psychological strategy used, these PIPT interventions were categorized as follows: (1) cognitive-behavioral physical therapy, (2) graded activity or graded exposure, (3) acceptance and commitment-based physical therapy, (4) internet-based psychological programs, and (5) others.

Cognitive-Behavioral Physical Therapy. The foundation of cognitive-behavioral therapy (CBT) is that cognitive and behavioral factors, including a person's thoughts, beliefs, and actions significantly impact whether they develop or retain chronic pain (Coronado et al., 2020). Patients who use CBT have access to various strategies that help them better manage their pain, feel more confident about managing it, and give the sense that they have more control over it. CBT strategies address dysfunctional ideas and beliefs impacting pain, identify and reduce maladaptive behaviors, promote healthy coping, and boost confidence in pain self-management (Cowell et al., 2021). Despite the fact that techniques differ from one therapist to the next, common features include elements of education (Simons et al., 2019), skill training (such as goal setting, activity pacing, relaxation techniques like deep breathing, distraction, and problem-solving) (Ballengee et al., 2020; Gray et al., 2020), and skill application and maintenance in the patient's daily life (Denneny et al., 2020). Our findings indicate that 12 out of the 18 research discuss the application of CBT in chronic pain (Table 9). The physical therapy interventions included a variety of CBT components, most of which involved education, goal-setting, problem-solving, and pain-coping techniques.

Graded Activity or Graded Exposure. Graded activity and graded exposure are based on the Fear Avoidance Model of Musculoskeletal Pain, which outlines key cognitive and emotional processes that underlie the perception and persistence of pain. Our findings show that 5 of 18 studies explore its use in chronic pain (Table 9). These therapies address avoidance by assisting a patient in repeatedly engaging in certain and perhaps

distressing physical activities or tasks in a timed, collaborative, and goal-directed approach (Ariza-Mateos et al., 2018). The patient's report of the exercises' difficulty, their chief complaints, and its relevance to their pain condition are taken into consideration while selecting the target exercises or activities for graded activity. The main objectives of the graded exercise are to encourage healthy habits and to raise the patient's tolerance for particular activities that are important to daily functioning (Gray et al., 2020). Patients learn to confront previously avoided behaviors as they pursue an increased activity, breaking the cycle of fear-avoidance-pain.

Acceptance and Commitment-Based Physical Therapy. Acceptance and commitment therapy (ACT) helps patients reconnect with their core values and build internal flexibility to live more fulfilled lives despite having chronic pain. Its method involves strategies for behavioral change, acceptance, and mindfulness. Our findings indicate that 5 out of the 18 research discuss the application of ACT in chronic pain (Table 9). By emphasizing "acceptance" and concurrent patient achievement of value-oriented goals like improved physical functioning and accepting that certain aspects of the experience of chronic pain cannot be modified, ACT shifts focus away from pain or symptom reduction (Aymerich et al., 2022). Furthermore, ACT aims to reduce experience avoidance—the avoidance of unpleasant thoughts, ideas, and emotions—and to promote psychological flexibility via openness, awareness, and active involvement (Godfrey et al., 2020).

Internet-Based Psychological Programs. Our findings show that only 4 of the 18 studies explore the use of an internet-based psychological program for chronic pain (Table 9). This might be because implementing PIPT could be complicated by the extensive training and long clinic sessions needed to give certain CBT- or ACT-based methods (Lindberg et al., 2021). Further, because psychological techniques may be regarded as being outside the scope of our training or comfort zone, physical therapists may find it difficult to implement them. A potential way to deliver PIPT more widely is through internet-based psychological programs or applications for pain, especially when combined with therapy (Fernandez et al., 2021). Several widely used programs have been discussed in the literature.

Others. Several infrequently reported uses of PIPT for chronic pain include psychomotor therapy (PMT) and group-based physiotherapy-led behavioral psychological interventions (GPBPIs). Due to its biopsychosocial foundation, integration of pedagogic and physical therapeutic techniques, and incorporation of parts of self-awareness and self-efficacy education, PMT was posited to improve conventional therapy when used in conjunction with an active exercise (AE) strategy. Yet according to research by Ingwersen et al. (2019), PMT did not enhance patient recovery in terms of pain and active function when compared to standard therapy. In contrast, it has been found to alter chronic pain's physiological, psychological, and social causes by raising body awareness, avoiding and re-balancing

incorrect muscular tension and stress, creating a state of bodily and mental tranquility, and obtaining personal insight (Stamp et al., 2018). Lastly, a study by Zhang et al. (2018) revealed that the usage of GPBPIs for persons with chronic low back pain in primary care had a long-term favorable effect on pain alleviation in contrast to no therapy and other active therapies.

Theme 2. Effectiveness/Efficacy of PIPT in Eliminating or Reducing Chronic Pain

Individuals with chronic pain are significantly impacted by the effectiveness or efficacy of PIPT in symptom elimination or reduction, with reports that contradict its usefulness and those that corroborate it being effective.

Four studies report on the effectiveness or efficacy of CBT as a PIPT approach in improving physical function (Archer et al., 2018; You et al., 2021) and eliminating the fear of movement which in turn improves disability and pain self-efficacy (Coronado et al., 2020) through prioritization of patient concerns (Cowell et al., 2021).

In line with the findings of two studies, graded activity and exposure directly address avoidance by assisting a patient in repeatedly engaging in dreaded physical activities or tasks in a controlled and goal-directed manner.

According to research by Ariza Mateos et al. (2018), graded exposure therapy (GET) can support women with chronic pelvic pain in improving their long-term fear avoidance behavior and physical functioning when combined with manual therapy (MT). Correspondingly, a systematic review of 12 articles with patients who had degenerative spine, hip, and knee conditions revealed that patients' function, pain, quality of life, and psychological factors improved more quickly after PIPT, which includes coping skills training, psychoeducation, and positive reinforcement (Coronado et al., 2018).

Two studies showed utilizing ACT as a PIPT approach in chronic pain management. In one study, Godfrey et al. (2020) assessed a physical therapy ACT approach (PACT) which was a short intervention that took place over the course of 3 separate sessions (two 1-hour in-person visits and one 20-minute telephone sessions), each spaced out over a month. Focus shifting, goal setting and modification based on values, mindfulness practices, action planning, support system identification, and skill application were among the tactics used in PACT with the purpose of fostering self-management and psychological flexibility. Participants in PACT show higher improvements in disability, physical function, and physical health after 3 months than those who receive standard physical therapy. However, this difference was not maintained for 1 year and there was no difference in pain intensity ratings between groups. Another study showed that a multidisciplinary program was the only intervention that significantly improved mobility and pain behavior (p 's 0.031; d = 0.69 and 0.55) (You et al., 2021). Also, they discovered that pain-

CBT or multidisciplinary programs significantly reduced pain catastrophizing, pain interference, fatigue, depression, anxiety, and social role satisfaction (p 's 0.037; d s = 0.29-0.73). Nevertheless, neither program substantially altered the pain assessments (p 's > 0.207).

Contrastingly, a study by Coronado et al. (2020) found that graded activity is not superior to other types of exercise for treating chronic low back pain and that an internet-based psychological program offered to patients undergoing physical therapy does not appear to improve outcomes when compared to physical therapy alone.

Theme 3. Clinical Utility of PIPTs Application in a Variety of Settings

Numerous evidence-based studies reinforce the use of PIPT for patients with chronic pain in an array of settings. Thirteen of the 23 publications focus on the application of PIPT in an outpatient setting, four in a multi-site setting, three in a virtual setting, two in an inpatient setting, and one in a classroom.

In the outpatient setting, PIPT interventions that address both the physical and psychological aspects of pain have shown significant potential. Graded exposure combined with manual therapy outperforms manual therapy alone in terms of preserving long-term benefits in fear-avoidance behavior and physical functioning (Ariza-Mateos et al., 2018). For patients at high risk of chronic LBP, psychological assessments consistently outperformed physical impairment indicators as treatment monitoring variables (Beneciuk et al., 2019). Furthermore, primary findings show that group-based behavioral therapies involving a variety of biopsychosocial model domains and administered by physiotherapists are superior to standard care and other treatments in the long run for reducing pain for patients with CLBP (Zhang et al., 2019).

These studies show that incorporating PIPT concepts into outpatient therapy enables physical therapists to address both physical symptoms and the psychological issues that contribute to pain and disability. This approach comprises identifying and correcting psychosocial difficulties such as fear avoidance, maladaptive attitudes, and emotional distress that may influence a patient's response to therapy. By using psychological strategies such as cognitive-behavioral therapies and patient education, PIPT in outpatient settings can improve treatment results, reduce disability, and improve patients' overall quality of life.

In a multi-site setting, the same clinical protocol is followed at two or more study sites where patients are assessed for an intervention and/or outcomes. In this setting, PIPT treatments cover a wide range of modalities, doses, and components. It consists of at least two locations of implementation, which might be outpatient, inpatient, virtual, homecare, or classroom. Most studies included in-person, one-on-one delivery of the behavioral component in conjunction with other strategies such as progressive in-clinic or home exercises (Archer et al., 2018; Coronado et al., 2018). Additionally, two studies analyzed by

Coronado et al. (2020) reported the effectiveness of combining internet-based psychological programs and physical therapy. However, it is unresolved how varied patterns of PIPT administration influence results. While most studies offered a general description that allowed for program replication, several characteristics, such as session-by-session content, were not explicitly stated. The PIPT components ranged from just one CBT component (psychoeducation) to up to four. None of the research was designed to investigate component effects, and no patterns emerged indicating which components were more effective. It is likely that specific combinations of CBT methods are more beneficial; however, this requires additional exploration.

In terms of PIPT's application in a virtual setting, a review conducted by Coronado et al. (2020) mentioned that internet-based psychological programs administered to physical therapy patients do not appear to improve outcomes when compared to traditional physical therapy. It shows that issues such as low adherence to the online program, a lack of support or integration of learned skills within therapy, or program specificity issues explain the apparent lack of additional benefit.

In the inpatient setting, only ACT-informed physiotherapy and PMT were investigated. A qualitative descriptive study by Aymerich et al. (2022) evaluated patients' experiences of ACT-informed physiotherapy via a focus group to better understand therapeutic processes and results. Answers were audio recorded, verbatim transcribed, and subjected to a hybrid inductive-deductive reflective theme analysis for interpretation. Crucially, participants described ACT-informed physical treatment as empowering—helping them live more fully and experience pain less—and they felt this resulted from a socially adept, psychologically flexible interaction with the physical therapist. In contrast, Ingwersen et al. (2019) stressed that in patients with chronic shoulder pain and low body awareness, there is no additional benefit from PMT above usual therapy in terms of patient-reported function and pain. Such disparities in outcomes in an inpatient setting can be related to the complex interaction of individual patient characteristics, differing healthcare situations, and the multiple nature of psychological and physical conditions. Beneficial results may occur when PIPT is skillfully adjusted to suit patients' particular psychological needs, fostering holistic well-being in addition to physical recovery. However, issues such as patient diversity, discrepancies in institutional methods, and a lack of integration of psychological ideas into typical physical therapy techniques can all lead to bad outcomes. The effectiveness of PIPT in an inpatient context depends on a thorough understanding of patient psychosocial characteristics, consistent implementation across healthcare teams, and therapy techniques. Last but not least, only Ballengee et al. (2020) investigated the application of PIPT in the classroom setting. The study demonstrated the need for psychologically informed pain management skills, which physiotherapists may learn through training programs. By incorporating psychological elements into physical therapy education, students can get a more comprehensive knowledge of patient care while also developing

empathy and good communication skills. PIPT in the classroom can provide prospective physical therapists with the tools necessary to address the psychological aspects of patient concerns, promoting an enhanced patient-centered approach. This method may result in better therapy collaborations and treatment adherence. Furthermore, including PIPT in the curriculum can help students traverse the complex interaction of physical and psychological elements, allowing them to give comprehensive and well-rounded treatment in their future clinical practice.

Theme 4: Cost-Effectiveness of PIPT as a Treatment Alternative in Economic Terms

Although PIPT indicated effectiveness in a variety of outcomes, its cost-effectiveness has been called into doubt. Unfortunately, we have found only two articles that discuss its cost-effectiveness. Archer et al. (2018) conducted peer-reviewed literature between published studies. According to one reviewed study, PIPT is cost-effective in 81-100 percent of cases. Moreover, a review conducted by Coronado et al. (2020) reported that while the study did not produce a formal cost-effectiveness analysis, there was a report of an increased cost of executing PIPT due to longer treatment sessions.

Theme 5: Barriers to PIPT Practice

Despite its potential to treat chronic pain, physiotherapy practices that use PIPT have encountered a number of implementation challenges. A review by Archer et al. (2018) enumerated several barriers to delivering PIPT programs. These constraints include (1) a lack of time for skill acquisition and clinical integration; (2) a lack of knowledge of CBT principles and techniques; and (3) current public perceptions about what physiotherapy encompasses. Such barriers limit the conveyance of PIPT and physiotherapy interventions effectively and efficiently, restrict physiotherapists in executing appropriate techniques due to scarcity in training programs involving PIPT, and lastly, physiotherapy is not limited to a biomedical approach (impairment-based interventions) but also involves an optimum treatment strategy which is the biopsychosocial approach. A pre-post study design by Ballengee et al. (2020) identified two common barriers: (1) physiotherapists' lack of confidence in executing the PIPT program owing to insufficient proper training, and (2) time constraints in providing the PIPT sessions. Similarly, a review by Coronado et al., (2020) revealed that access and cost were hurdles preventing clients/patients from obtaining PIPT intervention. Due to a dearth of well-trained physiotherapists performing proper techniques, physiotherapy practices implementing PIPT have limited patient access. Furthermore, challenges to PIPT adoption for internet-based psychological programs and physiotherapy which involve adequate training for physiotherapists may cause difficulty in implementing and delivering the PIPT practice model. Despite a surge in interest in the use of PIPT in chronic pain management, there is no universally agreed standard for PIPT interventions, resulting in these implementation barriers.

Theme 6. Country of Origin of the PIPT Intervention

With the continents of the countries involved taken into account, it was discovered that twelve of the twenty-three publications came from North America, seven from Europe, two from Asia, one from South America, and one from Australia. In North America and Europe, graded exposure, ACT, and CBT are frequently employed as PIPT interventions. In contrast, a biopsychosocial approach was more often used in South America and Asia. Lastly, there was another similarity between Australia and Asia: psychological interventions.

When compared to other continents, PIPT publications are far more prevalent in North America, especially in the United States. Various causes, including research and funding opportunities, clinical practices, cultural and socioeconomic influences, and the organization of the healthcare system, might be ascribed to this tendency. Increased research engagement and publication production in PIPT may result from the United States' robust research infrastructure and funding options for healthcare-related studies. While cultural and socioeconomic influences might affect the goals and interests of academics and healthcare professionals, regional differences in clinical practices and trends can impact study emphasis. Further study in this field may be prompted by the incorporation of psychological principles into the healthcare culture of North America.

Discussion

Summary of Findings

A summary of findings from recent studies highlights a few crucial conclusions. Firstly, compared to the other PIPT interventions identified, CBT is more often used and applied to a wide variety of situations. It is frequently the favored method of psychotherapy since it may immediately assist patients in identifying and dealing with specific challenges with regard to chronic pain. It is also usually more systematic and takes fewer sessions than other forms of treatment. Second, there appears to be a difference between PIPT interventions and conventional PT approaches in terms of perceived effectiveness/efficacy. Yet, the available data appears to favor the former's use. However, to further substantiate this claim, a longer period of time for its implementation is required. Third, despite their apparent usability and viability, internet-based psychological programs used in conjunction with physical therapy do not show to improve outcomes beyond physical therapy alone. The apparent lack of further benefit may be explained by problems with program specificity, limited adherence to the online program, a lack of support or integration of acquired skills within treatment, or problems with the program itself. Fourthly, the cost-effectiveness of PIPT interventions has not received much attention. The information found to explain this was solely inferred from the length of the therapy session. Fifth, a variety of implementation obstacles were explored, including a lack of time for skill development and clinical integration, a lack of understanding of CBT principles and methods, existing public conceptions of the

scope of practice in physiotherapy, and the unstandardized use of PIPT interventions. Sixth, when compared to other continents, PIPT publications are far more common in North America, particularly in the United States. This trend might be attributed to a variety of factors, including research and financing possibilities, clinical practices, cultural and socioeconomic impacts, and healthcare system organization. Lastly, as is frequently the case, certain areas lack conclusive evidence.

Limitations

While not the first to investigate the topic, this is the first scoping review to synthesize the evidence on PIPT. Furthermore, despite conducting an organized and thorough search, we are unable to confirm that we found all papers published since 2017 that meet our eligibility criteria.

Conclusion

This scoping review gave a clearer picture and grasp of the existing methods physiotherapists use to apply PIPT in treating chronic pain. The current methods used in the implementation of PIPT include cognitive-behavioral physical therapy (CBT), graded activity or graded exposure, acceptance and commitment-based physical therapy (ACT), internet-based psychological programs, other cutting-edge techniques like psychomotor therapy (PMT), and group-based physiotherapy-led behavioral psychological interventions (GPBPIs). Depending on the type of intervention employed, a PIPT method may or may not be more successful than conventional physical therapy at reducing or eliminating chronic pain. Furthermore, as compared to those employed in internet-based settings, the therapeutic benefit of PIPTs use in an outpatient context has shown improvements in the management of chronic pain. Still, barriers to its use in the treatment of chronic pain persist. Finally, PIPT is more commonly used as an intervention in Northern America than in the rest of the world. So, while PIPT remains a viable treatment paradigm, more data is needed to justify its widespread use, especially given the high demand for training and the challenges encountered in its implementation. Ultimately, physical therapists should be kept up to date on chronic pain management in both local and global contexts, interrogated about their perceptions of its therapeutic value and effectiveness/efficacy, and finally assessed on their preparation for handling patients who have chronic pain.

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Appendix A

JBI Appraisal Tool Results

Table 2. Critical Appraisal of Eligible Case Series

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Beneciuk et al.	Treatment monitoring as a component of psychologically informed physical therapy: A case series of patients at high risk for persistent low back pain related disability	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Table 3. Critical Appraisal of Eligible Qualitative Research

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Archer et al.	The Role of Psychologically Informed Physical Therapy for Musculoskeletal Pain	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Aymerich et al.	“Living more and struggling less”: a qualitative descriptive study of patient experiences of physiotherapy informed by Acceptance and Commitment Therapy within a multidisciplinary pain management programme	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cowell et al.	Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: A qualitative study	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Stamp et al.	Behavioural typologies of experienced benefit of psychomotor therapy in patients with chronic shoulder pain: A grounded theory approach	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Beneciuk et al.	Targeted interventions to prevent transitioning from acute to chronic low back pain in high-risk patients: development and delivery of a pragmatic training course of psychologically informed physical therapy for the TARGET trial	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Table 4. Critical Appraisal of Eligible Quasi-Experimental Study

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Ballengee et al.	Introduction of a psychologically informed educational intervention for pre-licensure physical therapists in a classroom setting	Y	N	N	U	Y	N	Y	Y	Y
	%	100.0	0.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Table 5. Critical Appraisal of Eligible Randomized Controlled Trial

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Ariza-Mateos et al.	Effects of a Patient-Centered Graded Exposure Intervention Added to Manual Therapy for Women with Chronic Pelvic Pain: A Randomized Controlled Trial	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y	Y	Y
Coronado et al.	Psychologically informed physical therapy for musculoskeletal pain: current approaches, implications, and future directions from recent randomized trials	Y	Y	Y	U	Y	Y	Y	U	Y	Y	Y	Y	Y
Simons et al.	Graded exposure treatment for adolescents with chronic pain (GET Living): Protocol for a randomized controlled trial enhanced with single case experimental design	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ingwersen et al.	Effect of Psychomotricity in Combination With 3 Months of Active Shoulder Exercises in Individuals with Chronic Shoulder Pain: Primary Results from an Investigator-Blinded, Randomized, Controlled Trial	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 5. Critical Appraisal of Eligible Randomized Controlled Trial

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Lindberg et al.	The effectiveness of exercise therapy and education plus cognitive behavioral therapy, alone or in combination with total knee arthroplasty in patients with knee osteoarthritis - study protocol for the MultiKnee trial	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Godfrey et. al	Physical Therapy Informed by Acceptance and Commitment Therapy (PACT) Versus Usual Care Physical Therapy for Adults with Chronic Low Back Pain: A Randomized Controlled Trial	Y	Y	U	U	N	U	N	U	N	Y	Y	Y	Y
You et al.	Effectiveness of a multidisciplinary rehabilitation program in real-world patients with chronic back pain: A pilot cohort data analysis	Y	Y	U	U	N	U	N	U	N	Y	Y	Y	Y
	%	100.0	100.0	85.7	57.1	71.4	85.7	85.7	71.4	85.7	100.0	100.0	100.0	100.0

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Table 6. Critical Appraisal of Systematic Review and Research Syntheses

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Zhang et al.	The Effectiveness of Group-Based Physiotherapy-Led Behavioral Psychological Interventions on Adults With Chronic Low Back Pain: A Systematic Review and Meta-Analysis	Y	Y	Y	U	U	Y	Y	Y	Y	Y	Y
Coronado et al.	Preoperative and postoperative psychologically informed physical therapy: A systematic review of randomized trials among patients with degenerative spine, hip, and knee conditions	Y	Y	Y	U	Y	Y	Y	U	Y	Y	Y
		%	100.0	100.0	100.0	100.0	100.0	50.0	50.0	50.0	50.0	100.0

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Table 7. Critical Appraisal of Eligible Text and Opinion Study

Author/s	Title	Q1	Q2	Q3	Q4	Q5	Q6
Fernandez et al.	Biopsychological approaches to telerehabilitation for chronic primary musculoskeletal pain: A real possibility for physical therapists, here to stay	Y	N	N	Y	U	N
Keefe et al.	Advancing Psychologically Informed Practice for Patients with Persistent Musculoskeletal Pain: Promise, Pitfalls, and Solutions	Y	Y	Y	Y	Y	Y
Ballengee et al.	Implementation of psychologically informed physical therapy for low back pain: Where do we stand, where do we go?	Y	Y	U	Y	Y	U
		%	100.0	66.7	33.3	100.0	66.7

Legend: Yes (Y), Unclear (U), No (N), Not Applicable (N/A)

Appendix B

Keyword Search Results

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
PubMed/ MEDLINE	(((((("Psychologically Informed Physical Therapy"[Text Word] OR "Psychologically Informed Physiotherapy" [Text Word] OR "Psychologically Informed Practice"[Text Word]) OR "Biopsychosocial Model"[Text Word]) OR "CBT"[Text Word]) AND (((("Physiotherapy"[Text Word] OR "Physiotherapist"[Text Word]) OR "Physical Therapy"[Text Word]) OR "Physical Therapist"[Text Word])) AND ("Chronic Pain"[Text Word] OR "Pain"[Text Word])) AND (((("Management"[Text Word] OR "Rehabilitation"[Text Word]) OR "Rehab"[Text Word]) OR "Treatment"[Text Word]) OR "Intervention"[Text Word]) AND ("2017/03/11"[PDat] : "2022/03/09"[PDat]))	73	73	15
Cochrane	(((((("Psychologically Informed Physical Therapy"[Text Word] OR "Psychologically Informed Physiotherapy"[Text Word] OR "Psychologically Informed Practice"[Text Word]) OR "Biopsychosocial Model"[Text Word]) OR "CBT"[Text Word]) AND (((("Physiotherapy"[Text Word] OR "Physiotherapist"[Text Word]) OR "Physical Therapy"[Text Word]) OR "Physical Therapist"[Text Word]) AND ("Chronic Pain"[Text Word] OR "Pain"[Text Word])) AND (((("Management"[Text Word] OR "Rehabilitation"[Text Word]) OR "Rehab"[Text Word]) OR "Treatment"[Text Word]) OR Intervention" [Text Word]) AND ("2017/03/11"[PDat] : "2022/03/09"[PDat]))	131	41	0
PhJPT	(((((("Psychologically Informed Physical Therapy"[Text Word] OR "Psychologically Informed Physiotherapy"[Text Word] OR "Psychologically Informed Practice"[Text Word]) OR "Biopsychosocial Model"[Text Word]) OR "CBT"[Text Word]) AND (((("Physiotherapy"[Text Word] OR "Physiotherapist"[Text Word]) OR "Physical Therapy"[Text Word]) OR "Physical Therapist"[Text Word])) AND ("Chronic Pain"[Text Word] OR "Pain"[Text Word])) AND (((("Management"[Text Word] OR "Rehabilitation"[Text Word]) OR "Rehab"[Text Word]) OR "Treatment"[Text Word]) OR "Intervention"[Text Word]) AND ("2017/03/11"[PDat]: "2022/03/09"[PDat]))	0	0	0
HERDIN	(((((("Psychologically Informed Physical Therapy"[Text Word] OR "Psychologically Informed Physiotherapy"[Text Word] OR "Psychologically Informed Practice"[Text Word]) OR "Biopsychosocial Model"[Text Word]) OR "CBT"[Text Word]) AND (((("Physiotherapy"[Text Word] OR "Physiotherapist"[Text Word]) OR "Physical Therapy"[Text Word]) OR "Physical Therapist"[Text Word])) AND ("Chronic Pain"[Text Word] OR "Pain"[Text Word])) AND (((("Management"[Text Word] OR "Rehabilitation"[Text Word]) OR "Rehab"[Text Word]) OR "Treatment"[Text Word]) OR "Intervention"[Text Word]) AND ("2017/03/11"[PDat] : "2022/03/09"[PDat]))	0	0	0
Clinical Key	"psychologically informed physical therapy" AND "chronic pain" AND "management"	680	680	0
	"psychologically informed physical therapy" AND "chronic pain" AND "rehabilitation"	303	303	0

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
Clinical Key	“psychologically informed physical therapy” AND “chronic pain” AND “rehab”	256	256	0
	“psychologically informed physical therapy” AND “chronic pain” AND “treatment”	896	896	0
	“psychologically informed physical therapy” AND “chronic pain” AND “intervention”	782	782	0
	“psychologically informed physical therapy” AND “pain” AND “management”	743	743	0
	“psychologically informed physical therapy” AND “pain” AND “rehabilitation”	366	366	0
	“psychologically informed physical therapy” AND “pain” AND “rehab”	518	518	0
	“psychologically informed physical therapy” AND “pain” AND “treatment”	1175	1175	1
	“psychologically informed physical therapy” AND “pain” AND “intervention”	1112	1112	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “management”	481	404	2
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehabilitation”	282	79	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehab”	415	208	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “treatment”	701	151	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “intervention”	548	46	1
	“psychologically informed physiotherapy” AND “pain” AND “management”	1490	564	0
	“psychologically informed physiotherapy” AND “pain” AND “rehabilitation”	396	29	0
	“psychologically informed physiotherapy” AND “pain” AND “rehab”	1016	295	0
	“psychologically informed physiotherapy” AND “pain” AND “treatment”	974	29	0
	“psychologically informed physiotherapy” AND “pain” AND “intervention”	997	56	0
	“psychologically informed practice” AND “chronic pain” AND “management”	1574	705	0
	“psychologically informed practice” AND “chronic pain” AND “rehabilitation”	764	310	0
	“psychologically informed practice” AND “chronic pain” AND “rehab”	496	258	1
	“psychologically informed practice” AND “chronic pain” AND “treatment”	1826	923	0
	“psychologically informed practice” AND “chronic pain” AND “intervention”	1809	793	0
	“psychologically informed practice” AND “pain” AND “management”	1540	746	0
	“psychologically informed practice” AND “pain” AND “rehabilitation”	1084	366	0
	“psychologically informed practice” AND “pain” AND “rehab”	1539	519	0
	“psychologically informed practice” AND “pain” AND “treatment”	2010	1175	0
	“psychologically informed practice” AND “pain” AND “intervention”	3122	1113	0
	“biopsychosocial model” AND “chronic pain” AND “management”	12	11	0
	“biopsychosocial model” AND “chronic pain” AND “rehabilitation”	10	5	0
“biopsychosocial model” AND “chronic pain” AND “rehab”	32	25	0	
“biopsychosocial model” AND “chronic pain” AND “treatment”	38	24	0	

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
	“biopsychosocial model” AND “chronic pain” AND “intervention”	23	14	0
	“biopsychosocial model” AND “pain” AND “management”	97	47	0
	“biopsychosocial model” AND “pain” AND “rehabilitation”	16	2	0
	“biopsychosocial model” AND “pain” AND “rehab”	66	24	0
	“biopsychosocial model” AND “pain” AND “treatment”	43	0	1
	“biopsychosocial model” AND “pain” AND “intervention”	65	22	0
	“CBT” AND “chronic pain” AND “management”	1044	84	0
	“CBT” AND “chronic pain” AND “rehabilitation”	296	22	0
	“CBT” AND “chronic pain” AND “rehab”	435	33	0
	“CBT” AND “chronic pain” AND “treatment”	1533	223	0
	“CBT” AND “chronic pain” AND “intervention”	1354	198	0
	“CBT” AND “pain” AND “management”	2373	104	0
	“CBT” AND “pain” AND “rehabilitation”	364	32	0
	“CBT” AND “pain” AND “rehab”	877	50	0
	“CBT” AND “pain” AND “treatment”	1886	329	0
	“CBT” AND “pain” AND “intervention”	2074	288	0
PEDro	“psychologically informed physical therapy” AND “chronic pain” AND “management”	0	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “rehabilitation”	0	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “rehab”	0	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “treatment”	2	2	0
	“psychologically informed physical therapy” AND “chronic pain” AND “intervention”	1	1	0
	“psychologically informed physical therapy” AND “pain” AND “management”	0	0	0
	“psychologically informed physical therapy” AND “pain” AND “rehabilitation”	0	0	0
	“psychologically informed physical therapy” AND “pain” AND “rehab”	0	0	0
	“psychologically informed physical therapy” AND “pain” AND “treatment”	2	1	0
	“psychologically informed physical therapy” AND “pain” AND “intervention”	3	3	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “management”	0	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehabilitation”	0	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehab”	0	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “treatment”	0	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “intervention”	0	0	0
	“psychologically informed physiotherapy” AND “pain” AND “management”	0	0	0
	“psychologically informed physiotherapy” AND “pain” AND “rehabilitation”	0	0	0
PEDro	“psychologically informed physiotherapy” AND “pain” AND “rehab”	0	0	0
	“psychologically informed physiotherapy” AND “pain” AND “treatment”	0	0	0
	“psychologically informed physiotherapy” AND “pain” AND “intervention”	0	0	0

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
	“psychologically informed practice” AND “chronic pain” AND “management”	0	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehabilitation”	0	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehab”	0	0	0
	“psychologically informed practice” AND “chronic pain” AND “treatment”	0	0	0
	“psychologically informed practice” AND “chronic pain” AND “intervention”	1	1	0
	“psychologically informed practice” AND “pain” AND “management”	0	0	0
	“psychologically informed practice” AND “pain” AND “rehabilitation”	0	0	0
	“psychologically informed practice” AND “pain” AND “rehab”	0	0	0
	“psychologically informed practice” AND “pain” AND “treatment”	0	0	0
	“psychologically informed practice” AND “pain” AND “intervention”	1	1	0
	“biopsychosocial model” AND “chronic pain” AND “management”	2	1	0
	“biopsychosocial model” AND “chronic pain” AND “rehabilitation”	4	4	0
	“biopsychosocial model” AND “chronic pain” AND “rehab”	4	4	0
	“biopsychosocial model” AND “chronic pain” AND “treatment”	5	5	0
	“biopsychosocial model” AND “chronic pain” AND “intervention”	7	6	0
	“biopsychosocial model” AND “pain” AND “management”	5	3	0
	“biopsychosocial model” AND “pain” AND “rehabilitation”	4	4	0
	“biopsychosocial model” AND “pain” AND “rehab”	4	4	0
	“biopsychosocial model” AND “pain” AND “treatment”	8	5	0
	“biopsychosocial model” AND “pain” AND “intervention”	12	7	0
	“CBT” AND “chronic pain” AND “management”	9	3	0
	“CBT” AND “chronic pain” AND “rehabilitation”	3	2	0
	“CBT” AND “chronic pain” AND “rehab”	3	2	0
	“CBT” AND “chronic pain” AND “treatment”	25	9	0
	“CBT” AND “chronic pain” AND “intervention”	25	12	0
	“CBT” AND “pain” AND “management”	14	5	0
	“CBT” AND “pain” AND “rehabilitation”	4	2	0
	“CBT” AND “pain” AND “rehab”	4	2	0
	“CBT” AND “pain” AND “treatment”	37	9	0
	“CBT” AND “pain” AND “intervention”	40	13	0
ProQuest	“psychologically informed physical therapy” AND “chronic pain” AND “management”	14	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “rehabilitation”	11	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “rehab”	4	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “treatment”	13	0	0
	“psychologically informed physical therapy” AND “chronic pain” AND “intervention”	14	0	0
ProQuest	“psychologically informed physical therapy” AND “pain” AND “management”	16	0	0
	“psychologically informed physical therapy” AND “pain” AND “rehabilitation”	13	0	0
	“psychologically informed physical therapy” AND “pain” AND “rehab”	4	0	0
	“psychologically informed physical therapy” AND “pain” AND “treatment”	16	0	0

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
	“psychologically informed physical therapy” AND “pain” AND “intervention”	16	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “management”	14	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehabilitation”	14	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “rehab”	4	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “treatment”	14	0	0
	“psychologically informed physiotherapy” AND “chronic pain” AND “intervention”	10	0	0
	“psychologically informed physiotherapy” AND “pain” AND “management”	16	0	0
	“psychologically informed physiotherapy” AND “pain” AND “rehabilitation”	16	0	0
	“psychologically informed physiotherapy” AND “pain” AND “rehab”	4	0	0
	“psychologically informed physiotherapy” AND “pain” AND “treatment”	16	0	0
	“psychologically informed physiotherapy” AND “pain” AND “intervention”	12	0	0
	“psychologically informed practice” AND “chronic pain” AND “management”	23	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehabilitation”	22	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehab”	7	0	0
	“psychologically informed practice” AND “chronic pain” AND “treatment”	23	0	0
	“psychologically informed practice” AND “chronic pain” AND “intervention”	20	0	0
	“psychologically informed practice” AND “pain” AND “management”	30	0	0
	“psychologically informed practice” AND “pain” AND “rehabilitation”	28	0	0
	“psychologically informed practice” AND “pain” AND “rehab”	8	0	0
	“psychologically informed practice” AND “pain” AND “treatment”	30	0	0
	“psychologically informed practice” AND “pain” AND “intervention”	26	0	0
	“biopsychosocial model” AND “chronic pain” AND “management”	630	0	0
	“biopsychosocial model” AND “chronic pain” AND “rehabilitation”	416	0	0
	“biopsychosocial model” AND “chronic pain” AND “rehab”	48	0	0
	“biopsychosocial model” AND “chronic pain” AND “treatment”	660	0	0
	“biopsychosocial model” AND “chronic pain” AND “intervention”	475	0	0
	“biopsychosocial model” AND “pain” AND “management”	1106	0	0
ProQuest	“biopsychosocial model” AND “pain” AND “rehabilitation”	656	0	0
	“biopsychosocial model” AND “pain” AND “rehab”	77	0	0
	“biopsychosocial model” AND “pain” AND “treatment”	1218	0	0
	“biopsychosocial model” AND “pain” AND “intervention”	859	0	0
	“CBT” AND “chronic pain” AND “management”	1282	0	0
	“CBT” AND “chronic pain” AND “rehabilitation”	623	0	0
	“CBT” AND “chronic pain” AND “rehab”	73	0	0
	“CBT” AND “chronic pain” AND “treatment”	1463	0	0
	“CBT” AND “chronic pain” AND “intervention”	1257	0	0
	“CBT” AND “pain” AND “management”	3088	0	0
	“CBT” AND “pain” AND “rehabilitation”	1225	0	0
	“CBT” AND “pain” AND “rehab”	121	0	0

Table 8. Keyword Search Results

Database	Search Terms	Hits	Yields	Obtained
	“CBT” AND “pain” AND “treatment”	3899	0	0
	“CBT” AND “pain” AND “intervention”	3071	0	0
	“psychologically informed practice” AND “chronic pain” AND “management”	23	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehabilitation”	22	0	0
	“psychologically informed practice” AND “chronic pain” AND “rehab”	7	0	0
	“psychologically informed practice” AND “chronic pain” AND “treatment”	23	0	0
	“psychologically informed practice” AND “chronic pain” AND “intervention”	20	0	0
	“psychologically informed practice” AND “pain” AND “management”	30	0	0
	“psychologically informed practice” AND “pain” AND “rehabilitation”	28	0	0
	“psychologically informed practice” AND “pain” AND “rehab”	8	0	0
	“psychologically informed practice” AND “pain” AND “treatment”	30	0	0
	“psychologically informed practice” AND “pain” AND “intervention”	26	0	0
	“psychologically informed practice” AND “chronic pain” AND “treatment”	23	0	0
	“psychologically informed practice” AND “chronic pain” AND “intervention”	20	0	0
	“psychologically informed practice” AND “pain” AND “management”	30	0	0
	“psychologically informed practice” AND “pain” AND “rehabilitation”	28	0	0

Appendix C

Study Characteristics

Table 9. Study Characteristics

No.	Author/s	Year of Publication	Quality of Evidence	Research Methods	Population and Sample Size	Aims/ Purpose
1	Archer et al.	2018	High	Systematic Review	N/A	To understand the benefits of PIPT and training needed to deliver PIPT programs.
2	Ariza-Mateos et al.	2018	High	RCT	Women with chronic pelvic pain (n=49)	To explore the effects of a 6-week patient-centered graded exposure intervention added to manual therapy in women with chronic pelvic pain and fear of movement/(re)injury.
3	Aymerich et al.	2022	High	Qualitative (Descriptive)	Patients with pain for at least 3 months significantly impacting their functioning and quality of life	To explore patients' experiences of ACT-informed physiotherapy.
4	Ballengee et al.	2020	Medium	Pre-Post Study Design	First- and second-year Doctor of Physical Therapy (DPT) students (n=30)	To investigate if an educational intervention changes DPT student attitudes towards biopsychosocial approaches and improves adherence to psychologically informed communication.
5	Ballengee et al.	2021	High	Text and Opinion Study (Discussion Paper)	N/A	To discuss the current state of PIPT training and implementation and propose a roadmap for future implementation to increase delivery of PiP-informed approaches by physical therapists.
6	Beneciuk et al.	2019	High	Qualitative (Case Series)	High-risk patients for persistent LBP (n=23)	To describe treatment monitoring using psychological and physical impairment measures for patients at high-risk for persistent low back pain related disability.
7	Beneciuk et al.	2019	High	RCT	Outpatient physical therapists (n=471)	To describe the PIPT program developed for training physical therapists in PIPT. To assess if prompt referral to PIPT-trained physical therapists reduces chronic LBP progression 6 months later (primary outcome) and improves back-related function compared to guideline-based primary care.
8	Coronado et al.	2018	High	Systematic Review and	Patients (n=1127)	To summarize evidence on preoperative and postoperative PIPT for improving outcomes

Table 9. Study Characteristics

No.	Author/s	Year of Publication	Quality of Evidence	Research Methods	Population and Sample Size	Aims/ Purpose
				Research Syntheses		after degenerative spine, hip, or knee surgery.
9	Coronado et al.	2020	High	Systematic Review and Research Syntheses	Patients (n=20 to 588 across all studies)	To review studies comparing PIPT and manual therapy for treating musculoskeletal pain, aiming to optimize pain rehabilitation.
10	Coronado et al.	2020	High	RCT	Group members > 21 years old who underwent lumbar spine surgery and scored > 39 on the Tampa Scale for Kinesiophobia (TSK)	To examine whether the CBPT program improves postoperative pain, disability, and physical health through changes in fear of movement, pain catastrophizing, and pain self-efficacy.
11	Cowell et al.	2018	High	Qualitative (Observational Study)	Patients with non-specific CLBP	To explore the perceptions of physiotherapists in primary care in England using a biopsychosocial approach to manage non-specific CLBP.
12	Cowell et al.	2021	High	Qualitative (Observational Study)	Patients ranging from 19 to 68 years old (n=19)	To determine how physiotherapists obtain and respond to patient concerns with their questioning strategies.
13	Denneny et al.	2020	High	Qualitative (Observational Study)	Experienced physiotherapists (n=4)	To describe behaviors and techniques used by experienced physiotherapists working with groups of chronic pain patients.
14	Fernandez et al.	2021	High	Text and Opinion Study (Editorial)	N/A	N/A
15	Godfrey et. al	2020	High	RCT	Individuals with CLBP (n=248)	To compare physical therapy informed by ACT (PACT) against standard care physical therapy for patients with CLBP. To inform management of CLBP with potential benefits for patients, health care providers and society.
16	Gray et al.	2020	High	Text and Opinion Study (Discussion Paper)	N/A	N/A
17	Ingwersen et al.	2019	High	RCT	Adult patients aged 18-75 with shoulder complaints lasting at least 3 months (n=87)	To determine whether active exercise alone is inferior to PMT combined with standard therapy for shoulder pain.

Table 9. Study Characteristics

No.	Author/s	Year of Publication	Quality of Evidence	Research Methods	Population and Sample Size	Aims/ Purpose
18	Keefe et al.	2018	High	Text and Opinion Study (Perspective Paper)	N/A	To inform readers about PIP as a nonpharmacological pain management method, describe PIP approaches, suggest clinical practice applications, and outline future research areas
19	Lindberg et al.	2021	High	Qualitative (Study Protocol)	Patients (n=282)	To evaluate the efficacy of patient education and exercise therapy combined with iCBT for knee OA patients undergoing TKA surgery compared to standard care.
20	Simons et al.	2019	High	Qualitative (Study Protocol)	Adolescents with chronic musculoskeletal pain and their parent caregivers (n=74)	To offer a targeted intervention for youth with musculoskeletal pain to enhance return to function.
21	Stamp et al.	2018	High	Qualitative (Observational Study)	Individuals with shoulder pain (n=87)	To develop a theoretical account of the benefits of psychomotor therapy in addition to standard treatment for chronic shoulder pain.
22	You et al.	2021	High	RCT	Patients who completed a multidisciplinary program including pain psychology and physical therapy (n=28) Patients who completed a CBT-alone program (n=18)	To determine the effectiveness of CBT in treating chronic back pain.
23	Zhang et al.	2019	High	Systematic Review and Research Syntheses	N/A	To investigate the effectiveness of group-based physiotherapy-led behavioral psychological interventions (GPBPIs) on pain relief in adult patients with CLBP.

Table 10. Overview of PIPT interventions

No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
1	Archer et al.	USA	CBT-based physical therapy	Exercise	N/A	Multi-site	N/A	The effectiveness of PIPT for musculoskeletal conditions is promising but still developing. Studies show PIPT likely benefits LBP and has potential for knee pain. Barriers were encountered, thus, requiring standardized treatment manuals and training programs to reduce these obstacles.
2	Ariza-Mateos et al.	Spain	Graded exposure: Initial session on pain causes, mechanisms, acute vs. chronic pain, treatment strategies, and behavioral impact on pain. Patients were then gradually exposed to their 5 most fearful, personally important tasks.	Manual techniques Soft tissue mobilizations and myofascial release for 20 minutes Deep pressure massage for 15 minutes Muscle energy techniques for 10 minutes	6 weeks (Twice a week, 45 minutes) Additional 45 minutes to group who received graded exposure therapy	Outpatient	Fear-avoidance behavior Pain interference and severity Disability	Graded exposure therapy combined with manual therapy is more effective than manual therapy alone for chronic pelvic pain and fear of movement/(re)injury, maintaining long-term improvements in fear-avoidance behavior and physical functioning.
3	Aymerich et al.	UK	ACT: mindful movements such as yoga, tai chi, and qigong	Sporting activities: Table tennis, dance, cycling Daily activities: Walking, lifting, stairs	3 weeks (5 days per week; 2 hours daily)	Inpatient	N/A	Patients who experienced ACT-informed physiotherapy helped them live more and struggle less with pain.
4	Ballengee et al.	USA	CBT-based physical therapy: Value-based goal setting, Shared decision- making	N/A	4 weeks	Classroom	Pain attitudes and beliefs PIPT adherent behaviors Student reactions	The study highlighted the importance of teaching psychologically informed skills for pain management to physiotherapists through training. Benefits included improved confidence and communication skills, while barriers included comfort levels and limited learning time due to work schedules.
5	Ballengee et al.	USA	N/A	N/A	N/A	Outpatient	N/A	There is no general agreement on optimal delivery of PIPT training programs. While evidence shows PIPT's effectiveness for certain populations, implementation in

Table 10. Overview of PIPT interventions

No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
								everyday clinical care remains challenging. Barriers to PIPT implementation include lack of primary care referrals and policies limiting reimbursement for non-pharmacological treatments. Solutions require significant resource investment, and physiotherapists need training to integrate PIP approaches. The study guides new pain management approaches and calls for increased training programs.
6	Beneciuk et al.	USA	PIPT: Treatment monitoring	Physical impairment measures	4 weeks	Outpatient	Fear-Avoidance Beliefs Kinesiophobia Pain Fear of Daily Activities Treatment monitoring Disability	Better and consistent results were seen in patients with high-risk persistent low back pain during treatment monitoring compared to physical impairment measures.
7	Beneciuk et al.	USA	Internet-based psychological program	N/A	2 months	Virtually	Pain Attitudes and Beliefs	Improved beliefs and confidence in applying PIPT skills during clinical practice.
8	Coronado et al.	USA	N/A	N/A	3 months	Multi-site	N/A	No clear superiority of PIPT after surgery, but there is potential for further development in the surgical context.
9	Coronado et al.	USA	Graded Exposure CBT-based physical therapy ACT-based physical therapy Internet-based psychological programs and physical therapy	Manual Therapy Motor Control Exercises	3 months	Multi-site	Disability Pain intensity Physical function Bodily pain	Based on the study, PIPT is promising for short-term treatment of musculoskeletal pain, but standard physical therapy interventions remain superior, requiring further study to support widespread adoption.
10	Coronado et al.	USA	Changing Behavior through	N/A	6 weeks	Multi-site	Pain	Fear of movement and pain self-efficacy may be

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			Physical Therapy (CBPT)				Disability	key mediators in CBPT, aiding effective PIPT program development for treating patients.
11	Cowell et al.	Qatar	CBT-based physical therapy: Biopsychosocial Approach	Standard care	N/A	Outpatient	N/A	Physiotherapists valued the biopsychosocial approach for managing non-specific chronic low back pain but faced limitations in knowledge and time to address cognitive and emotional factors.
12	Cowell et al.	UK	CBT-based physical therapy	NA	NA	Outpatient	Orebro Musculoskeletal Pain Questionnaire (OMPQ) Roland and Morris Disability Questionnaire (RMDQ) STarTBack Screening Tool (SBT) Numerical rating scale (NRS)	This study shows their observations that physical therapists prioritized patient concerns, employing key verbal and non-verbal communication behaviors and validating concerns.
13	Denney et al.	UK	CBT-based physical therapy	Exercise based and did not include any manual therapy	NA	Outpatient	NA	This study describes behaviors and techniques used by experienced physiotherapists with chronic pain groups, complementing recommendations for delivering psychologically informed physiotherapy.
14	Fernandez et al.	Brazil	Internet-based psychological programs Biopsychosocial interventions, such as CBT, pain neuroscience education, graded exposure, and cognitive functional therapy, through telerehabilitation	Manual Therapy	N/A	Virtually	Performance of the functional activities Self-efficacy Pain-related distress and disability Catastrophizing Coping with pain Kinesiophobia	Whereas providing biomedical interventions was challenging during the pandemic, there is now an opportunity to consolidate biopsychosocial approaches via telerehabilitation for chronic musculoskeletal pain, beyond the pandemic.

Table 10. Overview of PIPT interventions

No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
15	Godfrey et. al	UK	Psychologically informed physical therapy	Standard Physical therapy care to patients with CLBP	(PACT) Two 60-minute face-to-face sessions 2 weeks apart conducted in a private room, plus one 20-minute telephone call 1 month later.	Outpatient	Physical Disability Depression Anxiety Functionality Pain	PACT participants had a clinically meaningful reduction of over 3 points on the RMDQ at 3 and 12 months; UC achieved a 2-point reduction at both intervals. PACT also showed greater improvements in pain-related interference at 3 but not 12 months. PACT was rated higher in credibility, had no major cost differences compared to UC, and showed reduced resource use over time in both groups. PACT had lower attrition and shorter total treatment time (2 hours vs. 3 hours for UC). No differences were observed in secondary outcomes, including pain, mood, self-efficacy, or ACT variables. PACT focused on daily functioning rather than pain reduction, explaining the lack of difference in pain outcomes. Depression and anxiety scores were below clinical cut-offs at baseline and minimally targeted, accounting for the lack of change in these measures.
16	Gray et al.	Australia	Graded exposure CBT-based physical therapy: Various psychological interventions that help to create and maintain the therapeutic space and that also support the physical dimension of the intervention.	Exercise: Engaging the child in tailored activities focused on their abilities, addressing symptoms without highlighting them. Activities are implemented gradually, with gentle progression supported by the therapist.	NA	Outpatient	NA	The physical dimension of physical therapy includes: managing lower limb weakness, abnormal movements, dizziness, starting therapy in bed, using aids for function, and preventing falls. The psychological dimension includes: active listening, shifting focus, encouraging healthy motor patterns, setting positive beliefs, goal setting, fostering mastery and control, using behavioral programs, and mind-body strategies for NES, pain, and panic attacks.
17	Ingwersen et al.	Denmark	PMT + AE. It consists of soft	Strengthening and stabilization	12 weeks	Inpatient	Primary: Pain and function of	In patients with chronic shoulder pain and low

Table 10. Overview of PIPT interventions

No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
			manual palpation of muscles, breathing and bodily awareness exercises	exercises for the GH joint which focuses on the rotator cuff and scapulothoracic muscles Posture correction Stretching exercises			the UE (through the Disabilities of the Arm, Shoulder and Hand [DASH] questionnaire) Secondary: Pain (through the Numeric Rating Scale)	body awareness, PMT showed no significant benefit over usual care exercise in terms of function and pain. PMT does not improve recovery beyond normal treatment.
18	Keefe et al.	USA	CBT-based physical therapy ACT-based physical therapy	N/A	N/A	Outpatient	N/A	N/A
19	Lindberg et al.	Norway	Internet-based psychological program	Strengthening exercises Functional exercises Stretching	24 months	Virtually	Pain (pain subscale of the Knee Injury and Osteoarthritis Outcome Score [KOOS]) Symptoms, ADL, QOL, sport and recreation (four individual subscales of KOOS) Pain intensity, sites, & interference with functioning (Brief Pain Inventory) Health-related QOL (EuroQol-5D-5L) Ability to forget about the knee (Forgotten Joint Score) Pain catastrophizing (Pain catastrophizing scale) Anchor	N/A

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No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
							measures of satisfaction (Patient acceptable symptom state; Treatment failure; global perceived effect)	
							Functional LE Test (30-s STS Test)	
							Sleep quality (Pittsburgh Sleep Quality Index)	
							Mood states (Hospital Anxiety and Depression Scale)	
							Pain-related fear of movement (Fear-Avoidance Belief Questionnaire)	
							Health locus of control (Health Locus of Control Scale)	
							Self-reported level of physical activity level and readiness for change (HUNT2, Stages of Change physical activity)	
							Digital health literacy (The eHealth Literacy Questionnaire)	
							Health literacy (The International Health Literacy Population	

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No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
							survey questionnaire 2019-2021)	
							Comorbidity (Self-administered comorbidity questionnaire)	
							Time in active position / number of steps – (ActiGraph Professional Single Axis accelerometer)	
							Physical function (40-m fast paced walk test)	
							Lower body strength and balance (Stair climb test)	
20	Simons et al.	USA	Graded exposure CBT-based physical therapy: GET Living (i.e., combined PT and Psychology) or Multidisciplinary Pain Management (MPM) (i.e., separate PT and Psychology).	Physical therapy consists of six sessions	The treatment phase consists of 12 sessions (1-h in duration twice a week or 2-h in duration once a week) over 6–8 weeks for a total of 32 months.	Outpatient	Pain-related fear avoidance Functional disability	Effective treatment for chronic pain likely requires focusing on mechanisms that perpetuate the persistent pain state, rather than treating all patients with chronic pain as ‘the same’.
21	Stamp et al.	Denmark	PMT: Inquiry dialogue + Manual therapy Inquiry dialogue: Patients' symptoms were understood from a biopsychosocial perspective, emphasizing body stress, pain awareness, posture, sleep, breathing, relaxation, and exercises. Manual therapy: Full body	Strengthening exercises: Glenohumeral joint (with focus on activation of rotator cuff muscles) and scapulothoracic muscles Stabilization exercises (rotator cuff muscles) Posture correction Stretching	12 weeks physical exercises 1-hour psychomotor therapy sessions once a week for 5 weeks (Lasting 25-30 minutes of inquiry dialogue; 25-30 minutes of manual therapy)	Outpatient	N/A	Psychomotor therapy was a new and better way of coping with the patients' shoulder pain however, the way patients acquire and utilize new knowledge from psychomotor therapy varies from patient to patient.

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No.	Author/s	Origin	PIPT Intervention	Conventional Intervention	Duration of Intervention	Setting	Outcomes	Relevant Key Findings
			massage with gentle touch and slight muscle stretching to engage the proprioceptive sensory system.	exercises				
22	You et al.	USA	CBT	Aerobic Exercises Resistance Exercises	Pain-CBT: 8 weeks BIA: 12 sessions	Outpatient	Pain catastrophizing scale Numerical Pain Rating Scale Patient-Reported Outcomes Measurement Information System	The study showed that CBT is promising. It is evident that pain catastrophizing, pain interference, fatigue, depression, anxiety, and social role satisfaction were improved after the pain-CBT program. Although this is the case, improvements were only seen once PT components were incorporated.
23	Zhang et al.	China	Group-based physiotherapy-led behavioral psychological interventions	Active treatments Waitlist and usual care	N/A	Outpatient	Pain: VAS; NRS; RMDS.	Primary findings indicate that group-based behavioral therapies involving a number of biopsychosocial model domains and administered by physiotherapists are superior to both standard care and other treatments in the long term at reducing pain in individuals with CLBP.

Table 11. Summary of Studies Discussing PIPT interventions

No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
1	Archer et al.	The Role of Psychologically Informed Physical Therapy for Musculoskeletal Pain	CBT-based physical therapy	Exercise	N/A	This article presents findings to understand the benefits of PIPT and training needed to deliver the PIPT program specifically to patients with musculoskeletal pain such as knee pain and spine pain. It shows the effectiveness of PIPT (pain coping strategies and exercise) for improving physical function. PIPT through different delivery styles can achieve positive improvement in clinical outcomes.	N/A	E, CE, B
2	Ariza-Mateos et al.	Effects of a Patient-Centered Graded Exposure Intervention Added to Manual Therapy for Women With Chronic Pelvic Pain: A Randomized Controlled Trial	Graded exposure	Manual therapy	Fear-avoidance behavior Pain interference and severity Disability	GET added to MT is effective for women with CPP and fear of movement/ (re)injury showing significant time group interaction effects. This approach results distinctly superior to MT alone in maintaining improvements for long-term fear-avoidance behavior and physical functioning.	Moreover, a longer follow-up period may be needed to detect longer-term changes. Future studies should include women with acute and sub-acute pain with elevated pain-related fear; as such individuals may have a higher likelihood of developing chronic pain.	E
3	Aymerich et al.	“Living more and struggling less”: a qualitative descriptive study of patient experiences of physiotherapy informed by Acceptance and Commitment Therapy within a multidisciplinary pain management programme	ACT	Sporting activities Daily activities	N/A	One overarching theme (living more and struggling less) and four interconnected themes were generated from the data: 1) awareness and openness help to approach physical activities flexibly; 2) from battling against to working with the body compassionately; 3) from narrow focus to curiosity, freedom, and expansion; and 4) social connection is a catalyst for openness and engagement.	This study has several limitations. Although conducting focus groups at post-treatment mitigated recall bias, participants’ responses may have been influenced by the goodbye effect, whereby they may tend to report overly positive improvements at post-treatment due to demand characteristics	CU
4	Ballengee et al.	Introduction of a psychologically informed educational	CBT-based physical therapy	N/A	Pain attitudes and beliefs PIPT adherent behaviors	A total of thirty (30) DPT students took part in an educational intervention which utilizes CBT as a pain	The study reported several limitations such as (1) no control group due to difficulty	B

Table 11. Summary of Studies Discussing PIPT interventions

No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
		intervention for pre-licensure physical therapists in a classroom setting			Student reactions	management. The study showed positive changes in students in regards with the pain attitudes and beliefs about this new approach. Also, results showed improvement in PIPT adherent behaviors and communication dealing with patients. Furthermore, benefits and barriers were reported as students' reactions to the educational intervention.	recruiting more participants in the middle of an active semester; (2) mostly female participants; (3) high dropout rate from the study; and (4) having low response rate in participating in the study.	
5	Ballengee et al.	Implementation of psychologically informed physical therapy for low back pain: Where do we stand, where do we go?	N/A	N/A	N/A	Huge interest in the biopsychosocial approach as a pain management specially for musculoskeletal conditions in a clinical setting. This study discussed the current state of PIPT implementation and road map for PIPT implementation. In the current state of PIPT implementation, physiotherapists were trained to deliver PiP interventions to patients. However, it was stated that there is no universal standard for PIPT and an effective way to introduce and apply it in everyday clinical settings. Several barriers and solutions were discussed in the study. In this new approach, physiotherapists can be the provider but with only proper trainings provided.	N/A	E, B
6	Beneciuk et al.	Treatment monitoring as a component of psychologically informed physical therapy: A case series of	PIPT	Physical impairment measures	Fear-Avoidance Beliefs Kinesiophobia Pain	FABQ-PA and PCS changes provided the largest contributions to prediction of 4-week ODI scores. Treatment monitoring measures did not explain additional variability in 4-week NPRS scores	Findings from this exploratory case series should be interpreted with caution based on its small sample size and lack of statistical power which prohibits	CU

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No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
		patients at high risk for persistent low back pain related disability			Fear of Daily Activities Treatment monitoring Disability	after baseline scores were considered.	definitive conclusions to be made on any of the treatment monitoring measures.	
7	Beneciuk et al.	Targeted interventions to prevent transitioning from acute to chronic low back pain in high-risk patients: development and delivery of a pragmatic training course of psychologically informed physical therapy for the TARGET trial	Internet-based psychological program	N/A	Pain Attitudes and Beliefs	A total of 134 (28.4%) course participants completed a web-based version of the PABS-PT 4 months after training with biomedical (25.4 ± 7.9) and behavioral (40.9 ± 4.4) scale scores observed; however, these data were de-identified which does not allow us to determine if sustained scores were maintained over a longer duration of time.	Treatment fidelity was not measured directly, which was a limitation in the training approach and will continue to be a struggle for future pragmatic trials that are charged with delivering interventions as part of routine clinical practice.	CU
8	Coronado et al.	Preoperative and postoperative psychologically informed physical therapy: A systematic review of randomized trials among patients with degenerative spine, hip, and knee conditions	N/A	N/A	N/A	Twelve articles representing 10 unique studies (total $N = 1,127$ patients, 636 (56.4%) females) in lumbar ($n = 7$) or cervical spine surgery ($n = 1$), total knee arthroplasty ($n = 1$), and total knee/hip arthroplasty ($n = 1$) were included. The most common PIPT components were coping skills training, psychoeducation, and positive reinforcement. Greater improvements following PIPT were reported in 5 (56%) studies for function/disability, 6 (60%) for pain, 5 (71%) for quality of life, and 7 (70%) for psychological factors. Of these, greater long-term benefit was reported in three studies for function/disability, two for pain or quality of life, and four for psychological factors.	N/A	E

Table 11. Summary of Studies Discussing PIPT interventions

No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
9	Coronado et al.	Psychologically informed physical therapy for musculoskeletal pain: current approaches, implications, and future directions from recent randomized trials	Graded Exposure CBT-based physical therapy ACT-based physical therapy Internet-based psychological programs and physical therapy	Manual Therapy Motor Control Exercises	Disability Pain intensity Physical function Bodily pain	The study presented that graded activity is not a superior approach for chronic low back pain compared to other forms of exercises. It also shows that, internet-based psychological programs provided to patients in physical therapy do not seem to contribute to better outcomes compared to physical therapy alone.	The researchers did not meta-analyze outcome data from our included studies and are unable to confirm efficacy of specific PIPT approaches. Despite our structured and comprehensive search strategy, we cannot confirm that we have identified all studies since 2011 meeting our eligibility criteria.	CU, B
10	Coronado et al.	Psychosocial Mechanisms of Cognitive-Behavioral-Based Physical Therapy Outcomes After Spine Surgery: Preliminary Findings From Mediation Analyses	CBPT	N/A	Pain Disability	The results of the article shows that fear of movement for disability and pain self-efficacy may have a significant role being mediators of CBPT wherein it could be important mechanism to consider when developing programs involving in PIPT.	Future work with the CBPT intervention should establish whether psychosocial changes in the first 6 months after surgery mediate long-term patient-reported outcomes following spine surgery. Future trials should consider how additional constructs mediate the effects of CBT-based interventions.	CU, E
11	Cowell et al.	Perceptions of physiotherapists towards the management of non-specific chronic low back pain from a biopsychosocial perspective: A qualitative study	CBT-based physical therapy	Standard care	N/A	Three main themes emerged: (1) physiotherapists recognized the multi-dimensional nature of NSCLBP and the need to manage the condition from a BPS perspective, (2) addressing psychological factors was viewed as challenging due to a lack of training and guidance, (3) engaging patients to self-manage their NSCLBP was seen as a key objective.	The purposive sampling method and small sample size limit the transferability of these findings.	B
12	Cowell et al.	Physiotherapists' Approaches to Patients' Concerns in Back Pain Consultations	CBT-based physical therapy	N/A	Orebro Musculoskeletal Pain Questionnaire (OMPQ) Roland and	Following a training program in CFT, we observed how physiotherapists were prepared to share control of the interactional agenda and	Future work might also consider including patients with higher levels of disability; this is a relatively small sample size and,	CU, E

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		Following a Psychologically Informed Training Program			Morris Disability Questionnaire (RMDQ) STarTBack Screening Tool (SBT) Numerical rating scale (NRS)	prioritize patients' concerns. The physiotherapists were responsive to patients' "talk," employing key verbal and NV communication behaviors to support patient disclosure and allow the exploration and validation of patients' concerns. This contrasts with recent studies that have consistently demonstrated a more physiotherapist-focused style of communication, including with the same physiotherapists prior to this training. This suggests that the communication behavior of physiotherapists may be amenable to change.	therefore, the findings discussed are suggestive of the possible types of practices employed by physiotherapists in real-life interactions	
13	Denneny et al.	The application of psychologically informed practice: observations of experienced physiotherapists working with people with chronic pain	CBT-based physical therapy	Exercise	N/A	The physiotherapists studied clearly demonstrated competences as outlined in the model for cognitive and behavioural therapy (CBT) practitioners in a clinical setting. They were able to identify and reflect on the skills, applied specifically to the needs and difficulties of people with chronic pain. This paper complements current recommendations for training physiotherapists which focus on development of a treatment manual, workshops, and supervision by experienced CBT practitioners, by providing examples of these skills being used in clinical practice.	Physiotherapists may have been influenced by the presence of cameras and the psychologist operating them, and made more conscious effort to display CBT competencies in their interactions with patients. Qualitative analysis is always subject to unconscious bias on the part of those who perform it, and the psychological background of the two researchers, one a reader in clinical, educational and health psychology and the other a psychology graduate, both of whom were known to the participants, doubtless informed understanding of the material. Additionally, while	CU

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							to a large extent spontaneous, the physiotherapist explanations of both behaviour and intentions might have been somewhat censored for better self-presentation. Thematic analysis was used as given the breadth of the phenomenon being studied a true phenomenological approach was not possible. Lastly, The N for this study is very small, partly because the researchers wished to be certain of the level of training and experience of our subjects, and partly because the methods themselves were very time-consuming for researchers and for physiotherapist participants.	
14	Fernandez et al.	Biopsychological approaches to telerehabilitation for chronic primary musculoskeletal pain: A real possibility for physical therapists, here to stay	Internet-based psychological programs	Manual Therapy	Performance of the functional activities Self-efficacy Pain-related distress and disability Catastrophizing Coping with pain Kinesiophobia	Whereas providing biomedical interventions is challenging during the pandemic, there is now an unprecedented opportunity to consolidate biopsychosocial approaches delivered through telerehabilitation as a useful treatment option for patients with chronic musculoskeletal pain well beyond the pandemic subsiding.	Telerehabilitation cognitive functional therapy has some limitations and strengths. Looking into the patients' eyes is an important aspect of clinical interactions. However, if the clinician focuses on the camera lens, it is not really possible to look at the patient's facial expression at the same time. Another challenge is related to performing components of a physical examination, which may require imagination to modify standard	B

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							examination techniques use to perform special tests or assess range of motion or strength. Because there is evidence that manual therapy can help but is not mandatory for patients with chronic pain, the main challenge of health professionals that deliver online interventions such as cognitive behavioral therapy, graded exposure, and cognitive functional therapy is to increase patients' expectations to adhere to a treatment without manual therapy.	
15	Godfrey et. al	Physical Therapy Informed by Acceptance and Commitment Therapy (PACT) Versus Usual Care Physical Therapy for Adults With Chronic Low Back Pain: A Randomized Controlled Trial	PACT	Standard physical therapy	Physical Disability Depression Anxiety Functionality Pain	PACT significantly improved participants' back pain disability at the primary end point of 3 months' follow-up compared to UC physical therapy, although effect sizes were small and not sustained at 12 months. PACT participants achieved a clinically meaningful reduction of over 3 points on the RMDQ at both 3 and 12 months compared to baseline levels; UC also achieved a clinically meaningful reduction of 2 points at 3 months and 12 months, where 2 to 3 points are generally judged to be clinically important. ²	PACT treatment was too brief, as it involved 1 hour less treatment than UC, and increasing the dose with additional sessions might help maintain benefits. Additional training and support materials might address these issues and could increase access to PACT. In addition, it might be fruitful to investigate if the advantages of PACT over UC are clearer in patients with greater disability or more psychosocial risk factors at baseline	E
16	Gray et al.	Psychologically Informed Physical Therapy for Children and Adolescents with Functional	Graded exposure Cognitive-Behavioral Based Physical Therapy	Exercise	N/A	Physical therapy is an important component of multidisciplinary treatment interventions for children presenting with FND. In this article, the researchers have provided an	N/A	CU

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No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
		Neurological Symptoms: The Wellness Approach				overarching therapeutic framework that melds general principles of physical therapy and an understanding of the psychological dimensions of pediatric FND.		
17	Ingwersen et al.	Effect of Psychomotricity in Combination With 3 Months of Active Shoulder Exercises in Individuals With Chronic Shoulder Pain: Primary Results From an Investigator-Blinded, Randomized, Controlled Trial	PMT + AE	Strengthening and stabilization exercises Posture correction Stretching exercises	Primary: Pain and function of the UE (through the Disabilities of the Arm, Shoulder and Hand [DASH] questionnaire) Secondary: Pain (through the Numeric Rating Scale)	In patients with chronic shoulder pain and poor body awareness, the findings indicated no additional benefit from PMT over standard care exercise treatment in terms of patient-reported function and discomfort. This result implies that, in comparison to standard care, PMT does not improve patients' recovery in terms of pain and active function.	A weakness of the current study was the lack of blinding of the treating physiotherapists, which could have impacted administration of exercise	CU
18	Keefe et al.	Advancing Psychologically Informed Practice for Patients with Persistent Musculoskeletal Pain: Promise, Pitfalls, and Solutions	CBT-based physical therapy ACT-based physical therapy	N/A	N/A	N/A	N/A	E, B
19	Lindberg et al.	The effectiveness of exercise therapy and education plus cognitive behavioral therapy, alone or in combination with total knee arthroplasty in patients with knee osteoarthritis - study protocol for the MultiKnee trial	Internet-delivered CBT	Strengthening exercises Functional exercises Stretching	Pain (pain subscale of the Knee Injury and Osteoarthritis Outcome Score [KOOS]) Symptoms, ADL, QOL, sport and recreation (four individual subscales of KOOS) Pain intensity, sites, & interference with functioning (Brief Pain	N/A	N/A	E, CU

Table 11. Summary of Studies Discussing PIPT interventions

No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
					Inventory)			
					Health-related QOL (EuroQol-5D-5L)			
					Ability to forget about the knee (Forgotten Joint Score)			
					Pain catastrophizing (Pain catastrophizing scale)			
					Anchor measures of satisfaction (Patient acceptable symptom state; Treatment failure; global perceived effect)			
					Functional LE Test (30-s STS Test)			
					Sleep quality (Pittsburgh Sleep Quality Index)			
					Mood states (Hospital Anxiety and Depression Scale)			
					Pain-related fear of movement (Fear-Avoidance Belief Questionnaire)			
					Health locus of control (Health Locus of Control Scale)			
					Self-reported level of physical activity level			

Table 11. Summary of Studies Discussing PIPT interventions

No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
					and readiness for change (HUNT2, Stages of Change physical activity)			
					Digital health literacy (The eHealth Literacy Questionnaire)			
					Health literacy (The International Health Literacy Population survey questionnaire 2019-2021)			
					Comorbidity (Self-administered comorbidity questionnaire)			
					Time in active position / number of steps – (ActiGraph Professional Single Axis accelerometer)			
					Physical function (40-m fast paced walk test)			
					Lower body strength and balance (Stair climb test)			
20	Simons et al.	Graded exposure treatment for adolescents with chronic pain (GET Living): Protocol for a randomized controlled trial enhanced with single case	Graded exposure CBT-based physical therapy	Physical therapy	Pain-related fear avoidance Functional disability	Providing a framework where multidisciplinary RCTs can be rigorously combined with single case experimental design (SCED) represents a critical step forward in the field and will enable an investigation of group differences in terms of efficacy and individual response patterns. The	N/A	CU, E

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		experimental design				results of this trial are expected to provide a model for future studies to adopt this research and statistical design and well as provide substantive findings regarding the effectiveness of graded in-vivo exposure for youth with chronic musculoskeletal pain.		
21	Stamp et al.	Denmark	PMT	Strengthening exercises Stabilization exercises Posture correction Stretching exercises	N/A	Data regarding loss of functioning in daily living appeared frequently, and the category “regaining capability” emerged as representative of the pattern of the participants’ behaviour. The analysis generated an explanatory framework of the pattern of behaviour in people with chronic shoulder pain.	A limitation of this study is that we only collected data from one clinical setting. To improve the theoretical model of regaining capability, we will need to extend the data collection to cover different clinical settings. Future research will need to clarify the transferability of this GT to other types of chronic pain. A second limitation of this study is that no interviews were performed with patients not receiving the additional psychomotor interventions, whereas the implications of the physiotherapist’s advice on posture and pain management cannot be withdrawn.	E
22	You et al.	USA	CBT-based physical therapy	Aerobic Exercises Resistance Exercises	Pain catastrophizing scale Numerical Pain Rating Scale Patient-Reported Outcomes Measurement Information System	Pain interference improved in both groups, yet physical function/mobility improved only after the BIA, highlighting the additional benefit of improving physical function by the PT inclusion program	Intent-to-treat analysis and an examination of the sleeper effect should be done in future research.	E

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No.	Author/s	Title	PIPT Intervention	Conventional Intervention	Outcomes	Summary	Limitations	Remarks
23	Zhang et al.	China	Group-based physiotherapy-led behavioral psychological interventions	Active treatments Waitlist and usual care	Pain: VAS; NRS; RMDS.	Long-term pain reduction in patients with CLBP is achieved more successfully with group-based behavioral therapies administered by physiotherapists that address a variety of biopsychosocial model domains than with standard care or alternative treatments.	The present study was not able to use appropriate statistics and has no adequate sample size	E